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.
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

<table>
<thead>
<tr>
<th>Associates</th>
<th>Advisers</th>
<th>Laboratory</th>
<th>Expected/Actual Starting Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACH, Henning</td>
<td>A. D. Yaghjian</td>
<td>RADC</td>
<td>March 3, 1988</td>
</tr>
<tr>
<td>GANNON, Robert Lee</td>
<td>D. A. Terrian</td>
<td>AFSAM</td>
<td>December 9, 1987</td>
</tr>
<tr>
<td>HENSHAW, Thomas Lee</td>
<td>K. E. Siegenthaler</td>
<td>FSRL</td>
<td>October 26, 1987</td>
</tr>
</tbody>
</table>

CANDIDATES NOT OFFERED AWARDS BECAUSE OF LACK OF FUNDING

<table>
<thead>
<tr>
<th>Associates</th>
<th>Advisers</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHO, Wonsuk</td>
<td>T. Nicholas</td>
<td>AFML</td>
</tr>
<tr>
<td>RAMU, Anantha S.</td>
<td>M. A. Plamondon</td>
<td>AFWL</td>
</tr>
</tbody>
</table>

ALTERNATE WHOSE STATUS IS PENDING

<table>
<thead>
<tr>
<th>Associates</th>
<th>Advisers</th>
<th>Laboratory</th>
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<tr>
<td>CIUFOLINI, Ignazio</td>
<td>A. H. Gunther</td>
<td>AFWL</td>
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CANDIDATES WHO HAVE ACCEPTED AWARDS IN THE OCTOBER 1987 NRC-AFSC RESEARCH ASSOCIATESHIP PROGRAMS REVIEW

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<th>Laboratory</th>
<th>Expected/Actual Starting Date</th>
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<tbody>
<tr>
<td>NEKKANTI, Rama Manohara</td>
<td>D. Dimiduck</td>
<td>AFML</td>
<td>July 1, 1988</td>
</tr>
<tr>
<td>PILLAI, P. K. Chellapan</td>
<td>A. Gavrielides</td>
<td>AFWL</td>
<td>June 13, 1988</td>
</tr>
</tbody>
</table>

CANDIDATES NOT OFFERED AWARDS BECAUSE OF LACK OF FUNDING

<table>
<thead>
<tr>
<th>Associates</th>
<th>Advisers</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGHION, Ernest Eliyau</td>
<td>F. H. Froes</td>
<td>AFML</td>
</tr>
</tbody>
</table>

ALTERNATE WHOSE STATUS IS PENDING

<table>
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<th>Associates</th>
<th>Advisers</th>
<th>Laboratory</th>
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<tbody>
<tr>
<td>KOZLOWSKI, Gregory</td>
<td>C. E. Overly</td>
<td>AFAPL</td>
</tr>
</tbody>
</table>
### PART III

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

<table>
<thead>
<tr>
<th>Associates</th>
<th>Advisers</th>
<th>Laboratory</th>
<th>Expected/Actual Starting Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANTUNANO, Melchor J.</td>
<td>S. A. Nunneley</td>
<td>APSAM</td>
<td>September 1, 1988</td>
</tr>
<tr>
<td>FRENCH, Linda M.</td>
<td>S. D. Price</td>
<td>AFGL</td>
<td>June 1, 1988</td>
</tr>
<tr>
<td>MALOY, Joseph T.</td>
<td>J. S. Wilkes</td>
<td>AFSRL</td>
<td>June 3, 1988</td>
</tr>
<tr>
<td>MANASREH, M. Omar</td>
<td>D. W. Fischer</td>
<td>AFML</td>
<td>August 1, 1988</td>
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ALTERNATES WHOSE STATUS IS PENDING

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<th>Laboratory</th>
<th>Expected Starting Date</th>
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<tbody>
<tr>
<td>BABCOCK, Lucia M.</td>
<td>J. F. Paulson</td>
<td>AFGL</td>
<td>August 1, 1988</td>
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<tr>
<td>BEN-MENAHEM, Ari</td>
<td>D. H. Eckhardt</td>
<td>AFGL</td>
<td>August 1, 1988</td>
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<tr>
<td>BRATLAND, Stein D.</td>
<td>J. S. Wilkes</td>
<td>AFSRL</td>
<td>September 1, 1988</td>
</tr>
<tr>
<td>GOTTLIEB, Benjamin</td>
<td>H. C. Carlson</td>
<td>AFGL</td>
<td>May 1, 1988</td>
</tr>
<tr>
<td>LYNNES, Christopher S.</td>
<td>J. J. Cipar</td>
<td>AFGL</td>
<td>August 1, 1988</td>
</tr>
<tr>
<td>MEHRABADI, Morteza M.</td>
<td>S. W. Tsai</td>
<td>AFML</td>
<td>June 1, 1988</td>
</tr>
</tbody>
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CANDIDATES NOT OFFERED AWARDS BECAUSE OF LACK OF FUNDING

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<th>Associates</th>
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<th>Laboratory</th>
<th>Expected Starting Date</th>
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</thead>
<tbody>
<tr>
<td>KLEIMAN, Moshe M.</td>
<td>D. E. Bedo</td>
<td>AFGL</td>
<td>August 1988</td>
</tr>
</tbody>
</table>
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
NRC/AFSC Status Report
7/1/87-6/30/88
Page 9

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

One overdue Termination report was received during this reporting
period: Dr. William E. Czelen
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-APSC RESEARCH ASSOCIATESHIP PROGRAM
**OCTOBER 1987 RECOMMENDED CANDIDATES**

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

cc: Dr. John Dimmock  
Col. A. J. Driscoll  
Ms. Flo Batey
# NRC-ASFC Research Associateship Program

## February 1988 Recommended Candidates

<table>
<thead>
<tr>
<th>Name</th>
<th>PhD Year, Institution</th>
<th>Cit.</th>
<th>Visa</th>
<th>Adviser</th>
<th>Tenure (MOS)/ Level</th>
<th>Expected Starting Date</th>
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<tr>
<td><strong>Air Force Seiler Research Laboratory</strong></td>
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<tr>
<td>Bratland, Stein D.</td>
<td>Tech. Univ. of Norway</td>
<td>Nor</td>
<td>J-1</td>
<td>J.S. Wilkes</td>
<td>12/S</td>
<td>September 1, 1988</td>
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<tr>
<td>Maloy, Joseph T.</td>
<td>Univ. of Texas</td>
<td>US</td>
<td>N/A</td>
<td>J.S. Wilkes</td>
<td>06/S</td>
<td>May 16, 1988</td>
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<tr>
<td><strong>Air Force School of Aerospace Medicine</strong></td>
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<td>Antunano, Melchor</td>
<td>Nat'l Autonomous Univ.</td>
<td>Mex</td>
<td>J-1</td>
<td>S.A. Nunneley</td>
<td>12/R</td>
<td>August 1988</td>
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<td><strong>Air Force Geophysics Laboratory</strong></td>
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<tr>
<td>Babcock, Lucia M.</td>
<td>City Univ. of New York</td>
<td>US</td>
<td>N/A</td>
<td>J.F. Paulson</td>
<td>12/S</td>
<td>September 1, 1988</td>
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<tr>
<td>Gottlieb, Benjamin</td>
<td>Gujarat Univ.</td>
<td>US</td>
<td>N/A</td>
<td>H.C. Carlson</td>
<td>12/S</td>
<td>May 1, 1988</td>
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<tr>
<td><strong>Earth Science Division</strong></td>
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<td>French, Linda M.</td>
<td>Cornell Univ.</td>
<td>US</td>
<td>N/A</td>
<td>S.D. Price</td>
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<td>June 1, 1988</td>
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<td>Kleinman, Moshe M.</td>
<td>Hebrew Univ.</td>
<td>IS</td>
<td>J-1</td>
<td>D.E. Bedo</td>
<td>12/S</td>
<td>August 1988</td>
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<tr>
<td>Lynnes, Christopher S.</td>
<td>Univ. of Michigan</td>
<td>US</td>
<td>N/A</td>
<td>J.J. Cipar</td>
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<td>August 1, 1988</td>
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<tr>
<td>Calius, Emilio P.</td>
<td>Stanford Univ.</td>
<td>Argen</td>
<td>J-1</td>
<td>S.W. Tsai</td>
<td>12/R</td>
<td>July 1988</td>
</tr>
<tr>
<td>Manasreh, M. Omar</td>
<td>Univ. of Arkansas</td>
<td>US</td>
<td>N/A</td>
<td>D.W. Fischer</td>
<td>12/R</td>
<td>August 1988</td>
</tr>
<tr>
<td>Mehrabadi, Morteza M.</td>
<td>Tulane Univ.</td>
<td>US</td>
<td>N/A</td>
<td>S.W. Tsai</td>
<td>12/S</td>
<td>June 1, 1988</td>
</tr>
</tbody>
</table>
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:

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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

The National Research Council is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering to serve government and other organizations.
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</tr>
<tr>
<td>CHO, Wonsuk</td>
<td>87, Univ. of Michigan</td>
<td>Korea</td>
<td>J-1</td>
<td>T. Nicholas</td>
<td>12/R</td>
<td>Sept. 1, 1987</td>
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<td>FRANK J. SEILER RESEARCH LABORATORY</td>
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<td>HENSHAW, Thomas L.</td>
<td>87, Univ. of Denver</td>
<td>U.S.</td>
<td>N/A</td>
<td>K.E. Siegenthaler</td>
<td>12/R</td>
<td>September 1, 1987</td>
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<td>AIR FORCE SCHOOL OF AEROSPACE MEDICINE</td>
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<td>GANNON, Robert L.</td>
<td>87, Univ of Texas</td>
<td>U.S.</td>
<td>N/A</td>
<td>D. A. Terrian</td>
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<td>November 1, 1987</td>
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<td>AIR FORCE AEROMEDICAL RESEARCH LABORATORY</td>
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<td>ROME AIR DEVELOPMENT COMMAND</td>
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<td>BACH, Henning</td>
<td>67, Tech. Univ. of Denmark</td>
<td>J-1</td>
<td></td>
<td>A.D. Yaghjian</td>
<td>12/S</td>
<td>September 1, 1987</td>
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<td>AIR FORCE WEAPONS LABORATORY</td>
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<tr>
<td>CIUFOLINI, Ignazio</td>
<td>84, Univ. of Texas</td>
<td>IT</td>
<td></td>
<td>A. H. Guenther</td>
<td>12/R</td>
<td>September 1987</td>
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<tr>
<td>RAMU, Anantha S.</td>
<td>66, Waterloo</td>
<td>IN</td>
<td>J-1</td>
<td>M. A. Plamondon</td>
<td>12/S</td>
<td>September 1, 1987</td>
</tr>
</tbody>
</table>
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.

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
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)
5. Title of Research Project: "The Physiologic Characterization and Biofeedback 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
    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 arrhythmias). 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 attendant 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 documented, 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 consistent pattern. While the respiratory rate change is not statistically significant, minute volumes increased approximately 80% to 110% (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 gastrointestinal
derived potentials that closely track, in amplitude and time course, the levels of motion sickness symptomatology.

(Both of the parameters of respiration and gastrointestinal 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 acquisition 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 feedback parameter.)

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 dextroamphetamine. 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. "Electroencephalography During Oriolitis Induced Motion Sickness"
2. "Severe Hyperventilation During Acute Motion Sickness in Man"
3. "Cardiac Arrhythmias 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
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
10. SCIENTIFIC SEMINARS, MEETINGS, AND/OR CONSULTATIONS:
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 ZrO₂, HfO₂, Y₂O₃, 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 CO₂ 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.


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
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
    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


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


b. Poster Papers


c. Abstracts


17. N/A

18. Researcher

   Dipartimento di Fisica dell' Universita di Napoli

   Mostra D'Oltremare Pad. 19

   80125 Napoli   ITALY
NRC TERMINATION REPORT

Date: 2 September 1987

Name: Prof. Harald A. Øye

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

Dates of Tenure: 2 September 1986 - 5 September 1987

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

Research Advisor: Dr. John S. Wilkes

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

Non-U.S. Posts Held During Tenure:
   a. President (on leave), The Norwegian Academy of Technical Sciences.


Scientific Seminars and Meetings:
   e. The 6th International Course on "Process Metallurgy of Aluminum," Trondheim, Norway, 1-5 Jun 87. Director and Lecturer: "Cathodes in Aluminum Electrolysis."
11. **Seminars or Lectures Delivered at Universities and Institutes:**


   b. The University of Michigan, College of Engineering, Ann Arbor, MI, 6 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."


12. **Meetings Attended by Specific Invitation:**


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:**


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


17. Patents: None.

18. Future Position and Address:

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

(1) DATE 1 April 1988
(2) NAME K. Prabhakara Rao
(3) LOCATION OF TENURE
Air Force Materials Laboratory, 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,
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.

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 sublamine 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.


(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.
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
   Caracas, 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
   Caracas, 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


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.


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  
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.
   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 University of Dayton Research Institute
   300 College Park
   Dayton, OH 45469-0001

   The Forwarding Address:
   3875 C Hillsboro Drive
   Dayton, OH 45431 2450
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:

4. Wright-Patterson AFB, OH, 4-7 November 1985.
Lectures given at Universities and Institutes:

1984


1985


1986


1987


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

Boiling AFB, Washington, 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)


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


1986


1987


(17) N/A

TERMINATION REPORT

1. Date: April 27, 1988
2. Name: R. Sunder
3. Location of Tenure: Air Force Wright Aeronautical Laboratories, Materials Laboratory
4. 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:


   Meetings/consultations with professional colleagues at
   General Electric (Corp. R & D), Schenectady, N.Y. (Dr. Vasatis),
   Brown University (Prof. Suresh),


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:


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:


(17) N/A

(18) Forwarding Address:

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

(1) October 12, 1987

(2) Oskar von der Lühe

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


(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,

- 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 on adaptive optics,
  Freiburg, West Germany Sept. 8 - 9, 1987
Seminars or lectures delivered at Universities and Institutes:


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


- 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"

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.

I did no teaching as an associate.

Work in progress:

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

- Study of two-dimensional nonredundant arrays for solar imaging

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:


(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
1. Were the ...
   Yes No 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
1. Was the ...
   X
2. Is your ...
   X
3. Are you ...
   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 surface
of four excited quintet states of carbon monoxide. Concluded
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 water
molecules.

In order to improve the above outline, the progress of this program
should be more clearly defined. Future plans are to further explore
the potential energy surface of carbon monoxide in its ground and
excited states and to investigate its interactions with water.

I am grateful for the support and guidance I have received.
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

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<th>Yes</th>
<th>No</th>
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1. Were the on-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:

No problems - things are going smoothly.

over...
NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS

SIX-MONTH PROGRESS REPORT

Date: 29 Feb 1988

Associate Name: Andrea K. Dobson

Laboratory: AFGL

Location: Sunapart NWA

Starting Date of Tenure: Sep 1987

Adviser Name: Richard Radick

I. Associateship Office Functions

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</tr>
<tr>
<td>6. Are your questions to this Office being handled courteously and efficiently?</td>
<td>X</td>
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</table>

Comments: over...

2/5/85
II. Laboratory functions

1. Was the laboratory ready to receive you and help you get started?  
   Yes ☒ No ☐

2. Is your interaction with your research adviser and the NRC Laboratory Program Representative satisfactory?  
   Yes ☐ No ☒

3. Is the space assigned reasonably adequate?  
   Yes ☒ No ☐

4. Are you experiencing any problems with access to equipment, computer time, supplies, technical support?  
   If so, explain below.  
   Yes ☐ No ☒

5. Are you being encouraged to plan for publication of your research results in referred journals?  
   Yes ☒ No ☐

6. Are you able to participate in local seminars, colloquia, etc.?  
   Yes ☒ No ☐

7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?  
   Yes ☒ No ☐

8. Have you encountered laboratory influences detrimental to your proposed research? Explain.  
   Yes ☒ No ☐

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 and the people I am working with. I am glad the NRC program exists.

Suggestions:
**SIX-MONTH PROGRESS REPORT**

**Date:** July 88  
**Associate Name:** ROBERT LEE GANNON  
**Laboratory:** AIR FORCE SYSTEMS COMMAND / AFSAAM  
**Location:** BROOKS AFB, TX (SAN ANTONIO)  
**Starting Date of Tenure:** 6 Dec 87  
**Adviser Name:** DAVID M. TERRILAN

### I. Associateship Office Functions

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<th>Yes</th>
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<td>1. Were the pre-start materials and instructions satisfactory?</td>
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**Comments:**

...over...

2/5/85
<table>
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<tr>
<th>Question</th>
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<td>✓</td>
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<td>✓</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>Have you encountered laboratory influences detrimental to your proposed research? Explain.</td>
<td>✓</td>
<td></td>
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</table>

Comments:

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

Brief resume of progress:

ONE MANUSCRIPT HAS TO DATE BEEN COMPLETED AND IS TO BE SUBMITTED TO A JOURNAL 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 EXCELLENT. I HAVE ABSOLUTELY NO COMPLAINTS, NOR RESERVATIONS FOR ENTERING THIS PROGRAM.

Suggestions:
NATIONAL RESEARCH COUNCIL
ASSOCIATESHIP PROGRAMS
SIX-MONTH PROGRESS REPORT

Date: 4-11-88
Associate Name: Alexander Garcia
Laboratory: ARSCL / AFSC
Location: Newton, CT
Starting Date of Tenure: 1/1/87
Adviser Name: C. Wilson

I. Associateship Office Functions

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

Comments:

over...

2/5/85
II. Laboratory functions

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 collection as well have been completed. Preliminary results have promised 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: 2/5/85

Associate Name: Thomas L. Henshaw

Laboratory: Frank J. Seiler Research Laboratory - NIF

Location: United States Air Force Academy

Colorado Springs, CO

Starting Date of Tenure: 10-24-87

Adviser Name: Dr. R. J. Cook

<table>
<thead>
<tr>
<th>Associateship Office Functions</th>
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Comments:

over...

2/5/85
II. Laboratory functions

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 faculty.

Brief resume of progress:
We are investigating the use of molecular azides (HN3 and C2N3) as a precursor in the development of an electronic transition chemical laser. We are currently studying the N2(A^2Σu^+) + NO system. Future work includes the O + N3 and S + N3 reaction systems.

General impression of program to date:
The AFSC/FSSRL personnel have been very supportive of my efforts and ideas. I wish to express my thanks to AFSC/FSSRL 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: SWARNALATHA MALLAVARAPU

Laboratory: AIR FORCE WEAPONS LABORATORY

Location: KIRTLAND AIR FORCE BASE, ALBUQUERQUE, NM 87117

Starting Date of Tenure: 25 MAR 1987

Adviser Name: DR. ARTHUR H. GUENTHER

I. Associateship Office Functions

1. Were the pre-start materials and instructions satisfactory?
   Yes ☑ No

2. If requested, was the relocation and travel advance handled in a satisfactory manner?
   Yes ☑ No

3. If requested, was the stipend advance available when you began tenure?
   Yes ☑ No

4. Is the stipend being received regularly in a timely way?
   Yes ☑ No

5. Are Travel Requests and travel reimbursements handled promptly and satisfactorily?
   Yes ☑ No

6. Are your questions to this Office being handled courteously and efficiently?
   Yes ☑ No

Comments:

over...

2/5/85
II. Laboratory functions

1. Was the laboratory ready to receive you and help you get started?  
   Yes  No  

2. Is your interaction with your research advisor and the NRC Laboratory Program Representative satisfactory?  
   Yes  No  

3. Is the space assigned reasonably adequate?  
   Yes  No  

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?  
   Yes  No  

6. Are you able to participate in local seminars, colloquia, etc.?  
   Yes  No  

7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?  
   Yes  No  

8. Have you encountered laboratory influences detrimental to your proposed research? Explain.  
   Yes  No  

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 CW laser, deposition of thin films from the processed material by electron beam evaporation, and characterization of the optical properties of the films, in the work that has been done. The work yet to be done in the laser damage studies, structure and chemical analysis of films & blocking material and the analysis & correlation.

General impression of program to date:

The program has offered a good exposure to advanced techniques, current interest and new thoughts in the area of lasers, 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 permission from the concerned organization to put them...
Date: Oct 30th, 87

Associate Name: Dr. Telakula 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

1. Were the pre-start materials and instructions satisfactory? Yes __ No __

2. If requested, was the relocation and travel advance handled in a satisfactory manner? Yes __ No __

3. If requested, was the stipend advance available when you began tenure? Yes __ No __

4. Is the stipend being received regularly in a timely way? Yes __ No __

5. Are Travel Requests and travel reimbursements being handled promptly and satisfactorily? Yes __ No __

6. Are your questions to this Office being handled courteously and efficiently? Yes __ No __

Comments:

over...

2/5/85
II. Laboratory functions

1. Was the laboratory ready to receive you and help you get started?  
   Yes No

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?  
   Yes No

6. Are you able to participate in local seminars, colloquia, etc.?  
   Yes No

7. Are you encouraged to plan for attendance at appropriate national and/or regional meetings?  
   Yes No

8. Have you encountered laboratory influences detrimental to your proposed research? Explain.  
   Yes No

Comments:

The programme 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 interference 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:

Suggestions: