



Air Force Institute of Technology

Research Report 2014

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Graduate School of Engineering and Management

GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT
AIR FORCE INSTITUTE OF TECHNOLOGY
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

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AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

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Air Force Institute of Technology Research Report 2014 Foreword

Research programs at the Air Force Institute of Technology (AFIT) are an integral component of our research-based graduate education mission, and provide valuable technical and management experiences that enhance our graduates' performance throughout their careers. To maximize value, AFIT's research efforts are aligned with strategic priorities identified in guidance such as *America's Air Force: A Call to the Future* (2014), the United States Air Force Chief Scientist's report *Technology Horizons, A Vision for Air Force Science and Technology During 2010-2030*, and the *Air Force Science & Technology Strategy 2014*.

AFIT's Autonomy and Navigation Technology Center, Center for Cyberspace Research, Center for Directed Energy, Center for Operational Analysis, Center for Technical Intelligence Studies and Research, Center for Space Research and Assurance and other research groups serve as focal points for many of our research initiatives. Emerging research groups are addressing other game-changing technologies including hypersonics and human-machine systems.

AFIT has strategic partnerships with the Air Force Research Laboratory, the National Air and Space Intelligence Center, the Air Force Life Cycle Management Center, the United States Transportation Command, and many other organizations and operational communities to maximize the contributions of our research programs to national needs. Our faculty and students also engage in collaborations with researchers at universities throughout the nation to advance the state-of-the-art in a variety of disciplines. AFIT cooperates with commercial enterprises to ensure timely transfer of new technology to US industry through Cooperative Research and Development Agreements (CRADAs) whenever appropriate.

This Research Report is prepared annually to summarize the significant contributions of AFIT; to solicit continued involvement and support from our Air Force, DOD, and other federal partners; and to encourage new sponsors to participate in AFIT's research programs. AFIT welcomes new opportunities to engage in research projects that are of mutual interest to our customers, faculty, and students. Additional information is available at www.afit.edu/ENR/.

Heidi R. Ries, Ph.D.
Dean for Research
Graduate School of Engineering
and Management



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1. INTRODUCTION

1.1. OVERVIEW

This Research Report presents the FY14 research statistics and contributions of the Graduate School of Engineering and Management (EN) at AFIT. AFIT research interests and faculty expertise cover a broad spectrum of technical areas related to USAF needs, as reflected by the range of topics addressed in the faculty and student publications listed in this report. In most cases, the research work reported herein is directly sponsored by one or more USAF or DOD agencies.

AFIT welcomes the opportunity to conduct research on additional topics of interest to the USAF, DOD, and other federal organizations when adequate manpower and financial resources are available and/or provided by a sponsor. In addition, AFIT provides research collaboration and technology transfer benefits to the public through Cooperative Research and Development Agreements (CRADAs). Interested individuals may discuss ideas for new research collaborations, potential CRADAs, or research proposals with individual faculty using the contact information in this document or via the AFIT Directory at http://www.afit.edu/directory_search.cfm.

Additional information on the research programs at AFIT may also be found on the research web home page at <http://www.afit.edu/ENR/>. The Office of Research and Sponsored Programs, Graduate School of Engineering and Management can be reached at 937-255-3633, (DSN 785-3633) or by email: research@afit.edu. The primary points of contact are Dr. Michael J. Caylor, Director of Sponsored Programs, 937-255-3636 x7104, DSN 785-3636 x7104 and Dr. Heidi R. Ries, Dean for Research, 937-255-3636 x4544, DSN 785-3636 x4544.

1.2. THE GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT RESEARCH COLLABORATION

As detailed in the 2013-2014 catalog at <http://www.afit.edu/docs/20132014AFITcatalog.pdf>, AFIT offers Master's and Doctoral programs in a variety of disciplines through six departments: the Department of Aeronautics and Astronautics (ENY), the Department of Electrical and Computer Engineering (ENG), the Department of Engineering Physics (ENP), the Department of Mathematics and Statistics (ENC), the Department of Operational Sciences (ENS), and the Department of Systems Engineering and Management (ENV). In all of these disciplines, research is an integral component of graduate education, developing an individual student's skills and providing new knowledge of interest to many.

A brief listing of each department's research areas of emphasis appears below. Please contact the faculty or relevant departmental office for further information, or visit the Graduate School of Engineering and Management departmental websites at <http://www.afit.edu/en/>.

The [Department of Aeronautics and Astronautics](#) invites research topic proposals and collaborative suggestions for the Aeronautical Engineering, Astronautical Engineering, Materials Science, and Space Systems programs. The following list highlights the Department's research specialties:

Aeroelasticity and Design Optimization
Aerospace Structures and Materials
Autonomous Control of UAVs
Compact Combustor Development
Computational Fluid Dynamics
Control of High Performance Aircraft
Dynamic Flight Simulation
Experimental Fluid Dynamics
High Velocity Impact
Impact Dynamics
Inflatable Space Structures

Materials and Structural Analysis
Mechanics of Materials and Structures
Micro Air Vehicles
Non-Linear Dynamics
Re-entry Dynamics
Rocket & Space Propulsion
Rotorcraft Aeromechanics
Satellite Cluster Dynamics, Navigation, & Control
Spacecraft Dynamics & Control
Turbine Aerodynamics

The [Department of Electrical and Computer Engineering](#) invites research topic proposals and collaborative suggestions for the Electrical Engineering, Computer Engineering, Computer Science, Cyber Operations, and Cyber Warfare programs, as well as the **Autonomy and Navigation Technology Center** and the **Center for Cyberspace Research**. The following list highlights the Department’s research specialties:

Advanced Security-Focused Computing Architectures
Artificial Intelligence
Automatic Target Recognition
Communications/Radar
Computer Communication Networks
Cryptography
Cyber Operations and Security
Electromagnetics/Low Observables
Electro-Optics

Evolutionary Algorithms
Guidance, Navigation, and Control
Hardware Assurance
Information Visualization
Micro- and Nanosystems
Parallel and Distributed Processing
Signal and Image Processing
Software Protection
Wireless Networks
Wireless Sensor Networks

The [Department of Engineering Physics](#) invites research topic proposals and collaborative suggestions for the Applied Physics, Nuclear Engineering, Optical Sciences and Engineering, Materials Science (jointly operated with the Department of Aeronautics and Astronautics), and Combating Weapons of Mass Destruction programs, as well as the **Center for Directed Energy** and **Center for Technical Intelligence Studies and Research**. The following list highlights the Department’s research specialties within these programs:

Adaptive Optics, Aero-Optics and Beam Control
Atmospheric Characterization and Compensation
Atmospheric Effects on Weapons Systems
Atmospheric Electricity
Aviation Weather Forecasting
Biological and Chemical Weapon Technologies
Computational Physics
Defects in Crystalline Solids
Directed Energy Weapons Effectiveness
High Energy Density Physics
Imaging Science
Lasers and Electro-Optics
Muon Detection
Materials – Bio, Nuclear and Sensor
Microscopic Imaging of Surfaces
Modeling and Simulation of Atmospheric Effects

Molecular Reaction Dynamics
Nanomaterials
Nanomechanics
Nuclear Forensics
Nuclear Survivability
Nuclear Weapons Effects
Numerical Weather Prediction
Physics-Based Scene Modeling
Positron Spectrometry
Radiation and Particle Detection
Radiation Effects on Materials and Electronics
Radiation Transport
Remote Sensing and Signature Analysis
Satellite Meteorology
Semiconductors
Space Physics
Tropical Cyclone Analysis and Forecasting
Weather Radar

The [Department of Mathematics and Statistics](#) invites research topic proposals and collaborative suggestions for the following research specialties:

Acoustic Wave Scattering
Bayesian Analysis
Biostatistics
Categorical Data Analysis
Design of Experiments
Electromagnetics
Functional Analysis
Information Fusion

Nonlinear Waves
Numerical Analysis
Optimization
Partial Differential Equations
Rarefield Gas Dynamics
Regression Modeling
Stochastic Processes
Wavelets

The [Department of Operational Sciences](#), as well as its resident **Center for Operational Analysis**, invites research topic proposals and collaborative suggestions within the areas of Operations Research, Logistics, and Supply Chain Management programs. The following list highlights the Department's research specialties:

Advanced Research in Automatic Target Recognition	Repair Network Integration
Agile Combat Support Prioritization	Robust Decision Making
Facility Location Optimization	Science of Test Research Consortium
Force Structure Analysis Tool Development	Supply Chain Management
Irregular Warfare Model Development	Test and Evaluation of Autonomous Systems
Materials Research Test Planning	

The [Department of Systems Engineering and Management](#) is a multidisciplinary department offering graduate degrees in seven different majors and conducting research in collaboration with the wide spectrum of programs throughout AFIT. The mission of the department is to provide defense-focused graduate education and engage in interdisciplinary research to achieve integrated solutions to current and future Air Force challenges and enhance the interface between technology and human resources by focusing on systems, processes, and management. The following list highlights the Department's research specialties:

Applied Environmental Sciences	Information Assurance and Security
Computer and Network Security	Infrastructure Asset Management
Construction Management	Knowledge Management
Cost Analysis	Occupational/Environmental Exposures
Cyberlaw and Cyberwar	Organizational Change
Design and Analysis of Experiments	Product Design and Development
Ecological Engineering	Project Management
Facility and Infrastructure Management	Reliability Engineering
Fuels Microbiology	Strategic Decision Support
Geographical Information Science	Structural Health Monitoring
Human Systems Integration	Sustainability and Life Cycle Assessment
Image and Display Science	Systems Engineering

Another avenue for educational and research collaboration with the Graduate School of Engineering and Management is through association with one or more of **AFIT's Research Centers**. A brief listing of each Center's research or educational areas of emphasis appears below. Please contact the Centers directly (see Chapter 6) or visit <http://www.afit.edu/ENR/page.cfm> for further information.

The [Autonomy and Navigation Technology \(ANT\) Center](#) is a forward-looking research center seeking to identify and solve tomorrow's most challenging navigation and autonomous and cooperative control problems by focusing on three research thrusts: autonomous and cooperative systems, non-GPS precision navigation, and robust GPS navigation/NAVWAR.

The [Center for Cyberspace Research \(CCR\)](#) conducts cutting-edge research in all aspects of cyberspace operations, including offense/exploitation, network defense, vulnerability analysis, critical infrastructure protection, human factors, and reverse engineering. Under CCR's leadership, AFIT has been designated by the National Security Agency as a Center of Academic Excellence in Cyber Operations and in Information Assurance Research. AFIT/CCR also plays a prominent role in developing the Air Force's cyberspace operations workforce through execution of the Cyber 200 and Cyber 300 professional continuing education courses. Through these programs, AFIT/CCR helps produce a cadre of technically educated leaders for the DOD and Federal government. Finally, as the Air Force's Cyberspace Technical Center of Excellence, CCR faculty and staff advise Air Force and DOD leaders on issues related to force development, cyberspace education, and research activities.

The [Center for Directed Energy \(CDE\)](#) is dedicated to Air Force and DOD research in high energy lasers (HELs), high power microwaves (HPMs), and their enabling technologies. The Center is an advocate for transitioning these systems to the battlefield through vigorous scientific and engineering research, graduate education programs and diverse consulting activities.

The [Center for Operational Analysis \(COA\)](#) conducts defense-focused research and provides timely technology transfer to DoD sponsors. The center provides solutions to current and future operational challenges while developing critical and forward thinking analysts, managers, and leaders.

The [Center for Space Research and Assurance \(CSRA\)](#) is focused on delivering highly-valued resilient, responsive and reliable space capabilities to the DOD and Intelligence Community through executing cutting-edge space technology development, science and space experiments in collaboration with government organizations to meet the challenges of tomorrow by developing the technical space cadre through world-class research and immersive hands-on graduate education.

The [Center for Technical Intelligence Studies and Research \(CTISR\)](#) is focused on Air Force, Department of Defense and the U.S. Intelligence Community (IC)'s scientific, technical and operational activities through graduate research programs. Activities include remote sensing technologies, signature and algorithm development for target detection, clarification, and tracking, and advanced biometrics for force protection.

The **Center of Excellence (COE) for Scientific Test and Analysis Techniques (STAT) in Test & Evaluation (T&E)** is a reach-back T&E capability that provides advice and assistance in the application of scientific test and analysis techniques in the development of Test & Evaluation Master Plans (TEMP). The COE provides value to the PEOs/PMs across the Department of Defense through assistance provided to the Chief Developmental Tester (T&E Program Leads) during the T&E planning, execution and assessment. The COE provides an additional resource of subject matter expertise for the program managers and chief developmental testers of major defense acquisition program (MDAP) and Major Automated Information System (MAIS) during the T&E planning, execution, and assessment process.

2. SPECIAL RECOGNITIONS

2.1. FACULTY FELLOWS

Badiru, Adedeji B., Dean, Graduate School of Engineering and Management, Fellow of the Institute of Industrial Engineers, Fellow of the Nigerian Academy of Engineering.

Butts, Jonathan W., Maj, Fellow National Board of Information Security Examiners.

Bridgman, Charles J., Professor Emeritus of Nuclear Engineering, Department of Engineering Physics, Fellow of the American Nuclear Society.

Deckro, Richard F., Professor of Operations Research, Fellow of the Military Operations Research Society.

Elrod, William E., Professor Emeritus of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of American Society of Mechanical Engineers International.

Franke, Milton E., Professor Emeritus of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of the American Society of Mechanical Engineers.

Goltz, Mark N., Professor of Engineering and Environmental Management, Department of Systems Engineering and Management, Fellow of the Society of American Military Engineers.

Grimaila, Michael R., Professor and Head, Department of Systems Engineering and Management, Fellow of the Information System Security Association.

Hengehold, Robert L., Professor Emeritus of Physics, Department of Engineering Physics, Fellow of the American Physical Society.

Houpis, Constantine H., Professor Emeritus of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Institute of Electrical and Electronic Engineers.

Mall, Shankar, Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of the American Society of Mechanical Engineers International.

Maybeck, Peter S., Professor Emeritus of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Institute of Electrical and Electronic Engineers.

Nurre, Sarah G., Assistant Professor of Operations Research, Department of Operational Sciences, Fellow New Faculty Fellowship Program.

Pachter, Meir, Distinguished Professor of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Institute of Electrical and Electronic Engineers.

Palazotto, Anthony N., Distinguished Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of American Institute of Aeronautics and Astronautics, Fellow of the American Academy of Mechanics and the American Society of Civil Engineers; Fellow of the Engineering Mechanics Institute.

Perram, Glen P., Professor of Physics, Department of Engineering Physics, Fellow of the Directed Energy Professional Society.

Pignatiello, Joseph J., Professor and Head, Department of Operational Sciences, Fellow of the Institute of Industrial Engineers, Fellow of the American Society for Quality.

Polanka, Marc D., Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of the American Society of Mechanical Engineers International.

Raquet, John F., Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Institute of Navigation.

Ruggles-Wrenn, Marina B., Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of the American Society of Mechanical Engineers International.

Terzuoli, Andrew J., Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Electromagnetics Academy (FEMA).

Torvik, Peter J., Professor Emeritus of Aerospace Engineering and Engineering Mechanics, Department of Aeronautics and Astronautics, Fellow of the American Institute of Aeronautics and Astronautics, Life Fellow of American Society of Mechanical Engineers International, Fellow of the Ohio Academy of Science.

2.2. PROFESSIONAL CERTIFICATIONS

Ahner, Darryl K., Professional Engineer (Commonwealth of Virginia)

Badiru, Adedeji B., Certified Project Management Professional (PMP), Leadership Certificate (University of Tennessee Leadership Institute), Professional Engineer (State of Oklahoma)

Baldwin, Rusty O., Certified Information Systems Security Professional (CISSP), Professional Engineer (State of Ohio)

Bunker, David J., APDP Level III Certification – SPRDE, APDP Level II Certification – Program Management, APDP Level I Certification – Test and Evaluation

Butts, Jonathan W., Maj, Certified Information Systems Security Professional (CISSP), EC-Council Certified Ethical Hacker (CEH), Global Information Assurance Certification (GIAC) Security Essentials, National Security Agency Certificate for INFOSEC Professionals, National Security Agency Certificate for Senior Systems Managers

Coutu, Ronald A., Jr., Professional Engineer (State of California)

Cunningham, William A., Certified in Transportation and Logistics (CTL)

Dube, Thomas E., Maj, Certified Information Systems Security Professional (CISSP), EC-Council certified Security Analyst (ECSA)

Freels, Jason K., Maj, Systems Planning, Research, Development and Engineering (SPRDE) Certification, Level III

Golden, Eric M., Maj, APDP Level II Certification – SPRDE Science and Technology Manager, APDP Level II Certification – SPRDE Systems Engineer, APDP Level I Certification – Program Management

Goltz, Mark N., Board Certified Environmental Engineer (American Academy of Environmental Engineers), Professional Engineer (State of Minnesota)

Greendyke, Robert B., Professional Engineer (State of Texas)

Grimaila, Michael R., Certified Information Security Manager (CISM); Information Systems Audit and Control Association (ISACA); Certified Information System Security Professional (CISSP); International Information Systems Security Certification Consortium, Inc. (ISC)2; National Security Agency INFOSEC Assessment Methodology (IAM) Certification; National Security Agency INFOSEC Evaluation Methodology (IEM) Certification; National Security Agency 4011/4012/4013 Certification.

Hammond, Gregory D., Maj, Professional Engineer (State of North Carolina)

Harper, Willie F., Jr., Professional Engineer (State of Arizona)

***Houpis, Constantine H.**, Professional Engineer (State of Ohio)

Keefer, Kevin J., Lt Col (ret), APDP Level III Certification – Program Management, MASINT IR/SAR Professional

Kowash, Benjamin R., Maj, Professional Engineer, Nuclear Engineering (State of Michigan)

Kunz, Donald L., Professional Engineer (Commonwealth of Virginia)

Loper, Robert D., APDP Level II Certification – SPRDE, APDP Level II Certification – S&T Management, APDP Level I Certification – Program Management

Marciniak, Michael A., APDP Level II Certification – SPRDE, APDP Level II Certification – Program Management, APDP Level I Certification – Test and Evaluation, Certified Laser Safety Officer (Board of Laser Safety, Orlando, FL)

Mullins, Barry E., Assessing Wireless Networks (GAWN) Certification from the Sys Admin, Audit, Network, Security (SANS) Institute’s Global Information Assurance Certification (GIAC) Program, Certified Supervisory Control and Data Acquisition (SCADA) Security Architect (CSSA), Information Assurance Certification Review Board, National Security Agency INFOSEC Assessment Methodology (IAM) Certification, National Security Agency INFOSEC Evaluation Methodology (IEM) Certification, Professional Engineer (State of Colorado)

Overstreet, Robert E., Lt Col, Certified in Transportation & Logistics (CTL)

Palazotto, Anthony N., Professional Engineer (State of Ohio)

Perram, Glen P., Professional Engineer (State of Ohio)

Peterson, Gilbert L., ISC² Certified Cyber Forensics Professional (CCFP)

***Quinn, Dennis W.**, Professional Engineer, State of Ohio

Racz, LeeAnn, Maj, Professional Engineer (State of Colorado), Board Certified Industrial Hygienist, Board Certified Environmental Engineer

Reeder, Mark F., Professional Engineer (State of Ohio)

Ritschel, Jonathan, Lt Col, APDP Business-Cost Estimation Certification, Level II

Robinson, David J., Lt Col, Certified Information Systems Security Professional (CISSP)

Ruggles-Wrenn, Marina B., ASME Pressure Vessel and Piping Division, Certificate of Appreciation

Rutledge, James L., Maj, Professional Engineer (State of Texas)

Ryan, Erin T., Maj, Senior (Level 3) Space Professional, APDP Program Management Certification, Level III

Shelley, Michael L., Certified Air Force Hearing Conservationist

Stone, Brian B., Maj, Six Sigma Black Belt Certification, Arizona State University, Aug 2013; Certificate in Statistics, Arizona State University

Tuttle, Ronald F., APDP Level III Certification – Program Management, APDP Level III Certification – SPRDE

Valencia, Vhance V., Maj, Professional Engineering (State of North Carolina)

Yamamoto, Dirk, P., Lt Col, Certified Safety Professional (CSP)

*Emeritus faculty

RESEARCH AND TEACHING AWARDS

2.2.1. FACULTY

AHNER, DARRYL K.

2014 Council of Supply Chain Management Professionals E. Grosvenor Plowman Award.

AKERS, BENJAMIN F.

Ohio Magazine, Excellence in Education Award, Dec 2013.

BADIRU, ADEDEJI B.

Air Education and Training Command National Public Service Award.

BRIDGEMAN, CHARLES J.

Air Force Nuclear Weapons Center Order of the Nucleus.

BURGGRAF, LARRY W.

2013 AETC Nuclear Deterrence Operations Professional Team of the Year Award.

CHAMPAGNE, LANCE E., Lt Col

ENC Instructor of the Quarter, 2014 Winter Quarter.

COLOMBI, JOHN M.

2013 Department Researcher of the Year Award.

FICKUS, MATTHEW C.

ENC Instructor of the Quarter, 2013 Fall Quarter.

ENC Instructor of the Quarter, 2014 Spring Quarter.

FREELS, JASON K., Maj

The Lloyd S. Nelson Award: Awarded by the American Society for Quality (Statistics Division) - This award recognized the paper "Accelerated Test Methods for Reliability Prediction," by David H. Collins, Jason K. Freels, Aparna V. Huzurbazar, Richard L. Warr and Brian P. Weaver published in Journal of Quality Technology as the technical paper with the "Greatest Immediate Impact to Practitioners" for 2014.

HARPER, WILLIE F., Jr.

2013 Department Journal Publication of the Year.

HILL, RAYMOND R.,

SOCHE Outstanding Educator, Nov 2014.

JOHNSON, ALAN W.,

SIE Instructor Award for Outstanding Contributions to the Understanding of Management Sciences, Sigma Beta Chapter, Mar 2014

KOWASH, BENJAMIN R.

2013 AETC Nuclear Deterrence Operations Professional Team of the Year Award.

LIU, DAVID, Capt

2014 Best Student Paper Competition, 2nd Place – 2014 AIAA Region III Student Paper Conference, Apr 2014.

LUNDAY, BRIAN J., LTC

Indoctrinated into Omega Rho (Operations Research Honor Society), Feb 2014.

Dr. Leslie M. Thornton Teaching Excellence Award (AFIT Student Association), Mar 2014.

Faculty Member of the Year, Advanced School of Air Mobility (ASAM), Jun 2014.

MARTIN, RICHARD K.

2014 Air Force Outstanding Science and Engineering Educator Award.

MATHEWS, KIRK A., Maj

2013 AETC Nuclear Deterrence Operations Professional Team of the Year Award.

MCCLORY, JOHN W.

2013 AETC Nuclear Deterrence Operations Professional Team of the Year Award.

Ohio Magazine, Excellence in Education Honoree, Nov 2013.

MCHALE, STEPHEN R., LTC

2014 Southwest Ohio Council on Higher Education (SOCHE) Faculty Excellence in Teaching Award.

2013 AETC Nuclear Deterrence Operations Professional Team of the Year Award.

MULLINS, BARRY E.

Ohio Magazine, Excellence in Education Award, Nov 2013.

NURRE, SARAH G.

2014 ISERC Best Paper Award, Homeland Security Track, Jun 2014.

The Del and Ruth Karger Dissertation Prize for Outstanding DSES Thesis, Rensselaer Polytechnic Institute, Mar 2014.

OGDEN, JEFFREY A.

2014 Professor Ezra Kotcher Award, May 2014.

PERRAM, GLEN P.

2013 Air Force Outstanding Scientist/Engineer Award - Senior Civilian Category.

PETROSKY, JAMES C.

2013 AETC Nuclear Deterrence Operations Professional Team of the Year Award.

POLANKA, MARC D.

Ohio Magazine, Excellence in Education Award, Dec 2013.

RACZ, LEEANN, Lt Col

2013 Air Education and Training Command Educator of the Year Award.

2013 Military Officers Association of America AFIT Outstanding Military Faculty of the Year Award.

RAQUET, JOHN F.

The General Bernard A. Schriever Award, May 2014.

ROBBINS, MATTHEW J., Lt Col

2014 Outstanding Young OR/MS Award, INFORMS Cincinnati-Dayton Chapter, Aug 2014.

TUTTLE, RONALD F.

2013 AETC Nuclear Deterrence Operations Professional Team of the Year Award.

WARR, RICHARD L., Lt Col

Lloyd Nelson Award for the 2013 *Journal of Quality Technology* article with the “greatest immediate impact to practitioners,” 2014.

YAMAMOTO, DIRK P., Lt Col

2013 Department Faculty Scholar of the Year Award.

2013 Defense Education and Training (DETN) Broadcast Team of the Year, AFIT Civil Engineer School
WENV 220 Unit Environmental Coordinator (UEC) Satellite Course.

2.2.2. STUDENTS

BURGER, JOSHUA A.

2014 AFIT Louis F. Polk Award Winner.

DENEVE, ALLEN J.

Project Management Institute award, Mar 2014.

HOLDER, JOEL G.

2014 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Engineering Physics. Thesis title: "Polarimetric Calibration and Characterization of the Telops Field Portable Polarimetric-Hyperspectral Imager."

JABLONSKI, JAMES A.

2014 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Operational Sciences. Thesis title: "Reconstruction Error and Principal Component Based Anomaly Detection in Hyperspectral Imagery."

JEROSKI, JUSTINE D.

Best Paper in Human Factors and Ergonomics, Industrial and Systems Engineering Research Conference (ISERC), Jun 2014.

LEVENE, DAVID L.

2014 Chancellor's Award for the most exceptional master's thesis by a graduating student in the Department of Electrical and Computer Engineering. Thesis title: "An embedded, Programmable GPS Injection Jammer for Aircraft Testing and Aircrew Training."

MATACZYNSKI, MARK R.

2014 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Aeronautics and Astronautics. Thesis title: "Design and Simulation of a Pressure Wave Supercharger for a Small Two-Stroke Engine."

NEAL, CHARLES J.

2014 AFIT Systems Engineering Award.

NELSON, AARON A.

2014 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Mathematics and Statistics. Thesis title: "About Phase: Synthetic Aperture Radar and the Phase Retrieval."

PACK, ANDREW J.

Best Graduate Student Paper Award, Western Decision Sciences Institute Annual Meeting, Apr 2014.

PETTER, JACOB L.

International Cost Estimating and Analysis Association (ICEAA) award for the most outstanding thesis contribution to the cost community, Mar 2014.

QUINTON, MATTHEW J.

2014 American Institute of Aeronautics and Astronautics Dayton-Cincinnati Graduate Student Award for Research Excellence.

RECKER, MATTHEW C.

2014 American Nuclear Society AFIT Chapter Thesis Award.

SLAUGHTER, ROBERT C.

Best Student Paper, IEEE Advanced Imagery and Pattern Recognition Annual Workshop, Washington, DC, Oct 2013.

SUTHERLIN, JASON W.

Best Paper, Society of Flight Test Engineers 45th Annual International Symposium, Dayton, OH, Aug 2014.

SYNOVEC, THOMAS M.

2014 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Systems Engineering and Management. Thesis title: "Investigation on the Use of Equivalency Factors for the Design and Evaluation of Flexible Airfield Pavements."

3. RESEARCH STATISTICS

3.1. RESEARCH AND CONSULTING OUTPUT MEASURES

There are measurable indicators of AFIT's contribution to the engineering and scientific community and AFIT's success in staying well informed of technical possibilities and scientific opportunities. These indicators include the number and quality of technical publications accepted by the editors of journals; the number of presentations accepted for regional, national and international conferences; the number of sponsor funded research projects conducted; and finally, the number of student Graduate Research Papers, MS theses, and PhD dissertations completed and submitted to the Defense Technical Information Center. For FY14, these output measures are shown in Tables 3.1a and 3.1b for the Departments and Centers, respectively.

Table 3.1a Faculty Research and Sponsored Programs Output, by Department

	Graduate School, by Department						
	Graduate School (EN) Total	Math & Stats (ENC)	Electrical & Comp Eng (ENG)	Engineering Physics (ENP)	Operational Sciences (ENS)	Sys Eng & Management (ENV)	Aeronautics & Astro (ENY)
Number of Faculty (FTE)*	134	16	31	21	23	22	21
Refereed Publication Authorships**	238	44	51	47	31	40	25
Refereed Conferences on the Basis of Full Paper Review**	107	1	58	-	14	20	14
Refereed Conferences on the Basis of Abstract Review**	147	-	57	45	3	10	32
Sponsor Funded Projects***	206	6	72	45	22	14	46
Books & Chapters in Books**	25	-	11	1	-	13	-
Patents****	8	-	3	-	-	5	-
Doctoral Dissertations Advised	50	4	10	12	8	4	12
Master's Theses Advised	268	3	88	45	31	48	53
Graduate Research Papers Advised	16	-	-	-	16	-	-

*FTE: Full-time equivalent

**Publications/Presentations are counted by faculty authorships

***One project associated with the Office of Research and Sponsored Programs (ENR) is reflected in Graduate School (EN) Total

****Includes: Patents awarded, patent applications, and invention disclosures

Table 3.1b Faculty Research and Sponsored Programs Output, by Center

	Graduate School, by Center						
	Center Total	ANT	CCR	CDE	COA	CSRA	CTISR
Number of Affiliated Faculty*	105	24	23	8	22	21	7
Refereed Publication Authorships**	75	13	16	10	29	4	3
Refereed Conferences on the Basis of Full Paper Review**	42	9	17	-	14	2	-
Refereed Conferences on the Basis of Abstract Review**	45	14	2	18	2	7	2
Sponsor Funded Projects***	106	33	11	22	21	16	7
Books & Chapters in Books**	11	2	9	-	-	-	-
Patents	2	1	1	-	-	-	-
Doctoral Dissertations Advised	24	5	3	1	8	6	1
Master's Theses Advised	119	15	42	5	29	21	7
Graduate Research Papers Advised	16	-	-	-	16	-	-

*Some faculty are affiliated with multiple centers.

**Publications/Presentations are counted by faculty authorships.

***Four projects are shared by two centers, not reflected in the Center Total but credit given to both Centers.

3.2. RESEARCH AND CONSULTING SPONSORSHIP

As part of an Air Force institution, the faculty members of the Air Force Institute of Technology focus their research on current problems as well as future systems of the Air Force and other DOD organizations. Evidence of this focus is that 87% of all theses, dissertations, and graduate research papers listed in Table 3.1a are externally sponsored by Air Force, DOD and government agencies. In addition, most of the research projects and consultations are carried out for Air Force and DOD units. The data are summarized in Figure 3.1 and Table 3.2.

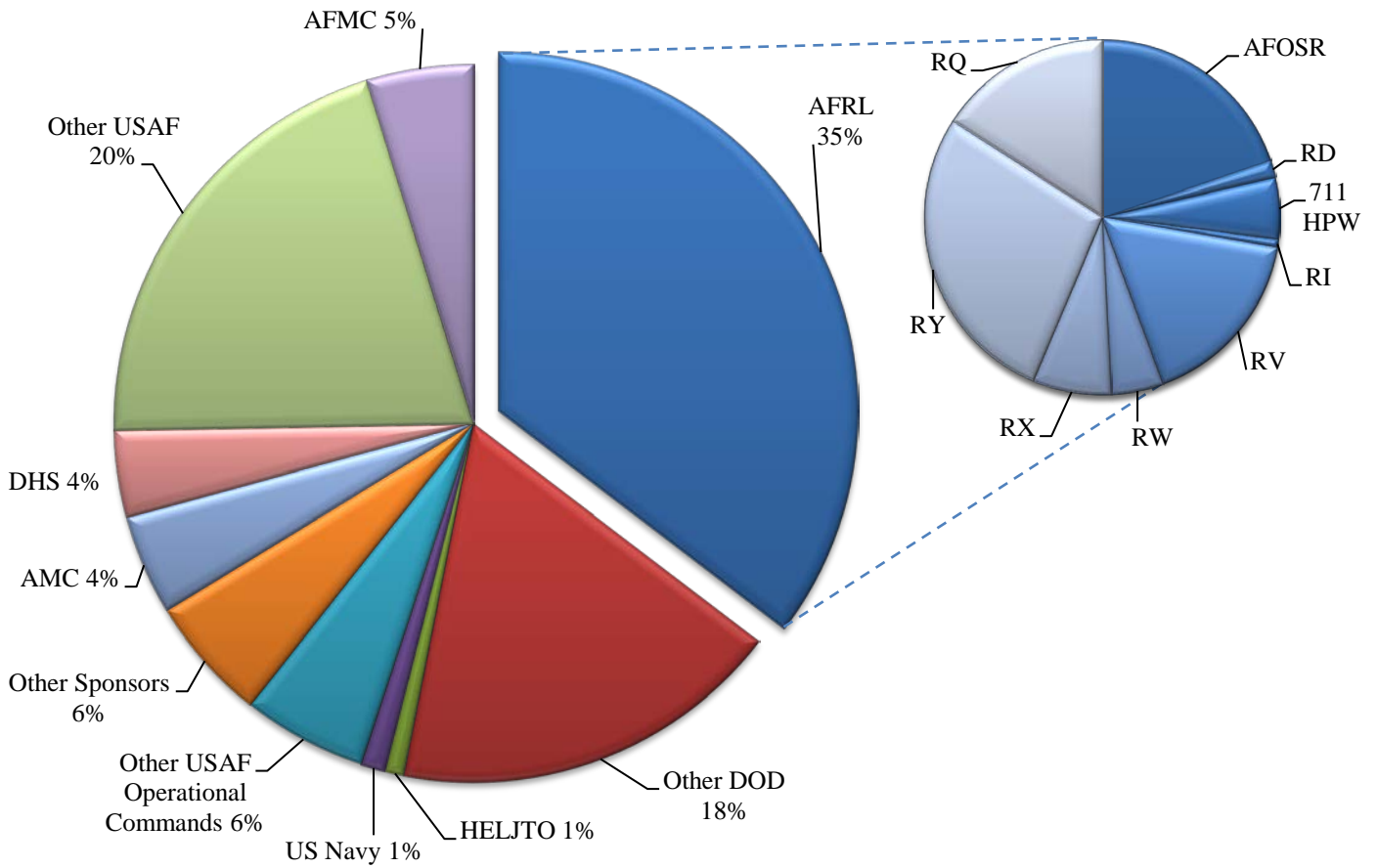


Figure 3.1 Sponsors of AFIT Theses, Dissertations, and Graduate Research Papers

Table 3.2 AFIT External Sponsorship by Organization

SPONSOR ORGANIZATION	PhD Dissertations	Master's Theses	Graduate Research Papers	Funded Projects
OFFICE OF THE SECRETARY OF THE AIR FORCE		2		1
HQ UNITED STATES AIR FORCE		5		
AIR COMBAT COMMAND		3		
AIR EDUCATION AND TRAINING COMMAND		1		
AIR FORCE MATERIEL COMMAND	1	3		3
46 th Test Group				1
746 th Test Squadron	1			1
Air Force Life Cycle Management Center		6		2
Air Force Nuclear Weapons Center	1	3		1
Air Force Research Laboratory (AFRL)				
711 Human Performance Wing (RH)	1	6		7
Air Force Office of Scientific Research (AFOSR)	9	16		35
Aerospace Systems Directorate (RQ)	7	13		11
Directed Energy Directorate (RD)		2		2
Information Directorate (RI)		1		1
Materials & Manufacturing Directorate (RX)	1	8		4
Munitions Directorate (RW)	1	5		9
Sensors Directorate (RY)	6	29		25
Space Vehicles Directorate (RV)	4	17		6
Air Force Seek Eagle Office		1		
Air Force Sustainment Center				2
Air Force Test Pilot School		1		1
AIR MOBILITY COMMAND		2	14	
AIR FORCE SPACE COMMAND				1
USAF FIELD OPERATING AGENCIES/DIRECT REPORTING UNITS				
Air Force Civil Engineer Center		6		1
Air Force Medical Operations Agency		1		
Air Force Medical Support Agency		3		
Air Force Technical Application Center				2
Air Force Weather Agency		4		
National Air and Space Intelligence Center		2		7
US Air Force Academy		1		
OTHER DEPARTMENT OF DEFENSE	1	14		16
Defense Advanced Research Projects Agency	1	2		4
Defense Acquisition University				1
Defense Information Systems Agency		1		1
Defense Threat Reduction Agency	2	15		5
High Energy Laser Joint Technology Office	1	2		5
Joint Chiefs of Staff		1		
Joint Warfare Analysis Center				2
Laboratory for Telecommunications Sciences	1	1		1
Missile Defense Agency				5
National Geospatial-Intelligence Agency				2
National Security Agency				4
Office of the Secretary of Defense	2	7		8
United States Army	1	4		6
United States Marine Corps				1
United States Navy	1	3		3
US European Command			1	
US Pacific Command			1	
US Strategic Command	1	1		1
US Transportation Command	2	4		1

*NOTE: Some student publications have multiple sponsors; See App B for Selected Acronym List

OTHER FEDERAL AGENCIES				
Department of Energy		5		2
Department of Homeland Security	1	13		2
Environmental Protection Agency		5		3
Lawrence Livermore National Laboratory	1			
Los Alamos National Laboratory		1		
National Aeronautics and Space Administration	1			
National Science Foundation				6
Oak Ridge National Laboratory		1		
NON-FEDERAL AGENCIES				
College of Performance Management		1		
Dayton Area Graduate Studies Institute				3
Locata		1		
Lockheed Martin		2		1
Riverside Research		1		
Turkish Air Force		1		
*TOTALS	48	227	16	206

3.3. EXTERNAL SPONSOR FUNDING FOR THE GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT

Many of the Graduate School of Engineering and Management’s theses and research projects completed under faculty supervision (sponsored or unsponsored) are funded in part by other Air Force, DOD and government units and agencies. Often, this funding results from collaboration between faculty and thesis sponsors and occurs when the research project can be leveraged by the purchase of equipment or services not otherwise available. Figure 3.2 summarizes the past ten fiscal years of sponsored funding. Tables 3.3 and 3.4, and Figure 3.3, summarize external funding for FY14.

Figure 3.2 New Award History FY05-FY14

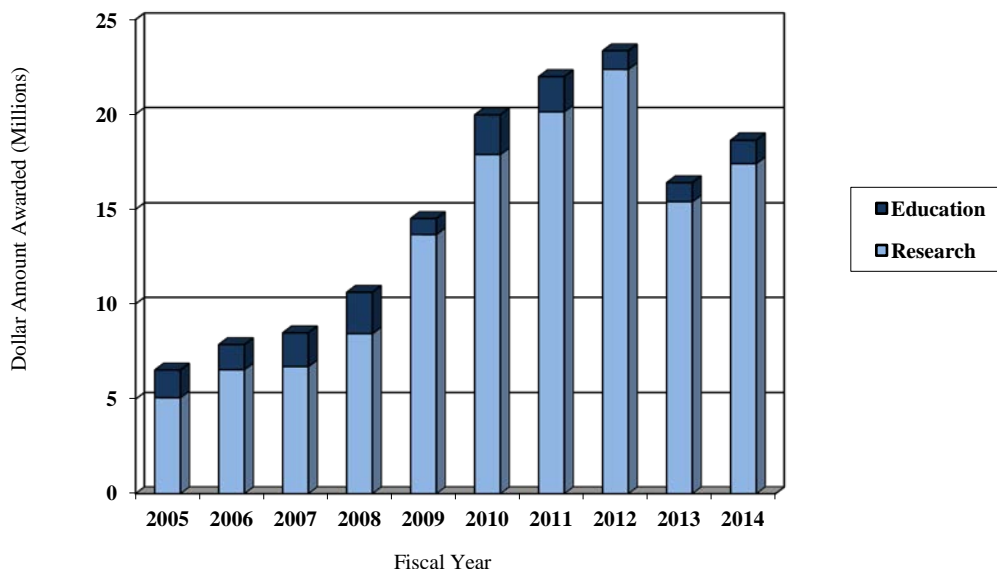


Table 3.3 FY14 External Funding & Research Expenditures for Academic Departments & Research Centers (\$1,000's)

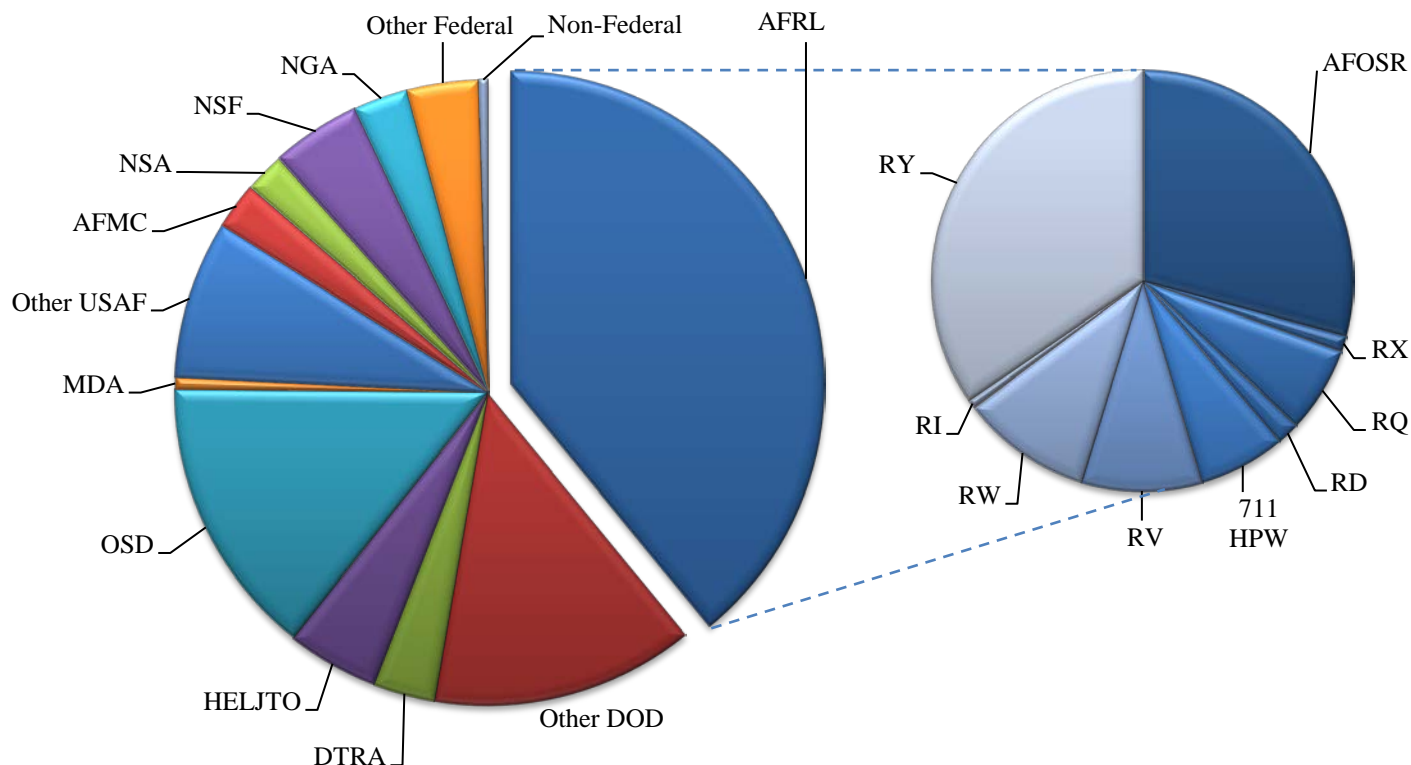
Department	Newly Awarded Research Projects		Newly Awarded Education Projects		Total FY14 Newly Awarded Projects		Total FY14 Research Expenditures
	#	\$k	#	\$k	#	\$k	\$k
Mathematics & Statistics (ENC)	5	318	1	13	6	331	334
Electrical & Computer Eng (ENG)	69	5,713	3	1,016	72	6,729	7,811
Engineering Physics (ENP)	44	4,144	1	9	45	4,153	5,630
Research & Sponsored Programs (ENR)	1	19	-	-	1	19	-
Operational Sciences (ENS)	17	4,028	5	145	22	4,173	3,923
Systems Eng & Management (ENV)	14	678	-	-	14	678	1,280
Aeronautical & Astronautical Eng (ENY)	44	2,522	2	50	46	2,572	4,583
TOTAL	194	17,422	12	1,233	206	18,655	23,561

Center	#	\$k	#	\$k	#	\$k	\$k
Autonomy and Navigation Technology (ANT)	30	3,104	-	-	30	3,104	3,677
Center for Cyberspace Research (CCR)	10	648	2	1,013	12	1,661	1,186
Center for Directed Energy (CDE)	22	2,128	1	9	23	2,137	2,544
Center for Operational Analysis (COA)*	17	3,953	5	145	22	4,098	3,790
Center for Space Research and Assurance (CSRA)	16	1,347	-	-	16	1,347	2,414
Center for Tech Intel Studies & Research (CTISR)	7	916	-	-	7	916	1,474
TOTAL	102	12,096	8	1,167	110	13,263	15,085

Notes: Total research expenditures reported include institutional cost sharing, which is not included in newly awarded projects. Numbers reported to the ASEE and NSF research expenditure surveys vary somewhat due to differences in definitions. All Center funds are also included in departmental funding.

*\$1.3M of STAT COE funding is captured under COA.

Figure 3.3 New FY14 Awards by Sponsor



*Pie Chart on the right shows breakdown by AFRL Technology Directorates

Table 3.4 New FY14 Awards to Academic Departments & Research Centers by Sponsor

Dept.	AFRL \$k	AFMC (Non-AFRL) \$k	Other USAF \$k	Other DOD \$k	NSF \$k	Other Federal \$k	Non- Federal \$k	Total \$k
ENC	316	-	-	-	15	-	-	331
ENG	3,683	140	331	1,508	842	225	-	6,729
ENP	1,424	-	460	1,992	-	266	11	4,153
ENR	19	-	-	-	-	-	-	19
ENS	385	275	460	3,053	-	-	-	4,173
ENV	212	-	32	230	10	194	-	678
ENY	1,254	40	236	966	-	-	76	2,572
TOTAL	7,293	455	1,519	7,749	867	685	87	18,655

Note: "Other DOD" in this table includes the DTRA, HELJTO, NGA, NSA, OSD, and MDA pie slices from Figure 3.3, plus funding from other DOD organizations.

Research Center

ANT	2,101	150	150	690	-	-	13	3,104
CCR	90	-	-	507	839	225	-	1,661
CDE	1,129	-	5	992	-	-	11	2,137
COA*	385	275	460	2,978	-	-	-	4,098
CSRA	532	-	187	628	-	-	-	1,347
CTISR	33	-	100	783	-	-	-	916
TOTAL	4,270	425	902	6,578	839	225	24	13,263

Note: All Center funds are also included in departmental funding.

*\$1.3M of STAT COE funding is captured under COA.

4. SPONSORSHIP OF STUDENT RESEARCH

4.1. OFFICE OF THE SECRETARY OF THE AIR FORCE

MASTER'S THESES

QUINTANILLA, JOSE A., *Department of Defense Operational Energy Strategy: A Content Analysis of Energy Literature from 1973-2014*. AFIT/ENS/14M-26. Faculty Advisor: Maj Joshua K. Strakos. Sponsor: SAF. [COA]

SUTHERLIN, JASON W., *Improving the Enterprise Requirements and Acquisition Model's Development Test and Evaluation Process Fidelity*. AFIT/ENV/14M-60. Faculty Advisor: Dr. John M. Colombi. Sponsor: SAF.

4.2. HEADQUARTERS UNITED STATES AIR FORCE

MASTER'S THESES

CHERRY, MATT J., *Empirical Analysis of Human Capital, Learning Culture, and Knowledge Management as Antecedents to Organizational Performance: Theoretical and Practical Implications for Logistics Readiness Officer Force Development*. AFIT/ENS/14M-02. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: HQ USAF/A4. [COA]

JONES, CHRISTOPHER M., *Value Focused Thinking Approach Using Multivariate Validation for Junior Enlisted Performance Reporting in the United States Air Force*. AFIT/ENS/14M-13. Faculty Advisor: Maj Jennifer L. Geffre. Sponsor: HQ USAF/A4. [COA]

RHOADS, JAMES D., *Optimizing Air Force Depot Programming to Maximize Operational Capability*. AFIT/ENS/14M-36. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: HQ USAF/A4. [COA]

STAHL, ADRIENNE L., *A Survey and Analysis of Aircraft Maintenance Metrics: A Balanced Scorecard Approach*. AFIT/ENS/14M-29. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: HQ USAF/A4. [COA]

TURNER, JONATHAN S., *A Methodology for Measuring Resilience in a Satellite-Based Communication Network*. AFIT/ENS/14M-31. Faculty Advisor: Dr. Richard F. Deckro. Sponsor: HQ USAF/A9.

4.3. AIR COMBAT COMMAND

MASTER'S THESES

ABEGAZ, YARED M., *Development of a Telemetry Data Analysis System for the MQ-1 Predator and MQ-9 Reaper Unmanned Aerial Systems*. AFIT/ENV/14M-01. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: ACC/556 TES.

BLOOM, GRANT R., *An Analysis of Total Force Integration in RED HORSE Organizations*. AFIT/ENV/14M-11. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: ACC/A7.

WORDEN, DANIEL R., *Connecting RED HORSE Squadron Personnel Unit Type Code Configuration to Capability Provided to Combatant Commanders*. AFIT/ENV/T/14J-30. Faculty Advisor: Col Paul Cotelleso. Sponsor: ACC.

4.4. AIR EDUCATION AND TRAINING COMMAND

AIR FORCE INSTITUTE OF TECHNOLOGY

DOCTORAL DISSERTATIONS

BATTERTON, KATHERINE A., *Statistical Inference on Optimal Points to Evaluate Multi-State Classification Systems*. AFIT/ENC/DS/14S-02. Faculty Advisor: Dr. Christine M. Schubert-Kabban. Sponsor: N/A.

GOLDEN, ERIC M., *Hyperfine Interactions in the Electron Paramagnetic Resonance Spectra of Point Defects in Wide-Band-Gap Semiconductors*. AFIT/ENP/DS/14S-07. Faculty Advisor: Dr. Nancy C. Giles. Sponsor: N/A.

VALENCIA, VHANCE V., *Network Interdependency Modeling for Risk Assessment on Built Infrastructure Systems*. AFIT/ENV/DS/13D-01. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: N/A.

MASTER'S THESES

ABBATE, EVELYN A., *Disaggregated Imaging Spacecraft Constellation Optimization with a Genetic Algorithm*. AFIT/ENY/14M-02. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A. [CSRA]

ABRAHAM, AMY M., *Combining Image Processing with Signal Processing to Improve Transmitter Geolocation Estimation*. AFIT/ENG/14M-01. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [ANT]

ALAMRI, MOHAMMAD, *Applying Lean to the F-15 Maintenance Process for the Royal Saudi Air Force*. AFIT/ENV/14M-03. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: N/A.

ALKHALDI, HUMOOD, *Integration of a Star Tracker and Inertial Sensors Using an Attitude Update*. AFIT/ENG/T/14S-16. Faculty Advisor: Dr. John F. Raquet. Sponsor: N/A. [ANT]

ALQAHTANI, MUFLIH, *Stochastic Prediction and Feedback Control of Router Queue Size in a Virtual Network Environment*. AFIT/ENG/T/14S-10. Faculty Advisor: LTC Robert J. McTasney. Sponsor: N/A. [CCR]

ALSUBAIE, FAWWAZ, *Multiple Signal Classification for Determining Direction of Arrival of Frequency Hopping Spread Spectrum Signals*. AFIT/ENG/14M-05. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [CCR]

ALT, ANTHONY T., *Analysis of Multi-User Environment Using RF-DNA*. AFIT/ENG/14M-06. Faculty Advisor: Dr. Robert F. Mills. Sponsor: N/A. [CCR]

ASPINWALL III, JON M., *Investigation of Helicopter Ground Resonance Subject to Nonlinear Energy Sink*. AFIT/ENY/14M-05. Faculty Advisor: Dr. Donald L. Kunz. Sponsor: N/A.

BALL, JUSTIN R., *Detection and Prevention of Android Malware Attempting to Root the Device*. AFIT/ENG/14M-08. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A.

BAUM, JAMES B., *Windows Memory Forensic Data Visualization*. AFIT/ENG/T/14J-01. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A. [CCR]

BERGER, ANDREW J., & MURPHY, CALEB S., *An Analysis of the Impact of Variation in Mean Time between Demand on Air Force Fleet Level Aircraft Parts Inventories*. AFIT/ENV/T/14J-21. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

BLACKFORD, JASON M., *Online Build-Order Optimization for Real-Time Strategy Agents Using Multi-Objective Evolutionary Algorithms*. AFIT/ENG/14M-13. Faculty Advisor: Dr. Gary B. Lamont. Sponsor: N/A.

BROUCH, EDWARD J., *Artificial Neural Network Prediction of Chemical-Disease Relationships Using Readily Available Chemical Properties*. AFIT/ENV/14M-12. Faculty Advisor: Dr. Willie F. Harper, Jr. Sponsor: N/A.

CHINERY, MARK B., *Using Sensor-Based Demand Controlled Ventilation to Realize Energy Savings in Laboratories*. AFIT/ENV/14M-16. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: N/A.

COPELAND, PATRICK T., *Using State Merging and State Pruning to Address the Path Explosion Problem Faced by Symbolic Execution*. AFIT/ENG/T/14J-03. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A. [CCR]

CRAWFORD, JAMES K., *Over the Air Interface Element Scanning and Debugging the Mobile Equipment to Subscriber Identity Module Interface*. AFIT/ENG/14M-20. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A. [CCR]

DIGIACOMO, WILLIAM J., *Feasibility Assessment of Repurposing an Aerial Radio Frequency Geolocation Sensor to the Space Environment*. AFIT/ENV/14M-16. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A. [CSRA]

DUFAUD, KYLE J., *An Experimental Evaluation of Image Quality for Various Scenarios in a Chromotomographic System with a Spinning Prism*. AFIT/ENP/14M-07. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: N/A. [CTISR]

FEIGH, STEVEN N., *Network Monitoring Traffic Compression Using Singular Value Decomposition*. AFIT/ENG/14M-27. Faculty Advisor: Dr. Kennard R. Laviers. Sponsor: N/A. [CCR]

FLAMM, BRADLEY M., *Extending Differential Fault Analysis to Dynamic S-Box Advanced Encryption Standard Implementations*. AFIT/ENG/T/14S-08. Faculty Advisor: Maj Thomas E. Dube. Sponsor: AF CyTCoE. [CCR]

GALLAGHER, DANIEL M., *Analysis of Effects of Sensor Multithreading to Generate Local System Event Timelines*. AFIT/ENG/14M-31. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A. [CCR]

GRANIER, SEAN V., *Counter-Chemical Weapons Concept of Operations (C-CW CONOPS) Alternative Protection Scenario (APS) Study*. AFIT/ENV/14M-27. Faculty Advisor: Maj Gregory D. Hammond. Sponsor: N/A.

GRENGA, ANTHONY J., *Android Based Behavioral Biometric Authentication via Multi-Modal Fusion*. AFIT/ENG/T/14J-05. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A. [CCR]

HARTZELL, STEPHEN D., *Non-Linear Optimization Applied to Angle-of-Arrival Satellite-Based Geolocation*. AFIT/ENG/T/14J-07. Faculty Advisor: Dr. Andrew J. Terzuoli. Sponsor: N/A.

HELINE, TIFFANY R., *Field Evaluation of Solvent-Free Sampling with Di-n-butylamine for the Determination of Airborne Monomeric and Oligomeric 1,6-Hexamethylene Diisocyanate*. AFIT/ENV/14M-29. Faculty Advisor: Lt Col Dirk P. Yamamoto. Sponsor: N/A.

HIGBEE, JEREMY M., *A Quantification of the 3D Modeling Capabilities of the KinectFusion Algorithm*. AFIT/ENG/14M-40. Faculty Advisor: Maj Brian G. Woolley. Sponsor: N/A. [ANT]

KEEFER, JORDAN S., *Improving Statistical Machine Translation through N-best List*. AFIT/ENG/14M-43. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: N/A.

KHAN, UMAR M., *Optimal Partitioning of a Surveillance Space for Persistent Coverage Using Multiple Autonomous Unmanned Aerial Vehicles: An Integer Programming Approach*. AFIT/ENS/14M-16. Faculty Advisor: Dr. James W. Chrissis. Sponsor: N/A. [COA]

KING, DAVID W., Jr., *Complexity, Heuristic, and Search Analysis for the Games of Crossings and Epaminondas*. AFIT/ENG/14M-44. Faculty Advisor: LTC Robert J. McTasney. Sponsor: N/A.

KULESZA, NICHOLAS J., *Radio Frequency Fingerprinting Techniques through Preamble Modification in IEEE 802.11b*. AFIT/ENG/T/14J-08. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: N/A. [CCR]

LAMBACH, JACOB L., *Integrating UAS Flocking Operations with Formation Drag Reduction*. AFIT/ENV/14M-01DL. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

LAY, JOSEPH R., *Air Force Inspection System: An Application for System-of-Systems (SOS) Engineering*. AFIT/ENV/T/14J-25. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

LEWIS, TYRONE A., *An Artificial Neural Network-Based Decision-Support System for Integrated Network Security*. AFIT/ENG/T/14S-09. Faculty Advisor: Maj Brian G. Woolley. Sponsor: N/A. [CCR]

MACANDREW, MICHAEL V., *Analysis of Biological Weapon Spread through a Transportation Network*. AFIT/ENS/14M-19. Faculty Advisor: Dr. Richard F. Deckro. Sponsor: N/A.

MARSHALL, SEAN R., *A Model to Guide Development of Environmental Final Governing Standards for Overseas United States Department of Defense Installations*. AFIT/ENV/14M-37. Faculty Advisor: Dr. Willie F. Harper, Jr. Sponsor: N/A.

MARTY, JOSEPH A., *Vulnerability Analysis of the MAVLink Protocol for Command and Control of Unmanned Aircraft*. AFIT/ENG/14M-50. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: N/A. [CCR]

MEISER, DANIEL M., *Calibrated Model for Point Source Spectroscopy*. AFIT/ENP/14J-42. Faculty Advisor: Dr. Michael T. Eismann. Sponsor: N/A [CDE]

MITCHELL, KURT A., *Characterizing the Effects of Sensor Degradation on SOSI Network Performance*. AFIT/ENY/14M-54. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A. [CSRA]

MOTE, ERIC W., *Characterizing and Optimizing the Performance of the MAESTRO 49-core Processor*. AFIT/ENG/14M-55. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: N/A.

MURPHY, CALEB S., See BERGER, ANDREW J.

MURPHY, WILLIAM E., *Large Scale Hierarchical K-Means Based Image Retrieval with MapReduce*. AFIT/ENG/14M-56. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: N/A.

MYERS, MICHAEL M., *Outperforming Game Theoretic Play with Opponent Modeling in Two Player Dominoes*. AFIT/ENG/14M-57. Faculty Advisor: Dr. Brett J. Borghetti. Sponsor: N/A.

NELSON, AARON A., *About Phase: Synthetic Aperture Radar and the Phase Retrieval Problem*. AFIT/ENC/14M-03. Faculty Advisor: Capt Dustin G. Mixon. Sponsor: N/A.

PAL, RAJAN, *Microelectromechanical Systems (MEMS) for Hall Effect Thruster Plume Characterization*. AFIT/ENG/14M-60. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: N/A.

PENNINGTON, JASON R., *Scalable System Design for Covert MIMO Communications*. AFIT/ENG/DS/14J-05. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [CCR]

PERHAI, ANDREA E., *Enhanced Polarimetric Radar Imaging Using Cross-Channel Coupling Constraints*. AFIT/ENG/T/14J-09. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: N/A.

PONDER, REBECCA L., *An Analysis of Insulated Concrete Forms for Use in Sustainable Military Construction*. AFIT/ENV/14M-51. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: N/A.

RAYNOR, ROBERT A., *Range Finding with a Plenoptic Camera*. AFIT/ENP/14M-29. Faculty Advisor: Col Karl C. Walli. Sponsor: N/A. [CTISR]

ROJAS, LUIS S., *Simulated Assessment of Interference Effects in Direct Sequence Spread Spectrum (DSSS) QPSK Receiver*. AFIT/ENG/14M-64. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [CCR]

RUTHERFORD, NICHOLAS A., *Blind Demodulation of Pass Band OFDMA Signals and Jamming Battle Damage Assessment Utilizing Link Adaptation*. AFIT/ENG/14M-65. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [CCR]

STEBELTON, KAREN J., *A System Concept for Detecting Suicide Warning Signs in Social Media*. AFIT/ENG/T/14S-15. Faculty Advisor: Dr. Robert F. Mills. Sponsor: N/A. [CCR]

STILSON, CHRISTOPHER L., *Contact Resistance Evolution and Degradation of Highly Cycled Micro-Contacts*. AFIT/ENG/14M-73. Faculty Advisor: Dr. Ronald A. Coutu. Sponsor: N/A.

SWEETNICH, STEPHEN R., *Integration, Testing, and Analysis of Multispectral Imager on Small Unmanned Aerial System for Skin Detection*. AFIT/ENV/14M-70. Faculty Advisor: Dr. David R. Jacques. Sponsor: N/A.

TERVO, RYAN L., *Comparative Analysis of Reconstructed Image Quality in a Simulated Chromotomographic Imager*. AFIT/ENP/14M-35. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: N/A. [CTISR]

THORNTON, ISSAC J., *Development of Adaptive Tilt Tracker that Utilizes QUAD-cell Detector to Track Extended Objects*. AFIT/ENG/14M-78. Faculty Advisor: Lt Col James A. Louthain. Sponsor: N/A.

WALES, JESSE G., *Analysis of a SCADA System Anomaly Detection Model Based on Information Entropy*. AFIT/ENS/14M-32. Faculty Advisor: Maj Jennifer L. Geffre. Sponsor: N/A. [COA]

WERLING, KAITLIN A., *Enhancing Operational Transition Opportunity of RF-DNA Fingerprinting Using Commercial Satcom Systems*. AFIT/ENG/14M-82. Faculty Advisor: Dr. Michael A. Temple. Sponsor: N/A. [CCR]

ZIEGLER, KYLE K., *Selectively Tuning a Buckled Si/SiO₂ Membrane MEMS through Joule Heating Actuation and Mechanical Restriction*. AFIT/ENG/14M-88. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: N/A

4.5. AIR FORCE MATERIEL COMMAND

DOCTORAL DISSERTATIONS

KELLEHER, CLAYTON T., *Dynamic Bayesian Networks as a Probabilistic Metamodel for Combat Simulations*. AFIT/ENS/DS/14S-20. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMC/A9. [COA]

MASTER'S THESES

BREWER, JAMES J., *The Differential Vector Phase-Locked Loop for Global Navigation Satellite System Signal Tracking*. AFIT/ENG/DS/14J-02. Faculty Advisor: Dr. John F. Raquet. Sponsor: 746 TS. [ANT]

LITCHFIELD III, ARTHUR R., *Optimizing the Disposition and Retrograde of United States Air Force Class VII Equipment from Afghanistan*. AFIT/ENS/14M-18. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMC/OC-ALC. [COA]

SHEPPARD, WESLEY A., *Simulating F-22 Heavy Maintenance and Modifications Workforce Multi-Skilling*. AFIT/ENS/14M-28. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFMC/A4. [COA]

SONYA, SOLOMAN Y., *A New Secured Distributed-Access Protection System To Secure Data Within Enterprise Networks and Enhance Next Generation Data Loss Prevention Paradigms*. AFIT/ENG/14M-71. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: HQ AFMC. [CCR]

AIR FORCE LIFE CYCLE MANAGEMENT CENTER

MASTER'S THESES

BURGER, JOSHUA A., *Interface Evaluation for Open System Architectures*. AFIT/ENV/14M-14. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFLCMC.

ERICKSON, BRYNGEL J., *Simulation Modeling of Advanced Pilot Training: The Effects of a New Aircraft Family of Systems*. AFIT/ENS/14M-05. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFLCMC. [COA]

FRAWLEY, TIMOTHY D., *Application of a Multi-Objective Network Model to a Combat Simulation Game: "The Drive on Metz" Case Study*. AFIT/ENS/14M-08. Faculty Advisor: Dr. James W. Chrissis. Sponsor: AFLCMC. [COA]

JENSEN, JACOB C., *KC-46 Workforce Requirements for Depot Maintenance Activation*. AFIT/ENS/14M-12. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFLCMC. [COA]

KIM, JOSEPH S., *Exploring a Method to Quantitatively Measure Design Flexibility Early in the Defense Acquisition Life Cycle*. AFIT/ENV/14M-32. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFLCMC.

WILSON, DAVID J., *Tailoring Systems Engineering for Rapid Acquisition*. AFIT/ENV/14M-69. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFLCMC.

AIR FORCE NUCLEAR WEAPONS CENTER

DOCTORAL DISSERTATIONS

SINGLETON, BRIANA J., *Radiation Effects on Ytterbium-Doped Optical Fibers*. AFIT/ENP/DS/14J-15. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

MASTER'S THESES

BABIS, BRIAN W., *Analysis of Preheated Starting Length Convection Effects on Military Aircraft Skins Subjected to Simulated Thermal Assault*. AFIT/ENY/14M-06. Faculty Advisor: Maj James L. Rutledge. Sponsor: AFNWC.

MARCUM, CHELSEA C., *Measurements of DNA Damage and Repair in Bacillus Anthracis Sterne Spores by UV Radiation*. AFIT/ENP/T/14S-01. Faculty Advisor: Dr. Larry W. Burggraf. Sponsor: EPA/NHSRC & AFNWC.

TRYON, TIMOTHY A., *Nuclear Thermal Effects Analysis on Operational Aircraft*. AFIT/ENP/14M-37. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

AFRL: 711th HUMAN PERFORMANCE WING

DOCTORAL DISSERTATIONS

PARR, JEFFREY C., *A Method to Develop Neck Injury Criteria to Aid Design and Test of Escape Systems Incorporating Helmet Mounted Displays*. AFIT/ENV/DS/14S-22. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

MASTER'S THESES

CAIN, LINDSAY R., *Feature Selection on Hyperspectral Data for Dismount Skin Analysis*. AFIT/ENG/14M-15. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: 711 HPW/RH.

CHAN, ALICE W., *An Assessment of Normalized Difference Skin Index Robustness in Aquatic Environments*. AFIT/ENG/14M-17. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: 711 HPW/RH.

DENEVE, ALLEN J., *A Macro-Stochastic Approach to Improved Cost Estimation for Defense Acquisition Programs*. AFIT/ENV/14M-20. Faculty Advisor: Lt Col Erin T. Ryan. Sponsor: 711HPW/RH.

JEROSKI, JUSTINE D., *Physiological Investigation of Localized Temperature Effects on Vigilance Performance*. AFIT/ENV/14M-30. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

TUNG, KALYN A., *An Analysis of Eye Movements with Helmet Mounted Displays*. AFIT/ENV/14M-67. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

YEOM, JENNIFER S., *Textile Fingerprinting for Dismount Analysis in the Visible, Near, and Shortwave Infrared Domain*. AFIT/ENG/14M-86. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: 711 HPW/RH.

AFRL: AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

DOCTORAL DISSERTATIONS

BUENTELLO HERNANDEZ, RODOLFO G., *3D Finite Element Modeling of Sliding Wear*. AFIT/ENY/DS/13D-06. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

DOYLE, DANIEL D., *Real-Time, Multiple, Pan/Tilt/Zoom, Computer Vision Tracking, and 3D Position Estimating System for Small Unmanned Aircraft System Metrology*. AFIT/ENY/DS/13D-08. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFOSR. [ANT & CSRA]

GEYER, ANDREW J., *Different Formulations of the Orthogonal Array Problem and Their Symmetries*. AFIT/ENC/DS/14J-16. Faculty Advisor: Dr. Dursun A. Bulutoglu. Sponsor: AFOSR.

GLAUVITZ, NATHAN E., *MEMS Cantilever Sensor for THz Photoacoustic Chemical Sensing and Spectroscopy*. AFIT/ENG/DS/13D-03. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

GREENWELL, BRANDON M., *Topics in Statistical Calibration*. AFIT/ENC/DS/14M-01. Faculty Advisor: Dr. Christine M. Schubert-Kabban. Sponsor: AFOSR.

HARRIS, THOMAS R., *A Systematic Study of the Optical and Electrical Properties of $Ge_{1-x}Sn_x$ and $Ge_{1-x}Si_xSn_y$ Semiconductor Alloys*. AFIT/ENP/DS/14M-04. Faculty Advisor: Dr. Yung Kee Yeo. Sponsor: AFOSR.

PAEK-SPIDELL, GRACIE Y., *Analysis of Heat Partitioning During Sliding Contact at High Speed and Pressure*. AFIT/ENC/DS/14M-02. Faculty Advisor: Dr. William P. Baker. Sponsor: AFOSR.

SPENCER, MARK F., *The Scattering of Partially Coherent Electromagnetic Beam Illumination from Statistically Rough Surfaces*. AFIT/ENG/DS/14J-07. Faculty Advisor: Maj Milo W. Hyde. Sponsor: AFOSR. [CDE]

VAN DYK, GREGORY K., *Muon Concentration and Spectrometry for Muon Catalyzed Fusion Experiments*. AFIT/ENP/DS/13D-03. Faculty Advisor: Dr. Larry W. Burggraf. Sponsor: AFOSR.

MASTER'S THESES

ADORNO-RODRIGUEZ, RUBEN, *Nonlinear Structural Analysis of an Icosahedron and its Application to Lighter than Air Vehicles under a Vacuum*. AFIT/ENY/14M-03. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

ALBAN, CHRISTOPHER J., *Thermal and Melt Wear Characterization of Materials in Sliding Contact at High Speed Energy Sink*. AFIT/ENY/14M-04. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

BARAJAS, EDUARDO, *Radio Frequency (RF) Responses and Material Characterization of Germanium Telluride (GeTe) and Germanium Antimony Telluride (GST)*. AFIT/ENG/14M-09. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

BRINKER, ANDREW J., *Liquid Spray Characterization in Flow Fields with Centripetal Acceleration*. AFIT/ENY/14M-09. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR.

CAVALLARO, GREG V., *A Study of Slipper and Rail Wear Interaction at Low Speed*. AFIT/ENY/T/14J-31. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

CROSSER, MATTHEW P., *Improved Dictionary Formation and Search for Synthetic Aperture Radar Canonical Shape Feature Extraction*. AFIT/ENG/14M-21. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFOSR.

DAMELE, CHRISTOPHER J., *Operational Characteristics of an Ultra Compact Combustor*. AFIT/ENY/14M-13. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR.

DANELLA, THEA S., *Identifying High-Traffic Patterns in the Workplace with Radio Tomographic Imaging in 3D Wireless Sensor Networks*. AFIT/ENG/14M-24. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFOSR. [ANT & CCR]

FLYNN, MATTHEW S., *Salient Feature Identification and Analysis Using Kernel-Based Classification Techniques for Synthetic Aperture Radar Automatic Target Recognition*. AFIT/ENG/14M-30. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFOSR.

GARDUNO, ELI A., *Characterization and Mitigation of Resistive Losses in a Large Area Laser Power Converter*. AFIT/ENP/14M-09. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFOSR.

HELLER, JASON C., *Feasibility of Very Large Sparse Aperture Deployable Antennas*. AFIT/ENY/14M-24. Faculty Advisor: Dr. Alan L. Jennings. Sponsor: AFOSR. [CSRA]

LYONS, KATHERINE B., *A Recommender System in the Cyber Defense Domain*. AFIT/ENG/14M-49. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFOSR. [CCR]

MIRANDA, JOSE L., *The Use of an Ultra-Compact Combustor as an Inter-Turbine Burner for Improved Engine Performance*. AFIT/ENY/14M-38. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR.

NEWBERRY, RICHARD A., *Microelectromechanical Systems (MEMS) Photoacoustic (PA) Detector of Terahertz (THz) Radiation for Chemical Sensing*. AFIT/ENG/14M-58. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

QUINTON, MATTHEW J., *Optimization of Graphene Sensors to Detect Biological Warfare Agents*. AFIT/ENP/14M-42. Faculty Advisor: LTC Douglas R. Lewis. Sponsor: AFOSR.

RADEMACHER, RICHARD W., *Bayesian Methods and Confidence Intervals for Automatic Target Recognition of SAR Canonical Shapes*. AFIT/ENG/14M-62. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFOSR.

AFRL: AEROSPACE SYSTEMS DIRECTORATE

DOCTORAL DISSERTATIONS

ALBINALI, SALMAN A., *Structural Health Monitoring System Trade Space Analysis Tool with Consideration for Crack Growth, Sensor Degradation and a Variable Detection Threshold*. AFIT/ENV/DS/14S-23. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RQ.

AL ROMAIHI, MOHAMED M., *Advanced Composite Air Frame Life Cycle Cost Estimating*. AFIT/ENS/DS/14J-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AFRL/RQ. [COA]

COX, GEOFFREY S., *Experimental Uncertainty Associated with Traveling Wave Excitation*. AFIT/ENY/DS/14S-26. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFRL/RQ.

DELUCA, ANTHONY M., *Aerodynamic Performance and Particle Image Velocimetry of Piezo Actuated Biomimetic *Manduca sexta* Engineered Wings towards the Design and Application of a Flapping Wing Flight Vehicle*. AFIT/ENY/DS/13D-01. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: AFRL/RQ.

GREINER, NATHAN J., *Convective Heat Transfer with and without Film Cooling in High Temperature, Fuel Rich and Lean Environments*. AFIT/ENY/DS/14S-28. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

HARLEY, JACOB L., *Development of Imaging Fourier-Transform Spectroscopy for the Characterization of Turbulent Jet Flames*. AFIT/ENP/DS/14S-13. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: AFRL/RQ.

STEVENS, CHRISTOPHER A., *Development of a Detonation Diffuser*. AFIT/ENY/DS/14M-05. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

MASTER'S THESES

KAISER, JENNIFER N., *Effects of Dynamically Weighting Autonomous Rules in a UAS Flocking Model*. AFIT/ENV/T/14S-06. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFRL/RQ.

LIBER, MEI-LING, *Measurement and Image Processing Techniques for Particle Image Velocimetry Using Solid-Phase Carbon Dioxide*. AFIT/ENY/14M-32. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: AFRL/RQ.

LIVERMORE, RILEY A., *Optimal UAV Path Planning for Tracking a Moving Ground Vehicle with a Gimbaled Camera*. AFIT/ENY/14M-33. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RQ. [ANT]

MATACZYNSKI, MARK R., *Design and Simulation of a Pressure Wave Supercharger for a Small Two-Stroke Engine*. AFIT/ENY/14M-34. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

MCGAHAN, CHRISTOPHER J., *Utilizing Near-IR Tunable Laser Absorption Spectroscopy to Study Detonation and Combustion Systems*. AFIT/ENP/14M-22. Faculty Advisor: Col Brian A. Tom. Sponsor: AFRL/RQ. [CDE]

MERRICK, JUSTIN D., *Influence of Mach Number and Dynamic Pressure on Cavity Tones and Freedrop Trajectories*. AFIT/ENY/14M-36. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: AFRL/RQ.

NEAL, CHARLES J., *Feasibility of Onboard Processing of Heuristic Path Planning and Navigation Algorithms within SUAS Autopilot Computational Constraints*. AFIT/ENV/14M-44. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFRL/RQ.

RITTENHOUSE, JOSHUA A., *Thermal Loss Determination for a Small Internal Combustion Engine*. AFIT/ENY/14M-41. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

ROWTON, ALEX K., *Measuring Scaling Effects in Small Two-Stroke Internal Combustion Engines*. AFIT/ENY/T/14J-36. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

SHEWART, ANDREW T., *Minimization of the Effects of Secondary Reactions on Turbine Film Cooling in a Fuel Rich Environment*. AFIT/ENY/14J-37. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

THOMAS, JASON W., *A Method of Surrogate Model Construction which Leverages Lower-fidelity Information using Space Mapping Techniques*. AFIT/ENY/14M-46. Faculty Advisor: Lt Col Jeremy S. Agte. Sponsor: AFRL/RQ.

WAKEFIELD, STEPHEN D., *Development and Characterization of a High Speed Mid-IR Tunable Diode Laser Absorption Spectrometer for CO and CO₂ Detection in Detonation Events*. AFIT/ENP/14M-38. Faculty Advisor: Col Brian A. Tom. Sponsor: AFRL/RQ. [CDE]

WILKINSON, MICHAEL P., *Mechanical Properties and Fatigue Behavior of Unitized Composite Airframe Structures at Elevated Temperature*. AFIT/ENY/14M-05. Faculty Advisor: Dr. Marina B. Ruggles-Wrenn. Sponsor: AFRL/RQ.

AFRL: DIRECTED ENERGY DIRECTORATE

MASTER'S THESES

JOSE, FRANKLIN N., *Isolation of Speckle for Target-in-the-Loop Coherent Beam Combining*. AFIT/ENG/T/14J-40. Faculty Advisor: Maj Milo W. Hyde. Sponsor: AFRL/RD.

WYMAN, JASON E., *A Method for Detection and Correction of Stair Mode across an Optical Phased Array*. AFIT/ENG/14M-85. Faculty Advisor: Maj Milo W. Hyde. Sponsor: AFRL/RD.

AFRL: INFORMATION DIRECTORATE

MASTER'S THESES

MEEKER, RICHARD A., *Mapping Computer Network Topologies*. AFIT/ENG/14M-53. Faculty Advisor: Maj Thomas E. Dube. Sponsor: AFRL/RI. [CCR]

AFRL: MATERIALS AND MANUFACTURING DIRECTORATE

DOCTORAL DISSERTATIONS

JACKSON, HELEN C., *Effect of Variation of Silicon Nitride Passivation Layer on Electron Irradiated Aluminum Gallium Nitride/Gallium Nitride HEMT Structures*. AFIT/ENP/DS/14J-17. Faculty Advisor: Dr. Nancy D. Giles. Sponsor: AFRL/RX.

MASTER'S THESES

ALLEN, BRANDON M., *Finite Element Analysis Modeling of Chemical Vapor Deposition of Silicon Carbide*. AFIT/ENP/T/14J-38. Faculty Advisor: Dr. Alex G. Li. Sponsor: AFRL/RX.

AMACK, DANIEL C., *Waste-to-Energy Decision Support Method for Forward Deployed Forces*. AFIT/ENV/14M-05. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: AFRL/RX.

ANDERSON, MUNSON J., *Carbon Allotrope Dependence on Temperature and Pressure during Thermal Decomposition of Silicon Carbide*. AFIT/ENG/14M-07. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/RX.

BERTRAND, DUSTIN J., *Ceramic Matrix Characterization under a Gas Turbine Combustion and Loading Environment*. AFIT/ENY/14M-08. Faculty Advisor: Dr. Shankar Mall. Sponsor: AFRL/RX.

HILBURN, SKYLER R., *Experimental Investigation of Mechanical Behavior of an Oxide/Oxide Ceramic Composite in Interlaminar Shear and Under Combined Tension-Torsion Loading*. AFIT/ENY/14M-26. Faculty Advisor: Dr. Marina B. Ruggles-Wrenn. Sponsor: AFRL/RX.

KORTH, HANS G., *Investigation of the Potential for FTIR as a Nondestructive Inspection Technique for Aircraft Coating Degradation*. AFIT/ENP/14M-19. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFRL/RX.

OPIE, NATHANIEL P., *A Comparison of Afghanistan, Yuma, Az, and Manufactured Sands Melted on EB-PVD Thermal Barrier Coatings*. AFIT/ENY/T/14S-18. Faculty Advisor: Lt Col Timothy C. Radsick. Sponsor: AFRL/RX.

WESTING, NICHOLAS M., *Carbon Nanotube Growth Rate Regression using Support Vector Machines and Artificial Neural Networks*. AFIT/ENG/14M-83. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: AFRL/RX.

AFRL: MUNITIONS DIRECTORATE

DOCTORAL DISSERTATIONS

LINDHOLM, GARRISON J., *Closed-Loop Control of Constrained Flapping Wing Micro Air Vehicles*. AFIT/ENY/DS/14M-02. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RW. [ANT]

MASTER'S THESES

BROWN, ZACHARY R., *Experimental Characterization of Wings for a Hawkmoth-Sized Micro Air Vehicle*. AFIT/ENY/14M-10. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: AFRL/RW.

PNG, JASON, *Simulation Platform for Vision Aided Inertial Navigation*. AFIT/ENV/T/14S-14. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RW. [ANT]

SOEDER, JUSTIN T., *Image-Aided Navigation Using Cooperative Binocular Stereopsis*. AFIT/ENG/14M-70. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RW. [ANT]

TILLMAN, BRETT D., *Two and Three-Dimensional Computational Study of Shock Ignition Phenomena*. AFIT/ENY/14M-47. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: AFRL/RW.

WOODSIDE, DUSTIN C., *A Computational Investigation of Localized Critical Ignition Energy of Mesoscale Explosives*. AFIT/ENY/14M-52. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: AFRL/RW.

AFRL: SENSORS DIRECTORATE

DOCTORAL DISSERTATIONS

EVANS, JONATHAN W., *Iron-Doped Zinc Selenide: Spectroscopy and Laser Development*. AFIT/ENP/DS/14M-01. Faculty Advisor: Dr. Nancy C. Giles. Sponsor: AFRL/RX.

GIVENS, RYAN N., *Automated Synthetic Scene Generation*. AFIT/ENP/DS/14S-08. Faculty Advisor: Col Karl C. Walli. Sponsor: AFRL/RX. [CTISR]

PATEL, HIREN J., *Advances in SCA and RF-DNA Fingerprinting through Enhanced Linear Regression Attacks and Application of Random Forest Classifiers*. AFIT/ENG/DS/14S-03. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RX. [CCR]

ROGERS, NEIL G., *Nondestructive Electromagnetic Characterization of Uniaxial Materials*. AFIT/ENG/DS/14S-05. Faculty Advisor: Dr. Michael J. Havrilla. Sponsor: AFRL/RX.

STRINGER, JEREMY P., *Development of a Resource Manager Framework for Adaptive Beamformer Selection*. AFIT/ENG/DS/13D-01. Faculty Advisor: Lt Col Geoffrey Akers. Sponsor: AFRL/RX.

VONGSY, KARMON M., *Removing Parallax-Induced False Changes in Change Detection*. AFIT/ENG/DS/14M-01. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RX.

MASTER'S THESES

- AGBEYIBOR, RICHARD C., *Secure ADS-B: Towards Airborne Communications Security in the Federal Aviation Administration's Next Generation Air Transportation System*. AFIT/ENG/14M-02. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: AFRL/R.Y. [CCR]
- BEAN, MATTHEW A., *Chirp Reduction in Non-Isolated Quantum-Well Semiconductor Lasers under Optical Injection*. AFIT/ENG/14M-12. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/R.Y.
- BONDY, JAMES M., *Structural Characterization of Atomically Thin Hexagonal Boron Nitride via Raman Spectroscopy*. AFIT/ENP/14M-02. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFRL/R.Y.
- CRUZ, JESSE B., *Comparison of Image Processing Techniques Using Random Noise Radar*. AFIT/ENG/14M-22. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/R.Y. [ANT]
- DOWDEN, RYAN M., *Process Development for the Fabrication of Spheroidal Microdevice Packages Utilizing MEMS Technologies*. AFIT/ENG/14M-26. Faculty Advisor: Maj Derrick Langley. Sponsor: AFRL/R.Y.
- GRAHAM, JEFFREY J., *Hydrothermal Crystal Growth of Lithium Tetraborate and Lithium γ -Metaborate*. AFIT/ENP/14M-12. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFRL/R.Y.
- HENNESSEY, ETHAN S., *Opportunistic Access in Frequency Hopping Cognitive Radio Networks*. AFIT/ENG/14M-38. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/R.Y. [CCR]
- HEROLD, MATTHEW L., *Selective Dry Etch for Defining Ohmic Contacts for High Performance ZnO TFTs*. AFIT/ENG/14M-39. Faculty Advisor: Maj Derrick Langley. Sponsor: AFRL/R.Y.
- HOGGARD, ROBERT J., *Passive Interferometric Synthetic Aperture Radar Using a Two Transmitter Baseline*. AFIT/ENG/T/14S-18. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFRL/R.Y.
- JABLONSKI, JAMES A., *Reconstruction Error and Principal Component Based Anomaly Detection in Hyperspectral Imagery*. AFIT/ENS/14M-11. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/R.Y. [COA]
- KEBEDE, BEMNET, *Characterization of the Pyroelectric Properties of AlN Thin Films Using MEMS Structures for Infrared Sensing Applications*. AFIT/ENG/14M-42. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFRL/R.Y.
- KRONES, RUSSELL P., *Design, Fabrication and Testing of Two Dimensional Radio Frequency Metamaterials*. AFIT/ENG/14M-45. Faculty Advisor: Maj Derrick Langley. Sponsor: AFRL/R.Y.
- LATCHU, TRISTAN A., *Characterization and Performance Comparison of Low-Voltage, High-Speed, Push-Pull and Traveling-Wave Silicon Mach-Zehnder Modulators*. AFIT/ENG/14M-48. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/R.Y.
- LEVENE, DAVID L., *An Embedded, Programmable GPS Injection Jammer for Aircraft Testing and Aircrew Training*. AFIT/ENG/14M-89. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/R.Y. [ANT]
- MCGUIRE, JONATHAN D., *Radio Frequency Distinctive Native Attribute (RF-DNA) Fingerprinting Applied to Commercial SatCom Short Burst Data Modems*. AFIT/ENG/14M-51. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/R.Y. [CCR]

- MEDVE, CURTIS C., *Estimation and Coordination of Sequence Patterns for Frequency Hopping Dynamic Spectrum Access Networks*. AFIT/ENG/14M-52. Faculty Advisor: LTC Robert J. McTasney. Sponsor: AFRL/RV. [CCR]
- MOORE, KRISTY L., *Salient Feature Selection Using Feed-Forward Neural Networks and Signal-to-Noise Ratios with a Focus toward Network Threat Detection and Risk Level identification*. AFIT/ENS/14M-22. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/RV. [COA]
- NEGRETTE, JOSE F., *Broadband Modulation Spectroscopy Simulation and Demonstration*. AFIT/ENP/14M-26. Faculty Advisor: Dr Michael R. Hawks. Sponsor: AFRL/RV.
- RAMSTAD, ROGER J., *Integrated Air Defense System Scan Rate Exploitation and Exploratory Research via Adaptive Technologies*. AFIT/ENG/14M-63. Faculty Advisor: Dr. Robert F. Mills. Sponsor: AFRL/RV. [CCR]
- SADHWANI, DUSHYANT A., *Characterizing Optical Loss in Orientation Patterned III-V Materials Using Laser Calorimetry*. AFIT/ENP/14M-32. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFRL/RV.
- SEERY, MICHAEL K., *Complex VLSI Feature Comparison for Commercial Microelectronics Verification*. AFIT/ENG/14M-67. Faculty Advisor: Dr. Mary Y. Lanzerotti. Sponsor: AFRL/RV.
- STUBBS, TYLER D., *A Comparison of RF-DNA Fingerprinting Using High/Low Value Receivers with ZigBee Devices*. AFIT/ENG/14M-74. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV. [CCR]
- THOMPSON, JARED J., *A Test Methodology for Evaluating Cognitive Radio Systems*. AFIT/ENG/14M-77. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RV. [CCR]
- TRAN, THANG M., *Passive RF Tomography: Signal Processing and Experimental Validation*. AFIT/ENG/14M-91. Faculty Advisor: Dr. Andrew J. Terzuoli. Sponsor: AFRL/RV.
- TUMA, ALLAN D., *Automated Driftmeter Fused with Inertial Navigation*. AFIT/ENG/14M-79. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/RV. [ANT]
- VINCIE, MATTHEW J., *Airborne Wireless Communication Modeling and Analysis with MATLAB*. AFIT/ENG/14M-80. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RV. [ANT]
- WARD, MARC R., *Automatic Target Recognition Using Nonlinear Autoregressive Neural Networks*. AFIT/ENS/14M-33. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/RV. [COA]
- WILLIS, KARA M., *Signal Processing in Cold Atom Interferometry-Based INS*. AFIT/ENG/14M-84. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/RV. [ANT]
- ZEQOLLARI, ANGELA J., *Ultra Wideband Radio Frequency Fingerprinting*. AFIT/ENG/14M-87. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RV. [ANT & CCR]

AFRL: SPACE VEHICLES DIRECTORATE

DOCTORAL DISSERTATIONS

- BETTINGER, ROBERT A., *The Prospect of Responsive Spacecraft Using Aeroassisted, Trans-Atmospheric Maneuvers*. AFIT/ENY/DS/14J-13. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV. [CSRA]

BROUSSARD, COREY M., *Multistatic Initial Orbit Determination Techniques Using Wideband Receivers*. AFIT/ENY/DS/14M-01. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV. [ANT & CSRA]

LEIGH, ABRAHAM M., *Navigation Solution for a Multiple Satellite and Multiple Ground Architecture*. AFIT/ENY/DS/14S-01. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV. [ANT & CSRA]

SIMMONS, JOSEPH R., *Design and Evaluation of Dual-Expander Aerospike Nozzle Upper Stage Engine*. AFIT/ENY/DS/14S-06. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV. [CSRA]

MASTER'S THESES

ABAY, RASIT, *KAM Torus Orbit Prediction from Two Line Element Sets*. AFIT/ENY/14M-01. Faculty Advisor: Dr. William E. Wiesel, Jr. Sponsor: AFRL/RV.

BASEL, JAMES P., *Analysis of Geolocation Approaches Using Satellites*. AFIT/ENY/14M-07. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

BENNETT, BENJAMIN M., *Systems Engineering Approach to Automated Cueing for LEO Satellite Tracking*. AFIT/ENY/14M-53. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV. [CSRA]

DALTON, DEVIN K., *Ground Target Overflight and Orbital Maneuvering via Atmospheric Maneuvering*. AFIT/ENY/14M-12. Faculty Advisor: Lt Col Ronald J. Simmons. Sponsor: AFRL/RV. [CSRA]

DANNEMEYER, ERIN R., *Design and Analysis of an Attitude Determination and Control Subsystem (ADCS) for AFIT's 6U Standard Bus*. AFIT/ENY/14M-14. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV. [CSRA]

DENEVE, ELIZABETH-ANN R., *Informing Spacecraft Maneuver Decisions to Reduce Probability of Collision*. AFIT/ENY/14M-15. Faculty Advisor: Dr. William E. Wiesel, Jr. Sponsor: AFRL/RV. [CSRA]

DUNK, ADAM B., *Applying KAM Theory to Highly Eccentric Orbits*. AFIT/ENY/14M-19. Faculty Advisor: Dr. William E. Wiesel, Jr. Sponsor: AFRL/RV. [CSRA]

FIELDS, ANDREW R., *Continuous Control Artificial Potential Function Methods and Optimal Control*. AFIT/ENY/14M-20. Faculty Advisor: Lt Col Jeremy S. Agte. Sponsor: AFRL/RV. [CSRA]

GRUNWALD, WARREN C., *Design of a Programmable Star Tracker-Based Reference System for a Simulated Spacecraft*. AFIT/ENY/14M-22. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

HATZUNG, DANIEL M., *Thermal Characterization of the Air Force Institute of Technology Solar Simulation Thermal Vacuum Chamber*. AFIT/ENY/14M-23. Faculty Advisor: Maj James L. Rutledge. Sponsor: AFRL/RV. [CSRA]

KENERLEY, KYLE D., *Computer Vision Tracking Using Particle Filters for 3D Position Estimation*. AFIT/ENY/14M-28. Faculty Advisor: Dr. Alan L. Jennings. Sponsor: AFRL/RV. [CSRA]

LATTA III, ROBERT C., *Structural Analysis of a 6U CubeSat Chassis*. AFIT/ENY/14M-30. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

PERRY, DOMINIC A., *Space Object Self-Tracker Hardware Analysis and Environmental Testing*. AFIT/ENY/14M-39. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

SCHAFFER, MEGAN A., *Space Object Self-Tracker Experiments*. AFIT/ENY/14M-43. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

SMALL, ANDREW J., *Radio Frequency Emitter Geolocation Using Cubesats*. AFIT/ENG/14M-68. Faculty Advisor: Maj Marshall E. Haker. Sponsor: AFRL/RV. [ANT]

STICKNEY, HEATHER M., *Performance Characterization, Development, and Application of Artificial Potential Function Guidance Methods*. AFIT/ENY/14M-44. Faculty Advisor: Lt Col Jeremy S. Agte. Sponsor: AFRL/RV. [CSRA]

UNRUH, REBECCA A., *Data Fusion for Decision Support*. AFIT/ENY/14M-48. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV. [CSRA]

AIR FORCE SEEK EAGLE OFFICE

MASTER'S THESES

GABBARD, MARK D., *Modeling the Effects of Underwing Missile Canards on F-16 Limit Cycle Oscillations*. AFIT/ENY/14M-21. Faculty Advisor: Dr. Donald L. Kunz. Sponsor: AFSEO.

AIR FORCE TEST PILOT SCHOOL

MASTER'S THESES

RUPP, JARED M., *Adaptive Positive Position Feedback Control of Flexible Aircraft Structures Using Piezoelectric Actuators*. AFIT/ENY/14M-42. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFTPS.

4.6. AIR MOBILITY COMMAND

MASTER'S THESES

HOMAN, HALEY A., *Comparison of Ensemble Mean and Deterministic Forecasts for Long-Range Airlift Fuel Planning*. AFIT/ENP/14M-15. Faculty Advisor: Lt Col Robert S. Wacker. Sponsor: AMC.

MORTON, CHARLES H., *An Investigation into the Challenges of Joint Basing*. AFIT/ENS/T/14J-16. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: 628 ABW. [COA]

GRADUATE RESEARCH PAPERS

ABERCROMBIE, PETER B., *C-Bag Consolidation: An Inventory and Safety Stock Analysis*. AFIT/ENS/GRP/14J-01. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: AMC. [COA]

CAMPANILE, KEVIN J., *Determining the Optimal C-130 Deployed Crew Ratio*. AFIT/ENS/GRP/14J-03. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AMC. [COA]

CAPPER, JUSTIN R., *Tanker Fuel Efficiency: Saving through Receiver Fuel Planning*. AFIT/ENS/GRP/14J-04. Faculty Advisor: Maj Joshua K Strakos. Sponsor: AMC. [COA]

DURHAM, RYAN E., *Alternatives to Contingency Response Group Organization: Tradeoffs to Balance Capability and Capacity*. AFIT/ENS/GRP/14J-05. Faculty Advisor: Dr. Kenneth L. Schultz. Sponsor: AMC. [COA]

GOHN, RUSSELL D., *Changing the Culture of Fuel Efficiency: A Change in Attitude*. AFIT/ENS/GRP/14J-06. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC. [COA]

- LAFERRIERE, JAMES M., *Frequency Based Continuation Training (FBCT): A Concept for use in the Mobility Air Forces (MAF)*. AFIT/ENS/GRP/14J-07. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC. [COA]
- LIPPERT, ROYCE M., *Investigating Disruptions to Channel Missions - What's the Breaking Point?* AFIT/ENS/GRP/14J-08. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AMC. [COA]
- MACGARVEY, MASON E., *ABW and AMW Consolidation on AMC-Led Joint Bases: A Delphi Study*. AFIT/ENS/GRP/14J-09. Faculty Advisor: Dr. Alan R. Heminger . Sponsor: AMC. [COA]
- MAGILL, JONATHAN H., *Regionalization of the C-17A Home Station Check to Minimize Costs*. AFIT/ENS/GRP/14J-10. Faculty Advisor: LTC Brian J. Lunday. Sponsor: AMC. [COA]
- MESHANKO, MATTHEW D., *Impact of Volcanic Activity on AMC Channel Operations*. AFIT/ENS/GRP/14J-11. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC. [COA]
- PASTUZYN, MICHAEL, *The Potential for Additional Channel Airlift in a L Cargo Demand Theater*. AFIT/ENS/GRP/14J-12. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: AMC. [COA]
- ROVELLO, FRANK W., *Estimating C-17 Aircrew Seasoning Given a Prediction of Flying Austerity*. AFIT/ENS/GRP/14J-13. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC. [COA]
- RUPP, KAREN P., *A Cost Analysis of Space Available Travel*. AFIT/ENS/GRP/14J-14. Faculty Advisor: Maj Joshua K. Strakos. Sponsor: AMC. [COA]
- YARIAN, MARK L., *Synchronized Stability: A Case Study Investigation of AMC's Stabilized Approach Program*. AFIT/ENS/GRP/14J-16. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC. [COA]

4.7. USAF FIELD OPERATING AGENCIES/DIRECT REPORTING UNITS

AIR FORCE CIVIL ENGINEERING CENTER

MASTER'S THESES

- ADAMSON, SCOTT D., *Strategic Positioning of United States Air Force Civil Engineer Contingency Equipment within the Supply Chain*. AFIT/ENV/14M-02. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: AFCEC.
- BROWN, STANTON P., *A Change Management Approach to Enhance Facility Maintenance Programs*. AFIT/ENV/14M-13. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: AFCEC.
- ELLIS, RICHARD T., *A Method to Determine an Organization's Compatibility with Hybrid Workspaces*. AFIT/ENV/14M-25. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: AFCEC.
- MACKINDER, STEVEN L., *Geospatial Analysis of Construction Labor Wage Rates in the United States of America*. AFIT/ENV/14M-36. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: AFCEC.
- SYNOVEC, THOMAS M., *Investigation on the Use of Equivalency Factors for the Design and Evaluation of Flexible Airfield Pavements*. AFIT/ENV/14M-63. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: AFCEC.
- TELLEZ, MARIO H., *Treatment of Perfluorinated Compounds and Nitroaromatics by Photocatalysis in the Presence of Ultraviolet and Solar Light*. AFIT/ENV/14M-64. Faculty Advisor: Dr. Mark N. Goltz. Sponsor: AFCEC.

AIR FORCE MEDICAL OPERATIONS AGENCY

MASTER'S THESES

EL-AMIN, AMBER J., *Mixed Methods Approach to Identify Factors and the Extent to Which They Influence Medical/Surgical Prime Vendor Use*. AFIT/ENS/14M-03. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: AFMOA. [COA]

AIR FORCE MEDICAL SUPPORT AGENCY

MASTER'S THESES

EDWARDS, CHRISTOPHER W., *Gas Phase Organophosphate Detection Using Enzymes Encapsulated within Peptide Nanotubes*. AFIT/ENV/14M-41. Faculty Advisor: Lt Col Dirk P. Yamamoto. Sponsor: AFMSA/SG.

KING, SCOTT T., *Detecting Industrial Chemicals in Water with Microbial Fuel Cells and Artificial Neural Networks*. AFIT/ENV/14M-33. Faculty Advisor: Dr. Willie F. Harper, Jr. Sponsor: AFMSA/SG.

SYLVANDER, MARC P., *Microbial Fuel Cell Transformation of Recalcitrant Organic Compounds in Support of Biosensor Research*. AFIT/ENV/14M-62. Faculty Advisor: Dr. Willie F. Harper, Jr. Sponsor: AFMSA.

AIR FORCE WEATHER AGENCY

MASTER'S THESES

CLEMENTS, WILLIAM B., *Validation of the Air Force Weather Agency Ensemble Prediction Systems*. AFIT/ENP/14M-04. Faculty Advisor: Lt Col Kevin S. Bartlett. Sponsor: AFWA.

HROMSCO, JEREMY J., *Sensitivity of IFM/GAIM-GM Model to High-Cadence Kp and F10.7 Input*. AFIT/ENP/14M-17. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: AFWA.

SPAHR, GORDON M., *Fully Automated Sunspot Detection and Classification Using SDO HMI Imagery in MATLAB*. AFIT/ENP/14M-34. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: AFWA.

THURMOND, KYLE R., *Operational Cloud-to-Ground Lightning Initiation Forecasting Utilizing S-Band Dual-Polarization Radar*. AFIT/ENP/14M-36. Faculty Advisor: Lt Col Kevin S. Bartlett. Sponsor: AFWA.

NATIONAL AIR AND SPACE INTELLIGENCE CENTER

MASTER'S THESES

COBB, JOHN M., *Decapitation Attacks against Mission-Critical Networks*. AFIT/ENG/14M-18. Faculty Advisor: Dr. Robert F. Mills. Sponsor: NASIC. [CCR]

MARTIN, MARGARET T., *The Air Force Records Management Program: A Paradigm Shift from Compliance to Guiding Principles in an Ever-Changing Information Environment*. AFIT/ENS/T/14J-15. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: NASIC. [COA]

UNITED STATES AIR FORCE ACADEMY

MASTER'S THESES

MYERS, SARAH J., *Design, Analysis, and Characterization of an Optical Photon Sieve for Space-Based Imaging Systems*. AFIT/ENP/14M-02. Faculty Advisor: Lt Col Anthony L. Franz. Sponsor: USAFA/SPARC.

4.8. DEPARTMENT OF DEFENSE

MASTER'S THESES

BELL, JAMES M., *Accounting for Mass Transfer Kinetics when Modeling the Impact of Low Permeability Layers in a Groundwater Source Zone on Dissolved Contaminant Fate and Transport*. AFIT/ENV/14M-08. Faculty Advisor: Dr. Mark N. Goltz. Sponsor: DOD/SERDP.

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

DOCTORAL DISSERTATIONS

ZINGARELLI, JOHN C., *Enhancing Ground Based Telescope Performance with Image Processing*. AFIT/ENG/DS/13D-04. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: DARPA.

MASTER'S THESES

GESSEL, BRENT H., *Binary Detection Using Multi-Hypothesis Log-Likelihood, Image Processing*. AFIT/ENG/14M-34. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: DARPA.

KESTER, BRIAN W., *Development of a Concept of Operations for the FalconSAT-7 CubeSat*. AFIT/ENY/14M-29. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: DARPA. [CSRA]

DEFENSE INFORMATION SYSTEMS AGENCY

MASTER'S THESES

PERKINS, COREY J., *Cloud Computing Implementation Organizational Success in the Department of Defense*. AFIT/ENV/14M-48. Faculty Advisor: Lt Col Darin A. Ladd. Sponsor: DISA.

DEFENSE THREAT REDUCTION AGENCY

DOCTORAL DISSERTATIONS

KELLY II, TONY D., *Electronic and Physical Characterization of Hydrothermally Grown Single Crystal ThO₂*. AFIT/ENP/DS/13D-02. Faculty Advisor: Dr. James C. Petrosky. Sponsor: DTRA.

MORELLO, MATTHEW R., *Estimating Disruption Fires from a Nuclear Weapon Detonation Using Fire Following Earthquake Methodology*. AFIT/ENP/DS/14S-09. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA & LLNL.

MASTER'S THESES

- CASEBOLT, JARED D., *Characterization of Construction Material Properties through Gamma Spectroscopy, X-ray Fluorescence, and Hyper-Spectral Imagery for Background Correction Applications in Nuclear Detection*. AFIT/ENP/14M-45. Faculty Advisor: Dr. David J. Bunker. Sponsor: DTRA. [CTISR]
- DECKER, ANDREW W., *Verification and Validation of Monte Carlo n-Particle Code 6 (MCNP6) with Neutron Protection Factor Measurements of an Iron Box*. AFIT/ENP/14M-05. Faculty Advisor: Lt Col Stephen R. McHale. Sponsor: DTRA.
- DELORME, KERRIANN A., *Production Potential of Scandium-47 Using Spallation Neutrons at Los Alamos Isotope Production Facility*. AFIT/ENP/14M-02. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: DTRA & LANL.
- DIERKEN, JOSIAH M., *Analysis of Fallout Particles Using Image Registration of Autoradiography and Scanning Electron Microscopy*. AFIT/ENP/T/14J-32. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.
- GENDA, TIMOTHY P., *Optimization of Prompt Neutron Detector Placement for Standoff Photon Interrogation of Special Nuclear Materials*. AFIT/ENP/14M-10. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.
- GETTINGS, MATTHEW L., *Estimating Fireball Temperature from a Nuclear Detonation Using Digital Films*. AFIT/ENP/14M-11. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA.
- HOLDER, JOEL G., *Polarimetric Calibration and Characterization of the Telops Field Portable Polarimetric-Hyperspectral Imager*. AFIT/ENP/14M-14. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: DTRA. [CTISR]
- KEMP, EVAN R., *Proton Damage Effects on Carbon Nanotube Field-Effect Transistors*. AFIT/ENP/T/14J-39. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.
- LENYK, CHRISTOPHER A., *Defining a Methodology for Data Analysis Using Streak Films*. AFIT/ENP/14M-20. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA. [CTISR]
- LERCH, ANDREW G., *Nuclear Structure of Rhenium-186 Revealed by Neutron-Capture Gamma Rays*. AFIT/ENP/14M-21. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA.
- ORTA, JAMES P., *Electrical Characterization of Spherical Copper Oxide Memristive Array Sensors*. AFIT/ENP/14M-40. Faculty Advisor: Maj Timothy W. Zens. Sponsor: DTRA.
- OSPINO, TYRONE A., *Modeling Detector Response to Scattered Gamma Rays*. AFIT/ENP/14M-27. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.
- REARDON, CHRISTOPHER J., *Comparison of Biological Agent Attack Detection Strategies on the Battlefield*. AFIT/ENV/14M-53. Faculty Advisor: Dr. Michael W. Haas. Sponsor: DTRA.
- RECKER, MATTHEW C., *Copper Doping of Zinc Oxide by Nuclear Transmutation*. AFIT/ENP/14M-30. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.
- WILLEY, GARY A., *Memristive Responses of Jammed Granular Copper Array Sensors to Mechanical Stress*. AFIT/ENP/14M-44. Faculty Advisor: Maj Timothy W. Zens. Sponsor: DTRA.

HIGH ENERGY LASER JOINT TECHNOLOGY OFFICE

DOCTORAL DISSERTATIONS

ACOSTA, ROBERTO I., *Imaging Fourier Transform Spectroscopy of the Boundary Layer Plume from Laser Irradiated Polymers and Carbon Materials*. AFIT/ENP/DS/14J-08. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO.

MASTER'S THESES

BAUMANN, SEAN M., *Direct Emissivity Measurements of Painted Metals for Improved Temperature Estimation During Laser Damage Testing*. AFIT/ENP/14M-43. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: HELJTO. [CDE]

WYMAN, KEITH A., *Wigner Distribution Functions as a Tool for Studying Gas Phase Alkali Metal Plus Noble Gas Collisions*. AFIT/ENP/14M-39. Faculty Advisor: Dr. David E. Weeks. Sponsor: HELJTO. [CDE]

JOINT CHIEFS OF STAFF

MASTER'S THESES

STOVER, LUKE R., *Towards Reengineering the United States Department of Defense: A Financial Case for a Functionally-Aligned, Unified Military Structure*. AFIT/ENS/14M-30. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: JCS/J5. [COA]

LABORATORY FOR TELECOMMUNICATIONS SCIENCES

DOCTORAL DISSERTATIONS

MORRIS, JEFFREY D., *Conceptual Modeling of a Quantum Key Distribution Simulation Framework Using the Discrete Event System Specification*. AFIT/ENV/DS/14S-25. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: LTS.

MASTER'S THESES

GARRETT, VIRGINIA R., *Numerical Integration with Graphical Processing Unit for QKD Simulation*. AFIT/ENG/14M-33. Faculty Advisor: Dr. Douglas D. Hodson. Sponsor: LTS. [CCR]

OFFICE OF THE SECRETARY OF DEFENSE

DOCTORAL DISSERTATIONS

DOUGHERTY, SHANE A., *A Comparison Study of Second-Order Screening Designs and Their Extension*. AFIT/ENS/DS/13D-01. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD. [COA]

FREELS, JASON K., *Modeling Reliability Growth in Accelerated Stress Testing*. AFIT/ENS/DS/13D-02. Faculty Advisor: Dr Joseph J. Pignatiello. Sponsor: OSD/DOT&E. [COA]

MASTER'S THESES

AL-QAHTANI, IBRAHIM, *Crack Initiation and Growth Behavior at Corrosion Pit in 2024-T3 Aluminum Alloy*. AFIT/ENY/T/14S-05. Faculty Advisor: Dr. Shankar Mall. Sponsor: OSD.

BEAM, BRIAN A., *Leveraging the Cloud for Integrated Network Experimentation*. AFIT/ENG/14M-11. Faculty Advisor: Dr. Douglas D. Hodson. Sponsor: OSD. [CCR]

DOLU, ZAFER, *Crack Initiation and Growth Behavior at Corrosion Pit in 7075-T6 under Biaxial and Uniaxial Fatigue*. AFIT/ENY/T/14J-33. Faculty Advisor: Dr. Shankar Mall. Sponsor: OSD.

GAREE, MICHAEL J., *Fragment Capture Simulation for MANPADS Test Arena Optimization*. AFIT/ENS/14M-09. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD/DOT&E. [COA]

JOHNSON, JOSHUA D., *Comparing the Predictive Capabilities of Level Three EVM Cost Data with Level Five EVM Cost Data*. AFIT/ENC/14M-04. Faculty Advisor: Dr. Edward D. White. Sponsor: OSD/PARCA.

LIU, TONY, *Modeling Continuous IED Supply Chains*. AFIT/ENC/14M-02. Faculty Advisor: Capt Kevin R. Pond. Sponsor: OSD/DDESB.

RUSSELL, BRENT D., *Capturing Uncertainty in Fatigue Life Data*. AFIT/ENS/T/14S-15. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD. [COA]

UNITED STATES ARMY

DOCTORAL DISSERTATIONS

SAIE, CADE M., *Nation-Building Modeling and Resource Allocation via Dynamic Programming*. AFIT/DS/ENS/14S-18. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: CAA. [COA]

MASTER'S THESES

FETT, GARRET D., *Aircraft Route Optimization Using the A-Star Algorithm*. AFIT/ENS/14M-06. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: USA FORSCOM. [COA]

KENEALLY, SEAN K., *A Markov Decision Process Model for the Optimal Dispatch of Military Medical Evacuation Assets*. AFIT/ENS/14M-15. Faculty Advisor: Lt Col Matthew J. Robbins. Sponsor: AMEDD/MEPD. [COA]

MCCORMACK, IAN M., *The Military Inventory Routing Problem with Direct Delivery*. AFIT/ENS/14M-20. Faculty Advisor: Lt Col Matthew J. Robbins. Sponsor: USAACE. [COA]

TERPENING, CHRISTOPHER D., *Characterization of CH-47D Rotor System Fault Signatures Using a Comprehensive Model*. AFIT/ENY/14M-45. Faculty Advisor: Dr. Donald L. Kunz. Sponsor: AMRDEC.

UNITED STATES NAVY

DOCTORAL DISSERTATIONS

HALSTEAD, MATTHEW R., *Investigating Time and Spectral Dependence in Neutron Radiation Environments for Semiconductor Damage Studies*. AFIT/ENP/DS/14S-04. Faculty Advisor: Dr. James C. Petrosky. Sponsor: NAVSEA/NSWC.

MASTER'S THESES

DRAS, LUKE C., *Model Uncertainty and Test of a Segmented Mirror Telescope*. AFIT/ENY/14M-18. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: NPS. [CSRA]

FISCHER, COY C., *Sensitivity of 96 and 120-hour Numerical Model Tropical Cyclone Position Forecasts to Initial Position Errors*. AFIT/ENP/14M-08. Faculty Advisor: Lt Col Robert S. Wacker. Sponsor: JTWC.

POISSON, ROBERT J., *Spatial Disorientation: Past, Present, and Future*. AFIT/ENV/14M-50. Faculty Advisor: Dr. Michael E. Miller. Sponsor: NAMRU-D.

UNITED STATES EUROPEAN COMMAND

GRADUATE RESEARCH PAPERS

BAKER, JUDD W., *Optimizing C-17 Pacific Basing*. AFIT/ENS/GRP/14J-02. Faculty Advisor: Dr. William A. Cunningham. Sponsor: EUCOM/USAFE. [COA]

UNITED STATES PACIFIC COMMAND

GRADUATE RESEARCH PAPERS

SPONSELLER, HUGH P., *Over the Pole: A Fuel Efficiency Analysis of Employing Joint Base Elmendorf-Richardson for Polar Route Utilization*. AFIT/ENS/GRP/14J-15. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: PACAF. [COA]

UNITED STATES STRATEGIC COMMAND

DOCTORAL DISSERTATIONS

SHOWALTER, DANIEL J., *Optimal Autonomous Spacecraft Resiliency Maneuvers Using Metaheuristics*. AFIT/ENY/DS/14S-29. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: USSTRATCOM. [CSRA]

MASTER'S THESES

MEIER, NATHANIEL J., *The Use of the Generalized Polynomial Chaos Method in Wargaming Simulations*. AFIT/ENY/14M-35. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: USSTRATCOM.

UNITED STATES TRANSPORTATION COMMAND

DOCTORAL DISSERTATIONS

MCNABB, MARCUS E., *Exploring Heuristics for the Vehicle Routing Problem with Split Deliveries and Time Windows*. AFIT/ENS/DS/14S-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

REIMAN, ADAM D., *Enterprise Analysis of Strategic Airlift to Obtain Competitive Advantage through Fuel Efficiency*. AFIT/ENS/DS/14S-16. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

MASTER'S THESES

FLORES, CHARLES M., *A Proper Splitting Theater Distribution Model for Improving Force Flow Analysis*. AFIT/ENS/14M-07. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

KANNON, TANYA E., *Improving the Air Mobility Command's Air Refueler Route Building*. AFIT/ENS/14M-14. Faculty Advisor: Dr. Sarah G. Nurre. Sponsor: USTRANSCOM. [COA]

POWER, EMILY K., *A Heuristic Approach to the Theater Distribution Problem*. AFIT/ENS/14M-25. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

WHITE, JONATHAN D., *Enhanced Vehicle Beddown Approximations for the Improved Theater Distribution Model*. AFIT/ENS/14M-34. Faculty Advisor: Dr. Jeffrey D. Weir. Sponsor: USTRANSCOM. [COA]

4.9. OTHER FEDERAL AGENCIES

DEPARTMENT OF ENERGY

MASTER'S THESES

BARFIELD, HELEN L., *Naïve Bayes Classification and Text Mining Analysis of Cost Growth Risk in Department of Energy Remediation Projects*. AFIT/ENV/14M-06. Faculty Advisor: Lt Col Jonathan D. Ritschel. Sponsor: DOE/EM.

CLAYSON, DENIS S., *Cost Performance Stability in DOE Office of Environmental Management Projects*. AFIT/ENV/14M-17. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: DOE/EM.

PACK, ANDREW J., *A Case Study of Department of Energy Office of Environmental Management Project Risk Management*. AFIT/ENV/14M-47. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: DOE/EM.

PEERY, TYLER R., *Modeling Nuclear Weapon Fireballs in DIRSIG*. AFIT/ENP/14M-28. Faculty Advisor: Col Karl C. Walli. Sponsor: DOE/NNSA. [CTISR]

PORTER, KEVIN J., *A Case Study of Project Participant Relationships in the DOE Office of Environmental Management*. AFIT/ENV/14M-52. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: DOE/EM.

DEPARTMENT OF HOMELAND SECURITY

DOCTORAL DISSERTATIONS

RAMSEY, BENJAMIN W., *Improved Wireless Security through Physical Layer Protocol Manipulation and Radio Frequency Fingerprinting*. AFIT/ENG/DS/14S-10. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

MASTER'S THESES

ABNER, BENJAMIN N., *Modeling the Purex Process*. AFIT/ENP/14M-01. Faculty Advisor: Dr. James C. Petrosky. Sponsor: DHS.

BODENHEIM, ROLAND C., *Impact of the Shodan Computer Search Engine on Internet-Facing Industrial Control System Devices*. AFIT/ENG/14M-14. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

CLEMENT, PAUL A., *Timing and Spectroscopy Requirements for a Plastic Scintillating Fiber Bundle Time-of-Flight Neutron Spectrometer*. AFIT/ENP/13D-01. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: DHS.

DALRYMPLE, SCOTT D., *Comparison of ZigBee Replay Attacks Using a Universal Software Radio Peripheral and USB Radio*. AFIT/ENG/14M-23. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

DOROSKI, MICHAEL W., *Integrity Verification for SCADA Devices Using Bloom Filters and Deep Packet Inspection*. AFIT/ENG/14M-25. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

FINK, DEANNA R., *Toward Automating Web Protocol Configuration for a Programmable Logic Controller Emulator*. AFIT/ENG/T/14J-04. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

GARCIA, ARTURO M., *Firmware Modification Analysis in Programmable Logic Controllers*. AFIT/ENG/14M-32. Faculty Advisor: Dr. Robert F. Mills. Sponsor: DHS. [CCR]

GREB, MATTHEW A., *Magnetic Separation of Soil Contaminated with Weapon Grade Plutonium*. AFIT/ENP/14M-13. Faculty Advisor: Dr. James C. Petrosky. Sponsor: DHS.

REDING, JOSHUA D., *Band Gap Transition Studies of U:ThO₂ Using Cathodoluminescence*. AFIT/ENP/14M-31. Faculty Advisor: Dr. Robert L. Hengehold. Sponsor: DHS.

SCHNEIDER, EDWARD C., *Positron Spectroscopy of Hydrothermally Grown Actinide Oxides*. AFIT/ENP/14M-33. Faculty Advisor: Dr. James C. Petrosky. Sponsor: DHS.

SCHUETT, CARL D., *Programmable Logic Controller Modification Attacks for Use in Detection Analysis*. AFIT/ENG/14M-66. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

WERLING, JESSICA R., *Behavioral Profiling of SCADA Network Traffic using Machine Learning Algorithms*. AFIT/ENG/14M-81. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

WILLIAMS, PAUL M., *Distinguishing Internet-Facing ICS Devices Using PLC Programming Information*. AFIT/ENG/T/14J-41. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

ENVIRONMENTAL PROTECTION AGENCY

MASTER'S THESES

BATES, CHRISTOPHER S., *Ultraviolet Light Emitting Diode Optical Power Characterization*. AFIT/ENV/14M-07. Faculty Advisor: Dr. Michael E. Miller. Sponsor: EPA/NHSRC.

DUCKWORTH, KELSEY L., *Ultraviolet Light Emitting Diode Use in Advanced Oxidation Processes*. AFIT/ENV/14M-22. Faculty Advisor: Lt Col LeeAnn Racz. Sponsor: EPA/NHSRC.

MARCUM, CHELSEA C., *Measurements of DNA Damage and Repair in Bacillus Anthracis Sterne Spores by UV Radiation*. AFIT/ENP/T/14S-01. Faculty Advisor: Dr. Larry W. Burggraf. Sponsor: EPA/NHSRC & AFNWC.

RICHWINE, JOHN P., *Modeling the Effects of Ultraviolet (UV) Light Emitting Diode (LED) Use in the Advanced Oxidation Process (AOP)*. AFIT/ENV/14M-55. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: EPA.

SPENCER, MICHAEL J., *Design Considerations for a Water Treatment System Utilizing Ultra-Violet Light Emitting Diodes*. AFIT/ENV/14M-58. Faculty Advisor: Dr. Michael E. Miller. Sponsor: EPA.

LAWRENCE LIVERMORE NATIONAL LABORATORY

DOCTORAL DISSERTATION

MORELLO, MATTHEW R., *Estimating Disruption Fires from a Nuclear Weapon Detonation Using Fire Following Earthquake Methodology*. AFIT/ENP/DS/14S-09. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA & LLNL.

LOS ALAMOS NATIONAL LABORATORY

MASTER'S THESES

DELORME, KERRIANN A., *Production Potential of Scandium-47 Using Spallation Neutrons at Los Alamos Isotope Production Facility*. AFIT/ENP/14M-02. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: DTRA & LANL.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

DOCTORAL DISSERTATIONS

ARENDR, CHRISTOPHER D., *Optimal Control of Fully Routed Air Traffic in the Presence of Uncertainty and Kinodynamic Constraints*. AFIT/ENS/DS/14S-15. Faculty Advisor: Dr. James W. Chrissis. Sponsor: NASA. [COA]

OAK RIDGE NATIONAL LABORATORY

MASTER'S THESES

WRIGHT, BRADLEY C., *PLC Hardware Discrimination Using RF-DNA Fingerprinting*. AFIT/ENG/T/14J-12. Faculty Advisor: Maj Samuel J. Stone. Sponsor: ORNL. [CCR]

4.10. NON-FEDERAL SPONSORS

COLLEGE OF PERFORMANCE MANAGEMENT

MASTER'S THESES

PETTER, JACOB L., *An Analysis of Stability Properties in Earned Value Management's Cost Performance Index and Earned Schedule's Schedule Performance Index*. AFIT/ENV/14M-49. Faculty Advisor: Lt Col Jonathan D. Ritschel. Sponsor: CPM.

LOCATA

MASTER'S THESES

BARHORST, JASON M., *GPS Multipath Reduction with Correlator Beamforming*. AFIT/ENG/14-M-10. Faculty Advisor: Dr. John F. Raquet. Sponsor: Locata. [ANT]

LOCKHEED MARTIN

MASTER'S THESES

CHRISTENSEN, BENJAMIN A., *Transonic Wind Tunnel Testing of Extremely High Off-Boresight Maneuver for Missile Concept*. AFIT/ENY/14M-11. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: Lockheed Martin.

JOHNSON, LARS C., *Aerodynamic Characterization of a Transverse Jet Controlled Air-to-Air Missile Using Kestrel 4.0*. AFIT/ENY/14M-27. Faculty Advisor: Capt Christopher L. Martin. Sponsor: Lockheed Martin.

RIVERSIDE RESEARCH

MASTER'S THESES

SMITH, ADAM J., *REDIR: Automated Static Detection of Obfuscated Anti-Debugging Techniques*. AFIT/ENG/14M-69. Faculty Advisor: Dr. Robert F. Mills. Sponsor: Riverside Research. [CCR]

TURKISH AIR FORCE

MASTER'S THESES

ERDEMIR, UGUR, *Optimizing Flight Schedules by an Automated Decision Support System*. AFIT/ENS/14M-04. Faculty Advisor: Dr. Jeffrey D. Weir. Sponsor: TuAF. [COA]

5. ACADEMIC DEPARTMENT PUBLICATIONS AND FUNDING INFORMATION

5.1. DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS

Access Phone: 937-255-3069, DSN 785-3069

Fax: 937-656-7621, DSN 986-7621

Homepage: <http://www.afit.edu/ENY/>

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5.1.1. DOCTORAL DISSERTATIONS

- BETTINGER, ROBERT A., *The Prospect of Responsive Spacecraft Using Aeroassisted, Trans-Atmospheric Maneuvers*. AFIT/ENY/DS/14J-13. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV. [CSRA]
- BROUSSARD, COREY M., *Multistatic Initial Orbit Determination Techniques Using Wideband Receivers*. AFIT/ENY/DS/14M-01. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV. [ANT & CSRA]
- BUENTELLO HERNANDEZ, RODOLFO G., *3D Finite Element Modeling of Sliding Wear*. AFIT/ENY/DS/13D-06. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.
- COX, GEOFFREY S., *Experimental Uncertainty Associated with Traveling Wave Excitation*. AFIT/ENY/DS/14S-26. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFRL/RQ.
- DELUCA, ANTHONY M., *Aerodynamic Performance and Particle Image Velocimetry of Piezo Actuated Biomimetic Manduca Sexta Engineered Wings towards the Design and Application of a Flapping Wing Flight Vehicle*. AFIT/ENY/DS/13D-01. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: AFRL/RQ.
- DOYLE, DANIEL D., *Real-Time, Multiple, Pan/Tilt/Zoom, Computer Vision Tracking, and 3D Position Estimating System for Small Unmanned Aircraft System Metrology*. AFIT/ENY/DS/13D-08. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFOSR. [ANT & CSRA]
- GREINER, NATHAN J., *Convective Heat Transfer with and without Film Cooling in High Temperature, Fuel Rich and Lean Environments*. AFIT/ENY/DS/14S-28. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.
- LEIGH, ABRAHAM M., *Navigation Solution for a Multiple Satellite and Multiple Ground Architecture*. AFIT/ENY/DS/14S-01. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV. [ANT & CSRA]
- LINDHOLM, GARRISON J., *Closed-Loop Control of Constrained Flapping Wing Micro Air Vehicles*. AFIT/ENY/DS/14M-02. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV. [ANT]
- SHOWALTER, DANIEL J., *Optimal Autonomous Spacecraft Resiliency Maneuvers Using Metaheuristics*. AFIT/ENY/DS/14S-29. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: USSTRATCOM. [CSRA]
- SIMMONS, JOSEPH R., *Design and Evaluation of Dual-Expander Aerospike Nozzle Upper Stage Engine*. AFIT/ENY/DS/14S-06. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV. [CSRA]
- STEVENS, CHRISTOPHER A., *Development of a Detonation Diffuser*. AFIT/ENY/DS/14M-05. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

5.1.2. MASTER'S THESES

- ABAY, RASIT, *KAM Torus Orbit Prediction from Two Line Element Sets*. AFIT/ENY/14M-01. Faculty Advisor: Dr. William E. Wiesel, Jr. Sponsor: AFRL/RV.
- ABBATE, EVELYN A., *Disaggregated Imaging Spacecraft Constellation Optimization with a Genetic Algorithm*. AFIT/ENY/14M-02. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A. [CSRA]
- ADORNO-RODRIGUEZ, RUBEN, *Nonlinear Structural Analysis of an Icosahedron and its Application to Lighter than Air Vehicles under a Vacuum*. AFIT/ENY/14M-03. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

ALBAN, CHRISTOPHER J., *Thermal and Melt Wear Characterization of Materials in Sliding Contact at High Speed Energy Sink*. AFIT/ENY/14M-04. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

AL-QAHTANI, IBRAHIM, *Crack Initiation and Growth Behavior at Corrosion Pit in 2024-T3 Aluminum Alloy*. AFIT/ENY/T/14S-05. Faculty Advisor: Dr. Shankar Mall. Sponsor: OSD.

ASPINWALL III, JON M., *Investigation of Helicopter Ground Resonance Subject to Nonlinear Energy Sink*. AFIT/ENY/14M-05. Faculty Advisor: Dr. Donald L. Kunz. Sponsor: N/A.

BABIS, BRIAN W., *Analysis of Preheated Starting Length Convection Effects on Military Aircraft Skins Subjected to Simulated Thermal Assault*. AFIT/ENY/14M-06. Faculty Advisor: Maj James L. Rutledge. Sponsor: AFNWC.

BASEL, JAMES P., *Analysis of Geolocation Approaches Using Satellites*. AFIT/ENY/14M-07. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

BENNETT, BENJAMIN M., *Systems Engineering Approach to Automated Cueing for LEO Satellite Tracking*. AFIT/ENY/14M-53. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV. [CSRA]

BERTRAND, DUSTIN J., *Ceramic Matrix Characterization under a Gas Turbine Combustion and Loading Environment*. AFIT/ENY/14M-08. Faculty Advisor: Dr. Shankar Mall. Sponsor: AFRL/RX.

BRINKER, ANDREW J., *Liquid Spray Characterization in Flow Fields with Centripetal Acceleration*. AFIT/ENY/14M-09. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR.

BROWN, ZACHARY R., *Experimental Characterization of Wings for a Hawkmoth-Sized Micro Air Vehicle*. AFIT/ENY/14M-10. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: AFRL/RW.

CAVALLARO, GREG V., *A Study of Slipper and Rail Wear Interaction at Low Speed*. AFIT/ENY/T/14J-31. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

CHRISTENSEN, BENJAMIN A., *Transonic Wind Tunnel Testing of Extremely High Off-Boresight Maneuver for Missile Concept*. AFIT/ENY/14M-11. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: Lockheed Martin.

DALTON, DEVIN K., *Ground Target Overflight and Orbital Maneuvering via Atmospheric Maneuvering*. AFIT/ENY/14M-12. Faculty Advisor: Lt Col Ronald J. Simmons. Sponsor: AFRL/RV. [CSRA]

DAMELE, CHRISTOPHER J., *Operational Characteristics of an Ultra Compact Combustor*. AFIT/ENY/14M-13. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR.

DANNEMEYER, ERIN R., *Design and Analysis of an Attitude Determination and Control Subsystem (ADCS) for AFIT's 6U Standard Bus*. AFIT/ENY/14M-14. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV. [CSRA]

DENEVE, ELIZABETH-ANN R., *Informing Spacecraft Maneuver Decisions to Reduce Probability of Collision*. AFIT/ENY/14M-15. Faculty Advisor: Dr. William E. Wiesel, Jr. Sponsor: AFRL/RV. [CSRA]

DIGIACOMO, WILLIAM J., *Feasibility Assessment of Repurposing an Aerial Radio Frequency Geolocation Sensor to the Space Environment*. AFIT/ENY/14M-16. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A. [CSRA]

DOLU, ZAFER, *Crack Initiation and Growth Behavior at Corrosion Pit in 7075-T6 under Biaxial and Uniaxial Fatigue*. AFIT/ENY/T/14J-33. Faculty Advisor: Dr. Shankar Mall. Sponsor: OSD.

DRAS, LUKE C., *Model Uncertainty and Test of a Segmented Mirror Telescope*. AFIT/ENY/14M-18. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: NPS. [CSRA]

DUNK, ADAM B., *Applying KAM Theory to Highly Eccentric Orbits*. AFIT/ENY/14M-19. Faculty Advisor: Dr. William E. Wiesel, Jr. Sponsor: AFRL/RV. [CSRA]

FIELDS, ANDREW R., *Continuous Control Artificial Potential Function Methods and Optimal Control*. AFIT/ENY/14M-20. Faculty Advisor: Lt Col Jeremy S. Agte. Sponsor: AFRL/RV. [CSRA]

GABBARD, MARK D., *Modeling the Effects of Underwing Missile Canards on F-16 Limit Cycle Oscillations*. AFIT/ENY/14M-21. Faculty Advisor: Dr. Donald L. Kunz. Sponsor: AFSEO.

GRUNWALD, WARREN C., *Design of a Programmable Star Tracker-Based Reference System for a Simulated Spacecraft*. AFIT/ENY/14M-22. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

HATZUNG, DANIEL M., *Thermal Characterization of the Air Force Institute of Technology Solar Simulation Thermal Vacuum Chamber*. AFIT/ENY/14M-23. Faculty Advisor: Maj James L. Rutledge. Sponsor: AFRL/RV. [CSRA]

HELLER, JASON C., *Feasibility of Very Large Sparse Aperture Deployable Antennas*. AFIT/ENY/14M-24. Faculty Advisor: Dr. Alan L. Jennings. Sponsor: AFOSR. [CSRA]

HILBURN, SKYLER R., *Experimental Investigation of Mechanical Behavior of an Oxide/Oxide Ceramic Composite in Interlaminar Shear and Under Combined Tension-Torsion Loading*. AFIT/ENY/14M-26. Faculty Advisor: Dr. Marina B. Ruggles-Wrenn. Sponsor: AFRL/RX.

JOHNSEN, LARS C., *Aerodynamic Characterization of a Transverse Jet Controlled Air-to-Air Missile Using Kestrel 4.0*. AFIT/ENY/14M-27. Faculty Advisor: Capt Christopher L. Martin. Sponsor: Lockheed Martin.

KENERLEY, KYLE D., *Computer Vision Tracking Using Particle Filters for 3D Position Estimation*. AFIT/ENY/14M-28. Faculty Advisor: Dr. Alan L. Jennings. Sponsor: AFRL/RV. [CSRA]

KESTER, BRIAN W., *Development of a Concept of Operations for the FalconSAT-7 CubeSat*. AFIT/ENY/14M-29. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: DARPA. [CSRA]

LATTA III, ROBERT C., *Structural Analysis of a 6U CubeSat Chassis*. AFIT/ENY/14M-30. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

LIBER, MEI-LING, *Measurement and Image Processing Techniques for Particle Image Velocimetry Using Solid-Phase Carbon Dioxide*. AFIT/ENY/14M-32. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: AFRL/RQ.

LIVERMORE, RILEY A., *Optimal UAV Path Planning for Tracking a Moving Ground Vehicle with a Gimbaled Camera*. AFIT/ENY/14M-33. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RQ. [ANT]

MATACZYNSKI, MARK R., *Design and Simulation of a Pressure Wave Supercharger for a Small Two-Stroke Engine*. AFIT/ENY/14M-34. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

MEIER, NATHANIEL J., *The Use of the Generalized Polynomial Chaos Method in Wargaming Simulations*. AFIT/ENY/14M-35. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: USSTRATCOM.

MERRICK, JUSTIN D., *Influence of Mach Number and Dynamic Pressure on Cavity Tones and Freedrop Trajectories*. AFIT/ENY/14M-36. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: AFRL/RQ.

MIRANDA, JOSE L., *The Use of an Ultra-Compact Combustor as an Inter-Turbine Burner for Improved Engine Performance*. AFIT/ENY/14M-38. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR.

MITCHELL, KURT A., *Characterizing the Effects of Sensor Degradation on SOSI Network Performance*. AFIT/ENY/14M-54. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A. [CSRA]

OPIE, NATHANIEL P., *A Comparison of Afghanistan, Yuma, Az, and Manufactured Sands Melted on EB-PVD Thermal Barrier Coatings*. AFIT/ENY/T/14S-18. Faculty Advisor: Lt Col Timothy C. Radsick. Sponsor: AFRL/RX.

PERRY, DOMINIC A., *Space Object Self-Tracker Hardware Analysis and Environmental Testing*. AFIT/ENY/14M-39. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

RITTENHOUSE, JOSHUA A., *Thermal Loss Determination for a Small Internal Combustion Engine*. AFIT/ENY/14M-41. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

ROWTON, ALEX K., *Measuring Scaling Effects in Small Two-Stroke Internal Combustion Engines*. AFIT/ENY/T/14J-36. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

RUPP, JARED M., *Adaptive Positive Position Feedback Control of Flexible Aircraft Structures Using Piezoelectric Actuators*. AFIT/ENY/14M-42. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFTPS.

SCHAFFER, MEGAN A., *Space Object Self-Tracker Experiments*. AFIT/ENY/14M-43. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

SHEWART, ANDREW T., *Minimization of the Effects of Secondary Reactions on Turbine Film Cooling in a Fuel Rich Environment*. AFIT/ENY/14J-37. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

STICKNEY, HEATHER M., *Performance Characterization, Development, and Application of Artificial Potential Function Guidance Methods*. AFIT/ENY/14M-44. Faculty Advisor: Lt Col Jeremy S. Agte. Sponsor: AFRL/RV. [CSRA]

TERPENING, CHRISTOPHER D., *Characterization of CH-47D Rotor System Fault Signatures Using a Comprehensive Model*. AFIT/ENY/14M-45. Faculty Advisor: Dr. Donald L. Kunz. Sponsor: AMRDEC.

THOMAS, JASON W., *A Method of Surrogate Model Construction which Leverages Lower-fidelity Information using Space Mapping Techniques*. AFIT/ENY/14M-46. Faculty Advisor: Lt Col Jeremy S. Agte. Sponsor: AFRL/RQ.

TILLMAN, BRETT D., *Two and Three-Dimensional Computational Study of Shock Ignition Phenomena*. AFIT/ENY/14M-47. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: AFRL/RW.

WILKINSON, MICHAEL P., *Mechanical Properties and Fatigue Behavior of Unitized Composite Airframe Structures at Elevated Temperature*. AFIT/ENY/14M-05. Faculty Advisor: Dr. Marina B. Ruggles-Wrenn. Sponsor: AFRL/RQ.

WOODSIDE, DUSTIN C., *A Computational Investigation of Localized Critical Ignition Energy of Mesoscale Explosives*. AFIT/ENY/14M-52. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: AFRL/RW.

UNRUH, REBECCA A., *Data Fusion for Decision Support*. AFIT/ENY/14M-48. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV. [CSRA]

5.1.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AGTE, JEREMY S., Lt Col,

Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2011 (AFIT/ENY); BS, Aeronautical Engineering, United States Air Force Academy, 1997; MS, Mechanical Engineering, The George Washington University, 1999; PhD, Aeronautical and Astronautical Engineering, Massachusetts Institute of Technology, 2011. Lt Col Agte has significant experience in aircraft design, systems optimization, and computational analysis of aerospace systems. Additionally, he is a flight test engineering graduate of the U.S. Air Force Test Pilot School (01A). His research focus areas include aerospace systems design, multidisciplinary design optimization, multistate design for robustness, and optimal control. Tel. 255-3636 x4667, email: Jeremy.Agte@afit.edu

AYRES, BRADLEY J.,

Visiting Assistant Professor of Systems Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2012 (AFIT/ENY); BS, Chemical Engineering, University of Missouri, Columbia, 1982; M.A., Procurement and Acquisition Management, Webster University, St. Louis, 1991; M.S., Software Systems Management, Air Force Institute of Technology, 1992; PhD, Business Administration specializing in MIS, Florida State University, 2003. Dr. Ayres' research interests include development of complex systems. He is a member of AIAA, the Project Management Institute, and the International Council on Systems Engineering. Tel. 255-3355 x3422 email: Bradley.Ayres.ctr@afit.edu

BENTLEY, BROOK I., Capt,

Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2013 (AFIT/ENY); BS Mechanical Engineering, Brigham Young University, 2005; MS Aeronautical Engineering, Air Force Institute of Technology, 2009; PhD, Air Force Institute of Technology, 2013. Capt Bentley's research interests include hypersonics, scramjets, fluids, and surface phenomena such as ablation and sublimation. He is a member of AIAA, Phi Kappa Phi, Tau Beta Pi, and Sigma Gamma Tau. Tel. 937-255-3636 x7478, email: Brook.Bentley@afit.edu

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Bentley, B., "Scattering, Adsorption, and Langmuir-Hinshelwood Desorption Models for Physisorptive and Chemisorptive Gas-Surface Systems," presented to faculty, researchers, students, and staff at the University of Queensland's Centre for Hypersonics, Sep 2014.

BLACK, JONATHAN T.,

Director, Center for Space Research and Assurance, Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2007 (AFIT/ENY); BS Industrial Engineering, University of Illinois at Urbana-Champaign, 2001; MS Mechanical and Aerospace Engineering, Joint Institute for Advancement of Flight Sciences (joint NASA Langley Research Center and George Washington University program), 2003; PhD, Mechanical Engineering, University of Kentucky, 2006. Dr. Black has worked on several successful space experiments and AFIT's Space Vehicle Design sequence. His current research interests include structures, structural dynamics, advanced sensing technologies, space systems engineering, and novel orbit analysis for a wide variety of military and intelligence applications including large lightweight space structures, micro UAV development, and taskable satellites. He is the first AFIT recipient of an AFOSR Young Investigator Award and is an AIAA Associate Fellow. Email: Jonathan.Black@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"AFIT Space Research in Support of SMC/SDL." Sponsor: AFSPC. Funding: \$50,000. [CSRA]

"AFIT USSTRATCOM." Sponsor: USSTRATCOM. Funding: \$30,000 - Black 50%, Jennings 25% , Simmons 25%. [CSRA]

“EO Imaging SmallSats Study.” Sponsor: N/A. Funding: \$75,000 - Black 50%, Swenson 50%. [CSRA]

“Imaging Chromotomographic Spectrometer Experiment (CTex).” Sponsor: N/A. Funding: \$55,000 - Black 40%, Cobb 30%, Swenson 30%. [CSRA]

“Imaging Chromotomographic Spectrometer Experiment (CTex).” Sponsor: N/A. Funding: \$97,300 - Black 50%, Hawks 50%. [CSRA]

“JWAC AFIT Interaction.” Sponsor: JWAC. Funding: \$125,000. [CSRA]

“Program Analyst for Integrated Air and Missile Defense.” Sponsor: MDA. Funding: \$12,996.23. [CSRA]

COBB, RICHARD G.,

Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2001 (AFIT/ENY); BS, Pennsylvania State University, 1988; MS, Air Force Institute of Technology, 1992; PhD, Air Force Institute of Technology, 1996. Dr. Cobb teaches courses on control theory, optimization and satellite design. His research focuses on dynamics and control of space structures for space-based remote sensing, and optimization and control for aerospace applications. Recent research includes developing optimal trajectory plans for Global Strike missions, maneuver planning for satellite proximity operations, and dynamics and control techniques for lightweight space optics and sensor systems for Space Situational Awareness. While on active duty, Dr Cobb has served as the technical advisor for AFRL’s Space Vehicles Technology Branch, and has led several space flight experiment programs, including the Vibration Isolation and Suppression System sponsored by BMDO, and the Satellite Ultra-quiet Isolation Technology Experiment. Dr. Cobb has also served as a launch operations officer at Cape Canaveral AFS on the Global Positioning System program, responsible for the integration and launch of the GPS Block II satellite constellation. Dr Cobb is an Associate Fellow of AIAA. Tel. 937-255-3636 x4559, email: Richard.Cobb@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Automatic Airborne Collision Avoidance System for Remotely Piloted Aircraft.” Sponsor: AFRL/RQ. Funding: \$25,000. [ANT]

“Collaborative Control for Multi-UAV Operations.” Sponsor: AFRL/RQ. Funding: \$10,000 - Cobb 25%, Jacques 25%, Colombi 25%, Pachter 25%. [ANT]

“GEO Space Situational Awareness.” Sponsor: AFRL/RV. Funding: \$120,000 - Cobb 34%, Wiesel 33%, Simmons 33%. [CSRA]

“Model Uncertainty and Test of a Segmented Mirror Telescope.” Sponsor: OSD. Funding: \$20,000. [CSRA]

“TNG Microsatellite Development.” Sponsor: N/A. Funding: \$83,160 - Cobb 40%, Swenson 30%, Black 30%. [CSRA]

“Toolset Development and Pathfinder for SSA Enhancement.” Sponsor: NASIC. Funding: \$137,000. [CSRA]

REFEREED JOURNAL PUBLICATIONS

Lindholm, G. J. and Cobb, R. G., “Passive Rotation Joint Design Considerations for Lift and Thrust Generation for a Biomimetic Flapping Wing,” *International Journal of Micro Air Vehicles*, Vol. 6, No. 3, pp. 141-154, Sep 2014.

Ross, S. M., Cobb, R. G., Baker, W. P., and Harmon F., “Implementation lessons and pitfalls for real-time optimal control with stochastic systems,” *Optimal Control Applications and Methods*, Published online on 27 Feb 2014, DOI: 10.1002/oca.2110. [ANT]

Lindholm, G. J. and Cobb, R. G., "Closed-Loop Control of a Constrained, Resonant-Flapping Micro Air Vehicle," *AIAA Journal*, Vol. 52, No. 8, pp. 1616-1623, Aug 2014, DOI: 10.2514/1.J052641. [ANT]

Ross, S. M., Cobb, R. G. and Baker, W. P., "Stochastic Real-Time Optimal Control for Bearing-only Trajectory Planning," *International Journal of Micro Air Vehicles*, Vol. 6, No. 1, Mar 2014, DOI: 10.1260/1756-8293.6.1.1. [ANT]

Anderson, M. and Cobb, R., "Implementation and Evaluation of a Flapping Wing Control Technique for Micro Air Vehicles," *AIAA Journal of Guidance, Control and Dynamics*, Vol. 37, No.1, pp. 290-300, Jan 2014, DOI:10.2514/1.57855. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Smith, N. E., Cobb, R., Pierce, S., and Raska, V., "Optimal Collision Avoidance Trajectories via Direct Orthogonal Collocation for Unmanned/Remotely Piloted Aircraft Sense and Avoid Operations," AIAA-2014-0966, AIAA Guidance, Navigation, and Control Conference, National Harbor, MD, 13-17 Jan 2014. [ANT]

Jodeh, N. M., Coon, T., Masternak, T. J., Cobb, R. G., and Agte, J. S., "Optimal Airborne Trajectories for Data Collected from Emplaced Ground Sensor Arrays," AIAA-2014-1291, AIAA Guidance, Navigation, and Control Conference, National Harbor, MD, 13-17 Jan 2014. [ANT]

Dras, L., Jennings, A. L., and Cobb, R. G., "Model Complexity Reduction of a Segmented Mirror Telescope," AIAA-2014-0476, AIAA Modeling and Simulation Technologies Conference, National Harbor, MD, 13-17 Jan 2014. [CSRA]

DELUCA, ANTHONY M., Lt Col,

Deputy Head and Assistant Professor of Aerospace Engineering, AFIT Appointment Date: 2013 (AFIT/ENY); BS Mechanical Engineering, US Military Academy at West Point, 1995; MBA Technology Management, University of Phoenix/ABQ, 1998; MS Aeronautical Engineering, Air Force Institute of Technology, 2004; PhD Aeronautical Engineering, Air Force Institute of Technology, 2013. Lt Col DeLuca's research interests include aerodynamics, fluid mechanics, and biomimetic flight systems. Lt Col DeLuca is a flight test engineer with extensive experience in air-to-air and air-to-ground weapons, and on national ISR systems, conducting flight test in a variety of aircraft. He is a commercial pilot with instrument and high-performance ratings, and a member of Tau Beta Pi, Sigma Gamma Tau, and AIAA. Tel. 937-255-3636 x4537, email: Anthony.Deluca@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Development of Autonomous Functional Defeat Technologies for use against Hard and Deeply Buried Targets." Sponsor: AFRL/RW. Funding: \$50,000 - DeLuca 50%, Reeder 25%, Cobb 25%. [ANT]

DILLSAVER, MATTHEW J., Maj,

Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2013 (AFIT/ENY); BS Mechanical Engineering, University of Oklahoma, 2002; MS Aeronautical Engineering, Air Force Institute of Technology, 2007; PhD, Aerospace Engineering, University of Michigan, 2013. Maj Dillsaver has experience as a Mechanical Systems and Aircraft Battle Damage Repair Engineer on the KC-135, F-15 Stability and Control Engineer, as well as Executive Officer and Assistant Director of Operations at the Air Force SEEK EAGLE Office. His research focus areas include control of very flexible aircraft, maneuver optimization for aircraft combat survivability and optimal control. Tel. 255-3636 x4745, email: Matthew.Dillsaver@afit.edu

GEISEL, CHRISTOPHER D., Maj,

Assistant Professor of Astronautical Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2014 (AFIT/ENY); BS Astronautical Engineering, United States Air Force Academy,

2001; MS Astronautical Engineering, Air Force Institute of Technology, 2008; PhD, Purdue University, 2013. Maj Geisel's research interests include astrodynamics and dynamical systems theory. He has investigated spacecraft orbit design in a multi-body environment as well as navigation solutions for on-orbit inspection of satellites. Previously, he worked as an orbital analyst for the Advanced Payload Design Team at NASA's Jet Propulsion Laboratory. At the Air Force Research Laboratory Sensors Directorate, he led the design of a sensor system for hypersonic vehicles. At the Space and Missile Systems Center / Missile Defense Systems Group, he supervised development, integration, testing, and operator training for two satellites designed to track ballistic missiles. He also mentored Iraqi and Afghan security forces during Operation Iraqi Freedom and Operation Enduring Freedom. Maj Geisel is a member of Sigma Gamma Tau, Tau Beta Pi, and AIAA. Tel. 937-255-3636 x4237, email: Christopher.Geisel@afit.edu

GREENDYKE, ROBERT B.,

Associate Professor of Aeronautics and Astronautics and Director, AFIT Scientist and Engineer Education Programs at Kirtland AFB; Appointment Date: 2005 (AFIT/ENY); BBA, Economics, Baylor University, 1979; BS, Aerospace Engineering, Texas A&M University, 1986; MS, Aerospace Engineering, Texas A&M University, 1988; PhD, Interdisciplinary Engineering, Texas A&M University, 1998. Dr. Greendyke's research interests include computational fluid dynamics, Direct Simulation Monte Carlo methods, hypersonic and reacting flows, radiation simulation, thermophysics, and plasma simulation. Dr. Greendyke was a Research Scientist at NASA-Langley Research Center studying re-entry and aerobraking flows, and an Associate Professor in the University of Texas at Tyler establishing a start-up Mechanical Engineering Program from concept through accreditation. He has published over 30 journal articles, technical reports and conference publications in multiple fields. He is an Associate Fellow of the American Institute of Aeronautics and Astronautics. Tel. 937-255-3636 x4567, email: Robert.Greendyke@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

"Hypersonic Physics Short Course." Sponsor: NASIC. Funding: \$24,300.

SPONSOR FUNDED RESEARCH PROJECTS

"Computational and Experimental Investigation of Ablative-Radiative Hypersonic Flows." Sponsor: AFOSR. Funding: \$32,796 - Greendyke 60%, Martin, C. 40%.

"Explosives and Warhead Research." Sponsor: AFRL/RW. Funding: \$60,000 - Greendyke 75%, Liu 25%.

"Thermophysical Prediction of Hypersonic Vehicles." Sponsor: NASIC. Funding: \$25,000.

JENNINGS, ALAN L.,

Research Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2012 (AFIT/ENY); BS Mechanical Engineering, University of Akron, 2006; MS Electrical Engineering, University of Dayton, 2007; PhD, Electrical Engineering, University of Dayton, 2012. Dr. Jennings' research interests include dynamics of light-weight flexible structures, including flapping wing, space-structures and the non-contact measurement systems needed to characterize their behavior, machine vision, trajectory optimization and function approximation. His current work involves characterizing the deployment and operational precision of a large, sparse reflector in space, uncertainty in visual navigation induced by clouds, and measuring instantaneous forces of flapping wings by measuring the bob and surge via image processing. Dr. Jennings has also supported strategic exercises by visualization of space operations. Tel. 255-3636 x7495, email: Alan.Jennings@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Cloud-Induced Uncertainty for Visual Navigation." Sponsor: DAGSI. Funding: \$12,614. [ANT]

"Structural Design Considerations for Very-Large Space Antenna." Sponsor: AFOSR. Funding: \$36,720 - Jennings 75%, Black 25%. [CSRA]

REFEREED JOURNAL PUBLICATIONS

D.D. Doyle, A.L. Jennings, J.T. Black, "Optical Flow Background Estimation for Real-Time Pan/Tilt Camera Object Tracking," *Measurement*, Elsevier, Vol. 48, Feb 2014, pp. 195-207, DOI: 10.1016/j.measurement.2013.10.025. [ANT & CSRA]

A. Jennings and R. Ordonez, "Optimal Inverse Functions Created via Population Based Optimization," *Transactions on Cybernetics*, IEEE, Jun 2014, pp. 950-965. DOI: 10.1109/TCYB.2013.2278102. [CSRA]

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C. Bellows, A.L. Jennings, J. Black, "Analysis of Angle Data Extraction Techniques for Electro-optical Satellite Tracking," *AIAA Space 2014*, 5 Aug 2014. [CSRA]

Alyssa Gutierrez, A.L. Jennings, "Cloud-Induced Uncertainty for Visual Navigation: Development of Cloud Templates," *IEEE National Aerospace Electronics Conference (NAECON)*, 25 Jun 2014. [ANT & CSRA]

A.L. Jennings, M. Mayhew, J. Black, "In-Flight Oscillation of Flapping Wing Vehicle," *AIAA Atmospheric Flight Mechanics Conference*, 17 Jan 2014, DOI: 10.2514/6.2014-0890. [CSRA]

Jason Heller, A.L. Jennings, J. Black, G. Greschik, "Precision of Large Deployable Reflector," *AIAA Spacecraft Structures Conference*, 17 Jan 2014, DOI:10.2514/6.2014-1513. [CSRA]

L. Dras, A.L. Jennings, R. Cobb, "Model Complexity Reduction of a Segmented Mirror Telescope," *AIAA Modeling and Simulation Technologies Conference*, 17 Jan 2014, DOI: 10.2514/6.2014-0476. [CSRA]

KING, PAUL I.,

Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 1991 (AFIT/ENY); BS, Arizona State University, 1971; MS, Air Force Institute of Technology, 1972; PhD, Oxford University, England, 1986. He is a former faculty member at the U.S. Air Force Academy and at the Cleveland State University. Dr. King's research interests include internal and external aerodynamics and heat transfer (wings and bodies, turbomachinery and other applications). His research emphasizes experimentation and instrumentation. He has published over 100 articles and reports and chaired over 70 theses and dissertations. Tel. 937-255-3636 x4628, email: Paul.King@afit.edu

KUNZ, DONALD L.,

Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2003 (AFIT/ENY); BS, Syracuse University, 1971; MS, Georgia Institute of Technology, 1972; PhD, Georgia Institute of Technology, 1976; Dr. Kunz's research interests include rotorcraft dynamics, vibrations, and loads, structural dynamics, aeroelasticity, multibody dynamics, smart structures, and computational structural mechanics. He has published more than 100 journal articles, conference papers, and technical reports. Prior to coming to AFIT, Dr. Kunz worked at the US Army Aeroflightdynamics Directorate, McDonnell Douglas Helicopter Company, Old Dominion University, and the US Army Aviation and Missile Command. He is an Associate Fellow of AIAA, a member of AHS and ASME, and a licensed professional engineer in the Commonwealth of Virginia. Tel. 937-255-3636 x4548, email: Donald.Kunz@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"CH-47 Rotating System Fault Sensing for Condition Based Maintenance." Sponsor: AMRDEC. Funding: \$28,100.

"Research Support for Joint AFIT/TPS Test Management Projects." Sponsor: AFTPS. Funding: \$30,000.

REFEREED JOURNAL PUBLICATIONS

Kolsti, K.F. and Kunz, D.L., "A Time-Marching Collocation Method Based on Quintic Hermite Polynomials and Adjustable Acceleration and Jerk Constraints," *International Journal for Numerical Methods in Engineering*, Vol. 99, No. 8, 24 Aug 2014, pp. 547-565, DOI: 10.1002/nme.4681.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Greene, K.M., Kunz, D.L., and Cotting, M.C., "Toward a Flying Qualities Standard for Unmanned Aircraft," AIAA 2014-2194, Proceedings of the AIAA Atmospheric Flight Mechanics Conference, Atlanta, GA, Jun 2014.

LIEBST, BRADLEY S.,

Professor of Aerospace Engineering and Head, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 1989 (AFIT/ENY); BS, Wichita State University, 1978; MS, Massachusetts Institute of Technology, 1979; PhD, Massachusetts Institute of Technology, 1981. Dr. Liebst's research interests include eigenstructure assignment and control, stability and control of aerospace vehicles, passive and active control of large flexible structures, and aircraft handling qualities. He has published over 30 articles and reports and chaired over 40 theses and dissertations. Prior to teaching at AFIT, Professor Liebst was Assistant Professor of Aerospace Engineering for 6 years at the University of Minnesota where he was voted the 1987 Best Institute of Technology (U of M) Professor. Tel. 937-255-3636 x4636, email: Bradley.Liebst@afit.edu

LIU, DAVID, Capt,

Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2011 (AFIT/ENY); BS Aerospace Engineering, University of Texas at Austin, 2002; MS Aerospace Engineering, University of Texas at Austin, 2004; PhD, Astronautical Engineering, Air Force Institute of Technology, 2011. Prior to his assignment to AFIT, Capt Liu was assigned to the AFRL, Space and Missile Directorate at Edwards AFB, CA as lead Experimental Test Engineer and later as Chief of Operations for the Experimental Demonstration Branch. Capt Liu was responsible for testing state-of-the-art rocket Technology for the USAF and other government agencies. Capt Liu was also part of the Joint Combat Assessment Team deployed to Afghanistan to determine the effects of combat damage on Joint aviation assets for the advancement of aircraft survivability efforts. Capt Liu's interests include experimental research in plasma phenomenon in electric propulsion and other aerospace applications. In addition, Capt Liu's interests include the improvement of aircraft survivability, advances in weapons design, Additive Manufacturing, and Topology Optimization. Capt Liu is a member of Tau Beta Pi, Sigma Gamma Tau, and AIAA. Tel. 255-3636 x4542, email: David.Liu@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

"Combat Aircraft Survivability Education." Sponsor: JASPO. Funding: \$26,000.

SPONSOR FUNDED RESEARCH PROJECTS

"Design Tools for Direct Digital Fabrication of Hypersonic Systems." Sponsor: AFOSR. Funding: \$18,640.

"Explosives and Warhead Research." Sponsor: AFRL/RW. Funding: \$20,000 - Liu 25%, Greendyke 75%.

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Liu, D., Huffman, R. E., Branam, R. D. and Hargus, W. A., "Ultrahigh Speed Images of Hall Thruster Azimuthal Instabilities," *IEEE Transaction on Plasma Science*, Vol. 42, No. 10.

REFEREED CONFERENCE PAPER ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Lesko, J., Liu, K., McCafferty, J., Woods, R., and Liu, D., "Initial Micro-Resistojet Component Testing in Atmospheric and Simulated Space Environment," AIAA Region III Student Paper Conference, Cleveland, OH, 4-5 Apr 2014.

REFEREED CONFERENCE PAPER ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Pal, R. Coutu, R. A., Liu, D., "Using Microelectromechanical Systems (MEMS) Parallel-Plate Electrostatic Sensors to Determine Thrust of a Hall Effect Thruster," Proceedings of SPIE Vol. 8973 Micromachining and Microfabrication Process Technology XIX, San Francisco, CA, 2-7 Feb 2014.

MALL, SHANKAR,

Distinguished Professor, Department of Aeronautics and Astronautics, AFIT Appointment Date: 1986 (AFIT/ENY); BS, Mechanical Engineering, Banaras Hindu University, India, 1964; MS, Mechanical Engineering, Banaras Hindu University, 1966; PhD, Mechanical Engineering, University of Washington, 1977. Dr. Mall's research centers on composite and smart materials, fatigue and fracture. Dr. Mall has authored over 300 papers and has been the co-editor of a book and five conference proceedings. He is a Fellow of ASME, Associate Fellow of AIAA. He was also the Principal Materials Research Engineer, Materials and Manufacturing Directorate, Air Force Research Laboratory. Tel. 937-255-3636 x4587, email: Shankar.Mall@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Carbon Nanotube Yarns' Performance under Tension Load." Sponsor: N/A. Funding: \$53,060.

"Corrosion Fatigue Crack Initiation and Growth Behavior of ZnNi/Cadmium Plated High Strength Steel and Alum." Sponsor: OSD. Funding: \$180,000.

"Electromechanical Characterization of Nanocomp's Carbon Nanotube Products (Yarns, Sheets and Tapes)." Sponsor: N/A. Funding: \$68,580.

REFEREED JOURNAL PUBLICATIONS

Misak, H. E, Perel, V. Y., Sabelkin, V. and Mall, S., "Corrosion Fatigue Crack Growth Behavior of 7075-T6 under Biaxial Tension-Tension Cyclic Loading Condition", Engineering Fracture Mechanics, 38-48, 2013.

Misak, H., V. Sabelkin, L. Miller, R. Asmatulu, S. Mall and P.E. Kladitis. "Creep and Inverse Stress Relaxation Behavior Carbon Nanotube Wire," Journal of Nanoscience and Nanotechnology, 8331-8339, 2013.

MARTIN, CHRISTOPHER L., Capt,

Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2012 (AFIT/ENY); BSE: Mechanical, University of Tennessee at Chattanooga, 2005; MS Mechanical Engineering, University of New Mexico, 2008; PhD, Air Force Institute of Technology, 2011. Capt Martin's research interests include all aspects of Computational Fluid Dynamics with a particular interest in modeling thermophysical phenomena, especially those associated with hypersonics, nonequilibrium kinetics and radiation-gasdynamic interactions. Previous research has included the computational modeling of plasma-based aerodynamic actuators and radiation-dominated reentry flow fields. He is a member of Sigma Gamma Tau, Tau Beta Pi and AIAA. Tel. 255-3636 x4403, email: Christopher.Martin@afit.edu

PALAZOTTO, ANTHONY N.,

Distinguished Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 1975 (AFIT/ENY); BS, New York University, 1955; MS, Brooklyn Polytechnic Institute, 1961; PhD, New York University, 1968. Professor Palazotto's interests include nonlinear mechanics, shell

analysis, finite elements, composite materials, viscoplasticity and nonlinear dynamics. Dr. Palazotto is the co-author of a textbook, "The Nonlinear Analysis of Shell Structures," published in 1992 by the AIAA. In addition he has authored 221 archival technical publications and more than 500 technical presentations and manuscripts. Dr. Palazotto received the Hetenyi Award in 1982 from the Society of Experimental Mechanics, the Cleary Award in 1981 from the Air Force Materials Lab, the Structures and Materials Award from the ASCE in 1986 and the AIAA Sustained Service Award in 2004. Dr. Palazotto is a Fellow of the ASCE; a Fellow of the AIAA and a Fellow of the American Academy of Mechanics. He is a registered Professional Engineer in the state of Ohio. Tel. 937-255-3636 x4599, email: Anthony.Palazotto@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Evaluation of a Lighter Than Air Using Unique Geometries." Sponsor: AFOSR. Funding: \$53,985.

"Evaluation of turbine blades considering damping." Sponsor: AFRL/RQ. Funding: \$23,000.

"Extreme Wear-Resistant Materials." Sponsor: AFOSR. Funding: \$37,300.

"Structural Dynamics and Mechanics of Turbomachinery." Sponsor: DAGSI. Funding: \$21,420.

REFEREED JOURNAL PUBLICATIONS

Hollenbeck, A., Palazotto, A., and Willis, M., "Mechanical Characterization of Flight Mechanism in the Hawkmoth *Manduca Sexta*," J. Experimental Mechanics, Vol. 53, No. 7, pp. 1189-1199, 2013.

Buentello, R., and Palazotto, A., "Thermal Contributions to the Mechanical High-Speed Sliding Wear," Intl. Test and Evaluation Journal, Vol. 35, No. 2, pp. 182-199, 2014.

Easterday, O., Palazotto, A., Baker, W., Branum, R., and George, T., "Thermal Issues in Development of an Apparatus to Enable Characterization of Coatings," J. of Materials Science and Engineering with Advanced Technology, Vol. 9, No. 2, pp. 69-107, 2014.

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Cox, G., Palazotto, A., Beck, J., Brown, J., "The Experimental Foundation Used to Validate a Reduced Order Model for Mistuned Rotors," paper No. AIAA-2014, 0099, presented at the AIAA SciTech, National Harbor, MD., 6 Jan 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Cranston, Brian, and Palazotto, A., "Evaluation of the Thorax of the *Manduca Sexta* for Flapping Wing Air Vehicle," (Award Winner), presented at the WSU, ASME, DESS, 2013, Conference, 29 Oct 2013.

Alban, C., Palazotto, A., Baker, W., and Rutledge, J., "Thermal and Melt Wear Characterization of Materials in Sliding Contact at High Speeds," presented at the WSU, ASME, DESS, 2013, Conference, 29 Oct 2013.

Cavallaro, G., Palazotto, A., Baker, W., "Comparison of Medium and High Speed Wear Rates Using Abaqus," presented at the WSU, ASME, DESS, 2013, Conference, 29 Oct 2013.

Deleon, A., and Palazotto, A., "Finite Element Modeling of Stress Wave Propagation," presented at the WSU, ASME, DESS, 2013, Conference, Oct 29, 2013.

Adomo-Rodriguez, R. and Palazotto, A., "The Analysis of a Lighter Than Air Vehicle Within a Vacuum," presented at the WSU, ASME, DESS, 2013, Conference, 29 Oct 2013.

Cox, G., Palazotto, A., Brown, J., and George, T., "Experimental Uncertainty Qualification and its Cumulative Effects on the Identification of Geometric Mistuning In Cyclic Structures," presented at the WSU, ASME, DESS, 2013, Conference, 29 Oct 2013.

Wuertemberger, L., and Palazotto, A., "Predicting Wear of a High Speed Rocket Sled Using a HydoCode (CTH)," presented at the WSU, ASME, DESS, 2013, Conference, 29 Oct 2013.

Alban, C., Palazotto, A., Baker, W., and Rutledge, J., "High Speed Effects on Thermal Wear," presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 5 Mar 2014. Dayton, OH.

Cavallaro, G., Palazotto, A., and Baker, W., "The Use of Abaqus in Evaluating Medium Velocity Wear," presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 5 Mar 2014. Dayton, OH.

Cranston, B. and Palazotto, A., "Evaluation of a Flapping MAV Wing," presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 5 Mar 2014. Dayton, OH.

Deleon, A. and Palazotto, A., "Wave Propagation in a 3D Beam," presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 5 Mar 2014. Dayton, OH.

Adomo, Rodriquez, R., and Palazotto, A., "Analysis of a LTA Vehicle," presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 5 Mar 2014. Dayton, OH.

Cox, G., Palazotto, A., Brown, J., George, T., "Experimental Evaluation of Mistuning," presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 5 Mar 2014. Dayton, OH.

Wuertemberger, L., and Palazotto, A., "The Use of a HydoCode in Evaluating Wear at High Velocities," presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 5 Mar 2014. Dayton, OH.

POLANKA, MARC D.,

Associate Professor of Aerospace Engineering, AFIT Appointment Date: 2009 (AFIT/ENY); BS, Mechanical Engineering, University of Dayton, 1992; MS, Mechanical Engineering, Stanford University, 1993; PhD, Mechanical Engineering, University of Texas, 1999; Prior to accepting a position with AFIT, Dr. Polanka served 17 years in Turbine Engine Division of the Air Force Research Laboratory's Propulsion Directorate. Dr. Polanka's research interests include aspects of heat transfer, combustion, and fluid mechanics focusing on experimental applications involving turbine and combustor aerodynamics and cooling techniques. He has been published in a variety of journals including the Journal of Turbomachinery, the AIAA Journal of Propulsion and Power, and the Journal of Engineering for Gas Turbines and Power. He also has two patents to his credit. Dr. Polanka is an Associate Fellow of the AIAA, the past Section Chair of the Dayton-Cincinnati Section of the AIAA, and the Honors and Awards Chair for the same section. Dr. Polanka serves as the Faculty representative for the AFIT Student Section branch of AIAA. He is also a Fellow of the ASME and serves on the Executive Board of the K-14 Committee of the International Gas Turbine Institute where he is also a past Point Contact for the annual Turbo Expo conference. Tel. 937-255-3636 x4714, email: Marc.Polanka@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"AFIT Combustion Laboratory Program Concerning UCC and Small Engine Combustion Phenomena."
Sponsor: AFRL/RQ. Funding: \$25,000.

"Combustion Physics under High Centripetal Acceleration." Sponsor: AFOSR. Funding: \$32,380 - Polanka 85%, Rutledge 15%.

"Cooling Techniques to Minimize Impact of Secondary Reactions in the High Fuel Air Environment."
Sponsor: AFRL/RQ. Funding: \$37,380 - Polanka 90%, Rutledge 10%.

“Fundamental Understanding of Flowpath Issues through an Engine with an ITB and UCC Combustor.”
Sponsor: AFOSR. Funding: \$52,191.

“Unmanned Air Vehicle (UAV) and Payload Systems Technology (UPST).” Sponsor: AFMC. Funding:
\$10,000 - Woolley 22%, Polanka 20%, Collins 37%, Jacques 21%. [ANT]

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Greiner, N.J., Polanka, M.D., Robertson, J.R., Rutledge, J.L., “Effect of Variable Properties within a Boundary Layer with Large Freestream to Wall Temperature Differences,” *Journal for Gas Turbines and Power*, Vol. 136, Iss. 5, Jul 2014, pp. 052604 1-9.

Crosbie, S.C., Polanka, M.D., Litke, P., and Hoke, J.L., “Increasing Reliability of a Small 2-Stroke Internal Combustion Engine for Dynamically Changing Altitudes,” *Journal of Propulsion and Power*, Vol. 30, Iss. 1, Jan 2014, pp. 87-95.

Heffernen, J.J., Hartsfield, C.R., Reeder, M.F., Polanka, M.D., “Horizontally Issuing Diffusion Flames Characterized by OH-PLIF and Visualizations,” *International Journal of Spray and Combustion*, Vol. 6, No. 1, Mar 2014, pp. 35-65.

Bohan, B.T., Blunck, D.L., Polanka, M.D., Kostka, S., Jiang, N., Stouffer, S.D., “Impact of an Upstream Film-Cooling Row on Mitigation of Secondary Combustion in a High Fuel-Air Environment,” *Journal of Turbomachinery*, Vol. 136, No.3, Mar 2014, pp. 031008 1-8.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Rutledge, J.L., and Polanka, M.D., “CFD Evaluations of Unconventional Film Cooling Scaling Parameters on a Simulated Turbine Blade Leading Edge,” GT2014-25893, ASME Turbo Expo 2014, Dusseldorf, Germany, 16-20 Jun 2014.

Greiner, N.J., Polanka, M.D., Rutledge, J.L., and Shewhart, A.T., “Effect of Variable Properties and Radiation on Convective Heat Transfer Measurements at Engine Conditions,” GT2014-25701, ASME Turbo Expo 2014, Dusseldorf, Germany, 16-20 Jun 2014.

Greiner, N.J., Polanka, M.D., and Rutledge, J.L., “Scaling of Film Cooling Performance from Ambient to Engine Temperatures,” GT2014-25702, ASME Turbo Expo 2014, Dusseldorf, Germany, 16-20 Jun 2014.

Shewhart, A.T., Polanka, M.D., Robertson, J.R., Greiner, N.J., and Rutledge, J.L., “Minimization of Heat Load due to Secondary Reactions in Fuel Rich Environments,” GT2014-25703, ASME Turbo Expo 2014, Dusseldorf, Germany, 16-20 Jun 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Mataczynski, M.R., Hoke, J.L., Paxson, D.E., and Polanka, M.D., “Design, Simulation, and Testing of a Pressure Wave Supercharger for a Small Internal Combustion Engine,” SAE Aerospace Systems and Technology Conference, SAE 2014-01-2136, Cincinnati, OH, 23-25 Sep 2014.

Richardson, D.R., Brinker, A.J., Polanka, M.D., Lynch, A.C., and Blunck, D.L. “Liquid Spray Characterization in Flow Fields with Centripetal Acceleration,” AIAA SciTech Conference, AIAA-2014-1021, National Harbor, MD, 13-17 Jan 2014.

Damele, C.J., Polanka, M.D., Wilson, J.D., and Rutledge, J.L. “Characterizing Thermal Exit Conditions for an Ultra Compact Combustor,” AIAA SciTech Conference, AIAA-2014-0456, National Harbor, MD, 13-17 Jan 2014.

Mataczynski, M.R., Polanka, M.D., Hoke, J.L., and Paxson, D.E., "Design and Implementation of Waverotor Technology for Small-Bore Two-Stroke Internal Combustion Engines," AIAA SciTech Conference, AIAA-2014-0528, National Harbor, MD, 13-17 Jan 2014.

Miranda, J.L., Polanka, M.D., and Simmons, R.J., "The Use of an Ultra-Compact Combustor as an Inter-Turbine Burner for Improved Engine Performance," AIAA SciTech Conference, AIAA-2014-0458, National Harbor, MD, 13-17 Jan 2014.

Rittenhouse, J.A., Rowton, A.K., Ausserer, J.K., Polanka, M.D., Litke, P.J., Grinstead, K.D., "Thermal Loss Determination for Small Internal Combustion Engines," AIAA SciTech Conference, AIAA-2014-0529, National Harbor, MD, 13-17 Jan 2014.

Ausserer, J.K., Litke, P.J., Groenewegen, J.R., Rowton, A.K., Polanka, M.D., and Grinstead, K.D., "Development of Test Bench and Characterization of Performance in Small Internal Combustion Engines," SAE-2013-32-9036, 19th Small Engine Technology Conference, Taipei, Taiwan, 8-10 Oct 2013.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Polanka, M.D. "Ultra Compact Combustors," Presented to The Ohio State University Department of Mechanical and Aerospace Engineering, Nov 2013.

RADSICK, TIMOTHY C., Lt Col,

Assistant Professor of Aerospace Engineering and Deputy Head, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2011 (AFIT/ENY); BS Physics, Harvey Mudd College, 1991; MS Materials, University of California, Santa Barbara, 2001; PhD, Materials, University of California, Santa Barbara, 2007. Lt Col Radsick's research interests include: processing of ceramics and ceramic matrix composites; advanced materials and fabrication techniques for aerospace and surface transport vehicles; aircraft life extension and corrosion prevention; and fuel-efficient ground vehicles, specifically hydraulic-pneumatic energy recovery systems and single-person vehicles. In previous assignments he served as Director of the USAF Academy's Center for Aircraft Structural Life Extension (CAStLE) and as Assistant Professor of Engineering Mechanics, was an ESEP Research Scientist at the German Aerospace Center (DLR/Köln-Porz), and researched advanced materials for spacelift at the Rocket Lab at Edwards AFB. In 2011, Lt Col Radsick deployed to Iraq as an Air Advisor and Chief of the New Al-Muthana Base Transition Team. Tel. 255-3636 x4204, email: Timothy.Radsick@afit.edu

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SPONSOR FUNDED RESEARCH PROJECTS

“ ‘Flight Testing’ in the AFIT Low Speed Wind Tunnel.” Sponsor: AFRL/RW. Funding: \$60,000 - Reeder 50%, Cobb 50%. [ANT]

“ ‘Flip-Turn’ Missile Aerodynamic Characterization.” Sponsor: Lockheed Martin. Funding: \$42,000 - Reeder 50%, Lofthouse 50%.

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Heffernen, J., Hartsfield, C. Reeder, M., Polanka, M., “Horizontally Issuing Diffusion Flames Characterized by OH-PLIF and Visualizations,” accepted to the journal, *International Journal of Spray and Combustion Dynamics*, Vol. 6, No. 1, pp. 35-65, Mar 2014. (GSC=N/A, JIF = 0.636).

Callaway, D., Reeder, M., Greendyke, R., and Gosse, R., “Ablation Measurements and Analysis of Solid Carbon Dioxide Models at Mach 3,” *AIAA Journal of Spacecraft and Rockets*, Vol. 51, pp. 213-225, Jan 2014. (GSC=N/A, JIF = 0.489).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Mei-Ling Liber, Mark F. Reeder, Daniel Wolfe, Ryan F. Schmit, Benjamin J. Hagen, “PIV in the Trisonic Gas Dynamics Facility,” AIAA Paper 2014-2661, presented at Aviation 2014, Atlanta, GA, Jun 2014.

Brian Babis, James L. Rutledge, Mark F. Reeder, James C. Petrosky, “Analysis of Preheated Effects on Military Aircraft Skins Subjected to Simulated Thermal Assault,” presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 4 Mar 2014. Dayton, OH.

Mei-Ling Liber and Mark F. Reeder, “New Measurement and Image Processing Techniques for Particle Image Velocimetry Using Solid-Phase Carbon Dioxide,” presented at the AIAA 39th Dayton-Cincinnati, Aerospace Science Symposium, 4 Mar 2014. Dayton, OH.

RUGGLES-WRENN, MARINA B.,

Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2003 (AFIT/ENY); BS, Polytechnic Institute of New York, 1981; MS, Rensselaer Polytechnic Institute, 1983; PhD, Rensselaer Polytechnic Institute, 1987. Dr. Ruggles-Wrenn’s interests center on mechanics of materials and structures, including experimental investigation of time-dependent material behavior, high-temperature structural materials, advanced composite materials, high-temperature structural design methods, and viscoplasticity. Dr. Ruggles-Wrenn has published over 100 journal articles and technical reports, and has co-authored 7 books on fatigue, fracture, and high temperature structural design methods. Dr. Ruggles-Wrenn received several research and best paper awards, Col Gage H. Crocker Outstanding Professor Award as well as the AFIT Instructor of the Quarter Award. Prior to joining AFIT Dr. Ruggles-Wrenn was a research staff member at the Oak Ridge National Laboratory (1987-2003). Dr. Ruggles-Wrenn is a member of the Editorial Board of Applied Composite Materials. She is also currently serving as an Associate Technical Editor of the ASME Journal of Pressure Vessel Technology and has served in that capacity previously (1996-2002). She has chaired the ASME PVPD Design & Analysis Technical Committee (2006-2010). She currently serves as the Communications Chair of the ASME PVPD and is a member of the ASME PVPD Executive Committee. Dr. Ruggles-Wrenn is a member of The American Ceramic Society and a Fellow of the American Society of Mechanical Engineers. Tel. 937-255-3636 x4641, email: Marina.Ruggles-Wrenn@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Effects of Cure on Fatigue Performance of High-Temperature Polymer Matrix Composites.” Sponsor: AFRL/RX. Funding: \$20,000.

“High Temperature Durability of Composites - Thermal Stability.” Sponsor: AFRL/RX. Funding: \$20,000.

“Mechanical Properties and Fatigue Behavior of Unitized Composite Airframe Structures at Elevated Temperature.” Sponsor: AFRL/RQ. Funding: \$10,000.

“Mechanical Properties, Creep Deformation and Durability of Ultra High Temperature Ceramics for Aerospace Materials Systems in Extreme Environments.” Sponsor: AFOSR. Funding: \$72,983.

REFEREED JOURNAL PUBLICATIONS

M. B. Ruggles-Wrenn, M. T. Pope and T. W. Zens, “Creep Behavior in Interlaminar Shear of a Hi-Nicalon™/SiC-B₄C Composite at 1200°C in Air and in Steam,” *Materials Science and Engineering A*, Vol. 610, 2014, pp. 279-289.

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C. J. Armani, M. B. Ruggles-Wrenn, R. S. Hay, G. E. Fair and K. A. Keller, “Creep of Polycrystalline Yttrium Aluminum Garnet (YAG) at Elevated Temperature in Air and in Steam,” *Materials Science and Engineering A*, Vol. 589, 2014, pp. 125-131.

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R. Hay, C. J. Armani, M. Ruggles-Wrenn and G. Fair, “Creep Mechanisms and Microstructure Evolution of Nextel™ 610 Fiber in Air and Steam,” *Proceedings of the 38th International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach FL, Jan 26-31, 2014.

R. Hay, G. Fair M. B. Ruggles-Wrenn, C. Armani, N. Jacobson, and K. Keller, “Environmental Effects on Nextel™ 620 and Nextel™ 720 Fibers and Their Composites,” *Proceedings of the Materials Science & Technology 2013 Conference and Exhibition*, Montreal, Quebec, Canada, Oct 27-31, 2013.

R. Hay, G. Fair M. B. Ruggles-Wrenn, B. Steffens, and T. Shillig, “Stressed and Unstressed Oxidation of SiC Fibers in Steam, Air, and Low pO₂: Oxidation Kinetics and Tensile Strength,” *Proceedings of the Materials Science & Technology 2013 Conference and Exhibition*, Montreal, Quebec, Canada, Oct 27-31, 2013.

RUTLEDGE, JAMES L., Maj,

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Appointment Date 2011 (AFIT/ENY); BS, Mechanical Engineering, University of Texas at Austin, 2002;
MS, Mechanical Engineering, University of Texas at Austin, 2004; PhD, Aeronautical Engineering, Air Force
Institute of Technology, 2009. Maj Rutledge’s research interests include experimental and computational
investigations of gas turbine heat transfer, unsteady fluid mechanics, inverse heat transfer and
aerothermodynamics. He has published articles in several journals and was awarded the Rohsenow Prize in
2008 by ASME. Maj Rutledge is a member of the ASME K-14 Gas Turbine Heat Transfer Committee,
ASME, AIAA, and Tau Beta Pi. He is a registered professional engineer in the State of Texas and has
deployed to Afghanistan in support of Operation Enduring Freedom. Tel. 937-255-3636 x4734, e-mail:
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SPONSOR FUNDED RESEARCH PROJECTS

“Aerodynamic Performance and Heat Transfer Characterization for Advanced Turbine Designs.” Sponsor: AFRL/RQ. Funding: \$26,322 - Rutledge 90%, Polanka 10%.

REFEREED JOURNAL PUBLICATIONS

Greiner, N.J., Polanka, M.D., Rutledge, J.L., Robertson, J.J., 2014, “Effect of Variable Properties Within a Boundary Layer With Large Freestream-to-Wall Temperature Differences,” *Journal of Engineering for Gas Turbines and Power*, Vol. 136, May 2014, pp. 052604-1 – 052604-9.

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Zimmer, V., Rutledge, J.L., Knieriem, C., Ou, S., “The Influence of Coolant Unsteadiness on Impingement Heat Transfer,” ASME Turbo Expo 2014, Düsseldorf, Germany, 16-20 Jun 2014, Paper No. GT2014-25897.

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Shewhart, A.T., Greiner, N.J., Polanka, M.D., Rutledge, J.L. , “Minimization of Heat Load due to Secondary Reactions in Fuel Rich Environments,” ASME Turbo Expo 2014, Düsseldorf, Germany, 16-20 Jun 2014, Paper No. GT2014-25703.

Greiner, N.J., Polanka, M.D., Rutledge, J.L., Shewhart, A.T., “Scaling of Film Cooling Performance From Ambient to Engine Temperatures,” ASME Turbo Expo 2014, Düsseldorf, Germany, 16-20 Jun 2014, Paper No. GT2014-25702.

Greiner, N.J., Polanka, M.D., Rutledge, J.L., Shewhart, A.T., “Effect of Variable Properties and Radiation on Convective Heat Transfer Measurements at Engine Conditions,” ASME Turbo Expo 2014, Düsseldorf, Germany, 16-20 Jun 2014, Paper No. GT2014-25701.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Damele, C.J., Polanka, M.D., Wilson, J.D., Rutledge, J.L., “Establishing Proper Exit Conditions for an Ultra Compact Combustor,” 52nd AIAA Aerospace Sciences Meeting, National Harbor, MD, 13-17 Jan 2014, AIAA 2014-0456.

SIMMONS, RONALD J., Lt Col,

Assistant Professor of Aeronautical Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2009 (AFIT/ENY); BS, Aeronautical Engineering & BS Astronautical Engineering, United States Air Force Academy, 1988; MS Aeronautical and Astronautical Engineering, Massachusetts Institute of Technology, 1990; PhD, Aerospace Engineering, The Ohio State University, 2009. Lt Col Simmons’ research interests include astrodynamics, re-entry dynamics, space propulsion, and turbine propulsion. His dissertation work investigated the optimal design and control of a variable cycle turbine engine with an independently modulated third stream. He is a command pilot with over 4,000 hours in six aircraft, and has also served as a professor of Astronautics at the US Air Force Academy. Tel. 937-255-3636 x4723, email: Ronald.Simmons@afit.edu

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Engineer, and a Nuclear Measurements Technician. More recently, he has been a key player in AFIT's recent expansion in space-related experimental research including the development of 6U CubeSats, a satellite attitude simulator called SimSat, and various other space experiments. His previous research has focused on solving multi-million degree of freedom finite element models with viscoelastic materials, satellite design and test, damage detection techniques, and system identification through optimization. He is a Technical Area Editor for the Journal of Small Spacecraft and he is a member of Chi Epsilon, SPIE, Tau Beta Pi, and AIAA. Tel. 255-3636 x7479, email: Eric.Swenson@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"AFRL/RV-AFIT 2012 MOA Research." Sponsor: AFRL/RV. Funding: \$375,000 - Swenson 25%, Cobb 25%, Black 25%, Wiesel 25%. [CSRA]

"Multidisciplinary Satellite, Design, Build and Test." Sponsor: N/A. Funding: \$70,000 - Swenson 40%, Black 40%, Cobb 20%. [CSRA]

"Peregrine: Deployable Photon Sieve." Sponsor: DARPA. Funding: \$35,405 - Swenson 40%, Black 25%, Cobb 25%, Rutledge 10%. [CSRA]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Swenson, E.D. "CubeSat Testing," 6th Government CubeSat Technical Exchange Meeting, California Institute of Technology, CA, Apr 2014. [CSRA]

TORVIK, PETER J.,

Professor Emeritus of Aerospace Engineering and Engineering Mechanics, Department of Aeronautics and Astronautics, (AFIT/ENY); BS, University of Minnesota, 1960; MS, University of Minnesota, 1962; PhD, University of Minnesota, 1965; BA, Wright State University, 1980. Professor Torvik is a specialist in theory of elasticity, wave propagation, shock and vibration, impact damage in aircraft systems, laser-material interactions, and aircraft survivability/ vulnerability. His primary research interests include structural dynamics, specifically, damping, impact, and penetration mechanics. Dr. Torvik is the author of over 100 technical papers and reports and some 30 other publications. He served as Head of the Department of Aeronautics and Astronautics, 1980-1990. He is the recipient of the AF Meritorious Civilian Service Award, the AF Exceptional Civilian Service Award, the Outstanding Civilian Career Service Award, USAF, and the John Leland Atwood Award and Medal, AIAA and ASEE. Dr. Torvik is a Fellow of AIAA, a Fellow of the ASME, and a Fellow of Ohio Academy of Science. Tel. 937-255-3636 x4740, email: Peter.Torvik@afit.edu

WIESEL, WILLIAM E., Jr.,

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REFEREED JOURNAL PUBLICATIONS

Wiesel, W.E., "A Theory of Low Eccentricity Earth Satellite Motion," Journal of the Astronautical Sciences, 59, 629-649, 2012. (publication occurred in 2014).

5.2. DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

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5.2.1. DOCTORAL DISSERTATIONS

BREWER, JAMES J., *The Differential Vector Phase-Locked Loop for Global Navigation Satellite System Signal Tracking*. AFIT/ENG/DS/14J-02. Faculty Advisor: Dr. John F. Raquet. Sponsor: 746 TS. [ANT]

GLAUVITZ, NATHAN E., *MEMS Cantilever Sensor for THz Photoacoustic Chemical Sensing and Spectroscopy*. AFIT/ENG/DS/13D-03. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

PATEL, HIREN J., *Advances in SCA and RF-DNA Fingerprinting through Enhanced Linear Regression Attacks and Application of Random Forest Classifiers*. AFIT/ENG/DS/14S-03. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV. [CCR]

PENNINGTON, JASON R., *Scalable System Design for Covert MIMO Communications*. AFIT/ENG/DS/14J-05. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [CCR]

RAMSEY, BENJAMIN W., *Improved Wireless Security through Physical Layer Protocol Manipulation and Radio Frequency Fingerprinting*. AFIT/ENG/DS/14S-10. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

ROGERS, NEIL G., *Nondestructive Electromagnetic Characterization of Uniaxial Materials*. AFIT/ENG/DS/14S-05. Faculty Advisor: Dr. Michael J. Havrilla. Sponsor: AFRL/RV.

SPENCER, MARK F., *The Scattering of Partially Coherent Electromagnetic Beam Illumination from Statistically Rough Surfaces*. AFIT/ENG/DS/14J-07. Faculty Advisor: Maj Milo W. Hyde. Sponsor: AFOSR. [CDE]

STRINGER, JEREMY P., *Development of a Resource Manager Framework for Adaptive Beamformer Selection*. AFIT/ENG/DS/13D-01. Faculty Advisor: Lt Col Geoffrey Akers. Sponsor: AFRL/RV.

VONGSY, KARMON M., *Removing Parallax-Induced False Changes in Change Detection*. AFIT/ENG/DS/14M-01. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RV.

ZINGARELLI, JOHN C., *Enhancing Ground Based Telescope Performance with Image Processing*. AFIT/ENG/DS/13D-04. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: DARPA.

5.2.2. MASTER'S THESES

ABRAHAM, AMY M., *Combining Image Processing with Signal Processing to Improve Transmitter Geolocation Estimation*. AFIT/ENG/14M-01. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [ANT]

AGBEYIBOR, RICHARD C., *Secure ADS-B: Towards Airborne Communications Security in the Federal Aviation Administration's Next Generation Air Transportation System*. AFIT/ENG/14M-02. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: AFRL/RV. [CCR]

ALKHALDI, HUMOOD, *Integration of a Star Tracker and Inertial Sensors Using an Attitude Update*. AFIT/ENG/T/14S-16. Faculty Advisor: Dr. John F. Raquet. Sponsor: N/A. [ANT]

ALQAHTANI, MUFLIH, *Stochastic Prediction and Feedback Control of Router Queue Size in a Virtual Network Environment*. AFIT/ENG/T/14S-10. Faculty Advisor: LTC Robert J. McTasney. Sponsor: N/A. [CCR]

ALSUBAIE, FAWWAZ, *Multiple Signal Classification for Determining Direction of Arrival of Frequency Hopping Spread Spectrum Signals*. AFIT/ENG/14M-05. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [CCR]

ALT, ANTHONY T., *Analysis of Multi-User Environment Using RF-DNA*. AFIT/ENG/14M-06. Faculty Advisor: Dr. Robert F. Mills. Sponsor: N/A. [CCR]

ANDERSON, MUNSON J., *Carbon Allotrope Dependence on Temperature and Pressure during Thermal Decomposition of Silicon Carbide*. AFIT/ENG/14M-07. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/RX.

BALL, JUSTIN R., *Detection and Prevention of Android Malware Attempting to Root the Device*. AFIT/ENG/14M-08. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A.

BARAJAS, EDUARDO, *Radio Frequency (RF) Responses and Material Characterization of Germanium Telluride (GeTe) and Germanium Antimony Telluride (GST)*. AFIT/ENG/14M-09. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

BARHORST, JASON M., *GPS Multipath Reduction with Correlator Beamforming*. AFIT/ENG/14M-10. Faculty Advisor: Dr. John F. Raquet. Sponsor: Locata. [ANT]

BAUM, JAMES B., *Windows Memory Forensic Data Visualization*. AFIT/ENG/T/14J-01. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A. [CCR]

BEAM, BRIAN A., *Leveraging the Cloud for Integrated Network Experimentation*. AFIT/ENG/14M-11. Faculty Advisor: Dr. Douglas D. Hodson. Sponsor: OSD. [CCR]

BEAN, MATTHEW A., *Chirp Reduction in Non-Isolated Quantum-Well Semiconductor Lasers under Optical Injection*. AFIT/ENG/14M-12. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/RX.

BLACKFORD, JASON M., *Online Build-Order Optimization for Real-Time Strategy Agents Using Multi-Objective Evolutionary Algorithms*. AFIT/ENG/14M-13. Faculty Advisor: Dr. Gary B. Lamont. Sponsor: N/A.

BODENHEIM, ROLAND C., *Impact of the Shodan Computer Search Engine on Internet-Facing Industrial Control System Devices*. AFIT/ENG/14M-14. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

CAIN, LINDSAY R., *Feature Selection on Hyperspectral Data for Dismount Skin Analysis*. AFIT/ENG/14M-15. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: 711 HPW/RH.

CHAN, ALICE W., *An Assessment of Normalized Difference Skin Index Robustness in Aquatic Environments*. AFIT/ENG/14M-17. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: 711 HPW/RH.

COBB, JOHN M., *Decapitation Attacks against Mission-Critical Networks*. AFIT/ENG/14M-18. Faculty Advisor: Dr. Robert F. Mills. Sponsor: NASIC. [CCR]

COPELAND, PATRICK T., *Using State Merging and State Pruning to Address the Path Explosion Problem Faced by Symbolic Execution*. AFIT/ENG/T/14J-03. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A. [CCR]

CRAWFORD, JAMES K., *Over the Air Interface Element Scanning and Debugging the Mobile Equipment to Subscriber Identity Module Interface*. AFIT/ENG/14M-20. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A. [CCR]

CROSSER, MATTHEW P., *Improved Dictionary Formation and Search for Synthetic Aperture Radar Canonical Shape Feature Extraction*. AFIT/ENG/14M-21. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFOSR.

CRUZ, JESSE B., *Comparison of Image Processing Techniques Using Random Noise Radar*. AFIT/ENG/14M-22. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/R.Y. [ANT]

DALRYMPLE, SCOTT D., *Comparison of ZigBee Replay Attacks Using a Universal Software Radio Peripheral and USB Radio*. AFIT/ENG/14M-23. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

DANELLA, THEA S., *Identifying High-Traffic Patterns in the Workplace with Radio Tomographic Imaging in 3D Wireless Sensor Networks*. AFIT/ENG/14M-24. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFOSR. [ANT & CCR]

DOROSKI, MICHAEL W., *Integrity Verification for SCADA Devices Using Bloom Filters and Deep Packet Inspection*. AFIT/ENG/14M-25. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

DOWDEN, RYAN M., *Process Development for the Fabrication of Spheroidal Microdevice Packages Utilizing MEMS Technologies*. AFIT/ENG/14M-26. Faculty Advisor: Maj Derrick Langley. Sponsor: AFRL/R.Y.

FEIGH, STEVEN N., *Network Monitoring Traffic Compression Using Singular Value Decomposition*. AFIT/ENG/14M-27. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: N/A. [CCR]

FINK, DEANNA R., *Toward Automating Web Protocol Configuration for a Programmable Logic Controller Emulator*. AFIT/ENG/T/14J-04. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

FLAMM, BRADLEY M., *Extending Differential Fault Analysis to Dynamic S-Box Advanced Encryption Standard Implementations*. AFIT/ENG/T/14S-08. Faculty Advisor: Maj Thomas E. Dube. Sponsor: AF CyTCoE. [CCR]

FLYNN, MATTHEW S., *Salient Feature Identification and Analysis Using Kernel-Based Classification Techniques for Synthetic Aperture Radar Automatic Target Recognition*. AFIT/ENG/14M-30. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFOSR.

GALLAGHER, DANIEL M., *Analysis of Effects of Sensor Multithreading to Generate Local System Event Timelines*. AFIT/ENG/14M-31. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A. [CCR]

GARCIA, ARTURO M., *Firmware Modification Analysis in Programmable Logic Controllers*. AFIT/ENG/14M-32. Faculty Advisor: Dr. Robert F. Mills. Sponsor: DHS. [CCR]

GARRETT, VIRGINIA R., *Numerical Integration with Graphical Processing Unit for QKD Simulation*. AFIT/ENG/14M-33. Faculty Advisor: Dr. Douglas D. Hodson. Sponsor: LTS. [CCR]

GESSEL, BRENT H., *Binary Detection Using Multi-Hypothesis Log-Likelihood, Image Processing*. AFIT/ENG/14M-34. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: DARPA.

GRENGA, ANTHONY J., *Android Based Behavioral Biometric Authentication via Multi-Modal Fusion*. AFIT/ENG/T/14J-05. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A. [CCR]

HARTZELL, STEPHEN D., *Non-Linear Optimization Applied to Angle-of-Arrival Satellite-Based Geolocation*. AFIT/ENG/T/14J-07. Faculty Advisor: Dr. Andrew J. Terzuoli. Sponsor: N/A.

HENNESSEY, ETHAN S., *Opportunistic Access in Frequency Hopping Cognitive Radio Networks*. AFIT/ENG/14M-38. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/R.Y. [CCR]

HEROLD, MATTHEW L., *Selective Dry Etch for Defining Ohmic Contacts for High Performance ZnO TFTs*. AFIT/ENG/14M-39. Faculty Advisor: Maj Derrick Langley. Sponsor: AFRL/R.Y.

HIGBEE, JEREMY M., *A Quantification of the 3D Modeling Capabilities of the KinectFusion Algorithm*. AFIT/ENG/14M-40. Faculty Advisor: Maj Brian G. Woolley. Sponsor: N/A. [ANT]

HOGGARD, ROBERT J., *Passive Interferometric Synthetic Aperture Radar Using a Two Transmitter Baseline*. AFIT/ENG/T/14S-18. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFRL/R.Y.

JOSE, FRANKLIN N., *Isolation of Speckle for Target-in-the-Loop Coherent Beam Combining*. AFIT/ENG/T/14J-40. Faculty Advisor: Maj Milo W. Hyde. Sponsor: AFRL/RD.

KEBEDE, BEMNET, *Characterization of the Pyroelectric Properties of AlN Thin Films Using MEMS Structures for Infrared Sensing Applications*. AFIT/ENG/14M-42. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFRL/R.Y.

KEEFER, JORDAN S., *Improving Statistical Machine Translation through N-best List*. AFIT/ENG/14M-43. Faculty Advisor: Maj Kennard R. Lavers. Sponsor: N/A.

KING, DAVID W., Jr., *Complexity, Heuristic, and Search Analysis for the Games of Crossings and Epaminondas*. AFIT/ENG/14M-44. Faculty Advisor: LTC Robert J. McTasney. Sponsor: N/A.

KRONES, RUSSELL P., *Design, Fabrication and Testing of Two Dimensional Radio Frequency Metamaterials*. AFIT/ENG/14M-45. Faculty Advisor: Maj Derrick Langley. Sponsor: AFRL/R.Y.

KULESZA, NICHOLAS J., *Radio Frequency Fingerprinting Techniques through Preamble Modification in IEEE 802.11b*. AFIT/ENG/T/14J-08. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: N/A. [CCR]

LATCHU, TRISTAN A., *Characterization and Performance Comparison of Low-Voltage, High-Speed, Push-Pull and Traveling-Wave Silicon Mach-Zehnder Modulators*. AFIT/ENG/14M-48. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/R.Y.

LEVENE, DAVID L., *An Embedded, Programmable GPS Injection Jammer for Aircraft Testing and Aircrew Training*. AFIT/ENG/14M-89. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/R.Y. [ANT]

LEWIS, TYRONE A., *An Artificial Neural Network-Based Decision-Support System for Integrated Network Security*. AFIT/ENG/T/14S-09. Faculty Advisor: Maj Brian G. Woolley. Sponsor: N/A. [CCR]

LYONS, KATHERINE B., *A Recommender System in the Cyber Defense Domain*. AFIT/ENG/14M-49. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFOSR. [CCR]

MARTY, JOSEPH A., *Vulnerability Analysis of the MAVLink Protocol for Command and Control of Unmanned Aircraft*. AFIT/ENG/14M-50. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: N/A. [CCR]

MCGUIRE, JONATHAN D., *Radio Frequency Distinctive Native Attribute (RF-DNA) Fingerprinting Applied to Commercial SatCom Short Burst Data Modems*. AFIT/ENG/14M-51. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV. [CCR]

MEDVE, CURTIS C., *Estimation and Coordination of Sequence Patterns for Frequency Hopping Dynamic Spectrum Access Networks*. AFIT/ENG/14M-52. Faculty Advisor: LTC Robert J. McTasney. Sponsor: AFRL/RV. [CCR]

MEEKER, RICHARD A., *Mapping Computer Network Topologies*. AFIT/ENG/14M-53. Faculty Advisor: Maj Thomas E. Dube. Sponsor: AFRL/RI. [CCR]

MOTE, ERIC W., *Characterizing and Optimizing the Performance of the MAESTRO 49-core Processor*. AFIT/ENG/14M-55. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: N/A.

MURPHY, WILLIAM E., *Large Scale Hierarchical K-Means Based Image Retrieval with MapReduce*. AFIT/ENG/14M-56. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: N/A.

MYERS, MICHAEL M., *Outperforming Game Theoretic Play with Opponent Modeling in Two Player Dominoes*. AFIT/ENG/14M-57. Faculty Advisor: Dr. Brett J. Borghetti. Sponsor: N/A.

NEWBERRY, RICHARD A., *Microelectromechanical Systems (MEMS) Photoacoustic (PA) Detector of Terahertz (THz) Radiation for Chemical Sensing*. AFIT/ENG/14M-58. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

PAL, RAJAN, *Microelectromechanical Systems (MEMS) for Hall Effect Thruster Plume Characterization*. AFIT/ENG/14M-60. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: N/A.

PERHAI, ANDREA E., *Enhanced Polarimetric Radar Imaging Using Cross-Channel Coupling Constraints*. AFIT/ENG/T/14J-09. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: N/A.

RADEMACHER, RICHARD W., *Bayesian Methods and Confidence Intervals for Automatic Target Recognition of SAR Canonical Shapes*. AFIT/ENG/14M-62. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFOSR.

RAMSTAD, ROGER J., *Integrated Air Defense System Scan Rate Exploitation and Exploratory Research via Adaptive Technologies*. AFIT/ENG/14M-63. Faculty Advisor: Dr. Robert F. Mills. Sponsor: AFRL/RV. [CCR]

ROJAS, LUIS S., *Simulated Assessment of Interference Effects in Direct Sequence Spread Spectrum (DSSS) QPSK Receiver*. AFIT/ENG/14M-64. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [CCR]

RUTHERFORD, NICHOLAS A., *Blind Demodulation of Pass Band OFDMA Signals and Jamming Battle Damage Assessment Utilizing Link Adaptation*. AFIT/ENG/14M-65. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [CCR]

SCHUETT, CARL D., *Programmable Logic Controller Modification Attacks for Use in Detection Analysis*. AFIT/ENG/14M-66. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

SEERY, MICHAEL K., *Complex VLSI Feature Comparison for Commercial Microelectronics Verification*. AFIT/ENG/14M-67. Faculty Advisor: Dr. Mary Y. Lanzerotti. Sponsor: AFRL/RV.

SMALL, ANDREW J., *Radio Frequency Emitter Geolocation Using Cubesats*. AFIT/ENG/14M-68. Faculty Advisor: Maj Marshall E. Haker. Sponsor: AFRL/RV. [ANT]

SMITH, ADAM J., *REDIR: Automated Static Detection of Obfuscated Anti-Debugging Techniques*. AFIT/ENG/14M-69. Faculty Advisor: Dr. Robert F. Mills. Sponsor: Riverside Research. [CCR]

SOEDER, JUSTIN T., *Image-Aided Navigation Using Cooperative Binocular Stereopsis*. AFIT/ENG/14M-70. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RW. [ANT]

SONYA, SOLOMAN Y., *A New Secured Distributed-Access Protection System To Secure Data Within Enterprise Networks and Enhance Next Generation Data Loss Prevention Paradigms*. AFIT/ENG/14M-71. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: HQ AFMC. [CCR]

STEBELTON, KAREN J., *A System Concept for Detecting Suicide Warning Signs in Social Media*. AFIT/ENG/T/14S-15. Faculty Advisor: Dr. Robert F. Mills. Sponsor: N/A. [CCR]

STILSON, CHRISTOPHER L., *Contact Resistance Evolution and Degradation of Highly Cycled Micro-Contacts Micro-Contacts*. AFIT/ENG/14M-73. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: N/A.

STUBBS, TYLER D., *A Comparison of RF-DNA Fingerprinting Using High/Low Value Receivers with ZigBee Devices*. AFIT/ENG/14M-74. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV. [CCR]

THOMPSON, JARED J., *A Test Methodology for Evaluating Cognitive Radio Systems*. AFIT/ENG/14M-77. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RV. [CCR]

THORNTON, ISSAC J., *Development of Adaptive Tilt Tracker that Utilizes QUAD-cell Detector to Track Extended Objects*. AFIT/ENG/14M-78. Faculty Advisor: Lt Col James A. Louthain. Sponsor: N/A.

TRAN, THANG M., *Passive RF Tomography: Signal Processing and Experimental Validation*. AFIT/ENG/14M-91. Faculty Advisor: Dr. Andrew J. Terzuoli. Sponsor: AFRL/RV.

TUMA, ALLAN D., *Automated Driftmeter Fused with Inertial Navigation*. AFIT/ENG/14M-79. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/RV. [ANT]

VINCIE, MATTHEW J., *Airborne Wireless Communication Modeling and Analysis with MATLAB*. AFIT/ENG/14M-80. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RV. [ANT]

WERLING, JESSICA R., *Behavioral Profiling of SCADA Network Traffic using Machine Learning Algorithms*. AFIT/ENG/14M-81. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

WERLING, KAITLIN A., *Enhancing Operational Transition Opportunity of RF-DNA Fingerprinting Using Commercial Satcom Systems*. AFIT/ENG/14M-82. Faculty Advisor: Dr. Michael A. Temple. Sponsor: N/A. [CCR]

WESTING, NICHOLAS M., *Carbon Nanotube Growth Rate Regression using Support Vector Machines and Artificial Neural Networks*. AFIT/ENG/14M-83. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: AFRL/RX.

WILLIAMS, PAUL M., *Distinguishing Internet-Facing ICS Devices Using PLC Programming Information*. AFIT/ENG/T/14J-41. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

- WILLIS, KARA M., *Signal Processing in Cold Atom Interferometry-Based INS*. AFIT/ENG/14M-84. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/R.Y. [ANT]
- WRIGHT, BRADLEY C., *PLC Hardware Discrimination Using RF-DNA Fingerprinting*. AFIT/ENG/T/14J-12. Faculty Advisor: Maj Samuel J. Stone. Sponsor: ORNL. [CCR]
- WYMAN, JASON E., *A Method for Detection and Correction of Stair Mode across an Optical Phased Array*. AFIT/ENG/14M-85. Faculty Advisor: Maj Milo W. Hyde. Sponsor: AFRL/RD.
- YEOM, JENNIFER S., *Textile Fingerprinting for Dismount Analysis in the Visible, Near, and Shortwave Infrared Domain*. AFIT/ENG/14M-86. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: 711 HPW/RH.
- ZEQOLLARI, ANGELA J., *Ultra Wideband Radio Frequency Fingerprinting*. AFIT/ENG/14M-87. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/R.Y. [ANT & CCR]
- ZIEGLER, KYLE K., *Selectively Tuning a Buckled Si/SiO₂ Membrane MEMS through Joule Heating Actuation and Mechanical Restriction*. AFIT/ENG/14M-88. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: N/A.

5.2.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BALDWIN, RUSTY O.,

Professor of Computer Engineering, Research Director, Center for Cyberspace Research, Department of Electrical and Computer Engineering, AFIT Appointment Date: 1999 (AFIT/ENG), BSEE, New Mexico State University, 1987; MS, Computer Engineering, Air Force Institute of Technology, 1992; PhD, Virginia Polytechnic Institute and State University, 1999. His research interests include computer communication networks, embedded and wireless networking, computer security, side channel analysis, reconfigurable computing systems, and military medical networks.

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Increasing the Federal Cybersecurity Workforce through Graduate Education and Research at AFIT.”

Sponsor: NSF. Funding: \$838,723 - Baldwin 50%, Raines 50%. [CCR]

REFEREED JOURNAL PUBLICATIONS

Montminy, D., Baldwin, R., Temple, M., “Differential Electromagnetic Attacks on a 32-bit Microprocessor Using Software Defined Radios, IEEE Trans on Info Forensics & Security,” Vol. 8, Iss. 12, pp. 2101-2114, Dec 2013. [CCR]

BORGHETTI, BRETT J.,

Assistant Professor of Computer Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2008; (AFIT/ENG), BSEE, Worcester Polytechnic Institute, 1992; MSCS, Air Force Institute of Technology, 1996; PhD, Computer Science, University of Minnesota, 2006. His research interests include machine learning, autonomous agents, and multi-agent systems. Tel. 937-255-3636 x4612, email: Brett.Borghetti@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Game-Theoretic Analysis & Recommendations for Pursuer’s Deception in Pursuer-Evader Asym Info Scenarios.” Sponsor: N/A. Funding: \$99,346 - Borghetti 34%, Pachter 30%, Lamont 12%, Peterson 12%, Hopkinson 12%. [ANT]

“HUMAN Lab Study #1 Analysis and Development of Cyber Operations Multi Attribute Task Battery.”

Sponsor: 711 HPW/RH. Funding: \$59,443 - Borghetti 50%, Rusnock 50%. [ANT & CCR]

REFEREED JOURNAL PUBLICATIONS

Weller-Fahy, D.J, Borghetti, B.J., and Sodemann, A.A., “A Survey of Distance and Similarity Measures used within Network Intrusion Anomaly Detection,” IEEE Communication Surveys and Tutorials, Early Access Article. Vol. PP, No. 99, Jul 2014, DOI10.1109/COMST.2014.2333610. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Rusnock, C.F., Borghetti, B.J., and McQuaid, I.W., “Predicting Operator Workload Using a Combined Modeling Approach,” AFIT-AFRL Colloquium – Human Machine Systems 2.0, 30 Sep 2014. [CCR]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Sullivan, N.M., Borghetti, B.J., and Coutu, R.A., “Energy Harvesting & Recapture from Human Subjects: Dual-Stage Thermal MEMS Energy Converter,” IEEE Conference on Reliability Science for Advanced Materials and Devices (RSAMD) Sep, 2014.

BROWN, FRANK M.,

Professor Emeritus of Electrical Engineering, Department of Electrical and Computer Engineering, (AFIT/ENG); BS, MS, PhD, The Ohio State University. Dr. Brown's research interests are discrete mathematics and operations research.

BUTTS, JONATHAN W., Maj,

Division Chief and Assistant Professor of Computer Science, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2010 (AFIT/ENG); BS, Computer Science, Chapman University, 2001; MS, Information Assurance, Air Force Institute of Technology, 2006; PhD, Computer Science, University of Tulsa, 2010. His research interests include critical infrastructure protection, information assurance, telecommunication systems security, strategic communications and operationalizing military actions in cyberspace.

REFEREED JOURNAL PUBLICATIONS

Bodenheim, R., Butts, J.W., Dunlap, S., and Mullins, B.E., "Evaluation of the Ability of the Shodan Engine to Identify Internet-Facing Industrial Control Devices," International Journal of Critical Infrastructure Protection, Elsevier, Vol. 7, No. 2, 2014, pp. 114-123. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Agbeyibor, R., Butts, J., Grimaila, M., and Mills, R., "Evaluation of Format-Preserving Encryption Algorithms for Critical Infrastructure Protection," Proceedings of the Eight Annual IFIP Working Group 11.10 International Conference on Critical Infrastructure Protection, Arlington VA, Mar 2014. [CCR]

Garcia, A., Mills, R., Butts, J., and Lopez, J. "Firmware Modification Analysis in Programmable Logic Controllers," International Conference on Cyber Warfare and Security (ICCWS), West Lafayette IN, Mar 2014. [CCR]

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Jaromin, R.M., Mullins, B.E., and Butts, J.W., "Design and Implementation of Industrial Control Emulators," Critical Infrastructure Protection VII, J. Butts and S. Sheno, eds., Springer, New York, NY, 12 Dec 13, pp. 35-46. [CCR]

CAIN, STEPHEN C.,

Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2003 (AFIT/ENG), BSEE, University of Notre Dame, 1992; MSEE, Michigan Technological University, 1994; PhD, University of Dayton, 2001. His research interests include electro-optics, remote sensing, and signal processing. Tel. 937-255-3636 x4625, email: Stephen.Cain@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Multi-Frame Fusion of 2-D and 3-D FLASH LADAR for Simultaneously Improving Both Spatial and Range Resolution." Sponsor: AFOSR. Funding: \$46,023 - Cain 50%, Martin, R. 50%.

"Signal Processing for Improving SST Detection Performance." Sponsor: DARPA. Funding: \$50,000.

REFEREED JOURNAL PUBLICATIONS

Zingarelli, J. and Cain, S. "Phase Retrieval and Zernike Decomposition Using Measured Intensity Data and the Estimated Electric Field," Applied Optics, Vol. 52, No. 31, pp. 7435-7444, Nov 2013.

Zingarelli J., Pearce, E. Lambour, R., Blake, T., Peterson, C., Cain, S. "Improving the Space Surveillance Telescope's Performance Using Multi-Hypothesis Testing," The Astronomical Journal, Vol. 147, No. 5, pp. 111, May 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Gessel, B., Cain, S., "Effects of Star Crossings on the Detection of Dim Objects in Orbit and Mitigation Strategies for Improving Detection," SPIE DSS 2014, Baltimore, MD, May 5, 2014.

CLARK, JEFFREY D., Lt Col,

Deputy Department Head and Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2011 (AFIT/ENG), BS, Electrical Engineering, University of Arkansas, 1994; MS, Electrical Engineering, Air Force Institute of Technology, 2006; PhD, Electrical Engineering, Air Force Institute of Technology, 2011. His research interests include artificial intelligence, machine learning, and hyperspectral remote sensing.

SPONSOR FUNDED RESEARCH PROJECTS

"Hyperspectral Classification and Sensor Fusion for Dismount Skin and Clothing Identification." Sponsor: 711 HPW/RH. Funding: \$50,000.

"Skin and Textile Identification Using Hyperspectral Imagery." Sponsor: 711 HPW/RH. Funding: \$35,000.

REFEREED JOURNAL PUBLICATIONS

Mehmood, Clark, Sakla, W., "Dismount Detection Using Kernel Sparse Representation," Journal of Patterson Recognition Research (JPRR), Vol. 8, No. 1 (2013), pp. 123-131; 101.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Mehmood, A., Clark, J., Sakla, W., "Skin-Based Hyperspectral Dismount Detection Using Sparse Representation," Fifth Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing, IEEE WHISPERS, Gainesville, FL, 25-28-Jun 2013, pp. 1-4.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Westing, N., Clark, J., Hooper, D., Nikolaev, P., Maruyama, B., "Support Vector Machine Classification of Single Walled Carbon Nanotube Growth Parameters," MRS, San Francisco, CA Apr 2014.

Sweetnich S., Fernandes, S., Clark, J., Wesam, S., "An Objective Multi-Sensor Fusion Metric for Target Detection," Proc. Of SPIE, Baltimore, MD, May 2014.

Mehmood, A., MCGurr, M., Brickhouse, M., Chen, H., Clark, J., "Hyperspectral Chemical Agent Standoff Detection Using Sparse Representation," Image and Signal Processing for Remote Sensing, SPIE, Amsterdam, The Netherlands, Sep 2014.

COLLINS, PETER J.,

Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2006 (AFIT/ENG); BA, Bethel College, MN, 1985; BSEE, University of Minnesota, 1985; MSEE, Air Force Institute of Technology, 1990; PhD, Air Force Institute of Technology, 1996. His research interests include low observables, computational electromagnetics, radar cross section metrology, remote sensing, and electromagnetic material design and analysis. He is a senior member of the IEEE. Tel. 937-255-3636 x7256, email: Peter.Collins@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Enabling Technologies for Radar Scattering Measurements." Sponsor: AFRL/RV. Funding: \$117,081.

"Technical Support: Geospatial Intelligence (GEOINT) and Measurement and Signature Intelligence (MASINT)." Sponsor: NASIC. Funding: \$16,000.

“Technical Support: RCS Metrology.” Sponsor: 46TG. Funding: \$30,000.

“Unmanned Air Vehicle (UAV) and Payload Systems Technology (UPST).” Sponsor: AFMC. Funding: \$17,200 - Collins 37%, Woolley 22%, Jacques 21%, Polanka 20%. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Wilson, R. and Collins, P., “Noise Radar as an Indoor Navigation Aide,” The 35th Antenna Measurement Techniques Association Symposium, Columbus, OH, 6-11 Oct 2013. [ANT]

Hardin, J. and Collins, P., “An Exploration of a Multi-function Waveform for Simultaneous RF Communications and Ranging,” The 35th Antenna Measurement Techniques Association Symposium, Columbus, OH, 6-11 Oct 2013. [ANT]

CORBELL, PHILLIP M., Lt Col,

Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2014 (AFIT/ENG); BSEE, Southern Illinois University, 1998; MSEE, AFIT, 2000; PhD, AFIT, 2006. His research interests include Electronic Warfare, Navigation Warfare, Waveform Diversity, Phased array, Adaptive, Cognitive, MIMO, multi-static MTI Radar architectures, Software Defined Radios and other disruptive technologies. He is a member of Tau Beta Pi, Eta Kappa Nu, Alpha Lambda Delta, and IEEE. Tel. 937-255-3636x4370, email: Phillip.Corbell@afit.edu

COUTU, RONALD, A., Jr.,

Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 12 Aug 2008 (AFIT/ENG); BSEE, University of Massachusetts, Amherst, 1993; MSEE, California Polytechnic (CalPoly) State University, San Luis Obispo, 1995; PhD, Air Force Institute of Technology, 2004. His research interests include microelectronics, microelectromechanical systems (MEMS) and MEMS fabrication with emphasis on micro electrical contacts, phase change materials, tunable metamaterials and terahertz components. His areas of expertise include design, fabrication, and test of micro/nano devices. He is a member of Tau Beta Pi, Eta Kappa Nu, SEM, SPIE, MRS and a Senior Member of the IEEE. Tel. 937-255-3636 x7230, email: Ronald.Coutu@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Characterizing Metal-Insulator-Transition (MIT) Phase-Change Materials (PCM) for Micro-switching Elements.” Sponsor: AFOSR. Funding: \$62,331.

“Characterizing Ultrathin and Ultrathin Structured Films for Improved Detector Efficiency.” Sponsor: AFOSR. Funding: \$42,502.

“Design, Model and Fabricate a 5x5 Large Tip, Tilt and Piston MEMS Micromirror Array.” Sponsor: AFRL/R.Y. Funding: \$88,918 - Coutu 80%, Langley 20%.

“Development of High Fill-Factor Large Aperature Micro-Mirrors for Beamsteering Applications.” Sponsor: AFRL/R.Y. Funding: \$25,000.

“Mask Making Support.” Sponsor: AFRL/R.Y. Funding: \$13,000.

“New: Low Loss Plasmonic Devices Using Transparent Conducting Oxides.” Sponsor: AFRL/R.Y. Funding: \$34,888.

“Photoacoustic Detections of Terahertz Radiation for Chemical Sensing and Imaging Applications.” Sponsor: AFOSR. Funding: \$59,717.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Toler, B.F., Stilson, C. and Coutu, Jr., R.A. "Contact Resistant Evolution of Lightly Loaded, Highly Cycled, Micro Contacts," Proceedings of the 59th IEEE Holm Conference on Electrical Contacts, pp. 56-64, Newport, RI, 16-20 Sep 2013.

Stilson, C.L., Toler, B.F. and Coutu, Jr., R.A., "Micro-Contact Performance Characterization of Carbon Nanotube (CNT)-Au Composite Micro-Contacts," Proceedings of the 59th IEEE Holm Conference on Electrical Contacts, pp. 358-365, Newport, RI, 16-20 Sep 2013.

Kebede, B., Coutu, Jr., R.A. and Starman, L.A., "Using Microelectromechanical Systems (MEMs) Test Structures for Investigating Pyroelectric Response," Government Microcircuit Applications and Critical Technology Conference, pp. 1-4, Charleston, SC, 31 Mar – 3 Apr 2014.

Dowden, R.M., Langley, D., Coutu, Jr., R.A. and Starman, L.A., "Fabrication of Spheroidal Microdevice Packages," Government Microcircuit Applications and Critical Technology Conference, pp. 1-5, Charleston, SC, 31 Mar – 3 Apr 2014.

Stilson, C.L. and Coutu, Jr., R.A., "Micro-Contact Resistance of Au/Au on Engineered Contact Surfaces using Grayscale Lithography," The 27th International Conference on Electrical Contacts, pp. 1-6, Dresden, Germany, 23-26 Jun, 2014.

Stilson, C.L. and Coutu, Jr., R.A., "Reliability Evolution of Au/Au, Au/Ru and Au/RuO₂ Micro-Contacts," The 27th International Conference on Electrical Contacts, pp. 1-6, Dresden, Germany, 23-26 Jun, 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Glauvitz, N.E., Coutu, Jr., R.A., Petkie, D.T. and Medvedev, I.R., "A Micro-Cantilever Based Photoacoustic Detector of Terahertz Radiation for Chemical Sensing," Proceedings of the 38th International Conference on Infrared, Millimeter and Terahertz Waves, session Mo8, pp. 1-3, Mainz, Germany, 1-6 Sep 2013.

Barajas, E., and Coutu, Jr., R.A., "Phase Change Materials (PCM) Fabricated in Vertical Structures for Reconfigurable and Tunable Circuits," SPIE Photonics West Symposium, Micromachining and Microfabrication Process Technology XIX Conference, pp. 1-9, San Francisco, CA, 1-6 Feb 2014.

Stilson, C.L., Pal, R. and Coutu, Jr., R.A., "Fabrication of 3D Surface Structures using Grayscale Lithography," SPIE Photonics West Symposium, Micromachining and Microfabrication Process Technology XIX Conference, pp. 1-10, San Francisco, CA, 1-6 Feb 2014.

Lake, R.A. and Coutu, Jr., R.A. "A Unique Method for Fabricating Structures Half the Size of the Listed Minimum Feature Size of a Direct-Write Laser Photolithography System," SPIE Photonics West Symposium, Micromachining and Microfabrication Process Technology XIX Conference, pp. 1-8, San Francisco, CA, 1-6 Feb 2014.

Newberry, R., Glauvitz, N., Coutu, Jr., R.A., Medvedev, I. and Petkie, D., "Fabrication of Microelectromechanical Systems (MEMS) Cantilevers of Photoacoustic (PA) Detection of Terahertz (THz) Radiation," SPIE Photonics West Symposium, Micromachining and Microfabrication Process technology XIX Conference, pp. 1-8, San Francisco, CA, 1-6 Feb 2014.

Pal, R., Coutu, Jr., R.A. and Liu, D., "Using Microelectromechanical Systems (MEMS) Parallel-Plate Capacitive Sensors to Determine Thrust of a Hall Effect Thruster," SPIE Photonics West Symposium, Micromachining and Microfabrication process Technology XIX Conference, pp. 1-11, San Francisco, CA, 1-6 Feb 2014.

Kebede, B., Coutu, Jr., R.A. and Starman, L.A., "Optimal Microelectromechanical Systems (MEMS) Device for Achieving High Pyroelectric Response of AlN," SPIE Photonics West Symposium, Micromachining and Microfabrication Process Technology XIX Conference, pp. 1-10, San Francisco, CA, 1-6 Feb 2014.

Stilson, C.L. and Coutu, Jr., R.A., "Contact Resistance Evolution of Lightly Loaded, Highly Cycled, Micro-Contacts," SPIE Photonics West Symposium, Reliability, Packaging, Testing, and Characterization of MOEMS/MEMS, Nanodevices, and Nanomaterials XIII Conference, pp. 1-12, San Francisco, CA, 1-6 Feb 2014.

Ziegler, K.K., Lake, R.A. and Coutu, Jr., R.A., "Isolating the Negative Stiffness Region of a Buckled Si/SiO₂ Membrane," SPIE Photonics West Symposium, Micromachining and Microfabrication Process Technology XIX Conference, pp. 1-10, San Francisco, CA, 1-6 Feb 2014.

Ziegler, K.K., Lake, R.A. and Coutu, Jr., R.A., "Spring Constant Characterization of a Thermally Tunable MEMS Regressive Spring," The 15th International Symposium on MEMS and Nanotechnology, SEM Annual Conference, pp. 1-9, Greenville, SC, 2-4 Jun 2014.

Dowden, R.M., Langley, D., Coutu, Jr., R.A. and Starman, L.A., "Bonded Hemishell Approach to Encapsulate Microdevices in Spheroidal Packages," The 15th International Symposium on MEMS and Nanotechnology, SEM Annual Conference, pp. 1-9, Greenville, SC, 2-4 Jun 2014.

Krones, R.P., Langley, D., Collins, P.J. and Coutu, Jr., R.A., "Modeling and Testing RF Meta-Atom Designs for Rapid Metamaterial Prototyping," The 15th International Symposium on MEMS and Nanotechnology, SEM Annual Conference, pp. 1-8, Greenville, SC, 2-4 Jun 2014.

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Toler, B.F., Coutu, Jr., R. A. and McBride, J.W., Chapter Title: Microelectromechanical Systems (MEMS) Metal Contact Switches, (Editor: Dr. Paul G. Slade), Book Title: Electrical Contacts: Principles and Applications, (Second Edition, pp. 1-53), ISBN-10: 1439881308, CRC Press, Taylor & Francis Group, Dec 2013.

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DAVIS, NATHANIEL J., IV,

Professor and Head, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2005 (AFIT/ENG), BSEE, Virginia Polytechnic Institute and State University, 1976, MSEE, Virginia Polytechnic Institute and State University, 1977, PhD, Purdue University, 1985. His research interests include computer communications networks, cyber operations, and large scale computer architectures. Dr. Davis is a senior member of the IEEE and a member of the Sigma Xi, Eta Kappa Nu, and Tau Beta Pi honorary societies. Tel. 937-255-3636 x7218, email: Nathaniel.Davis@afit.edu

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GUNAWARDENA, SANJEEV,

Research Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2014 (AFIT/ENG), BSEE and BS Engineering Physics, Ohio University, 1997; MSEE, Ohio University, 2000; PhD, Ohio University, 2007. His research interests include RF design, digital systems design, reconfigurable computing, software-defined radio, and all aspects of GNSS receivers and associated signal processing. Tel. 937-255-3636 x4659, email: Sanjeev.Gunawardena@afit.edu

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SPONSOR FUNDED RESEARCH PROJECTS

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HARTRUM, THOMAS C.,

Professor of Emeritus of Electrical Engineering, Department of Electrical and Computer Engineering, (AFIT/ENG); BEE, The Ohio State University, 1969; MS, The Ohio State University, 1969; PhD, The Ohio State University, 1973; MBA, Wright State University, 1979. Dr. Hartum’s field of expertise is software engineering.

HAVRILLA, MICHAEL J.,

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SPONSOR FUNDED RESEARCH PROJECTS

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HODSON, DOUGLAS D.,

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HOPKINSON, KENNETH M.,

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HOUPIS, CONSTANTINE H.,

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HYDE, MILO W. IV, Maj,

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SPONSOR FUNDED RESEARCH PROJECTS

"Beam Control for Optical Phased Array Weapons." Sponsor: AFRL/RV. Funding: \$125,357 - Hyde 95%, Fiorino 5%. [CDE]

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JACKSON, JULIE A.,

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KAUFFMAN, KYLE J.,

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SPONSOR FUNDED RESEARCH PROJECTS

“Hybrid Sensor Fusion for Autonomous Applications.” Sponsor: AFOSR. Funding: \$39,325 - Kauffman 75%, Pachter 25%. [ANT]

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LAMONT, GARY B.,

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and Exposition on Experimental and Applied Mechanics 2014, Greenville, SC, Conference Proceedings of
the SEM Series Vol. 8, Paper 173, pp. 1 – 9, Jun 2014.

Krones, R. P., Langley, D., “Modeling and Testing RF Meta-Atom Designs for Rapid Metamaterial
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Engineering Careers,” 121st American Society for Engineering Education Annual Conference &
Exposition, Indianapolis, IN, Paper ID#8542, pp. 1 – 8, 15 – 18 Jun 2014.

LANZEROTTI, MARY Y.,

Associate Professor of Computer Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2011 (AFIT/ENG); AB, Harvard University, 1989; MS Phil, University of Cambridge
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VLSI design and analysis. She is a member of the IEEE (Senior Member), IEEE Press Editorial Board
(elected member), ASEE, APS Committee on Education, CUR, and Phi Beta Kappa. She is Editor-in-Chief
of the IEEE Solid-State Circuits Magazine and completed ABET Program Evaluator training. She holds four
U.S. patents.

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Adding Pedagogical Expertise in Engineering Instruction.” Sponsor: NSF. Funding: \$2,785.

SPONSOR FUNDED RESEARCH PROJECTS

“Technical Support: Complex Signal Processing in the RF Domain.” Sponsor: AFRL/R.Y. Funding: \$50,000 -
Lanzerotti 80%, Martin, R. 10%, Temple 10%.

“Technical Support: Research and Development in Integrated Circuits” Sponsor: AFRL/R.Y. Funding: \$25,720.

“Topological Constraints for Integrated Circuits.” Sponsor: AFOSR. Funding: \$39,447 - Lanzerotti 92%, Magnus 8%.

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Warner, K., Bartsch, C., Lombardi, J., and Lanzerotti, M., “Characterization of Electrical and Physical Properties of Single-Walled Carbon Nanotube Ink,” National Aerospace & Electronics Conference (NAECON), Dayton, OH, Jun 2014, 8 pages.

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LAVIERS, KENNARD R., Maj,

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SPONSOR FUNDED RESEARCH PROJECTS

“Information Integrity for Autonomous Systems.” Sponsor: AFRL/RQ. Funding: \$45,000 - Martin, R. 90%, Raquet 10%. [ANT]

“Joint SIGINT-IMINT Position Tracking.” Sponsor: N/A. Funding: \$26,895 - Martin, R. 80%, Sambora 20%. [ANT]

“Physical Modeling of Radio Tomographic Imaging.” Sponsor: AFOSR. Funding: \$41,513.

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MAYBECK, PETER S.,

Professor Emeritus of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 1973 (AFIT/ENG); BS, Massachusetts Institute of Technology, 1968; PhD, Massachusetts Institute of Technology, 1972. Dr. Maybeck's research interests include optimal estimation and stochastic control Kalman filtering, adaptive estimation, pointing and tracking, optimally aided inertial navigation systems, multiple model adaptive filtering. He is the author of the widely recognized three-volume reference text, "Stochastic Models, Estimation and Control" and over 100 technical articles. Dr. Maybeck has received numerous national and local awards included the C. Holmes MacDonald Distinguished Young Electrical Engineering Teach and the ASEE Frederick Emmons Terman Award as the outstanding Electrical Engineering Professor in the US and 1985. He is a fellow of the IEEE. Tel. 937-255-3636 x4581, email: Peter.Maybeck@afit.edu

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MENDENHALL, MICHAEL J.,

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SPONSOR FUNDED RESEARCH PROJECTS

"Phase I Support: DISA Critical Infrastructure Protection." Sponsor: DISA. Funding: \$20,000. [CCR]

MILLS, ROBERT F.,

Director of Center for Cyberspace Research, Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2003 (AFIT/ENG); BS, Electrical Engineering, Montana State University, 1983; MS, Electrical Engineering, AFIT, 1987; PhD, Electrical Engineering, University of Kansas, 1994. His research interests include network management and security, cyber operations and warfare, insider threat mitigation, and electronic warfare. He is a Senior Member of the IEEE and is a member of the Eta Kappa Nu and Tau Beta Pi honor societies. Tel. 937-255-3636 x4527, email: Robert.Mills@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Cognitive Electronic Warfare." Sponsor: AFRL/RV. Funding: \$10,000 - Mills 50%, Hopkinson 50%. [CCR]

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Smith, A., Mills, R., Bryant, A., Grimaila, M., and Peterson, G. "The Role of Expert Systems in Reverse Code Engineering Tasks," International Conference on Cyber Warfare and Security (ICCWS), West Lafayette, IN, Mar 2014. [CCR]

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MULLINS, BARRY E.,

Professor of Computer Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2004 (AFIT/ENG); BS, Computer Engineering (cum laude), University of Evansville, 1983; MS, Computer Engineering, Air Force Institute of Technology, 1987; PhD, Electrical Engineering, Virginia Polytechnic Institute and State University, 1997. His research interests include cyber operations, malware analysis, reverse code engineering, computer/network security, SCADA (supervisory control and data acquisition) security, computer communication networks, embedded (sensor) and wireless networking, and reconfigurable computing systems. Tel. 937-255-3636 x7979, email: Barry.Mullins@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

"IASP Tuition and Resource Support for the AFIT Center for Cyberspace Research (CCR)." Sponsor: NSA. Funding: \$174,367. [CCR]

SPONSOR FUNDED RESEARCH PROJECTS

"Development and Implementation of a Testbed for Research and Analysis of Malware." Sponsor: DHS. Funding: \$225,000 - Mullins 20%, Humphries 20%, Butts 20%, Robinson 20%, Raines 20%. [CCR]

“Real-Time Intrusion Detection, Response and Mitigation via Exposing Inter-VM Traffic.” Sponsor: NSA.
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Ramsey, B.W., Mullins, B.E., Speers, R., and Batterton, K.A., “Watching for Weakness in Wild WPANs,” IEEE Military Communications Conference 2013 (MILCOM 2013), San Diego, CA, 18-20 Nov 13, pp. 1404-1409. [CCR]

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Ramsey, B.W., and Mullins, B.E., “Defensive Rekeying Strategies for Physical-Layer-Monitored Low-Rate Wireless Personal Area Networks,” *Critical Infrastructure Protection VII*, J. Butts and S. Sheno, eds., Springer, New York, NY, 12 Dec 13, pp. 63-80. [CCR]

PACHTER, MEIR,

Professor, Department of Electrical and Computer Engineering, AFIT Appointment Date: 1993 (AFIT/ENG); BS, Israel Institute of Technology, 1967; MS, Israel Institute of Technology, 1969; PhD, Israel Institute of Technology, 1975. Dr. Pachter's fields of expertise include automatic control of aircraft and missiles, adaptive control and system identification, inertial and GPS navigation, autonomous control/neural networks/fuzzy logic control, nonlinear control, and applied mathematics. Dr. Pachter has published papers in these areas and in differential games, robotics, and the theory of computational geometry. Dr. Pachter is

interested in the application of mathematics to the solution of engineering and scientific problems. His current areas of interest include military operations optimization, cooperative control, estimation and optimization, statistical signal processing, adaptive optics, inertial navigation, and GPS navigation. For his work on adaptive and reconfigurable flight control, he received the AFRL Air Vehicle's Directorate Foulis Award for 1994, together with Phil Chandler and Mark Mears. Tel. 937-255-3636 x7247, email: Meir.Pachter@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Autonomous Control and Navigation." Sponsor: AFRL/RQ. Funding: \$20,000. [ANT]

"Control & Estimation in the Presence of Adversarial Action and Uncertainty." Sponsor: AFOSR. Funding: \$52,565. [ANT]

"Decision Support Technologies." Sponsor: AFRL/RV. Funding: \$10,000. [ANT]

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Pham, K., and Pachter, M., "A Risk-Averse Game-Theoretic Approach to Distributed Control," in Dynamics of Information Systems – Algorithmic Approaches, P.M. Pardalos, V. Boginski, C. Commander and Y. Ye, Eds., Springer 2013, pp. 121-146. [ANT]

Pachter, M., "Static Linear-Quadratic Gaussian Games," in Advances in Dynamic Games, V. Krivan and G. Zaccour, Eds., Birkhauser 2013, pp. 85-105.

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PECARINA, JOHN M, Maj,

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SPONSOR FUNDED RESEARCH PROJECTS

“AFIT Support for AFRL Navigation Estimation Optimization (NEO) Program.” Sponsor: AFRL/R.Y. Funding: \$122,426 - Peterson 80%, Raquet 20%. [ANT]

REFEREED JOURNAL PUBLICATIONS

Bailey, K.O., Okolica, J.S., and Peterson, G.L., User Identification and Authentication using Multi-Modal Behavioral Biometrics, Computers & Security, 43:77-89, 2014. [CCR]

Noel, G.E., and Peterson, G.L., Applicability of Latent Dirichlet Allocation to Multi-Disk Search, Digital Investigation, 11(1):43-56, 2014. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

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REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Vaughn, S.L., Mills, R.F., Grimaila, M.R., Peterson, G.L., and Rogers, S.K., “Narratives as a Fundamental Component of Consciousness,” 2014 Workshop on Computational Models of Narrative, pp. 1-5, 2014. [CCR]

BOOKS AND CHAPTERS IN BOOKS

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Esposito, S.J., and Peterson, G.L., “Creating Super Timelines in Windows Investigations,” Advances in Digital Forensics IX, G.L. Peterson and S. Sheno, (Eds.), Springer-Verlag, 2013, pp. 135-144. [CCR]

PIERCE, SCOTT, Maj,

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MS Electrical Engineering, Air Force Institute of Technology, 2006; PhD, Electrical Engineering, University of New Mexico, 2010. His research interests include techniques for high-speed direct modulation of novel semiconductor laser structures and development of cathode materials for high power microwave sources.

SPONSOR FUNDED RESEARCH PROJECTS

“Optically Injected Semiconductor Lasers for Microwave Generation.” Sponsor: AFOSR. Funding: \$25,795

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Latchu, T. A., Pochet, M. C., Usechak, N. G., DeRose, C., Lentine, A. L., Trotter, D. C., and Zortman, W. A., “Power-Penalty Comparison of Push-Pull and Traveling-Wave Electrode Silicon Mach-Zehnder Modulators,” *IEEE Optical Interconnects Conference MC7*, 2 pages, May 2014.

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PYATI, VITTAL P.,

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RAMSEY, BENJAMIN W. P., Capt,

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using signals of opportunity, integration of MEMS-based inertial measurement units with other sensors, autonomous vehicle navigation and control, and electromagnetic interference and mitigation techniques affecting GPS performance. Tel. 937-255-3636 x4580, email: John.Raquet@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“ANT Center and Laboratory Support per Attachment 6 of the MOA between AFIT and AFRL.” Sponsor: AFRL/RW. Funding: \$50,000 - Raquet 50%, Haker 50%. [ANT]

“Autonomous System Testbed Development.” Sponsor: AFRL/RW. Funding: \$85,160. [ANT]

“GPS/Inertial/Vision Integrated Navigation System (GIVINS) Development.” Sponsor: AFRL/RW. Funding: \$265,000 - Raquet 50%, Woolley 25%, Jacques 25%. [ANT]

“GNSS Testbed Development.” Sponsor: AFRL/RW. Funding: \$665,000 - Raquet 50%, Haker 50%. [ANT]

“Navigation Modeling Tools for the Joint Air-to-Surface Missile (JASSM) Program.” Sponsor: AFLCMC. Funding: \$50,000. [ANT]

“Project Management Support for Autonomous Aerial Vehicle Competition.” Sponsor: AFRL/RW. Funding: \$5,000. [ANT]

“Support for Adaptable Navigation Systems Program.” Sponsor: DARPA. Funding: \$470,000 - Raquet 25%, Kauffman 50%, Collins 15%, Jackson 10%. [ANT]

“Support for All-Source Positioning and Navigation (ASPN) Program Phase II.” Sponsor: DARPA. Funding: \$22,000 - Raquet 60%, Fisher 30%, Peterson 10%. [ANT]

“Ultra-High Accuracy Reference System (UHARS) Support.” Sponsor: 746 TS. Funding: \$150,000 - Raquet 90%, Fisher 10%. [ANT]

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Kauffman, K., Raquet, J., Morton, Y., and Garmatyuk, D., “Real-Time UWB-OFDM Radar-Based Navigation in Unknown Terrain,” *IEEE Trans. Aerospace and Electronic Systems*, Vol. 49, No. 3, pp. 1453-1466, Jul 2013. [ANT]

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Alix, D., Walli, K., and Raquet, J., “Error Characterization of Flight Trajectories Reconstructed Using Structure from Motion,” *IEEE AIPR* (Applied Imagery Pattern Recognition Workshop), Washington, DC, 23-25 Oct 2013. [ANT]

Hebert, J., Levene, D., Raquet, J., Deike, W., and Drescher, D., “Simulated Programmable Aircraft-Embedded Jammer (SPACE JAM),” *ION Joint Navigation Conference*, Orlando, FL, 16-19 Jun 2014. [ANT]

Venable, D., Kauffman, K., Campbell, J., Raquet, J., Kresge, J., Smearcheck, M., Pestak, T., and Marietta, D
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Navigation Conference, Orlando, FL, 16-19 Jun 2014. [ANT]

Pierce, S., and Raquet, J., “Star Tracker Integration with Navigation Systems,” ION Joint Navigation
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Patent No. 8,577,538, Issued 5 Nov 2013. [ANT]

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REFEREED JOURNAL PUBLICATIONS

Seal, M.D., and Marciniak, M.A., “Partially Coherent Bidirectional Reflectance Distribution Data
Computation for Modeling Periodic Plasmonic Structures at Infrared Wavelengths,” *Infrared Phys.*
Technol. 62(0), pp. 39-44, 2014.

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SPONSOR FUNDED RESEARCH PROJECTS

“Continued Support of AFRL Beamforming.” Sponsor: AFRL/RV. Funding: \$35,136.

“HF Squid Detector Support.” Sponsor: AFRL/RV. Funding: \$90,000 - Stringer 50%, Stone 50%.

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Stringer, J.P., and Akers, G.A., “A Signal Disambiguation Algorithm for use in Multi-Beam Receivers,” 2014
IEEE Statistical Signal Processing Workshop, 29 Jun 14 – 2 Jul 14, Gold Coast, Queensland, Australia.

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SPONSOR FUNDED RESEARCH PROJECTS

“Phase III Support: RF-EW Systems.” Sponsor: AFRL/RV. Funding: \$50,000. [CCR]

“RFINT for Commercial Communications.” Sponsor: N/A. Funding: \$123,094. [CCR]

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Montminy, D., Baldwin, R., Temple, M., “Differential Electromagnetic Attacks on a 32-bit Microprocessor
Using Software Defined Radios,” IEEE Trans on Info Forensics & Security, Vol. 8, Iss. 12, pp. 2101-2114,
Dec 2013. [CCR]

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Patel, P., Temple, M., Baldwin, R., Ramsey, B., Application of Ensemble Decision Tree Classifiers to ZigBee
Device Network Authentication Using RF-DNA Fingerprinting, Int’l Conf on Cyber Warfare and Security,
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Dubendorfer, Ramsey, Temple, “ZigBee Device Verification For Securing Industrial Control and Building
Automation Systems,” Critical Infrastructure Protection VII, Springer, New York, NY, pp. 47-62, Dec
2013. [CCR]

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SPONSOR FUNDED RESEARCH PROJECTS

“Remote Sensing and Communications for Advanced Technical Exploitation.” Sponsor: NASIC. Funding: \$110,000.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Tran, T.M., Terzuoli, A.J., Scalzi, G.J., and Monte, L.L., “Passive RF Tomography: Signal Processing and Experimental Validation,” Proceedings for the 2014 IEEE Radar Conference (RadarCon2014), Cincinnati, OH, 19-23 May 2014.

Hartzell, S., Haker, M., Martin, R., Taylor, C., and Terzuoli, A., “AOA Geolocation for Fast-Movers using Nonlinear Optimization,” Proceedings of the 2014 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2014), Quebec, Canada, 13-18 Jul 2014. [ANT]

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Wilson, J., Moore, E., Hartzell, S., Marhefka, R., and Terzuoli, A., “Sparse Cruciform Reflector with Phased Array Feed,” Proceedings of the 2014 IEEE International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting, Memphis, TN, 6-11 Jul 2014.

Wolfe, T.S., Cetnar, J.S., Moore, E.S., Burchett, R., and Terzuoli, A., “Pulsed Radio Frequencies Using a Photoconductive Semiconductor Switch,” Proceedings of the 2014 American Electromagnetics Symposium (AMEREM 2014), Albuquerque, NM, 27-31 Jul 2014.

WOOLLEY, BRIAN G., Maj,

Computer Science and Engineering Division Chief, Assistant Professor of Computer Science, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2012 (AFIT/ENG); BS, Computer Engineering, California State University, Sacramento, 2002; MS Computer Engineering, Air Force Institute of Technology, 2007; PhD, Computer Engineering, University of Central Florida, 2012. His research interests include artificial intelligence for autonomous vehicles, evolutionary computation of control behaviors, and sensor fusion via computer vision techniques for world modeling. Tel. 937-255-3636 x4618, email: Brian.Woolley@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Automated Aerial Refueling: Precise Relative Navigation from Stereo Vision.” Sponsor: AFRL/RQ. Funding: \$198,440 - Woolley 50%, Raquet 25%, Pecarina 25%. [ANT]

“Unmanned Air Vehicle (UAV) and Payload Systems Technology (UPST).” Sponsor: AFMC. Funding: \$72,800 - Woolley 22%, Jacques 21%, Polanka 20%, Collins 37%. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

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5.3.1. DOCTORAL DISSERTATIONS

ACOSTA, ROBERTO I., *Imaging Fourier Transform Spectroscopy of the Boundary Layer Plume from Laser Irradiated Polymers and Carbon Materials*. AFIT/ENP/DS/14J-08. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO.

EVANS, JONATHAN W., *Iron-Doped Zinc Selenide: Spectroscopy and Laser Development*. AFIT/ENP/DS/14M-01. Faculty Advisor: Dr. Nancy C. Giles. Sponsor: AFRL/RX.

GIVENS, RYAN N., *Automated Synthetic Scene Generation*. AFIT/ENP/DS/14S-08. Faculty Advisor: Col Karl C. Walli. Sponsor: AFRL/RX. [CTISR]

GOLDEN, ERIC M., *Hyperfine Interactions in the Electron Paramagnetic Resonance Spectra of Point Defects in Wide-Band-Gap Semiconductors*. AFIT/ENP/DS/14S-07. Faculty Advisor: Dr. Nancy C. Giles. Sponsor: N/A.

HALSTEAD, MATTHEW R., *Investigating Time and Spectral Dependence in Neutron Radiation Environments for Semiconductor Damage Studies*. AFIT/ENP/DS/14S-04. Faculty Advisor: Dr. James C. Petrosky. Sponsor: NAVSEA/NSWC.

HARLEY, JACOB L., *Development of Imaging Fourier-Transform Spectroscopy for the Characterization of Turbulent Jet Flames*. AFIT/ENP/DS/14S-13. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: AFRL/RQ.

HARRIS, THOMAS R., *A Systematic Study of the Optical and Electrical Properties of $Ge_{1-y}Sn_y$ and $Ge_{1-x-y}Si_xSn_y$ Semiconductor Alloys*. AFIT/ENP/DS/14M-04. Faculty Advisor: Dr. Yung Kee Yeo. Sponsor: AFOSR.

JACKSON, HELEN C., *Effect of Variation of Silicon Nitride Passivation Layer on Electron Irradiated Aluminum Gallium Nitride/Gallium Nitride HEMT Structures*. AFIT/ENP/DS/14J-17. Faculty Advisor: Dr. Nancy D. Giles. Sponsor: AFRL/RX.

KELLY II, TONY D., *Electronic and Physical Characterization of Hydrothermally Grown Single Crystal ThO_2* . AFIT/ENP/DS/13D-02. Faculty Advisor: Dr. James C. Petrosky. Sponsor: DTRA.

MORELLO, MATTHEW R., *Estimating Disruption Fires from a Nuclear Weapon Detonation Using Fire Following Earthquake Methodology*. AFIT/ENP/DS/14S-09. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA & LLNL.

SINGLETON, BRIANA J., *Radiation Effects on Ytterbium-Doped Optical Fibers*. AFIT/ENP/DS/14J-15. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

VAN DYK, GREGORY K., *Muon Concentration and Spectrometry for Muon Catalyzed Fusion Experiments*. AFIT/ENP/DS/13D-03. Faculty Advisor: Dr Larry W. Burggraf. Sponsor: AFOSR.

5.3.2. MASTER'S THESES

ABNER, BENJAMIN N., *Modeling the Purex Process*. AFIT/ENP/14M-01. Faculty Advisor: Dr. James C. Petrosky. Sponsor: DHS.

ALLEN, BRANDON M., *Finite Element Analysis Modeling of Chemical Vapor Deposition of Silicon Carbide*. AFIT/ENP/T/14J-38. Faculty Advisor: Dr. Alex G. Li. Sponsor: AFRL/RX.

- BAUMANN, SEAN M., *Direct Emissivity Measurements of Painted Metals for Improved Temperature Estimation During Laser Damage Testing*. AFIT/ENP/14M-43. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: HELJTO. [CDE]
- BONDY, JAMES M., *Structural Characterization of Atomically Thin Hexagonal Boron Nitride via Raman Spectroscopy*. AFIT/ENP/14M-02. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFRL/RY.
- CASEBOLT, JARED D., *Characterization of Construction Material Properties through Gamma Spectroscopy, X-ray Fluorescence, and Hyper-Spectral Imagery for Background Correction Applications in Nuclear Detection*. AFIT/ENP/14M-45. Faculty Advisor: Dr. David J. Bunker. Sponsor: DTRA. [CTISR]
- CLEMENT, PAUL A., *Timing and Spectroscopy Requirements for a Plastic Scintillating Fiber Bundle Time-of-Flight Neutron Spectrometer*. AFIT/ENP/13D-01. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: DHS.
- CLEMENTS, WILLIAM B., *Validation of the Air Force Weather Agency Ensemble Prediction Systems*. AFIT/ENP/14M-04. Faculty Advisor: Lt Col Kevin S. Bartlett. Sponsor: AFWA.
- DECKER, ANDREW W., *Verification and Validation of Monte Carlo n-Particle Code 6 (MCNP6) with Neutron Protection Factor Measurements of an Iron Box*. AFIT/ENP/14M-05. Faculty Advisor: Lt Col Stephen R. McHale. Sponsor: DTRA.
- DELORME, KERRIANN A., *Production Potential of Scandium-47 Using Spallation Neutrons at Los Alamos Isotope Production Facility*. AFIT/ENP/14M-02. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: DTRA & LANL.
- DIERKEN, JOSIAH M., *Analysis of Fallout Particles Using Image Registration of Autoradiography and Scanning Electron Microscopy*. AFIT/ENP/T/14J-32. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.
- DUFAUD, KYLE J., *An Experimental Evaluation of Image Quality for Various Scenarios in a Chromotomographic System with a Spinning Prism*. AFIT/ENP/14M-07. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: N/A. [CTISR]
- FISCHER, COY C., *Sensitivity of 96 and 120-hour Numerical Model Tropical Cyclone Position Forecasts to Initial Position Errors*. AFIT/ENP/14M-08. Faculty Advisor: Lt Col Robert S. Wacker. Sponsor: JTWC.
- GARDUNO, ELI A., *Characterization and Mitigation of Resistive Losses in a Large Area Laser Power Converter*. AFIT/ENP/14M-09. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFOSR.
- GETTINGS, MATTHEW L., *Estimating Fireball Temperature from a Nuclear Detonation Using Digital Films*. AFIT/ENP/14M-11. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA.
- GENDA, TIMOTHY P., *Optimization of Prompt Neutron Detector Placement for Standoff Photon Interrogation of Special Nuclear Materials*. AFIT/ENP/14M-10. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.
- GRAHAM, JEFFREY J., *Hydrothermal Crystal Growth of Lithium Tetraborate and Lithium γ -Metaborate*. AFIT/ENP/14M-12. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFRL/RY.

GREB, MATTHEW A., *Magnetic Separation of Soil Contaminated with Weapon Grade Plutonium*. AFIT/ENP/14M-13. Faculty Advisor: Dr. James C. Petrosky. Sponsor: DHS.

HOLDER, JOEL G., *Polarimetric Calibration and Characterization of the Telops Field Portable Polarimetric-Hyperspectral Imager*. AFIT/ENP/14M-14. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: DTRA. [CTISR]

HOMAN, HALEY A., *Comparison of Ensemble Mean and Deterministic Forecasts for Long-Range Airlift Fuel Planning*. AFIT/ENP/14M-15. Faculty Advisor: Lt Col Robert S. Wacker. Sponsor: AMC.

HROMSCO, JEREMY J., *Sensitivity of IFM/GAIM-GM Model to High-Cadence Kp and F10.7 Input*. AFIT/ENP/14M-17. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: AFWA.

KEMP, EVAN R., *Proton Damage Effects on Carbon Nanotube Field-Effect Transistors*. AFIT/ENP/T/14J-39. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.

KORTH, HANS G., *Investigation of the Potential for FTIR as a Nondestructive Inspection Technique for Aircraft Coating Degradation*. AFIT/ENP/14M-19. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFRL/RX.

LENYK, CHRISTOPHER A., *Defining a Methodology for Data Analysis Using Streak Films*. AFIT/ENP/14M-20. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA. [CTISR]

LERCH, ANDREW G., *Nuclear Structure of Rhenium-186 Revealed by Neutron-Capture Gamma Rays*. AFIT/ENP/14M-21. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA.

MARCUM, CHELSEA C., *Measurements of DNA Damage and Repair in Bacillus Anthracis Sterne Spores by UV Radiation*. AFIT/ENP/T/14S-01. Faculty Advisor: Dr. Larry W. Burggraf. Sponsor: EPA/NHSRC & AFNWC.

MCGAHAN, CHRISTOPHER J., *Utilizing Near-IR Tunable Laser Absorption Spectroscopy to Study Detonation and Combustion Systems*. AFIT/ENP/14M-22. Faculty Advisor: Col Brian A. Tom. Sponsor: AFRL/RQ. [CDE]

MEISER, DANIEL M., *Calibrated Model for Point Source Spectroscopy*. AFIT/ENP/14J-42. Faculty Advisor: Dr. Michael T. Eismann. Sponsor: N/A [CDE]

MYERS, SARAH J., *Design, Analysis, and Characterization of an Optical Photon Sieve for Space-Based Imaging Systems*. AFIT/ENP/14M-02. Faculty Advisor: Lt Col Anthony L. Franz. Sponsor: USAFA/SPARC.

NEGRETTE, JOSE F., *Broadband Modulation Spectroscopy Simulation and Demonstration*. AFIT/ENP/14M-26. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: AFRL/RX.

ORTA, JAMES P., *Electrical Characterization of Spherical Copper Oxide Memristive Array Sensors*. AFIT/ENP/14M-40. Faculty Advisor: Maj Timothy W. Zens. Sponsor: DTRA.

OSPINO, TYRONE A., *Modeling Detector Response to Scattered Gamma Rays*. AFIT/ENP/14M-27. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.

PEERY, TYLER R., *Modeling Nuclear Weapon Fireballs in DIRSIG*. AFIT/ENP/14M-28. Faculty Advisor: Col Karl C. Walli. Sponsor: DOE/NNSA. [CTISR]

- QUINTON, MATTHEW J., *Optimization of Graphene Sensors to Detect Biological Warfare Agents*. AFIT/ENP/14M-42. Faculty Advisor: LTC Douglas R. Lewis. Sponsor: AFOSR.
- RAYNOR, ROBERT A., *Range Finding with a Plenoptic Camera*. AFIT/ENP/14M-29. Faculty Advisor: Col Karl C. Walli. Sponsor: N/A. [CTISR]
- RECKER, MATTHEW C., *Copper Doping of Zinc Oxide by Nuclear Transmutation*. AFIT/ENP/14M-30. Faculty Advisor: Dr. John W. McClory. Sponsor: DTRA.
- REDING, JOSHUA D., *Band Gap Transition Studies of U:ThO₂ Using Cathodoluminescence*. AFIT/ENP/14M-31. Faculty Advisor: Dr. Robert L. Hengehold. Sponsor: DHS.
- SADHWANI, DUSHYANT A., *Characterizing Optical Loss in Orientation Patterned III-V Materials Using Laser Calorimetry*. AFIT/ENP/14M-32. Faculty Advisor: Maj Timothy W. Zens. Sponsor: AFRL/RV.
- SCHNEIDER, EDWARD C., *Positron Spectroscopy of Hydrothermally Grown Actinide Oxides*. AFIT/ENP/14M-33. Faculty Advisor: Dr. James C. Petrosky. Sponsor: DHS.
- SPAHR, GORDON M., *Fully Automated Sunspot Detection and Classification Using SDO HMI Imagery in MATLAB*. AFIT/ENP/14M-34. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: AFWA.
- TERVO, RYAN L., *Comparative Analysis of Reconstructed Image Quality in a Simulated Chromotomographic Imager*. AFIT/ENP/14M-35. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: N/A. [CTISR]
- THURMOND, KYLE R., *Operational Cloud-to-Ground Lightning Initiation Forecasting Utilizing S-Band Dual-Polarization Radar*. AFIT/ENP/14M-36. Faculty Advisor: Lt Col Kevin S. Bartlett. Sponsor: AFWA.
- TRYON, TIMOTHY A., *Nuclear Thermal Effects Analysis on Operational Aircraft*. AFIT/ENP/14M-37. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.
- WAKEFIELD, STEPHEN D., *Development and Characterization of a High Speed Mid-IR Tunable Diode Laser Absorption Spectrometer for CO and CO₂ Detection in Detonation Events*. AFIT/ENP/14M-38. Faculty Advisor: Col Brian A. Tom. Sponsor: AFRL/RQ. [CDE]
- WILLEY, GARY A., *Memristive Responses of Jammed Granular Copper Array Sensors to Mechanical Stress*. AFIT/ENP/14M-44. Faculty Advisor: Maj Timothy W. Zens. Sponsor: DTRA.
- WYMAN, KEITH A., *Wigner Distribution Functions as a Tool for Studying Gas Phase Alkali Metal Plus Noble Gas Collisions*. AFIT/ENP/14M-39. Faculty Advisor: Dr. David E. Weeks. Sponsor: HELJTO. [CDE]

5.3.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

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Assistant Professor of Atmospheric Science, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, University of California, Los Angeles, 1997; MS, Air Force Institute of Technology, 2004; PhD, SUNY-Albany, 2013. Major Bartlett's research covers a wide range of topics in the atmospheric sciences. His recent work has focused on modeling mineral dust emissions and transport in the Middle East as well as aviation weather. Before joining AFIT he was Commander, Detachment 1, 18th Weather Squadron, and Staff Weather Officer to the 3rd Infantry and 10th Mountain Divisions in Iraq and New York. He is a member of the American Meteorological Society, the Air Weather Association, and the American Geophysical Union. Tel. 937-255-3636 x4520, email: Kevin.Bartlett@afit.edu

BAILEY, WILLIAM F.,

Associate Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1978 (AFIT/ENP); BS, United States Military Academy, 1964; MS, The Ohio State University, 1966; PhD, Air Force Institute of Technology, 1978. Dr. Bailey's research interests center on weakly ionized gases and reactive kinetics with special applications to semiconductor processing in gas discharges, shock characterization in ionized flows, and solutions of the inhomogeneous electron kinetic equation. Dr. Bailey has published over 20 papers in refereed conference proceedings and international journals and chaired over 25 theses and dissertations. He is a member of Tau Beta Pi, Sigma Pi Sigma, and Sigma Xi. Tel. 937-255-3636 x4501, email: William.Bailey@afit.edu

BOREL-DONOHUE, CHRISTOPH C.,

Research Associate Professor, Department of Engineering Physics, AFIT Appointment Date: 2010 (AFIT/ENP); Dipl. El. Eng ETH, Swiss Federal Institute of Technology, Zurich, Switzerland, 1981; PhD, University of Massachusetts, 1988. Dr. Borel's research focuses on visible through thermal hyperspectral data analysis; atmospheric correction; temperature-emissivity separation; Bidirectional Reflectance Distribution Function (BRDF) modeling; adjoint radiosity methods to retrieve reflectance in complex environments; spatial/spectral sharpening and data fusion; Fourier transform spectrometer imaging; atmospheric correction of satellite imagery; scene simulation in the visible and infrared using computer graphics; end-to-end modeling of hyperspectral sensors; and top of atmosphere albedo of the earth. At AFIT, he continues work in the hyperspectral thermal area but is also involved in analyzing video to extract gait information and tracking moving vehicles in persistent surveillance data. For DTRA, he currently works on methods to speed up the prediction of radiation background using remote sensing data. Before joining AFIT, he was a technical staff member at the Los Alamos National Laboratory for 17 years and worked at Ball Aerospace for 5 years. He is a senior member of IEEE and SPIE. Tel. 937-255-3636 x4957, email: Christoph.Borel@afit.edu

BRIDGMAN, CHARLES J.,

Professor Emeritus of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 1960 (AFIT/ENP); BS, United States Naval Academy, 1952; MS, North Carolina State University, 1958; PhD, North Carolina State University, 1963. Dr. Bridgman's interests center around nuclear weapon effects and military nuclear power applications. He has been associated with nuclear weapon defense since 1952. He was a member of the first military team to be operational on the H-bomb. His current research interest is

nuclear weapon fallout modeling. He is the author of a textbook, "Introduction to the Physics of Nuclear Weapons Effects," and numerous technical articles in a wide variety of journals. In his 38 years on the AFIT faculty, he has chaired over 120 MS theses and PhD dissertations. He has received several awards, including Tau Beta Pi Teacher of the Year, the Gage H. Crocker Outstanding Professor Award, and the Order of the Nucleus Award. Dr. Bridgman is a Fellow of the American Nuclear Society.

BUNKER, DAVID J.,

Director, Center for Technical Intelligence Studies and Research, and Research Assistant Professor of Engineering Physics, Department of Engineering Physics, AFIT Appointment Date: 2010 (AFIT/ENP); BS, Aerospace-Engineering, Pennsylvania State University, 1984; MS, Mechanical Engineering, University of Dayton, 1988; PhD, Aerospace Engineering Sciences, University of Colorado, 1994. Dr Bunker's research interests include applications of-measurement and signature technology, remote sensing, and technical intelligence. Additional interests include high angle of attack and vertical flow structures, unsteady fluid dynamics, experimental wind tunnel testing, and low-speed fluid mechanics.

SPONSOR FUNDED RESEARCH PROJECTS

"Open Skies Assessment." Sponsor: NASIC. Funding: \$100,000 - Bunker 50%, Hopkinson 25%, Peterson 25%. [CTISR]

"Overhead Persistent Infra-Red (OPIR) Research and Algorithm Development." Sponsor: NGA. Funding: \$375,000 - Bunker 50%, Borel-Donohue 50%. [CTISR]

"Rapid Location of Radiation Sources in Complex Environments Using Optical and Radiation Sensors." Sponsor: DTRA. Funding: \$308,340 - Bunker 25%, Borel-Donohue 50%, Magnus 15%, Tuttle 10%. [CTISR]

"Signatures from Human Activities." Sponsor: AFOSR. Funding: \$15,000 - Bunker 35%, Borel-Donohue 35%, Magnus 30%. [CTISR]

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BURGGRAF, LARRY W.,

Professor of Engineering Physics and Chemical Physics, Department of Engineering Physics, AFIT Appointment Date: 1994 (AFIT/ENP); BA, Chemistry, Olivet Nazarene University, 1968; MS, Chemistry, The Ohio State University, 1971; MA, Applied Mathematics, University of West Florida, 1977; PhD, Chemistry, University of Denver, 1981; Postdoctoral Associate, Computational Chemistry, Iowa State University, 1993. Dr. Burggraf conducts experimental and theoretical research in physical chemistry and materials chemistry including radiation biophysics, exotic atom chemistry, positron spectroscopy, surface and cluster spectroscopy, excitonic nanomaterials, atomic force microscopy, gamma spectroscopy and imaging to solve DOD, DHS and DOE problems in WMD non-proliferation. Theoretical research to model surfaces, clusters, nanomaterials and exotic-atom molecules applies quantum mechanics modeling to interpret experimental results. Dr. Burggraf is author for more than 50 refereed archival publications. Tel. 937-255-3636 x4507, email: Larry.Burggraf@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Muon Chemistry in Plasmas for Imaging." Sponsor: AFOSR. Funding: \$51,856.

"Surface Chemistry of Positrons and Positronium Atoms: Modeling and Spectrometry." Sponsor: AFOSR. Funding: \$56,984.

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Yun Xing, Alex Li, Daniel L. Felker and Larry W. Burggraf, "Nanoscale Structural and Mechanical Analysis of Bacillus anthracis Spores Inactivated with Rapid Dry Heating," *Applied and Environmental Microbiology*, Vol. 80, No. 5, pp. 1739-1749 (Mar 2014).

CLINTON, JUSTIN A.,

Visiting Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2013 (AFIT/ENP); BS, Nuclear Engineering, 2004; PhD, Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY, 2011. Dr. Clinton's research interests are in the area of radiation detection, both experimental and theoretical modeling, as it applies to nuclear forensics. His expertise includes particle transport, Monte Carlo methods, analog and digital data acquisition and analysis, and detector development. Dr. Clinton is a member of the American Nuclear Society (ANS) as well as the Institute of Electrical and Electronics Engineers (IEEE). Tel. 937-255-6565 x4586, email: Justin.Clinton.ctr@afit.edu

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T. P. Genda, J. W. McClory, B. R. Kowash, S. R. McHale, J. A. Clinton, "Optimization of Detector Placement for High Energy Photon Interrogation of Special Nuclear Material," *Hardened Electronics and Radiation Technology Conference Proceedings*, Paper PH.2, Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

A. W. Decker, M. P. Shannon, J. A. Clinton, J. W. McClory, S. R. McHale, "Verification and Validation of Monte Carlo N-particle Code 6 (MCNP6) with Neutron Protection Factor," *Hardened Electronics and Radiation Technology Conference Proceedings*, Paper A.6, Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

FERDINANDUS, MANUEL R., Maj,

Assistant Professor of Optical Sciences, Department of Engineering Physics, AFIT Appointment Date: 2014 (AFIT/ENP); BS, Seattle University, 1999; MS, Rochester Institute of Technology, 2007; PhD, University of Central Florida, 2014. Maj Ferdinandus performs research into nonlinear optics, optical limiting, infrared laser sources and hyperspectral target detection. Previously he has worked in space operations and satellite system acquisition. He has published two refereed journal articles and seven conference presentations. Member of the Optical Society of America. Tel. 937-255-6565 x4339, email: Manuel.Ferdinandus@afit.edu.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

M. Reichert, H. Hu, M. Ferdinandus, M. Seidel, P. Zhao, J. Reed, D. Fishman, S. Webster, D. Hagan, and E. Van Stryland, "Measurement of Nonlinear Refraction Dynamics of CS₂," in *CLEO: 2014, OSA Technical Digest (online)* (Optical Society of America, 2014), paper JT4A.18.

Honghua H, Trenton R. Ensley, Matthew Reichert, Manuel R. Ferdinandus, Davorin Peceli, Olga V. Przhonska, Seth R. Marder, Alex K-Y. Jen, Joel M. Hales, Joseph W. Perry, David J. Hagan, Eric W. Van Stryland, Optimization of the electronic third-order nonlinearity of cyanine-like molecules for all optical switching. *Proc. SPIE 8983, Organic Photonic Materials and Devices XVI*, 898303 (Mar 7, 2014); doi:10.1117/12.2037003. [CSRA]

FIORINO, STEVEN T.,

Director, Center for Directed Energy, and Research Associate Professor of Atmospheric Physics, AFIT Appointment Date: 2003 (AFIT/ENP); BS, Geography (Climatology), The Ohio State University, 1987; BS, Meteorology, Florida State University, 1989; MS, Atmospheric Dynamics, The Ohio State University, 1993; PhD, Physical Meteorology, Florida State University, 2002. Dr. Fiorino's research interests include retrieving environmental parameters via microwave remote sensing; developing signal processing algorithms to fuse meteorological data collection with non-weather ISR platforms; evaluating uncertainty in high-energy laser engagement due to atmospheric effects; and improving microphysical characterizations for nuclear fallout, transport, and dispersion. He has published broadly in meteorological, directed energy, and military

journals. Dr. Fiorino is a member of the American Meteorological Society, American Institute of Aeronautics and Astronautics, the Directed Energy Professional Society, Society of Photo-Instrumentation Engineers (SPIE), and additionally holds a Master of Military Operational Art and Science from Air University (2003). Tel. 937-255-3636 x4506, email: Steven.Fiorino@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Atmospheric Effects & Software Codes Short Course.” Sponsor: AFRL/RV. Funding: \$8,532. [CDE]

SPONSOR FUNDED RESEARCH PROJECTS

“2014 AFIT Center for Directed Energy Summer Intern (DESI) Program.” Sponsor: HELJTO. Funding: \$50,000 - Fiorino 90%, Perram 5%, Marciniak 5%. [CDE]

“Additions to AFIT Atmospheric Effects Software Code for AFRL/RV.” Sponsor: AFRL/RV. Funding: \$125,000. [CDE]

“Airborne Aero-Optics Lab Beam Control Collection and Evaluation.” Sponsor: HELJTO. Funding: \$123,253. [CDE]

“Atmospheric Characterization and Clouds for Directed Energy.” Sponsor: MDA. Funding: \$52,500. [CDE]

“Atmospheric Characterization for Directed Energy Applications (Phase II SBIR).” Sponsor: MDA. Funding: \$15,000. [CDE]

“HELJTO M&S TAWG Product Development.” Sponsor: HELJTO. Funding: \$500,000. [CDE]

“Development of HELEEOS and LEEDR for End-to-End Laser Engagement.” Sponsor: NASIC. Funding: \$5,000. [CDE]

“High Energy Laser-Joint Technology Office Predictive Avoidance Subject Matter Expert.” Sponsor: HELJTO. Funding: \$15,000. [CDE]

“Iterative High Energy Laser End-to-End Operational Simulation Enhancements Using Design of Experiments.” Sponsor: AFRL/RD. Funding: \$75,000. [CDE]

“Modification of AFIT Atmospheric Effects Software Code for AFRL/RV.” Sponsor: AFRL/RV. Funding: \$106,477. [CDE]

“Wave Optics of Deep Atmospheric Turbulence: From Underlying Physics towards Predictive Modeling, Mitigation and Exploitation.” Sponsor: AFOSR. Funding: \$270,000 - Fiorino 55%, Cusumano 45%. [CDE]

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Fiorino, S.T., R.M. Randall, M.F. Via, and J.L. Burley: “Validation of a UV-to-RF high-spectral-resolution atmospheric boundary layer characterization tool,” *Journal of Applied Meteorology and Climatology*, Vol. 53, No. 1, pp. 136-156. (2014) [CDE]

Yarbrough, A.W., M.J. Mendenhall, R.K. Martin, and S.T. Fiorino: “Hyperspectral-Based Adaptive Matched Filter Detector Error as a Function of Atmospheric Profile Estimation,” *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 52, Iss. 4, pp. 2029 – 2039. (2014) [CDE]

Burchett, L.R. and S.T. Fiorino: “Wavelength correction of refractivity variation measurements,” *Optics Express*, Vol. 21, Iss. 26, pp. 31990-31997. (Dec 2013) [CDE]

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Basu, Santasri, M.W. Hyde, J. E. McCrae, Jr., M.F. Spencer, S.T. Fiorino., “Examining the validity of using a Gaussian Schell Model for modeling an extended beacon on a rough perfectly reflecting surface,” Proceedings of SPIE Vol. 9224, 92240L. (Jul 2014) [CDE]

Zuraski, S.M. and S.T. Fiorino, “Worldwide study of the performance of a sodium guidestar,” Proceedings of SPIE Vol. 9224, 92240D. (Jul 2014) [CDE]

Basu, Sukanta, C.G. Nunalee, P. He, S.T. Fiorino, M.A. Vorontsov, “Reconstructing the prevailing meteorological and optical environment during the time of the Titanic disaster,” Proceedings of SPIE Vol. 9224, 92240Y. (2014) [CDE]

Nunalee, C.G., P. He, Sukanta Basu, M. A. Vorontsov, S.T. Fiorino, “Impact of large-scale atmospheric refractive structures on optical wave propagation,” Proceedings of SPIE Vol. 9224, 92240W. (2014) [CDE]

He P., C.G. Nunalee, Sukanta Basu, M.A. Vorontsov, S.T. Fiorino, “Current status and challenges in optical turbulence simulations in various layers of the Earth’s atmosphere,” Proceedings of SPIE Vol. 9224, 92240F. (2014) [CDE]

Fiorino S.T., “Satellite and Radar Measurement of CT₂, Cn₂, and Cv₂” Propagation through and Characterization of Distributed Volume Turbulence (pcDVT), Imaging and Applied Optics Conference, Seattle, WA, 13-17 Jul 2014. Invited. [CDE]

Meier, D.C. and S.T. Fiorino, “Correlated Satellite-derived Turbulence, Clouds and Aerosol Data,” Propagation through and Characterization of Distributed Volume Turbulence (pcDVT), Imaging and Applied Optics Conference, Seattle, WA, 13-17 Jul 2014. [CDE]

McCrae, J.E. and S.T. Fiorino, “Simulation of Deep Turbulence Compensation for a Laser Phased Array,” 2014 IEEE Aerospace Conference Big Sky, MT, 1-8 Mar 2014. [CDE]

Fiorino, S.T., M.F. Via, D.C. Meier, B.J. Elmore, and K.J. Keefer, “Enhanced Atmospheric Refraction and Radiative Transfer Analyses Merging Gridded Numerical Weather Forecast and Satellite Data,” (Poster), 18th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface (IOAS-AOLS), 94th Annual American Meteorological Society Meeting, Atlanta, GA 2-6 Feb 2014. <https://ams.confex.com/ams/94Annual/webprogram/Paper241611.html>. [CDE]

FRANZ, ANTHONY L., Lt Col,

Assistant Professor of Physics, Deputy Department Head, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, United States Air Force Academy, 1992; MS, Air Force Institute of Technology, 1997; PhD, University of Maryland, 2007. Lt Col Franz’s research focuses on lasers and optics. His recent work has focused on developing light weight diffractive optics for use on satellites. Before joining AFIT, he was a physics faculty member at the Air Force Academy for 8 years and deployed to Iraq and Afghanistan. He has also worked in nuclear treaty monitoring and infrared missile engagement modeling and-simulation. Member of the American Association of Physics Teachers and the American Physical Society. Tel. 937-255-3636 X4429, email: Anthony.Franz@afit.edu

GILES, NANCY C.,

Professor of Physics and Head, Department of Engineering Physics, AFIT Appointment Date: 2009 (AFIT/ENP); BS, University of North Carolina at Chapel Hill, 1981; PhD, North Carolina State University, 1987. Professor Giles’ research focuses on solid-state physics: photoluminescence (PL), absorption, Raman, and magnetic resonance (EPR) spectroscopy leading to identification of point defects in semiconducting and optical materials; PL excitation and time-resolved PL spectroscopies; nonlinear optical materials; laser-host materials; and scintillators. She is the author of 175 archival publications in refereed journals. Before joining AFIT, she was a physics faculty member at West Virginia University for 19 years. Her current work includes studies of scintillator materials (ZnO:Ga, CdWO₄) for improved detection of nuclear radiation, wide

band-gap semiconductors for photorefractive applications, and infrared non-linear optical materials for infrared countermeasures. Member of the Optical Society of America, American Physical Society, and Materials Research Society. Tel. 937-255-3636 x4601, email: Nancy.Giles@afit.edu

REFEREED JOURNAL PUBLICATIONS

E. M. Golden, S. M. Evans, L. E. Halliburton, and N. C. Giles, "Neutral nitrogen acceptors in ZnO: The ^{67}Zn hyperfine interactions," *Journal of Applied Physics* 115, 103703 (2014).

A. T. Brant, E. M. Golden, N. C. Giles, Shan Yang, M. A. R. Sarker, S. Watauchi, M. Nagao, I. Tanaka, D. A. Tryk, A. Manivannan, and L. E. Halliburton, "Triplet ground state of the neutral oxygen-vacancy donor in rutile TiO_2 ," *Physical Review B* 89, 115206 (2014).

M. C. Recker, J. W. McClory, M. S. Holston, E. M. Golden, N. C. Giles, and L. E. Halliburton, "Copper doping of ZnO crystals by transmutation of ^{64}Zn to ^{65}Cu : An electron paramagnetic resonance and gamma spectroscopy study," *Journal of Applied Physics* 115, 243706 (2014).

A.T. Brant, D. A. Buchanan, J.W. McClory, V.T. Adamiv, Ya. V. Burak, L. E. Halliburton, and N. C. Giles, "Photoluminescence from Ag^{2+} ions in lithium tetraborate ($\text{Li}_2\text{B}_4\text{O}_7$) crystals," *Journal of Luminescence* vol. 153, pp.79-84 (Apr 2014).

GOLDEN, ERIC M., Maj,

Assistant Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 2014 (AFIT/ENP); BS, West Virginia University, 2003; MS, Air Force Institute of Technology, 2008; PhD, Air Force Institute of Technology, 2014. Maj Golden's current research is focused on the characterization of point defects in semiconductors ($\text{Sn}_2\text{P}_2\text{S}_6$, TiO_2 , ZnO) and nonlinear optical materials (CdSiP_2 , KTiOPO_4). Characterization techniques of interest include electron paramagnetic resonance, electron-nuclear double resonance, Fourier transform infrared spectroscopy, and photoluminescence. His previous assignments include the Air Force Research Laboratory Directed Energy and Munitions Directorates where he managed and performed research in space situational awareness and hardware-in-the-loop simulation. Tel: 937-255-3636x4518, email: Eric.Golden@afit.edu

REFEREED JOURNAL PUBLICATIONS

E. M. Golden, S. M. Evans, L. E. Halliburton, and N. C. Giles, "Neutral nitrogen acceptors in ZnO: The ^{67}Zn hyperfine interactions," *Journal of Applied Physics* 115, 103703 (2014).

A. T. Brant, E. M. Golden, N. C. Giles, Shan Yang, M. A. R. Sarker, S. Watauchi, M. Nagao, I. Tanaka, D. A. Tryk, A. Manivannan, and L. E. Halliburton, "Triplet ground state of the neutral oxygen-vacancy donor in rutile TiO_2 ," *Physical Review B* 89, 115206 (2014).

M. C. Recker, J. W. McClory, M. S. Holston, E. M. Golden, N. C. Giles, and L. E. Halliburton, "Copper doping of ZnO crystals by transmutation of ^{64}Zn to ^{65}Cu : An electron paramagnetic resonance and gamma spectroscopy study," *Journal of Applied Physics* 115, 243706 (2014).

GROSS, KEVIN C.,

Assistant Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Wright State University, 1998; MS, Wright State University, 2001; PhD, Air Force Institute of Technology, 2007. Dr. Gross' main interests are remote sensing, spectroscopy, and radiative transfer and his research is focused on the remote sensing of chemically evolving systems in the battlespace (detonation fireballs, muzzle flashes, rocket and jet engine plumes, smokestack effluents, etc.) using hyperspectral, radiometric, and high-speed imagery techniques. He is developing hyperspectral imaging for combustion diagnostics. He is also leading a new effort to develop polarimetric hyperspectral imaging for improved target detection and robust material identification. He has 22 archival publications in peer reviewed journals and has secured over \$3M in external funding. He has successfully chaired nine MS students, one PhD student, and is

advising four PhD students. He is a member of the Optical Society of America (OSA), SPIE, and the Combustion Institute. Tel: 937-255-3636 x4558, email: Kevin.Gross@afit.edu

REFEREED JOURNAL PUBLICATIONS

M. R. Rhoby, D. L. Blunck, K. C. Gross, "Mid-IR hyperspectral imaging of laminar flames for 2-D scalar values," *Optics Express*, Vol. 22, No. 18, pp. 21600–21617 (2014).
<http://dx.doi.org/10.1364/OE.22.021600>.

R. I. Acosta, K. C. Gross, G. P. Perram, S. Johnson, L. Dao, D. Medina, and R. Roybal, P. Black, "Gas phase plume from laser irradiated fiberglass reinforced polymers via imaging Fourier-transform spectroscopy," *Applied Spectroscopy*, Vol. 68, No. 7, pp. 723–732 (2014). <http://dx.doi.org/10.1366/13-07213>. [CDE]

J. L. Harley, D. L. Blunck, B. A. Rankin, J. P. Gore, K. C. Gross, "Imaging Fourier-transform spectrometer measurements of a turbulent non-premixed jet flame," *Optics Letters*, Vol. 39, No 8, pp. 2350–2353 (2014). <http://dx.doi.org/10.1364/OL.39.002350>.

J. M. Gordon, K. C. Gross, G. P. Perram, "Temperature dynamics of aluminized cyclotrimethylenetrinitramine fireballs for event classification," *Optical Engineering*, Vol. 53, No. 2, paper # 021106 (2013). <http://dx.doi.org/10.1117/1.OE.53.2.021106>. [CTISR]

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HAGER, GORDON D.,

Research Professor of Chemical Physics, Department of Engineering Physics, AFIT Appointment Date: 2007 (AFIT/ENP); BS, Western Washington University, 1968; PhD, Washington State University, 1973. Professor Hager's research primarily focuses on high-power chemical and gas phase lasers, including laser device development, characterization, and scaling. His current research emphasizes the spectroscopy and kinetics of diode pumped alkali lasers for tactical weapons applications. He has advised eight MS students, eight PhD students, and eight postdoctoral researchers. He has published over 50 refereed articles and led the team to demonstrate the first supersonic Chemical Oxygen-Iodine Laser.

REFEREED JOURNAL PUBLICATIONS

Gordon D. Hager, Gordon E. Lott, Aaron J. Archibald, L Blank, David E. Weeks, and Glen P. Perram, High pressure line shapes for Cs D1 and D2 lines and empirically informed interaction potentials, *J. Quant. Spectrosc. Radiative Transfer* Vol. 147 (2014) 261.

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HAWKS, MICHAEL R.,

Research Assistant Professor of Optical Engineering, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Astrophysics, Michigan State University, 1991; MS, Engineering Physics, AFIT, 1993; PhD, Optical Sciences, AFIT, 2006. Dr. Hawks' main research interests include electro-optic and infrared (EO/IR) remote sensing. Specific application areas include monocular passive ranging and hyperspectral and polarimetric imaging. He previously taught at the United States Air Force Academy and

has conducted research in chemical lasers, space object identification, chem/bio agent detection, infrared countermeasures, nuclear detonation detection, and other remote sensing applications at the Air Force Research Laboratory and other assignments. He has published 21 technical papers, reports, and presentations. He is a member of the Optical Society of America and the Directed Energy Professional Society, and is a retired USAF Lt Col. Tel. 937-255-3636 x4828, email: Michael.Hawks.ctr@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Spectropolarimetric Imaging of Disturbed Earth (SIDE).” Sponsor: USA/ERDC. Funding: \$20,000 - Hawks 80%, Gross 20%. [CTISR]

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R. L. Tervo, M. Hawks and G. P. Perram “Effects of optical aberration on chromotomographic reconstruction,” Proc. SPIE Vol. 9088, SPIE Defense and Security, Paper 908817, 13 Jun 2014.

HENGHELD, ROBERT L.,

Professor Emeritus of Physics, Department of Engineering Physics, AFIT Appointment Date: 1961 (AFIT/ENP); AB, Thomas More College, 1956; MS, University of Cincinnati, 1961; PhD, University of Cincinnati, 1965. Professor Hengehold’s research areas center around experimental solid state physics, semiconductor physics, optical diagnostics, and electron and laser spectroscopy. He is the author of over 100 archival publications and over 215 presentations at technical meetings. He has served as advisor on over 17 doctoral dissertations and 80 master’s theses. He is currently carrying out studies of (1) depth resolved cathodoluminescent spectroscopy of materials suitable for neutron absorbing semiconductor solid state detectors and (2) optical characterization of compound semiconductor materials and superlattice structures for mid-infrared diode lasers and detectors. This work involves collaborative efforts with the-Directed Energy and Sensors Directorates at AFRL and DTRA. Dr. Hengehold received the Air University Commander’s Award for Faculty Achievement in 1982, the Gage H. Crocker Outstanding Professor Award in 1996, the Outstanding Professional Achievement Award from the Affiliate Society Council of the Engineering and Science Foundation of Dayton in 1997, and the General Bernard A. Schriever Award in 1999. He was elected a Fellow of the American Physical Society in 2008. Tel. 937-255-3636 x4502, email: Robert.Hengehold@afit.edu

KELLY, TONY D.,

Research Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2014 (AFIT/ENP); BA, Physics, California State University-Bakersfield, 2006; MS, Physics, University of Nebraska-Lincoln, 2010; PhD, Nuclear Engineering, Air Force Institute of Technology, 2013; Research Assistant Professor, Nuclear Engineering, Air Force Institute of Technology, 2014. Dr. Kelly conducts experimental and theoretical research in developing detectors and materials for radiation detection including photoemission spectroscopy, x-ray absorption fine structure spectroscopy, x-ray fluorescence, and radiation effects on electronics. His theoretical research models materials’ electronic bulk and surface properties. Tel. 937-255-3636 x4697, email: Tony.Kelly@afit.edu

REFEREED JOURNAL PUBLICATIONS

T. D. Kelly, E. Echeverria, Sumit Beniwal, V. T. Adamiv, Ya. V. Burak, Axel Enders, J. C. Petrosky, J. W. McClory, and P. A. Dowben, “The chromium site in doped glassy lithium tetraborate,” *Materials Chemistry and Physics*, Vol. 147, pp. 492-495, Aug 2014. <http://dx.doi.org/10.1016/j.matchemphys.2014.05.021>.

Tony D. Kelly, James C. Petrosky, John W. McClory, Volodymyr T. Adamiv, Yaroslav V. Burak, Bohdan V. Padlyak, Ihor M. Teslyuk, Ning Lu, Lu Wang, Wai-Ning Mei, Peter A. Dowben, “Rare earth dopant (Nd, Gd, Dy, and Er) hybridization in lithium tetraborate,” *Frontiers in Physics*, Vol. 2, Article no. 31 (10 pages), May 2014. <http://dx.doi.org/10.3389/fphy.2014.00031>.

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KOWASH, BENJAMIN R., Maj,

Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Nuclear Engineering, Oregon State University, 2000; BS, Mechanical Engineering, Oregon State University, 2000; MS, Nuclear Engineering, Air Force Institute of Technology, 2002; PhD, Nuclear Engineering, University of Michigan, 2008. Major Kowash's research interests are in the fields of radiation detection and measurements (emphasis on inverse problems and imaging), nuclear weapon effects, and space nuclear power. His current research considers autonomous radiation detection and imaging systems for the stand-off detection (10-100 meters) of ionizing radiation sources over wide fields of view and in complex background environments. His other interests include modeling and analysis of nuclear weapons effects, inverse problems in detection, adaptive detection systems, radiation shielding, and Mossbauer spectroscopy. He is a member of the American Nuclear Society and IEEE, and maintains an active professional engineering license (nuclear engineering) in the state of Michigan.

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T. P. Genda, J. W. McClory, B. R. Kowash, S. R. McHale, J. A. Clinton, "Optimization of Detector Placement for High Energy Photon Interrogation of Special Nuclear Material," *Hardened Electronics and Radiation Technology Conference Proceedings*, Paper PH.2, Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

C. A. Lenyk, D. J. Bunker, J. W. McClory, B. R. Kowash, S. R. McHale, "Defining a Methodology for Data Analysis Using Streak Films," *Hardened Electronics and Radiation Technology Conference Proceedings*, Paper PE.1, Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

LEWIS, C. DAVID, Capt,

Assistant Professor of Physics, Department of Engineering Physics, AFIT, Appointment Date: 2014 (AFIT/ENP); BS/BA, Physics/Chemistry, Duke University, 2005; MS, Applied Physics, Air Force Institute of Technology, 2009; PhD, Physics, Air Force Institute of Technology, 2011. Capt Lewis' primary research interests focus on computationally modeling quantum mechanical and electro dynamical phenomenon for application to various classes of lasers, interaction of microwaves with electronics, chemical/biological agent neutralization, and positrons. Before joining AFIT, Capt Lewis has served in a number of scientific roles including assignments at AFRL Sensors Directorate and the Defense Threat Reduction Agency (DTRA). At AFRL he was a lead researcher on electronic attack techniques to disrupt/disable surveillance radars, small UAVs, and IEDs. At DTRA he was an offensive counter-WMD chief scientist for Advanced Technologies where he brought together directed energy, access denial technologies, and counter-communication techniques to develop highly asymmetrical capabilities to hold at risk chemical and biological production and storage facilities and the means to employ those weapons. Tel. 937-255-3636 x4695, email: Charlton.Lewis@afit.edu

LEWIS, DOUGLAS R., LTC,

Assistant Professor of Biodefense Science, Department of Engineering Physics, AFIT, Appointment Date: 2012; BS, USAF Academy 1991, MS Pennsylvania State University 1995, PhD, George Mason University 2012. LTC Lewis' previous research focused on genetic components of the insect immune system, genetic response to laser induced damage, peptide capture of biological agents, genetic identification of smallpox, and the organizational factors which have influenced the development of the US Biodefense program. Before joining AFIT, he served 16 years in the US Air Force and 5 years in the US Army to include assignments as an aircraft maintenance officer and as an Assistant Professor of Biology at the Air Force Academy. He also served in counter-WMD positions with the Defense Intelligence Agency (DIA), Air Staff, as an US/UK exchange scientist and with the Defense Threat Reduction Agency (DTRA). His current research is investigating the ability of graphen to serve as a biological detector. His other interest is investigating the

possibility of developing a biological collection network based upon native collection entities. Tel. 937-255-3636 x4569, email: Douglas.Lewis@afit.edu

LI, ALEX G.,

Research Associate Professor, Department of Engineering Physics, AFIT Appointment Date: 1995 (Research Associate), 2008 (Research Faculty); BS, Changchun University of Science and Technology, 1982; PhD, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, 1990. Dr. Li has over 20 years of research experience using AFM, SEM, FTIR, Raman, photoluminescence, EPR, ESCA, and XRD to characterize glass, ceramics, semiconductors, polymers, nano-carbon composites, and biological materials. He has published, mostly as the lead author, over two dozen peer-reviewed journal articles, including one top-ten download article of the Institute of Physics (IOP). He also conducted computer modeling of thermal transport and thermal stress in polymers, composites, and other advanced multifunctional materials. Dr. Li invented a novel AFM nano-patterning technique for producing sub-100 nm two-dimensional nanostructures in polymers, and held one patent for a proton conductor material. He was a post-doctoral fellow at Nagoya Institute of Technology and Aichi Institute of Technology prior to working for AFIT in 1995. Dr. Li had taught two core courses, Materials Characterization (MATL 680) and Materials Selection and Processing (MATL 685), for the AFIT materials science program. His current research includes experiment and computer modeling of thermal, mechanical, and electrical properties of granular systems, memristive devices and systems, biomaterials, ceramic matrix composites (CMC), and polymer matrix composites ceramic (PMC). Tel. 937-255-3636 x4576, email: Alex.Li@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Tamping-Induced Phase Transitions in Protective Materials for WMD-Related Sensing and Monitoring.”
Sponsor: DTRA. Funding: \$149,096 - Li 75%, Zens 25%.

“Thermal and Mechanical Characterizations of Multilayer Thermal Protection Material.” Sponsor: AFRL/RX.
Funding: \$20,000.

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Y. Xing, A. Li, D. L. Felker and L.W. Burggraf, “Nanoscale Structural and Mechanical Analysis of Bacillus Anthracis Spores Inactivated with Rapid Dry Heating,” Applied and Environmental Microbiology, Vol. 80, No. 5, pp. 1739-1749 (Mar 2014).

LOPER, ROBERT D.,

Assistant Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 2014 (AFIT/ENP); BS, University of Dayton, 1994; MS, University of Texas at Dallas, 1998; MTS, United Theological Seminary, 2011; PhD, Air Force Institute of Technology, 2013. Dr. Loper’s research interests are in computational quantum physics, centering on collisional broadening and shifting of atomic spectral lines, and space physics, centering on solar astrophysics. Dr. Loper is a member of Tau Beta Pi and Sigma Pi Sigma. Tel. 937-255-3636 x4333, email: Robert.Loper@afit.edu

MAGNUS, AMY L.,

Research Assistant Professor, Department of Engineering Physics, AFIT Appointment Date: 2007 (AFIT/ENP); BSEE, Rochester Institute of Technology, 1990; MSEE, Air Force Institute of Technology, 1995; PhD, Air Force Institute of Technology, 2003. Dr. Magnus conducts and manages research in machine intelligence, near and remote sensing, pattern recognition, network science, and distributed intelligence with particular interest in signal to symbol translations and query based intelligence assessments of sensor management systems. She designs active workspaces for the analysis of kinetic events to ensure authoritative reporting of actionable information. Dr. Magnus has published 11 articles and is writing a book on machine intelligence. She is a retired Major, USAF. Tel. 937-255-3636 x4555, email: Amy.Magnus@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Signatures from Human Activities.” Sponsor: AFOSR. Funding: \$18,000 - Magnus 30%, Bunker 35%, Borel 35%. [CTISR]

“Understanding Persona in Cyberspace.” Sponsor: NSA. Funding: \$10,000. [CCR & CTISR]

MARCINIAK, MICHAEL A.,

Associate Professor of Physics, Department of Engineering Physics. AFIT Appointment Date: 1999 (AFIT/ENP); BS, St. Joseph’s College, 1981; BSEE, University of Missouri, 1983; MSEE, Air Force Institute of Technology, 1987; PhD, Air Force Institute of Technology, 1995. Professor Marciniak’s research interests include various aspects of light-matter interaction, including (1) polarimetric scatterometry of nanostructured materials, such as photonic crystals, plasmonic materials, and optical meta-materials; (2) bidirectional reflectance distributions for optical signatures; and (3) high-energy laser damage assessment. He has published 22 refereed and 62 other publications and chaired 5 PhD and 47 MS thesis committees. He is a retired Lt Col, USAF, with 22 years of service. Tel. 937-255-3636 x4529, email:

Michael.Marciniak@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Laser-damage thresholds in carbon-nanotube films.” Sponsor: AFOSR. Funding: \$47,580. [CDE]

“Radiometrically Accurate BRDF's in the Infrared.” Sponsor: AFRL/RV. Funding: \$100,000. [CDE]

“Thin-Film Research for Infrared Optical Coatings and Meta-Materials.” Sponsor: DAGSI. Funding: \$11,240. [CDE]

“Understanding the spectral dependence of the BRDF.” Sponsor: AFRL/RV. Funding: \$100,000. [CDE]

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M. R. Benson and M. A. Marciniak, “Design considerations regarding ellipsoidal-mirror-based reflectometers,” *Optics Express* Vol. 21, No. 23, pp. 27519-27536 (Nov 2013). [CDE]

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M. Benson, P. Shah, M. Marciniak, A. Sarangan, and A. Urbas, “Optical characterization of silver-nanorod thin films grown using oblique angle deposition,” *Journal of Nanomaterials* Vol. 2014, pp. 694982(1-8) (May 2014). [CDE]

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S. M. Baumann, B. E. Hurst, M. A. Marciniak and G. P. Perram, “Fiber laser heating and penetration of aluminum in shear flow,” *Optical Engineering* Vol. 53, No. 12, pp. 122510(1-7) (Aug 2014). [CDE]

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S.D. Butler, M.A. Marciniak and J.N. Meola, "Modeling effects of bidirectional reflectance distribution function on remote sensing in the long wave infrared spectrum," Proceedings of the SPIE, Vol. 9222, 9222-16, 17-21 Aug 2014, San Diego, CA. [CDE]

S.M. Baumann, C. Keenan, M.A. Marciniak and G.P. Perram, "Spectral and temperature-dependent infrared emissivity measurements of painted metals for improved temperature estimation during laser damage testing," Proceedings of the SPIE, Vol. 9237, 9237-39, 14-17 Sep 2014, Boulder, CO. [CDE]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Samuel Freda, Stephen E. Nauyoks and Michael A. Marciniak, "Dynamic data-driven bidirectional reflectance distribution function," 16th Annual Directed Energy Annual Symposium, 10-14 Mar 2014, Huntsville, AL. [CDE]

MATHEWS, KIRK A.,

Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 1987 (AFIT/ENP); BS, California Institute of Technology, 1971; MS, Air Force Institute of Technology, 1982; PhD, Air Force Institute of Technology, 1983. Dr. Mathews' research interests center on computational methods for neutral particle radiation transport and modeling and analysis of nuclear phenomena and measurements, including enrichment cascade modeling, high altitude radiation transport, blast and shock, nuclear thermal radiation, deconvolution of radiation spectra, and statistical analysis of nuclear measurements. Dr. Mathews has published 20 papers in refereed journals and 21 conference proceedings and chaired 35 theses and 13 dissertations. He is a member of the American Nuclear Society and Tau Beta Pi. Tel. 937-255-3636 x4508, email: Kirk.Mathews@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"AFIT Research Supporting Satellite-Based Nuclear Detonation Detection." Sponsor: DOE/NNSA. Funding: \$100,000.

"Algorithm/Software Development for AFTAC/THD 2014." Sponsor: AFTAC. Funding: \$35,000.

MCCLORY, JOHN W.,

Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Physics, Rensselaer Polytechnic Institute, 1984; MS, Physics, Texas A&M University, 1993; PhD, Nuclear Engineering, Air Force Institute of Technology, 2008. Dr. McClory's expertise is in radiation effects radiation detector development and nuclear weapon effects. His research includes determining the effect of space and nuclear weapon radiation on electronic and structural materials. It also includes the interaction of radiation with matter, particularly focused on the characterization and improvement of nuclear radiation detectors. He has advised 5 PhD students (5 current) and 25 M.S. students

(4 current), received 11 research grants, and published 48 journal articles during his time on the AFIT faculty. He is a member of the IEEE Nuclear and Plasma Sciences Society, American Nuclear Society and Materials Research Society. Tel. 937-255-3636 x7308, email: John.McClory@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“AFIT/ENP Research in Support of Defense Threat Reduction Agency Nuclear Technologies.” Sponsor: DTRA. Funding: \$50,000.

“Irradiation of Thin Film Systems.” Sponsor: AFRL/RV. Funding: \$22,000.

“Rapid Debris Analysis.” Sponsor: DTRA. Funding: \$18,000.

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M. C. Recker, J. W. McClory, M. S. Holston, E. M. Golden, N. C. Giles, and L. E. Halliburton, “Copper doping of ZnO crystals by transmutation of ^{64}Zn to ^{65}Cu : An electron paramagnetic resonance and gamma spectroscopy study,” *Journal of Applied Physics* 115, 243706 (2014).

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D. A. Buchanan, M. S. Holston, A. T. Brant, J. W. McClory, V. T. Adamiv, Ya. V. Burak, and L. E. Halliburton, “Electron paramagnetic resonance and thermoluminescence study of Ag^{2+} ions in $\text{Li}_2\text{B}_4\text{O}_7$ crystals,” *Journal of Physics and Chemistry of Solids*, Vol. 75, Iss. 12, pp. 1347-1353, Dec 2014. <http://dx.doi.org/10.1016/j.jpcs.2014.07.014>.

T. D. Kelly, E. Echeverria, Sumit Beniwal, V. T. Adamiv, Ya. V. Burak, Axel Enders, J. C. Petrosky, J. W. McClory, and P. A. Dowben, “The chromium site in doped glassy lithium tetraborate,” *Materials Chemistry and Physics*, Vol. 147, pp. 492-495, Aug 2014. <http://dx.doi.org/10.1016/j.matchemphys.2014.05.021>.

Jeffrey J. Graham, J. Matthew Mann, Timothy W. C. Zens, John W. McClory, “Hydrothermal Phase Stability Study of $\text{Li}_2\text{B}_4\text{O}_7$,” *Journal of Solid State Chemistry*, Vol. 216, pp. 79-84, Aug 2014. <http://dx.doi.org/10.1016/j.jssc.2014.04.019>.

Tony D. Kelly, James C. Petrosky, John W. McClory, Volodymyr T. Adamiv, Yaroslav V. Burak, Bohdan V. Padlyak, Ihor M. Teslyuk, Ning Lu, Lu Wang, Wai-Ning Mei, Peter A. Dowben, “Rare earth dopant (Nd, Gd, Dy, and Er) hybridization in lithium tetraborate,” *Frontiers in Physics*, Vol. 2, Article no. 31 (10 pages), May 2014. <http://dx.doi.org/10.3389/fphy.2014.00031>.

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S. Ashley Francis, Cory D. Cress, John W. McClory, Elizabeth A. Moore, James C. Petrosky, “Characterization of Radiation Damage in Carbon Nanotube Field-Effect Transistors,” *IEEE Transactions on Nuclear Science*, Vol.60, No.6, pp.4087-4093, Dec. 2013. <http://dx.doi.org/10.1109/TNS.2013.2284542>.

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M. R. Morello, J. W. McClory, J. D. Cordeiro, B. R. Kowash, "Estimating Disruption Ignitions from a Nuclear Weapon Detonation Using Fire Following Earthquake Methodology", Paper A.5, *Hardened Electronics and Radiation Technology Conference*, Huntsville AL, 24 Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

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A. W. Decker, M. P. Shannon, J. A. Clinton, J. W. McClory, S. R. McHale, "Verification and Validation of Monte Carlo N-particle Code 6 (MCNP6) with Neutron Protection Factor," *Hardened Electronics and Radiation Technology Conference Proceedings*, Paper A.6, Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

MCHALE, STEPHEN R., LTC,

Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2011 (AFIT/ENP); BS, Engineering Physics, United States Military Academy at West Point, 1994; MS, Nuclear Engineering, Air Force Institute of Technology, 2006; PhD, Nuclear Engineering, Air Force Institute of Technology, 2011. He has been an Army officer since 1994 serving in the United States and Asia. LTC McHale's research focuses on nuclear weapons effects and the interaction of radiation with materials. Member of the American Nuclear Society and Tau Beta Pi. Tel. 937-255-3636 x4438, email: Stephen.McHale@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

T. P. Genda, J. W. McClory, B. R. Kowash, S. R. McHale, J. A. Clinton, "Optimization of Detector Placement for High Energy Photon Interrogation of Special Nuclear Material," *Hardened Electronics and Radiation Technology Conference Proceedings*, Paper PH.2, Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

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A. W. Decker, M. P. Shannon, J. A. Clinton, J. W. McClory, S. R. McHale, "Verification and Validation of Monte Carlo N-particle Code 6 (MCNP6) with Neutron Protection Factor," *Hardened Electronics and Radiation Technology Conference Proceedings*, Paper A.6, Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

MCCRAE, JACK E., Jr.,

Research Assistant Professor, Department of Engineering Physics, AFIT Appointment Date: 2013 (AFIT/ENP); BS, Physics, Massachusetts Institute of Technology, 1984; MS, Physics (Optics), Air Force Institute of Technology, 1993; PhD, Physics, Air Force Institute of Technology, 1997; Dr McCrae's research interests include optics, lasers, quantum and non-linear optics, quantum computing, laser radar, atmospheric propagation and imaging. Tel. 937-255-3636 x4739, email: Jack.Mccrae@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Basu, Santasri, M.W. Hyde, J. E. McCrae, Jr., M.F. Spencer, S.T. Fiorino., “Examining the validity of using a Gaussian Schell Model for modeling an extended beacon on a rough perfectly reflecting surface,” Proceedings of SPIE Vol. 9224, 92240L (Jul 2014). [CDE]

McCrae, J.E. and S.T. Fiorino, “Simulation of Deep Turbulence Compensation for a Laser Phased Array,” 2014 IEEE Aerospace Conference Big Sky, MT, 1-8 Mar 2014. [CDE]

NAUYOKS, STEPHEN E.,

Research Assistant Professor , Department of Engineering Physics, AFIT Appointment Date: 2010 (AFIT/ENP); BS, Applied Mathematics, 2002; MS, Applied Mathematics, New Jersey Institute of Technology, Newark, NJ, 2004; PhD, Physics, Texas Christian University, Fort Worth, TX, 2009. Dr. Nauyoks has been modifying a CASI system to be able to run full polarimetric scatterometry analysis using lasers at variable wavelengths of unique materials with nano and micron sized structures. Dr. Nauyoks is a member of the Society of Photo-Instrumentation Engineers (SPIE). Tel. 937-255-6565 x7501, email: Stephen.Nauyoks@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

S.E. Nauyoks, S. Freda and M.A. Marciniak, “Dynamic data driven bidirectional reflectance distribution function measurement system,” Proceedings of the SPIE, Vol. 9205, 9205-1, 17-21 Aug 2014, San Diego, CA. [CDE]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Samuel Freda, Stephen E. Nauyoks and Michael A. Marciniak, “Dynamic data-driven bidirectional reflectance distribution function,” 16th Annual Directed Energy Annual Symposium, 10-14 Mar 2014, Huntsville, AL. [CDE]

PERRAM, GLEN P.,

Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1989 (AFIT/ENP); BS, Cornell University, 1980; MS, Air Force Institute of Technology, 1981; PhD, Air Force Institute of Technology, 1986. Dr. Perram’s research interests include high power chemical lasers, optically pumped gas phase lasers, laser-material interactions, hyperspectral imaging, reaction kinetics, atomic and molecular spectroscopy, environmental science, photochemistry, optical diagnostics, and remote sensing. He has advised 32 PhD and 48 MS students, received 46 research grants, and published over 78 journal articles during his 25 years on the AFIT faculty. Tel. 937-255-3636 x4504, email: Glen.Perram@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Diode Pumped Rare Gas Lasers.” Sponsor: HELJTO. Funding: \$199,100. [CDE]

“HEL Analysis Tool with Experimentally Corroborated DPAL Rate Constants.” Sponsor: MDA. Funding: \$18,586.77. [CDE]

“Merging Hyperspectral Imagery and Multi-Scale Modeling for Laser Lethality.” Sponsor: AFOSR. Funding: \$150,156 - Perram 80%, Marciniak 20%. [CDE]

“Rubidium Vapor Circulation System: Optical Diagnostics.” Sponsor: MDA. Funding: \$18,586.76. [CDE]

“Zeeman Deceleration of a Cold Atom Beam.” Sponsor: AFRL/RV. Funding: \$23,477.

“Zeeman Deceleration of a Cold Atom Beam II. Cold Atom Precision Timing and Inertial Navigation.” Sponsor: AFRL/RV. Funding: \$20,422. [CDE]

REFEREED JOURNAL PUBLICATIONS

- R. I. Acosta, K. C. Gross, G. P. Perram, S. Johnson, L. Dao, D. Medina, and R. Roybal, P. Black, "Gas phase plume from laser irradiated fiberglass reinforced polymers via imaging Fourier-transform spectroscopy," *Applied Spectroscopy*, Vol. 68, No. 7, pp. 723–732 (2014). <http://dx.doi.org/10.1366/13-07213>
- R. I. Acosta, K. C. Gross, G. P. Perram, S. M. Johnson, L. Dao, D. F. Medina, R. Roybal, and P. Black, "*Gas Phase Plume from Laser Irradiated Fiberglass Reinforced Polymers via Imaging Fourier-Transform Spectroscopy*," *Applied Spectroscopy*, 68, 723-732, Jul 2014.
- J. M. Gordon, K. C. Gross, G. P. Perram, "Temperature dynamics of aluminized cyclotrimethylenetrinitramine fireballs for event classification," *Optical Engineering*, Vol. 53, No. 2, Paper # 021106 (2013). <http://dx.doi.org/10.1117/1.OE.53.2.021106>. [CTISR]
- J. M. Gordon, K. C. Gross, G. P. Perram, "*Temperature dynamics of aluminized cyclotrimethylenetrinitramine (RDX) fireballs for event classification*," *Optical Engineering* 53(2), 021106, Feb 2014. [CTISR]
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- Greg A. Pitz, Gordon D. Hager, Tiffany B. Tafoya, Joseph W. Young, Glen P. Perram, and David A. Hostutler, "*An experimental high pressure line shape study of the rubidium D1 and D2 transitions with the noble gases, methane, and ethane*," *Proc. SPIE* 8962, High Energy/Average Power Lasers and Intense Beam Applications VII, Paper 896208, Feb 2014.
- Ben Eshel, David E. Weeks, Glen P. Perram, "*The role of adiabaticity in alkali atom fine structure mixing*," *SPIE Proc* 8962, SPIE Photonics West, Paper 896207, 25 Feb 2014.
- Ryan L. Tervo, Michael Hawks and Glen P. Perram "Effects of optical aberration on chromotomographic reconstruction," *Proc. SPIE* 9088, SPIE Defense and Security, Paper 908817, 13 Jun 2014.

PETROSKY, JAMES C.,

Associate Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2000 (AFIT/ENP); BA, Engineering Physics/Computer Science, Millersville University of Pennsylvania, 1984; MS, Engineering Physics, Rensselaer Polytechnic Institute, 1992; PhD, Engineering Physics, Rensselaer Polytechnic Institute, 1995. Dr. Petrosky has expertise in radiation effects on electronic devices, EMP, experimental design, radiation detection, and nuclear weapon effects. His research spans narrow and wide band gap materials using combinations of electrical, optical, and absorption spectroscopy to gain information on the damaging effects of ionizing and non-ionizing radiation. Experimental techniques include I-V(T), C-V(T), photoluminescence spectroscopy, Hall Effect, x-ray and UV photo spectroscopy; applications of measurement techniques in harsh environments/in-situ measurements and obtaining real-time data. Applications include electronic switches and actuators, RF/IR sensors, force transducers, and electronics controls for use in the space and nuclear weapons environment. Dr. Petrosky has successfully advised 6 PhD students 40 Masters students and mentored and supported 4 post-doctoral researchers. Tel. 937-255-3636 x4562, email: James.Petrosky@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Nuclear Survivability Experimentation, Modeling, and Data Verification.” Sponsor: AFNWC. Funding: \$320,000 - Petrosky 35%, McClory 25%, Reeder 25%, Rutledge 15%.

“Radiation Effects on GaN Devices.” Sponsor: AFRL/RX. Funding: \$30,000.

“Rotating Scatter Mask (RSM) Development.” Sponsor: DTRA. Funding: \$69,220 - Petrosky 35%, Burggraf 35%, Clinton 30%.

“Support to NNSA for QASPR Independent Review.” Sponsor: DOE/NNSA. Funding: \$16,509.

“Support Activities to Homeland Security.” Sponsor: DHS. Funding: \$150,000 - Petrosky 90%, Hengehold 10%.

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Fee J. R., Petrosky J. C., “Modeling Electromagnetic Pulse (EMP) from Air Bursts,” DTRIAC Paper A.4 *Hardened Electronics and Radiation Technology Conference*, Huntsville, AL, 24 Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

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SPONSOR FUNDED RESEARCH PROJECTS

"AFRL-AFIT MOA Partnership Agreement #1." Sponsor: AFOSR. Funding: \$18,724.

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REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

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SPONSOR FUNDED RESEARCH PROJECTS

“Spectral Line Shape of $M + Ng$ for $M = K, Rb, Cs$, and $Ng = He, Ne, Ar$.” Sponsor: AFOSR. Funding: \$10,224.

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WOLF, PAUL J.,

Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1994 (AFIT/ENP), and Associate Dean for Academic Affairs, Graduate School of Engineering and Management (AFIT/EN); BS, Regis College, 1978; MS, Air Force Institute of Technology, 1979; PhD, Air Force Institute of Technology, 1985. Dr. Wolf's research interests include experimental atomic/molecular spectroscopy, reactive and non-reactive collision kinetics, laser-based thin film deposition processes, ionospheric and atmospheric chemistry, environmental monitoring, and non-linear dynamics with a focus on complex systems. He has published over 20 papers. Tel. 937-255- 0452, email: Paul.Wolf@afit.edu

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properties of elemental, compound, ternary, and quaternary semiconductors using techniques, such as Hall-effect measurement; deep level transient spectroscopy; electroluminescence; and photoluminescence. Professor Yeo has published around 120 articles in archival journals and several technical reports, presented around 220 papers at professional conferences, and holds one patent. He is a reviewer for the Applied Physics Letters, Journal of Applied Physics, Journal of Electronic Materials, and Air Force Office of Scientific Research (AFOSR) proposal. He is currently funded by the AFOSR to study Si- and Ge-based semiconductors such as GeSn and GeSiSn. This work involves collaborative effort with the Arizona State University, University of Delaware, Kangwon National University, and Taiwan National University. He has directed the research of seven postdoc fellows, five visiting research faculty members, sixteen PhDs, and twenty five MS students. He received the Ezra Kotcher Award for 1990, received the Gage H. Crocker Outstanding Professor Award for 1992, and received the General Bernard A. Schriever Award for 1997. Tel. 937-255-3636 x4532, email: Yung.Yeo@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Optical and Electrical Characterization of Direct Bandgap GeSn and GeSiSn Semiconductors and Devices.”
Sponsor: AFOSR. Funding: \$173,001.

REFEREED JOURNAL PUBLICATIONS

T. R. Harris, Y. K. Yeo, M.-Y. Ryu, R. T. Beeler, and J. Kouvetakis, “Observation of heavy- and light-hole split direct bandgap photoluminescence from tensile-strained GeSn (0.03% Sn),” Journal of Applied Physics 116, 103502 (7 pp) (Sep 2014).

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ZENS, TIMOTHY W., Maj,

Assistant Professor of Materials Science, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS Physics and BS Mathematics, University of Minnesota, Minneapolis; MS, Air Force Institute of Technology, 2005; PhD, Massachusetts Institute of Technology, 2011; Academic Awards: American Legion Scholastic Award, 2000; Society of the War of 1812 Award (for Academic Excellence), 2001; American Veterans Award (Scholastic), 2003; American Association for Crystal Growth; Bonner Memorial scholarship, 2006 and 2007. Maj Zens has expertise in synthesis of electronic and optical materials and devices. His research is focused on: synthesis of bulk ThO₂ and UO₂ crystals using hydrothermal growth techniques; fabrication of laser power converters using molecular beam epitaxy; orientation patterned infrared non-linear optical materials for infrared countermeasures and terahertz generation; growth of 2D BN on graphene; and long wavelength infrared detectors from polycrystalline Pb_{1-x}Sn_xTe films.

5.4. DEPARTMENT OF MATHEMATICS AND STATISTICS

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5.4.1	<u>DOCTORAL DISSERTATIONS</u>	132
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5.4.1. DOCTORAL DISSERTATIONS

BATTERTON, KATHERINE A., *Statistical Inference on Optimal Points to Evaluate Multi-State Classification Systems*. AFIT/ENC/DS/14S-02. Faculty Advisor: Dr. Christine M. Schubert Kabban. Sponsor: N/A.

GEYER, ANDREW J., *Different Formulations of the Orthogonal Array Problem and Their Symmetries*. AFIT/ENC/DS/14J-16. Faculty Advisor: Dr. Dursun A. Bulutoglu. Sponsor: AFOSR.

GREENWELL, BRANDON M., *Topics in Statistical Calibration*. AFIT/ENC/DS/14M-01. Faculty Advisor: Dr. Christine M. Schubert Kabban. Sponsor: AFOSR.

PAEK-SPIDELL, GRACIE Y., *Analysis of Heat Partitioning During Sliding Contact at High Speed and Pressure*. AFIT/ENC/DS/14M-02. Faculty Advisor: Dr. William P. Baker. Sponsor: AFOSR.

5.4.2. MASTER'S THESES

JOHNSON, JOSHUA D., *Comparing the Predictive Capabilities of Level Three EVM Cost Data with Level Five EVM Cost Data*. AFIT/ENC/14M-04. Faculty Advisor: Dr. Edward D. White. Sponsor: OSD/PARCA.

LIU, TONY, *Modeling Continuous IED Supply Chains*. AFIT/ENC/14M-02. Faculty Advisor: Capt Kevin R. Pond. Sponsor: OSD/DDESB.

NELSON, AARON A., *About Phase: Synthetic Aperture Radar and the Phase Retrieval Problem*. AFIT/ENC/14M-03. Faculty Advisor: Capt Dustin G. Mixon. Sponsor: N/A.

5.4.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AKERS, BENJAMIN F.,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2011 (AFIT/ENC); BS, Pennsylvania State University, 2003; MA, University of Wisconsin - Madison, 2005; PhD, University of Wisconsin - Madison, 2008. Dr. Akers' research interests include nonlinear waves, applied mathematics, fluid mechanics, and numerical analysis. Dr. Akers' current research considers the stability and existence of traveling water waves, especially developing numerical methods for problems with two-dimensional kernels. Tel. 937-255-3636 x4522, email: Benjamin.Akers@afit.edu

REFEREED JOURNAL PUBLICATIONS

Akers, B., D. M. Ambrose, and J. D. Wright, Traveling waves from the arclength parameterization: Vortex sheets with surface tension, *Interfaces and Free Boundaries* 15 (2013), 359–380.

Akers, B, D. M. Ambrose, and J. D. Wright, Gravity Perturbed Crapper Waves, *Proceedings of the Royal Society of London A*. 470 (2014), 2161-2175.

Akers, B. and D. P. Nicholls, The spectrum of finite depth water waves, *European Journal of Mechanics B/Fluids* 46 (2014), 181-189.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Akers, B., “Overturning Interfacial Waves,” Banff International Research Station workshop on “Water Waves: Computational Methods for Complex Problems,” Banff, Alberta, Canada, Jun 30 - Jul 5, 2014.

Akers, B., “Interfacial Traveling Waves,” Mathematics Department Colloquium, Florida Atlantic University, Boca Raton, FL, Feb 2014.

Akers, B., “Short Course: HOPS Methods for Water Waves II & IV,” Isaac Newton Institute, Cambridge, UK, Jul 2014.

BAKER, WILLIAM P.,

Associate Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 1986 (AFIT/ENC); BA, University of California at Irvine, 1969; MA, University of California at Irvine, 1970; PhD, Northwestern University, 1987. Dr. Baker's research interests include asymptotic and perturbation methods, wave propagation and scattering theory, applied mathematics, functional analysis, low observables, and numerical analysis. Dr. Baker's current research is in thermal dynamics of high speed wear, vibrational dynamics of thermally loaded materials and dynamics and control of satellite structures. Dr. Baker is a Master Navigator with prior military assignments in flight test, satellite communications, cruise missile and radar analysis. Tel. 937-255-3636 x4517, email: William.Baker@afit.edu

REFEREED JOURNAL PUBLICATIONS

Ross, S. M., R. G. Cobb, and W. P. Baker, Stochastic real-time optimal control for bearing-only trajectory planning, *International Journal of Micro Air Vehicles* 6 (2014), 1-28.

Easterday, O. T., A. N. Palazotto, W. P. Baker, R. D. Branam and T. George, Thermal issues in development of an apparatus to enable characterization of coatings, *Journal of Materials Science and Engineering with Advanced Technology* 9 (2014), 69-107.

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SPONSOR FUNDED RESEARCH PROJECTS

“Improving Exact Algorithms for Finding Efficient Designs and Test Suites for Test and Evaluation.”
Sponsor: AFOSR. Funding: \$35,043.

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OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Warr, R. L. and J. D. Cordeiro, First Passage Moments of Finite-State Semi-Markov Processes. Los Alamos National Lab Technical Report LA-UR-14-22145 (2014).

DEA, JOHN R., Lt Col,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2008 (AFIT/ENC); BS, Baylor University, 1993; MS, Creighton University, 1998; PhD, Naval Postgraduate School, 2008. Lt Col Dea's research interests include numerical analysis of fluid flow and wave propagation, including recent papers on non-reflecting boundary conditions for modeling wave propagation in a truncated portion of a large or infinite domain. Lt Col Dea's previous military assignments include software development for strategic war-planning systems, flight test support and coordination, and architecture and systems engineering for long-term space superiority mission area planning.

REFEREED JOURNAL PUBLICATIONS

Dea, J. R., A Higdon-like non-reflecting boundary condition for the Klein-Gordon equation with evanescent waves, *Wave Motion* 51 (2014), 256-265.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Dea, J. R., “Absorbing Boundary Conditions for the Fractional Wave Equation,” Department of Mathematics and Statistics Colloquium, Air Force Institute of Technology, Wright-Patterson AFB, OH, Nov 2013.

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REFEREED JOURNAL PUBLICATIONS

- Bhagavatula, R., M. T. McCann, M. Fickus, C. A. Castro, J. A. Ozolek, and J. Kovacevic, A vocabulary for the identification and delineation of teratoma tissue components in hematoxylin and eosin-stained samples, *Journal of Pathology Informatics* 5 (2014), 1–19.
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OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

- Fickus, M., “Constructing equi-isoclinic tight fusion frames,” 5th International Conference on Computational Harmonic Analysis, Vanderbilt University, Nashville, TN, May 2014.
- Fickus, M., “Pseudorandom coded apertures for compressive imaging,” 2014 NSF/DTRA/NGA Algorithms for Threat Detection Program Review, Boulder, CO, Mar 2014.
- Fickus, M., “Compressed sensing with equiangular tight frames,” Department of Mathematics, University of Houston, Houston, TX, Mar 2014.
- Fickus, M., “Compressed sensing with equiangular tight frames,” Department of Mathematics, University of Hawaii, Honolulu, HI, Feb 2014.
- Fickus, M., “Optimal packings of lines, Department of Mathematical Sciences,” George Mason University, Fairfax, VA, Jan 2014.
- Fickus, M., “Optimal packings of lines, Department of Mathematics and Statistics,” American University, Washington, DC, Jan 2014.

Fickus, M., "Equiangular tight frames and the restricted isometry property," Matheon Workshop on Compressed Sensing and its Applications 2013, Technische Universitat Berlin, Germany, Dec 2013.

Fickus, M., "Optimal packings of lines, AFG Oberseminar," Technische Universitat Berlin, Germany, Dec 2013.

Fickus, M., "Equiangular tight frames and the restricted isometry property," AMS Fall Central Sectional Meeting, Special Session on "Wavelets, Frames, and Related Expansions," Washington University, St. Louis, MO, Oct 2013.

GEYER, ANDREW J., Maj,

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- Bandeira, A. S., J. Cahill, D. G. Mixon, and A. A. Nelson, Saving phase: Injectivity and stability for phase retrieval, *Applied and Computational Harmonic Analysis* 37 (2014), 106-125.
- Bandeira, A. S., Y. Chen, and D. G. Mixon, Phase retrieval from power spectra of masked signals, *Information and Inference* 3 (2014), 83-102.
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- Mixon, D. G., "Phase retrieval: Approaching the theoretical limits in practice," Analysis Seminar, University of Texas at Austin, Austin, TX, Sep 2014.
- Mixon, D. G., "Compressed sensing: Variations on a theme," Mathematisches Forschungsinstitut Oberwolfach Mini-Workshop: Mathematical Physics meets Sparse Recovery, Oberwolfach, Germany, Apr 2014.
- Mixon, D. G., "A new approach to derandomize compressed sensing matrices," Program in Applied and Computational Mathematics IDeAS Seminar, Princeton University, Princeton, NJ, Jan 2014.
- Mixon, D. G., "A new approach to derandomize compressed sensing matrices," Matheon workshop on "Compressed Sensing and its Applications," Technical University of Berlin, Berlin, Germany, Dec 2013.
- Mixon, D. G., "Phase retrieval: Approaching the theoretical limits in practice," Institute for Numerical and Applied Mathematics Colloquium, University of Goettingen, Goettingen, Germany, Dec 2013.
- Mixon, D. G., "A new approach to derandomize compressed sensing matrices," AMS Fall Central Sectional Meeting, Special Session on "Wavelets, Frames, and Related Expansions," Washington University, St. Louis, MO, Oct 2013.

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Montminy, D. P., R. O. Baldwin, M. A. Temple, and M. E. Oxley, Differential electromagnetic attacks on a 32-bit microprocessor using software defined radios, *IEEE Transactions on Information Forensics and Security* 8 (2013), 2101-2114.

Kharoufeh, J. P., S. M. Cox, and M. E. Oxley, Reliability of manufacturing equipment in complex environments, *Annals of Operations Research* 209 (2013), 231-254.

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Casazza, P. G. and J. Peterson, Weighted fusion frame construction via spectral tetris, *Advances in Computational Mathematics* 40 (2014), 335-351.

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OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

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REYNOLDS, DANIEL E.,

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SPONSOR FUNDED RESEARCH PROJECTS

“Performance and Validation in Structural Health Monitoring Systems.” Sponsor: AFOSR. Funding: \$187,031.

“Sequencing Classification Systems for Improved Accuracy and Reduced Cost.” Sponsor: AFOSR. Funding: \$48,976.

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Warr, R. L., “Predictive Bayesian Regression: A Case Study,” Department of Mathematics and Statistics Colloquium, Wright State University, Dayton, OH, Oct 2013.

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Mitchell, T., E. D. White III, and D. Ritschel, Investigating the correlation of the U.S. Air Force physical fitness test to combat-based fitness: A women only study, *Military Medicine* 179 (2014), 653-658.

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SPONSOR FUNDED EDUCATIONAL PROJECTS

“LEADER (Launching Equity in the Academy across the Dayton Entrepreneurial Region).” Sponsor: NSF. Funding: \$13,497.23.

SPONSOR FUNDED RESEARCH PROJECTS

“Distributional Monte Carlo Methods for Rarefied Gas Dynamics.” Sponsor: AFOSR. Funding: \$45,123.

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Wood, A. W., “Topics on EM scattering from cavities,” Beijing University of Science and Technology, Beijing, China, Dec 2014.

5.5. DEPARTMENT OF OPERATIONAL SCIENCES

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5.5.1. DOCTORAL DISSERTATIONS

AL ROMAIHI, MOHAMED M., *Advanced Composite Air Frame Life Cycle Cost Estimating*. AFIT/ENS/DS/14J-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AFRL/RQ. [COA]

ARENDR, CHRISTOPHER D., *Optimal Control of Fully Routed Air Traffic in the Presence of Uncertainty and Kinodynamic Constraints*. AFIT/ENS/DS/14S-15. Faculty Advisor: Dr. James W. Chrissis. Sponsor: NASA. [COA]

DOUGHERTY, SHANE A., *A Comparison Study of Second-Order Screening Designs and Their Extension*. AFIT/ENS/DS/13D-01. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD. [COA]

FREELS, JASON K., *Modeling Reliability Growth in Accelerated Stress Testing*. AFIT/ENS/DS/13D-02. Faculty Advisor: Dr Joseph J. Pignatiello. Sponsor: OSD/DOT&E. [COA]

KELLEHER, CLAYTON T., *Dynamic Bayesian Networks as a Probabilistic Metamodel for Combat Simulations*. AFIT/ENS/DS/14S-20. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMC/A9. [COA]

MCNABB, MARCUS E., *Exploring Heuristics for the Vehicle Routing Problem with Split Deliveries and Time Windows*. AFIT/ENS/DS/14S-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

REIMAN, ADAM D., *Enterprise Analysis of Strategic Airlift to Obtain Competitive Advantage through Fuel Efficiency*. AFIT/ENS/DS/14S-16. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

SAIE, CADE M., *Nation-Building Modeling and Resource Allocation via Dynamic Programming*. AFIT/DS/ENS/14S-18. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: CAA. [COA]

5.5.2. MASTER'S THESES

CHERRY, MATT J., *Empirical Analysis of Human Capital, Learning Culture, and Knowledge Management as Antecedents to Organizational Performance: Theoretical and Practical Implications for Logistics Readiness Officer Force Development*. AFIT/ENS/14M-02. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: HQ USAF/A4. [COA]

EL-AMIN, AMBER J., *Mixed Methods Approach to Identify Factors and the Extent to Which They Influence Medical/Surgical Prime Vendor Use*. AFIT/ENS/14M-03. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: AFMOA. [COA]

ERDEMIR, UGUR, *Optimizing Flight Schedules by an Automated Decision Support System*. AFIT/ENS/14M-04. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: TuAF. [COA]

ERICKSON, BRYNGEL J., *Simulation Modeling of Advanced Pilot Training: The Effects of a New Aircraft Family of Systems*. AFIT/ENS/14M-05. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFLCMC. [COA]

FETT, GARRET D., *Aircraft Route Optimization Using the A-Star Algorithm*. AFIT/ENS/14M-06. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: USA FORSCOM. [COA]

FLORES, CHARLES M., *A Proper Splitting Theater Distribution Model for Improving Force Flow Analysis*. AFIT/ENS/14M-07. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

FRAWLEY, TIMOTHY D., *Application of a Multi-Objective Network Model to a Combat Simulation Game: "The Drive on Metz" Case Study*. AFIT/ENS/14M-08. Faculty Advisor: Dr. James W. Chrissis. Sponsor: AFLCMC. [COA]

GAREE, MICHAEL J., *Fragment Capture Simulation for MANPADS Test Arena Optimization*. AFIT/ENS/14M-09. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD/DOT&E. [COA]

JABLONSKI, JAMES A., *Reconstruction Error and Principal Component Based Anomaly Detection in Hyperspectral Imagery*. AFIT/ENS/14M-11. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/Ry. [COA]

JENSEN, JACOB C., *KC-46 Workforce Requirements for Depot Maintenance Activation*. AFIT/ENS/14M-12. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFLCMC. [COA]

JONES, CHRISTOPHER M., *Value Focused Thinking Approach Using Multivariate Validation for Junior Enlisted Performance Reporting in the United States Air Force*. AFIT/ENS/14M-13. Faculty Advisor: Maj Jennifer L. Geffre. Sponsor: HQ USAF/A4. [COA]

KANNON, TANYA E., *Improving the Air Mobility Command's Air Refueler Route Building*. AFIT/ENS/14M-14. Faculty Advisor: Dr. Sarah G. Nurre. Sponsor: USTRANSCOM. [COA]

KENEALLY, SEAN K., *A Markov Decision Process Model for the Optimal Dispatch of Military Medical Evacuation Assets*. AFIT/ENS/14M-15. Faculty Advisor: Lt Col Matthew J. Robbins. Sponsor: AMEDD/MEPD. [COA]

KHAN, UMAR M., *Optimal Partitioning of a Surveillance Space for Persistent Coverage Using Multiple Autonomous Unmanned Aerial Vehicles: An Integer Programming Approach*. AFIT/ENS/14M-16. Faculty Advisor: Dr. James W. Chrissis. Sponsor: N/A. [COA]

LITCHFIELD III, ARTHUR R., *Optimizing the Disposition and Retrograde of United States Air Force Class VII Equipment from Afghanistan*. AFIT/ENS/14M-18. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMC/OC-ALC. [COA]

MACANDREW, MICHAEL V., *Analysis of Biological Weapon Spread through a Transportation Network*. AFIT/ENS/14M-19. Faculty Advisor: Dr. Richard F. Deckro. Sponsor: N/A.

MARTIN, MARGARET T., *The Air Force Records Management Program: A Paradigm Shift from Compliance to Guiding Principles in an Ever-Changing Information Environment*. AFIT/ENS/T/14J-15. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: NASIC. [COA]

MCCORMACK, IAN M., *The Military Inventory Routing Problem with Direct Delivery*. AFIT/ENS/14M-20. Faculty Advisor: Lt Col Matthew J. Robbins. Sponsor: USAACE. [COA]

MOORE, KRISTY L., *Salient Feature Selection Using Feed-Forward Neural Networks and Signal-to-Noise Ratios with a Focus toward Network Threat Detection and Risk Level Identification*. AFIT/ENS/14M-22. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/Ry. [COA]

MORTON, CHARLES H., *An Investigation into the Challenges of Joint Basing*. AFIT/ENS/T/14J-16. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: 628 ABW. [COA]

POWER, EMILY K., *A Heuristic Approach to the Theater Distribution Problem*. AFIT/ENS/14M-25. Faculty Advisor: Dr. Jeffrey D. Weir. Sponsor: USTRANSCOM. [COA]

QUINTANILLA, JOSE A., *Department of Defense Operational Energy Strategy: A Content Analysis of Energy Literature from 1973-2014*. AFIT/ENS/14M-26. Faculty Advisor: Maj Joshua K. Strakos. Sponsor: SAF. [COA]

RHOADS, JAMES D., *Optimizing Air Force Depot Programming to Maximize Operational Capability*. AFIT/ENS/14M-36. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: HQ USAF/A4. [COA]

RUSSELL, BRENT D., *Capturing Uncertainty in Fatigue Life Data*. AFIT/ENS/T/14S-15. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD. [COA]

SHEPPARD, WESLEY A., *Simulating F-22 Heavy Maintenance and Modifications Workforce Multi-Skilling*. AFIT/ENS/14M-28. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFMC/A4. [COA]

STAHL, ADRIENNE L., *A Survey and Analysis of Aircraft Maintenance Metrics: A Balanced Scorecard Approach*. AFIT/ENS/14M-29. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: HQ USAF/A4. [COA]

STOVER, LUKE R., *Towards Reengineering the United States Department of Defense: A Financial Case for a Functionally-Aligned, Unified Military Structure*. AFIT/ENS/14M-30. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: JCS/J5. [COA]

TURNER, JONATHAN S., *A Methodology for Measuring Resilience in a Satellite-Based Communication Network*. AFIT/ENS/14M-31. Faculty Advisor: Dr. Richard F. Deckro. Sponsor: HQ USAF/A9.

WALES, JESSE G., *Analysis of a SCADA System Anomaly Detection Model Based on Information Entropy*. AFIT/ENS/14M-32. Faculty Advisor: Maj Jennifer L. Geffre. Sponsor: N/A. [COA]

WARD, MARC R., *Automatic Target Recognition Using Nonlinear Autoregressive Neural Networks*. AFIT/ENS/14M-33. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/RV. [COA]

WHITE, JONATHAN D., *Enhanced Vehicle Beddown Approximations for the Improved Theater Distribution Model*. AFIT/ENS/14M-34. Faculty Advisor: Dr. Jeffrey D. Weir. Sponsor: USTRANSCOM. [COA]

5.5.3. GRADUATE RESEARCH PAPERS

ABERCROMBIE, PETER B., *C-Bag Consolidation: An Inventory and Safety Stock Analysis*. AFIT/ENS/GRP/14J-01. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: AMC. [COA]

BAKER, JUDD W., *Optimizing C-17 Pacific Basing*. AFIT/ENS/GRP/14J-02. Faculty Advisor: Dr. William A. Cunningham. Sponsor: EUCOM/USAFE. [COA]

CAMPANILE, KEVIN J., *Determining the Optimal C-130 Deployed Crew Ratio*. AFIT/ENS/GRP/14J-03. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AMC. [COA]

CAPPER, JUSTIN R., *Tanker Fuel Efficiency: Saving through Receiver Fuel Planning*. AFIT/ENS/GRP/14J-04. Faculty Advisor: Maj Joshua K Strakos. Sponsor: AMC. [COA]

DURHAM, RYAN E., *Alternatives to Contingency Response Group Organization: Tradeoffs to Balance Capability and Capacity*. AFIT/ENS/GRP/14J-05. Faculty Advisor: Dr. Kenneth L. Schultz. Sponsor: AMC. [COA]

- GOHN, RUSSELL D., *Changing the Culture of Fuel Efficiency: A Change in Attitude*. AFIT/ENS/GRP/14J-06. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC. [COA]
- LAFERRIERE, JAMES M., *Frequency Based Continuation Training (FBCT): A Concept for use in the Mobility Air Forces (MAF)*. AFIT/ENS/GRP/14J-07. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC. [COA]
- LIPPERT, ROYCE M., *Investigating Disruptions to Channel Missions - What's the Breaking Point?* AFIT/ENS/GRP/14J-08. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AMC. [COA]
- MACGARVEY, MASON E., *ABW and AMW Consolidation on AMC-Led Joint Bases: A Delphi Study*. AFIT/ENS/GRP/14J-09. Faculty Advisor: Dr. Alan R. Heminger . Sponsor: AMC. [COA]
- MAGILL, JONATHAN H., *Regionalization of the C-17A Home Station Check to Minimize Costs*. AFIT/ENS/GRP/14J-10. Faculty Advisor: LTC Brian J. Lunday. Sponsor: AMC. [COA]
- MESHANKO, MATTHEW D., *Impact of Volcanic Activity on AMC Channel Operations*. AFIT/ENS/GRP/14J-11. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC. [COA]
- PASTUZYN, MICHAEL, *The Potential for Additional Channel Airlift in a L Cargo Demand Theater*. AFIT/ENS/GRP/14J-12. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: AMC. [COA]
- ROVELLO, FRANK W., *Estimating C-17 Aircrew Seasoning Given a Prediction of Flying Austerity*. AFIT/ENS/GRP/14J-13. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC. [COA]
- RUPP, KAREN P., *A Cost Analysis of Space Available Travel*. AFIT/ENS/GRP/14J-14. Faculty Advisor: Maj Joshua K. Strakos. Sponsor: AMC. [COA]
- SPONSELLER, HUGH P., *Over the Pole: A Fuel Efficiency Analysis of Employing Joint Base Elmendorf-Richardson for Polar Route Utilization*. AFIT/ENS/GRP/14J-15. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: PACAF. [COA]
- YARIAN, MARK L., *Synchronized Stability: A Case Study Investigation of AMC's Stabilized Approach Program*. AFIT/ENS/GRP/14J-16. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC. [COA]

5.5.4. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AHNER, DARRYL K.,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date 2010; Director, Center for Operational Analysis, Appointment Date, May 2011; Director, Scientific Test and Analysis (STAT) for Test and Evaluation (T&E) Center of Excellence, Appointment Date 2012; BS, Mechanical Engineering, United States Military Academy, 1990; MS, Applied Mathematics, Rensselaer Polytechnic Institute, 1999; MS, Operations Research & Statistics, Rensselaer Polytechnic Institute, 1999; PhD, Systems Engineering, Boston University, 2005. Dr. Ahner's research interests include dynamic programming applications, queuing applications, mathematical control theory and model predictive control of complex systems, missile defense, combat modeling algorithm development, and models for supply chain management. Dr. Ahner is a Member of the Board, Military Operations Research Society. Tel 937-255-6565 x4708, email: Darryl.Ahner@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

"2 AFIT Instructors in VA SOT310." Sponsor: DAU. Funding: \$10,500. [COA]

"Design of Experiments Course." Sponsor: SPAWAR. Funding: \$11,000. [COA]

"Design of Experiments Course." Sponsor: ATEC. Funding: \$22,000. [COA]

"Design of Experiments Training." Sponsor: TARDEC. Funding: \$11,500. [COA]

"SOT 210 310 Proposal." Sponsor: USMC. Funding: \$18,000. [COA]

SPONSOR FUNDED RESEARCH PROJECTS

"Aegis Travel Support." Sponsor: NAVSEA. Funding: \$19,000. [COA]

"AFIT Partnership for Modeling and Simulation." Sponsor: AFMC/A4. Funding: \$125,000 - Ahner 25%, Miller 25%, Ogden 25%, Weir 25%. [COA]

"A System of Equations to Capture SSTRO Dynamics." Sponsor: CAA. Funding: \$170,000 - Ahner 50%, Akers 50%. [COA]

"Epidemiological Assessment of Incident Post-deployment Mental Health Problems in Air Force Military Medical Personnel." Sponsor: 711 HPW/RH. Funding: \$150,000 - Ahner 34%, Schultz 33%, White 33%. [COA]

"Methods of Determining Best Mix Options for Directed and Kinetic Energy Weapons." Sponsor: AFRL/RW. Funding: \$100,000. [COA]

"Sampling Strategies." Sponsor: NGA. Funding: \$150,000 - Ahner 50%, Bunker 50%. [COA & CTISR]

"STAT COE." Sponsor: OSD. Funding: \$1,310,000. [COA]

"Test Generation and Analysis Techniques for Autonomous Systems." Sponsor: AFRL/RQ. Funding: \$60,000 - Ahner 34%, Stone 33%, Pignatiello 33%. [COA]

REFEREED JOURNAL PUBLICATIONS

Ahner, D.K., Brown, D.C., 2014, "Efforts to Establish More Rigor in Developmental Test and Evaluation (DT&E)," *ITEA Journal*, Vol. 35, No. 1, Mar 2014. [COA]

Ahner, D.K., Goddard, D., Kensler, J., 2014, "Air Force Enterprise Effort to Improve the Acquisition Workforce in Testing," *ITEA Journal*, Vol. 35. No. 2, Jun 2014. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Ahner, D.K., Sandlin, D.E., Saldanha, J., Swan, P., "Exploring the Use of the Upper-Semi Variance as a Robust Estimator For Calculating Safety Stocks," *Council of Supply Chain Management Professionals Global Conference*, San Diego, CA, 27-30 Sep 2014. [COA]

BAUER, KENNETH W.,

Professor of Operations Research, Department of Operational Sciences; Program Chair, PhD, Operations Research, Department of Operational Sciences, AFIT Appointment Date: 1996 (AFIT/ENS); Director, Sensor Fusion Laboratory; BS, Miami University (Ohio), 1976; MEA, University of Utah, 1980; MS, Air Force Institute of Technology, 1981; PhD, Purdue University, 1987. Dr. Bauer's research interests include pattern recognition, applied multivariate statistics, and statistical aspects of neural networks; all usually within the specific application area of automatic target recognition and more recently hyper-spectral imaging processing. Tel. 937-255-6565 x4328, email: Kenneth.Bauer@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Data Analysis and Tool Development for Analyst Image Exploitation." Sponsor: 711 HPW/RH. Funding: \$75,000. [COA]

REFEREED JOURNAL PUBLICATIONS

Bauer, K.W., Dube, T., Grimaila, M., Raines, R., Rogers, S., 2013, "Malware Target Recognition of Unknown Threats," *IEEE Systems Journal*, Vol. 7, No. 3. [COA]

Bauer, K.W., Bihl, T.J., Friend, M.A., Friessen, K.D., 2013, "Contextual Anomaly Detection Cueing Methods for Hyperspectral Target Recognition," *American Journal of Science and Engineering*, Vol. 2, No. 1, pp. 9-16, Jul 2013. [COA]

Bauer, K.W., Bihl, T.J., Williams, J., 2013, "Towards the Mitigation of Correlation Effects in Anomaly Detection for Hyperspectral Imagery," *Journal of Defense Modeling and Simulation*, Vol. 10, No. 3, pp. 263-273, Jul 2013. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bauer, K.W., Bihl, T.J., Ward, M.R., 2014, "Vibrometry-based vehicle identification framework using nonlinear autoregressive neural networks and decision fusion," *IEEE National Aerospace & Electronics Conference*, Dayton, OH, 25-27 Jun 2014. [COA]

CHRISSIS, JAMES W.,

Associate Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 1987 (AFIT/ENS); BS, University of Pittsburgh, 1975; MS, Virginia Polytechnic Institute and State University, 1977; PhD, Virginia Polytechnic Institute and State University, 1980. Dr. Chrissis' research interests include mathematical programming, optimization, engineering design optimization, simulation-driven optimization, and integer modeling. Dr. Chrissis has been a member of the faculties of Virginia Tech and the University of South Florida. He is a member of the Institute for Operations Research and Management Sciences (INFORMS), the Military Operations Research Society (MORS), The American Institute for Aeronautics and Astronautics (AIAA), and Sigma Xi. Tel. 937-255-3636 x4606, email: James.Chrissis@afit.edu

REFEREED JOURNAL PUBLICATIONS

Chrissis, J.W., Deckro, R.F., Hamill, J., Herbranson, T.J., 2013, "Considering the Isolation Set Problem," *European Journal of Operational Research*, Vol. 227, No. 2, pp. 268-274. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Chan, Y., Chrissis, J.W., Isensee, E., 2014, "Multicriteria Vehicle-Routing in a 3-D Network: Cost vs. Risk," *ISERC Conference & Expo*, Montreal, QC, Canada, 31 May – 3 Jun 2014. [COA]

COCHRAN, JEFFERY K.,

Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2007 (AFIT/ENS); BSE, Purdue University, 1973; MSNE, Purdue University, 1976; MSIE, Purdue University, 1982; PhD, Purdue University, 1984. Dr. Cochran's research interests include operations of high technology entity flow systems, heuristic optimization of stochastic models, and Markov chain, queuing network, and probability modeling.

CUNNINGHAM, WILLIAM A.,

Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Program Chair, MS in Logistics and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Date: 1994 (AFIT/ENS); BS, Business Administration, Missouri Southern State College, 1976; MS, Economics, Oklahoma State University, 1979; PhD, Economics, University of Arkansas, 1986. Dr. Cunningham's research interests include strategic mobility, cost/benefit analysis, econometric modeling, costing privatization and A-76 studies, modal choice networks, location analysis, supply chain management, and RFID. Tel. (937) 255-6565 x4283, email: William.Cunningham@afit.edu

REFEREED JOURNAL PUBLICATIONS

Cunningham, W., Johnson, A., Kiymaz, E., 2014, "Fuel Efficiency Assessment with Data Envelope Analysis," *Journal of Defense Modeling and Simulation*, pp. 2-9, 13 May 2014. [COA]

DECKRO, RICHARD F.,

Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 1994 (AFIT/ENS); Director, Future Operations Investigation Laboratory, BSIE, State University of New York at Buffalo, 1972; MBA & DBA, Decision Sciences, Kent State University, 1976. Dr. Deckro's research, teaching, and consultation interests include the areas of information operations and information assurance, reconstruction and stabilization, measures of effectiveness and assessment, behavioral modeling including social network analysis, counter insurgency and irregular warfare, applied mathematical programming and optimization, project and program management, modeling and analysis, space applications, campaign modeling, technology selection and management, scheduling, network models, advanced manufacturing methods, multi-criteria decision making, and decision analysis. Dr. Deckro is the editor of *Military Operations Research* and a Fellow of the Military Operations Research Society. Tel. 937-255-6565 x4325, email: Richard.Deckro@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"JWAC AFIT Interaction." Sponsor: JWAC. Funding: \$55,000 - Deckro 80%, Ahner 20%. [COA]

REFEREED JOURNAL PUBLICATIONS

Chrissis, J.W., Deckro, R.F., Hamill, J., Herbranson, T.J., 2013, "Considering the Isolation Set Problem," *European Journal of Operational Research*, Vol. 227, No. 2, pp. 268-274.

Bernardoni, B.J., Deckro, R.F., Robbins, M.J., 2013, "Using Social Networking Analysis to Inform Stabilization Efforts," *Military Operations Research*, Vol. 18, No. 4, pp. 37-60.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Kallemyn, B.S., Deckro, R.F., Lunday, B.J., 2014, "An Approach to Network Diverting," *Military Operations Research Society Symposium 82*, Alexandria, VA, 23-25 Jul 2014.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Guzman, J.D., Deckro, R.F., Robbins, M.J., Morris, J.F., and Ballester, N.A., 2014, "An Analytical Comparison of Social Network Measures," *IEEE Transactions on Computational Social Systems*, San Diego, CA, 5-8 Oct 2014.

On 5 Sep, MAJ Eric Miller USA (GOR 13M), Dr. James Morris (NASIC/SMRB & ENS) and Dr. Dick Deckro participated in a classified VTC of the interagency Northwest Africa/Al-Qaeda of the Maghreb (AQIM) Working Group. MAJ Miller, at the request of the interagency working group, presented information from his thesis entitled *A Network Analysis of Social Balance in Conflict in the Maghreb*.

GEFFRE, JENNIFER L., Maj,

Instructor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2012 (ENS); BS, Mathematics, Colorado State University; MS, Operations Research, Air Force Institute of Technology, 2007. Maj Geffre's research interests include risk analysis and management, decision analysis, information operations, influence and social network models, network optimization, data mining and multivariate analysis. Tel 937-255-3636 x4646, e-mail: Jennifer.Geffre@afit.edu

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Jones, C. and Geffre, J.L., 2014, "Value Focused Thinking Approach Using Multivariate Validation for Junior Enlisted Reporting in the United States Air Force," *Military Operations Research Virtual Symposium 82*, Virtual/Washington DC, 6 Jun 2014. [COA]

Jones, C. and Geffre, J.L., 2014 "International Heavyweight Tender," *Military Operations Research Virtual Symposium 82*, Virtual/Washington DC, 6 Jun 2014. [COA]

Consulted with AMC/A9 and TRANSCOM to deliver an inter/intra-theater selection model proposal and to demo the prototype model. [COA]

Consulted with HAF/A1PP CMSgt to highlight findings of Capt Jones' thesis as it related to upcoming changes in the personnel evaluation system. [COA]

HILL, RAYMOND R., Jr.,

Professor of Operations Research, Department of Operational Sciences; Program Chair, Graduate Test and Evaluation Certificate, Department of Operational Sciences, AFIT Appointment Dates: 1997-2002, 2008 (AFIT/ENS); BS, Mathematics, Eastern Connecticut State University, 1983; MS, Operations Research, Air Force Institute of Technology, 1988; PhD, Industrial and Systems Engineering, The Ohio State University, 1996. Dr. Hill's research interests include applied statistics, in particular the application of design of experiments methodologies to test and evaluation; mathematical optimization, in particular the use of heuristic search methods for addressing particularly hard problems; and applied simulation modeling and analysis with particular interests in the area of agent-based modeling and the validation of such models. Tel. 937-255-6565 x7469, email: Raymond.Hill@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"The Science of Test: Advanced Test and Evaluation in Support of the DOD Test and Evaluation Enterprise." Sponsor: OSD. Funding: \$1,120,960 - Hill 25%, Stone 25%, Freels 25%, Hodson 25%. [COA]

REFEREED JOURNAL PUBLICATIONS

- Hodson, D.D., Gutman, A.J., Hill, R.R., 2014, "Quantifying Radar Measurement Errors in a Live-Virtual-Constructive Environment to Determine System Viability: A Case Study," *Journal of Defense Modeling and Simulation*, Vol. 12, No. 1, Jan 2014. [COA]
- Hodson, D.D., Hill, R.R., 2013, "The Art and Science of Live, Virtual and Constructive Simulation for Test and Analysis," *Journal of Defense Modeling and Simulation*, Vol. 12, No. 1. [COA]
- Gutman, A.J., White, E.D., Lin, D.J.K., Hill, R.R., 2014, "Augmenting Supersaturated Designs with Bayesian D-Optimality," *Computational Statistics & Data Analysis*, Vol. 71, pp. 1147-1158, Mar 2014. [COA]
- Tan, H.T., Hill, R.R., 2014, "The In-Transit Vigilant Covering Tour Problem for Routing Unmanned Ground Vehicles," *Military Operations Research*, Vol. 18, No. 4, pp. 5-18, Jan 2014. [COA]
- Heath, B.L., Ciarallo, F.W., Hill, R.R., 2013, "An Agent-Based Approach to Analyze the Impact of Warehouse Congestion on Cost Performance," *International Journal of Advanced Manufacturing Technology*, Vol. 67, Nos. 1-4, pp. 563-574. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

- Kannon, T.E., Nurre, S.G., Lunday, B.J., Hill, R.R., 2014, "The Aircraft Routing with Air Refueling Problem: Exact and Greedy Approaches," *Proceedings of the 2014 Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada. 31 May – 3 Jun 2014. Best paper in Homeland Security Track. [COA]
- Garee, M.J., Hill, R.R., Russell, B., 2014, "Fragment Capture Simulation for Missile Blast Test Optimization," *Proceedings of the 2014 Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada. 31 May – 3 Jun 2014. Best paper in Military Applications Track. [COA]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

- Hill, R.R., Fett, G., and Nurre, S.G., 2014, "The Aircraft Routing with Air Refueling Problem: Exact and Greedy Approach," *The 17th ROK-US Defense Analysis Exchange*, Seoul, Korea, Apr 2014. [COA]
- Garee, M. and Hill, R.R., 2014, "Fragment Capture Simulation for Missile Blast Test Optimization," *The 17th ROK-US Defense Analysis Exchange*, Seoul, Korea, Apr 2014. [COA]
- Hill, R.R., 2013, "Simulation: Making Decisions in a Complex World," *OR/MS Today*, Vol. 40, No. 4, pp. 58-59. [COA]
- Consulted with 96th TG-OL/AS on their laser panel testing. [COA]
- Consulted with 711th HPW on their upcoming project to improve the load planning for Aeromedical Evacuation. [COA]
- Consulted with SAF-IE (Energy Office) on their efforts to reduce the cost of flight training through the use of simulation technology. [COA]

HUSCROFT, JOSEPH R., Lt Col,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Deputy Department Head of Operational Sciences; AFIT Appointment date: 2012 (AFIT/ENS); BS, Behavioral Science, United States Air Force Academy, 1994; Master of Public Administration, Troy State University, 2002; MS, Logistics Management, Air Force Institute of Technology, 2004; PhD, Management, Auburn University, 2010. Lt Col Huscroft's research interests include supply chain management, reverse logistics, reverse logistics metrics, innovation and flexibility in the supply chain, operations management, information

systems impact on the supply chain, and transportation and distribution. Tel. 937-255-3636 x 4533, e-mail: Joseph.Huscroft@afit.edu

REFEREED JOURNAL PUBLICATIONS

Hall, D.J., Huscroft, J.R., Hazen, B.T., and Hanna, J.B., 2013, "Reverse Logistics Goals, Metrics, and Challenges: Perspectives from Industry," *International Journal of Physical Distribution & Logistics Management*, Vol. 43, No. 9, pp. 768-785. [COA]

Huscroft, J.R., Hazen, B.T., Hall, D.J., Skipper, J.B., and Hanna, J.B., 2013, "Reverse Logistics: Past Research, Current Management, Issues, and Future Directions," *International Journal of Logistics Management*, Vol. 24, No. 3, pp. 304-327. [COA]

Huscroft, J.R., Hazen, B.T., Hall, D.J., and Hanna, J.B., 2013, "Task-technology Fit For Reverse Logistics Performance," *International Journal of Logistics Management*, Vol. 24, No. 2, pp. 230-246. [COA]

Hazen, B.T., Huscroft, J.R., Hall, D.J., Weigel, F.K., and Hanna, J.B., 2014, "Reverse Logistics Information System Success and the Effect of Motivation," *International Journal of Physical Distribution & Logistics Management*, Vol. 44, No. 3, pp. 201-220. [COA]

JOHNSON, ALAN W.,

Associate Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Program Chair, PhD, Logistics, Department of Operational Sciences, AFIT Appointment Date: 2004 (AFIT/ENS); BS, Mechanical Engineering, Montana State University, 1982; MS, Systems Management, Air Force Institute of Technology, 1989; PhD, Industrial and Systems Engineering, Virginia Polytechnic Institute and State University, 1996. Dr. Johnson's research interests include space logistics, strategic mobility, discrete-event simulation, logistics management, reliability and maintainability, and discrete optimization and heuristics. Tel. 937-255-3636 x4703, email: Alan.Johnson@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

"Research, Analysis and Transition Support to the Directorate of Logistics and Sustainment Air Force Sustainment Center (Executive Education)." Sponsor: AFSC. Funding: \$90,000. [COA]

SPONSOR FUNDED RESEARCH PROJECTS

"Research, Analysis and Transition Support to the Directorate of Logistics and Sustainment Air Force Sustainment Center." Sponsor: AFSC. Funding: \$350,000. [COA]

REFEREED JOURNAL PUBLICATIONS

Hackleman, A.S., Johnson, A.W., and Ahner, D.K., 2014, "Nuclear Enterprise Performance Measurement," *Journal of Defense Modeling and Simulation*, Vol. 11, No. 3, pp. 245-264. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Breitbach, T., Johnson, A.W., Weir, J.D., Brown, J., 2014, "Afghanistan Air Cargo Routing – A Systems Approach," *Proceedings of the IIE Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada, 31 May – 3 Jun 2014. [COA]

Sills, R., Johnson, A.W., White, E., 2014, "Restoring Trust to Air Force Materiel Command's Personnel Loss Forecast Legacy Software," *Proceedings of the 2014 Western Decision Sciences Institute Conference*, Napa, CA, 1-4 Apr 2014. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Cobb, B. and Johnson, A.W., 2014, "Mixture Distributions for Modeling Lead Time Demand in Coordinated Supply Chains," *Proceedings of the 2014 Defense Acquisition Symposium*, Monterey, CA, 5-6 Apr 2014. [COA]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Boehmke, B., Johnson, A.W., Weir, J.D., White, E., Gallagher, M., 2014, "Data Science: A Focus on Strategic Cost Analytics across the Value Chain," *IIE Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada, 31 May – 3 Jun 2014. [COA]

LUNDAY, BRIAN J., LTC,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2013 (AFIT/ENS); BS, Mechanical Engineering, U.S. Military Academy, West Point, 1992; MS, Industrial Engineering, University of Arizona, 2001; PhD, Industrial and Systems Engineering, Virginia Polytechnic Institute, 2010. LTC Lunday's research interests include network interdiction, game theoretic resource allocation, and public service applications; mathematical modeling, global optimization algorithms, and heuristic development. Tel. 937-255-3636 x4624, email: Brian.Lunday@afit.edu

REFEREED JOURNAL PUBLICATIONS

Sherali, H.D., Lunday, B.J., 2013, "On Generating Maximal Nondominated Benders Cuts," *Annals of Operations Research*, Vol. 210, No. 1, pp. 57-72. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kannon, T.E., Nurre, S.G., Lunday, B.J., and Hill, R.R., 2014, "The Aircraft Routing Problem with Refueling: Exact and Greedy Approaches." *Proceedings of the Industrial and Systems Engineering Research Conference (ISERC)*, Montreal, Quebec, Canada, 31 May – 3 Jun 2014. [COA]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Kallemyn, B.S., Deckro, R.F., Lunday, B.J., 2014, "An Approach to Network Diverting," *Military Operations Research Society Symposium 82*, Alexandria, VA, 23-25 Jul 2014. [COA]

Consulted with the Army Analytics group (AAG) from Monterey, CA to establish an Institutional Agreement for IRB Review (IAIR) between AAG and AFIT/AFRL. [COA]

Consulted with the Army Marketing Research Group (AMRG) from Alexandria, VA to establish an Institutional Agreement for IRB Review (IAIR) between AAG and AFIT/AFRL. [COA]

MILLER, JOHN O.,

Associate Professor of Operations Research, Department of Operational Sciences; Program Chair, MS in Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2002 (AFIT/ENS); Director, Combat Modeling Laboratory; BS, Biology, United States Air Force Academy, 1980; MBA, University of Missouri at Columbia, 1983; MS, Operations Research, Air Force Institute of Technology, 1987; PhD, Industrial Engineering, The Ohio State University, 1997. Dr. Miller's research interests include computer simulation, ranking and selection, agent based modeling, combat modeling, network centric warfare, high performance computing, applied statistics, and nonparametric statistics. Tel. 937-255-6565 x4326, email: John.Miller@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Wahoske, T., Miller, J.O., Cunningham, W.A., 2014, "Cost Effectiveness Approach to B-1B Consumable and Repairable Procurement Strategies," *Proceedings of the 2014 Industrial Engineering Research Conference*, Montreal, Canada, 31 May – 3 Jun 2014. [COA]

Weimer, C., Miller, J.O., Friend, M., and Miller, J.E., 2013, "Forecasting Effects of MISO Actions: An ABM Methodology," *Proceedings of the 2013 Winter Simulation Conference*, Washington, DC 8-11 Dec 2013, ed. R. Pasupathy, S.H. Kim, A. Tolk, R. Hill, and M.E. Kuhl. [COA]

Williams, D., Miller, J.O., and Mattioda, D., 2013, "Simulation and Analysis of EXPRESS Run Frequency," *Proceedings of the 2013 Winter Simulation Conference*, Washington, DC 8-11 Dec 2013, ed. R. Pasupathy, S.H. Kim, A. Tolk, R. Hill, and M.E. Kuhl. [COA]

NURRE, SARAH G.,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2013 (AFIT/ENS); BS, Mathematical Sciences, Rensselaer Polytechnic Institute, 2007; MEng, Industrial and Management Engineering, Rensselaer Polytechnic, 2011; PhD, Decision Sciences and Engineering Systems, Rensselaer Polytechnic Institute, 2013. Dr. Nurre's research interests include network optimization, scheduling, integer programming, optimization algorithms, heuristics and applied deterministic optimization. Tel. 937-255-6565 x4319, email: Sarah.Nurre@afit.edu

REFEREED JOURNAL PUBLICATIONS

Nurre, S.G., and Sharkey, T.C., 2014, "Integrated Network Design and Scheduling Problems with Parallel Identical Machines: Complexity Results and Dispatching Rules," *Networks*, Vol. 63, No. 4, pp. 306-326, Jul 2014. [COA]

Nurre, S.G., Bent, R., Pan, F., and Sharkey, T.C., 2014, "Managing Operations of Plug-In Hybrid Electric Vehicle (PHEV) Exchange Stations for Use with a Smart Grid," *Energy Policy*, Vol. 67, 364-377. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kannon, T.E., Nurre, S.G., Lunday, B.J., and Hill, R.R., 2014, "The Aircraft Routing with Air Refueling Problem: Exact and Greedy Approaches," *Proceedings of the Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada, 31 May – 3 Jun 2014. [COA]

Martin, M.T., Nurre, S.G., and Grimaila, M.R., 2014, "Modeling Shared Drive Utilization Using Stochastic Techniques," *Proceedings of the International Conference on Information and Knowledge Engineering*, Las Vegas, NV, 21-24 Jul 2014. [COA]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Nurre, S.G. and Sharkey, T.C., 2013, "Online Integrated Network Design and Scheduling Problems," *INFORMS Annual Meeting*, Minneapolis, MN, 6-9 Oct 2013. [COA]

Hill, R.R., Fett, G., and Nurre, S.G., 2014, "The Aircraft Routing with Air Refueling Problem: Exact and Greedy Approach," *The 17th ROK-US Defense Analysis Exchange*, Seoul, Korea, Apr 2014. [COA]

OGDEN, JEFFERY A.,

Associate Professor of Logistics and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Date: 2006 (AFIT/ENS); BS, Accounting, Weber State University, 1998; MBA with emphasis in Supply Chain Management, Arizona State University, 2000; PhD, Business Administration with emphasis in Supply Chain Management, Arizona State University, 2003. Dr. Ogden's research interests include supply chain management, supply base reduction, ERP implementation, E-marketplaces, RFID, supply chain quality,

purchasing strategies, buyer-supplier relationships, supply chain interoperability, supply chain services, and qualitative research methods. Tel. 937-255-3636 x4653, email: Jeffrey.Ogden@afit.edu

OVERSTREET, ROBERT E., Lt Col,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Division Chief, Logistics Division, Department of Operational Sciences, AFIT Appointment Date: 2012 (AFIT/ENS); BBA, General Business, Campbell University, 1998; MS, Logistics, Air Force Institute of Technology, 2002; PhD, Management, Auburn University, 2012. Lt Col Overstreet's research interests include leadership in the supply chain, organizational innovativeness, lean and agile logistics, transportation, and humanitarian logistics. Tel. 937-255-3636 x 4590, email: Robert.Overstreet@afit.edu

REFEREED JOURNAL PUBLICATIONS

Overstreet, R.E., Hazen, B.T., Skipper, J.B., and Hanna, J.B., "Bridging the Gap between Strategy and Performance: Using Leadership Style to Enable Structural Elements," *Journal of Business Logistics*, Vol. 35, No. 2, pp.136–149. [COA]

Fawcett, S.E., Waller, M.A., Miller, J.W., Schwieterman, M.A., Hazen, B.T. and Overstreet, R.E., "A Trail Guide to Publishing Success: Tips on Writing Influential Conceptual, Qualitative, and Survey Research," *Journal of Business Logistics*, Vol. 35, No. 1, pp. 1–16. [COA]

Hazen, B.T., Weigel, F., and Overstreet, R.E., 2014, "Innovating to Integrate the Intangibles Into the Learning Air Force," *The United States Army Medical Department Journal*, pp. 77-85, Jan - Mar. [COA]

PIGNATIELLO, JOSEPH J., Jr.,

Professor of Operations Research, Department of Operational Sciences; Head, Department of Operational Sciences, AFIT Appointment Date: 2010 (AFIT/ENV), 2011 (AFIT/ENS); BS, Mathematics, University of Massachusetts; MS, Industrial and Systems Engineering, The Ohio State University, 1979; PhD, Industrial and Systems Engineering, The Ohio State University, 1982. Dr. Pignatiello serves on the editorial review boards of Quality Engineering, IIE Transactions and the International Journal of Lean Six Sigma. He is a Fellow of both the American Society for Quality and the Institute of Industrial Engineers. Tel. 937-255-3636 x4311, email: Joseph.Pignatiello@afit.edu

RANDALL, CHRISTIAN E., Maj,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Program Chair, Master of Science in Logistics (ASAM) and Program Chair, Master of Science in Logistics (IDE), Department of Operational Sciences. AFIT Appointment date: 2012; BS, Business Administration, University of Phoenix, 1997; MS, Logistics Management, Air Force Institute of Technology, 2004; PhD, Business Administration (Logistics), The Ohio State University, 2013. Maj Randall's research interests include social network impacts on supply chain management, resilience, and impacts of technology on logistics performance. Tel. 937-255-3636 x 4337, email: Christian.Randall@afit.edu

ROBBINS, MATTHEW J., Lt Col,

Assistant Professor of Operations Research, Department of Operational Sciences; Division Chief, Operations Research Division, Department of Operational Sciences, AFIT Appointment Date: 2010 (AFIT/ENS); BS, Computer Systems Engineering, University of Arkansas, 1999; MS, Operations Research, Air Force Institute of Technology, 2005; PhD, Industrial Engineering, University of Illinois at Urbana-Champaign, 2010. Lt Col Robbins' research interests include applied mathematical programming, applied statistics, approximate dynamic programming, decision making under uncertainty, game theory, and stochastic modeling; problems related to defense (stability operations management, MEDEVAC location and dispatching, military inventory routing, and missile defense) and problems within the general area of public health (vaccine economics and transportation regulatory policies). Tel. 937-255-3636 x4539, email: Matthew.Robbins@afit.edu

REFEREED JOURNAL PUBLICATIONS

Guzman, J.D., Deckro, R.F., Robbins, M.J., Morris, J.F., and Ballester, N.A., "An Analytical Comparison of Social Network Measures," *IEEE Transactions on Computational Social Systems*, Vol. 1, No. 1, pp. 35-45. [COA]

Robbins, M.J., Jacobson, S.H., Shanbhag, U.V., and Behzad, B., 2014, "The Weighted Set Covering Game: A Vaccine Pricing Model For Pediatric Immunization," *INFORMS Journal on Computing*, Vol. 26, No. 1, pp. 183-198. [COA]

Bernardoni, B.J., Deckro, R.F., and Robbins, M.J., 2013, "Using Social Network Analysis to Inform Stabilization Efforts," *Military Operations Research*, Vol. 18, No. 4, pp. 37-60. [COA]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Jacobson, S.H., King, D.M., Ryan, K.C., Robbins, M.J., 2013, "Assessing the Long Term Benefit of Banning the Use of Hand-Held Wireless Devices While Driving," *2013 INFORMS Annual Meeting*, Minneapolis, MN, 6-9 Oct, 2013. [COA]

Behzad, B., Jacobson, S.H., and Robbins, M.J., 2013, "Bertrand-Edgeworth-Chamberlin Competition: a Pediatric Vaccine Pricing Model," *2013 INFORMS Annual Meeting*, Minneapolis, MN, 6-9 Oct, 2013. [COA]

SANDLIN, DORAL E., Col,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Deputy Director, Center for Operational Analysis, Department of Operational Sciences, AFIT Appointment Date: 2010 (AFIT/ENS); BS, Civil Engineering, US Air Force Academy, 1992; MBA, Business, Rutgers University, 2004; MLM, Logistics and Supply Chain Management, Air Force Institute of Technology, 2006; MA, Logistics Management, The Ohio State University, 2009; PhD, Logistics, The Ohio State University, 2010. Col Sandlin's research interests include transportation selection models, cross-functional integration, and logistics strategy. Tel. 937-255-3636 x 4740, email: Doral.Sandlin@afit.edu

SCHULTZ, KENNETH L.,

Associate Professor of Logistics and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Date: 2011; BS, Economics, University of Pennsylvania, 1980; PhD, Operations Management, Cornell University, 1997. Dr. Schultz's research interests include improving operations management models by including the consideration of behavior issues including motivation and peer pressure in production systems and process flows. Tel. 937-255-3636 x 4725, email: Kenneth.Schultz@afit.edu

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Consulted with The Ohio State University on a PhD student's dissertation research, "Operations Factors Influencing the Confidentiality of Proprietary Assets." [COA]

Schultz, K.L., Ingolfsson, A., Kolfal, B., and Delassay, M., 2014, "Influence of Load on Service Times," *presentation at the PhD Symposium on Behavioral Management*, Erasmus University and the University of Lugano. [COA]

STONE, BRIAN B., Maj,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2013 (AFIT/ENS); BS, Mathematics, Truman State University, 1999; MS, Operations Research, Air Force Institute of Technology, 2008; PhD, Industrial Engineering, Arizona State University, 2013. Maj Stone's research interests include design of experiments, response surface methodology, statistical quality control, and regression analysis. He is a member of the Institute for Operations Research and Management Science (INFORMS), the Military Operations Research Society (MORS), and the American Society for Quality (ASQ). Tel. 937-255-3636 x 4510, email: Brian.Stone@afit.edu

REFEREED JOURNAL PUBLICATIONS

Stone, B.B., Montgomery, D.C., Hassler, E. and Silvestrini, R.T., "An Expected Cost Methodology for Screening Design Selection," *Quality Engineering*, Vol. 26, No. 2, pp. 139-153. [COA]

STRAKOS, JOSHUA K., Maj,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Program Chair, Graduate Supply Chain Management Certificate, Department of Operational Sciences, AFIT Appointment Date: 2013 (AFIT/ENS); BS, Occupational Education (Human Services), Wayland Baptist University, 1999; MBA, Business Administration (Petroleum Management), University of Kansas, 2006; PhD, Operations Management, University of Houston, 2013. Maj Strakos' research interests include government and non-government related energy topics, disaster relief supply chain management, and humanitarian logistics and supply chain management. Tel. 937-255-3636 x 4318, email: Joshua.Strakos@afit.edu

WEIR, JEFFERY D.,

Associate Professor of Operations Research, Department of Operational Sciences; Deputy Department Head, Department of Operational Sciences; Program Chair, Master of Science in Operational Analysis (IDE), Department of Operational Sciences, AFIT Appointment Dates: 2002-2008, 2009 (AFIT/ENS); Bachelors Electrical Engineering, Georgia Institute of Technology, 1988; Masters Business Administration, Embry Riddle-Aeronautical University, 1992; Master of Science Operations Research, Air Force Institute of Technology, 1995; PhD, Industrial Engineering & Operations Research, Georgia Institute of Technology, 2002. Dr. Weir's research interests include decision analysis, large-scale optimization, deterministic optimization, and mathematical programming. He is a member of the Institute for Operations Research and Management Science (INFORMS), the Military Operations Research Society (MORS), the Institute of Industrial Engineers (IIE) and the Decision Sciences Institute (DSI). Tel. 937-255-3636 x4523, email: Jeffery.Weir@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"AFMC Hierarchy Builder Modification." Sponsor: AFMC/A9. Funding: \$150,000. [COA]

"JDPAC and AFIT Distribution Research Proposal." Sponsor: USTRANSCOM. Funding: \$155,000. [COA]

"Secretary of the Air Force Inspector General USAF Inspections Support (SAF/IGI Support)." Sponsor: SAF. Funding: \$20,088. [COA]

REFEREED JOURNAL PUBLICATIONS

Hu, M., Wu, T., Weir, J.D., 2013, "An Adaptive Particle Swarm Optimization with Multiple Adaptive Methods," *IEEE Transactions on Evolutionary Computation*, Vol.17, No.5, pp.705-720, Oct 2013. [COA]

Hendrix, J., Jacques, D., and Weir, J.D., 2014, "Continuous Decision Support," *International Journal of Multicriteria Decision Making*, Vol. 4, No. 1, pp. 69-89. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Al-Romaihi, M., Soni, S.R., Wirthlin, J.R., Badiru, A.B., Weir, J.D., and Shenk, B., "Advanced Composite Air Frame Life Cycle Cost Estimating Model," *American Society for Composites 28th Technical Conference*, Penn State University, 8-11 Sep 2013. [COA]

Breitbach, T.W., Johnson, A.W., Weir, J.D., Brown, G.R., "Afghanistan Air Cargo Routing," *Proceedings of the 2014 Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada, 31May – 3 Jun 2014, Y. Guan and H. Liao, eds. [COA]

5.6. DEPARTMENT OF SYSTEMS ENGINEERING AND MANAGEMENT

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5.6.1. DOCTORAL DISSERTATIONS

ALBINALI, SALMAN A., *Structural Health Monitoring System Trade Space Analysis Tool with Consideration for Crack Growth, Sensor Degradation and a Variable Detection Threshold*. AFIT/ENV/DS/14S-23. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RQ.

MORRIS, JEFFREY D., *Conceptual Modeling of a Quantum Key Distribution Simulation Framework Using the Discrete Event System Specification*. AFIT/ENV/DS/14S-25. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: LTS.

PARR, JEFFREY C., *A Method to Develop Neck Injury Criteria to Aid Design and Test of Escape Systems Incorporating Helmet Mounted Displays*. AFIT/ENV/DS/14S-22. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

VALENCIA, VHANCE V., *Network Interdependency Modeling for Risk Assessment on Built Infrastructure Systems*. AFIT/ENV/DS/13D-01. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: N/A.

5.6.2. MASTER'S THESES

ABEGAZ, YARED M., *Development of a Telemetry Data Analysis System for the MQ-1 Predator and MQ-9 Reaper Unmanned Aerial Systems*. AFIT/ENV/14M-01. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: ACC/556 TES.

ADAMSON, SCOTT D., *Strategic Positioning of United States Air Force Civil Engineer Contingency Equipment within the Supply Chain*. AFIT/ENV/14M-02. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: AFCEC.

ALAMRI, MOHAMMAD, *Applying Lean to the F-15 Maintenance Process for the Royal Saudi Air Force*. AFIT/ENV/14M-03. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: N/A.

AMACK, DANIEL C., *Waste-to-Energy Decision Support Method for Forward Deployed Forces*. AFIT/ENV/14M-05. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: AFRL/RX.

BARFIELD, HELEN L., *Naïve Bayes Classification and Text Mining Analysis of Cost Growth Risk in Department of Energy Remediation Projects*. AFIT/ENV/14M-06. Faculty Advisor: Lt Col Jonathan D. Ritschel. Sponsor: DOE/EM.

BATES, CHRISTOPHER S., *Ultraviolet Light Emitting Diode Optical Power Characterization*. AFIT/ENV/14M-07. Faculty Advisor: Dr. Michael E. Miller. Sponsor: EPA/NHSRC.

BELL, JAMES M., *Accounting for Mass Transfer Kinetics when Modeling the Impact of Low Permeability Layers in a Groundwater Source Zone on Dissolved Contaminant Fate and Transport*. AFIT/ENV/14M-08. Faculty Advisor: Dr. Mark N. Goltz. Sponsor: DOD/SERDP.

BERGER, ANDREW J., & MURPHY, CALEB S., *An Analysis of the Impact of Variation in Mean Time between Demand on Air Force Fleet Level Aircraft Parts Inventories*. AFIT/ENV/T/14J-21. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

BLOOM, GRANT R., *An Analysis of Total Force Integration in RED HORSE Organizations*. AFIT/ENV/14M-11. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: ACC/A7.

BROUCH, EDWARD J., *Artificial Neural Network Prediction of Chemical-Disease Relationships Using Readily Available Chemical Properties*. AFIT/ENV/14M-12. Faculty Advisor: Dr. Willie F. Harper, Jr. Sponsor: N/A.

BROWN, STANTON P., *A Change Management Approach to Enhance Facility Maintenance Programs*. AFIT/ENV/14M-13. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: AFCEC.

BURGER, JOSHUA A., *Interface Evaluation for Open System Architectures*. AFIT/ENV/14M-14. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFLCMC.

CHINERY, MARK B., *Using Sensor-Based Demand Controlled Ventilation to Realize Energy Savings in Laboratories*. AFIT/ENV/14M-16. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: N/A.

CLAYSON, DENIS S., *Cost Performance Stability in DOE Office of Environmental Management Projects*. AFIT/ENV/14M-17. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: DOE/EM.

DENEVE, ALLEN J., *A Macro-Stochastic Approach to Improved Cost Estimation for Defense Acquisition Programs*. AFIT/ENV/14M-20. Faculty Advisor: Lt Col Erin T. Ryan. Sponsor: 711HPW/RH.

DUCKWORTH, KELSEY L., *Ultraviolet Light Emitting Diode Use in Advanced Oxidation Processes*. AFIT/ENV/14M-22. Faculty Advisor: Lt Col LeeAnn Racz. Sponsor: EPA/NHSRC.

EDWARDS, CHRISTOPHER W., *Gas Phase Organophosphate Detection Using Enzymes Encapsulated within Peptide Nanotubes*. AFIT/ENV/14M-41. Faculty Advisor: Lt Col Dirk P. Yamamoto. Sponsor: AFMSA/SG.

ELLIS, RICHARD T., *A Method to Determine an Organization's Compatibility with Hybrid Workspaces*. AFIT/ENV/14M-25. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: AFCEC.

GRANIER, SEAN V., *Counter-Chemical Weapons Concept of Operations (C-CW CONOPS) Alternative Protection Scenario (APS) Study*. AFIT/ENV/14M-27. Faculty Advisor: Maj Gregory D. Hammond. Sponsor: N/A.

HELINE, TIFFANY R., *Field Evaluation of Solvent-Free Sampling with Di-n-butylamine for the Determination of Airborne Monomeric and Oligomeric 1,6-Hexamethylene Diisocyanate*. AFIT/ENV/14M-29. Faculty Advisor: Lt Col Dirk P. Yamamoto. Sponsor: N/A.

JEROSKI, JUSTINE D., *Physiological Investigation of Localized Temperature Effects on Vigilance Performance*. AFIT/ENV/14M-30. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

KAISER, JENNIFER N., *Effects of Dynamically Weighting Autonomous Rules in a UAS Flocking Model*. AFIT/ENV/T/14S-06. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFRL/RQ.

KIM, JOSEPH S., *Exploring a Method to Quantitatively Measure Design Flexibility Early in the Defense Acquisition Life Cycle*. AFIT/ENV/14M-32. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFLCMC.

KING, SCOTT T., *Detecting Industrial Chemicals in Water with Microbial Fuel Cells and Artificial Neural Networks*. AFIT/ENV/14M-33. Faculty Advisor: Dr. Willie F. Harper, Jr. Sponsor: AFMSA/SG.

LAMBACH, JACOB L., *Integrating UAS Flocking Operations with Formation Drag Reduction*. AFIT/ENV/14M-01DL. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

LAY, JOSEPH R., *Air Force Inspection System: An Application for System-of-Systems (SOS) Engineering*. AFIT/ENV/T/14J-25. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

NEAL, CHARLES J., *Feasibility of Onboard Processing of Heuristic Path Planning and Navigation Algorithms within SUAS Autopilot Computational Constraints*. AFIT/ENV/14M-44. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFRL/RQ.

MACKINDER, STEVEN L., *Geospatial Analysis of Construction Labor Wage Rates in the United States of America*. AFIT/ENV/14M-36. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: AFCEC.

MARSHALL, SEAN R., *A Model to Guide Development of Environmental Final Governing Standards for Overseas United States Department of Defense Installations*. AFIT/ENV/14M-37. Faculty Advisor: Dr. Willie F. Harper, Jr. Sponsor: N/A.

MURPHY, CALEB S., See BERGER, ANDREW J.

PACK, ANDREW J., *A Case Study of Department of Energy Office of Environmental Management Project Risk Management*. AFIT/ENV/14M-47. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: DOE/EM.

PERKINS, COREY J., *Cloud Computing Implementation Organizational Success in the Department of Defense*. AFIT/ENV/14M-48. Faculty Advisor: Lt Col Darin A. Ladd. Sponsor: DISA.

PETTER, JACOB L., *An Analysis of Stability Properties in Earned Value Management's Cost Performance Index and Earned Schedule's Schedule Performance Index*. AFIT/ENV/14M-49. Faculty Advisor: Lt Col Jonathan D. Ritschel. Sponsor: CPM.

PNG, JASON, *Simulation Platform for Vision Aided Inertial Navigation*. AFIT/ENV/T/14S-14. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RW. [ANT]

POISSON, ROBERT J., *Spatial Disorientation: Past, Present, and Future*. AFIT/ENV/14M-50. Faculty Advisor: Dr. Michael E. Miller. Sponsor: NAMRU-D.

PONDER, REBECCA L., *An Analysis of Insulated Concrete Forms for Use in Sustainable Military Construction*. AFIT/ENV/14M-51. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: N/A.

PORTER, KEVIN J., *A Case Study of Project Participant Relationships in the DOE Office of Environmental Management*. AFIT/ENV/14M-52. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: DOE/EM.

REARDON, CHRISTOPHER J., *Comparison of Biological Agent Attack Detection Strategies on the Battlefield*. AFIT/ENV/14M-53. Faculty Advisor: Dr. Michael W. Haas. Sponsor: DTRA.

RICHWINE, JOHN P., *Modeling the Effects of Ultraviolet (UV) Light Emitting Diode (LED) Use in the Advanced Oxidation Process (AOP)*. AFIT/ENV/14M-55. Faculty Advisor: Dr. Michael R. Grimala. Sponsor: EPA.

SPENCER, MICHAEL J., *Design Considerations for a Water Treatment System Utilizing Ultra-Violet Light Emitting Diodes*. AFIT/ENV/14M-58. Faculty Advisor: Dr. Michael E. Miller. Sponsor: EPA.

SUTHERLIN, JASON W., *Improving the Enterprise Requirements and Acquisition Model's Development Test and Evaluation Process Fidelity*. AFIT/ENV/14M-60. Faculty Advisor: Dr. John M. Colombi. Sponsor: SAF.

- SWEETNICH, STEPHEN R., *Integration, Testing, and Analysis of Multispectral Imager on Small Unmanned Aerial System for Skin Detection*. AFIT/ENV/14M-70. Faculty Advisor: Dr. David R. Jacques. Sponsor: N/A.
- SYLVANDER, MARC P., *Microbial Fuel Cell Transformation of Recalcitrant Organic Compounds in Support of Biosensor Research*. AFIT/ENV/14M-62. Faculty Advisor: Dr. Willie F. Harper, Jr. Sponsor: AFMSA.
- SYNOVEC, THOMAS M., *Investigation on the Use of Equivalency Factors for the Design and Evaluation of Flexible Airfield Pavements*. AFIT/ENV/14M-63. Faculty Advisor: Dr. Alfred E. Thal. Sponsor: AFCEC.
- TELLEZ, MARIO H., *Treatment of Perfluorinated Compounds and Nitroaromatics by Photocatalysis in the Presence of Ultraviolet and Solar Light*. AFIT/ENV/14M-64. Faculty Advisor: Dr. Mark N. Goltz. Sponsor: AFCEC.
- TUNG, KALYN A., *An Analysis of Eye Movements with Helmet Mounted Displays*. AFIT/ENV/14M-67. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.
- WILSON, DAVID J., *Tailoring Systems Engineering for Rapid Acquisition*. AFIT/ENV/14M-69. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFLCMC.
- WORDEN, DANIEL R., *Connecting RED HORSE Squadron Personnel Unit Type Code Configuration to Capability Provided to Combatant Commanders*. AFIT/ENV/T/14J-30. Faculty Advisor: Col Paul Cotelleso. Sponsor: ACC.

5.6.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliation is listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BADIRU, ADEDEJI B.,

Dean, Graduate School of Engineering and Management, AFIT Appointment Date: 2013 (AFIT/EN); BS, Tennessee Technological University, 1979; MS, Tennessee Technological University, 1981; PhD, Industrial Engineering, University of Central Florida, 1984. Dr. Badiru's research interests include Project Modeling, Analysis, Management, and Control, Mathematical Modeling, Computer Simulation, Information Systems, and Economic Analysis. He is the author of several books and technical journals. Tel. 937-255-3636 x4799, email: Adedeji.Badiru@afit.edu

REFEREED JOURNAL PUBLICATIONS

Badiru, A. B. (2014), "Adverse Impacts of Furlough Programs on Employee Work Rate and Organizational Productivity," *Defense ARJ* (Defense Acquisition Research Journal), Apr 2014, Vol. 21, No. 2, pp. 595–624.

Badiru, A. B., J. Elshaw, and M. Everly (2013), "Half-Life Learning Curve Computations for Airframe Life-Cycle Costing of Composite Manufacturing," *Journal of Aviation and Aerospace Perspectives*, Fall 2013 – Vol. 3, No. 2, pp. 6-37.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Soni, S. and A. B. Badiru, "Advanced Composite Air Frame Life Cycle Cost Estimation Model," 2014 Industrial Engineering and Operations Management Conference, 7-9 Jan 2014, Bali, Indonesia.

Badiru, A.B., "Fourteen Grand Challenges and Skills for Engineers in 2020," *QScience Proceedings: Vol 2014, World Congress on Engineering Education 2013, 5*, <http://dx.doi.org/10.5339/qproc.2014.wcee2013.5>.

BOOKS AND CHAPTERS IN BOOKS

Badiru, A. B. (2014), editor; Handbook of Industrial & Systems Engineering, Second Edition, Taylor & Francis CRC Press, Boca Raton, FL.

Badiru, A. B. and L. Racz (2014), Handbook of Emergency Response: Human Factors and Systems Engineering Approach, Taylor & Francis CRC Press, Boca Raton, FL.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Badiru, A. B. (2013), "Up to the Task: Industrial engineering is essential to meeting NAE's grand challenges," *Industrial Engineer*, Vol. 45, No. 11, pp. 42-45, Nov 2013.

Badiru, Adedeji B, invited seminar on "The 8 by 3 Paradigm: Effective and Efficient Management of Faculty Time and Effort," Central State University, NSF LEADER ADVANCE distinguished seminar series, 12 Nov 2013.

COLOMBI, JOHN M.,

Associate Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT Civilian Appointment Date: 2008 (AFIT/ENV); BSEE, University of Lowell, 1982; MSEE, Air Force Institute of Technology, 1992; PhD, Electrical Engineering, Air Force Institute of Technology, 1996. Dr. Colombi's research interests within the growing discipline of Systems Engineering include: systems architecture, systems of systems analysis, complex adaptive systems and human systems integration. Tel. 937-255-3636 x3347, email: John.Colombi@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Enterprise Requirements and Acquisition Model (ERAM) Analysis and Extensions - Phase II.” Sponsor: NPS. Funding: \$80,000 - Colombi 90%, Wirthlin 10%.

REFEREED JOURNAL PUBLICATIONS

Panton, B.C., Colombi, J.M., Grimaila, M.R., and Mills, R.F., Secure DOD Software: Considerations for the Vulnerability Market, *Cross Talk, The Journal of Defense Software Engineering*, Nov/Dec 2013, pp. 18-21.

Panton, B., C., Colombi, J. M., & Mills, R. F. (2014). Strengthening DOD cyber security with the vulnerability market, *Defense Acquisition Review Journal (DARJ)*, 21(1), 466-484.

Colombi, J. M., Wirthlin, J. R., Auger, C. M., Yoshimoto, B. K., & Baldus, L. (2014). Modeling space launch process delays to improve space vehicle acquisition planning.. *M&S Journal, Winter*,31-43. [CSRA]

Colombi, J.M.; Miller, M.E.; Bohren, J.S.; Howard, J.K., (2014). Conceptual Design Using Executable Architectures for a Manned Mission to Mars, *Systems Journal, IEEE* , 99, 1-13, doi: 10.1109/JSYST.2014.2314793. [CSRA]

Worger, D., Jalao, E. R., Wirthlin, J. R., Colombi, J., & Wu, T. (2014). Intervention strategies for the Department of Defense acquisition process. *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, doi: 10.1177/1548512914548615.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Sutherlin, J., Colombi, J., Wirthlin, J.R., Oyama, K. & J. Vandeweile. Analyzing DT&E Flight Test Missions. Society of Flight Test Engineers, 45th Annual Int’l Symposium, Dayton, OH, 19-21 Aug 2014.

Thompson, R., Colombi, J., Black J. and B. Ayres (2014). Optimization of Disaggregated Defense Weather System Follow-on Architectures. AIAA SPACE 2014 Conference and Exposition, San Diego, CA, 4-7 Aug 2014. [CSRA]

Thompson, R., Colombi, J. and J. Black (2014). Computer Aided Architecting of Disaggregated Space Systems. IEEE Aerospace Conference, Big Sky, MT, 1-8 Mar 2014. [CSRA]

Timothy D. West and John M. Colombi, “Rapid Development Case Study: Lessons Learned From Arming the C-145 Skytruck,” Proceeding of INCOSE International Symposium, Las Vegas, NV, Jun-Jul 2014.

Kalyn A.Tung, Michael E. Miller, John M. Colombi, and Suzanne Smith. Eye movement in a Vibrating HMD Environment, Y. Guan and H. Liao, eds. Proceedings of the 2014 Industrial and Systems Engineering Research Conference (ISERC).

BOOKS AND CHAPTERS IN BOOKS

Mailloux, L. O., Grimaila, M. R., Colombi, J. M., Hodson, D. D., & Baumgartner, G. (2014). System security engineering for information systems. In B. Akhgar, & H. Arabnia (Eds.), *Emerging trends in information and communication technologies (ICT) security* (pp. 5-24). Waltham MA: Elsevier (Morgan Kaufman).

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Briefed SECAF Deborah James and MGen Kwast (AU/CV) on Small UAV research.

ELSHAW, JOHN J.,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management; AFIT Civilian Appointment Date: 2013 (AFIT/ENV) BS, Accounting, University of Akron, 1991; MBA, Regis

University, 1996, PhD, Krannert School of Management, Purdue University, 2010. Dr. Elshaw's research interests include organizational behavior, trust, leadership, human resource management, organizational causes of high-consequence errors, technology impact on individual and group behavior, social network analysis, cognition and emotions, organizational climate and culture, psychological influences on foreign audiences, cross-cultural leadership and communication, and hierarchical linear modeling. Tel. 937-255-3636 x4650, email: John.Elshaw@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Stress and Workaholism: An Empirical Examination of Women and Minority Advancement in Science, Technology, Engineering and Mathematics." Sponsor: NSF. Funding: \$5,000.

REFEREED JOURNAL PUBLICATIONS

Badiru, A. D., Elshaw, J. J., and Everly, M. Half-Life Learning Curve Computations for Airframe Life-cycle Costing of Composite Manufacturing. *Journal of Aviation and Aerospace Perspectives*, Vol. 3, No. 2, Fall 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Shinkle, G. A., Yang, M., Yang, F., Elshaw, J. J., Schleicher, D.J. Goals and Governance, Complements or Substitutes? Both. A Study of Performance in Government Organizations. Australian and New Zealand Academy of Management Conference, Hobart, Tasmania, 2013.

FELKER, DANIEL L.,

Chemist GS-11, Department of Systems Engineering and Management, Appointment Date: 2006; PhD. Analytical Chemistry, Kansas State University, 2005, served in the United States Army from December 1986 to August 1997. Current research interests include: X-ray photoelectron spectroscopy of thin film surfaces with a focus on the surface absorption organophosphates; modeling the absorbent properties of nano-particles for remediation of toxic compounds; the mechanism of thermo deactivation of Bacillus Anthracis Spores; electrochemical biosensors for the detection of organophosphates, and environmental chemistry of wetlands. Tel. 937-255-3636 x7410, email: Daniel.Felker@afit.edu

REFEREED JOURNAL PUBLICATIONS

Janeczko, A. K., Walters, E.B., Schuldt, S.J., Magnuson, M.L., Willison, S.A., Brown, L.M., Ruiz, O.N. Felker, D.L., and Racz, L. (2014) Fate of malathion and a phosphonic acid in activated sludge with varying solids retention times. *Water Research* 57C, 127-139.

Xing, Y., Li, A., Felker, D.L., and Burggraf, L.W., (2014) Nanoscale Structural and Mechanical Analysis of Bacillus anthracis Spores Inactivated with Rapid Dry Heat. *Applied and Environmental Microbiology* 80 No. 5 1738-1749.

Cooper, C., Slagley, J., Lohaus, J., Escamilla, E., Bliss, C., Semler, D., Felker, D., Smith, D., and Ott, D. (2014) Comparison of high-volume air sampling equipment for viral aerosol sampling during emergency response. *Journal of Emergency Management (Weston, Mass.)*, 12 No.2, 161-70.

Stahler, A.C., Monahan, M.L., Dagher, J.M., Baker, J.D., Markopoulos, M.M., Iragena, D.B., Nejame, B.M., Slaughter, R., Felker, D.L., Burggraf, L.W., Isaac, L.A.C., Grossie, D., Gagnon, Z.E., Pavel-Sizemore, I. (2013) Evaluating the abnormal ossification in tibiotarsi of developing chick embryos exposed to 1.0 ppm doses of platinum group metals by spectroscopic techniques. *Bone* 53 421-429.

FORD, THOMAS C., Lt Col,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT Military Appointment Date: 2014 (AFIT/ENV); BS Electrical Engineering, Brigham Young University, 1994; BA Chinese, Brigham Young University, 1994; MS Engineering, Wright State University, 1998; PhD,

Systems Engineering, Air Force Institute of Technology, 2008. Lt Col Ford's research interests include: interoperability, resiliency, and system architecting. Tel. 937-255-3636 x4747, email: Thomas.Ford@afit.edu

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Invited Speech, "Space Resiliency." Society of Space Professionals International. Dec 2013.

FREELS, JASON K., Maj,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 2013 (AFIT/ENV); BS, Auburn University, 2000; MS, Air Force Institute of Technology, 2006; PhD, Systems Engineering, Air Force Institute of Technology, 2013. Maj Freels' research interests include reliability growth testing, accelerated life testing, accelerated degradation testing, and competing risk analysis. Tel. 937-255-3636 x4676, email: Jason.Freels@afit.edu

REFEREED JOURNAL PUBLICATIONS

Freels, J. K., Pignatiello, J. J., Warr, R. L. and Hill, R. R. (2014), Bridging the Gap between Quantitative and Qualitative Accelerated Life Tests. *Quality and Reliability Engineering International*. doi: 10.1002/qre.1636.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Consulted with the Armament Directorate (Eglin AFB, FL) on the application of a testing technique devised by Sandia Labs for use in a new munitions development program.

Consulted with USSOUTHCOM on a proposed regression analysis to evaluate correlations between energy production and interstate conflict.

Consulted with the National Institutes of Health to analyze panel data from experimental procedure to evaluate a novel treatment of Type I Diabetes using the injection of Islet cells in a patient's pancreas.

GOLTZ, MARK N.,

Professor of Engineering and Environmental Management, Department of Systems Engineering and Management, AFIT Appointment Date: 1996 (AFIT/ENV); BS, Cornell University, 1972; MS, University of California, Berkeley, 1973; PhD, Environmental Engineering and Science, Stanford University, 1986. Dr. Goltz specializes in modeling the physical, chemical, and biological processes that affect the fate and transport of contaminants in the subsurface. He is also interested in the environmental fate and transport of nanomaterials, as well as the use of nanomaterials to remediate water contamination. Tel. 937-255-3636 x4638, email: Mark.Goltz@afit.edu

REFEREED JOURNAL PUBLICATIONS

Baker, P.A., M.N. Goltz, A.M. Schrand, D.Y. Yoon, and D.S. Kim, Organophosphate Vapor Detection on Gold Electrodes Using Peptide Nanotubes, *Biosensors and Bioelectronics* 61: 119–123, 2014.

Ayral, D., M. Otero, M.N. Goltz and A.H. Demond, Impact of DNPAL Contact on the Structure of Smectitic Clay Materials, *Chemosphere*, 95: 182-187, 2014.

Huang, J. and M.N. Goltz, Spatial Moment Equations for a Groundwater Plume with Degradation and Rate-Limited Sorption, *Journal of Hydrologic Engineering*, 19(5): 1053-1058, 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Kanel, S.R., M. Tellez, A. Meyerhoefer, and M.N. Goltz, Photooxidation of Nitroaromatic Explosives in Aqueous Solution by Silver Doped Titanium Dioxide Thin Film in the Presence of Natural Solar Light, 2014 World Environmental & Water Resources Congress, Portland, OR, 1-5 Jun 2014.

Tellez, M., M.A. Mills, A. Agrawal, K. Dasu, W. Brashear, M.N. Goltz, S.R. Kanel, Photocatalysis of Nitroaromatic- and Perfluorinated-Compound Contaminated Water, Ninth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA, 19-22 May 2014.

McDaniel, E.B., D.S. Kim, and M.N. Goltz, Gas Phase Organophosphorus Detection via Encapsulation of Enzyme into Peptide-Nanotubes, AIChE Annual Meeting, San Francisco, CA, 3-8 Nov 2013.

BOOKS AND CHAPTERS IN BOOKS

McPherson, A.W., M.N. Goltz and A. Agrawal, Pollutant Degradation by Nanoscale Zero Valent Iron (nZVI): Role of Polyelectrolyte Stabilization and Catalytic Modification on nZVI Performance, in: R. Doong, V.K. Sharma, and H. Kim, eds., Interactions of Nanomaterials with Emerging Environmental Contaminants, Vol. 1150, ISBN13: 9780841229167, ACS Symposium Series, American Chemical Society, Washington, DC, 2013.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Goltz, M.N., Contaminated Groundwater Research: Chemical Engineering in the Subsurface, Department of Chemical, Paper, and Biomedical Engineering Seminar, Miami University, Oxford, OH, 23 Sep 2014. (Invited Talk)

GRMAILA, MICHAEL R.,

Professor and Head, Department of Systems Engineering and Management, AFIT Appointment Date: 2004 (AFIT/ENV); BS, Texas A&M University, 1993; MS, Texas A&M University, 1995; PhD, Computer Engineering, Texas A&M University, 1999. Dr. Grimaila's research interests include modeling and simulation, mission assurance, network management and security, quantum cryptography, and systems engineering. He is a member of the ACM, a Senior Member of the IEEE, a Fellow of the ISSA, and serves as an advisor to the Prince of Wales Fellows / Prince Edward Fellows at MIT and Harvard. Tel. 937-255-3636 x4800, email: Michael.Grimaila@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Communication Systems Security." Sponsor: LTS. Funding: \$105,000 - Grimaila 50%, Hodson 50%. [CCR]

REFEREED JOURNAL PUBLICATIONS

Panton, B.C., Colombi, J.M., Grimaila, M.R., and Mills, R.F., Secure DOD Software: Considerations for the Vulnerability Market, *Cross Talk, The Journal of Defense Software Engineering*, Nov/Dec 2013, pp. 18-21.

Larkin, R.D., Lopez, J., Butts, J.W., and Grimaila, M.R., Evaluation of Security Solutions in the SCADA Environment, *The DATA BASE for Advances in Information Systems*, Vol. 45, No. 1, Feb 2014, pp. 38-53.

Morris, J.D., Hodson, D.D., Grimaila, M.R., Jacques, D.R., and Baumgartner, G., Towards the Modeling and Simulation of Quantum Key Distribution Systems, *International Journal of Emerging Technology and Advanced Engineering*, Vol. 4, No. 2, Feb 2014, pp. 11-22.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Martin, M.T., Nurre, S., and Grimaila, M.R., "Modeling File-Share Server Utilization Using Stochastic Techniques," Proceedings of the 2014 International Conference on Information and Knowledge Management (IKE14), Las Vegas, NV, 21-24 Jul 2014.

Mailloux, L., Grimaila, M.R., Hodson, D., Dazzio-Cornn, E., and McLaughlin, C., "Modeling Continuous Time Optical Pulses in a Quantum Key Distribution Discrete Event Simulation," Proceedings of the 2014 International Conference on Security and Management (SAM14), Las Vegas, NV, 21-24 Jul 2014.

BOOKS AND CHAPTERS IN BOOKS

Morris, J.D., Grimaila, M.R., Hodson, D., Jacques, D., and Baumgartner, G., "A Survey of Quantum Key Distribution (QKD) Technologies," *Emerging Trends in Information System Security*, 1st Ed., Elsevier, ISBN 9780124114746, Nov 2013, pp. 141-151.

Mailloux, L.O., Grimaila, M.R., Colombi, J., Hodson, D., and Baumgartner, G., "System Security Engineering for Information Systems," *Emerging Trends in Information System Security*, 1st Ed., Elsevier, ISBN 9780124114746, Nov 2013, pp. 5-23.

Beeker, K.R., Mills, R.F., Grimaila, M.R., and Haas, M.W., "Operationally Responsive Cyberspace: A Critical Piece in the Strategic Deterrence Equation," *Thinking About Deterrence: Enduring Questions in a Time of Rising Powers, Rogue Regimes, and Terrorism*, A.B. Lowther, ed., Air Force Research Institute, Air University, Dec 2013.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Consultant to the 556th Test and Evaluation (556 TES) Squadron at Creech AFB to develop data analysis tool to improved T&E mission capability, 2011-Present.

HAAS, MICHAEL W.,

Associate Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 2013 (AFIT/ENV); BS, Wright State University, 1977; MS, University of Utah, 1985; PhD, Engineering and Applied Science, University of Southampton, England, 1996. Dr. Haas' research interests include human factors and human systems integration. He serves on numerous IEEE committees and is the founding chair of the Man & Cybernetics Society and Engineering in Medicine & Biology Society.

SPONSOR FUNDED RESEARCH PROJECTS

"AFIT Human Factors Support for RT-115 Security Engineering Research." Sponsor: OSD. Funding: \$15,000.

"Cyber Affect Laboratory Final Report." Sponsor: 711 HPW/RH. Funding: \$13,500.

BOOKS AND CHAPTERS IN BOOKS

Beeker, K.R., Mills, R.F., Grimaila, M.R., and Haas, M.W., "Operationally Responsive Cyberspace: A Critical Piece in the Strategic Deterrence Equation," *Thinking About Deterrence: Enduring Questions in a Time of Rising Powers, Rogue Regimes, and Terrorism*, A.B. Lowther, ed., Air Force Research Institute, Air University, Dec. 2013.

Haas, M.W. and Badiru, A.B., (2013) *Educating Military Engineers and Managers with a Systems Engineering Perspective at the Air Force Institute of Technology: A Blended Research and Education Approach*, In *Advances in Systems Engineering Research*, Nova Science Publishers, Inc., New York, NY, pp. 27 - 46.

HAMMOND, GREGORY D., Maj,

Assistant Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 2013 (AFIT/ENV); BS, Brigham Young University, 2002; MS, Air Force Institute of Technology, 2009; PhD, Industrial and Systems Engineering, University of Wisconsin-Madison, 2013. Maj Hammond's research interests include emergency management uncertainty and decision making, evacuation planning, engineering management, risk analysis, and civil engineering. Tel. 937-255-3636 x7101, email:

Gregory.Hammond@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Hammond, G.D. and Bier, V.M. (2013). Alternative Evacuation Strategies for Nuclear Power Accidents. American Nuclear Society's Winter Topical Meeting: Risk Management for Complex Socio-technical Systems, Washington, DC, 10-14 Nov.

HARPER, WILLIE F. Jr.,

Associate Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 2012 (AFIT/ENV); BS, Civil Engineering, University of California, Los Angeles, 1992; MENG, Environmental Engineering Cornell University, 1993; PhD, Environmental Engineering, University of California, Berkeley, 2002. Dr. Harper is interested in biotechnology for environmental applications related to water quality. Research topics include biotransformation of micro-contaminants, biosensing, microbial products, enzymatic processes, and environmental sustainability. Tel. 937-255-3636 x4528, email: Willie.Harper@afit.edu

REFEREED JOURNAL PUBLICATIONS

Rothermel, M., Landis, A.E., Barr, W., Soratana, K., Reddington, K., Weschler, M., Witter, G., Harper Jr, W.F. (2013). Coupling wastewater treatment with algae cultivation for nutrient removal and renewable resource production, *Journal of Environmental Protection*, Vol. 4, 1018-1033.

Feng, Y. and W.F. Harper, Jr. (2013). Biosensing with microbial fuel cells and artificial neural networks: Laboratory and Field Investigations. *Journal of Environmental Management*, Vol. 130, 369-374.

Harper, Jr., W.F., and Taewoo Yi. (2013). Using electronic signals and neural networks to monitor the performance of an anaerobic bioreactor. *International Journal of Water Resources and Environmental Engineering*, Vol. 5(9), 521-532.

Weschler, M.K., Barr, W.J., Harper, Jr., W.F., Landis, A.E. (2014). Process energy comparison for the production and harvesting of algal biomass as a biofuel feedstock bioresource technology, *Bioresource Technology*, Vol. 153, 108-115.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Feng, Y. and W. F. Harper Jr., Precise Water Quality Monitoring with Microbial Fuel Cells and Artificial Neural Networks, 86th Annual Water Environment Federation Technical Exposition and Conference, Chicago, IL., Oct 2013.

HEMINGER, ALAN R.,

Associate Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 1994 (AFIT/ENV); BA, Philosophy, University of Michigan, 1966; MS, Educational Psychology, California State University at Hayward, 1978; PhD, Management Information Systems, University of Arizona, 1988. Dr. Heminger's research interests include information integration, strategic information management, computer supported group problem-solving, reengineering, and long-term access to information. Tel. 937-255-3636 x7405, email: Alan.Heminger@afit.edu

REFEREED JOURNAL PUBLICATIONS

Soine, A. T., J. W. Harker, A. R. Heminger, and J. H. Scherrer, "Deployed Comm in an Austere Environment: A Delphi Study," *Air and Space Power Journal*, Nov - Dec 2013, Vol. 27 No. 6, pp. 82 - 94.

JACQUES, DAVID R.,

Associate Professor of Aerospace Engineering, Department of Systems Engineering and Management, AFIT. Appointment Date: 1999 (AFIT/ENV); BS, Mechanical Engineering, Lehigh University, 1983; MS, Aeronautical Engineering, AFIT, 1989; PhD, Aeronautical Engineering, AFIT, 1995. Dr. Jacques' research interests include development planning, architecture based evaluation, multi-objective or constrained optimal

design, and cooperative behavior and control of autonomous vehicles. Tel. 937-255-3636 x3329, email: David.Jacques@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Flexible Weapons Concept Exploration.” Sponsor: AFRL/RW. Funding: \$40,000 - Jacques 33.4%, Ryan 33.3%, Oyama 33.3%.

“Ilities Tradespace and Analysis Program.” Sponsor: OSD. Funding: \$30,000.

REFEREED JOURNAL PUBLICATIONS

Hendrix, J., Jacques, D., and Weir, J., “Continuous Decision Support,” *International Journal of Multicriteria Decision Making*, Inderscience Enterprises, Ltd., Vol.4, No.1, 2014.

Morris, J.D., D. Hodson, M. Grimaila, D. Jacques and G. Baumgartner, “Towards the Modeling and Simulation of Quantum Key Distribution Systems,” *International Journal of Emerging Technologies and Advanced Engineering*, Vol. 4, Iss. 2, Feb 2014.

BOOKS AND CHAPTERS IN BOOKS

Smith, D.E and D. Jacques, “A Practical, Simplified Chemical Agent Sensor Placement Methodology,” *Handbook of Emergency Management: A Human Factors and Systems Engineering Approach*, Taylor and Francis, 2014, pp 35-54.

Morris, J.D., M. Grimaila, D. Hodson, D. Jacques and G. Baumgartner, “A Survey of Quantum Key Distribution (QKD) Technologies,” *Emerging Trends in ICT Security*, Morgan Kaufman, 2014, pp 141-152.

LANGHALS, BRENT T., Lt Col,

Assistant Professor of Engineering Systems, Department of Systems Engineering and Management. AFIT Appointment Date: 2011 (AFIT/ENV); BS, United States Air Force Academy, 1995; MS, Air Force Institute of Technology, 2001; PhD, University of Arizona, 2011. Lt Col Langhals’ research interests include Human-Computer Interfaces, Systems Engineering, Vigilance, and Psychophysiological Cue Detection. Tel 937-255-3636 x4352, email: Brent.Langhals@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Jeroski, J., Miller, M., Langhals, B. T., Tripp, L., “Impact of Vigilance Decrement upon Physiology Measures,” Proceedings of the 2014 ISERC, Montreal, Canada, Jun 2-4, 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Langhals, B.T., Russi, J., Miller, M.E., “The Effects of Stereoscopic Radar Displays on Air Traffic Controller Effectiveness and Situational Awareness,” Proceedings of the 68th DOD Human Factors Effectiveness Conference, Aberdeen, MD, May 20-22, 2014.

PATENT APPLICATIONS

Russi, J.G., Langhals, B.T., Heft, E.L. and Miller, M.E. (2014). Stereoscopic 3D Presentation for Air Traffic Control Digital Radar Displays, Feb 2014. U.S. Serial No. 14/186,040.

MILLER, MICHAEL E.,

Assistant Professor of Systems Integration, Department of Systems Engineering and Management, AFIT Appointment Date: 2010 (AFIT/ENV); BS, Ohio University, 1987; MS, Ohio University, 1989; PhD, Industrial and Systems Engineering, Virginia Polytechnic Institute and State University, 1993. Dr. Miller’s

research interests include Human Systems Integration, Application of Human Vision to Display and Lighting Design and Systems Design for Light Emitting Diodes. Tel. 937-255-3636 x4651, email: Michael.Miller@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Enhancing Human-Systems Integration in Acquisitions: Tools to Aid Decision-making and IMPRINT Adoption.” Sponsor: 711HPW/RH. Funding: \$103,012 - Miller 34%, Rusnock 33%, Haas 33%. [ANT]

“Workload-Adaptive Human Interface to Aid Robust Decision Making.” Sponsor: AFOSR. Funding: \$55,114 - Miller 50%, Langhals 25%, Peterson 25%.

REFEREED JOURNAL PUBLICATIONS

Bindewald, J.M., Miller, M.E. and Peterson, G.L. (2014). A Function-To-Task Model for Adaptive Automation System Design. *International Journal of Human-Computer Studies*, 72, pp 822-834. DOI: 10.1016/j.ijhcs.2014.07.004.

Poisson III, R.J. and Miller, M.E. (2014). Spatial Disorientation Mishap Trends in the US Air Force 1993-2013. *Aviation, Space and Environmental Medicine*, 85(9), pp 919-924.

Ochs, K.S.; Miller, M.E.; Thal, A.E.; and Ritschel, J.D. (2014). A proposed method for analyzing infrastructure investment decisions involving rapidly evolving technology: A case study in LED streetlights, *Journal of Management in Engineering*, 30(1), pp. 41-49.

Parr, J.C., Miller, M.E., Pelletiere, J.A., and Erich, R.A. (2013). Neck Injury Criteria Formulation and Injury Risk Curves for the Ejection Environment: A Pilot Study, *Aviation, Space and Environmental Medicine*, 84(12), pp. 1240-1248.

Gilman, J.M.; Miller, M.E.; Grimaila, M.R. (2013) A simplified control system for a daylight-matched LED lamp, *Lighting Research and Technology*, 45(5), pp. 614-629. doi: 10.1177/1477153512452276.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Jeroski, J., Miller, M.E., Langhals, B. and Tripp, L. (2014). Impact of Vigilance Decrement upon Physiology Measures. Proceedings of the 2014 Industrial and Systems Engineering Research Conference, Montreal, CA, 1 Jun 2014.

Poisson III, R.J., Miller, M.E., Haas, M.W. and Williams, H.P. (2014). Evaluation of a Non-Traditional Aircraft Attitude Indicator. Proceedings of the 2014 Industrial and Systems Engineering Research Conference, Montreal, CA, 3 Jun 2014.

Tung, K.A., Miller, M.E. Colombi, J.M. and Smith, S. (2014). Eye movement in a vibrating HMD environment. Proceedings of the 2014 Industrial and Systems Engineering Research Conference, Montreal, CA, 3 Jun 2014.

Splawn, J. and Miller M.E. (2013) Prediction of perceived workload from task performance and heart rate measures, Proceedings of the Human Factors and Ergonomics Society, San Diego, CA, Oct 2013.

Uribe, D.J. and Miller, M.E. (2013) Eye movements when viewing a HMD under vibration, Proceedings of the Human Factors and Ergonomics Society, San Diego, CA, Oct 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Parr, J. C., Miller, M. E., Colombi, J. R. (2013). A Human Systems Integration Analysis of Helmet Mounted Displays. Proceedings of the 51st Annual SAFE Symposium, Creswell, OR.

BOOKS AND CHAPTERS IN BOOKS

Miller, M.E., Colombi, J.M. and Tvaryanas, A.P. (2013). Human Systems Integration, in Badiru, D. (ed)., Handbook of Industrial and Systems Engineering, Second Edition, CRC Press, Boca Raton, FL, pp 197-216.

PATENTS AWARDED

Cok, R.S., Hamer, J.W., and Miller, M.E. (Jan 2014) Digital display with integrated computing circuit. United States Patent 8,624,882.

Miller, M.E. and White, C.J. (Nov 2013). Tonescale compression for electroluminescent display, United States Patent 8,576,145.

PATENT APPLICATIONS

Russi, J.G., Langhals, B.T., Heft, E.L. and Miller, M.E. (2014). Stereoscopic 3D Presentation for Air Traffic Control Digital Radar Displays, Feb 2014. U.S. Serial No. 14/186,040.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Miller, M.E., Number 1509, Towards a Design Method for Systems Employing Adaptive Automation, Industrial and Systems Engineering Research Conference, Montreal, QC, 3 Jun 2014.

Miller, M.E., Uribe, D.J., Tung, K.A., Colombi, J. and Smith, S., Effect of Vibration on Eye, Head and Helmet Movement While Wearing an HMD, DOD Human Factors Engineering Technical Advisory Group, Aberdeen, MD, May 2014.

Miller, M.E., Bindewald, J. and Peterson, B., A Function-to-Task Process Model for Adaptive Automation System Design, DOD Human Factors Engineering Technical Advisory Group, Aberdeen, MD, May 2014.

Miller, M.E., Peterson, G., Rusnock, C., and Borghetti, B. (Dec, 2013) AFIT Adaptive Automation Research Portfolio, AHEAD Poster Session, Dayton, OH.

Miller, M.E., Peterson, G., Langhals, B. and Bindewald, J. (2014) Workload-Adaptive Human Interface to Aid Robust Decision Making in Human-System Interface: Year 1 Report, Interim Report, DTIC Accession Number: ADA601227. <http://www.dtic.mil/docs/citations/ADA601227>.

OYAMA, KYLE, F., Lt Col,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 2013 (AFIT/ENV); BS, Northwestern University, 1998; MS, Air Force Institute of Technology, 2010; PhD, Systems Engineering, University of Virginia, 2013. Lt Col Oyama's research interests include New Product Development, Decision Analysis, Risk Analysis, Complex Adaptive Systems, and studying how organizations make decisions. Tel. 937-255-3636 x4352, email: Kyle.Oyama@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Sutherland, J., Colombi, J., Wirthlin, J.R., Oyama, K. & J. Vandeweile. Analyzing DT&E Flight Test Missions. Society of Flight Test Engineers, 45th Annual Int'l Symposium, Dayton, OH, 19-21 Aug 2014.

RACZ, LEEANN, Lt Col,

Assistant Professor of Environmental Science and Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 2010 (AFIT/ENV); BS, Environmental Engineering, California Polytechnic State University, 1996; MS, Biological and Agricultural Engineering, University of Idaho, 2004; PhD, Civil and Environmental Engineering, University of Utah, 2010. Lt Col Racz specializes in wastewater

treatment of pollutants of emerging concern, the fate of chemical warfare agents in the environment, nitrifying mixed cultures, and environmental microbiology analyses.

SPONSOR FUNDED RESEARCH PROJECTS

“Hyperspectral Imagery for Large Area Survey of Organophosphate Pesticides.” Sponsor: EPA. Funding: \$98,609 - Racz 25%, Harper 25%, Perram 25%, Gross 25%.

“Ultraviolet Light Emitting Diode Use in Advanced Oxidation Water Treatment.” Sponsor: EPA. Funding: \$26,215 - Racz 25%, Harper 25%, Miller 25%. Grimaila 25%.

“Water Infrastructure Contamination Study.” Sponsor: EPA. Funding: \$68,900 - Racz 50%, Harper 50%.

REFEREED JOURNAL PUBLICATIONS

Delorit, J.D. and Racz, L. Evaluation of activated sludge for biodegradation of propylene glycol as an aircraft deicing fluid, *Water Environment Research*, 86(4):366-371, 2014.

Janeczko, A.K., Walters, E.B., Schuldt, S.J., Magnuson, M.L., Willison, S.W., Brown, L.M., Ruiz, O.N., Felker, D.L., and Racz, L. Fate of malathion and a phosphonic acid in activated sludge with varying solids retention times, *Water Research*, 57:127-139, 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Magnuson, M., Minamyer, S., Clark, S., Hall, J., Szabo, J., Vekhter, E.P., Pildus, I.E., Demenkova, E.A., James, R., Hanft, E., Racz, L., Miller, M., Grimaila, M., Tran, T., Duckworth, K., Spencer, M., Richwine, J., Bates, C., Selected On-going Homeland Security Water and Wastewater Decontamination Research Projects, 2013 EPA International Decontamination Research and Development Conference, Research Triangle Park, NC, 5-7 Nov 2013.

Racz, L., Miller, M., Grimaila, M., Magnuson, M., Willison, S., Tran, T., Duckworth, K., Spencer, M., Richwine, J., Ultraviolet Light Emitting Diode Use in Water Disinfection, 2013 Pilot Research Project Symposium, Cincinnati, OH, 10-11 Oct 2013.

RITSCHEL, JONATHAN D., Lt Col,

Assistant Professor of Cost Analysis, Department of Systems Engineering and Management, AFIT
Appointment Date: 2011 (AFIT/ENV); BBA, Accountancy, University of Notre Dame, 1997; MS, Cost Analysis, Air Force Institute of Technology, Wright-Patterson AFB, OH, 2003; PhD, Economics, George Mason University, VA, 2011. Lt Col Ritschel’s research interests include public choice, the effects of acquisition reforms on cost growth in DOD weapon systems, research and development cost estimation, and economic institutional analysis. Tel. 937-255-3636 x4441, email: Jonathan.Ritschel@afit.edu

REFEREED JOURNAL PUBLICATIONS

Mitchell, T.D., White, E.D. and Ritschel, J.D. (2014) “Investigating the Correlation of the U.S. Air Force Physical Fitness Test to Combat-Based Fitness: A Women-Only Study,” *Military Medicine* 179 (6), 653-658.

Crumrine, K.T., Ritschel, J.D., and White, E.D. (2014). “Earned Schedule 10 Years Later: Analyzing Military Programs,” *Crosstalk: The Journal of Defense Software Engineering*, Mar/Apr, 30-33.

Jones, G.L., White, E.D., Ryan, E.T., and Ritschel, J.D. (2014). “Investigation into the Ratio of Operating and Support Costs to Life-Cycle Costs for DOD Weapon Systems,” *Defense Acquisition Review Journal*, 21(1), 442-464.

Ochs, K.S., Miller, M.E., Thal, A.E., and Ritschel, J.D. (2014) "Proposed Method for Analyzing Infrastructure Investment Decisions Involving Rapidly Evolving Technology: Case Study in LED Streetlights," *Journal of Management in Engineering*, 30(1), 41-49.

Ritschel, J.D. (2013). "Impact of Political-Economy Variables on Cost Growth in Military Weapon System Contracts," *Journal of Public Procurement*, 13 (4), 516-538.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Petter, J.L., Ritschel, J.D., and White, E.D. "xPI Stability: Analyzing DOD Contracts," 30th annual EVM World Conference, San Antonio, TX, 21-23 May 2014.

RUSNOCK, CHRISTINA, F., Capt,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 2013 (AFIT/ENV); BA, Economics-Government, Claremont McKenna College, 2004; MS, Research and Development Management, Air Force Institute of Technology, 2008; MS, Industrial Engineering-Systems Engineering, University of Central Florida, 2011; PhD, Industrial Engineering-Human Factors, University of Central Florida, 2013. Capt Rusnock's research interests include cognitive workload modeling, human performance modeling, human-systems integration, and discrete event simulation. Tel. 937-255-3636 x4611, email: Christina.Rusnock@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Hybrid Cognitive Modeling Simulation Using ACT-R and IMPRINT." Sponsor: NSF. Funding: \$5,000.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Rusnock, C.F. & Geiger C.D. (2014). Simulation-based Assessment of Performance-Workload Tradeoffs for System Design Evaluation. *Proceedings of the 2014 Institute of Industrial Engineers (IIE) Industrial & Systems Engineering Research Conference (CD-ROM)*, Montreal, Canada, 31 May - 3 Jun 2014.

Rusnock, C.F. & Geiger C.D. (2013). The Impact of Adaptive Automation Invoking Thresholds on Cognitive Workload and Situational Awareness. *Proceedings of the 2013 Human Factors and Ergonomics Society Annual Meeting*, San Diego, CA, Oct 2013.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Bates, L., McQuaid, I., Borghetti, B., Rusnock, C.F. (2014) Predicting Operator Workload Using a Combined Modeling Approach. Air Force Research Laboratories – Air Force Institute of Technology Colloquium on Human Machine Systems 2.0, Wright-Patterson AFB, OH, 30 Sep 2014.

Bowden, J., Rusnock, C.F. (2014) Effects of Display Design on Process Control Operations. Air Force Research Laboratories – Air Force Institute of Technology Colloquium on Human Machine Systems 2.0, Wright-Patterson AFB, OH, 30 Sep 2014.

Rusnock, C.F., "The Improved Performance Research Integration Tool (IMPRINT): Using Discrete-Event Simulation to Model Cognitive Workload," Invited Speaker by the Industrial and Systems Engineering Department, Texas A&M University, College Station, TX, 15 Sep 2014.

Rusnock, C.F., "Validating Workload in IMPRINT Operations Models," Invited Speaker by the Human Research Engineering Directorate, Army Research Laboratory, Aberdeen Proving Ground, MD, 20 Aug 2014.

Miller, M.E., Peterson, G.L., Rusnock, C.F., and Borghetti, B.J., "AFIT Adaptive Automation Research Portfolio," Ahead Autonomy Research Showcase, 10 Dec 2013, Dayton, OH.

Rusnock, C.F., "Modeling Cognitive Workload Using the Improved Performance Research Integration Tool (IMPRINT)," Invited Speaker by the Cognitive Models and Agents Branch, 711th Human Performance Wing, Air Force Research Laboratory, Wright-Patterson AFB, OH, 16 Oct 2013.

Rusnock, C.F., "Validating Cognitive Workload Simulation Models Using Human Performance Data," Invited Speaker by the Applied Neurosciences Lab, 711th Human Performance Wing, Air Force Research Laboratory, Wright-Patterson AFB, OH, 16 Oct 2013.

Bates, L., Rusnock, C. (2014). "Using Discrete-Event Simulation to Predict Workload and Performance in Unmanned Vehicle Operations," Air Force Research Laboratory – Air Force Institute of Technology Colloquium on Human Machine Systems 2.0, Wright-Patterson AFB, OH, 30 Sep 2014.

Corpuz, M., Rusnock, C. (2014). "Using Discrete-Event Simulation to Evaluate the Effects of Flight Medicine Clinic Staffing Levels on Patient Wait Time." Air Force Research Laboratory – Air Force Institute of Technology Colloquium on Human Machine Systems 2.0, Wright-Patterson AFB, OH, 30 Sep 2014.

Katrein, S., Rusnock, C. (2014). "Using Discrete-Event Simulation to Determine the Effects of Automation Types and Levels on Remotely Piloted Aircraft Tasks." Air Force Research Laboratory – Air Force Institute of Technology Colloquium on Human Machine Systems 2.0, Wright-Patterson AFB, OH, 30 Sep 2014.

VanHoose, T., Rusnock, C. (2014). "Enhancing Department of Defense Human Performance Models through Improving Probability Distributions," Air Force Research Laboratory – Air Force Institute of Technology Colloquium on Human Machine Systems 2.0, Wright-Patterson AFB, OH, 30 Sep 2014.

Wade, D., Rusnock, C. (2014). "Utilizing Cluster Analysis to Generate Healthcare Patient Profiles." Air Force Research Laboratory – Air Force Institute of Technology Colloquium on Human Machine Systems 2.0, Wright-Patterson AFB, OH, 30 Sep 2014.

Bates, L., Rusnock, C. (2014). "Using Discrete-Event Simulation to Predict Workload and Performance in Unmanned Vehicle Operations," Southwestern Ohio Council for Higher Education (SOCHE) Air Force Institute of Technology Summer Intern Poster Session, Wright-Patterson AFB, OH, 30 Jul 2014.
Recognition: Poster of Excellence Award.

VanHoose, T., Rusnock, C. (2014). "Enhancing Department of Defense Human Performance Models through Improving Probability Distributions," Southwestern Ohio Council for Higher Education (SOCHE) Air Force Institute of Technology Summer Intern Poster Session, Wright-Patterson AFB, OH, 30 Jul 2014.

Boubin, J., Rusnock, C. (2014). "Modeling Cognitive Workload and Fatigue for Defensive Cyber Security Operations," Southwestern Ohio Council for Higher Education (SOCHE) Air Force Institute of Technology Summer Intern Poster Session, Wright-Patterson AFB, OH, 30 Jul 2014.

RYAN, ERIN T., Lt Col,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT
Appointment Date: 2012 (AFIT/ENV); BS, University of Washington, 1998; MA, New Mexico State University, 2008; PhD, Systems Engineering, Air Force Institute of Technology, 2012. Lt Col Ryan's research interests include cost estimating methodologies and cost-based decision tools for valuing system design options.. Tel. 937-255-3636 x3348, email: Erin.Ryan@afit.edu

REFEREED JOURNAL PUBLICATIONS

Jones, G., White, E., Ryan, E., & Ritschel, J. (2014). "Investigation into the Ratio of Operating and Support Costs to Life-Cycle Costs for DOD Weapon Systems." *Defense Acquisition Research Journal*, 21(1): 441-462.

SHELLEY, MICHAEL L.,

Professor of Environmental Science and Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 1996 (AFIT/ENV); BCE (Civil Engineering), Auburn University, 1974; MS (Environmental Engineering), Virginia Tech, 1975; PhD, Environmental Science and Engineering, University of North Carolina, 1985. Dr. Shelley focuses on system dynamics modeling in analyzing long-term management strategies. His research interests include abiotic and biochemical contaminant fate and transport, physiologically-based pharmacokinetic modeling, and ecological engineering design to optimize mission activity with environmental constraints. Tel. 937-255-3636 x7387, email: Michael.Shelley@afit.edu

REFEREED JOURNAL PUBLICATIONS

G.C. Struckhoff, K. Qin, A. Agrawal, and M.L. Shelley. Natural Attenuation Potential of Trichloroethene in Wetland Plant Roots: Role of Native Ammonium-Oxidizing Microorganisms. *Chemosphere*, 2014.

BOOKS AND CHAPTERS IN BOOKS

Gregory G. Seaman, Michael L. Shelley, Jeffrey M. Gearhart, and David A. Smith, *Dynamics and dangers of therapeutic strategies for organophosphate poisoning: A physiologically based model*, chapter 16 in *Handbook of Emergency Response* (p387-409), Adedeji Badiru and Leeann Racz, eds., CRC Press, Taylor and Francis Group, ISBN: 13:978-1-4665-1456-0, 2014.

PATENTS AWARDED

Michael L. Shelley (Air Force Institute of Technology), "Upward Flow Constructed Wetland for Treatment of Water Contaminated with Chlorinated Aliphatics", U. S. Patent No. 8,894,849, issue date 25 Nov 14; Other participants: Dr Abinash Agrawal (Wright State University) and Dr James Amon (Wright State University).

THAL, ALFRED E., Jr.,

Assistant Professor of Engineering Management, Department of Systems Engineering and Management, AFIT Appointment Date: 1998 (AFIT/ENV); BS, Civil Engineering, Texas Tech University, 1981; MS, Engineering Management, AFIT, 1985; PhD, Environmental Engineering, University of Oklahoma, 1999. Dr. Thal's research interests include engineering and environmental management, groundwater flow and remediation technologies, facility and infrastructure management, product development, sustainability and project management. Tel. 937-255-3636 x7401, email: Al.Thal@afit.edu

REFEREED JOURNAL PUBLICATIONS

Griffin, J.S., A.E. Thal, Jr., and S.E. Leach, "Enhancing Asset Management Through a Better Understanding of Energy Consumption," *International Journal of Strategic Property Management*, 18(3):253-264, 2014.

Blomberg, D.L., P. Cotelleso, W.E. Sitzabee, A.E. Thal, Jr., "Discovery of Internal and External Factors Causing Military Construction Cost Premiums," *Journal of Construction Engineering and Management*, 140(3), 04013060, pp. 1-9, Mar 2014. [http://dx.doi.org/10.1061/\(ASCE\)CO.1943-7862.0000810](http://dx.doi.org/10.1061/(ASCE)CO.1943-7862.0000810).

Ochs, K.S., M.E. Miller, A.E. Thal, Jr., and J.D. Ritschel, "Proposed Method for Analyzing Infrastructure Investment Decisions Involving Rapidly Evolving Technology: A Case Study in LED Streetlights," *Journal of Management in Engineering*, 30(1):41-49, Jan 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Pack, A.J., and A.E. Thal, Jr., "Barriers to Project Risk Management: An Investigative Framework," Western Decision Sciences Institute Annual Meeting, Napa, CA, 1-4 Apr 2014.

VALENCIA, VHANCE V., Maj,

Assistant Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 2013 (AFIT/ENV); BS, Mechanical Engineering, San Diego State University, 2001; MS Engineering Management, Air Force Institute of Technology, 2007; PhD, Systems Engineering, Air Force Institute of Technology, 2013. Maj Valencia's primary interest is in infrastructure asset management and systems engineering as applied to infrastructure. Research topics include civil engineering applications for additive manufacturing technologies, autonomous systems for assessing infrastructure, and infrastructure applications for geographic information systems. Tel. 937-255-3636 x4826, email: Vhance.Valencia@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Civil Engineering Applications for Direct Digital Manufacturing.” Sponsor: AFCEC. Funding: \$32,460 - Valencia 50%, Oyama 25%, Freels 25%.

YAMAMOTO, DIRK P., Lt Col,

Assistant Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 2010 (AFIT/ENV); BS, Electrical Engineering, University of Minnesota, 1992; MS, Engineering Systems Management, St Mary's University, 1995; MS, Public Health (Industrial Hygiene emphasis), University of Utah, 2003; PhD, Systems Engineering, Air Force Institute of Technology, 2010. Lt Col Yamamoto's research interests include deployed military waste/burn pit emissions and pharmacokinetic modeling of nanoparticle exposures. Other research interests include bioaerosol sampling, advanced composite material exposure assessment, and geospatial/plume dispersion modeling. Tel: 937-255-3636 x4511, email: Dirk.Yamamoto@afit.edu

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Yamamoto, D., “Emissions in the Deployed Military Environment.” *2014 AF Research Laboratory Waste-to-Energy Workshop*, Wright-Patterson AFB, OH, 6 May 2014.

Heline, T., Yamamoto, D., Felker, D., Racz, L., Rubenstein, M., “Field Evaluation of Solvent-Free Sampling with Di-N-Butylamine for the Determination of Airborne Monomeric and Polymeric 1,6-Hexamethylene Diisocyanate.” *AIHce 2014*, Jun 2014. (poster)

6. RESEARCH CENTER PUBLICATIONS AND FUNDING INFORMATION

The contents of this section are duplicated data, grouped by center. The information is previously listed within each project's specific academic department.

6.1. AUTONOMY AND NAVIGATION TECHNOLOGY CENTER

Autonomy and Navigation Technology (ANT) Center

Director 255-3636 x4580

Executive Administrator 255-3636 x4583

Laboratory Manager 255-3636 x4911

Homepage: <http://www.afit.edu/ANT>

6.1.1. DOCTORAL DISSERTATIONS

BREWER, JAMES J., *The Differential Vector Phase-Locked Loop for Global Navigation Satellite System Signal Tracking*. AFIT/ENG/DS/14J-02. Faculty Advisor: Dr. John F. Raquet. Sponsor: 746 TS.

BROUSSARD, COREY M., *Multistatic Initial Orbit Determination Techniques Using Wideband Receivers*. AFIT/ENY/DS/14M-01. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV.

DOYLE, DANIEL D., *Real-Time, Multiple, Pan/Tilt/Zoom, Computer Vision Tracking, and 3D Position Estimating System for Small Unmanned Aircraft System Metrology*. AFIT/ENY/DS/13D-08. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFOSR.

LEIGH, ABRAHAM M., *Navigation Solution for a Multiple Satellite and Multiple Ground Architecture*. AFIT/ENY/DS/14S-01. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV.

LINDHOLM, GARRISON J., *Closed-Loop Control of Constrained Flapping Wing Micro Air Vehicles*. AFIT/ENY/DS/14M-02. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RW.

6.1.2. MASTER'S THESES

ABRAHAM, AMY M., *Combining Image Processing with Signal Processing to Improve Transmitter Geolocation Estimation*. AFIT/ENG/14M-01. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A.

ALKHALDI, HUMOOD, *Integration of a Star Tracker and Inertial Sensors Using an Attitude Update*. AFIT/ENG/T/14S-16. Faculty Advisor: Dr. John F. Raquet. Sponsor: N/A.

BARHORST, JASON M., *GPS Multipath Reduction with Correlator Beamforming*. AFIT/ENG/14M-10. Faculty Advisor: Dr. John F. Raquet. Sponsor: Locata.

CRUZ, JESSE B., *Comparison of Image Processing Techniques Using Random Noise Radar*. AFIT/ENG/14M-22. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RV.

DANELLA, THEA S., *Identifying High-Traffic Patterns in the Workplace with Radio Tomographic Imaging in 3D Wireless Sensor Networks*. AFIT/ENG/14M-24. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFOSR.

HIGBEE, JEREMY M., *A Quantification of the 3D Modeling Capabilities of the KinectFusion Algorithm*. AFIT/ENG/14M-40. Faculty Advisor: Maj Brian G. Woolley. Sponsor: N/A.

LEVENE, DAVID L., *An Embedded, Programmable GPS Injection Jammer for Aircraft Testing and Aircrew Training*. AFIT/ENG/14M-89. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RV.

LIVERMORE, RILEY A., *Optimal UAV Path Planning for Tracking a Moving Ground Vehicle with a Gimbaled Camera*. AFIT/ENY/14M-33. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RQ.

PNG, JASON, *Simulation Platform for Vision Aided Inertial Navigation*. AFIT/ENV/T/14S-14. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RW.

SMALL, ANDREW J., *Radio Frequency Emitter Geolocation Using Cubesats*. AFIT/ENG/14M-68. Faculty Advisor: Maj Marshall E. Haker. Sponsor: AFRL/RV.

SOEDER, JUSTIN T., *Image-Aided Navigation Using Cooperative Binocular Stereopsis*. AFIT/ENG/14M-70. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RW.

TUMA, ALLAN D., *Automated Driftmeter Fused with Inertial Navigation*. AFIT/ENG/14M-79. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/RV.

VINCIE, MATTHEW J., *Airborne Wireless Communication Modeling and Analysis with MATLAB*. AFIT/ENG/14M-80. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RV.

WILLIS, KARA M., *Signal Processing in Cold Atom Interferometry-Based INS*. AFIT/ENG/14M-84. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/RV.

ZEQOLLARI, ANGELA J., *Ultra Wideband Radio Frequency Fingerprinting*. AFIT/ENG/14M-87. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RV.

6.1.3. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BORGHETTI, BRETT J., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“Game-Theoretic Analysis & Recommendations for Pursuer's Deception in Pursuer-Evader Asym Info Scenarios.” Sponsor: N/A. Funding: \$99,346 - Borghetti 34%, Pachter 30%, Lamont 12%, Peterson 12%, Hopkinson 12%.

“HUMAN Lab Study #1 Analysis and Development of Cyber Operations Multi Attribute Task Battery.” Sponsor: 711 HPW/RH. Funding: \$59,443 - Borghetti 50%, Rusnock 50%.

COBB, RICHARD G., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

“Automatic Airborne Collision Avoidance System for Remotely Piloted Aircraft.” Sponsor: AFRL/RQ. Funding: \$25,000.

“Collaborative Control for Multi-UAV Operations.” Sponsor: AFRL/RQ. Funding: \$10,000 - Cobb 25%, Jacques 25%, Colombi 25%, Pachter 25%.

REFEREED JOURNAL PUBLICATIONS

Ross, S. M., Cobb, R. G., Baker, W. P., and Harmon F., “Implementation lessons and pitfalls for real-time optimal control with stochastic systems,” *Optimal Control Applications and Methods*, Published online on 27 Feb 2014, DOI: 10.1002/oca.2110.

Lindholm, G. J. and Cobb, R. G., "Closed-Loop Control of a Constrained, Resonant-Flapping Micro Air Vehicle," *AIAA Journal*, Vol. 52, No. 8, pp. 1616-1623, Aug 2014, DOI: 10.2514/1.J052641.

Ross, S. M., Cobb, R. G. and Baker, W. P., "Stochastic Real-Time Optimal Control for Bearing-only Trajectory Planning," *International Journal of Micro Air Vehicles*, Vol. 6, No. 1, Mar 2014, DOI: 10.1260/1756-8293.6.1.1.

Anderson, M. and Cobb, R., "Implementation and Evaluation of a Flapping Wing Control Technique for Micro Air Vehicles," *AIAA Journal of Guidance, Control and Dynamics*, Vol. 37, No.1, pp. 290-300, Jan 2014, DOI:10.2514/1.57855.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Smith, N. E., Cobb, R., Pierce, S., and Raska, V., "Optimal Collision Avoidance Trajectories via Direct Orthogonal Collocation for Unmanned/Remotely Piloted Aircraft Sense and Avoid Operations," AIAA-2014-0966, AIAA Guidance, Navigation, and Control Conference, National Harbor, MD, 13-17 Jan 2014.

Jodeh, N. M., Coon, T., Masternak, T. J., Cobb, R. G., and Agte, J. S., "Optimal Airborne Trajectories for Data Collected from Emplaced Ground Sensor Arrays," AIAA-2014-1291, AIAA Guidance, Navigation, and Control Conference, National Harbor, MD, 13-17 Jan 2014.

COLLINS, PETER J., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Unmanned Air Vehicle (UAV) and Payload Systems Technology (UPST)." Sponsor: AFMC. Funding: \$17,200 - Collins 37%, Woolley 22%, Jacques 21%, Polanka 20%.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Wilson, R. and Collins, P., "Noise Radar as an Indoor Navigation Aide," The 35th Antenna Measurement Techniques Association Symposium, Columbus, OH, 6-11 Oct 2013.

Hardin, J. and Collins, P., "An Exploration of a Multi-function Waveform for Simultaneous RF Communications and Ranging," The 35th Antenna Measurement Techniques Association Symposium, Columbus, OH, 6-11 Oct 2013.

DELUCA, ANTHONY M., Lt Col, Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"Development of Autonomous Functional Defeat Technologies for use against Hard and Deeply Buried Targets." Sponsor: AFRL/RW. Funding: \$50,000 - DeLuca 50%, Reeder 25%, Cobb 25%.

HAKER, MARSHALL E., Maj, Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"GNSS-Based Positioning Accuracy." Sponsor: N/A. Funding: \$35,970 - Haker 40%, Swenson 40%, Jennings 20%.

"GNSS Timing Testbed." Sponsor: N/A. Funding: \$54,000 - Haker 70%, Raquet 30%.

"Integrated Authentication and Geolocation of GPS and Accompanying Interference Sources." Sponsor: AFRL/RV. Funding: \$18,480.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Honaker, H. and Haker, M., "Evaluating the Navigation Potential of a Navigation Warfare Emission," Proc Joint Navigation Conference, Orlando, FL, 19 Jun 2014.

Carroll, K. and Haker, M., "Authenticating Received Global Positioning System Signals Using Transmitted Physical Layer Attributes," Proc Joint Navigation Conference, Orlando, FL, 19 Jun 2014.

HODSON, DOUGLAS D., Department of Electrical and Computer Engineering

REFEREED JOURNAL PUBLICATIONS

Hasse, C.L., Hill, R.R., and Hodson, D.D., "Planning for LVC Simulation Experiments," Applied Mathematics, Vol. 5, No. 14, pp. 2143-2167, Jul 2014.

Hodson, D.D., and Hill, R.R., "The Art and Science of Live, Virtual and Constructive Simulation for Test and Analysis," Journal of Defense Modeling and Simulation, Vol. 11, No 2, pp. 77-89, Apr 2014 (Special Issue).

Hodson, D.D., Esken, B.L., Gutman, A.J. and Hill, R.R., "Quantifying Radar Measurement Errors in a Live-Virtual-Constructive Environment to Determine System Viability: A Case Study," Journal of Defense Modeling and Simulation, Vol. 11, No 2, pp. 115-124, Apr 2014 (Special Issue).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Hodson, D.D., Ziegler, J., Kamrud, A., Roberson, D., "Unified Behavior Framework (UBF) Implementation in Unity, AFSIM and Open Eagles," SimTIM (Simulation Technical Interchange Meeting), Jun 2014.

Millar, J.R., Hodson, D.D., Lamont, G.B., and Peterson, G.L., "Multi-Objective Optimization of Dead-Reckoning Error Thresholds for Virtual Environments," International Conference on Collaborative Technologies and Systems (CTS), May 2014.

JENNINGS, ALAN L., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"Cloud-Induced Uncertainty for Visual Navigation." Sponsor: DAGSI. Funding: \$12,614.

REFEREED JOURNAL PUBLICATIONS

D.D. Doyle, A.L. Jennings, J.T. Black, "Optical Flow Background Estimation for Real-Time Pan/Tilt Camera Object Tracking," Measurement, Elsevier, Vol. 48, Feb 2014, pp. 195-207, DOI: 10.1016/j.measurement.2013.10.025.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Alyssa Gutierrez, A.L. Jennings, "Cloud-Induced Uncertainty for Visual Navigation: Development of Cloud Templates," IEEE National Aerospace Electronics Conference (NAECON), 25 Jun 2014.

KAUFFMAN, KYLE J., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Hybrid Sensor Fusion for Autonomous Applications." Sponsor: AFOSR. Funding: \$39,325 - Kauffman 75%, Pachter 25%.

“UAV Vision-Aided Navigation (UVAN) Demo.” Sponsor: AFRL/RV. Funding: \$285,000 - Kauffman 50%, Raquet 30%, Haker 10%, Woolley 10%.

REFEREED JOURNAL PUBLICATIONS

Kauffman, K., Raquet J., Morton, Y., and Garmatyuk, D., “Real-time UWB-OFDM radar based navigation in unknown terrain,” IEEE Trans. Aero. & Elec. Sys., Jul 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kauffman, K., and Raquet, J., “Navigation via H-field Signature Map Correlation and INS Integration,” Proc. IEEE Radar Conf., Cincinnati, OH, May 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Kauffman, K., Marietta, D., Canciani A., and Smearcheck, M., “High-performance Plug-and-play Bayesian Estimation Software Suite for Navigation,” Proc. ION Joint Navigation Conference, Orlando, FL, Jun 2014, FOUO-release only.

MARTIN, RICHARD K., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“Information Integrity for Autonomous Systems.” Sponsor: AFRL/RQ. Funding: \$45,000 - Martin, R. 90%, Raquet 10%.

“Joint SIGINT-IMINT Position Tracking.” Sponsor: N/A. Funding: \$26,895 - Martin, R. 80%, Sambora 20%.

“Programming Support for Radio Tomography Network.” Sponsor: AFOSR. Funding: \$8,500.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Hartzell, S., Haker, M., Martin, R.K., Taylor, C., and Terzuoli, A., “AOA Geolocation for Fast-Movers using Nonlinear Optimization,” Proc. International Geoscience and Remote Sensing Symposium (IGARSS), Quebec City, Canada, Jul 2014, 4 pages.

MILLER, MICHAEL E., Department of Systems Engineering and Management

SPONSOR FUNDED RESEARCH PROJECTS

“Enhancing Human-Systems Integration in Acquisitions: Tools to Aid Decision-making and IMPRINT Adoption.” Sponsor: 711HPW/RH. Funding: \$103,012 - Miller 34%, Rusnock 33%, Haas 33%.

PACHTER, MEIR, Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“Autonomous Control and Navigation.” Sponsor: AFRL/RQ. Funding: \$20,000.

“Control & Estimation in the Presence of Adversarial Action and Uncertainty.” Sponsor: AFOSR. Funding: \$52,565.

“Decision Support Technologies.” Sponsor: AFRL/RV. Funding: \$10,000.

REFEREED JOURNAL PUBLICATIONS

Krishnamoorthy, K., Park, M., Dharba, S., Pachter, M., Chandler, P., and Casbeer, D., "A Lower Bounding Algorithm for the Perimeter Patrol Optimization Problem," AIAA J. of Guidance, Control and Dynamics, Vol. 37, No. 2, Mar-Apr 2014, pp. 558-565.

Pachter, M., Welker, T., and Huffman, R., "Gyro-Free INS Theory," NAVIGATION, Journal of the Institute of Navigation, Vol. 60, No. 2, Summer 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kalayanam, K., Pachter, M., and Chandler, P., "Optimal Cooperative Pursuit on a Manhattan Grid," AIAA Guidance, Navigation and Control (GNC) Conference, 19-22 Aug 2013, Boston, MA.

Quarmyne, J., and Pachter, M., "Inertial Navigation System Aiding Using Vision," paper WeA03, pp. 85-90, American Control Conference, 4-6 Jun 2014 Portland, OR.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Willis, K., and Pachter, M., "Signal Processing in Col Atom Interferometry – Based INS," ION Joint Navigation Conference, 16-19 Jun 2014, Orlando, FL.

BOOKS AND CHAPTERS IN BOOKS

Pachter, M., and Pham K., "Static Teams and Stochastic Games," in Dynamics of Information Systems – Algorithmic Approaches, P.M. Pardalos, V. Boginski, C. Commander and Y. Ye, Eds., Springer 2013, pp. 147-176.

Pham, K., and Pachter, M., "A Risk-Averse Game-Theoretic Approach to Distributed Control," in Dynamics of Information Systems – Algorithmic Approaches, P.M. Pardalos, V. Boginski, C. Commander and Y. Ye, Eds., Springer 2013, pp. 121-146.

PETERSON, GILBERT L., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"AFIT Support for AFRL Navigation Estimation Optimization (NEO) Program." Sponsor: AFRL/R.Y. Funding: \$122,426 - Peterson 80%, Raquet 20%.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Miller, J.R., Hodson, D.D., Lamont, G.B., and Peterson, G.L., "Multi-Objective Optimization of Dead-Reckoning Error Thresholds for Virtual Environments," International Conference on Collaborative Technologies and Systems (CTS), 2014.

POLANKA, MARC D., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"Unmanned Air Vehicle (UAV) and Payload Systems Technology (UPST)." Sponsor: AFMC. Funding: \$10,000 - Woolley 22%, Polanka 20%, Collins 37%, Jacques 21%.

RAQUET, JOHN F., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“ANT Center and Laboratory Support per Attachment 6 of the MOA between AFIT and AFRL.” Sponsor: AFRL/RW. Funding: \$50,000 - Raquet 50%, Haker 50%.

“Autonomous System Testbed Development.” Sponsor: AFRL/RW. Funding: \$85,160.

“GPS/Inertial/Vision Integrated Navigation System (GIVINS) Development.” Sponsor: AFRL/RW. Funding: \$265,000 - Raquet 50%, Woolley 25%, Jacques 25%.

“GNSS Testbed Development.” Sponsor: AFRL/RW. Funding: \$665,000 - Raquet 50%, Haker 50%.

“Navigation Modeling Tools for the Joint Air-to-Surface Missile (JASSM) Program.” Sponsor: AFLCMC. Funding: \$50,000.

“Project Management Support for Autonomous Aerial Vehicle Competition.” Sponsor: AFRL/RW. Funding: \$5,000.

“Support for Adaptable Navigation Systems Program.” Sponsor: DARPA. Funding: \$470,000 - Raquet 25%, Kauffman 50%, Collins 15%, Jackson 10%.

“Support for All-Source Positioning and Navigation (ASPN) Program Phase II.” Sponsor: DARPA. Funding: \$22,000 - Raquet 60%, Fisher 30%, Peterson 10%.

“Ultra-High Accuracy Reference System (UHARS) Support.” Sponsor: 746 TS. Funding: \$150,000 - Raquet 90%, Fisher 10%.

REFEREED JOURNAL PUBLICATIONS

Kauffman, K., Raquet, J., Morton, Y., and Garmatyuk, D., “Real-Time UWB-OFDM Radar-Based Navigation in Unknown Terrain,” IEEE Trans. Aerospace and Electronic Systems, Vol. 49, No. 3, pp. 1453-1466, Jul 2013.

Raquet, J., “What’s Next for Practical Ubiquitous Navigation?,” Inside GNSS (trade magazine), Vol. 8, No. 5, pp. 61-69, Sep/Oct 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Xie, J., Yan, W., Namuduri, K., Fu, S., Peterson, G., and Raquet, J., “Estimation and Validation of the 3D Smooth-Turn Mobility Model for Airborne Networks,” IEEE MILCOMM, San Diego, CA, 18-20 Nov 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Alix, D., Walli, K., and Raquet, J., “Error Characterization of Flight Trajectories Reconstructed Using Structure from Motion,” IEEE AIPR (Applied Imagery Pattern Recognition Workshop), Washington, DC, 23-25 Oct 2013.

Hebert, J., Levene, D., Raquet, J., Deike, W., and Drescher, D., “Simulated Programmable Aircraft-Embedded Jammer (SPACE JAM),” ION Joint Navigation Conference, Orlando, FL, 16-19 Jun 2014.

Venable, D., Kauffman, K., Campbell, J., Raquet, J., Kresge, J., Smearcheck, M., Pestak, T., and Marietta, D. “Unmanned Aerial System Vision Aided Navigation (UVAN) Rapid Reaction Effort,” ION Joint Navigation Conference, Orlando, FL, 16-19 Jun 2014.

Pierce, S., and Raquet, J., "Star Tracker Integration with Navigation Systems," ION Joint Navigation Conference, Orlando, FL, 16-19 Jun 2014.

Smearcheck, M., Marietta, D., and Raquet, J., "Expandable Flight Reference Data Processing Software," ION Joint Navigation Conference, Orlando, FL, 16-19 Jun 2014.

PATENTS

Morrison, J., Raquet, J., and Veth, M., "Coded Aperture Aided Navigation and Geolocation System," US Patent No. 8,577,538, Issued 5 Nov 2013.

REEDER, MARK F., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"'Flight Testing' in the AFIT Low Speed Wind Tunnel." Sponsor: AFRL/RW. Funding: \$60,000 - Reeder 50%, Cobb 50%.

TERZUOLI, ANDREW J., Jr., Department of Electrical and Computer Engineering

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Hartzell, S., Haker, M., Martin, R., Taylor, C., and Terzuoli, A., "AOA Geolocation for Fast-Movers using Nonlinear Optimization," Proceedings of the 2014 IEEE International Geoscience and Remote Sensing Symposium (IGARSS 2014), Quebec, Canada, 13-18 Jul 2014.

WOOLLEY, BRIAN G., Maj, Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Automated Aerial Refueling: Precise Relative Navigation from Stereo Vision." Sponsor: AFRL/RQ. Funding: \$198,440 - Woolley 50%, Raquet 25%, Pecarina 25%.

"Unmanned Air Vehicle (UAV) and Payload Systems Technology (UPST)." Sponsor: AFMC. Funding: \$72,800 - Woolley 22%, Jacques 21%, Polanka 20%, Collins 37%.

6.2. CENTER FOR CYBERSPACE RESEARCH

Center for Cyberspace Research (CCR)

Director 255-6565 x4690

Executive Program Coordinator 255-3636 x4602

Homepage: <http://www.afit.edu/CCR>

6.2.1. DOCTORAL DISSERTATIONS

PATEL, HIREN J., *Advances in SCA and RF-DNA Fingerprinting through Enhanced Linear Regression Attacks and Application of Random Forest Classifiers*. AFIT/ENG/DS/14S-03. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/R.Y.

PENNINGTON, JASON R., *Scalable System Design for Covert MIMO Communications*. AFIT/ENG/DS/14J-05. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A.

RAMSEY, BENJAMIN W., *Improved Wireless Security through Physical Layer Protocol Manipulation and Radio Frequency Fingerprinting*. AFIT/ENG/DS/14S-10. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS.

6.2.2. MASTER'S THESES

AGBEYIBOR, RICHARD C., *Secure ADS-B: Towards Airborne Communications Security in the Federal Aviation Administration's Next Generation Air Transportation System*. AFIT/ENG/14M-02. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: AFRL/R.Y.

ALQAHTANI, MUFLIH, *Stochastic Prediction and Feedback Control of Router Queue Size in a Virtual Network Environment*. AFIT/ENG/T/14S-10. Faculty Advisor: LTC Robert J. McTasney. Sponsor: N/A.

ALSUBAIE, FAWWAZ, *Multiple Signal Classification for Determining Direction of Arrival of Frequency Hopping Spread Spectrum Signals*. AFIT/ENG/14M-05. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A.

ALT, ANTHONY T., *Analysis of Multi-User Environment Using RF-DNA*. AFIT/ENG/14M-06. Faculty Advisor: Dr. Robert F. Mills. Sponsor: N/A.

BAUM, JAMES B., *Windows Memory Forensic Data Visualization*. AFIT/ENG/T/14J-01. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A.

BEAM, BRIAN A., *Leveraging the Cloud for Integrated Network Experimentation*. AFIT/ENG/14M-11. Faculty Advisor: Dr. Douglas D. Hodson. Sponsor: OSD.

BODENHEIM, ROLAND C., *Impact of the Shodan Computer Search Engine on Internet-Facing Industrial Control System Devices*. AFIT/ENG/14M-14. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS.

COBB, JOHN M., *Decapitation Attacks against Mission-Critical Networks*. AFIT/ENG/14M-18. Faculty Advisor: Dr. Robert F. Mills. Sponsor: NASIC.

COPELAND, PATRICK T., *Using State Merging and State Pruning to Address the Path Explosion Problem Faced by Symbolic Execution*. AFIT/ENG/T/14J-03. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A.

CRAWFORD, JAMES K., *Over the Air Interface Element Scanning and Debugging the Mobile Equipment to Subscriber Identity Module Interface*. AFIT/ENG/14M-20. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A.

DALRYMPLE, SCOTT D., *Comparison of ZigBee Replay Attacks Using a Universal Software Radio Peripheral and USB Radio*. AFIT/ENG/14M-23. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS.

DANELLA, THEA S., *Identifying High-Traffic Patterns in the Workplace with Radio Tomographic Imaging in 3D Wireless Sensor Networks*. AFIT/ENG/14M-24. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFOSR.

DOROSKI, MICHAEL W., *Integrity Verification for SCADA Devices Using Bloom Filters and Deep Packet Inspection*. AFIT/ENG/14M-25. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS.

FEIGH, STEVEN N., *Network Monitoring Traffic Compression Using Singular Value Decomposition*. AFIT/ENG/14M-27. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: N/A.

FINK, DEANNA R., *Toward Automating Web Protocol Configuration for a Programmable Logic Controller Emulator*. AFIT/ENG/T/14J-04. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS.

FLAMM, BRADLEY M., *Extending Differential Fault Analysis to Dynamic S-Box Advanced Encryption Standard Implementations*. AFIT/ENG/T/14S-08. Faculty Advisor: Maj Thomas E. Dube. Sponsor: AF CyTCoE.

GALLAGHER, DANIEL M., *Analysis of Effects of Sensor Multithreading to Generate Local System Event Timelines*. AFIT/ENG/14M-31. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A.

GARCIA, ARTURO M., *Firmware Modification Analysis in Programmable Logic Controllers*. AFIT/ENG/14M-32. Faculty Advisor: Dr. Robert F. Mills. Sponsor: DHS.

GARRETT, VIRGINIA R., *Numerical Integration with Graphical Processing Unit for QKD Simulation*. AFIT/ENG/14M-33. Faculty Advisor: Dr. Douglas D. Hodson. Sponsor: LTS.

GRENGA, ANTHONY J., *Android Based Behavioral Biometric Authentication via Multi-Modal Fusion*. AFIT/ENG/T/14J-05. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: N/A.

HENNESSEY, ETHAN S., *Opportunistic Access in Frequency Hopping Cognitive Radio Networks*. AFIT/ENG/14M-38. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RV.

KULESZA, NICHOLAS J., *Radio Frequency Fingerprinting Techniques through Preamble Modification in IEEE 802.11b*. AFIT/ENG/T/14J-08. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: N/A.

LEWIS, TYRONE A., *An Artificial Neural Network-Based Decision-Support System for Integrated Network Security*. AFIT/ENG/T/14S-09. Faculty Advisor: Maj Brian G. Woolley. Sponsor: N/A.

LYONS, KATHERINE B., *A Recommender System in the Cyber Defense Domain*. AFIT/ENG/14M-49. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFOSR.

MARTY, JOSEPH A., *Vulnerability Analysis of the MAVLink Protocol for Command and Control of Unmanned Aircraft*. AFIT/ENG/14M-50. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: N/A.

MCGUIRE, JONATHAN D., *Radio Frequency Distinctive Native Attribute (RF-DNA) Fingerprinting Applied to Commercial SatCom Short Burst Data Modems*. AFIT/ENG/14M-51. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV.

MEDVE, CURTIS C., *Estimation and Coordination of Sequence Patterns for Frequency Hopping Dynamic Spectrum Access Networks*. AFIT/ENG/14M-52. Faculty Advisor: LTC Robert J. McTasney. Sponsor: AFRL/RV.

MEEKER, RICHARD A., *Mapping Computer Network Topologies*. AFIT/ENG/14M-53. Faculty Advisor: Maj Thomas E. Dube. Sponsor: AFRL/RI.

RAMSTAD, ROGER J., *Integrated Air Defense System Scan Rate Exploitation and Exploratory Research via Adaptive Technologies*. AFIT/ENG/14M-63. Faculty Advisor: Dr. Robert F. Mills. Sponsor: AFRL/RV.

ROJAS, LUIS S., *Simulated Assessment of Interference Effects in Direct Sequence Spread Spectrum (DSSS) QPSK Receiver*. AFIT/ENG/14M-64. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A.

RUTHERFORD, NICHOLAS A., *Blind Demodulation of Pass Band OFDMA Signals and Jamming Battle Damage Assessment Utilizing Link Adaptation*. AFIT/ENG/14M-65. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A.

SCHUETT, CARL D., *Programmable Logic Controller Modification Attacks for Use in Detection Analysis*. AFIT/ENG/14M-66. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS.

SMITH, ADAM J., *REDIR: Automated Static Detection of Obfuscated Anti-Debugging Techniques*. AFIT/ENG/14M-69. Faculty Advisor: Dr. Robert F. Mills. Sponsor: Riverside Research.

SONYA, SOLOMAN Y., *A New Secured Distributed-Access Protection System To Secure Data Within Enterprise Networks and Enhance Next Generation Data Loss Prevention Paradigms*. AFIT/ENG/14M-71. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: HQ AFMC.

STEBELTON, KAREN J., *A System Concept for Detecting Suicide Warning Signs in Social Media*. AFIT/ENG/T/14S-15. Faculty Advisor: Dr. Robert F. Mills. Sponsor: N/A.

STUBBS, TYLER D., *A Comparison of RF-DNA Fingerprinting Using High/Low Value Receivers with ZigBee Devices*. AFIT/ENG/14M-74. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV.

THOMPSON, JARED J., *A Test Methodology for Evaluating Cognitive Radio Systems*. AFIT/ENG/14M-77. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RV.

WERLING, JESSICA R., *Behavioral Profiling of SCADA Network Traffic using Machine Learning Algorithms*. AFIT/ENG/14M-81. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS.

WERLING, KAITLIN A., *Enhancing Operational Transition Opportunity of RF-DNA Fingerprinting Using Commercial Satcom Systems*. AFIT/ENG/14M-82. Faculty Advisor: Dr. Michael A. Temple. Sponsor: N/A.

WILLIAMS, PAUL M., *Distinguishing Internet-Facing ICS Devices Using PLC Programming Information*. AFIT/ENG/T/14J-41. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS.

WRIGHT, BRADLEY C., *PLC Hardware Discrimination Using RF-DNA Fingerprinting*. AFIT/ENG/T/14J-12. Faculty Advisor: Maj Samuel J. Stone. Sponsor: ORNL.

ZEQOLLARI, ANGELA J., *Ultra Wideband Radio Frequency Fingerprinting*. AFIT/ENG/14M-87. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RY.

6.2.4. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BALDWIN, RUSTY O., Department of Electrical and Computer Engineering

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Increasing the Federal Cybersecurity Workforce through Graduate Education and Research at AFIT.”
Sponsor: NSF. Funding: \$838,723 - Baldwin 50%, Raines 50%.

REFEREED JOURNAL PUBLICATIONS

Montminy, D., Baldwin, R., Temple, M., “Differential Electromagnetic Attacks on a 32-bit Microprocessor Using Software Defined Radios, IEEE Trans on Info Forensics & Security,” Vol. 8, Iss. 12, pp. 2101-2114, Dec 2013.

BORGHETTI, BRETT J., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“HUMAN Lab Study #1 Analysis and Development of Cyber Operations Multi Attribute Task Battery.”
Sponsor: 711 HPW/RH. Funding: \$59,443 - Borghetti 50%, Rusnock 50%.

REFEREED JOURNAL PUBLICATIONS

Weller-Fahy, D.J, Borghetti, B.J., and Sodemann, A.A., “A Survey of Distance and Similarity Measures used within Network Intrusion Anomaly Detection,” IEEE Communication Surveys and Tutorials, Early Access Article. Vol. PP, No. 99, Jul 2014, DOI10.1109/COMST.2014.2333610.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Rusnock, C.F., Borghetti, B.J., and McQuaid, I.W., “Predicting Operator Workload Using a Combined Modeling Approach,” AFIT-AFRL Colloquium – Human Machine Systems 2.0, 30 Sep 2014.

BUTTS, JONATHAN W., Maj, Department of Electrical and Computer Engineering

REFEREED JOURNAL PUBLICATIONS

Bodenheim. R., Butts, J.W., Dunlap, S., and Mullins, B.E., “Evaluation of the Ability of the Shodan Engine to Identify Internet-Facing Industrial Control Devices,” International Journal of Critical Infrastructure Protection, Elsevier, Vol. 7, No. 2, 2014, pp. 114-123.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Agbeyibor, R., Butts, J., Grimaila, M., and Mills, R., “Evaluation of Format-Preserving Encryption Algorithms for Critical Infrastructure Protection,” Proceedings of the Eight Annual IFIP Working Group 11.10 International Conference on Critical Infrastructure Protection, Arlington VA, Mar 2014.

Garcia, A., Mills, R., Butts, J., and Lopez, J. “Firmware Modification Analysis in Programmable Logic Controllers,” International Conference on Cyber Warfare and Security (ICCWS), West Lafayette IN, Mar 2014.

BOOKS AND CHAPTERS IN BOOKS

Jaromin, R.M., Mullins, B.E., and Butts, J.W., "Design and Implementation of Industrial Control Emulators," Critical Infrastructure Protection VII, J. Butts and S. Sheno, eds., Springer, New York, NY, 12 Dec 13, pp. 35-46.

DUBE, THOMAS E., Maj, Department of Electrical and Computer Engineering

PATENTS

Dube, T., Raines, R., Rogers, S., "Malware Target Reconfiguration," US Patent 8,756,693, 17 Jun 2014.

GRMAILA, MICHAEL R., Department of Systems Engineering and Management

SPONSOR FUNDED RESEARCH PROJECTS

"Communication Systems Security." Sponsor: LTS. Funding: \$105,000 - Grimaila 50%, Hodson 50%.

HODSON, DOUGLAS D., Department of Electrical and Computer Engineering

REFEREED JOURNAL PUBLICATIONS

Morris, J.J., Hodson, D.D., Grimaila, M.R., Jacques, D.R., and Baumgartner, G., "Towards the Modeling and Simulation of Quantum Key Distribution Systems," International Journal of Emerging Technology and Advanced Engineering (IJETA), Vol. 4, Iss. 2, Feb 2014.

Mailloux, L.O., Grimaila, M.R., Hodson, D.D. and Colombi, J.M., "A Practical Assessment of Security Design Patterns," The Information System Security Association (ISSA) Journal, 11(9), Sep 2013, pp. 29-35.

BOOKS AND CHAPTERS IN BOOKS

Mailloux, L.O., Grimaila, M.R., Colombi, J., Hodson, D.D., and Baumgartner, G., (2013). System Security Engineering for Information Systems. In Babak Akhgar and Hamid R. Arabnia (eds.), "Emerging Trends in Information and Communication Technologies Security." Elsevier (Morgan Kaufmann). 2014.

Morris, J.D., Grimaila, M.R., Hodson, D.D., Jacques, D., and Baumgartner, G., (2013). A Survey of Quantum Key Distribution (QKD) Technologies. In Babak Akhgar and Hamid R. Arabnia (eds.), "Emerging Trends in Information and Communication Technologies Security." Elsevier (Morgan Kaufmann), 2014.

HOPKINSON, KENNETH M., Department of Electrical and Computer Engineering

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Hennessey, E.S., Hopkinson, K.M., Silvius, M.D., Opportunistic Access in Frequency Hopping Cognitive Radio Networks, IEEE Wireless Telecommunications Symposium (WTS), 9-11 Apr 2014, Washington, DC, USA, pp. 1-6.

Thompson, J.J., Hennessey, E.S., Hopkinson, K.M., Silvius, M.D., Evaluation of Fast Frequency Hopping Model Using Evaluation-Based Test Framework for Cognitive Radios, Wireless Innovation Forum Conference on Wireless Communications Technologies and Software Defined Radio (SDR-WInnComm), 11-13 Mar 2014, Schaumburg, IL, USA, pp. 1-5.

Medve, C.C., Seery, M.K., Silvius, M.D., McTasney, R.J., Hopkinson, K.M., Hardware Implementation of Gold's Algorithm for Rendezvous in Adaptable FH Cognitive Radio Networks, Wireless Innovation Forum Conference on Wireless Communications Technologies and Software Defined Radio (SDR-WInnComm), 11-13 Mar 2014, Schaumburg, IL, USA, pp. 1-10.

Azghandi, S., Hopkinson, K.M., McTasney, R.J., An Empirical Model for Smart Meters Using Data Security, IEEE Fifth Innovative Smart Grid Technologies Conference, 19-22 Feb 2014, Washington, DC, USA, pp. 1-5.

Tolson, M.R., Dalton C.V., Silvius, M.D., Hennessey, E.S., Medve, C.V., Thompson, J.J., Hopkinson, K.M., Azghandi, S., Totally-Ordered, Reliable Multicast Over Cognitive Radio Networks, IEEE Hawaii International Conference on System Sciences, 6-9 Jan 2014, Waikoloa, HI, USA, pp. 5135-5143.

Clark, M.R., Hopkinson, K.M., Towards an Understanding of the Tradeoffs in Adversary Models of Smart Grid Privacy Protocols, IEEE General Power Meeting, 21-25 Jul 2013, Vancouver, BC, Canada.

LANZEROTTI, MARY Y., Department of Electrical and Computer Engineering

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Seery, M.K., Lanzerotti, M.Y., and Orlando, L., "Complex VLSI Feature Comparison for Commercial Microelectronics Verification," Proc. GOMACTech, Charleston, SC, Apr 2014, 7 pages.

MAGNUS, AMY L., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

"Understanding Persona in Cyberspace." Sponsor: NSA. Funding: \$10,000.

MENDENHALL, MICHAEL J., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Phase I Support: DISA Critical Infrastructure Protection." Sponsor: DISA. Funding: \$20,000.

MILLS, ROBERT F., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Cognitive Electronic Warfare." Sponsor: AFRL/R.Y. Funding: \$10,000 - Mills 50%, Hopkinson 50%.

REFEREED JOURNAL PUBLICATIONS

Barcomb, K.E., Krill, D.J., Mills, R.F., and Saville, M.A., "Establishing Cyberspace Sovereignty," International Journal of Cyber Warfare and Terrorism, Vol. 2, No. 3, Jul-Sept 2012, pp. 26-38, Oct 2013.

Panton, B.C., Colombi, J.M., Grimaila, M.R., and Mills, R.F., "Strengthening DOD Cyber Security with the Vulnerability Market," Defense Acquisition Review Journal, Jan 2014, Vol. 21, No. 1, pp. 466-484.

Panton, B.C., Colombi, J.M., Grimaila, M.R., and Mills, R.F., "Secure DOD Software: Considerations for the Vulnerability Market," CrossTalk: The Journal of Defense Software Engineering, Vol. 26, No. 6, Nov/Dec 2013, pp. 18-21.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Vaughan, S.L., Mills, R.F., Grimaila, M.R., Peterson, G.L., and Rogers, S.K., "Narratives as a Fundamental Component of Consciousness," to be presented at Computational Models of Narrative Workshop (CMN-14), Quebec City, Canada, Jul 2014, 5 pages.

Agbeyibor, R., Butts, J., Grimaila, M., and Mills, R., "Evaluation of Format-Preserving Encryption Algorithms for Critical Infrastructure Protection," Proceedings of the Eight Annual IFIP Working Group 11.10 International Conference on Critical Infrastructure Protection, Arlington, VA, Mar 2014.

Garcia, A., Mills, R., Butts, J., and Lopez, J. "Firmware Modification Analysis in Programmable Logic Controllers," International Conference on Cyber Warfare and Security (ICCWS), West Lafayette, IN, Mar 2014.

Smith, A., Mills, R., Bryant, A., Grimaila, M., and Peterson, G. "The Role of Expert Systems in Reverse Code Engineering Tasks," International Conference on Cyber Warfare and Security (ICCWS), West Lafayette, IN, Mar 2014.

BOOKS AND CHAPTERS IN BOOKS

Beeker, K.R., Mills, R.F., Grimaila, M.R., and Haas, M.W., "Operationally Responsive Cyberspace: A Critical Piece in the Strategic Deterrence Equation," in Thinking about Deterrence: Enduring questions in a Time of Rising Powers, Rogue Regimes, and Terrorism, A. Lowther, ed., Maxwell AFB, AL: Air University Press, Chapter 2, pp. 17-35, Dec 2013.

MULLINS, BARRY E., Department of Electrical and Computer Engineering

SPONSOR FUNDED EDUCATIONAL PROJECTS

"IASP Tuition and Resource Support for the AFIT Center for Cyberspace Research (CCR)." Sponsor: NSA. Funding: \$174,367.

SPONSOR FUNDED RESEARCH PROJECTS

"Development and Implementation of a Testbed for Research and Analysis of Malware." Sponsor: DHS. Funding: \$225,000 - Mullins 20%, Humpheries 20%, Butts 20%, Robinson 20%, Raines 20%.

"Real-Time Intrusion Detection, Response and Mitigation via Exposing Inter-VM Traffic." Sponsor: NSA. Funding: \$79,901.

REFEREED JOURNAL PUBLICATIONS

Kulesza, N.J., Ramsey, B.W., and Mullins, B.E., "Radio Frequency Fingerprinting through Preamble Manipulation," The Journal of Information Warfare, Peregrine Technical Solutions, Vol. 13, No. 2, 2014, pp. 23-32.

Bodenheim, R., Butts, J.W., Dunlap, S., and Mullins, B.E., "Evaluation of the Ability of the Shodan Engine to Identify Internet-Facing Industrial Control Devices," International Journal of Critical Infrastructure Protection, Elsevier, Vol. 7, No. 2, 2014, pp. 114-123.

Badenhop, C.W., and Mullins, B.W., "A Black Hole Attack Model Using Topology Approximation for Reactive Ad-hoc Routing Protocols," International Journal of Security and Networks (IJSN), Inderscience Publishers, Vol. 9, No. 2, 2014, pp. 63-77.

Henry, W.C., and Mullins, B.E., "VANISH: A Variable Advanced Network IRC Stealth Handling System," International Journal of Security and Networks (IJSN), Inderscience Publishers, Vol. 9, No. 2, 2014, pp. 114-123.

Reynolds, M.B., Hulce, D.R., Hopkinson, K.H., Oxley, M.E., and Mullins, B.E., "A Bin Packing Heuristic for On-Line Service Placement and Performance Control," IEEE Transactions on Network and Service Management, Vol. 10, No. 3, 2013, pp. 326-339.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kulesza, N.J., Ramsey, B.W., and Mullins, B.E., "Wireless Intrusion Detection through Preamble Manipulation," 9th International Conference on Cyber Warfare and Security ICCWS-2014, West Lafayette, IN, 24-25 Mar 2014, pp. 132-139.

Sonya, S.Y., and Mullins, B.E., "Secured Distributed-Access Protection System – A New Construct Engineered for Digital Security Paradigms," 9th International Conference on Cyber Warfare and Security ICCWS-2014, West Lafayette, IN, 24-25 Mar 2014, pp. 201-210.

Ramsey, B.W., Mullins, B.E., Speers, R., and Batterton, K.A., "Watching for Weakness in Wild WPANs," IEEE Military Communications Conference 2013 (MILCOM 2013), San Diego, CA, 18-20 Nov 13, pp. 1404-1409.

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Jaromin, R.M., Mullins, B.E., and Butts, J.W., "Design and Implementation of Industrial Control Emulators," Critical Infrastructure Protection VII, J. Butts and S. Sheno, eds., Springer, New York, NY, 12 Dec 13, pp. 35-46.

Ramsey, B.W., and Mullins, B.E., "Defensive Rekeying Strategies for Physical-Layer-Monitored Low-Rate Wireless Personal Area Networks," Critical Infrastructure Protection VII, J. Butts and S. Sheno, eds., Springer, New York, NY, 12 Dec 13, pp. 63-80.

PETERSON, GILBERT L., Department of Electrical and Computer Engineering

REFEREED JOURNAL PUBLICATIONS

Bailey, K.O., Okolica, J.S., and Peterson, G.L., "User Identification and Authentication using Multi-Modal Behavioral Biometrics," Computers & Security, 43:77-89, 2014.

Noel, G.E., and Peterson, G.L., "Applicability of Latent Dirichlet Allocation to Multi-Disk Search," Digital Investigation, 11(1):43-56, 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Vaughn, S.L., Mills, R.F., Grimaila, M.R., Peterson, G.L., and Rogers, S.K., "Narratives as a Fundamental Component of Consciousness," 2014 Workshop on Computational Models of Narrative, pp. 1-5, 2014.

BOOKS AND CHAPTERS IN BOOKS

Peterson, G., and Sheno, S., Advances in Digital Forensics IX, Springer-Verlag, 2013.

Esposito, S.J., and Peterson, G.L., "Creating Super Timelines in Windows Investigations," Advances in Digital Forensics IX, G.L. Peterson and S. Sheno, (Eds.), Springer-Verlag, 2013, pp. 135-144.

TEMPLE, MICHAEL A., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“Phase III Support: RF-EW Systems.” Sponsor: AFRL/R.Y. Funding: \$50,000.

“RFINT for Commercial Communications.” Sponsor: N/A. Funding: \$123,094.

REFEREED JOURNAL PUBLICATIONS

Montminy, D., Baldwin, R., Temple, M., “Differential Electromagnetic Attacks on a 32-bit Microprocessor Using Software Defined Radios,” IEEE Trans on Info Forensics & Security, Vol. 8, Iss. 12, pp. 2101-2114, Dec 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Patel, P., Temple, M., Baldwin, R., Ramsey, B., Application of Ensemble Decision Tree Classifiers to ZigBee Device Network Authentication Using RF-DNA Fingerprinting, Int’l Conf on Cyber Warfare and Security, Purdue University, Mar 2014.

BOOKS AND CHAPTERS IN BOOKS

Dubendorfer, Ramsey, Temple, “ZigBee Device Verification For Securing Industrial Control and Building Automation Systems,” Critical Infrastructure Protection VII, Springer, New York, NY, pp. 47-62, Dec 2013.

6.3. CENTER FOR DIRECTED ENERGY

Center for Directed Energy (CDE)

Director 255-3636 x4506

Executive Administrator 255-3636 x4551

Homepage: <http://www.afit.edu/CDE>

6.3.1. DOCTORAL DISSERTATION

SPENCER, MARK F., *The Scattering of Partially Coherent Electromagnetic Beam Illumination from Statistically Rough Surfaces*. AFIT/ENG/DS/14J-07. Faculty Advisor: Maj Milo W. Hyde. Sponsor: AFOSR.

6.3.2. MASTER'S THESES

BAUMANN, SEAN M., *Direct Emissivity Measurements of Painted Metals for Improved Temperature Estimation During Laser Damage Testing*. AFIT/ENP/14M-43. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: HELJTO.

MCGAHAN, CHRISTOPHER J., *Utilizing Near-IR Tunable Laser Absorption Spectroscopy to Study Detonation and Combustion Systems*. AFIT/ENP/14M-22. Faculty Advisor: Col Brian A. Tom. Sponsor: AFRL/RQ.

MEISER, DANIEL M., *Calibrated Model for Point Source Spectroscopy*. AFIT/ENP/14J-42. Faculty Advisor: Dr. Michael T. Eismann. Sponsor: N/A.

WAKEFIELD, STEPHEN D., *Development and Characterization of a High Speed Mid-IR Tunable Diode Laser Absorption Spectrometer for CO and CO₂ Detection in Detonation Events*. AFIT/ENP/14M-38. Faculty Advisor: Col Brian A. Tom. Sponsor: AFRL/RQ.

WYMAN, KEITH A., *Wigner Distribution Functions as a Tool for Studying Gas Phase Alkali Metal Plus Noble Gas Collisions*. AFIT/ENP/14M-39. Faculty Advisor: Dr. David E. Weeks. Sponsor: HELJTO.

6.3.3. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

FIORINO, STEVEN T., Department of Engineering Physics

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Atmospheric Effects & Software Codes Short Course.” Sponsor: AFRL/RV. Funding: \$8,532.

SPONSOR FUNDED RESEARCH PROJECTS

“2014 AFIT Center for Directed Energy Summer Intern (DESI) Program.” Sponsor: HELJTO. Funding: \$50,000 - Fiorino 90%, Perram 5%, Marciniak 5%.

“Additions to AFIT Atmospheric Effects Software Code for AFRL/RV.” Sponsor: AFRL/RV. Funding: \$125,000.

“Airborne Aero-Optics Lab Beam Control Collection and Evaluation.” Sponsor: HELJTO. Funding: \$123,253.

- “Atmospheric Characterization and Clouds for Directed Energy.” Sponsor: MDA. Funding: \$52,500.
- “Atmospheric Characterization for Directed Energy Applications (Phase II SBIR).” Sponsor: MDA. Funding: \$15,000.
- “HELJTO M&S TAWG Product Development.” Sponsor: HELJTO. Funding: \$500,000.
- “Development of HELEEOS and LEEDR for End-to-End Laser Engagement.” Sponsor: NASIC. Funding: \$5,000.
- “High Energy Laser-Joint Technology Office Predictive Avoidance Subject Matter Expert.” Sponsor: HELJTO. Funding: \$15,000.
- “Iterative High Energy Laser End-to-End Operational Simulation Enhancements Using Design of Experiments.” Sponsor: AFRL/RD. Funding: \$75,000.
- “Modification of AFIT Atmospheric Effects Software Code for AFRL/RD.” Sponsor: AFRL/RD. Funding: \$106,477.
- “Wave Optics of Deep Atmospheric Turbulence: From Underlying Physics towards Predictive Modeling, Mitigation and Exploitation.” Sponsor: AFOSR. Funding: \$270,000 - Fiorino 55%, Cusumano 45%.

REFEREED JOURNAL PUBLICATIONS

- Fiorino, S.T., R.M. Randall, M.F. Via, and J.L. Burley: “Validation of a UV-to-RF high-spectral-resolution atmospheric boundary layer characterization tool,” *Journal of Applied Meteorology and Climatology*, Vol. 53, No. 1, pp. 136-156. (2014)
- Yarbrough, A.W., M.J. Mendenhall, R.K. Martin, and S.T. Fiorino: “Hyperspectral-Based Adaptive Matched Filter Detector Error as a Function of Atmospheric Profile Estimation,” *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 52, Iss. 4, pp. 2029 – 2039. (2014)
- Burchett, L.R. and S.T. Fiorino: “Wavelength correction of refractivity variation measurements,” *Optics Express*, Vol. 21, Iss. 26, pp. 31990-31997. (Dec 2013)

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

- Basu, Santasri, M.W. Hyde, J. E. McCrae, Jr., M.F. Spencer, S.T. Fiorino., “Examining the validity of using a Gaussian Schell Model for modeling an extended beacon on a rough perfectly reflecting surface,” *Proceedings of SPIE* Vol. 9224, 92240L. (Jul 2014)
- Zuraski, S.M. and S.T. Fiorino, “Worldwide study of the performance of a sodium guidestar,” *Proceedings of SPIE* Vol. 9224, 92240D. (Jul 2014)
- Basu, Sukanta, C.G. Nunalee, P. He, S.T. Fiorino, M.A. Vorontsov, “Reconstructing the prevailing meteorological and optical environment during the time of the Titanic disaster,” *Proceedings of SPIE* Vol. 9224, 92240Y. (2014)
- Nunalee, C.G., P. He, Sukanta Basu, M. A. Vorontsov, S.T. Fiorino, “Impact of large-scale atmospheric refractive structures on optical wave propagation,” *Proceedings of SPIE* Vol. 9224, 92240W. (2014)
- He P., C.G. Nunalee, Sukanta Basu, M.A. Vorontsov, S.T. Fiorino, “Current status and challenges in optical turbulence simulations in various layers of the Earth’s atmosphere,” *Proceedings of SPIE* Vol. 9224, 92240F. (2014)

Fiorino S.T., "Satellite and Radar Measurement of CT2, Cn2, and Cv2" Propagation through and Characterization of Distributed Volume Turbulence (pcDVT), Imaging and Applied Optics Conference, Seattle, WA, 13-17 Jul 2014. Invited.

Meier, D.C. and S.T. Fiorino, "Correlated Satellite-derived Turbulence, Clouds and Aerosol Data," Propagation through and Characterization of Distributed Volume Turbulence (pcDVT), Imaging and Applied Optics Conference, Seattle, WA, 13-17 Jul 2014.

McCrae, J.E. and S.T. Fiorino, "Simulation of Deep Turbulence Compensation for a Laser Phased Array," 2014 IEEE Aerospace Conference Big Sky, MT, 1-8 Mar 2014.

Fiorino, S.T., M.F. Via, D.C. Meier, B.J. Elmore, and K.J. Keefer, "Enhanced Atmospheric Refraction and Radiative Transfer Analyses Merging Gridded Numerical Weather Forecast and Satellite Data," (Poster), 18th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans and Land Surface (IOAS-AOLS), 94th Annual American Meteorological Society Meeting, Atlanta, GA 2-6 Feb 2014. <https://ams.confex.com/ams/94Annual/webprogram/Paper241611.html>.

GROSS, KEVIN C., Department of Engineering Physics

REFEREED JOURNAL PUBLICATIONS

R. I. Acosta, K. C. Gross, G. P. Perram, S. Johnson, L. Dao, D. Medina, and R. Roybal, P. Black, "Gas phase plume from laser irradiated fiberglass reinforced polymers via imaging Fourier-transform spectroscopy," Applied Spectroscopy, Vol. 68, No. 7, pp. 723-732 (2014). <http://dx.doi.org/10.1366/13-07213>.

HYDE, MILO W., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Beam Control for Optical Phased Array Weapons." Sponsor: AFRL/RV. Funding: \$125,357 - Hyde 95%, Fiorino 5%.

MARCINIAK, MICHAEL A., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

"Laser-damage thresholds in carbon-nanotube films." Sponsor: AFOSR. Funding: \$47,580.

"Radiometrically Accurate BRDF's in the Infrared." Sponsor: AFRL/RV. Funding: \$100,000.

"Thin-Film Research for Infrared Optical Coatings and Meta-Materials." Sponsor: DAGSI. Funding: \$11,240.

"Understanding the spectral dependence of the BRDF." Sponsor: AFRL/RV. Funding: \$100,000.

REFEREED JOURNAL PUBLICATIONS

M. R. Benson and M. A. Marciniak, "Design considerations regarding ellipsoidal-mirror-based reflectometers," Optics Express Vol. 21, No. 23, pp. 27519-27536 (Nov 2013).

M. D. Seal and M. A. Marciniak, "Partially coherent bidirectional reflectance distribution data computation for modeling periodic plasmonic structures at infrared wavelengths," Infrared Physics and Technology Vol. 62, pp. 39-44 (Jan 2014).

M. Benson, P. Shah, M. Marciniak, A. Sarangan, and A. Urbas, "Optical characterization of silver-nanorod thin films grown using oblique angle deposition," Journal of Nanomaterials Vol. 2014, pp. 694982(1-8) (May 2014).

M. D. Seal, N. R. Murphy, J. P. Lombardi and M. A. Marciniak, "Selective thermal emission from a patterned metalized plastic," *Infrared Physics and Technology* Vol. 67, pp. 250-255 (Aug 2014).

S. M. Baumann, B. E. Hurst, M. A. Marciniak and G. P. Perram, "Fiber laser heating and penetration of aluminum in shear flow," *Optical Engineering* Vol. 53, No. 12, pp. 122510(1-7) (Aug 2014).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

S.E. Nauyoks, S. Freda and M.A. Marciniak, "Dynamic data driven bidirectional reflectance distribution function measurement system," *Proceedings of the SPIE*, Vol. 9205, 9205-1, 17-21 Aug 2014, San Diego, CA.

S.D. Butler and M.A. Marciniak, "Robust categorization of micro-facet BRDF models to enable flexible application-specific BRDF adaptation," *Proceedings of the SPIE*, Vol. 9205, 9205-6, 17-21 Aug 2014, San Diego, CA.

M.F. Spencer, S. Basu, M.W. Hyde IV and M.A. Marciniak, "Wave-optics simulation of partially coherent beam illumination scattered from perfectly-reflecting rough surfaces," *Proceedings of the SPIE*, Vol. 9205, 9205-19, 17-21 Aug 2014, San Diego, CA.

S.D. Butler, M.A. Marciniak and J.N. Meola, "Modeling effects of bidirectional reflectance distribution function on remote sensing in the long wave infrared spectrum," *Proceedings of the SPIE*, Vol. 9222, 9222-16, 17-21 Aug 2014, San Diego, CA.

S.M. Baumann, C. Keenan, M.A. Marciniak and G.P. Perram, "Spectral and temperature-dependent infrared emissivity measurements of painted metals for improved temperature estimation during laser damage testing," *Proceedings of the SPIE*, Vol. 9237, 9237-39, 14-17 Sep 2014, Boulder, CO.

MCCRAE, JACK E., Jr., Department of Engineering Physics

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Basu, Santasri, M.W. Hyde, J. E. McCrae, Jr., M.F. Spencer, S.T. Fiorino., "Examining the validity of using a Gaussian Schell Model for modeling an extended beacon on a rough perfectly reflecting surface," *Proceedings of SPIE* Vol. 9224, 92240L (Jul 2014).

McCrae, J.E. and S.T. Fiorino, "Simulation of Deep Turbulence Compensation for a Laser Phased Array," 2014 IEEE Aerospace Conference Big Sky, MT, 1-8 Mar 2014.

NAUYOKS, STEPHEN E., Department of Engineering Physics

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

S.E. Nauyoks, S. Freda and M.A. Marciniak, "Dynamic data driven bidirectional reflectance distribution function measurement system," *Proceedings of the SPIE*, Vol. 9205, 9205-1, 17-21 Aug 2014, San Diego, CA.

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Samuel Freda, Stephen E. Nauyoks and Michael A. Marciniak, "Dynamic data-driven bidirectional reflectance distribution function," 16th Annual Directed Energy Annual Symposium, 10-14 Mar 2014, Huntsville, AL.

PERRAM, GLEN P., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

“Diode Pumped Rare Gas Lasers.” Sponsor: HELJTO. Funding: \$199,100.

“HEL Analysis Tool with Experimentally Corroborated DPAL Rate Constants.” Sponsor: MDA. Funding: \$18,586.77.

“Merging Hyperspectral Imagery and Multi-Scale Modeling for Laser Lethality.” Sponsor: AFOSR. Funding: \$150,156 - Perram 80%, Marciniak 20%.

“Rubidium Vapor Circulation System: Optical Diagnostics.” Sponsor: MDA. Funding: \$18,586.76.

“Zeeman Deceleration of a Cold Atom Beam II. Cold Atom Precision Timing and Inertial Navigation.” Sponsor: AFRL/RV. Funding: \$20,422.

REFEREED JOURNAL PUBLICATIONS

S. M. Baumann, B. E. Hurst, M. A. Marciniak and G. P. Perram, “Fiber laser heating and penetration of aluminum in shear flow,” Optical Engineering Vol. 53, No. 12, pp. 122510(1-7) (Aug 2014).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

S.M. Baumann, C. Keenan, M.A. Marciniak and G.P. Perram, “Spectral and temperature-dependent infrared emissivity measurements of painted metals for improved temperature estimation during laser damage testing,” Proceedings of the SPIE, Vol. 9237, 9237-39, 14-17 Sep 2014, Boulder, CO.

6.4. CENTER FOR OPERATIONAL ANALYSIS

Center for Operational Analysis (COA)

Director 255-6565 x4708

Projects Director 255-6565 x4251

Homepage: <http://www.afit.edu/COA>

6.4.1. DOCTORAL DISSERTATIONS

AL ROMAIHI, MOHAMED M., *Advanced Composite Air Frame Life Cycle Cost Estimating*. AFIT/ENS/DS/14J-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AFRL/RQ.

ARENDT, CHRISTOPHER D., *Optimal Control of Fully Routed Air Traffic in the Presence of Uncertainty and Kinodynamic Constraints*. AFIT/ENS/DS/14S-15. Faculty Advisor: Dr. James W. Chrissis. Sponsor: NASA.

DOUGHERTY, SHANE A., *A Comparison Study of Second-Order Screening Designs and Their Extension*. AFIT/ENS/DS/13D-01. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD.

FREELS, JASON K., *Modeling Reliability Growth in Accelerated Stress Testing*. AFIT/ENS/DS/13D-02. Faculty Advisor: Dr. Joseph J. Pignatiello. Sponsor: OSD/DOT&E.

KELLEHER, CLAYTON T., *Dynamic Bayesian Networks as a Probabilistic Metamodel for Combat Simulations*. AFIT/ENS/DS/14S-20. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMC/A9.

MCNABB, MARCUS E., *Exploring Heuristics for the Vehicle Routing Problem with Split Deliveries and Time Windows*. AFIT/ENS/DS/14S-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM.

REIMAN, ADAM D., *Enterprise Analysis of Strategic Airlift to Obtain Competitive Advantage through Fuel Efficiency*. AFIT/ENS/DS/14S-16. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM.

SAIE, CADE M., *Nation-Building Modeling and Resource Allocation via Dynamic Programming*. AFIT/ENS/DS/14S-18. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: CAA.

6.4.2. MASTER'S THESES

CHERRY, MATT J., *Empirical Analysis of Human Capital, Learning Culture, and Knowledge Management as Antecedents to Organizational Performance: Theoretical and Practical Implications for Logistics Readiness Officer Force Development*. AFIT/ENS/14M-02. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: HQ USAF/A4.

EL-AMIN, AMBER J., *Mixed Methods Approach to Identify Factors and the Extent to Which They Influence Medical/Surgical Prime Vendor Use*. AFIT/ENS/14M-03. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: AFMOA.

ERDEMIR, UGUR, *Optimizing Flight Schedules by an Automated Decision Support System*. AFIT/ENS/14M-04. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: TuAF.

ERICKSON, BRYNGEL J., *Simulation Modeling of Advanced Pilot Training: The Effects of a New Aircraft Family of Systems*. AFIT/ENS/14M-05. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFLCMC.

FETT, GARRET D., *Aircraft Route Optimization Using the A-Star Algorithm*. AFIT/ENS/14M-06. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: USA FORSCOM.

FLORES, CHARLES M., *A Proper Splitting Theater Distribution Model for Improving Force Flow Analysis*. AFIT/ENS/14M-07. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM.

FRAWLEY, TIMOTHY D., *Application of a Multi-Objective Network Model to a Combat Simulation Game: "The Drive on Metz" Case Study*. AFIT/ENS/14M-08. Faculty Advisor: Dr. James W. Chrissis. Sponsor: AFLCMC.

GAREE, MICHAEL J., *Fragment Capture Simulation for MANPADS Test Arena Optimization*. AFIT/ENS/14M-09. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD/DOT&E.

JABLONSKI, JAMES A., *Reconstruction Error and Principal Component Based Anomaly Detection in Hyperspectral Imagery*. AFIT/ENS/14M-11. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/R.Y.

JENSEN, JACOB C., *KC-46 Workforce Requirements for Depot Maintenance Activation*. AFIT/ENS/14M-12. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFLCMC.

JONES, CHRISTOPHER M., *Value Focused Thinking Approach Using Multivariate Validation for Junior Enlisted Performance Reporting in the United States Air Force*. AFIT/ENS/14M-13. Faculty Advisor: Maj Jennifer L. Geffre. Sponsor: HQ USAF/A4.

KANNON, TANYA E., *Improving the Air Mobility Command's Air Refueler Route Building*. AFIT/ENS/14M-14. Faculty Advisor: Dr. Sarah G. Nurre. Sponsor: USTRANSCOM.

KENEALLY, SEAN K., *A Markov Decision Process Model for the Optimal Dispatch of Military Medical Evacuation Assets*. AFIT/ENS/14M-15. Faculty Advisor: Lt Col Matthew J. Robbins. Sponsor: AMEDD/MEPD.

KHAN, UMAR M., *Optimal Partitioning of a Surveillance Space for Persistent Coverage Using Multiple Autonomous Unmanned Aerial Vehicles: An Integer Programming Approach*. AFIT/ENS/14M-16. Faculty Advisor: Dr. James W. Chrissis. Sponsor: N/A.

LITCHFIELD III, ARTHUR R., *Optimizing the Disposition and Retrograde of United States Air Force Class VII Equipment from Afghanistan*. AFIT/ENS/14M-18. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMC/OC-ALC.

MARTIN, MARGARET T., *The Air Force Records Management Program: A Paradigm Shift from Compliance to Guiding Principles in an Ever-Changing Information Environment*. AFIT/ENS/T/14J-15. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: NASIC.

MCCORMACK, IAN M., *The Military Inventory Routing Problem with Direct Delivery*. AFIT/ENS/14M-20. Faculty Advisor: Lt Col Matthew J. Robbins. Sponsor: USAACE.

MOORE, KRISTY L., *Salient Feature Selection Using Feed-Forward Neural Networks and Signal-to-Noise Ratios with a Focus toward Network Threat Detection and Risk Level identification*. AFIT/ENS/14M-22. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/R.Y.

MORTON, CHARLES H., *An Investigation into the Challenges of Joint Basing*. AFIT/ENS/T/14J-16. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: 628 ABW.

- POWER, EMILY K., *A Heuristic Approach to the Theater Distribution Problem*. AFIT/ENS/14M-25. Faculty Advisor: Dr. Jeffrey D. Weir. Sponsor: USTRANSCOM.
- QUINTANILLA, JOSE A., *Department of Defense Operational Energy Strategy: A Content Analysis of Energy Literature from 1973-2014*. AFIT/ENS/14M-26. Faculty Advisor: Maj Joshua K. Strakos. Sponsor: SAF.
- RHOADS, JAMES D., *Optimizing Air Force Depot Programming to Maximize Operational Capability*. AFIT/ENS/14M-36. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: HQ USAF/A4.
- RUSSELL, BRENT D., *Capturing Uncertainty in Fatigue Life Data*. AFIT/ENS/T/14S-15. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD.
- SHEPPARD, WESLEY A., *Simulating F-22 Heavy Maintenance and Modifications Workforce Multi-Skilling*. AFIT/ENS/14M-28. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFMC/A4.
- STAHL, ADRIENNE L., *A Survey and Analysis of Aircraft Maintenance Metrics: A Balanced Scorecard Approach*. AFIT/ENS/14M-29. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: HQ USAF/A4.
- STOVER, LUKE R., *Towards Reengineering the United States Department of Defense: A Financial Case for a Functionally-Aligned, Unified Military Structure*. AFIT/ENS/14M-30. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: JCS/J5.
- WALES, JESSE G., *Analysis of a SCADA System Anomaly Detection Model Based on Information Entropy*. AFIT/ENS/14M-32. Faculty Advisor: Maj Jennifer L. Geffre. Sponsor: N/A.
- WARD, MARC R., *Automatic Target Recognition Using Nonlinear Autoregressive Neural Networks*. AFIT/ENS/14M-33. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/RV.
- WHITE, JONATHAN D., *Enhanced Vehicle Beddown Approximations for the Improved Theater Distribution Model*. AFIT/ENS/14M-34. Faculty Advisor: Dr. Jeffrey D. Weir. Sponsor: USTRANSCOM.

6.4.3. GRADUATE RESEARCH PAPERS

- ABERCROMBIE, PETER B., *C-Bag Consolidation: An Inventory and Safety Stock Analysis*. AFIT/ENS/GRP/14J-01. Faculty Advisor: Lt Col Joseph B. Skipper. Sponsor: AMC.
- BAKER, JUDD W., *Optimizing C-17 Pacific Basing*. AFIT/ENS/GRP/14J-02. Faculty Advisor: Dr. William A. Cunningham. Sponsor: EUCOM/USAFE.
- CAMPANILE, KEVIN J., *Determining the Optimal C-130 Deployed Crew Ratio*. AFIT/ENS/GRP/14J-03. Faculty Advisor: Dr. Jeffrey D. Weir. Sponsor: AMC.
- CAPPER, JUSTIN R., *Tanker Fuel Efficiency: Saving through Receiver Fuel Planning*. AFIT/ENS/GRP/14J-04. Faculty Advisor: Maj Joshua K Strakos. Sponsor: AMC.
- DURHAM, RYAN E., *Alternatives to Contingency Response Group Organization: Tradeoffs to Balance Capability and Capacity*. AFIT/ENS/GRP/14J-05. Faculty Advisor: Dr. Kenneth L. Schultz. Sponsor: AMC.
- GOHN, RUSSELL D., *Changing the Culture of Fuel Efficiency: A Change in Attitude*. AFIT/ENS/GRP/14J-06. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC.

LAFERRIERE, JAMES M., *Frequency Based Continuation Training (FBCT): A Concept for use in the Mobility Air Forces (MAF)*. AFIT/ENS/GRP/14J-07. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC.

LIPPERT, ROYCE M., *Investigating Disruptions to Channel Missions - What's the Breaking Point?* AFIT/ENS/GRP/14J-08. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AMC.

MACGARVEY, MASON E., *ABW and AMW Consolidation on AMC-Led Joint Bases: A Delphi Study*. AFIT/ENS/GRP/14J-09. Faculty Advisor: Dr. Alan R. Heminger . Sponsor: AMC.

MAGILL, JONATHAN H., *Regionalization of the C-17A Home Station Check to Minimize Costs*. AFIT/ENS/GRP/14J-10. Faculty Advisor: LTC Brian J. Lunday. Sponsor: AMC.

MESHANKO, MATTHEW D., *Impact of Volcanic Activity on AMC Channel Operations*. AFIT/ENS/GRP/14J-11. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC.

PASTUZYN, MICHAEL, *The Potential for Additional Channel Airlift in a L Cargo Demand Theater*. AFIT/ENS/GRP/14J-12. Faculty Advisor: Lt Col Joseph R. Huscroft. Sponsor: AMC.

ROVELLO, FRANK W., *Estimating C-17 Aircrew Seasoning Given a Prediction of Flying Austerity*. AFIT/ENS/GRP/14J-13. Faculty Advisor: Col Doral E. Sandlin. Sponsor: AMC.

RUPP, KAREN P., *A Cost Analysis of Space Available Travel*. AFIT/ENS/GRP/14J-14. Faculty Advisor: Maj Joshua K. Strakos. Sponsor: AMC.

SPONSELLER, HUGH P., *Over the Pole: A Fuel Efficiency Analysis of Employing Joint Base Elmendorf-Richardson for Polar Route Utilization*. AFIT/ENS/GRP/14J-15. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: PACAF.

YARIAN, MARK L., *Synchronized Stability: A Case Study Investigation of AMC's Stabilized Approach Program*. AFIT/ENS/GRP/14J-16. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC.

6.4.4. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AHNER, DARRYL K., Department of Operational Sciences

SPONSOR FUNDED EDUCATIONAL PROJECTS

“2 AFIT Instructors in VA SOT310.” Sponsor: DAU. Funding: \$10,500.

“Design of Experiments Course.” Sponsor: SPAWAR. Funding: \$11,000.

“Design of Experiments Course.” Sponsor: ATEC. Funding: \$22,000.

“Design of Experiments Training.” Sponsor: TARDEC. Funding: \$11,500.

“SOT 210 310 Proposal.” Sponsor: USMC. Funding: \$18,000.

SPONSOR FUNDED RESEARCH PROJECTS

“Aegis Travel Support.” Sponsor: NAVSEA. Funding: \$19,000.

“AFIT Partnership for Modeling and Simulation.” Sponsor: AFMC/A4. Funding: \$125,000 - Ahner 25%, Miller 25%, Ogden 25%, Weir 25%.

“A System of Equations to Capture SSTRO Dynamics.” Sponsor: CAA. Funding: \$170,000 - Ahner 50%, Akers 50%.

“Epidemiological Assessment of Incident Post-deployment Mental Health Problems in Air Force Military Medical Personnel.” Sponsor: 711 HPW/RH. Funding: \$150,000 - Ahner 34%, Schultz 33%, White 33%.

“Methods of Determining Best Mix Options for Directed and Kinetic Energy Weapons.” Sponsor: AFRL/RW. Funding: \$100,000.

“Sampling Strategies.” Sponsor: NGA. Funding: \$150,000 - Ahner 50%, Bunker 50%.

“STAT COE.” Sponsor: OSD. Funding: \$1,310,000.

“Test Generation and Analysis Techniques for Autonomous Systems.” Sponsor: AFRL/RQ. Funding: \$60,000 - Ahner 34%, Stone 33%, Pignatiello 33%.

REFEREED JOURNAL PUBLICATIONS

Ahner, D.K., Brown, D.C., 2014, “Efforts to Establish More Rigor in Developmental Test and Evaluation (DT&E),” *ITEA Journal*, Vol. 35, No. 1, Mar 2014.

Ahner, D.K., Goddard, D., Kensler, J., 2014, “Air Force Enterprise Effort to Improve the Acquisition Workforce in Testing,” *ITEA Journal*, Vol. 35, No. 2, Jun 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Ahner, D.K., Sandlin, D.E., Saldanha, J., Swan, P., “Exploring the Use of the Upper-Semi Variance as a Robust Estimator For Calculating Safety Stocks,” *Council of Supply Chain Management Professionals Global Conference*, San Diego, CA, 27-30 Sep 2014.

BAUER, KENNETH W., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

“Data Analysis and Tool Development for Analyst Image Exploitation.” Sponsor: 711 HPW/RH. Funding: \$75,000.

REFEREED JOURNAL PUBLICATIONS

Bauer, K.W., Dube, T., Grimaila, M., Raines, R., Rogers, S., 2013, “Malware Target Recognition of Unknown Threats,” *IEEE Systems Journal*, Vol. 7, No. 3.

Bauer, K.W., Bihl, T.J., Friend, M.A., Friessen, K.D., 2013, “Contextual Anomaly Detection Cueing Methods for Hyperspectral Target Recognition,” *American Journal of Science and Engineering*, Vol. 2, No. 1, pp. 9-16, Jul 2013.

Bauer, K.W., Bihl, T.J., Williams, J., 2013, “Towards the Mitigation of Correlation Effects in Anomaly Detection for Hyperspectral Imagery,” *Journal of Defense Modeling and Simulation*, Vol. 10, No. 3, pp. 263-273, Jul 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bauer, K.W., Bihl, T.J., Ward, M.R., 2014, "Vibrometry-based vehicle identification framework using nonlinear autoregressive neural networks and decision fusion," *IEEE National Aerospace & Electronics Conference*, Dayton, OH, 25-27 Jun 2014.

CHRISSIS, JAMES W., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Chrissis, J.W., Deckro, R.F., Hamill, J., Herbranson, T.J., 2013, "Considering the Isolation Set Problem," *European Journal of Operational Research*, Vol. 227, No. 2, pp. 268-274.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Chan, Y., Chrissis, J.W., Isensee, E., 2014, "Multicriteria Vehicle-Routing in a 3-D Network: Cost vs. Risk," *ISERC Conference & Expo*, Montreal, QC, Canada, 31 May – 3 Jun 2014.

CUNNINGHAM, WILLIAM A., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Cunningham, W., Johnson, A., Kiymaz, E., 2014, "Fuel Efficiency Assessment with Data Envelope Analysis," *Journal of Defense Modeling and Simulation*, pp. 2-9, 13 May 2014.

DECKRO, RICHARD F., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

"JWAC AFIT Interaction." Sponsor: JWAC. Funding: \$55,000 - Deckro 80%, Ahner 20%.

HILL, RAYMOND R., Jr., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

"The Science of Test: Advanced Test and Evaluation in Support of the DOD Test and Evaluation Enterprise." Sponsor: OSD. Funding: \$1,120,960 - Hill 25%, Stone 25%, Freels 25%, Hodson 25%.

REFEREED JOURNAL PUBLICATIONS

Hodson, D.D., Gutman, A.J., Hill, R.R., 2014, "Quantifying Radar Measurement Errors in a Live-Virtual-Constructive Environment to Determine System Viability: A Case Study," *Journal of Defense Modeling and Simulation*, Vol. 12, No. 1, Jan 2014.

Hodson, D.D., Hill, R.R., 2013, "The Art and Science of Live, Virtual and Constructive Simulation for Test and Analysis," *Journal of Defense Modeling and Simulation*, Vol. 12, No. 1.

Gutman, A.J., White, E.D., Lin, D.J.K., Hill, R.R., 2014, "Augmenting Supersaturated Designs with Bayesian D-Optimality," *Computational Statistics & Data Analysis*, Vol. 71, pp. 1147-1158, Mar 2014.

Tan, H.T., Hill, R.R., 2014, "The In-Transit Vigilant Covering Tour Problem for Routing Unmanned Ground Vehicles," *Military Operations Research*, Vol. 18, No. 4, pp. 5-18, Jan 2014.

Heath, B.L., Ciarallo, F.W., Hill, R.R., 2013, "An Agent-Based Approach to Analyze the Impact of Warehouse Congestion on Cost Performance," *International Journal of Advanced Manufacturing Technology*, Vol. 67, Nos. 1-4, pp. 563-574.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kannon, T.E., Nurre, S.G., Lunday, B.J., Hill, R.R., 2014, "The Aircraft Routing with Air Refueling Problem: Exact and Greedy Approaches," *Proceedings of the 2014 Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada. 31 May – 3 Jun 2014. Best paper in Homeland Security Track.

Garee, M.J., Hill, R.R., Russell, B., 2014, "Fragment Capture Simulation for Missile Blast Test Optimization," *Proceedings of the 2014 Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada. 31 May – 3 Jun 2014. Best paper in Military Applications Track.

HUSCROFT, JOSEPH R., Lt Col, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Hall, D.J., Huscroft, J.R., Hazen, B.T., and Hanna, J.B., 2013, "Reverse Logistics Goals, Metrics, and Challenges: Perspectives from Industry," *International Journal of Physical Distribution & Logistics Management*, Vol. 43, No. 9, pp. 768-785.

Huscroft, J.R., Hazen, B.T., Hall, D.J., Skipper, J.B., and Hanna, J.B., 2013, "Reverse Logistics: Past Research, Current Management, Issues, and Future Directions," *International Journal of Logistics Management*, Vol. 24, No. 3, pp. 304-327.

Huscroft, J.R., Hazen, B.T., Hall, D.J., and Hanna, J.B., 2013, "Task-technology Fit For Reverse Logistics Performance," *International Journal of Logistics Management*, Vol. 24, No. 2, pp. 230-246.

Hazen, B.T., Huscroft, J.R., Hall, D.J., Weigel, F.K., and Hanna, J.B., 2014, "Reverse Logistics Information System Success and the Effect of Motivation," *International Journal of Physical Distribution & Logistics Management*, Vol. 44, No. 3, pp. 201-220.

JOHNSON, ALAN W., Department of Operational Sciences

SPONSOR FUNDED EDUCATIONAL PROJECTS

"Research, Analysis and Transition Support to the Directorate of Logistics and Sustainment Air Force Sustainment Center (Executive Education)." Sponsor: AFSC. Funding: \$90,000.

SPONSOR FUNDED RESEARCH PROJECTS

"Research, Analysis and Transition Support to the Directorate of Logistics and Sustainment Air Force Sustainment Center." Sponsor: AFSC. Funding: \$350,000.

REFEREED JOURNAL PUBLICATIONS

Hackleman, A.S., Johnson, A.W., and Ahner, D.K., 2014, "Nuclear Enterprise Performance Measurement," *Journal of Defense Modeling and Simulation*, Vol. 11, No. 3, pp. 245-264.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Breitbach, T., Johnson, A.W., Weir, J.D., Brown, J., 2014, "Afghanistan Air Cargo Routing – A Systems Approach," *Proceedings of the IIE Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada, 31 May – 3 Jun 2014.

Sills, R., Johnson, A.W., White, E., 2014, "Restoring Trust to Air Force Materiel Command's Personnel Loss Forecast Legacy Software," *Proceedings of the 2014 Western Decision Sciences Institute Conference*, Napa, CA, 1-4 Apr 2014.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Cobb, B. and Johnson, A.W., 2014, "Mixture Distributions for Modeling Lead Time Demand in Coordinated Supply Chains," *Proceedings of the 2014 Defense Acquisition Symposium*, Monterey, CA, 5-6 Apr 2014.

LUNDAY, BRIAN J., LTC, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Sherali, H.D., Lunday, B.J., 2013, "On Generating Maximal Nondominated Benders Cuts," *Annals of Operations Research*, Vol. 210, No. 1, pp. 57-72.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kannon, T.E., Nurre, S.G., Lunday, B.J., and Hill, R.R., 2014, "The Aircraft Routing Problem with Refueling: Exact and Greedy Approaches," *Proceedings of the Industrial and Systems Engineering Research Conference (ISERC)*, Montreal, Quebec, Canada, 31 May – 3 Jun 2014.

MILLER, JOHN O., Department of Operational Sciences

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Wahoske, T., Miller, J.O., Cunningham, W.A., 2014, "Cost Effectiveness Approach to B-1B Consumable and Repairable Procurement Strategies," *Proceedings of the 2014 Industrial Engineering Research Conference*, Montreal, Canada, 31 May – 3 Jun 2014.

Weimer, C., Miller, J.O., Friend, M., and Miller, J.E., 2013, "Forecasting Effects of MISO Actions: An ABM Methodology," *Proceedings of the 2013 Winter Simulation Conference*, Washington, DC 8-11 Dec 2013, ed. R. Pasupathy, S.H. Kim, A. Tolk, R. Hill, and M.E. Kuhl.

Williams, D., Miller, J.O., and Mattioda, D., 2013, "Simulation and Analysis of EXPRESS Run Frequency," *Proceedings of the 2013 Winter Simulation Conference*, Washington, DC 8-11 Dec 2013, ed. R. Pasupathy, S.H. Kim, A. Tolk, R. Hill, and M.E. Kuhl.

NURRE, SARAH G., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Nurre, S.G., and Sharkey, T.C., 2014, "Integrated Network Design and Scheduling Problems with Parallel Identical Machines: Complexity Results and Dispatching Rules," *Networks*, Vol. 63, No. 4, pp. 306-326, Jul 2014.

Nurre, S.G., Bent, R., Pan, F., and Sharkey, T.C., 2014, "Managing Operations of Plug-In Hybrid Electric Vehicle (PHEV) Exchange Stations for Use with a Smart Grid," *Energy Policy*, Vol. 67, 364-377.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kannon, T.E., Nurre, S.G., Lunday, B.J., and Hill, R.R., 2014, "The Aircraft Routing with Air Refueling Problem: Exact and Greedy Approaches," *Proceedings of the Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada, 31 May – 3 Jun 2014.

Martin, M.T., Nurre, S.G., and Grimaila, M.R., 2014, "Modeling Shared Drive Utilization Using Stochastic Techniques," *Proceedings of the International Conference on Information and Knowledge Engineering*, Las Vegas, NV, 21-24 Jul 2014.

OVERSTREET, ROBERT E., Lt Col, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Overstreet, R.E., Hazen, B.T., Skipper, J.B., and Hanna, J.B., "Bridging the Gap between Strategy and Performance: Using Leadership Style to Enable Structural Elements," *Journal of Business Logistics*, Vol. 35, No. 2, pp.136–149.

Fawcett, S.E., Waller, M.A., Miller, J.W., Schwieterman, M.A., Hazen, B.T. and Overstreet, R.E., "A Trail Guide to Publishing Success: Tips on Writing Influential Conceptual, Qualitative, and Survey Research," *Journal of Business Logistics*, Vol. 35, No. 1, pp. 1–16.

Hazen, B.T., Weigel, F., and Overstreet, R.E., 2014, "Innovating to Integrate the Intangibles Into the Learning Air Force," *The United States Army Medical Department Journal*, pp. 77-85, Jan - Mar.

ROBBINS, MATTHEW J., Lt Col, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Guzman, J.D., Deckro, R.F., Robbins, M.J., Morris, J.F., and Ballester, N.A., "An Analytical Comparison of Social Network Measures," *IEEE Transactions on Computational Social Systems*, Vol. 1, No. 1, pp. 35-45.

Robbins, M.J., Jacobson, S.H., Shanbhag, U.V., and Behzad, B., 2014, "The Weighted Set Covering Game: A Vaccine Pricing Model For Pediatric Immunization," *INFORMS Journal on Computing*, Vol. 26, No. 1, pp. 183-198.

Bernardoni, B.J., Deckro, R.F., and Robbins, M.J., 2013, "Using Social Network Analysis to Inform Stabilization Efforts," *Military Operations Research*, Vol. 18, No. 4, pp. 37-60.

STONE, BRIAN B., Maj, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Stone, B.B., Montgomery, D.C., Hassler, E. and Silvestrini, R.T., "An Expected Cost Methodology for Screening Design Selection," *Quality Engineering*, Vol. 26, No. 2, pp. 139-153.

WEIR, JEFFERY D., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

"AFMC Hierarchy Builder Modification." Sponsor: AFMC/A9. Funding: \$150,000.

"JDPAC and AFIT Distribution Research Proposal." Sponsor: USTRANSCOM. Funding: \$155,000.

"Secretary of the Air Force Inspector General USAF Inspections Support (SAF/IGI Support)." Sponsor: SAF. Funding: \$20,088.

REFEREED JOURNAL PUBLICATIONS

Hu, M., Wu, T., Weir, J.D., 2013, "An Adaptive Particle Swarm Optimization with Multiple Adaptive Methods," *IEEE Transactions on Evolutionary Computation*, Vol.17, No.5, pp.705-720, Oct 2013.

Hendrix, J., Jacques, D., and Weir, J.D., 2014, "Continuous Decision Support," *International Journal of Multicriteria Decision Making*, Vol. 4, No. 1, pp. 69-89.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Al-Romaihi, M., Soni, S.R., Wirthlin, J.R., Badiru, A.B., Weir, J.D., and Shenk, B., "Advanced Composite Air Frame Life Cycle Cost Estimating Model," *American Society for Composites 28th Technical Conference*, Penn State University, 8-11 Sep 2013.

Breitbach, T.W., Johnson, A.W., Weir, J.D., Brown, G.R., "Afghanistan Air Cargo Routing," *Proceedings of the 2014 Industrial and Systems Engineering Research Conference*, Montreal, Quebec, Canada, 31May – 3 Jun 2014, Y. Guan and H. Liao, eds.

6.5. CENTER FOR SPACE RESEARCH AND ASSURANCE

Center for Space Research and Assurance (CSRA)

Director 255-3636 x4578

Deputy Director 255-3636 x4542

Director of Research 255-3636 x4901

Homepage: <http://www.afit.edu/CSRA>

6.5.1. DOCTRAL DISSERTATIONS

BETTINGER, ROBERT A., *The Prospect of Responsive Spacecraft Using Aeroassisted, Trans-Atmospheric Maneuvers*. AFIT/ENY/DS/14J-13. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV.

BROUSSARD, COREY M., *Multistatic Initial Orbit Determination Techniques Using Wideband Receivers*. AFIT/ENY/DS/14M-01. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV.

DOYLE, DANIEL D., *Real-Time, Multiple, Pan/Tilt/Zoom, Computer Vision Tracking, and 3D Position Estimating System for Small Unmanned Aircraft System Metrology*. AFIT/ENY/DS/13D-08. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFOSR.

LEIGH, ABRAHAM M., *Navigation Solution for a Multiple Satellite and Multiple Ground Architecture*. AFIT/ENY/DS/14S-01. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV.

SHOWALTER, DANIEL J., *Optimal Autonomous Spacecraft Resiliency Maneuvers Using Metaheuristics*. AFIT/ENY/DS/14S-29. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: USSTRATCOM.

SIMMONS, JOSEPH R., *Design and Evaluation of Dual-Expander Aerospike Nozzle Upper Stage Engine*. AFIT/ENY/DS/14S-06. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV.

6.5.2. MASTER THESES

ABBATE, EVELYN A., *Disaggregated Imaging Spacecraft Constellation Optimization with a Genetic Algorithm*. AFIT/ENY/14M-02. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A.

BASEL, JAMES P., *Analysis of Geolocation Approaches Using Satellites*. AFIT/ENY/14M-07. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV.

BENNETT, BENJAMIN M., *Systems Engineering Approach to Automated Cueing for LEO Satellite Tracking*. AFIT/ENY/14M-53. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV.

DALTON, DEVIN K., *Ground Target Overflight and Orbital Maneuvering via Atmospheric Maneuvering*. AFIT/ENY/14M-12. Faculty Advisor: Lt Col Ronald J. Simmons. Sponsor: AFRL/RV.

DANNEMEYER, ERIN R., *Design and Analysis of an Attitude Determination and Control Subsystem (ADCS) for AFIT's 6U Standard Bus*. AFIT/ENY/14M-14. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RV.

DENEVE, ELIZABETH-ANN R., *Informing Spacecraft Maneuver Decisions to Reduce Probability of Collision*. AFIT/ENY/14M-15. Faculty Advisor: Dr. William E. Wiesel, Jr. Sponsor: AFRL/RV.

DIGIACOMO, WILLIAM J., *Feasibility Assessment of Repurposing an Aerial Radio Frequency Geolocation Sensor to the Space Environment*. AFIT/ENY/14M-16. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A.

DRAS, LUKE C., *Model Uncertainty and Test of a Segmented Mirror Telescope*. AFIT/ENY/14M-18. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: NPS.

DUNK, ADAM B., *Applying KAM Theory to Highly Eccentric Orbits*. AFIT/ENY/14M-19. Faculty Advisor: Dr. William E. Wiesel, Jr. Sponsor: AFRL/RV.

FIELDS, ANDREW R., *Continuous Control Artificial Potential Function Methods and Optimal Control*. AFIT/ENY/14M-20. Faculty Advisor: Lt Col Jeremy S. Agte. Sponsor: AFRL/RV.

GRUNWALD, WARREN C., *Design of a Programmable Star Tracker-Based Reference System for a Simulated Spacecraft*. AFIT/ENY/14M-22. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV.

HATZUNG, DANIEL M., *Thermal Characterization of the Air Force Institute of Technology Solar Simulation Thermal Vacuum Chamber*. AFIT/ENY/14M-23. Faculty Advisor: Maj James L. Rutledge. Sponsor: AFRL/RV.

HELLER, JASON C., *Feasibility of Very Large Sparse Aperture Deployable Antennas*. AFIT/ENY/14M-24. Faculty Advisor: Dr. Alan L. Jennings. Sponsor: AFOSR.

KENERLEY, KYLE D., *Computer Vision Tracking Using Particle Filters for 3D Position Estimation*. AFIT/ENY/14M-28. Faculty Advisor: Dr. Alan L. Jennings. Sponsor: AFRL/RV.

KESTER, BRIAN W., *Development of a Concept of Operations for the FalconSAT-7 CubeSat*. AFIT/ENY/14M-29. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: DARPA.

LATTA III, ROBERT C., *Structural Analysis of a 6U CubeSat Chassis*. AFIT/ENY/14M-30. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV.

MITCHELL, KURT A., *Characterizing the Effects of Sensor Degradation on SOSI Network Performance*. AFIT/ENY/14M-54. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A.

PERRY, DOMINIC A., *Space Object Self-Tracker Hardware Analysis and Environmental Testing*. AFIT/ENY/14M-39. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV.

SCHAFFER, MEGAN A., *Space Object Self-Tracker Experiments*. AFIT/ENY/14M-43. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV.

STICKNEY, HEATHER M., *Performance Characterization, Development, and Application of Artificial Potential Function Guidance Methods*. AFIT/ENY/14M-44. Faculty Advisor: Lt Col Jeremy S. Agte. Sponsor: AFRL/RV.

UNRUH, REBECCA A., *Data Fusion for Decision Support*. AFIT/ENY/14M-48. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFRL/RV.

6.5.3. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BLACK, JONATHAN T., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

“AFIT Space Research in Support of SMC/SDL.” Sponsor: AFSPC. Funding: \$50,000.

“AFIT USSTRATCOM.” Sponsor: USSTRATCOM. Funding: \$30,000 - Black 50%, Jennings 25% , Simmons 25%.

“EO Imaging SmallSats Study.” Sponsor: N/A. Funding: \$75,000 - Black 50%, Swenson 50%.

“Imaging Chromotomographic Spectrometer Experiment (CTex).” Sponsor: N/A. Funding: \$55,000 - Black 40%, Cobb 30%, Swenson 30%.

“Imaging Chromotomographic Spectrometer Experiment (CTex).” Sponsor: N/A. Funding: \$97,300 - Black 50%, Hawks 50%.

“JWAC AFIT Interaction.” Sponsor: JWAC. Funding: \$125,000.

“Program Analyst for Integrated Air and Missile Defense.” Sponsor: MDA. Funding: \$12,996.23.

COLOMBI, JOHN M., Department of Systems Engineering and Management

REFEREED JOURNAL PUBLICATIONS

Colombi, J. M., Wirthlin, J. R., Auger, C. M., Yoshimoto, B. K., & Baldus, L. (2014). Modeling space launch process delays to improve space vehicle acquisition planning.. *M&S Journal, Winter,31-43*.

Colombi, J.M.; Miller, M.E.; Bohren, J.S.; Howard, J.K., (2014). Conceptual Design Using Executable Architectures for a Manned Mission to Mars, *Systems Journal, IEEE , 99, 1-13*, doi: 10.1109/JSYST.2014.2314793.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Thompson, R., Colombi, J., Black J. and B. Ayres (2014). Optimization of Disaggregated Defense Weather System Follow-on Architectures. AIAA SPACE 2014 Conference and Exposition, San Diego, CA, 4-7 Aug 2014.

Thompson, R., Colombi, J. and J. Black (2014). Computer Aided Architecting of Disaggregated Space Systems. IEEE Aerospace Conference, Big Sky, MT, 1-8 Mar 2014.

COBB, RICHARD G., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

“GEO Space Situational Awareness.” Sponsor: AFRL/RV. Funding: \$120,000 - Cobb 34%, Wiesel 33%, Simmons 33%.

“Model Uncertainty and Test of a Segmented Mirror Telescope.” Sponsor: OSD. Funding: \$20,000.

“TNG Microsatellite Development.” Sponsor: N/A. Funding: \$83,160 - Cobb 40%, Swenson 30%, Black 30%.

“Toolset Development and Pathfinder for SSA Enhancement.” Sponsor: NASIC. Funding: \$137,000.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Dras , L., Jennings, A. L., and Cobb, R. G., “Model Complexity Reduction of a Segmented Mirror Telescope,” AIAA-2014-0476, AIAA Modeling and Simulation Technologies Conference, National Harbor, MD,13-17 Jan 2014.

FERDINANDUS, MANUEL R., Maj, Department of Engineering Physics

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Honghua H, Trenton R. Ensley, Matthew Reichert, Manuel R. Ferdinandus, Davorin Peceli, Olga V. Przhonska, Seth R. Marder, Alex K-Y. Jen, Joel M. Hales, Joseph W. Perry, David J. Hagan, Eric W. Van Stryland, Optimization of the electronic third-order nonlinearity of cyanine-like molecules for all optical switching. Proc. SPIE 8983, Organic Photonic Materials and Devices XVI, 898303 (Mar 7, 2014); doi:10.1117/12.2037003.

HAKER, MARSHALL E., Maj, Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“GNSS-Based Positioning Accuracy.” Sponsor: N/A. Funding: \$35,970 - Haker 40%, Swenson 40%, Jennings 20%.

JENNINGS, ALAN L., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

“Structural Design Considerations for Very-Large Space Antenna.” Sponsor: AFOSR. Funding: \$36,720 - Jennings 75%, Black 25%.

REFEREED JOURNAL PUBLICATIONS

D.D. Doyle, A.L. Jennings, J.T. Black, “Optical Flow Background Estimation for Real-Time Pan/Tilt Camera Object Tracking,” Measurement, Elsevier, Vol. 48, Feb 2014, pp. 195-207, DOI: 10.1016/j.measurement.2013.10.025.

A. Jennings and R. Ordonez, “Optimal Inverse Functions Created via Population Based Optimization,” Transactions on Cybernetics, IEEE, Jun 2014, pp. 950-965. DOI: 10.1109/TCYB.2013.2278102.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

C. Bellows, A.L. Jennings, J. Black, “Analysis of Angle Data Extraction Techniques for Electro-optical Satellite Tracking,” AIAA Space 2014, 5 Aug 2014.

Alyssa Gutierrez, A.L. Jennings, “Cloud-Induced Uncertainty for Visual Navigation: Development of Cloud Templates,” IEEE National Aerospace Electronics Conference (NAECON), 25 Jun 2014.

A.L. Jennings, M. Mayhew, J. Black, “In-Flight Oscillation of Flapping Wing Vehicle,” AIAA Atmospheric Flight Mechanics Conference, 17 Jan 2014, DOI: 10.2514/6.2014-0890.

Jason Heller, A.L. Jennings, J. Black, G. Greschik, “Precision of Large Deployable Reflector,” AIAA Spacecraft Structures Conference, 17 Jan 2014, DOI:10.2514/6.2014-1513.

L. Dras, A.L. Jennings, R. Cobb, "Model Complexity Reduction of a Segmented Mirror Telescope," AIAA Modeling and Simulation Technologies Conference, 17 Jan 2014, DOI: 10.2514/6.2014-0476.

SWENSON, ERIC D., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"AFRL/RV-AFIT 2012 MOA Research." Sponsor: AFRL/RV. Funding: \$375,000 - Swenson 25%, Cobb 25%, Black 25%, Wiesel 25%.

"Multidisciplinary Satellite, Design, Build and Test." Sponsor: N/A. Funding: \$70,000 - Swenson 40%, Black 40%, Cobb 20%.

"Peregrine: Deployable Photon Sieve." Sponsor: DARPA. Funding: \$35,405 - Swenson 40%, Black 25%, Cobb 25%, Rutledge 10%.

6.6. CENTER FOR TECHNICAL INTELLIGENCE STUDIES AND RESEARCH

Center for Technical Intelligence Studies and Research (CTISR)

Director 255-3636 x4547

Homepage: <http://www.afit.edu/CTISR>

6.6.1. DOCTORAL DISSERTATIONS

GIVENS, RYAN N., *Automated Synthetic Scene Generation*. AFIT/ENP/DS/14S-08. Faculty Advisor: Col Karl C. Walli. Sponsor: AFRL/Ry.

6.6.2. MASTER'S THESES

CASEBOLT, JARED D., *Characterization of Construction Material Properties through Gamma Spectroscopy, X-ray Fluorescence, and Hyper-Spectral Imagery for Background Correction Applications in Nuclear Detection*. AFIT/ENP/14M-45. Faculty Advisor: Dr. David J. Bunker. Sponsor: DTRA.

DUFAUD, KYLE J., *An Experimental Evaluation of Image Quality for Various Scenarios in a Chromotomographic System with a Spinning Prism*. AFIT/ENP/14M-07. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: N/A.

HOLDER, JOEL G., *Polarimetric Calibration and Characterization of the Telops Field Portable Polarimetric-Hyperspectral Imager*. AFIT/ENP/14M-14. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: DTRA.

LENYK, CHRISTOPHER A., *Defining a Methodology for Data Analysis Using Streak Films*. AFIT/ENP/14M-20. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA.

PEERY, TYLER R., *Modeling Nuclear Weapon Fireballs in DIRSIG*. AFIT/ENP/14M-28. Faculty Advisor: Col Karl C. Walli. Sponsor: DOE/NNSA.

RAYNOR, ROBERT A., *Range Finding with a Plenoptic Camera*. AFIT/ENP/14M-29. Faculty Advisor: Col Karl C. Walli. Sponsor: N/A.

TERVO, RYAN L., *Comparative Analysis of Reconstructed Image Quality in a Simulated Chromotomographic Imager*. AFIT/ENP/14M-35. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: N/A.

6.6.3. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BUNKER, DAVID J., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

“Open Skies Assessment.” Sponsor: NASIC. Funding: \$100,000 - Bunker 50%, Hopkinson 25%, Peterson 25%.

“Overhead Persistent Infra-Red (OPIR) Research and Algorithm Development.” Sponsor: NGA. Funding: \$375,000 - Bunker 50%, Borel-Donohue 50%.

“Rapid Location of Radiation Sources in Complex Environments Using Optical and Radiation Sensors.”
Sponsor: DTRA. Funding: \$308,340 - Bunker 25%, Borel-Donohue 50%, Magnus 15%, Tuttle 10%.

“Signatures from Human Activities.” Sponsor: AFOSR. Funding: \$15,000 - Bunker 35%, Borel-Donohue 35%, Magnus 30%.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

C. A. Lenyk, D. J. Bunker, J. W. McClory, B. R. Kowash, S. R. McHale, “Defining a Methodology for Data Analysis Using Streak Films,” *Hardened Electronics and Radiation Technology Conference, Proceedings*, Paper PE.1, Mar 2014. Available with limited distribution at <http://www.dtra.mil/DTRIAC/stars>.

GROSS, KEVIN C., Department of Engineering Physics

REFEREED JOURNAL PUBLICATIONS

J. M. Gordon, K. C. Gross, G. P. Perram, “Temperature dynamics of aluminized cyclotrimethylenetrinitramine fireballs for event classification,” *Optical Engineering*, Vol. 53, No. 2, paper # 021106 (2013). <http://dx.doi.org/10.1117/1.OE.53.2.021106>.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

J. M. Holder, Jacob A. Martin, Jeremy Pitz, Larry Pezzaniti, Kevin C. Gross, “Calibration methodology and performance characterization of a polarimetric hyperspectral imager,” *Proc. SPIE 9099, Polarization: Measurement, Analysis, and Remote Sensing XI*, 90990J (May 21, 2014); SPIE Defense, Security, and Sensing, Baltimore, MD, 5-9 May 2014. <http://dx.doi.org/10.1117/12.2053783>.

HAWKS, MICHAEL R., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

“Spectropolarimetric Imaging of Disturbed Earth (SIDE).” Sponsor: USA/ERDC. Funding: \$20,000 - Hawks 80%, Gross 20%.

MAGNUS, AMY L., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

“Signatures from Human Activities.” Sponsor: AFOSR. Funding: \$18,000 - Magnus 30%, Bunker 35%, Borel 35%.

“Understanding Persona in Cyberspace.” Sponsor: NSA. Funding: \$10,000.

PERRAM, GLEN P., Department of Engineering Physics

REFEREED JOURNAL PUBLICATIONS

J. M. Gordon, K. C. Gross, G. P. Perram, “Temperature dynamics of aluminized cyclotrimethylenetrinitramine fireballs for event classification,” *Optical Engineering*, Vol. 53, No. 2, Paper # 021106 (2013). <http://dx.doi.org/10.1117/1.OE.53.2.021106>.

J. M. Gordon, K. C. Gross, G. P. Perram, “*Temperature dynamics of aluminized cyclotrimethylenetrinitramine (RDX) fireballs for event classification*,” *Optical Engineering* 53(2), 021106, Feb 2014.

7. TECHNOLOGY TRANSFER

7.1. COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS

“Cyber Collaborations for Air Defense,” USAF CRADA 14-AFIT-02, Collaborator: Raytheon Company, Faculty Investigator: Dr Rusty Baldwin, Effective Date: 24 Oct 2013, Term: 12 months.

“Human Universal Measurement and Assessment Network (HUMAN),” USAF CRADA 14-AFIT-05, Collaborator: Aptima Inc, Faculty Investigator: Dr Brett Borghetti, Effective Date: 20 Aug 2014, Term: 12 months.

“In-Process Monitoring of Additive Manufacturing,” USAF CRADA 14-AFIT-04, Collaborators: Mound Laser & Photonics Center Inc and Wright State University, Faculty Investigator: Dr Glen Perram, Effective Date: 5 Sep 2014, Term: 12 months.

“Signatures from Human Activities,” USAF CRADA 14-AFIT-01, Collaborator: Central State University, Faculty Investigator: Dr David Bunker, Effective Date: 23 Oct 2013, Term: 60 months.

“Star Trackers for Non-GPS Navigation,” USAF CRADA 14-AFIT-06, Collaborator: Charles Stark Draper Laboratory, Inc, Faculty Investigator: Dr John Raquet, Effective Date: 9 Sep 2014, Term: 27 months.

“Technical Intelligence Analyst Enhancement,” USAF CRADA 14-AFIT-03, Collaborator: Radiance Technologies Inc, Faculty Investigator: Dr David Bunker, Effective Date: 31 Dec 2013, Term: 48 months.

7.2. EDUCATIONAL PARTNERSHIP AGREEMENTS

“Facilitate Graduate Education Between Local Universities,” AFIT EPA 2014-01, Collaborator: Dayton Area Graduate Studies Institute, Faculty Investigator: Dr Heidi Ries, Effective Date: 13 Mar 2014, Term: 60 months.

APPENDICES

APPENDIX A: POST-DOCTORAL AND OTHER RESEARCH ASSOCIATES' CREDENTIALS

BASU, SANTASRI, Post-Doctoral Research Associate, Department of Engineering Physics, AFIT
Appointment date: 2011 (AFIT/ ENP); BS, Electrical Engineering, Jadavpur University, India, 2000; MS, Electrical Engineering, New Mexico State University, 2005; PhD, Electrical Engineering, New Mexico State University, 2008. Dr. Basu is working on modeling scattering from rough surfaces and laser beam propagation and imaging problems through atmospheric turbulence. Tel. 937-255-3636 x4903, email: Santasri.Basu.ctr.in@afit.edu.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Santasri Basu, Milo W. Hyde IV, Jack E. McCrae, Jr., Mark F. Spencer and Steven T. Fiorino, "Examining the validity of using a Gaussian Schell Model for modeling an extended beacon on a rough perfectly reflecting surface," Proceedings of SPIE, Vol. 9224, 92240L (2014).

Mark F. Spencer, Milo W. Hyde IV, Santasri Basu and Michael A. Marciniak, "The scattering of partially coherent electromagnetic beam illumination from a statistically rough surface modeled as a perfect electrical conductor," Proceedings of SPIE, Vol. 9205, 92050J (2014).

FRANCIS, SARAH A., Post-Doctoral Research Associate, Department of Engineering Physics, AFIT
Appointment Date: 2012 (AFIT/ENP); BS, Electrical Engineering, Western Kentucky University, 2006; MS, Electrical Engineering, Vanderbilt University, 2008; PhD, Electrical Engineering, Vanderbilt University, 2011; Dr Francis' research interests include semiconductor device physics, semiconductor performance and reliability analysis, and radiation effects in materials and systems. Tel. 937-255-3636 x4698, email: Sarah.Francis.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

S. Ashley Francis, Cory D. Cress, John W. McClory, Elizabeth A. Moore, James C. Petrosky, "Characterization of Radiation Damage in Carbon Nanotube Field-Effect Transistors," *IEEE Transactions on Nuclear Science*, Vol.60, No.6, pp.4087-4093, Dec 2013. <http://dx.doi.org/10.1109/TNS.2013.2284542>.

Singleton, B. J., J. C. Petrosky, M. C. Pochet, N. G. Usechak, S. A. Francis, "Gamma-radiation-induced degradation of actively pumped single-mode ytterbium-doped optical fibers," *Proc. SPIE 8982, Optical Components and Materials XI, 89820S*, Vol. 60, Article No. 6 (2014).

HARRIS, THOMAS R., Post-doctoral Research Associate, Department of Engineering Physics, AFIT
Appointment Date: 2014 (AFIT/ENP); BS, Physics, Cedarville University, 2008; MS, Applied Physics, Air Force Institute of Technology, 2010; PhD, Applied Physics, Air Force Institute of Technology, 2014; Dr Harris' research interests include semiconductors, esp. direct-bandgap group-IV alloys, optoelectronics, materials characterization, and device physics. Tel. 937-255-3636 x4574, email: Thomas.Harris.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

T. R. Harris, Y. K. Yeo, M.-Y. Ryu, R. T. Beeler, and J. Kouvetakis, "Observation of heavy- and light-hole split direct bandgap photoluminescence from tensile-strained GeSn (0.03% Sn)," *Journal of Applied Physics* 116, Article No. 103502 (2014).

T. R. Harris, M.-Y. Ryu, Y. K. Yeo, R. T. Beeler, and J. Kouvetakis, "Electrical characterization studies of p-type Ge, Ge_{1-y}Sn_y, and Si_{0.09}Ge_{0.882}Sn_{0.028} grown on n-Si substrates," *Current Applied Physics* 14, S123 (2014).

KANEL, SUSHIL R., National Research Council Post-Doctoral Fellow, AFIT Appointment Date: 2010 (AFIT/ENV); BE, Civil Engineering, Tribhuvan University (Nepal), 1992; MS, Environmental Science and Engineering, Gwangju Institute of Science and Technology (South Korea), 2001; PhD, Environmental Science and Engineering, Gwangju Institute of Science and Technology (South Korea), 2006. Dr. Kanel's work is focused on the fate and transport of nanomaterials in the subsurface, as well as the application of nanomaterials for water remediation. Tel. 937-255-3636 x4568, email: Susil.Kanel.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

Park K., Biswas, S., Kanel S. R., Nepal D., Vaia R. A. Engineering the Optical Properties of Gold Nanorods: Independent tuning of surface plasmon energy, extinction coefficient and scattering cross-section, *The Journal of Physical Chemistry C*, 118 (11), 5918-5926, 2014

Dorney, K.M., Baker, J.D., Edwards, M.L., Kanel, S.R., O'Malley, M., Sizemore I. P. Tangential Flow Filtration of Colloidal Silver Nanoparticles: A "Green" Laboratory Experiment for Chemistry and Engineering Students, *Journal of Chemical Education*, 91, 1044-1049, 2014

Kanel, S. R., Malla G., Choi H. Modeling and study of the mechanism of mobilization of arsenic contamination in the groundwater of Nepal in South Asia, *Clean Technologies & Environmental Policy*, 15, 1077-1082, 2013

Chattanathan S. A., Clement T. P., Kanel S. R., Barnett M. O. and Chatakondi N. Remediation of uranium-contaminated groundwater by sorption onto hydroxyapatite derived from catfish bones, *Water, Air and Soil Pollution*, 244, 1-9, 2013

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Kanel, S. R., Mario, T., Meyerhoefer, A., Goltz, M. N. Photo-oxidation of Nitroaromatic Explosives in Aqueous Solution by Silver Doped Titanium Dioxide Thin Film in the Presence of Natural Solar Light, *World Environmental and Water Resource Congress*, Portland, OR, USA, 1-5 Jun 2014.

Kanel, S. R., Mario, T., Goltz, M. N. The Challenges of Remediating Perfluorinated Compounds with Energy Efficient Techniques, *Ninth International Conference of Chlorinated and Recalcitrant Compounds Battelle Conference*, Monterey, CA, 19-22 May 2014

Kanel, S. R., Malla, G., Choi, H. Stochastic modeling and study of the mechanism of mobilization of the arsenic contamination in the groundwater of Nepal in South Asia, *World Environmental and Water Resource Congress*, Cincinnati, OH, USA, 19-23 May 2013.

KEEFER, KEVIN J., Research Physicist, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, Atmospheric Physics, United States Air Force Academy, 1981; MS, Systems Management, University of Southern California, 1983; MS Engineering Physics, Air Force Institute of Technology, 1985; PhD Solid State Physics, Air Force Institute of Technology, 1990; Measurement and Signature Intelligence Certificate, Air Force Institute of Technology, 2004. Dr Keefer's research interests include atmospheric sciences with particular focus on atmospheric radiative transfer effects and processes for remote sensing and directed energy applications; microphysical and radiative effects associated with atmospheric molecular and aerosol constituents; and military/geo-political history and implications for development of current and future national security strategy. Tel 937-255-3636 x4344, email: Kevin.Keefer.ctr@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Fiorino, S. T., M.F. Via, D.C. Meier, B.J. Elmore, and K.J. Keefer, "Enhanced Atmospheric Refraction and Radiative Transfer Analyses Merging Gridded Numerical Weather Forecast and Satellite Data," (Poster), 18th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans

and Land Surface (IOAS-AOLS), 94th Annual American Meteorological Society Meeting, Atlanta, GA 2-6 Feb 2014. <https://ams.confex.com/ams/94Annual/webprogram/Paper241611.html>. [CDE]

Fiorino, S. T., M.F. Via, D.C. Meier, B.J. Elmore, and K.J. Keefer, "Enhanced 4D Resolution of Atmospheric Transmission and Climate Change Modeling Using Real-Time Satellite, Surface, and Numerical Weather Data," 35th Annual Review of Atmospheric Transmission Models, Albuquerque, NM, 10-12 Jun 2014. [CDE]

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Fiorino, S. T., N.R. Van Zandt, K.J. Keefer, and P.R. Donnelly, "Improved Correlation of Thermal Blooming Distortion Number and Far-Field Irradiance in a Turbulent Environment," Directed Energy Professional Society, 16th Annual Directed Energy Symposium, Huntsville, AL, 10-14 Mar 2014. [CDE]

Van Zandt, N.R., S.T. Fiorino, K.J. Keefer, "A Comparison of Wave Optics and a High-Fidelity Scaling Law Code and Implications for Field Tests / Demos," Directed Energy Professional Society, 9th Annual Directed Energy Systems Symposium, Monterey, CA, 25-28 Aug 2014. [CDE]

Rice, C.A., K.J. Keefer, S.C. Wamsley, M.F. Via, and S.T. Fiorino, "Classification of Aerosol Type Using Field Deployable Ultraviolet LIDAR and Atmospheric Models," Directed Energy Professional Society, 9th Annual Directed Energy Systems Symposium, Monterey, CA, 25-28 Aug 2014. [CDE]

KEENAN, CAMERON B., Post-Doctoral Research Associate. AFIT Appointment Date: 2013 (AFIT/ENP); BS. Physics, Case Western Reserve University, 2002; PhD, Physics, West Virginia University, 2011. Dr. Keenan's work is focused on computer simulation and analysis of gas species during combustion events using imaging and non-imaging Fourier Transform Spectroscopy. Email: Cameron.Keenan@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

S.M. Baumann, C. Keenan, M.A. Marciniak and G.P. Perram, "Spectral and temperature-dependent infrared emissivity measurements of painted metals for improved temperature estimation during laser damage testing," Proceedings of the SPIE, Vol. 9237, 9237-39, 14-17 Sep 2014, Boulder, CO. [CDE]

KING, AMANDA S., Post-Doctoral Research Associate, Department of Mathematics and Statistics, AFIT Appointment Date: 2013 (AFIT/ENC); BS, Eastern Kentucky University, 2005; MS, Wright State University, 2009; PhD, Air Force Institute of Technology, 2013. Dr. King has been working on a model to predict crack length in air plane wings using electrical impulses. Tel. 937-255-3636 x6105, email: Amanda.King@afit.edu

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

King, A. S., C. M. Schubert Kabban, C. P. Edelmann, M. M. Derriso, "An Evaluation of Joint Models Using Different Feature Extraction Metrics for Structural Health Monitoring (SHM) of Aircraft," Interface Conference on Applied Statistics, Alexandria, VA, Dec 2013.

KONDRATH, ANDREW S., Oak Ridge Institute for Science and Education Post-Doctoral Research Fellowship, AFIT Appointment Date: 2014 (AFIT/ENG/ANT Center); BS, Electrical Engineering, Wright State University, 2004; MS, Electrical Engineering, Wright State University, 2007; PhD, Electrical Engineering, Wright State University, 2012. Dr. Kondrath's work is focused on trajectory optimization in radar simultaneous localization and mapping. Tel. 937-554-8055, email: Andrew.Kondrath.ctr@afit.edu.

RICE, CHRISTOPHER A., Post-Doctoral Research Associate, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, Electrical Engineering, Cedarville University, 2004; MS, Electrical Engineering, Air Force Institute of Technology, 2006; PhD, Applied Physics, Air Force Institute of Technology, 2012. Dr. Rice is interested in topic areas related to high energy lasers, remote sensing, and optical diagnostics. His work on specific research topics currently include atmospheric propagation of diode pumped alkali lasers; diode pumped alkali laser gain cell construction; aerosol measurement and validation;

modeling, simulation, and validation of directed energy simulations; rare gas laser device construction; and atmospheric aerosol characterization. Tel. 937-255-6565 x4375, email: Christopher.Rice.ctr@afit.edu

OTHER SIGNIFICANT RESEARCH PRODUCTIVITY

Steven T. Fiorino, Christopher A. Rice, Kevin J. Keefer and Michelle F. Via. "Lidar Validation Experiments of LEEDR Aerosol Boundary Layer Characterizations," Directed Energy Professional Society Sixteenth Annual Directed Energy Symposium, (2014).

Steven T. Fiorino, Christopher A. Rice, Kevin J. Keefer and Michelle F. Via. "Characterization of Aerosol Types using Field Deployable Ultraviolet LIDAR and Atmospheric Models," Directed Energy Professional Society Ninth Beam Control Conference, (2014).

TURNER, DAVID, Post-Doctoral Research Associate, Department of Engineering Physics, AFIT
Appointment Date: 2013 (AFIT/ENP); BS, Biochemistry, Millersville University of Pennsylvania, 2003;
PhD, Chemistry, The Ohio State University, 2009; Dr. Turner's research is focused on advanced
spectroscopy of actinides and radiation detection materials. Tel. 937-255-3636 x4742, email:
David.Turner.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

T. D. Kelly , J. C. Petrosky, D. Turner, J. W. McClory, J. M. Mann, J. W. Kolis, Xin Zhang, P. A. Dowben,
"The unoccupied electronic structure characterization of hydrothermally grown ThO₂ single crystals,"
Physica Status Solidi - Rapid Research Letters, Vol. 8, No. 3, pp. 283-286, Mar 2014.
<http://dx.doi.org/10.1002/pssr.201308286>.

APPENDIX B: SELECTED ACRONYM LIST

There are a number of abbreviations for organizations that are used in this report. This alphabetical listing includes only selected organizations.

711 HPW/RH	711 th Human Performance Wing Human Effectiveness Directorate
ACC	Air Combat Command
AETC	Air Education and Training Command
AFCEC	Air Force Civil Engineering Center
AFIT	Air Force Institute of Technology
AFLCMC	Air Force Life Cycle Management Center
AFMC	Air Force Materiel Command
AFMOA	Air Force Medical Operations Agency
AFMSA	Air Force Medical Support Agency
AFNWC	Air Force Nuclear Weapons Center
AFRL	Air Force Research Laboratory
AFRL/AFOSR	AFRL/Air Force Office of Scientific Research
AFRL/RD	AFRL/Directed Energy Directorate
AFRL/RI	AFRL/Information Directorate
AFRL/RQ	AFRL/Aerospace Systems Directorate
AFRL/RV	AFRL/Space Vehicles Directorate
AFRL/RW	AFRL/Munitions Directorate
AFRL/RX	AFRL/Materials and Manufacturing Directorate
AFRL/RY	AFRL/Sensors Directorate
AFSC	Air Force Sustainment Center
AFSEO	Air Force Seek Eagle Office (46 SK/SKE)
AFSPC	Air Force Space Command
AFTPS	Air Force Test Pilot School
AFTAC	Air Force Technical Applications Center
AFWA	Air Force Weather Agency
AIAA	American Institute of Aeronautics and Astronautics
AMC	Air Mobility Command
AMEDD	United States Army Medical Department
AMRDEC	Aviation and Missile Research Development and Engineering Center
ASEE	American Society for Engineering Education
ATEC	United States Army Test and Evaluation Command
CAA	Center for Army Analysis
CPM	College of Performance Management
CyTCoE	Cyberspace Technical Center of Excellence
DAGSI	Dayton Area Graduate Studies Institute
DARPA	Defense Advanced Research Projects Agency
DAU	Defense Acquisition University
DHS	Department of Homeland Security
DISA	Defense Information Systems Agency
DOD	Department of Defense
DOE	Department of Energy
DTRA	Defense Threat Reduction Agency
EPA	Environment Protection Agency
ERDC	Engineer Research and Development Center
EUCOM	United States European Command
FORSCOM	United States Army Forces Command
HELJTO	High Energy Laser Joint Technology Office
IEEE	Institute of Electrical and Electronics Engineers
INCOSE	International Council on Systems Engineering
JASPO	Joint Aircraft Survivability Program Office
JTWC	Joint Typhoon Warning Center

JWAC	Joint Warfare Analysis Center
LANL	Los Alamos National Laboratory
LLNL	Lawrence Livermore National Laboratory
LTS	Laboratory for Telecommunications Sciences
MDA	Missile Defense Agency
MIT	Massachusetts Institute of Technology
MORS	Military Operations Research Society
NAMRU-D	Naval Medical Research Unit - Dayton
NASA	National Aeronautics and Space Administration
NASIC	National Air and Space Intelligence Center
NAVSEA	Naval Sea Systems Command
NGA	National Geospatial-Intelligence Agency
NHSRC	National Homeland Security Research Center
NNSA	National Nuclear Security Administration
NPS	Naval Postgraduate School
NSA	National Security Agency
NSF	National Science Foundation
ORNL	Oak Ridge National Laboratory
OSD	Office of the Secretary of Defense
PACAF	United States Pacific Command
SAF	Office of the Secretary of the Air Force
SERDP	Strategic Environmental Research and Development Program
SMC	Space and Missiles Systems Center
SPIE	The International Society for Optical Engineering
TARDEC	United States Army Tank Automotive Research, Development & Engineering Center
TuAF	Turkish Air Force
USAACE	United States Army Aviation Center of Excellence
USAF	United States Air Force
USAFA	United States Air Force Academy
USSTRATCOM	United States Strategic Command
USTRANSCOM	United States Transportation Command
WPAFB	Wright-Patterson Air Force Base

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