XOT (3)

(2)

UNCLASSIFIED
SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1a. REPORT SECURITY CLASSIFICATION: Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT: Approved for public release; distribution is unlimited.
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S): AFOSR-TR- 88-1142
6a. NAME OF PERFORMING ORGANIZATION: National Academy of Sciences; 6b. OFFICE SYMBOL (If applicable):	7a. NAME OF MONITORING ORGANIZATION: AFOSR/XOT
6c. ADDRESS (City, State, and ZIP Code): 2101 Constitution Avenue, Washington, DC 20418	7b. ADDRESS (City, State, and ZIP Code): Building 410, Bolling AFB, DC 20332-6448
8a. NAME OF FUNDING/SPONSORING ORGANIZATION: AFOSR; 8b. OFFICE SYMBOL (If applicable): XOT	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER: F49620-85-C-0124
8c. ADDRESS (City, State, and ZIP Code): Building 410, Bolling AFB, DC 20332-6448	10. SOURCE OF FUNDING NUMBERS: PROGRAM ELEMENT NO. 61102F; PROJECT NO. 2306; TASK NO. D8; WORK UNIT ACCESSION NO.

11. TITLE (Include Security Classification)

(U) NATIONAL RESEARCH COUNCIL RESIDENT RESEARCH ASSOCIATESHIP (NRC-RRA) PROGRAM

12. PERSONAL AUTHOR(S)

13a. TYPE OF REPORT	13b. TIME COVERED	14. DATE OF REPORT (Year, Month, Day)	15. PAGE COUNT
Annual	FROM 870701 TO 880630	8808	76

16. SUPPLEMENTARY NOTATION

COSATI CODES		
FIELD	GROUP	SUB-GROUP
	11.07	
	06.20	

18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number)

AD-A200 183

ABSTRACT (Continue on reverse if necessary and identify by block number)

We report here on all Associateship Programs for the Air Force Systems Command. In addition to reporting on activities specifically sponsored under this contract, we also summarize any other current activities of the Air Force Associateship Program such as the termination of Associates who were sponsored under the previous year's contract. Furthermore, after each review of Air Force applicants, we have supplied a listing of all applicants who have passed the panel review.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT: ☒ UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS	21. ABSTRACT SECURITY CLASSIFICATION: UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL: V. C. Cavender, Jr.	22b. TELEPHONE (Include Area Code): (202) 767-4970; 22c. OFFICE SYMBOL: AFOSR/XOT

DD Form 1473, JUN 86 — Previous editions are obsolete. — SECURITY CLASSIFICATION OF THIS PAGE: UNCLASSIFIED

NATIONAL RESEARCH COUNCIL

Resident Research Associateship Program

with the AIR FORCE SYSTEMS COMMAND

Annual Report

(Required under Contract
No. F49620-85-C-0124)

July 1, 1987, through June 30, 1988

We report here on all Associateship Programs for the Air Force Systems Command.

In addition to reporting on activities specifically sponsored under this contract, we also summarize any other current activities of the Air Force Associateship Program such as the termination of Associates who were sponsored under the previous year's contract. Furthermore, after each review of Air Force applicants, we have supplied a listing of all applicants who have passed the panel review (Copies enclosed).

PUBLICITY

The National Research Council, in cooperation with the Air Force Systems Command, prepared a booklet describing opportunities for research in the NRC-AFSC Research Associateship Program. The laboratories participating in the program were sent a total of 275 booklets to be distributed by the research staff to persons interested in the program.

In October 1987, publicity materials concerning the 1988 NRC-AFSC Research Associateship Program were distributed to presidents, graduate deans, thesis advisers, and chairmen of appropriate departments of science and engineering of all academic, degree-granting institutions in the United States. Announcements were also sent to selected public and professional news media for publication.

REQUESTS

Through June 1988, the Associateship Programs Office sent 932 application packets to individuals for the 1988 NRC-AFSC Associateship Program in response to requests by persons whose fields of specialization appeared to be appropriate for the research opportunities available in the AFSC laboratories.

COMPETITION

At the request of the Air Force System Command, the Associateship Programs Office reviews applications in February, June, and October of each year.

Update on the 1987 Review

June 1987 Review

Information on this review was forwarded to you in our July 10, 1987 memo (copy enclosed). Seven applications were recommended for this review. Two applicants could not be offered awards because of lack of funds. Four were offered and have accepted awards, but another one is still pending, awaiting completion of the contract to provide the required funds.

October 1987 Review

Information on this review was forwarded to you in our November 9, 1987 memo (copy enclosed). Four applicants were recommended for award. Two have accepted the offers, one could not be offered an award because of lack of funds, and another is pending, awaiting completion of the contract to provide the required funds.

February 1988 Review

Nineteen applications were received by the Associateship Programs Office before the closing date of January 15, 1988. Three applications were incomplete, one application was withdrawn before review, and one was deferred to another review. Fourteen applications were reviewed by the Panel Review Board that met in Washington, D.C., February 25-26, 1988 (including one which, regardless of the outcome, could not be considered for an award because of lack of interest by the Laboratory in the applicant's proposal) . One applicant was not recommended, but twelve were recommended for award. Four recommended applicants were offered awards and have accepted the offers, one alternate could not be offered an award, and seven alternates are pending.

Detailed information on the February 1988 panel reviews and candidates recommended for awards was included in our March 17, 1988, report. An informational copy of this report is attached to this report.

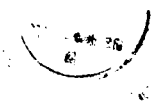
ASSOCIATES' ACTIVITIES

Part I includes information on the NRC-AFSC June 1987 Review

Part II includes information on the October 1987 Review.

Part III includes information on the current results of the February 1988 Review.

Part IV includes information on Associates whose tenure terminated during the reporting period, information on the renewed Associates, and information on the Associates on tenure as of July 1, 1988.



PART I

CANDIDATES WHO HAVE ACCEPTED AWARDS IN THE JUNE 1987 NRC-AFSC RESEARCH ASSOCIATESHIP PROGRAMS REVIEW

Associates	Advisers	Laboratory	Expected/Actual Starting Date
BACH, Henning	A. D. Yaghjian	RADC	March 3, 1988
GANNON, Robert Lee	D. A. Terrian	AFSAM	December 9, 1987
GUNDEL, Alexander W. H.	G. F. Wilson	AFARL	October 13, 1987
HENSHAW, Thomas Lee	K. E. Siegenthaler	FSRL	October 26, 1987

CANDIDATES NOT OFFERED AWARDS BECAUSE OF LACK OF FUNDING

CHO, Wonsuk	T. Nicholas	AFML
RAMU, Anantha S.	M. A. Plamondon	AFWL

ALTERNATE WHOSE STATUS IS PENDING

CIUFOLINI, Ignazio	A. H. Gunther	AFWL

PART II

CANDIDATES WHO HAVE ACCEPTED AWARDS IN THE OCTOBER 1987 NRC-AFSC RESEARCH ASSOCIATESHIP PROGRAMS REVIEW

Associates	Advisers	Laboratory	Expected/Actual Starting Date
NEKKANTI, Rama Manohara	D. Dimiduck	AFML	July 1, 1988
PILLAI, P. K. Chellapan	A. Gavrielides	AFWL	June 13, 1988

CANDIDATES NOT OFFERED AWARDS BECAUSE OF LACK OF FUNDING

AGHION, Ernest Eliyau	F. H. Froes	AFML

ALTERNATE WHOSE STATUS IS PENDING

KOZLOWSKI, Gregory	C. E. Overly	AFAPL

PART III

CANDIDATES WHO HAVE ACCEPTED AWARDS IN THE FEBRUARY 1988 NRC-AFSC RESEARCH ASSOCIATESHIP PROGRAMS REVIEW

Associates	Advisers	Laboratory	Expected/Actual Starting Date
ANTUNANO, Melchor J.	S. A. Nunneley	AFSAM	September 1, 1988
FRENCH, Linda M.	S. D. Price	AFGL	June 1, 1988
MALOY, Joseph T.	J. S. Wilkes	AFSRL	June 3, 1988
MANASREH, M. Omar	D. W. Fischer	AFML	August 1, 1988

ALTERNATES WHOSE STATUS IS PENDING

BABCOK, Lucia M.	J. F. Paulson	AFGL	August 1, 1988
BEN-MENAHEM, Ari	D. H. Eckhardt	AFGL	August 1, 1988
BRATLAND, Stein D.	J. S. Wilkes	AFSRL	September 1, 1988
GOTTLIEB, Benjamin	H. C. Carlson	AFGL	May 1, 1988
LYNNES, Christopher S.	J. J. Cipar	AFGL	August 1, 1988
MEHRABADI, Morteza M.	S. W. Tsai	AFML	June 1, 1988

CANDIDATES NOT OFFERED AWARDS BECAUSE OF LACK OF FUNDING

KLEIMAN, Moshe M.	D. E. Bedo	AFGL	August 1988

PART IV

ASSOCIATES WHOSE TENURE TERMINATED DURING THE REPORTING PERIOD

BOWHILL, Sidney Allan AFGL June 1, 1987 July 31, 1987
Adviser: Dr. Michael Smiddy
Termination Report received; Adviser's Evaluation overdue

LIN, Pei AFAPL June 23, 1986 June 22, 1988
Adviser: Dr. W. M. Roquemore
Termination Report overdue; Adviser's Evaluation overdue

MALLAVARAPU, Swarnalath AFWL March 25, 1987 May 3, 1988
Renewed for 2 months beginning March 25, 1987
Adviser: Dr. Arthur H. Guenther
Termination Report received; Adviser's Evaluation overdue

MARMOLINO, Ciro AFGL October 15, 1985 October 14, 1987
Adviser: Dr. Stephen L. Keil
Termination Report received; Adviser's Evaluation overdue

OYE, Harald FJSRL September 2, 1986 September 5, 1987
Extended for 3 days
Adviser: Dr. John S. Wilkes
Termination Report received; Adviser's Evaluation received

RAO, K. Prabhakara AFML May 7, 1986-May 6, 1988
Adviser: Dr. Stephen W. Tsai
Termination Report received; Adviser's Evaluation overdue

REA, Michael A. AFSAM February 24, 1986 September 2, 1987
Adviser: Dr. James W. Wolfe
Termination Report received; Adviser's Evaluation overdue

ROY, Ajit K. AFML October 17, 1985 September 30, 1987
Adviser: Dr. Stephen W. Tsai
Termination Report received; Adviser's Evaluation overdue

STEWART, James J. AFSRL August 13, 1984 August 12, 1987
Adviser: Dr. Chester J. Dymek
Termination Report received; Adviser's Evaluation received

SUNDER, Ramasubbu AFML May 19, 1986 May 18, 1987
Adviser: Dr. Theodore Nicholas
Termination Report received; Adviser's Evaluation overdue

VINCENT, Robert Alan AFGL June 16, 1987 December 31, 1987
Extended for 1/2 months
Adviser: Dr. Herbert C. Carlson, Jr.
Termination Report received; Adviser's Evaluation overdue

VON DER LUHE, Oskar AFGL November 1, 1986 October 31, 1987
Adviser: Dr. Richard R. Radick
Termination Report received; Adviser's Evaluation received

ASSOCIATES ON TENURE AS OF JULY 1, 1988

*BACH, Henning RADC March 7, 1988 March 6, 1989
Adviser: Dr. Arthur D. Yaghjian

BOHR, James E. AFRPL June 1, 1987 May 31, 1989
Renewed for 12 months beginning June 1, 1988
Adviser: Dr. Louis A. Dee

DAINTY, Anton Michael AFGL June 1, 1987 May 31, 1989
Renewed for 12 months beginning June 1, 1988
Adviser: Dr. John Joseph Cipar

*DOBSON, Andrea K. AFGL September 1, 1987 August 31, 1988
Adviser: Dr. Richard R. Radick

EL-HEWIE, Mohamed F. FJSRL September 2, 1986 September 1, 1988
Renewed for 12 months beginning September 2, 1988
Adviser: Dr. Richard J. Cook

*FRENCH, Linda M. AFGL June 1, 1988 May 31, 1989
Adviser: Dr. Stephan D. Price

*GANNON, Robert Lee AFSAM December 9, 1987 December 8, 1988
Adviser: Dr. David M. Terrian

*GUNDEL, Alexander W. H. AAMRL October 13, 1987 October 12, 1988
Adviser: Dr. Glenn F. Wilson

*HANSHAW, Thomas Lee FJSRL October 26, 1987 October 25, 1988
Adviser: Dr. Richard J. Cook

KATSUYAMA, Ronald M. AFAMRL August 26, 1986 August 25, 1988
Renewed for 12 months beginning August 26, 1987
Adviser: Dr. Rik Warren

KOUTCHMY, Serge L. AFGL January 5, 1987 December 16, 1988
Renewed for 11.5 months beginning January 5, 1988
Adviser: Dr. Stephen L. Keil

*MALOY, Joseph T. AFSRL June 3, 1988 September 2, 1988
Adviser: Dr. John S. Wilkes

MONTGOMERY, Leslie D. AMRL December 9, 1986 December 8, 1988
Renewed for 12 months beginning December 9, 1987
Adviser: Dr. Leon E. Kazarian

*PILLAI, P. K. Chellappan AFWL June 13, 1988 June 12, 1989
Adviser: Dr. Athanatio Gavrielides

RAMAMURTHY, T. S. AFML May 1, 1987 April 30, 1989
Renewed for 12 months beginning May 1, 1988
Adviser: Dr. Stephen W. Tsai

*RAO, Gopalakrishna M. FJSRL June 7, 1988 June 6, 1989
Adviser: Dr. John S. Wilkes

ROVANG, John W. FJSRL October 1, 1986 September 30, 1988
Renewed for 12 months beginning October 1, 1987
Adviser: Dr. John S. Wilkes

SUNDARESAN, Ranganathan AFML September 12, 1986 September 11, 1988
Renewed for 12 months beginning September 12, 1987
Adviser: Dr. Francis H. Froes

VENKATARAMAN, Ganapathy AFML April 11, 1986 April 10, 1987
Adviser: Dr. Francis H. Froes

REPORTS

Associates are required to submit a progress report six months after the beginning of tenure. Following is a list of Associates who have submitted a report:

BOHR, James E.
DAINTY, Anton M.
DOBSON, Andrea K.
GANNON, Robert L.
GUNDEL, Alexandria
HENSHAW, Thomas L.
MALLAVARAPU, Swarnalatha
RAMAMURTHY, Tellakula

One overdue Termination report was received during this reporting period: Dr. William E. Czelen

NATIONAL RESEARCH COUNCIL
OFFICE OF SCIENTIFIC AND ENGINEERING PERSONNEL
2101 Constitution Avenue Washington, D.C. 20418

ASSOCIATESHIP PROGRAMS (202) 334-2760

November 9, 1987

Lt. Col. Claude Cavender
XOT Operations Division
Bldg. 410
Bolling Air Force Base
Washington, D. C. 20332-6448

Dear Col. Cavender:

Enclosed is the Post-Board Roster for the NRC/AFSC Resident Research Associateship Program resulting from the October 1987 Panel Review process. From the standpoint of the NRC, these applicants have passed our review panels and thus are potential awardees, depending upon:

1. Each candidate's quality group ranking (which I will discuss with the each of the Laboratory Program Representatives).

2. Availability of funds in each Laboratory's NRC budget.

3. Air Force approval of a Visitor's Authorization for each of these potential Associates.

We would appreciate if you would initiate the Air Force Visitor's Authorization process for these people, and I will be discussing the list of successful candidates with each of the laboratories.

Sincerely yours,

R. H. Manka
Program Administrator

cc: Dr. John Dimmock, AFOSR
Col. A. J. Driscoll, AFOSR
Ms. Flo Batey, CVAII

NRC-AFSC RESEARCH ASSOCIATESHIP PROGRAM
OCTOBER 1987 RECOMMENDED CANDIDATES

November 1987

Name	PhD Year, Institution	Cit.	Visa	Adviser	Tenure (Mos.)/ Level	Expected Start Date
AIR FORCE MATERIALS LABORATORY						
AGHION, Ernest E.	87, Technion	Israel	J-1	F. H. Froes	12/R	October 1988
NEKKANTI, Rama M.	87, Univ. of Cincinnati	India	J-1	D. Dimiduck	12/R	January 1988
AIR FORCE AERO PROPULSION LABORATORY						
KOZLOWSKI, Gregory	75, Univ. of Wroclaw	Poland	J-1	C. E. Oberly	12/S	January 1988
AIR FORCE WEAPONS LABORATORY						
PILLAI, P.K. CHELLAPPAN	63, Univ. of Saugor	India	J-1	A. Gavrielides	12/S	December 1987

NATIONAL RESEARCH COUNCIL
OFFICE OF SCIENTIFIC AND ENGINEERING PERSONNEL
2101 Constitution Avenue Washington, D C. 20418

ASSOCIATESHIP PROGRAMS (202) 334-2760

March 17, 1988

Lt. Col. Claude Cavender
Program Manager, Special Research Programs
AFOSR/XOT
Bldg. 410
Bolling Air Force Base
Washington, D. C. 20332-6448

Dear Col. Cavender:

Enclosed is the Post-Board Roster for the NRC/AFSC Resident Research Associateship Program resulting from the February 1988 Panel Review process. From the standpoint of the NRC, these applicants have passed our review panels and thus are potential awardees, depending upon:

1. Each candidate's quality group ranking (which I will discuss with the each of the Laboratory Program Representatives).

2. Availability of funds in each Laboratory's NRC budget.

3. Air Force approval of a Visitor's Authorization for each of these potential Associates.

We would appreciate if you would initiate the Air Force Visitor's Authorization process for these people, and I will be discussing the list of successful candidates with each of the laboratories.

Sincerely yours,

R. H. Manka
Program Administrator

cc: Dr. John Dimmock
Col. A. J. Driscoll
Ms. Flo Batey

NRC-ASPC RESEARCH ASSOCIATESHIP PROGRAM
FEBRUARY 1988 RECOMMENDED CANDIDATES

March 1988

NAME	PHD YEAR, INSTITUTION	CIT.	VISA	ADVISER	TENURE (MOS.)/ LEVEL	EXPECTED STARTING DATE
AIR FORCE SEILER RESEARCH LABORATORY						
BRATLAND, Stein D.	67, Tech. Univ. of Norway	Nor	J-1	J.S. Wilkes	12/S	September 1, 1988
MALOY, Joseph T.	70, Univ. of Texas	US	N/A	J.S. Wilkes	06/S	May 16, 1988
AIR FORCE SCHOOL OF AEROSPACE MEDICINE						
ANTUNANO, Melchor	85, Nat'l Autonomous Univ.	Mex	J-1	S.A. Nunneley	12/R	August 1988
AIR FORCE GEOPHYSICS LABORATORY						
Ionosphere Physics Division						
BABCOCK, Lucia M.	78, City Univ. of New York	US	N/A	J.F. Paulson	12/S	September 1, 1988
GOTTLIEB, Benjamin	64, Gujerat Univ.	US	N/A	H.C. Carlson	12/S	May 1, 1988
Earth Science Division						
BEN-MENAHEM, Ari	61, Calif. Inst. of Tech,	IS	J-1	D.H. Eckhardt	12/S	August 1, 1988
FRENCH, Linda M.	80, Cornell Univ.	US	N/A	S.D. Price	12/S	June 1, 1988
Optical Physics Division						
KLEIMAN, Moshe M.	78, Hebrew Univ.	IS	J-1	D.E. Bedo	12/S	August 1988
LYNNES, Christopher S.	88, Univ. of Michigan	US	N/A	J.J. Cipar	12/R	August 1, 1988
AIR FORCE MATERIALS LABORATORY						
CALIUS, Emilio P.	88, Stanford Univ.	Argen	J-1	S.W. Tsai	12/R	July 1988
MANASREH, M. Omar	84, Univ. of Arkansas	US	N/A	D.W. Fischer	12/R	August 1988
MEHRABADI, Morteza M.	79, Tulane Univ.	US	N/A	S.W. Tsai	12/S	June 1, 1988

NATIONAL RESEARCH COUNCIL
OFFICE OF SCIENTIFIC AND ENGINEERING PERSONNEL
2101 Constitution Avenue Washington D.C. 20418

ASSOCIATESHIP PROGRAMS

(202) 334-2760

July 10, 1987

Mr. Mathew J. Kerper
XOT Operations Division
Bldg. 410
Bolling Air Force Base
Washington, D. C. 20332-6448

Dear Mr. Kerper:

Enclosed is the Post-Board Roster for the NRC/AFSC Resident Research Associateship Program resulting from the June 1987 Panel Review process. From the standpoint of the NRC, these applicants have passed our review panels and thus are potential awardees, depending upon:

1. Each candidate's quality group ranking (which I will discuss with the each of the Laboratory Program Representatives).

2. Availability of funds in each Laboratory's NRC budget.

3. Air Force approval of a Visitor's Authorization for each of these potential Associates.

We would appreciate if you would initiate the Air Force Visitor's Authorization process for these people, and I will be discussing the list of successful candidates with each of the laboratories.

Please note that we have an RADC applicant pending the outcome of our Site Visit next week, we may be able to proceed with that appointment.

Sincerely yours,

R. H. Manka
Program Administrator

cc: Dr. John Dimmock
Col. A. J. Driscoll
Ms. Flo Batey

NRC-AFSC RESEARCH ASSOCIATESHIP PROGRAM
JULY 1987 RECOMMENDED CANDIDATES

July 1987

Name	PhD Year, Institution	Cit.	Visa	Adviser	Tenure (Mos.)/ Level	Expected Start Date
AIR FORCE MATERIALS LABORATORY						
CHO, Wonsuk	87, Univ. of Michigan	Korea	J-1	T. Nicholas	12/R	Sept. 1, 1987
FRANK J. SEILER RESEARCH LABORATORY						
HENSHAW, Thomas L.	87, Univ. of Denver	U.S.	N/A	K.E. Siegenthaler	12/R	September 1, 1987
AIR FORCE SCHOOL OF AEROSPACE MEDICINE						
GANNON, Robert L.	87, Univ of Texas	U.S.	N/A	D. A. Terrian	12/R	November 1, 1987
AIR FORCE AEROMEDICAL RESEARCH LABORATORY						
GUNDEL, Alexander W.H.	77, Univ. of Gottingen	J-1		G. F. Wilson	12/S	October 1, 1987
ROME AIR DEVELOPMENT COMMAND						
BACH, Henning	67, Tech. Univ. of Denmark	Den	J-1	A.D. Yaghjian	12/S	September 1, 1987
AIR FORCE WEAPONS LABORATORY						
CIUFOLINI, Ignazio	84, Univ. of Texas	IT	J-1	A. H. Guenther	12/R	September 1987
RAMU, Anantha S.	66, Waterloo	IN	J-1	M. A. Plamondon	12/S	September 1, 1987

TERMINATION REPORT FOR NRC SENIOR POSTDOCTORAL FELLOW SIDNEY A. BOWHILL
July 16, 1987

Place of tenure: AFGL, Hanscom AFB
Research adviser: Dr. N.C. Maynard
Dates of Tenure: June 1 – July 31, 1987
On leave from: Prof. of Electrical Engineering, University of Lowell
International posts held during tenure: Chairman, Middle Atmosphere Program Steering Committee, Scientific Committee on Solar-Terrestrial Physics.
Travel during tenure: Attended CEDAR meeting, Boulder, Colorado, June 28 – July 2, 1987.
Scientific seminars and meetings attended: See above.
Seminars or lectures given: none
Meetings attended by specific invitation: none.
Teaching as an Associate: none
Publications and papers resulting from tenure: none.
Patents applied for resulting from Tenure: none
Work in progress: Examination of mechanisms and correlations involved in penetration of thermospheric disturbances into middle atmosphere.
Comments on the Associateship Program: none.
Summary of research during Associateship: see attachment.
Current forwarding address:

Prof. Sidney A. Bowhill, Head
Department of Electrical Engineering
University of Lowell
1 University Avenue
Lowell, MA 01854

S A Bowhill

SUMMARY OF RESEARCH DURING ASSOCIATESHIP

POSTDOCTORAL FELLOW SIDNEY A. BOWHILL

July 16, 1987

The objective of the research was to assess the possible effects on the middle atmosphere of high-latitude thermospheric disturbances such as auroral fields and particles. As a result of conversations with Dr. Nelson Maynard and Dr. Fred Rich, the global AE index was initially selected as an indicator of total energy input into the thermosphere at high latitudes. Urbana radar measurements of mesospheric turbulence, wind and gravity waves were correlated with AE using the superposed epoch method. Some preliminary indication of a correlation with wind velocity was found. Other matters investigated were the DE data base and previous theoretical work.

National Research Council Termination Report

1. Date: April 20, 1988
2. Name: William E. Czelen, M. D.
3. Location of Tenure: AFSC/AF-SAM (WPAFB-Dayton, Ohio)
4. Dates of Tenure: May 16, 1985 to May 15, 1987
5. Title of Research Project: "The Physiologic Characterization and Biofeeedback Treatment of Motion Sickness."
6. Research Adviser: Dr. Bryce Hartman
7. On Leave From a Professional Post? N/A
8. International Posts Held During Tenure? N/A
9. Programmatic Travel During Tenure: N/A
10. Scientific Seminars, Meetings, and/or Consultations:

Meetings: A. Annual Scientific Meetings of the Aerospace Medical Association

1. May, 1986, Nashville, Tennessee.
2. May, 1987, Las Vegas, Nevada.

B. Baylor College of Medicine Sponsored Symposium: "Physiologic Adaptation of Man in Space" Feb., 1986

Consultations: AF/SAM Department of Neuro-Psychiatry, Visited San Antonio, Texas.

11. Seminars or Lectures Delivered at Universities and/or Institutes: Wright State Univ./Dept. of Community Medicine./ Aerospace Medicine/Research Opportunities.
12. Meetings Attended by Specific Invitation: N/A
13. Teaching, if Any, as an Associate: Ongoing Instruction in Physiology, Biomedical Engineering, and Research to

Graduate Students at the Air Force Institute of Technology.

14. Work in Progress: Extension of research from 1986 and 1987 is continuing at the Air Force Institute of Technology based upon results from this work. Pathologic findings in this research on motion sickness have led to human experimental treatment trials. Being tested now is a novel form of pharmacologic therapy with much greater efficacy than any agent in current use.

15. Summary of Research During Tenure:

Examination of many of the numerous physiologic parameters detailed in the original NRC research proposal has yielded significant novel observations. Of the organs studied, the most productive results have been in the cardiovascular system, gastrointestinal system, respiratory system, and the central nervous system. The results in each system will be individually described.

1. Cardiovascular system: The results from consideration of this system have been, in some cases, supportive of the reports of prior investigations regarding heart rate modulation (The majority of the responses seen was that of tachycardia-with the exception of several cases of bradycardia associated with atrial and ventricular arrythmias). But the literature predominantly refutes the significance of cardiac changes in the motion sickness syndrome. The original results in this research were based upon the documentation of rhythm disturbances such as prolonged sinus arrest,

junctional rhythms, ventricular rhythms, ventricular ectopy, and the severe hypotension attendent upon these rhythms.

2. Respiratory system: Respiratory change during motion sickness, the literature suggests, is non-existent or variable. There has been a report, apparently ignored, that describes moderate hyperventilation and hypocapnia with motion sickness. Hyperventilation, this research has documemted, is a constant and much more significant response. The ventilatory response to motion sickness, based upon changes in tidal volume rather than respiratory rate, demonstrates an absolutely consistant pattern. While the respiratory rate change is not statistically significant, minute volumes increased approximately 80% to 150% (This corresponded to a minute volume change from 4.8 liters at rest to as high as 14 liters during severe motion sickness).

3. Gastrointestinal system: Abdominal skin surface potentials generated by the gastrointestinal tract, conventionally acquired with electrogastrography, have been studied only in vection induced motion sickness. In this study, a technique called electrosplanchnography, which differs in the use of a much wider amplifier bandwidth, was applied to motion sickness induced through cross coupled coriolis stimulation. The results of this technique demonstrate a near twenty-fold increase in gastrointestinally

derived potentials that closely track, in aplitude and time course, the levels of motion sickness symptomatology.

(Both of the parameters of respiration and gastro-intestinal surface potential changes are almost certainly directly applicable in the biofeedback treatment of motion sickness. Each reflects a specific system dysfunction that significantly relates to symptomatology. The instrumentation used for the basic signal acquision conveniently provides an analog output voltage that is a direct reflection of the level of organ or system dysfunction and may be directly used as a fedback paramter.)

4. The most significant result of this research has been in the realm of electroencephalography. While the literature acknowledges only some minor EEG slowing, significant brain wave changes in motion sickness are denied. This research employed instrumentation with wider low frequency response than is typically recommended. The use of amplifiers with sensitivity from the low delta to sub-delta frequencies has revealed a dramatic EEG response. EEG potential oscillations, in the 0.2 to 0.3 Hertz range, using both surface and subdermal electrodes, were measured at voltage levels near one millivolt.

These EEG changes resemble those found in psychomotor seizures. It is upon this similarity that the current

treatment protocol is based. Initial pilot treatment trials, with an anticonvulsant indicated in psychomotor or partial seizures, has demonstrated an efficacy twice as good as the "optimum" combination of scopolamine and dexedrine. This treatment is currently being quantified and is also being evaluated to verify the apparent absence of short term side effects.

16. Publications and Papers Resulting from Research as an Associate:

Publication submissions are currently being refereed through the journal: "Aviation, Space, and Environmental Medicine"

Publications include:

1. "Electrosplanchnography During Coriolis Induced Motion Sickness"
2. "Severe Hyperventilation During Acute Motion Sickness in Man"
3. "Cardiac Arrythmias During Acute Motion Sickness in Man"

17. Patents Applied for as a Result of Research as an Associate: N/A

18. Future Position and Address or Current Forwarding Address:

Current position: 1. Professor of Electrical Engineering/ Air Force Institute of Technology. 2. Clinical Instructor/ Wright State University School of Medicine-Department of Community Medicine.

Address: Home: 4396 Laclamen Dr.

TERMINATION REPORT

1. DATE: 6 April 1988

2. NAME: Swarnalatha Mallavarapu

3. LOCATION OF TENURE: Air Force Weapons Laboratory
Kirtland AFB NM 87117-6008

4. DATES OF TENURE: 24 March 1987 - 3 May 1988

5. TITLE OF RESEARCH PROJECT:

Optical, structural, and compositional characterization of coatings prepared from laser fused refractory oxides and oxide mixtures.

6. RESEARCH ADVISOR'S NAME: Dr Arthur H. Guenther

7. ARE YOU ON LEAVE FROM A PROFESSIONAL POST? No

8. INTERNATIONAL POSTS HELD DURING TENURE: None

9. PROGRAMMATIC TRAVEL DURING TENURE:

a. Santa Fe, New Mexico 4 - 7 May 1987

b. Boulder, Colorado 28 Oct 1987 - 31 Oct 1987

10. SCIENTIFIC SEMINARS, MEETINGS, AND/OR CONSULTATIONS:

a. Boulder, Colorado 28 Oct 1987 - 31 Oct 1987

b. Tucson, Arizona 12 Apr 1988 - 15 Apr 1988

11. SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTIONS: None

12. MEETINGS ATTENDED BY SPECIFIC INVITATION: None

13. TEACHING, IF ANY, AS AN ASSOCIATE: None

14. WORK IN PROGRESS:

Thin films of laser fused ZrO_2, HfO_2, Y_2O_3, and their mixtures of various compositions were deposited by electron beam evaporation. The optical properties and compositional analysis of these films revealed that the films were more homogeneous as compared to the films deposited from the same unprocessed material. The absorption at 351nm was higher for the mixed oxides.

The improvement in optical homogeneity in the films deposited from laser fused material may be due to a change in the nucleation and growth of the film and the structure of the films. The structural characterization of the films is being carried out by transmission electron microscopy, X-ray diffraction, and spectroscopic ellipsometry. Results obtained from these techniques need to be analyzed more thoroughly to make conclusive interpretations.

15. SUMMARY OF RESEARCH DURING TENURE:

Zironia, Hafnia, and Yttria powders and their mixtures of three different compositions were fused separately using a CO_2 laser to obtain their solid solutions. The optical, chemical, and structural properties of films deposited from these fused materials were studied.

The optical properties of these films indicated that better films with low inhomogeneity could be obtained by laser processing the starting material. The films of mixed oxides showed increasing absorption at 351nm. The composition of the mixed oxide films was fairly uniform over small thicknesses but showed a slightly decreasing zirconium to hafnium ratio over larger thicknesses.

16. PUBLICATIONS AND PAPERS RESULTING FROM RESEARCH AS AN ASSOCIATE.

a. Optical properties of coatings prepared from laser fused refractory oxide mixtures, S. Mallavarapu, A.F. Stewart, A.H. Guenther, and Tilak Raj and C.K. Carniglia. To be published in "Applied Optics", 1988, will be presented at Fourth Topical

Meeting on Optical Interference Coatings at Tuscon, Arizona, 12 - 15 April 1988.

b. Structural and compositional characterization of coatings prepared from laser fused refractory oxides, S. Mallavarpu, C. Magnalica, A.F. Stewart, Arthur H. Guenther, and Tilak Raj, under preparation.

17. PATENTS APPLIED FOR AS A RESULT OF RESEARCH AS AN ASSOCIATE: None

18. FUTURE POSITION AND ADDRESS OR CURRENT FORWARDING ADDRESS:

Dr S. Mallavarapu
331, Sampige Road
Malleswaram
Bangaldre - 560003
India

~~GT~~/ RHM / JS

TERMINATION REPORT

1. 15 October 1987
2. Ciro Marmolino
3. Air Force Geophysics Laboratory/Space Physics

   Sacramento Peak Observatory

   Sunspot, NM 88349
4. 15 October 1985 to 14 October 1987
5. Solar Atmospheric Dynamics Inferred from Line Profiles Studies
6. Stephen L. Keil
7. Researcher

   Dipartimento di Fisico

   dell' Universita di Napoli

   Mostra D'Oltremare Pad.19

   80125 Napoli Italy
8. N/A
9. Tucson, AZ, 6-7 April 1987, NSO Senior Staff Meeting
10. Santa Fe, NM 28-30 May 1986 Santa Fe Inter-Observatory Meeting

    Ames, IA 23-26 Jun 1986 168th American Astron. Soc. Mtg.

    Boulder CO 15-17 Sep 1986 Second Workshop on Problems in High Resolution Solar Physics

    Santa Fe, NM 7-9 Oct 1987 Santa Fe Inter-Observatory Meeting

Foreign Meeting

Tenerife (Canary Islands - Spain) 6-12 Oct 1986 The Role of Fine-Scale Magnetic Fields in the Structure of the Solar Atmosphere

11. N/A
12. N/A

13. N/A

14. a) Comparison between observed and theoretical line profiles in the presence of the 5-min oscillation in order to investigate the reasons for the discrepancies that still exist between theory and observations in the form of the eigenfunctions.

b). Study of line bisector shapes in quiet and active regions in order to understand the effects of the magnetic field on the convection zone, in particular on the granulation structure.

15. My research has concentrated on wave motions and their influence on spectral lines. The goal of the research is to develop diagnostic techniques for measuring wave motions and dissipation of wave energy in the solar atmosphere. The approach followed is a synthetic one and is, as far as possible, organized into analytical and numerical efforts. The main results obtained are: a) estimates of errors in abundances and turbulence determinations caused by ignoring dynamical processes in the sun's atmosphere, and b) interpretation of the observed differences between the red and blue flank oscillations of the line profiles as due to the radiative damping which affects the 5-min oscillation in the low photosphere.

16. Publications resulting from research as an associate

a. Publications in refereed journals

Severino, G., Roberti, G., Marmolino, C., Gomez, M. T. 1986, "The Effects of Acoustic-Gravity Waves on the KI 7699 Line," *Solar Phys.* **104**, 259-272.

Keil, S. L., Marmolino, C., "Diagnostics for Propagating Waves in the Solar Photosphere," 1986, *Ap. J.*, **310**, 912-926.

Marmolino, C., Roberti, G., Severino, G. 1987, "Line Asymmetries and Shirts in the Presence of Granulation and Oscillations: the CLV of the K I 7699 Resonance Line," *Solar Phys.*, **108**, 21-34.

Marmolino, C., "Effects of Acoustic and Gravity Waves on the Curve of Growth," *Solar Phys.* (accepted).

Gomez, M. T., Marmolino, C., Roberti, G., Severino, G., "Profile Temporal Variations Induced by the 5-Minute Photospheric Oscillation," *Astron. Astrophysics* (accepted).

Gomez, M. T., Marmolino, C., Roberti, G., Severino, G., "Broadening and Shift of FeI Lines Perturbed by Atomic Hydrogen," *Solar Phys.* (accepted).

b. Poster Papers

Marmolino, C., Roberti, G., Severino, G., "Fe II in the Presence of Photospheric Motions," 1986, Workshop Proceedings, Capri, Italy.

Marmolino, C., Roberti, G., Severino, G., "On the Differences Between Line Bisectors in Quiet and Active Sun," The Role of Fine-Scale Magnetic Fields in the Structure of the Solar Atmosphere: Workshop Proceedings, Tenerife (Canary Islands), 6-12 Oct., 1986.

c. Abstracts

Marmolino, C., "The Effects of Acoustic Waves on the Curve-of-Growth," 1986, *Bull. Am. Astron. Soc.*, **18**, No. 2.

Marmolino, C., Roberti, G. and Severino, G., 1986, "Broadening e Shift di righe Spettrali da Idrogeno Neutro," Societa Italiana di Fisica LXXII Congresso Nazionale, Padova 2-7 Oct. 1986.

17. N/A

18. Researcher

Dipartimento di Fisica dell' Universita di Napoli

Mostra D'Oltremare Pad. 19

80125 Napoli ITALY

NRC TERMINATION REPORT

1. Date: 2 September 1987

2. Name: **Prof. Harald A. Øye**

3. Location of Tenure: Frank J. Seiler Research Laboratory
USAF Academy
Colorado Springs, CO 80840-6528

4. Dates of Tenure: 2 September 1986 - 5 September 1987

5. Title of Research Project: "Thermodynamic and Transport Properties of Aluminum Halide Room Temperature Melts"

6. Research Advisor: Dr. John S. Wilkes

7. Permanent Position: Professor at Institute of Inorganic Chemistry, The Norwegian Institute of Technology, 7034 Trondheim, Norway.

8. Non-U.S. Posts Held During Tenure:

a. President (on leave), The Norwegian Academy of Technical Sciences.

b. Member, International Union of Pure and Applied Chemistry, Committee on Transport Properties.

9. Programmatic Travels: Institute of Inorganic Chemistry, The Norwegian Institute of Technology, Trondheim, Norway, 4-14 December 1986.

10. Scientific Seminars and Meetings:

a. The Electrochemical Society 170th Meeting, San Diego, CA, 19-24 Oct 86. Session Chairman and Speaker: "Evaluation of Cathode Materials Used in the Hall-Heroult Electrolysis."

b. The 116th TMS/AIME Annual Meeting, Denver, CO, 23-26 Feb 87. Served on the Task Force to Review Strategic Objections and on the Aluminum Committee.

c. The Third Aluminum Electrolysis Workshop, "Hall-Heroult Cathodes," Carnegie Mellon University, Pittsburgh, PA, 27-28 Feb 87. Co-chairman and Lecturer: "Mechanical, Thermal and Chemical Forces Acting on the Cathode," and "Some Failure Scenarios."

d. The Norwegian Academy of Technical Sciences Seminar on "Micro-electronics in the Information Age," Trondheim, Norway, 25-26 May 87.

e. The 6th International Course on "Process Metallurgy of Aluminum," Trondheim, Norway, 1-5 Jun 87. Director and Lecturer: "Cathodes in Aluminum Electrolysis."

f. University of Colorado, Boulder, CO, Chem. Eng. Dept., 15 Jun 87.

11. Seminars or Lectures Delivered at Universities and Institutes:

a. General Motors Research Laboratories, Warren, MI, 5 Nov 86. Lecture on: "Fundamental and Applied Research with Reference to Light Metals Production, Rare Earth Chemistry and Battery Systems."

b. The University of Michigan, College of Engineering, Ann Arbor, MI, 6 Nov 86. Lecture on: "Computer Modelling of Laboratory Data, Benefits and Pitfalls."

c. U.S. Air Force Academy, Colorado Springs, CO, 13 Nov 86. Lecture on: "Computer Modelling of Laboratory Data, Benefits and Pitfalls."

d. The University of New South Wales, School of Chemical Engineering and Industrial Chemistry, Sydney, Australia, 11 Feb 87. Lecture on: "Computer Modelling of Laboratory Data, Benefits and Pitfalls."

e. Oak Ridge National Laboratory, Oak Ridge, TN, 13 Apr 87. Lecture on: "Computer Modelling of Laboratory Data, Benefits and Pitfalls."

f. University of Tennessee, Chemistry Department, Knoxville, TN, 14 Apr 87. Lecture on: "Computer Modelling of Laboratory Data, Benefits and Pitfalls."

g. Wichita State University, Chemistry Department, Wichita, KS, 29 Apr 87. Lecture on: "Computer Modelling of Laboratory Data, Benefits and Pitfalls."

h. Argonne National Laboratory, Chemistry Department, Argonne, IL, 18 Aug 87. Lecture on: "Thermodynamics and Structure of 1-Methyl-3-Ethylimidazolium Chloride - Aluminum Chloride."

i. ALCAN Research Center, Jonquiere, Canada, 20 Aug 87. Lecture on: "Cathode Testing and Failure Mechanisms."

j. Rensselaer Polytechnical Institute, Chemistry Department, Troy, NY, 25 Aug 87. Seminar on: "Computer Modelling of Laboratory Data, Benefits and Pitfalls."

12. Meetings Attended by Specific Invitation:

a. The Second Australian Aluminum Smelter Technology Course, Sydney, Australia, 9-13 Feb 87. Lecture on: "Cathode Failure Mechanisms."

b. The Sixth Convocation of the Council of Academics of Engineering and Technological Sciences, Washington, DC, 30 Mar-1 Apr 87. Topic: "Technology and the Global Economy."

c. International Union of Pure and Applied Chemistry, General Meeting, Boston, MA, 21-24 Aug 87. Served on Subcommittee for Transport Properties. Lecture on: Precision Determination of the Viscosity of Water. Viscosities of Some Pure Hydrocarbons.

13. Teaching: None.

14. Work in Progress: Following my stay, a cooperative effort between FJSRL and the Institute of Inorganic Chemistry, NTH, will continue on the topic: thermodynamic and structure of chloroaluminate room temperature melts.

15. Summary of Research During Tenure: Developed a novel method for vapor pressure measurements and studied room temperature chloroaluminate melts resulting in a model that gave a total thermodynamic description (16.a, 16.b). The melt was also found to be more stable than expected, which points to new applications. The thermodynamic studies indicated a structural species present that had not been characterized. This species was subsequently found by IR-spectroscopy, and the spectrum confirmed by theoretical calculations (16.c). Due to the experimental facilities built up at FJSRL, I was asked by Oak Ridge National Laboratory to participate in a program for preparation and characterization of the new superconductors (16.d). Participated in the study of Al-deposition (16.e, 16.f) and conductivity of mixtures of ionic melts with organic solvents. Instigated exchange of major data programs between FJSRL and home institution.

16. Publications Resulting from Research as an Associate:

a. "Thermodynamics of 1-Methyl-3-Ethylimidazolium Chloride -- Aluminum Chloride Mixtures," C. J. Dymek, Jr., C. L. Hussey, J. S. Wilkes, and H. A. Øye, The Electrochemical Society National Meeting 1987, Honolulu, HI, Extended Abstracts. Submitted.

b. "Thermodynamics of 1-Methyl-3-Ethylimidazolium Chloride -- Aluminum Chloride Mixtures," C. J. Dymek, Jr., C. L. Hussey, J. S. Wilkes, and H. A. Øye; edited by M. Blander, H. Kojima, Z. Kozuka, G. Mamantov, M. L. Saboungi, and N. Watanabe, in press in the Proceedings of the Joint International Symposium on Molten Salts, The Electrochemical Society National Meeting 1987, Honolulu, HI.

c. "Spectral Identification of $Al_3Cl_{10}^-$ In 1-Methyl-3-Ethylimidazolium Chloroaluminate Molten Salt," C. J. Dymek, Jr., M.-A. Einarsrud, J. S. Wilkes, and H. A. Øye, submitted to Polyhedron.

d. "Effect of Oxygen Pressure on the Orthorhombic-Tetragonal Transition in the High-Temperature Superconductor $YBa_2Cu_3O_x$," E. D. Specht, C. J. Sparks, A. G. Dhere, J. Brynestad, O. B. Cavin, D. M. Kroeger, and H. A. Øye, submitted to Phys. Rev. B.

e. "Aluminum Redox Chemistry in Basic Room Temperature Chloroaluminate Molten Salts," K. M. Dieter, C. J. Dymek, Jr., S. W. Lander, Jr., H. A. Øye, J. W. Rovang, J. R. Stuff, and J. S. Wilkes, The Electrochemical Society, Spring Meeting 1987, Philadelphia, PA, Extended Abstracts, Vol 87-1.

f. "Irreversibility of the Aluminum Electrode in Basic Room-Temperature Chloroaluminate Molten Salts," K. M. Dieter, C. J. Dymek, Jr., S. W. Lander, Jr., H. A. Øye, J. W. Rovang, J. R. Stuff, and J. S. Wilkes, FJSRL Technical Report: FJSRL-TR-87-0003, June 1987.

During my tenure at FJSRL, I also published papers which were the result of earlier work:

g. "Evaluation of Cathode Materials Used in the Hall-Heroult Electrolysis," H. A. Øye, The Electrochemical Society, Autumn Meeting 1986, San Diego, CA, Extended Abstracts, p. 958.

h. "Infrared Spectra, Bonding and Structure of the $MgCl_2$/PhCOOEt/$TiCl_4$/AlR_3 Ziegler-Natta Catalytic System. Activation/Deactivation Kinetics of Propene Polymerization," E. Rytter, S. Kvisle, Ø. Nirisen, M. Ystenes, and H. A. Øye, Proceedings of 1986 International Symposium on Transition Metals Catalyzed Polymerizations, Institute of Polymer Science, Akron, OH, 1986.

i. "Structure and Stability of Solid and Molten Complexes in the $MgCl_2$-$AlCl_3$ System," M. A. Einarsrud, H. Justnes, E. Rytter, and H. A. Øye, Polyhedron, 6, 975-986 (1987).

j. "Vapour - Liquid Equilibrium in the System NdI_3-TlI," B. Knapstad, T. Østvold, and H. A. Øye, Acta Chem. Scand., A41, 98-103 (1987).

k. "Reactivity and Electrolytic Consumption of Anode Carbon with Various Additives," T. Muftuoglu and H. A. Øye, Light Metals (Warrendale, PA), 471-476 (1987).

l. "Compaction of Room Temperature Ramming Paste," M. Sørlie and H. A. Øye, Light Metals (Warrendale, PA), 571-580 (1987).

m. "Vapour Pressure of the $AlCl_3$-$POCl_3$ System," W. Brockner, K. Grande, and H. A. Øye, Ber. Bunsenges. Phys. Chem., 91, 561-565 (1987).

n. "Graphitization of Cokes, Characterized by $AlCl_3$ Intercalation," M. Sørlie, T. Grande, and H. A. Øye, Proceedings of the XVIII Biennial Conference on Carbon, Worchester, MA, 1987.

o. "A Hot-Strip Method for Determination of Thermal Conductivity in Solid Carbon Materials at Elevated Temperatures," T. Log and H. A. Øye, Proceedings of the XVIII Biennial Conference on Carbon, Worchester, MA, 1987.

17. Patents: None.

18. Future Position and Address:

Prof. Harald A. Øye
Institute of Inorganic Chemistry
The Norwegian Institute of Technology
7034 Trondheim
NORWAY

CT/LH/RKRW/JS

TERMINATION REPORT

(1) DATE 1 April 1988

(2) NAME K.Prabhakara Rao

(3) LOCATION OF TENURE

Air Force MaterialsLaboratory,AFSC,WPAFB,Dayton

(4) DATES OF TENURE 7 May 1986 to 6 May 1988

(5) TITLE OF RESEARCH PROJECT

Analysis of Hybrid Fiber Reinforced Plastic Structures

(6) RESEARCH ADVISOR'S NAME Dr. Stephen W. Tsai

(7) ARE YOU ON LEAVE FROM A PROFESSIONAL POST? Yes

Professor, Department of Aerospace Engineering,
Indian Institute of Science, Bangalore 560012, India.

(8) INTERNATIONAL POSTS HELD DURING TENURE

Professor,
Department of Aerospace Engineering,
Indian Institute of Science,
Bangalore, 560012, India.

(9) PROGRAMMATIC TRAVEL DURING TENURE None

(10) SCIENTIFIC SEMINARS, MEETINGS, AND/OR CONSULTATIONS

a) First Conference on Composite Materials
American Society for Composites
Dayton, OH ,October 7-9, 1986

b) Composite Materials Workshop
University of California, Berkeley, California
February 22-29, 1987

c) 13th Annual AIAA Mini-symposium,
Dayton-Cincinnati Section
Dayton, OH ,March 24, 1987

d) 32nd International SAMPE Symposium
Los Angeles, California
April 4-12, 1987

e) ASTM Symposium on Composites,

Cincinnati, April 27-28, 1987.

f) Mechanics of Composite Materials Review
Bal Harbor, Florida, October 16-17, 1987

g) ASTM Symposium on Advances in Thermoplastic Matrix Composite Materials,Bal Harbor,Florida, October 19-20,1987

h) AIAA/ASME/ASCE/AHS/ASC 29th Structures, Structural Dynamics and Materials Conference, Williamsburg,Virginia, April 18-20, 1988 (will attend)

(11) SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES

i) Gave a Seminar at General Electric Company, Cincinnati November 4, 1987.

(12) MEETINGS ATTENDED BY SPECIFIC INVITATION

None

(13) TEACHING, IF ANY, AS AN ASSOCIATE

None

(14) WORK IN PROGRESS

The work done so far deals with flat rectangular sandwich/stiffened composite panel buckling. The effect of curvature of a curved panel on the buckling loads is being examined. Also attention is being paid to the assessment of the deleterious effects of delamination on critical buckling loads.

(15) SUMMARY OF RESEARCH DURING TENURE

The work done during the tenure deals with the prediction of elastic buckling loads for sandwich/corrugated/stiffened/solid composite rectangular panels. Analysis has been developed to take into account panels made of repeated sublaminate construction. A large class of 0/90/45/-45 lamination schemes leading to quadridirectional, tridirectional and bidirectional panels are examined and ranked based on critical buckling loads. It is found that significant increases in buckling loads compared to quasi-isotropic case can be obtained by a proper choice of lamination scheme. Provision has also been made in the analysis to take into account several composite materials.

(16) PUBLICATIONS AND PAPERS RESULTING FROM RESEARCH AS AN ASSOCIATE

a) "Buckling of Sandwich/stiffened Panels", Rao.K.P., Section 24, Think Composites, Dayton, Ohio, Feb 1987.

b) "Design for Elastic Stability of Corrugated/Sandwich/Stiffened Composite Panels", Rao.K.P.,Proceedings of the 32nd International SAMPE Symposium, April 1987, pp. 540-550.

c) "Buckling of Composite Sandwich Rectangular Panels (Grid Core)", Rao.K.P.,Journal of Reinforced Plastics and Composites, Jan 1988, Vol 7, pp 72-89

d) "Shear Buckling of Corrugated Composite Panels", Rao.K.P.,Composite Structures,Vol 8,No 3,1987,pp 207-220.

(17) PATENTS APPLIED FOR AS A RESULT OF RESEARCH AS AN ASSOCIATE

None

(18) FUTURE POSITION AND ADDRESS OR CURRENT FORWARDING ADDRESS

Future Position and Address:

Dr.KPrabhakara Rao,
Professor,
Department of Aerospace Engineering,
Indian Institute of Science,
Bangalore, 560012, India.

L/LT/KMJ

NRC Research Associateship

Termination Report

1) 29 OCT 1987

2) Michael A. Rea. Ph.D.

3) USAF School of Aerospace Medicine
Clinical Sciences Division
Brooks AFB, TX 78235

4) 17 FEB 1986 - 2 SEP 1987

5) Presynaptic Regulation of Neuronal Responsiveness

6) David M. Terrian

7) No

8) N/A

9) Programmatic Travel

National

1. Society for Neuroscience Meeting
Washington, DC
11/10/86 - 11/14/87

International

2. American Society for Neurochemistry Meeting
Caracus, Venezuela
5/31/87 - 6/7/87

10) Scientific Seminars and Meetings

National

1. Society for Neuroscience Meeting
Washington, DC
11/10/86 - 11/14/86

International

2. American Society for Neurochemistry Meeting
Caracus, Venezuela
5/31/87 - 6/7/87

11) Seminars and Lectures

1. Seminar: Neurochemistry of the Suprachiasmatic Nuclei
USAF School of Aerospace Medicine
Crew Technology Division; 1/6/87

12) N/A

13) Lecturer in Graduate Neurochemistry course
Division of Life Sciences
University of Texas at San Antonio

14) Work in Progress

The AFOSR task entitled 'Presynaptic Regulation of Neuronal Responsiveness' continues under the direction of Dr. David M. Terrian.

I am serving as the Principle Investigator and Task Manager of a new AFOSR task entitled 'Neurochemistry of the Suprachiasmatic Nuclei'. This task seeks to determine the biochemical basis of circadian pacemaker function in the rat hypothalamus.

15) Our initial studies concerned the role of eicosanoids in the evoked release of neurotransmitters from a purified preparation of cerebellar glomeruli. We were able to show that potassium-induced depolarization of the glomerular preparation resulted in the calcium-dependent release of amino acids and that this release was accompanied by a liberation of arachidonic acid from membrane phospholipids. We later showed that administration of arachidonic acid, or prostaglandins PGF2alpha and PGE, was sufficient to cause acidic amino acid release and that this effect was blocked by inhibitors of prostaglandin synthesis. Based on these results, we have proposed a role for prostaglandins in the calcium dependent release of acidic amino acid neurotransmitters.

We continued our investigation of the presynaptic regulation of neurotransmitter release using a hippocampal nerve terminal preparation which is enriched in mossy fiber terminals, thought to be involved in learning-related plasticity in the hippocampus. Using this preparation we (1) demonstrated the potassium-stimulated, calcium-dependent release of glutamic acid and dynorphin peptides, (2) showed that 2-chloroadenosine inhibited the release of both glutamate and dynorphin B, and (3) found that exogenous zinc ions potentiate the release of dynorphin A(1-8), possibly by altering dynorphin peptide processing by activating an outwardly directed endopeptidase.

16) Abstracts

Terrian D.M, M. A. Rea and R. V. Dorman (1987) Involvement of eicosanoids in the potentiation of D-[3H]-aspartate by phorbol esters. J. Neurochemistry 48 (suppl): S85C.

Publications

Terrian D. M., M. A. Rea and R. V. Dorman. Relationship between prostaglandin synthesis and release of acidic amino

acid neurotransmitters. Aviation, Space and Environmental Medicine, in press.

Terrian D. M., D. Johnston and M. A. Rea. Collocalization and Ca+2-dependent release of endogenous glutamate and dynorphin B from isolated mossy fiber terminals of the rat hippocampus. In preparation.

Terrian D. M., R. I. Peters and M. A. Rea. Adenosine modulation of glutamate and dynorphin release from isolated hippocampal mossy fiber terminals. In preparation.

Rea, M. A. and D. M. Terrian. Influence of Zn2+ on the pattern of release of dynorphin peptides from hippocampal mossy fiber terminals. In preparation.

17) N/A

18) Research Chemist, GS 13
USAF School of Aerospace Medicine
Clinical Sciences Division (NGNS)
Brooks AFB, TX 78235

TERMINATION REPORT

(1) DATE 17 September 1987

(2) NAME AJIT K. ROY

(3) LOCATION OF TENURE Air Force Materials Laboratory, AFSC

(4) DATES OF TENURE 17 October 1985 to 30 September 1987

(5) TITLE OF RESEARCH PROJECT

Environmental and Processing Effects on Matrix Failure and Dynamic Stiffness of Fiber Reinforced Composites.

(6) RESEARCH ADVISOR'S NAME Dr. Stephen W. Tsai

(7) ARE YOU ON LEAVE FROM A PROFESSIONAL POST? No

(8) INTERNATIONAL POSTS HELD DURING TENURE None

(9) PROGRAMMATIC TRAVEL DURING TENURE

Department of Aerospace Engineering
Indian Institute of Science, Bangalore, India
December 15, 1986 - January 9, 1987

(10) SCIENTIFIC SEMINARS, MEETINGS, AND/OR CONSULTATIONS

a) Mechanics of Composite Materials Review
Dayton, OH
October 22-24, 1985

b) Composite Materials Workshop
University of California, Berkeley, California
February 24-28, 1986

c) 12th Annual AIAA Mini-symposium, Dayton-Cincinnati Section
Dayton, OH
March 26, 1987

d) 31st International SAMPE Symposium
Las Vegas, NV
April 7-10, 1986

e) Presented Seminar: "Simplified Composites Design"
Department of Aerospace Engineering and Mechanics
University of Minnesota, Minneapolis, MN
May 14, 1986

f) First Conference on Composite Materials
American Society for Composites
Dayton, OH
October 7-9, 1986

g) Composite Materials Workshop
University of California, Berkeley, CA
February 22-27, 1987

h) 32nd International SAMPE Symposium
Los Angeles, CA
April 4-12, 1987

i) 13th Annual AIAA Mini-symposium, Dayton-Cincinnati Section
Dayton, OH
March 24, 1987

j) 5th National Congress on Pressure Vessels and Piping Technology
San Diego, CA
June 28, 1987

k) Thick Composite in Compression Workshop
Oak Ridge, TN
July 14-15, 1987

l) 20th Midwestern Mechanics Conference
Purdue University, West Lafayette, IN
August 31-Sept 2, 1987

(11) SEMINARS OR LECTURES DELIVERED AT UNIVERSITIES AND/OR INSTITUTES

a) Presented Seminar: "Simplified Composites Design"
Department of Aerospace Engineering and Mechanics
University of Minnesota, Minneapolis, MN
May 14, 1986

b) Department of Aerospace Engineering
Indian Institute of Science, Bangalore, India
January 5, 1987

(12) MEETINGS ATTENDED BY SPECIFIC INVITATION

5th National Congress on Pressure Vessels and Piping Technology
Composite Materials Section
San Diego, CA
June 28, 1987

(13) TEACHING, IF ANY, AS AN ASSOCIATE

a) Teaching Assistant at "Composite Materials Workshop", University of California, Berkeley, California
February 24-28, 1986 and February 22-27, 1987

b) Conducted a Workshop on Composites Design
Xerkon Company, Minneapolis, MN
May 15, 1986

(14) WORK IN PROGRESS

Material Damping can be used to control vibration of structural members. Structures during its operational life undergo a wide variation of environmental conditions. The material damping of composite laminates in hostile environments, e.g. moisture and temperature effects, are being measured by band width test method.

(15) SUMMARY OF RESEARCH DURING TENURE

The interlaminar stresses for a few boundary value problems of laminated composite structures have been calculated based on elasticity solution. For sandwich composite beams it is found that for aspect ratio (i.e. the length to depth ratio) less than 5 results of the lamination theory is no longer valid. For thick pressure vessel subjected to internal or external pressure it is quantitavely shown that a hybrid or a multilayer construction will result in an efficient material use. It is also found that the stress or strain components through the thickness of thick composite structures have a significant influence on the quadratic failure criterion.

(16) PUBLICATIONS AND PAPERS RESULTING FROM RESEARCH AS AN ASSOCIATE

a) "Composites Design, 3rd Edition", Sections 22 and 23 (on Interlaminar Stresses and Pressure Vessels respectively) with S.W.Tsai, published by Think Composites, Dayton, Ohio, 1987.
b) "Design of Thick Composite Cylinders" with S.W.Tsai, published in "Design and Analysis of Composite Material Vessels", edited by D. Hui and T.J. Kozik, ASME, PVP-Vol. 121, 1987.
c) "Design of Composite Cylinders", with S.W.Tsai, to be appeared in Journal of Pressure Vessel Technology, Transaction of ASME.

(17) PATENTS APPLIED FOR AS A RESULT OF RESEARCH AS AN ASSOCIATE

None

(18) FUTURE POSITION AND ADDRESS OR CURRENT FORWARDING ADDRESS

Future Position:

Associate Reserch Engineer
The Unversity of Dayton Research Institute
300 College Park
Dayton, OH 45469-0001

The Forwarding Address:

3875 C Hillsboro Drive
Dayton, OH 45431 2450

CT/CM/JS

1 July 1987

National Research Council Associateship

Termination Report

James J. P. Stewart

Frank J. Seiler Research Laboratory

U.S. Air Force Academy

Colorado Springs, CO

(4) Start of Tenure: 13 August 1984

Finish of Tenure: 12 August 1987

(5) Title of Project: Theoretical Calculations of Energetic Materials

(6) Research Advisor: Lt Col Chester J. Dymek, Jr

(7) At Start of Tenure: Associate Professor, Department of Pure and Applied Chemistry, University of Strathclyde, Glasgow, Scotland, U.K.

At Finish of Tenure: Honorary Professor, Department of Pure and Applied Chemistry, University of Strathclyde, Glasgow, Scotland, U.K.

(8) N/A

(9) Programmatic Travel During Tenure:

1. Eastman-Kodak, Rochester, NY, Nov 84.
2. Polymers Division of Non-Metallic Materials Division, Wright-Patterson AFB, OH, 9 April 1985.
3. Department of Chemistry, University of Wisconsin, Madison, WI, 11 April 1985.
4. Wright-Patterson AFB, OH, 4-7 November 1985.
5. Wright-Patterson AFB, OH, 12-15 November 1985.
6. Sanibel Conference, Daytona Beach, FL, 6-15 March 1986.
7. Cray Research Inc., Minneapolis, MN, 11 June 1986.
8. Gordon Conference on Computational Chemistry, New London, NH, 21 August 1986.
9. State Department Office of Disaster Assistance, Washington, 4 September 1986.
10. Wright-Patterson AFB, OH, 28 October 1986.
11. University of Kansas, Wichita, KS, 12 November 1986.
12. Bolling AFB, Feb 1987.
13. Denver, Colorado, 6 April 1987.
14. Wellcome Research Laboratories, Kent, England, 7 July 1987
15. Oxford, England, 12-17 July 1987.
16. Imperial Chemical Industries, Cheshire, England, 22 July 1987
17. University of Strathclyde, Glasgow, Scotland, 27 July 1987
18. University of St. Andrews, St Andrews Scotland, 31 July 1987

(11) Lectures given at Universities and Institutes:

1984

1. "Molecular Orbital Calculations on Organic Polymers," J. J. P. Stewart, Eastman-Kodak, Rochester, NY, Nov 84.

1985

2. "MNDO Calculations on Organic Polymers," J. J. P. Stewart, Polymers Division of Non-Metallic Materials Division, Wright-Patterson AFB, OH, 9 April 1985.

3. "MNDO Calculations on Organic Polymers," James J. P. Stewart, Department of Chemistry, University of Wisconsin, Madison, WI, 11 April 1985.

4. "Semi-Empirical Modeling of Surface Phenomena," J. T. Swanson and J. J. P. Stewart, AFOSR Surface Science Molecular Dynamics Contractor's Conference, Wright-Patterson AFB, OH, 4-7 November 1985.

5. "Calculation of Elastic Moduli," H. E. Klei and J. J. P. Stewart, Ordered Polymers Contract Review, Wright-Patterson AFB, OH, 12-15 November 1985.

1986

6. "Theoretical Studies of the Active Site of Alpha-Chymotrypsin," L. D. Strawser, D. M. Storch, and J. J. P. Stewart, Sanibel Conference, FL, 6-15 March 1986.

7. "Calculation of Elastic Moduli Using Semi-Empirical Methods," J. J. P. Stewart and H. E. Klei, Sanibel Conference, FL, 6-15 March 1986.

8. "Calculation of Polymer Properties," James J. P. Stewart, Los Alamos NL, Los Alamos, NM, 8 April 1986.

9. "Applications of MOPAC: A Semi-Empirical Molecular Orbital Package," J. J. P. Stewart, Springs Organic Chemistry Society, 6 May 1986.

10. "Mechanism of a-Chymotrypsin Catalysis," J. J. P. Stewart, Cray Research Inc., Minneapolis, MN, 11 June 1986.

11. "Calculation of Polymer Elastic Moduli Using Semi-Empirical Methods," H. E. Klei and J. J. P. Stewart, Int'l Symposium on Approaches to Property Limits in Polymers, Princeton, NJ, 11-13 August 1986.

12. "The Ultimate Modulus of Rigid Rod Polymer Fibers", W. W. Adams, P. J. Lenhert, R. K. Eby, J. J. P. Stewart, and H. E. Klei, 11, August 1986.

13. "Semi-Empirical Prediction of Polymer Geometric Deformations," H. E. Klei and J. J. P. Stewart, Int'l Symposium on Approaches to Property Limits in Polymers, Princeton, NJ, 11-13 August 1986.

14. "Computational Studies of Enzyme Catalysis Model of alpha-Chymotrypsin," L. D. Strawser, D. M. Storch, J. J. P. Stewart, Gordon Conference on Computational Chemistry, 21 August 1986.

15. "Molecular Orbital Calculations on Polymers," J. J. P. Stewart, Plenary Lecture at the Gordon Conference on Computational Chemistry, 21 August 1986

16. "Explosive Outgassing of Cameroon Volcanic Lakes," J. J. P. Stewart and L. W. Burggraf, State Department Office of Disaster Assistance, Washington, 4 September 1986.

17. "Calculation of Polymer Theoretical Properties with Semi-Empirical Methods," J. J. P. Stewart and H. E. Klei, Ordered Polymer Contract Review, Wright-Patterson AFB, OH, 28 October 1986.

18. "Molecular Orbital Calculation on Polymers," J. J. P. Stewart, University of Kansas, Wichita, KS, 12 November 1986.

19. "Computational Chemistry," J. J. P. Stewart, Pikes Peak Community College, 19 November 1986.

1987

20. "MOPAC, an Overview," J. J. P. Stewart, New Direction in Energetic Materials, USAFA, CO, 12 March 1987.

21. "Experimental and Theoretical Tensile Modulus in Rigid-Rod Polymers," W. W. Adams, P. G. Lenhert, J. J. P. Stewart, H. E. Klei, R. K. Eby, H. Jiang, and J. Smith, American Physics Society, April 1987.

22. "Molecular Orbital Calculations on Polymers," J. J. P. Stewart and K. M. Dieter, Bolling AFB, Feb 1987.

23. "Vibrational Spectra and Hydrogen Bonding Studies of Isotopically Substituted 2,4,6-trinitrotoluene," J. J. P. Stewart, W. R. Carper, A. Chem. Soc., Phys. Chem. Div.6 April 1987.

24. "MOPAC -- Applications to Polymers," J. J. P. Stewart, Wellcome Research Laboratories, Kent, England, 7 July 1987

25. "MOPAC," J. J. P. Stewart, Quantum Chemistry Program Exchange, Summer Workshop, Oxford, England, 12-17 July 1987.

26. "MOPAC -- An Overview," J. J. P. Stewart, Imperial Chemical Industries, Cheshire, England, 22 July 1987

27. "MOPAC -- Applications to Polymers," J. J. P. Stewart, University of Strathclyde, Glasgow, Scotland, 27 July 1987

28. "MOPAC -- An Overview," J. J. P. Stewart, University of St. Andrews, St. Andrews Scotland, 31 July 1987

(12) Visits to Other Institutions made by Direct Invitation.
(This is an incomplete list - part of 1984 and all of 1985 missing)

1986

Cray Research Laboratories, Minnesota, March 1986

Los Alamo NPL, 7-9 April 1986.

Wright-Patterson AFB, Dayton OH, 28-29 April 1986

Bolling AFB, Washinton, DC, 4 September 1986.

Wright-Patterson AFB, Dayton OH, 30 October 1986

1987

Cray Research Laboratories, Minnesota, 9-22 February 1987

University of Texas at Austin, Texas, 20-21 April 1987

(13) N/A

(14) Work In Progress (Leading to Publications)

Poly (p-benzo bisthiazole) Elastic Modulus, W. W. Adams, H. Jiang, P. G. Lenhert, R. K. Eby, J. J. P. Stewart and H. E. Klei.

"Numerical Sensitivity of Trajectories Across Conformational Energy Hypersurfaces from Geometry Optimized Molecular Orbital Calculations," D. B. Boyd, D. W. Smith, J. J. P. Stewart, E. Wimmer.

"Semi-Empirical Calculations," J. J. P. Stewart, American Chemical Society Invited Paper.

Long Term Project

A general parametrization optimization procedure for calibrating semi-empirical methods is being developed and applied. This is very slow work and is expected to take another year or more.

(15) The semi-empirical quantum chemistry program MOPAC has been extended by the addition of the following functionalities: calculation of polymer properties, e.g. heats of polymerization, unit cell lengths, elastic moduli; AM1 method; analytical derivatives for geometry optimization; dynamic and intrinsic reaction coordinate trajectories. The code of MOPAC has been extensively debugged and standardized to allow easy portability.

MOPAC has been made generally available. Versions suitable for the IBM PC-AT and XT, VAX, Gould, Data General, CRAY X-MP and CRAY-2, Cyber-205 and ETA-10 have been written. Where appropriate, vectorization has been done. Several manuals on its use have been written.

A parametrization program for developing new methods was written and tested. Although successful, publication has been delayed due to technical difficulties.

(16) Publications During NRC Tenure

1. "AM1: A New General Purpose Quantum Mechanical Molecular Model," M. J. S. Dewar, E. G. Zoebisch, E. F. Healy, and J. J. P. Stewart, J. Am. Chem. Soc., 107, 3902-3909 (1985).

2. "Portability of Computer Programs," J. J. P. Stewart, QCPE Bull., 5, 51-54 (1985).

3. "DENSITY," Density plots from MOPAC (QCPE 455) Calculations, J. J. P. Stewart, QCPE Bull., No. 492, 5, 59 (1985).

4. "MOHELP," A General Input Utility (Help Utility), J. J. P. Stewart and D. M. Storch, QCPE Bull., No. 494, 5, 62 (1985).

5. "MOSOL," MOPAC for Solid-State Physics, J. J. P. Stewart, QCPE Bull., No. 495, 5, 62 (1985).

6. "MNDO Calculations of Ions in Chloroaluminate Molten Salts," L. P. Davis, C. J. Dymek, J. J. P. Stewart, H. P. Clark, W. J. Lauderdale, J. Am. Chem. Soc., 107, 5041-5046 (1985).

7. "Mechanism of the Diels-Alder Reaction; Reactions of Butadiene with Ethylene and Cyanoethylenes," M. J. S. Dewar, S. Olivella, and J. J. P. Stewart.

8. "MNDO Calculations for Compounds Containing Lead," M. J. S. Dewar, G. L. Grady, K. Merz, and J. J. P. Stewart, Organometallic, Vol. 4, 1964 (1985).

9. "MNDO Calculations for Compounds Containing Lead," M. J. S. Dewar, G. L. Grady, K. Merz, and J. J. P. Stewart, Organometallic, Vol. 4, 1973 (1985).

10. "MOPAC: A General MNDO and MINDO/3 Program," J. J. P. Stewart, Quantum Chemistry Program Exchange No. 455, Vol. 5, No. 4, 133 (1985) (Third Edition).

11. "Reply to 'Remarks on the Application of the MNDO Program,'" J. J. P. Stewart, Quantum Chemistry Program Exchange, Vol. 5, No. 4, 126-130 (1985).

1986

12. "Hydrogen Bonding Studies of 2,4,6-Trinitrotoluene," W. R. Carper, S. R. Bosco, and J. J. P. Stewart, 42A, 461 (1986).

13. "Vibrational Spectra of 2,4,6-Trinitrotoluene and its Isotopically Substituted Analogues," J. J. P. Stewart, S. R. Bosco, W. R. Carper, Spectrochimica Acta, 42 13-21 (1986).

14. "Revised MNDO Parameters for Silicon," M.J.S. Dewar, J. Freidheim, G. grady, E.F. Healy, J.J.P. Stewart, Organometallics, 5, 375-379, (1986)

15. "AMPAC: Austin Method 1 Package" Dewar Research Group and J. J. P. Stewart, Quantum Chemistry Program Exchange, no. 506, nn, nnn, (1986)

16. "Mechanism of the Diels-Alder Reaction: Reactions of Butadiene with Ethylene and Cyanoethylenes," J. Am. Chem. Soc., 108, 5771-5779 (1986).

17. "MOPAC: A General MNDO and MINDO/3 Program," J. J. P. Stewart, Quantum Chemistry Program Exchange No. 455, Vol. 6, No. 3, 91-91 (1986).

18. "MOPAC Version 3.1 for CRAY X-MP Computers," J. J. P. Stewart, Quantum Chemistry Program Exchange No. 516, Vol. 6, No. 3, 99-99 (1986).

19. "MOPAC Version 3.1 for IBM-PC Microcomputers (QCPM019)," N. E. Heimer, J. T. Swanson and J. J. P. Stewart, Quantum Chemistry Program Exchange, Vol. 6, No. 3, 85-86, 108-109 (1986).

20. "Calculation of Polymer Elastic Moduli Using Semi-Empirical Methods," H. E. Klei and J. J. P. Stewart, Int. J. Quant. Chem., 20, 529-540 (1986).

21. "Mechanism of alpha-Chymitrypsin Catalysis using Semi-empirical Methods," L. D. Strawser, D. M. Storch, J. J. P. Stewart, Proceedings, First Symposium, Computational Chemistry on Cray Supercomputers, 73-75, (1986).

1987

22. "Effects of Isotopic Substitution on the Vibrational Spectra of 2,4,6-Trinitrotoluene," W. R. Carper and J. J. P. Stewart, Spectrochimica Acta (In Press)

23. "MNDO Cluster Model Calculations on Organic Polymers," J. J. P. Stewart, New Polymeric Materials (In Press)

24. "Semi-Empirical Calculations of Molecular Trajectories: Method and Application to Some Simple Molecular Systems," J. J. P. Stewart, L. P. Davis, and L. Burggraf. J. Comp. Chem. (In Press).

25. "MOPAC: For the Aeon:032/PC Coprocessor Board," J. T. Swanson, H. E. Klei, and J. J. P. Stewart, Quantum Chemistry Program Exchange, 7, 6-7, 1987, "MOPAC: A General Molecular Orbital Package (IBM-PC/AEON:032 Version), J. T. Swanson, H. E. Klei, and J. J. P. Stewart, Quantum Chemistry Program Exchange, 7, 48-49, (1987),

26. "MOPAC: For the Ryan-McFarland and IBM Compilers," J. T. Swanson, T. A. Miller, and J. J. P. Stewart, Quantum Chemistry Program Exchange, 7, 97, (1987),

(17) N/A

(18) Frank J. Seiler Research Laboratory, U.S. Air Force Academy, Colorado Springs CO 80840.

TERMINATION REPORT

1. Date: April 27, 1988

2. Name: R. Sunder

3. Location of Tenure: Air Force Wright Aeronautical Laboratories, Materials Laboratory

. Date of Tenure: May 19, 1986 - May 17, 1988

5. Title of Research Project: Study of Fatigue Crack Growth

6. Research Advisor's Name: Dr. Theodore Nicholas

7. Are you on leave from a professional post? No

8. International posts held during tenure: None

9. Programmatic travel during tenure: None

10. Scientific seminars, meetings and/or consultations:

18th Annual ASTM Symposium, San Antonio, Texas, June 30 to July 2, 1986.

Meetings/consultations with professional colleagues at General Electric (Corp. R & D), Schenectady, N.Y. (Dr. Vasatis), Brown University (Prof. Suresh), M.I.T., Boston (Prof. Pelloux), Aug.-Sept. 1986.

Materials Week: Annual ASM/TMS meetings, Orlando, Florida, November 22 - 26, 1986.

ASTM Symposium on Standardisation of Loading Spectra, Cincinnati, Ohio, April 29, 1987.

19th Annual ASTM Symposium, Bethlehem, Pennsylvania, June 23 - 25, 1987.

Third Int. Conference on Fatigue and Fatigue Thresholds, Charlottesville, Virginia, June 28 - July 2, 1987.

Int. Symposium on Environmentally Assisted Cracking: Science and Engineering, Bal Harbour, Florida, Nov. 11, 1987.

ASTM Sympoium on Surface Crack Growth: Models, Experiments and Structures, Sparks, Nevada, April 25, 1988.

11. Seminars or lectures delivered:

Fatigue Crack Growth Under Spectrum Loading: To Graduate students of the University of Cincinnati, February 26, 1988.

12. Meetings attended by specific invitation: None.

13. Teaching, if any as an associate: None

14. Work in progress:

Fatigue crack growth tests on a nickel-base superalloy at ambient and elevated temperatures.

15. Summary of research during tenure:

Engineering models were developed to predict:

(a) Crack growth in a nickel-base superalloy under arbitrary load temperature variation, including elevated temperature fatigue and thermal-mechanical fatigue crack growth.

(b) Notch root fatigue crack growth in Al-alloy material under aircraft spectrum loading.

Realtime control and data acquisition software was developed for creep crack growth and major-minor fatigue cycle testing. A few experiments were conducted on fatigue crack growth in a nickel-base superalloy and an Al-alloy.

16. Publications and papers resulting from research as an associate:

(a) Procedures for Fatigue Crack Propagation Testing Under Spectrum Loading, ASTM Symposium on Standardisation of Loading Spectra, Cincinnati, April 29, 1987. To appear in ASTM STP. (Work done at NAL and written up on tenure as NRC Associate.)

(b) Significance of Fatigue Crack Closure under Spectrum Loading, Fatigue'87, (Ed: R.O. Ritchie and E.A. Starke), EMAS, vol. 1, pp. 185-194, 1987.

(c) Analysis of Crack Growth under Programmed Load-Temperature History in a Nickel Base Superalloy, Int. Symposium on Environmentally Assisted Cracking: Science and Engineering, Bal Harbour, Nov. 11, 1987 (under review for publication in ASTM STP).

(d) Engineering Analysis of Notch Root Fatigue Crack Growth Under Spectrum Loading, ASTM Symposium on Surface Crack Growth: Models, Experiments and Structures, Sparks, Nevada, April 25, 1988, (under review for publication in ASTM STP).

(e) (with D. Maxwell and M. Khobeib), Study of Fatigue Crack Closure Using Back-Face Strain and Fractography, mini-AIAA Symposium, Dayton, March 29, 1988.

17. Patents applied for :None

18. Future position and address:

Senior Scientist
Materials Science Division
National Aeronautical Laboratory
BANGALORE 560 017. India

TERMINATION REPORT

(1) Date: 3 December 1987

(2) Name: Dr. Robert A. Vincent

(3) Location: Air Force Geophysics Laboratory

(4) Dates of Tenure: 15 June- 31 December 1987

(5) Title of Research Project:

Dynamics of the upper middle atmosphere

(6) Research Advisor: Dr. Herbert C. Carlson

(7) Permanent position and affiliation:

Reader in Physics
Physics Department
University of Adelaide
Adelaide 5001
Australia

(8)N/A

(9)N/A

(10) Scientific Meetings:

Location	Dates	Meeting
Vancouver	10-22 Aug	IUGG Assembly
AFGL, Boston	20-22 Oct	Density Workshop
San Fransisco	9-13 Dec	AGU Fall Meeting

Scientific Consultation:

Arecibo Ionospheric Observatory, Arecibo, 29 oct-1 Nov

(11) Seminar Presentations:

Boston University,	16 Oct
Arecibo Observatory,	30 Oct

(12) N/A

(13) N/A

(14) Work in Progress:

The emphasis during the final month of tenure has been on completion of the analysis of data relating to atmospheric gravity waves. Another project nearing completion is the analysis of density variations caused by the atmospheric diurnal tide, work which is based on a recently submitted paper with Professor J. M. Forbes of Boston University (see (16) below). This research is being prepared for publication as an AFGL report to be entitled, "Effects of mean winds and dissipation on the diurnal propagating tide and implications for density variations in the lower thermosphere".

(15) Summary of Research during Tenure:

Poorly known properties of atmospheric gravity waves and tides in the lower thermosphere, such as the density fluctuations, have been investigated. Using ground based radar measured winds it has been possible to derive gravity wave climatologies for selected locations. The development of an analytic model of the propagating diurnal tide has not only allowed the density fluctuations associated with the tide to be inferred from the wind observations but has also aided the interpretation of tidal parameters computed using complicated numerical models.

(16) Publications:

Forbes, J. M. and R. A. Vincent, Effects of mean winds and dissipation on the diurnal propagating tide: An analytic approach, Planet. Space Sci., (submitted), 1987.

(17) N/A

(18) Forwarding Address:

Dr. R. A. Vincent
Physics Department
University of Adelaide
PO Box 498
Adelaide 5001
Australia

CT/LH/KHM/JS

Termination Report

(1) October 12, 1987

(2) Oskar von der Lühe

(3) Air Force Geophysics Laboratory
Solar Research Branch
Sunspot, NM 88349

(4) Dates of tenure: Nov. 1, 1986 through Oct. 31, 1987

(5) Title of research project:
"Combination of pre-processing and post-processing imaging techniques for solar observations"

(6) Research adviser's name: Dr. Richard R. Radick

(7) I am not on leave from a professional post.

(8) I held no international posts during tenure.

(9) I had no programmatic travel during tenure.

(10) Scientific seminars, meetings and consultations:

domestic:

- American Astronomical Society meeting,
  Pasadena, CA Jan. 5 - 9, 1987

- ESO/NOAO Joint Workshop on Interferometric Imaging,
  Oracle, AZ Jan. 12 - 15, 1987

- NSO Scientific Staff meeting,
  Tucson, AZ Jan. 29 - 30, 1987

- Consultation at Lockheed Palo Alto Research Laboratory
  on technology of adaptive optics,
  Palo Alto, CA March 17 - 20, 1987

- HAO / NSO Santa Fe Scientific meeting,
  Santa Fe, NM Oct. 7 - 9, 1987

foreign:

- LEST workshop an adaptive optics,
  Freiburg, West Germany Sept. 8 - 9, 1987

(11) Seminars or lectures delivered at Universities and Institutes:

- National Solar Observatory, Sunspot, Feb. , 1987,
  "On the Brightness, Sizes and Dynamics of Photospheric Faculae"

- National Radio Astronomy Observatory, Soccorro, NM, March 27, 1987,
  "High Spatial Resolution for Solar Observations"

- High Altitude Observatory, Boulder, CO July 28, 1987,
  "Solar Interferometric Imaging"

- Kiepenheuer Institut f. Sonnenphysik, Freiburg, West Germany,
  Sept. 10, 1987, "Solar Interferometric Imaging"

- Applied Optics Research group at the University of Erlangen, West Germany,
  Sept. 15, 1987, "Adaptive Optics for Solar Research"

- Astronomisches Institut d. Eidgenössischen Technischen Hochschule,
  Zürich, Switzerland, Sept. 18, 1987, "Solar Interferometric Imaging"

- Universitätsternwarte Göttingen, West Germany,
  Sept. 24, 1987, "Solar Interferometric Imaging"

(12) Meetings attended by specific invitation:
I presented an invited talk on Image Stabilization at the AAS meeting in Pasadena in January 1987.
The meeting in Oracle, January 1987, was for invited participants only.

(13) I did no teaching as an associate.

(14) Work in progress:

- Study of advanced speckle imaging techniques (speckle masking) for extended objects

- Study of two-dimensional nonredundant arrays for solar imaging

(15) Summary of research during tenure:

I found during extensive testing that the overly-sensitive optical setup of the LPARL prototype adaptive optical system prevented scientifically useful operation. I could not collect the data required to carry out the original program.

I studied the transfer function associated to the Knox-Thompson speckle imaging technique, using log-normal statistics for the complex wave amplitude and second-order statistics based on a Kolmogorov turbulence spectrum. I developed a new technique for measuring wavefront errors by using fine structure of an extended, incoherent source as tracers. The prospects of a wavefront sensor for a solar adaptive optical system based on this technique appear to be good.

(16) Publications and papers resulting from research as an associate:

von der Lühe, O. (1987), "Photospheric Fine Structure close to a Sunspot," to appear in *Proceedings of the 1986 Inaugural Workshop of the Canary Islands*

von der Lühe, O. (1987), "Calibration Problems in Solar Speckle Interferometry," in *Interferometric Imaging in Astronomy*, Proceedings of an ESO/NOAO Joint Workshop, Ed. Jean W. Goad, published by National Optical Astronomy Observatories, April 1987, Tucson, AZ. pp 9-12.

von der Lühe, O. (1987), "Application of the Knox-Thompson Method to Solar Observations," in *Interferometric Imaging in Astronomy*, Proceedings of an ESO/NOAO Joint Workshop, Ed. Jean W. Goad, published by National Optical Astronomy Observatories, April 1987, Tucson, AZ. pp 37-40.

von der Lühe, O. (1987), "Study of Sizes, Brightnesses and Dynamics of Solar Facular Points," in *Interferometric Imaging in Astronomy*, Proceedings of an ESO/NOAO Joint Workshop, Ed. Jean W. Goad, published by National Optical Astronomy Observatories, April 1987, Tucson, AZ. pp 225-228.

von der Lühe, O. (1987), "On the Signal Transfer Function of the Knox-Thompson Speckle Imaging Technique," submitted to **Journ. Opt. Soc. Am. A**

von der Lühe, O. (1987), "A Wavefront Error Measurement Technique using Extended, Incoherent Light Sources," submitted to **Opt. Eng.**

von der Lühe, O. (1987), "Photon Noise Analysis for a LEST Multidither Adaptive Optical System," to appear in *Proceedings of the LEST Workshop on Adaptive Optics*".

von der Lühe, O. (1987), "A Wavefront Sensor for Extended, Incoherent Targets," to appear in *Proceedings of the LEST Workshop on Adaptive Optics*".

(17) Patents: I plan to apply for a patent for the wavefront sensing technique mentioned above.

(18) Future position and address:

Associate Scientist
National Solar Observatory
Sacramento Peak
Sunspot, New Mexico 88349

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 2/18/88
Associate Name: James E. Bohr
Laboratory: Air Force Astronautics Laboratory
Location: Edwards Air Force Base, CA 93523-5000
Starting Date of Tenure: 6/1/87
Adviser Name: Dr. Louis A. Dee

I. Associateship Office Functions	Yes	No
1. Were the ...	X	
2. If ...	X	
3. If ...	X	
4. Is the ...	X	
5. Are ...	X	
6. Are your ...	X	

Comments: I am particularly grateful that the NRC agreed to cover the cost of transporting my van. Also, the relocation was handled smoothly by the moving company.

II. Laboratory Functions	YES	NO
1. Was the ...	X	
2. Is your ...	X	
3. Is the ...	X	
4. Are you ...		X
5. Are you ...	X	
6. Are you ...	X	
7. Are you ...	X	
8. Have you ...		X

Comments: Library facilities and holdings need improvement at this laboratory. Computer on-line literature searching is available, but hard copy of many journal articles must be obtained from other libraries.

Brief resume of progress: Determined the potential energy curves of four excited quintet states of carbon monoxide. Identified one of these as a strong candidate molecule for energy storage. Currently investigating the long range interactions between carbon monoxide in its ground and excited states and other molecules.

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 16 February 1988

Associate Name: Anton M. Dainty

Laboratory: Air Force Geophysics Laboratory

Location: Hanscom AFB, MA 01731-5000

Starting Date of Tenure 1 June 1987

Adviser Name: Dr. John J. Cipar

I. Associateship Office Functions	Yes	No
1. Were the pre-start materials and instructions satisfactory?	X	
2. If requested, was the relocation and travel advance handled in a satisfactory manner?		
3. If requested, was the stipend advance available when you began tenure?		
4. Is the stipend being received regularly in a timely way?	X	
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	X	
6. Are your questions to this Office being handled courteously and efficiently?	X	

Comments:

No problems - things are going smoothly.

over...

CT/LH/RHM/JS

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 29 Feb 1988

Associate Name: Andrea K. Dobson

Laboratory: AFGL

Location: Sunspot NM

Starting Date of Tenure 1 Sept 1987

Adviser Name: Richard Radick

I. Associateship Office Functions	Yes	No	
1. Were the pre-start materials and instructions satisfactory?	X		
2. If requested, was the relocation and travel advance handled in a satisfactory manner?			n.a.
3. If requested, was the stipend advance available when you began tenure?			n.a.
4. Is the stipend being received regularly in a timely way?	X		
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	X		
6. Are your questions to this Office being handled courteously and efficiently?	X		

Comments:

over...

II. Laboratory functions

	Yes	No
1. Was the laboratory ready to receive you and help you get started?	X	
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	X	
3. Is the space assigned reasonably adequate?	X	
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.		X
5. Are you being encouraged to plan for publication of your research results in referred journals?	X	
6. Are you able to participate in local seminars, colloquia, etc.?	X	
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	X	
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.		X

Comments:
The computers here are down quite a bit. (~7% of working hours) This is somewhat frustrating. This is my only complaint & it is NOT a major problem

Brief resume of progress:

The most widely used indicator of stellar magnetic activity is emission in the H+K lines of Ca II. It is now apparent that only part of this emission is actually due to varying magnetic activity. I have spent a large portion of my time to date establishing what fraction of this emission, as a function of B-V color, is magnetic in origin. This is a necessary step before adequate use can be made of Ca II H+K observations in the comparison of the magnetic activity of stars of differing compositions.

General impression of program to date:
Overall I am very pleased with my reception here at Sunspot. I am happy to have the opportunity to conduct research here. I enjoy the work I am doing & the people I am working with. I am glad the NRC program exists.

Suggestions:

CT/JS/RHM

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 7 JULY 88

Associate Name: ROBERT LEE GANNON

Laboratory: AIR FORCE SYSTEMS COMMAND/AFSAM

Location: BROOKS AFB, TX (SAN ANTONIO)

Starting Date of Tenure 6 DEC 87

Adviser Name: DAVID M. TERRIAN

I. Associateship Office Functions	Yes	No
1. Were the pre-start materials and instructions satisfactory?	✓	
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	✓	
3. If requested, was the stipend advance available when you began tenure?	✓	
4. Is the stipend being received regularly in a timely way?	✓	
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	✓	
6. Are your questions to this Office being handled courteously and efficiently?	✓	

Comments:

over...

Laboratory functions	Yes	No
1. Was the laboratory ready to receive you and help you get started?	✓	
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	✓	
3. Is the space assigned reasonably adequate?	✓	
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	✓	
5. Are you being encouraged to plan for publication of your research results in referred journals?	✓	
6. Are you able to participate in local seminars, colloquia, etc.?	✓	
7. Are you encouraged to plan for at endance at appropriate national and/or regional meetings?	✓	
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.	N/A	✓

Comments:

#4 - ORDERING SUPPLIES THROUGH THE AIR FORCE ACQUISITION SYSTEM IS, TO BE POLITE, A NIGHTMARE. IT IS EXTREMELY DIFFICULT TO GET ANYTHING IN A TIMELY MANNER. NEVERTHELESS, WITH ADEQUATE PLANNING I AM USUALLY ABLE TO PREVENT ANY DELAYS OR WORK STOPPAGE.

Brief resume of progress:

ONE MANUSCRIPT HAS THUS FAR BEEN COMPLETED AND IS TO BE SUBMITTED TO BRAIN RESEARCH WITHIN THE MONTH. IN ADDITION, (2) Abstracts have been submitted for presentation to the Society for Neuroscience. WORK TOWARDS THE NEXT MANUSCRIPT IS PROGRESSING AT AN ACCEPTABLE RATE. I FEEL THE CURRENT RESEARCH TOPICS ARE OF A HIGH SCIENTIFIC INTEREST.

General impression of program to date:

The NRC RESEARCH ASSOCIATE PROGRAM IS EXCEPTIONAL. I HAVE ABSOLUTELY NO COMPLAINTS, NOT RESERVATIONS FOR entering this PROGRAM.

Suggestions:

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 4 - 11 - 88

Associate Name: Alexander Gunnell

Laboratory: AAMRL / MFSC

Location: Dayton, OH

Starting Date of Tenure 12/2 - 87

Adviser Name: G. F. Wilson

I. Associateship Office Functions	Yes	No
1. Were the pre-start materials and instructions satisfactory?	✓	
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	✓	
3. If requested, was the stipend advance available when you began tenure?	✓	
4. Is the stipend being received regularly in a timely way?	✓	
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	✓	
6. Are your questions to this Office being handled courteously and efficiently?	✓	

Comments:

over...

II. Laboratory functions

	Yes	No
1. Was the laboratory ready to receive you and help you get started?	✓	
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	✓	
3. Is the space assigned reasonably adequate?	✓	
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	✓	
5. Are you being encouraged to plan for publication of your research results in referred journals?	✓	
6. Are you able to participate in local seminars, colloquia, etc.?	✓	
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	✓	
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.		✓

Comments:

Brief resume of progress:

The proposed experiment and data reduction as well have been completed. Preliminary results look promising with respect to field applications.

General impression of program to date:

I am very satisfied with the program

Suggestions:

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date:

Associate Name: Thomas L. Henshaw

Laboratory: Frank J. Seiler Research Laboratory - NH

Location: United States Air Force Academy
Colorado Springs, CO

Starting Date of Tenure
10-26-87

Adviser Name:
Dr. R. J. Cook

I. Associateship Office Functions	Yes	No
1. Were the pre-start materials and instructions satisfactory?	✓	
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	n/a	
3. If requested, was the stipend advance available when you began tenure?	n/a	
4. Is the stipend being received regularly in a timely way?	✓	
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	✓	
6. Are your questions to this Office being handled courteously and efficiently?	✓	

Comments:

over...

II. Laboratory functions

	Yes	No
1. Was the laboratory ready to receive you and help you get started?	✓	
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	✓	
3. Is the space assigned reasonably adequate?	✓	
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.	✓	✓
5. Are you being encouraged to plan for publication of your research results in referred journals?	✓	
6. Are you able to participate in local seminars, colloquia, etc.?	✓	
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	✓	
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.		✓

Comments:

The Laser Kinetics laboratory, in which I work, is a relatively new laboratory. Hence, the first few months were devoted to ordering and building laboratory apparatus as well as getting introduced to the facilities.

Brief resume of progress:

We are investigating the use of molecular azides (HN_3 and ClN_3) as a precursor in the development of an electronic transition Chemical laser. We are currently studying the $N_2(A^3\Sigma_u^+) + NO$ system. Future work includes the $O + N_3$ and $S + N_3$ reaction systems.

General impression of program to date:

The AFSC/FJSRL personnel have been very supportive of my efforts and ideas. I wish to express my thanks to AFSC/FJSRL and the NRC for the opportunity to pursue them.

Suggestions:

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 4 Jan 1988

Associate Name: ~~HA~~ SWARNALATHA MALLAVARAPU

Laboratory: AIR FORCE WEAPONS LABORATORY

Location: KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NM-8711

Starting Date of Tenure 25 MAR 1987

Adviser Name: Dr. ARTHUR. H. GUENTHER

I. Associateship Office Functions	Yes	No
1. Were the pre-start materials and instructions satisfactory?	✓	
2. If requested, was the relocation and travel advance handled in a satisfactory manner?		✓
3. If requested, was the stipend advance available when you began tenure?	✓	
4. Is the stipend being received regularly in a timely way?	✓	
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	✓	
6. Are your questions to this Office being handled courteously and efficiently?	✓	

Comments:

over...

II. Laboratory functions

	Yes	No
1. Was the laboratory ready to receive you and help you get started?	✓	
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	✓	
3. Is the space assigned reasonably adequate?	✓	
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.		✓
5. Are you being encouraged to plan for publication of your research results in referred journals?	✓	
6. Are you able to participate in local seminars, colloquia, etc.?		✓
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	✓	
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.		✓

Comments:

I am glad I had this opportunity to work in a reputed Laboratory and interacted with well known Scientists.

Brief resume of progress:

I have been working on the optical and physical properties of optical thin films deposited from Laser fused mixed oxides. The processing of the mixed oxides using a high power CO_2 Lasers, deposition of thin films from the processed material by Electron beam evaporation and characterisation of the optical properties of the films is the work that has been done. The work yet to be done is the Laser damage studies, Structure and chemical analysis of films & Starting material and the analysis & correlation.

General impression of program to date:

The program has offered a good exposure to advn techniques, current interest and new thoughts in the area of Laser optics. It gave me an opportunity to work on a new and unconventional problem. By the end of my tenure, this work would be useful both, to me and to the Laboratory.

Suggestions:

Since the facilities for my work are available with the Contractors to the Air Force weapons Lab, it was required to pay for most of my work, by the Air Force weapons Lab. It would be helpful if NRC could offer some support or have some reserve funds to pay for work done outside the Laboratory or if NRC could obtain permissions from the concerned organisation to get the work

CT/KFM/J-

NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

RECEIVED
NOV 4 1987
ASSOCIATESHIP OFFICE

SIX-MONTH PROGRESS REPORT

Date: Oct 30th, 87.

Associate Name: Dr. TELLAKULA. S. RAMAMURTHY.

Laboratory: MATERIALS LABORATORY.

Location: AFWAL, WPAFB, DAYTON, OH 45433

Starting Date of Tenure May 1st 87.

Adviser Name: Dr. S.W. TSAI, MLBM.

I. Associateship Office Functions	Yes	No
1. Were the pre-start materials and instructions satisfactory?	✓	
2. If requested, was the relocation and travel advance handled in a satisfactory manner?	✓	
3. If requested, was the stipend advance available when you began tenure?	✓	
4. Is the stipend being received regularly in a timely way?	✓	
5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily?	✓	
6. Are your questions to this Office being handled courteously and efficiently?		

Comments:

over...

II. Laboratory functions

	Yes	No
1. Was the laboratory ready to receive you and help you get started?	✓	
2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?	✓	
3. Is the space assigned reasonably adequate?	✓	
4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support? If so, explain below.		✓
5. Are you being encouraged to plan for publication of your research results in referred journals?	✓	
6. Are you able to participate in local seminars, colloquia, etc.?	✓	
7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?	✓	
8. Have you encountered laboratory influences detrimental to your proposed research? Explain.		✓

Comments:

The programe gives an opportunity for people like me to participate and conduct research work in an advanced laboratory like Air Force Materials Laboratory. The computational facilities and resources are being provided. There is good interaction with my research adviser Dr.S.W.Tsai, and complete freedom is given to me to conduct my research work.

Brief resume of progress:

The project selected for research is the elastic analysis of intereference fit pins in composite plates. The composite plate is treated as an orthotropic continuum. A Finite Element Analysis Program is developed. Bypass pin load configuration is selected for analysis. At the pin hole interface both force equilibrium and displacement compatibility are accounted for. An inverse technique is used to generate parametric data. The computer program is fully operational at laboratory computer systems.

General impression of program to date:

Ramamurthy
Oct 30th, 87.

Suggestions: