

AWARD NUMBER: W81XWH-13-1-0124

TITLE: "Georgetown University and Hampton University Prostate Cancer Undergraduate Fellowship Program

PRINCIPAL INVESTIGATOR: Anatoly Dritschilo, MD

CONTRACTING ORGANIZATION: Georgetown University
Washington, DC 20057

REPORT DATE: January 2018

TYPE OF REPORT: Addendum to Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release;
Distribution Unlimited

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

1. REPORT DATE January 2018		2. REPORT TYPE Addendum to Final		3. DATES COVERED 23Sept2016 - 22Sept2017	
4. TITLE AND SUBTITLE "Georgetown University and Hampton University Prostate Cancer Undergraduate Fellowship Program				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER W81XWH-13-1-0124	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Anatoly Dritschilo, MD (Georgetown University) & Luisel Sant Ricks, PhD(Hampton University) E-Mail:dritscha@georgetown.edu				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Georgetown University Department of Oncology Research Building 3970 Reservoir Road NW Washington, DC 20057				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Medical Research and Materiel Command Fort Detrick, Maryland 21702-5012				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution Unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT The training program had two goals. The first was to integrate the students from Hampton University (HU) into the Prostate Cancer Center at Georgetown University through research, lectures, seminars, and clinical exposure. The second was to attract talented HU students into the graduate prostate cancer programs at GU and elsewhere. The training program was of two parts. Part I (8-12 weeks) consisted of a mentored summer research experience at GU in a laboratory and didactic lectures and seminars. Attendance at clinical conferences relevant to prostate cancer allowed trainees to learn about prostate cancer patient diagnosis and treatment issues. Trainees participated in weekly graduate record exam study sessions for the GRE general and subject tests. At Hampton University, during the academic year, Part II consisted of an educational and research component to enhance prostate cancer research training of the students through participation in HU BIO408 – Research Problems. Students from HU conducted research on the mechanism of action of novel drugs that sensitize prostate tumors to radiation treatment; on the role of metals in the activation of the androgen receptor; differences in protein signatures of prostate cancer cells from African and European Americans; and Metabolomic profiles from cells derived from AA vs Caucasians that were treated with chemotherapeutic agents in vitro. All student trainees registered to take the GRE exam.					
15. SUBJECT TERMS None listed					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Unclassified	18. NUMBER OF PAGES 19	19a. NAME OF RESPONSIBLE PERSON USAMRMC
a. REPORT Unclassified	b. ABSTRACT Unclassified	c. THIS PAGE Unclassified			19b. TELEPHONE NUMBER (include area code)

Table of Contents

	<u>Page</u>
1. Introduction.....	4
2. Overall Project Summary.....	4
3. Key Research and Training Accomplishments.....	5
4. Publications, Abstracts, and Presentations.....	10
5. Inventions, Patents and Licenses.....	11
6. Reportable Outcomes.....	11
7. Other Achievements.....	11
8. Appendix: Summer Lecture Titles and Schedule.....	12

INTRODUCTION

The Lombardi Comprehensive Cancer Center (LCCC) at Georgetown University (GU) is a National Cancer Institute designated Comprehensive Cancer Center. The Prostate Center at LCCC has a multidisciplinary clinic where physicians and scientists interact to advance state-of-the-art treatment of patients with the goal of curing prostate cancer and maximizing quality of life.

Urological surgeons, radiation oncologists, population scientists, medical oncologists, patient advocates, and basic scientists work together to develop clinical protocols that translate laboratory and technical discoveries to the clinic. Scientists at the Prostate Center are working to discover the molecular causes of prostate cancer and the population-wide impact of the disease. Their research is grouped into several thematic areas including prevention, detection and diagnosis, advancing treatment, and survivorship. Hampton University (HU), founded in 1869, is a dynamic, progressive institution of higher education that is a privately endowed, non-profit, non-sectarian, co-educational, Historically Black Colleges and Universities (HBCUs). The Department of Biological Sciences at HU has over 400 students and offers B.Sc. and M.Sc. degrees. The Department is ranked as 5th among HBCU's in the quality the B.Sc. program and boasts a retention rate of close to 100%. The DOD HU/GU Prostate Cancer training program had two goals. The first goal was to integrate upper level undergraduate students from Hampton University into the Georgetown Lombardi Comprehensive Cancer Center Prostate Center through research, lectures, seminars, and clinical exposure through a summer research experience. The second goal was to attract talented HU students into the graduate prostate cancer program, particularly at Georgetown University. To achieve these goals, the training program was divided into two parts. Part I (8-12 weeks) consisted of a mentored summer research experience at GU in the laboratory of a training faculty member and attendance at lectures, seminars, and journal clubs that provided a comprehensive scientific foundation in prevention, etiology, and initiation, and treatment options in prostate cancer. Attendance at clinical grand rounds and clinical conferences concerning prostate cancer allowed the trainees to gain an understanding of factors in prostate cancer diagnosis and treatment. Also, during the summer session, trainees attend a weekly graduate school preparation session and were scheduled to take the GRE general and relevant subject tests. During the academic year at Hampton University, Part II consisted of an educational and research component that enhanced the prostate cancer training of the students through enrollment in HU BIO408 – Research Problems. This class consists of seminars/lectures given by the HU and GU training faculty. In addition, the HU faculty served as mentors for prostate cancer research projects and assisted in development of research poster presentations.

KEY WORDS: prostate cancer, undergraduate training, underrepresented minorities

OVERALL PROJECT SUMMARY

Throughout the years of funding, we successfully recruited four very talented upper level undergraduate Biology and Biochemistry Majors from Hampton University to work throughout the summer participating in prostate cancer research at Georgetown University. In addition to working on mentored research projects, the students participated in seminars, lectures and clinically oriented meetings. They participated in practice sessions to prepare for the GRE exam. The students all successfully completed the Research Problems course at Hampton University and registered to take the GRE exam this semester if this goal has not already been accomplished.

KEY RESEARCH ACCOMPLISHMENTS *September 2015 to September 2017*

Aim 1 – Foster collaborations between Georgetown University and Hampton University that will lead to the recruitment of Hampton University undergraduate students into the prostate cancer training program at Georgetown University Medical Center.

Task 1. Recruitment of Hampton University undergraduate students:

A. Recruitment:

1. Dr. Ricks-Santi recruited a third year student for the summer of 2017 Nadia Holness (Dr. Christopher Albanese) and four third year undergraduate students from the Department of Biological Sciences at Hampton University for the summer of 2016. The students included Ms. Marissa (Dr. Vicente Notario), Ms. Jelissa Washington (Dr. Jan Blancato), Ms. Tanisha Maitre (Dr. MaryBeth Martin), and Mr. Tyler Dickerson (Dr. Christopher Albanese). Dr. Ricks Santi recruited Ms. Shannon Anderson, MS. Fiona Lewis, Mr. Myron Gilbert, and Mr. Ashton Green for the summer of 2015, and Ms. Tamara Miler, Tyanna Gray, Ms. Jasmine Hatcher-Moorman, and Mr. Isaih Brown.

Georgetown University faculty and graduate school staff visited Hampton U early each Spring for a seminar aimed to describe and answer questions about the Summer Prostate cancer research program.

B. Selection:

1. The students were selected based on their research interests, overall and science GPA, and letters of recommendation.

Task 2a. Placement of Hampton University undergraduate students in Georgetown University mentor's laboratory:

1. Based on their research interest, the Hampton students identified potential mentors in the GUMC prostate program.
2. Potential Georgetown University mentors were then contacted. Hampton University students were provided the contact information of undergraduate, graduate, and postdoctoral trainees in the mentor's laboratory and encouraged to contact the mentor's trainees.

Task 2b. Provide Hampton University students with rigorous coursework in cancer biology methods during the academic year:

Course coordinator:

Luisel Ricks-Santi, PhD

Associate Professor

Department of Biological Sciences

Director, Cancer Research Center

Hampton University

Hampton, VA 23668

Academic Catalog Course Description- BIO 423 Cancer Biology Laboratory. This Laboratory course is based on principles of cancer biology and fundamental techniques by which to investigate biochemical and molecular end-point responses of normal and cancer cells. The course is designed to provide hands-on laboratory research experience that will strengthen the ability of students to develop testable scientific hypotheses and skills in data analysis.

Prerequisite: BIO 105 and consent of instructor.

Applied Course Description – The goal of this course to identify the differences between normal cells and cancer cells using techniques commonly used in molecular biology. This

course will effectively train students to identify the appropriate technique for a given research question with a focus on some of the hallmarks of cancer. Those hallmarks are: (1) cancer cells stimulate their own growth; (2) they resist inhibitory signals that might otherwise stop their growth; (3) they resist their own programmed cell death (apoptosis); (4) they stimulate the growth of blood vessels to supply nutrients to tumors (angiogenesis); (5) they can multiply forever; (6) they invade local tissue and spread to distant sites (metastasis); (7) abnormal metabolic pathways; (8) evading the immune system; (9) chromosome abnormalities and unstable DNA; and (10) inflammation.^{1,2}

This lab experience will also reinforce understanding of the central dogma (Figure 1) – the flow of information from DNA to RNA to protein to phenotype, through comparing the phenotype of lung cancer cells from a smoker and a patient who never smoked. The lab will address basic principles in cell and molecular biology, including chemistry, cell structure and function, transcription and translation, enzymes, and principles of cell cycle regulation. The lab will also provide an opportunity to discuss relevant issues in society today (e.g., prostate cancer prevention and treatment, health care disparities) and why prostate cancer is so difficult to treat (e.g. not just one disease, as illustrated by the different genetic changes in the two cancer cell lines that are investigated).

Lab theme: Prostate Cancer

Prostate cancer (PCa) is the most common non-skin cancer and the second leading cause of cancer death among men in the United States (US) [1]. Although there are three well-established risk factors for prostate cancer, age, ethnicity, and family history [2], the molecular mechanisms underlying its development and progression remain poorly understood. Additionally, the factors influencing disparities of PCa in African American (AA) men also remain poorly understood as AA men have the highest mortality rate for PCa of any racial or ethnic group in US. The wide variation observed in the incidence of PCa and mortality rates in AA men are suggested to be multifactorial, with varying effects of genetic predisposition, diet, and other environmental factors. One approach that can help improve characterization of PCa tumors is to identify the molecular mechanisms that drive the aggressive phenotype and to identify the genes associated with aggressive, high Gleason (grade) PCa. So far, molecular analysis of PCa tumors have resulted in the identification of genomic markers associated with adverse outcomes and several groups have attempted to develop genomic profiles that can predict PCa aggressiveness [3-10]. Required Textbook(s) and materials- This course will use the publications and informational pamphlets:

Hanahan D, Weinberg RA (January 2000). "The Hallmarks of Cancer". *Cell* 100 (1):57–70. doi:10.1016/S0092-8674(00)81683-9. PMID 10647931

Hanahan, D. & Weinberg R.A. (2011) "Hallmarks of Cancer: The Next Generation". *Cell* 144 (5): 646-674. Doj: 10.1016/j.cell.2011.02.013. PMID 21376230

3-ring binder to place lab guides in.

Composition notebook to be used as a lab notebook. If you prefer, you can use Microsoft OneNote as an eLab notebook to write up your labs and keep your notes.

Recommended Reading (as cited in Lab Theme):

1. American Cancer Society, Cancer Facts and Statistics 2014. 2014.
2. Rodriguez C, Calle EE, Miracle-McMahill HL, Tatham LM, Wingo PA, Thun MJ, Heath CW, Jr.: Family history and risk of fatal prostate cancer. *Epidemiology* 1997, 8:653-657.
3. Klein EA, Cooperberg MR, Magi-Galluzzi C, Simko JP, Falzarano SM, Maddala T, Chan JM, Li J, Cowan JE, Tsiatis AC, Cherbavaz DB, Pelham RJ, Tenggara-Hunter I, Baehner FL, Knezevic D, Febbo PG, Shak S, Kattan MW, Lee M, Carroll PR: A 17-gene Assay to Predict Prostate Cancer Aggressiveness in the Context of Gleason Grade Heterogeneity, Tumor Multifocality, and Biopsy Undersampling. *Eur Urol* 2014.

4. Bibikova M, Chudin E, Arsanjani A, Zhou L, Garcia EW, Modder J, Kostelec M, Barker D, Downs T, Fan JB, Wang-Rodriguez J: Expression signatures that correlated with Gleason score and relapse in prostate cancer. *Genomics* 2007, 89:666-672.
5. Singh D, Febbo PG, Ross K, Jackson DG, Manola J, Ladd C, Tamayo P, Renshaw AA, D'Amico AV, Richie JP, Lander ES, Loda M, Kantoff PW, Golub TR, Sellers WR: Gene expression correlates of clinical prostate cancer behavior. *Cancer Cell* 2002, 1:203-209.
6. Cheville JC, Karnes RJ, Therneau TM, Kosari F, Munz JM, Tillmans L, Basal E, Rangel LJ, Bergstralh E, Kovtun IV, Savci-Heijink CD, Klee EW, Vasmataz G: Gene panel model predictive of outcome in men at high-risk of systemic progression and death from prostate cancer after radical retropubic prostatectomy. *J Clin Oncol* 2008, 26:3930-3936.
7. Cuzick J, Berney DM, Fisher G, Mesher D, Moller H, Reid JE, Perry M, Park J, Younus A, Gutin A, Foster CS, Scardino P, Lanchbury JS, Stone S: Prognostic value of a cell cycle progression signature for prostate cancer death in a conservatively managed needle biopsy cohort. *Br J Cancer* 2012, 106:1095-1099.
8. Amaro A, Esposito AI, Gallina A, Nees M, Angelini G, Albini A, Pfeffer U: Validation of proposed prostate cancer biomarkers with gene expression data: a long road to travel. *Cancer Metastasis Rev* 2014.
9. Rabiau N, Dantal Y, Guy L, Ngollo M, Dagdemir A, Kemeny JL, Terris B, Vieillefond A, Boiteux JP, Bignon YJ, Bernard-Gallon D: Gene panel model predictive of outcome in patients with prostate cancer. *OMICS* 2013, 17:407-413.
10. Erho N, Crisan A, Vergara IA, Mitra AP, Ghadessi M, Buerki C, Bergstralh EJ, Kollmeyer T, Fink S, Haddad Z, Zimmermann B, Sierocinski T, Ballman KV, Triche TJ, Black PC, Karnes RJ, Klee G, Davicioni E, Jenkins RB: Discovery and validation of a prostate cancer genomic classifier that predicts early metastasis following radical prostatectomy. *PLoS One* 2013, 8:e66855.
11. <http://www.cancer.org/cancer/prostatecancer/detailedguide/prostate-cancer-new-research>.
12. Shukla KK, Misra S, Pareek P, Mishra V, Singhal B, Sharma P Recent scenario of microRNA as diagnostic and prognostic biomarkers of prostate cancer., *Urol Oncol*. 2016Nov24.pii:S1078-1439(16)30356-8. doi: 10.1016/j.urolonc.2016.10.019.
13. Foulkes WD. DNA-Repair Gene Mutations in Metastatic Prostate Cancer. *N Engl J Med*. 2016 Nov 3;375(18):1803. doi: 10.1056/NEJMc1611137. PMID: 27806231

Specific Intended Student Learning Outcome(s) - By the end of this course, students will be able to describe, compare, select, and perform, appropriate molecular methods for cancer research using Scientific Reasoning and Critical Thinking core competencies.

General Instructional Objectives (Goals)

- Define basic terminology and describes concepts in molecular genetics that provide the foundation for implementing and adapting new techniques and assays in cancer research; this will be assessed through lab reports and final exam.
- Determine the difference between normal and cancer cells; this will be assessed through lab reports and final exam.
- Describe the principles of nucleic acid isolation and successfully perform isolations; this will be assessed through successful performance of the lab and the final exam.
- Describe the principles of polymerase chain reaction (PCR), reverse transcriptase PCR and other amplification techniques; this will be assessed through successful performance of the lab and the final exam.
- Describe the principles of nucleic acid electrophoresis and hybridization including Southern and Northern blots; this will be assessed through the final exam.

- Define SNPs and explain the principle of RFLP in genotyping; this will be assessed through successful performance of the lab and the final exam.
- Describe the principles of cytogenetics and fluorescent in situ hybridization (FISH); this will be assessed through successful performance of the lab and the final exam.
- Describe the principles of Immunohistochemistry, ELISA, and Western blot; this will be assessed through successful performance of the lab and the final exam.
- Interpret results in context of other laboratory data; this will be assessed through lab reports.
- Record and communicate cancer research results in a professional manner; this will be assessed through lab reports.

Week of	Topic	Assignment Due
15-January	Introduction to course, syllabus, and lab safety	
22-January	Lab 1. Measurements and Micropipetting	
29-January	Lab 2. Microscopy and cell culture lab	Lab notebook due
5-February	Lab 2. Microscopy and cell culture lab	
12-February	Lab 3. Protein extraction lab	Lab notebook due
19-February	Lab 3. Coomassie blue staining	
26-February	Lab 3. Western Blot lab	
5-March	Lab 4. Solutions and Dilutions	Lab notebook due
19-March	Lab 4. DNA isolation lab	
26-March	Lab 4. PCR lab	
2-April	Lab 4. Agarose gel electrophoresis lab	
9-April	Lab 5. Gene Expression	Lab notebook due
16-April	Presentations	
TBD	Final Presentations	

Print	Self-Evaluation	Complete assignment in notebook	Virtual Lab
	sign up		http://amrita.vlab.co.in/index.php?pg=bindex&bsub=login_page
✓	✓	Light Microscope	http://amrita.vlab.co.in/index.php?sub=3&brch=187&sim=323&cnt=1
✓	✓	Preparation of Buffer stocks (TBE, TE and TAE)	http://amrita.vlab.co.in/index.php?sub=3&brch=77&sim=1322&cnt=1
✓	✓	Western Blotting	http://amrita.vlab.co.in/index.php?sub=3&brch=187&sim=1331&cnt=1
✓	✓	Polyacrylamide Gel Electrophoresis	http://amrita.vlab.co.in/index.php?sub=3&brch=186&sim=319&cnt=1
✓	✓	Maintenance of Mamallian Cell Lines	http://amrita.vlab.co.in/index.php?sub=3&brch=188&sim=331&cnt=1
✓	✓	Cell Proliferation	http://amrita.vlab.co.in/index.php?sub=3&brch=188&sim=1101&cnt=1
✓	✓	Hemocytometer (Counting of Cells)	http://amrita.vlab.co.in/index.php?sub=3&brch=188&sim=336&cnt=1
✓	✓	Extraction of DNA from Fish Fins	http://amrita.vlab.co.in/index.php?sub=3&brch=77&sim=218&cnt=1
✓	✓	Agarose Gel Electrophoresis (AGE)	http://amrita.vlab.co.in/index.php?sub=3&brch=77&sim=1375&cnt=1
✓	✓	Polymerase Chain Reaction (PCR)	http://amrita.vlab.co.in/index.php?sub=3&brch=186&sim=321&cnt=1

Task 3. Georgetown University provided a summer research and training program for Hampton University undergraduate students:

1. The Hampton University undergraduates conducted prostate cancer research for (8 - 12 weeks) in the laboratory of a Georgetown University mentor (Drs. Notario, Blancato, Martin Albanese, Rosen, and Dritschilo.

In Dr. Notario's laboratory, research project focused on the study of the molecular mechanisms of oncogenesis and involved the investigation of the effects of environmental carcinogens such as ionizing radiation on prostate cancer cells with regard to the expression and activity of cancer genes and their protein products. Dr. Notario's research group isolated and investigates the role of a novel oncogene, termed PCPH, which is conserved in eukaryotic cells from yeast to humans, and cooperates with other oncogenes such as H-ras in the neoplastic transformation of mammalian cells. Ms. Willis studied the "effect of NTPDase inhibition on the malignant phenotype of human prostate cancer cells expressing the mt-PCPH oncogene.

Dr. Albanese is the Director of the Urogenital Program in the Center for Cellular Reprogramming at LCCC Dr. Albanese's research focuses on the role of oncogenes and tumor suppressor proteins in the induction and maintenance of genito-urinary and other cancers. Tyler Dickerson and Nadia Holness studied aspects of the in vitro differentiation of conditionally reprogrammed primary prostate cells in the study of prostate cancer.

Dr. Martin's lab has identified the environmental hormones referred to as metallo-hormones. In Dr. Martin's laboratory, Myron Gilbert, Jasmine Moorman, and Tanisha Maitre studied the role of metals in the development of prostate cancer to define the mechanisms by which metals activate the androgen receptor.

Dr. Blancato's laboratory is studying health disparities and differential responses to prostate cancer treatments. Shannon Anderson worked on a project investigating PTEN and TMPSS translocations in normal and prostate cancer cells during summer 2014. While in Dr. Blancato's laboratory, Jelissa Washington treated prostate cells derived from an African American patient and a Caucasian patient with three chemotherapeutic drugs with different properties used in prostate cancer and compared the metabolomic profiles to determine differences in responses. The analysis of these data is being evaluated for a larger follow-up study

2. Hampton University trainees participated in weekly laboratory research data meetings where they were able to discuss their research findings/

3. Hampton University trainees attended a seminar and discussion at the local prostate research non-profit, ZERO, The End of Prostate Cancer, in Alexandria, Virginia.

4. The trainees met with Dr. Sean Collins, a Radiation Oncologist at Georgetown who discussed prostate therapy and provided a tour of the facility including the CyberKnife suite.

5. The trainees attended the weekly Brown Bag Lunch Lecture. (Schedule with topics in Appendix)

6. The trainees also attended Oncology Grand Rounds, the weekly Oncology Journal Club and Seminar, and the weekly Oncology Faculty Seminar. (Schedule with topics in Appendix)

7. Trainees attended a weekly graduate school preparation session and are scheduled to take the GRE general and subject tests in the Fall of each year. T

Task 4. The Hampton University undergraduate course HU BIO408 Research Problems: was offered to all student trainees

1. Hampton University undergraduate students who participated in the summers enrolled in HU BIO423 Cancer Biology Laboratory. Dr. Ricks-Santi's HU423 course presents various aspects of clinical and basic cancer research in a lecture format (50 minutes) which is detailed in this report under Task 2B.

Task 5. Hampton University faculty advisors provided prostate cancer research opportunities for the undergraduate trainees:

1. The Hampton University faculty advisors are providing *in vitro* and genomic research opportunities in prostate cancer during the academic year for the undergraduate trainees via enrollment in HU BIO408 Research Problems.

Task 6. Georgetown University tracked the career progress of the Hampton University undergraduate students:

The career progress of the Hampton University students was tracked by the Office of Cancer Research Education of the Lombardi Comprehensive Cancer Center of Georgetown University. Currently, the students from the summer of 2016 are seniors at Hampton University and are expected to graduate in May 2017. Several students from the summer of 2014 are also graduating in May 2016. A number of these students are in the process of applying to graduate programs. Shannon Anderson, a student from the summer of 2014 graduated in May of 2015 from Hampton University and is currently enrolled in the Georgetown University/George Mason University joint program in Physiology.

PUBLICATIONS, ABSTRACTS, AND PRESENTATIONS

Presentations:

Shannon Anderson presented a poster describing her research at the National Association of African American Honors Programs (NAAAHP) Conference, Jackson, MS on Oct 9-11, 2014. Analysis of TMPRSS2:ERG fusion in conditionally reprogrammed prostate cancer cells; Shannon Anderson*, Jun Yeb Nam, Nancy Palechor-Ceron, Uttam Rasaily, Anil KC, Charlene Valdez, Jan K Blancato, *Department of Biological Sciences, Hampton University, Hampton, VA, 23668 and the Department of Oncology, Georgetown University Medical Center, Washington DC, 20057

The students presented their research at the Student Research Day at Hampton University which is held each Spring. Each student prepared and presented a poster based on their summer research project.

All participating Hampton U faculty and students were invited to present their research at the Student Research Day at Georgetown University at the end of the Spring term at Georgetown

University, but the travel distance between Hampton and Georgetown precluded their ability to participate during the regular semester.

INVENTIONS, PATENTS AND LICENSES - nothing to report

REPORTABLE OUTCOMES – nothing to report

Task 7: The career progress of the Hampton University students was tracked by the Office of Cancer Research Education of the Lombardi Comprehensive Cancer Center of Georgetown University

Status of Hampton University DOD Prostate Training Program Summer Students

LCCC and HU Fellowship Program Students 2004-2017

<i>Student of 9/09</i>	<i>HU-GU Fellow or Volunteer</i>	<i>Current Status</i>
Shannon Anderson	HU-GU Fellow Summer 2014 (Blancato lab)	Georgetown U M.S Physiology 2016 Medical student at Howard U Medical School
Myron Gilbert	HU-GU Fellow Summer 2014 (Martin)	B.A. Molecular Biology Hampton U, 2015 Medical Technologist, NIH
Ashton Green	HU-GU Fellow Summer 2014 (Albanese lab)	B.A. Biology Hampton U, 2016
Fionna Davis	HU-GU Fellow Summer 2014 (Dritschilo lab)	B.A. Molecular Biology Hampton U, 2016
Damara Miller	HU-GU Fellow Summer 2015 (Rosen lab)	B.S. Biochemistry Hampton U, 2016 Post-Bac Research Fellow, NIH, NINDS
Myron Gilbert	HU-GU Fellow Summer 2015 (Martin lab)	B.S. Biology Hampton U 2016 PhD Student in Molecular Biology at UVA
Tyanna J Gray	HU-GU Fellow Summer 2015 (Notario lab)	B.S Biology Hampton U, 2016 Medical Student at Ross U
Isiah Brown	HU-GU Fellow Summer 2015 (Dritschilo lab)	B.A. Biology Hampton U, 2016 Re-Applying to Post Bac and Medical schools
Jasmine Hatcher-Moorman	HU-GU Fellow Summer 2015 (Martin lab)	B.S. Biology Hampton U, 2016 Lab Technician at Northwestern U and applying to Medical Schools

Tanisha Maitre	HU-GU Fellow Summer 2016 (Martin)	Biology Major Hampton University, class of 2018 Volunteer at Hampton U Cancer Research Center
Jelissa Washington	HU-GU Fellow Summer 2016 (Blancato lab)	Biology Major Hampton University, class of 2018, Medical volunteer in Dominican Republic summer 2017
Marissa Willis	HU-GU Fellow Summer 2016 (Notario lab)	Biology Major Hampton University, class of 2018, Math and science tutor
Tyler Dickerson	HU GU Fellow Summer 2016 (Albanese lab)	B.S. Biology Hampton University, 2017 High school Biology Teacher, Prince Williams County, VA. Applying to NIH Prep Program
Nadia Holness	HU-GU Fellow Summer 2017 (Albanese lab)	Biology Major, Hampton University, class of 2019

APPENDIX

Topics of Brown Bag Lunch Seminars for Summers 2015-2017. Student trainees attended this educational offering as part of the training program.

Topics and Speakers of Oncology Grand Rounds

CANCER BIOLOGY & CANCER SYSTEMS BIOLOGY SEMINAR SERIES SCHEDULE:

Location: GA 2/4, Preclinical Science Building Time: Tuesdays – Noon - 1:00 pm June 1

CANCER BIOLOGY & CANCER SYSTEMS BIOLOGY SEMINAR SERIES

SCHEDULE: SUMMER 2015

Location: GA 2/4, Preclinical Science Building

Time: Tuesdays – Noon - 1:00 pm

June 16 Overview of Cancer

Louis Weiner, M.D.

Director of Lombardi Cancer Center

June 23 Overview of Cancer Systems Biology

Robert Clarke, Ph.D.

Dean for Research

June 30 Viruses and Cancer

Hang Yuan, Ph.D.

Associate Professor of Oncology

July 7 Metabolomics as a new tool in cancer systems biology

Amrita Cheema, Ph.D.

Associate Professor of Oncology

July 14 Cancer Prevention

Leena Hilakivi-Clarke, Ph.D.

Professor of Oncology

July 21 Cancer Drug discovery

Milton Brown, M.D./Ph.D.

Director of Drug Discovery

July 28 Vaccine Development

Richard Schlegel, M.D./Ph.D.

Chairman of Pathology

August 4 Career paths in science and medicine that lead to novel (potential) therapeutics

Jeffrey Toretsky, M.D.

Professor of Oncology

CANCER BIOLOGY SEMINAR SERIES

SCHEDULE: SUMMER 2016

Location: GA 2/4, Preclinical Science Building

Time: Tuesdays – Noon - 1:00 pm

June 14	Introduction of Cancer Biology MaryBeth Martin, Ph.D. Professor of Oncology
June 21	Overview of Cancer Louis Weiner, M.D. Director of Lombardi Cancer Center
June 28	Viruses and Cancer Hang Yuan, Ph.D. Associate Professor of Oncology
July 5	Metabolomics: a powerful approach for basic and translational cancer research Amrita Cheema, Ph.D. Associate Professor of Oncology
July 12	Cancer Prevention: Obstacles, Challenges, and the Road Ahead Leena Hilakivi-Clarke, Ph.D. Professor of Oncology
July 19	Cancer Drug Discovery Milton Brown, M.D./Ph.D. Director of Drug Discovery
July 26	Cancer & Carcinogenesis Fung-Lung Chung, Ph.D. Professor of Oncology
August 2	Career paths in science and medicine that lead to novel (potential) therapeutics Jeffrey Toretsky, M.D. Professor of Oncology

Coordinator: Mira Jung, Ph.D. (jungm@georgetown.edu)

CANCER BIOLOGY SEMINAR SERIES

SCHEDULE: SUMMER 2017

Location: GA 2/4, Preclinical Science Building

Time: Tuesdays – Noon - 1:00 pm

June 13 Introduction of Cancer Biology

Mary Beth Martin, Ph.D.

Professor of Oncology

June 20 Cancer Prevention: Obstacles, Challenges, and the Road Ahead

Leena Hilakivi-Clarke, Ph.D.

Professor of Oncology

June 27 Cancer Immunotherapy

Geeta Upadhyay, Ph.D.

Assistant Professor of Oncology

July 11 Hormones in Cancer

Anna Riegel, Ph.D.

Professor of Oncology

July 18 Metabolomics as a tool for basic and translational cancer research

Amrita Cheema, Ph.D.

Professor of Oncology

July 25 Cancer Therapy

Keith Unger, M.D.

Director of Radiation Oncology Resident Program

August 1 Career paths in science and medicine that lead to novel (potential) therapeutics

Jeffrey Toretzky, M.D.

Professor of Oncology

Oncology Grand Rounds for 2015-2016

FALL 2015

DATE	SPEAKERS	TITLE
September 4, 2015	Dr. Thomas Gajewski Professor, The Ben May Department for Cancer Research, Departments of Pathology & Medicine University of Chicago	Molecular mechanisms of the T-cell inflamed tumor microenvironment: implications for cancer immunotherapy
September 11, 2015	Dr. Ronald B. Gartenhaus Professor of Medicine University of Maryland	MNKs Modulate Oncogenic Translation in Diffuse Large B-Cell Lymphoma
September 18, 2015	Dr. Vilhelm Bohr Chief, Laboratory of Molecular Genetics National Institute on Aging, National Institute of Health	DNA repair defects and mitochondrial dysfunction in cancer and aging
September 25, 2015	Dr. Benjamin Neel Director, Laura And Isaac Perlmutter Cancer Center	Emergent vulnerabilities in breast cancer
October 2, 2015	Dr. Maureen Murphy Program Leader and Professor, Molecular and Cellular Oncogenesis The Wistar Institute	An African specific polymorphism in p53 tumor suppressor impairs its tumor suppressor function
October 23, 2015	Dr. Roger Abounader Professor, Microbiology, Immunology & Cancer Biology and Neurology University of Virginia School of Medicine	Identification and exploitation of master regulatory microRNAs in glioblastoma
October 30, 2015	Dr. Amato Giaccia Jack, Lulu and Sam Willson Professor of Cancer Biology Stanford University School of Medicine	Eradicating metastases with targeted therapy and immune therapy
November 13, 2015	Dr. Lisa Carey Physician-in-Chief North Carolina Cancer Hospital	Trails and tribulations of neoadjuvant systemic therapy for breast cancer
December 4, 2015	Dr. Giulio Draetta MD, PhD Director, Institute for Applied Cancer Science The University of Texas MD Anderson Cancer Center	Driving towards a better understanding of cancer complexity and therapeutic options
December 11, 2015	Dr. Timothy Rebbeck Professor of Epidemiology Dana Farber Cancer Institute and the TH Chan School of Public Health	BRCA 1/2: A paradigm for precision medicine
December 18, 2015	Dr. David Salomon Chief, Tumor Growth Factor Section, Mouse Cancer Genetics Program National Cancer Institute	Cripto-1: An embryonic stem cell gene that is reexpressed in multiple types of human cancers and represents a novel diagnostic and therapeutic target

	SPRING SEMESTER 2016	
January 15, 2016	Dr. Rachel Stolzenberg-Solomon (NIH) Senior Investigator, Division of Cancer Epidemiology & Genetics National Cancer Institute	The etiology of pancreatic cancer: nutrition and beyond
January 29, 2016	Dr. Daniel Hayes Stuart B. Padnos Professor of Breast Cancer Research University of Michigan Comprehensive Cancer Center	Circulating tumor cells and cell free DNA: liquid biopsies
February 5, 2016	Dr. Michael Hogarty Associate Professor, Department of Pediatrics Perelman School of Medicine at the University of Pennsylvania	A novel mitochondrial mechanism of cancer therapy resistance
February 12, 2016	Dr. Jordan Winter Associate Professor, Department of Surgery Thomas Jefferson University Hospital	Pancreatic cancer, are we on the right path?
February 19, 2016	Dr. David Perlin Executive Director & Professor, Public Health Research Institute & Rutgers Regional Biocontainment Laboratory New Jersey Medical School-Rutgers	Multidrug resistant fungal infections in cancer and other high risk patients
February 26, 2016	Dr. William Regine Isadore and Fannie Schneider Foxman Chair and Professor of Radiation Oncology, Executive Director Maryland Proton Treatment Center University of Maryland	Proton radiotherapy clinical trials: challenges and hoe for the future
March 4, 2016	Dr. David Solit Director, Marie-Josée & Henry R. Kravis Center for Molecular Oncology Memorial Sloan Kettering Cancer Center	Defining the actionable genome
March 11, 2016	Dr. Timothy Greten Senior Investigator, Thoracic and Gastrointestinal Oncology Branch National Institute of Health	Immunology and immunotherapy of hepatocellular carcinoma
March 18, 2016	Dr. Matthias Gromeier Associate Professor, Department of Neurosurgery, Department of Genetics & Microbiology Duke University Medical Center	Oncolytic immunotherapy with recombinant poliovirus
April 1, 2016	Dr. Robert Gatenby Chair, Department of Integrative Mathematical Oncology and Department of Diagnostic Imaging Moffitt Cancer Center	Evolutionary dynamics in cancer biology and treatment
April 8, 2016	Dr. Lisa Henske	Tuberous sclerosis complex:

	Director of the Center for LAM Research and Clinical Care Brigham and Women's Hospital	Lessons for sporadic malignancies with mTOR hyperactivism
April 22, 2016	Dr. Thomas Delaney Andrea Soriano Professor of Radiation Oncology Harvard Medical School	The integration of proton radiation therapy in clinical practice
April 29, 2016	Dr. Eileen White Associate Director, Basic Science Rutgers University	Role of autophagy in metabolism and cancer
May 6, 2016	Dr. George Calin Professor, Department of Experimental Therapeutics, Division of Cancer Medicine The University of Texas MD Anderson Cancer Center	About Chomsky, patterns, non-coding RNAs and cancer patients
May 13, 2016	Dr. Meenhard Herlyn Director, The Wistar Institute Melanoma Research Center Wistar Institute	Understanding the biology of melanoma to develop new strategies for therapy