

EXECUTIVE SUMMARY

1995 NSF Dynamic Systems and Control Workshop for the Advancement and Retention of Underrepresented and Minority Engineer Educators

The NSF Dynamic Systems and Control Workshop for the Advancement and Retention of Underrepresented and Minority Engineering Educators was held in Arlington VA. on Sept. 20-22, 1995 at the Renaissance Hotel adjacent to the NSF Washington D.C. area headquarters.

In keeping with the diversity related goals stated in the NSF Strategic Plan entitled NSF in a Changing World, the workshop was designed to encourage retention and advancement of qualified women and underrepresented minority engineers in pursuit of scientific and engineering challenges. The workshop brought together a select group of forty of the nation's outstanding engineering educators. Participants were women or minority engineering educators who predominately have been in tenure track positions for less than five years. The participants were employed in teaching and/or research positions and actively developing their own unique research programs in dynamics and controls, as applied to civil and mechanical systems.

Specific workshop goals were to:

- i) foster technical and intellectual exchange among Ph.D. level, underrepresented and minority engineers who work in the area of dynamics and controls
- ii) instill in its participants the sense of a technical community in which they can thrive and to which they can contribute.
- iii) increase participant awareness of research and funding opportunities

The workshop consisted of six formal sessions spread over a 2-1/2 day period and two half day technical tours of national research laboratories. Dr. Elbert Marsh, NSF Deputy Assistant Director for the Directorate for Engineering, opened the Workshop. His remarks were followed by an expression of welcome by the NSF co-sponsors of the workshop, Dr. Daniel Davis and Dr. Devendra Garg. Dr. Marsh then gave an extended presentation on the significant role of NSF and Engineering in a changing world. Other government speakers giving presentations included Dr. Leonidas Sakell of the Air Force Office of Scientific Research (AFOSR), Dr. Geoffrey L. Main of the Office of Naval Research (ONR), Dr. Dexter Johnson of NASA Lewis, and Dr. Daniel B. Hodge of the Division of Undergraduate Education, EHR Directorate. Each of these speakers outlined the emphasis of their agency's programs and described the opportunities available for seeking funding from their organizations.

Three invited keynote speakers presented an overview of prominent research challenges in the areas of i) controls, ii) vibrations and acoustics, and iii) dynamics diagnostics. The three speakers were Professor James E. Hubbard of Boston University, Dr. Ephraim Garcia of Vanderbilt University, and Dr. Mardi Hastings of the Ohio State University. These speakers were invited on the basis of their outstanding contributions to the field they individually pursued, and for their reputation as excellent role models.

Workshop participants presented a brief summary of their current research interests, thus increasing fellow participants' awareness of the rich diversity of related opportunities for involvement in dynamics and controls research and stimulating discussion related to collaborative research endeavors.

The workshop included technical tours of laboratories and on-going research activities at the National Institute of Standards and Technology (NIST), The Naval Surface Warfare Center

(NSWC), and the Naval Research Laboratories (NRL). Specific sections of these laboratories, where research activities were being pursued in the areas of intelligent systems and control, structural vibrations and acoustics, and dynamic systems diagnostics and acoustics, were included for the guided tours. Technical tours of the national research laboratories were customized to complement workshop discussion topics. Dr. James Albus from NIST provided an overview of NIST research areas and tour facilities. Dr. Geoffrey Main from ONR coordinated the NRL and NSWC component of the tours to match participant areas of interest.

Sessions were also devoted to small group discussions (8-10 participants) of topics selected by the participants: Networking and establishing contacts; Juggling family and academics; How to sell an idea; Collaborative research; Mentoring; Tenure, funding and diversity issues; Interdisciplinary research funding; and Networking.

The envisioned short-term benefits of participation in the workshop are as follows:

1. Increased awareness of research and funding opportunities.
2. Diversification of participants' research program goals.
3. Development of a network of peers encountering similar challenges in advancing within academe and in the field of controls and dynamics.

The envisioned long-term benefits of the program are as follows:

1. Increased retention of women and underrepresented minority engineers as active researchers in the field of dynamics and controls.
2. Development of an infrastructure of colleagues working on dynamics and controls research that has a rich diversity.

As documented by the participant questionnaire responses summarized on the following page, the workshop was indeed deemed as extremely valuable by participants. It brought together an extremely well-motivated and bright group of women and underrepresented minority faculty. It increased their awareness of research and funding opportunities, provided them a forum to share among themselves the thrust of their own research interests, exposed them to ongoing research projects and available facilities at the various national laboratories, and facilitated the development of a network of peers encountering similar challenges in advancing farther within the academe and in the field of dynamic systems and control research. In the long run it is expected that this workshop and similar activities will enhance the retention of women and underrepresented minority educators as active researchers, and will assist in developing an infrastructure of colleagues working on complex and challenging dynamics and control related research problems.

Partial list of workshop evaluation form and post workshop e-mail comments:

This workshop was a very good idea. It gave an opportunity, mostly to junior faculty, to obtain considerable insight into the working of Gov. funding agencies (not only about NSF). The information imported normally takes faculty many years to 'figure out' the things that were explicitly stated @ the conference. Additionally, the mix of invites that also included faculty that had been on-board past receiving tenure was important here (I'm not referring to those who were in for a long time but those who were in for 6-10 years). Those persons added a slightly more mature component but still could benefit from the networking and grant seeking strategies presented. I think the distribution of balance of experiences possessed by the invitees was right. The field trips were a good idea, but more attention needs to be paid to their organization (this will come with time). Keep it up! The 10-min. presentations, while long because of the number of participants, was excellent. It gave everyone some insight into a broad range of topics and exposed opportunities for collaboration and/or consultation.

This is such a great!!! idea and I benefited greatly. I would like to suggest it be done annually and in more discipline areas. ...

Wonderful idea. I wish the foundation would make this part of its regular program. I learned much from the participants.

Best workshop I've attended in quite some time! EXCELLENT! All participants to be congratulated.

I think the idea of bringing these people together was not only wonderful, but timely and needed also. I hope that this program is not only continued, but expanded. Thank you and keep up the good work.

Do it again next year Please!!

This was a great experience. I feel I have made life time contacts and friends. The schedule was tough and reasonable time needs to be given so this is my recommendation. We should do this more and we need to interact more. It was wonderful to be around more "minorities" with experience and concerns like me.

...OVERALL, EXCELLENT Conference and am EXTREMELY pleased to be able to participate.

...I got a lot out of it and may possibly start collaborative research with one other participant. Hope this program continues in the future.

This was a wonderful group of diverse people. Coming from a mixed background, it was very beneficial to meet and hear talks on such a variety of topics. Also, the lab tours were very inspiring. People do actually have a great test facilities.

I had a great time last week with all of you. It was invigorating to say the least..... I think that it was a marvelous affair and certainly worth the time and effort.

I just want to say hello and open the lines of communications.... Being a new professor, I feel this was the most beneficial program that I have attended. I will support it anyway I can...

...I think that it is very important for this workshop to NOT be a one-time affair. I think we've been given a mechanism to support each other in our respective careers. ...

Just a quick note to say thank you for making this past week a most memorable occasion in my life. The discussions, both public and private have been to my benefit. ...

I want to add my personal thanks to those feelings already expressed. ... I was particularly impressed by the warmth and congeniality of this group - I can't remember the last time I went to an engineering workshop and hugged the other participants when I left. That kind of warmth and generosity of spirit truly complements the technical excellence of everyone involved. I hope we can continue to grow in this spirit of community - the world is at our fingertips, ready for change! ...

Just thought I'd take the time to express my sincere congratulations on hosting such a wonderful workshop. My life and perspective has been greatly enhanced as a result of attending this workshop. A rare event indeed.....THANX!! ...

Just a note to thank you for the opportunity to participate in an excellent workshop. The workshop was enlightening and rewarding and I personally benefited from participating. My only suggestion on how to improve upon this experience is to have it become an annual (or even bi-annual) event and to extend it to other divisions within NSF. My colleagues in other fields are somewhat jealous of my participation in this event (and rightly so!).

.... I suspect that the contacts made at the NSF workshop will change the course of more than a few careers - for the better!...

.... I had a wonderful time interacting with many of the participants, learning about their research interests and discussing possible areas of collaboration. We have already started exchanging ideas through e-mail and we hope to continue this productive interaction..... In short, this was one of the most interesting and informative workshops I have ever attended. Thank you very much for all your hard work in making this workshop a big success. ...

Schedule of Events

NSF Dynamic Systems and Controls Workshop

for the advancement and retention of underrepresented and minority engineering educators
9/20/95-9/22/95

WEDNESDAY 9/20/95

8:00 AM - 8:15 AM Opening and Welcome

- Dr. Alison Flatau, Associate Professor of Aerospace Engineering & Engineering Mechanics,
Iowa State University
- Dr. Elbert L. Marsh, Deputy Assistant Director, National Science Foundation Directorate for Engineering.
- Dr. Daniel Davis, Program Manager, Human Resources and Centers, Division of Engineering Education & Centers in the NSF Directorate for Engineering.
- Dr. Devendra Garg, Program Manager, Dynamic Systems & Controls Program, Division of Civil & Mechanical Systems in the NSF Directorate for Engineering.

8:15 AM - 12:00 PM Session I. Research & Funding Opportunities

- 8:15 Dr. Elbert L. Marsh, Deputy Assistant Director, National Science Foundation Directorate for Engineering.
- 9:00 Dr. Leonidas Sakell, Program Manager, External Aerodynamics and Hypersonics, AFOSR, Bolling Air Force Base, Washington D.C., "Basic Research Funding at AFOSR."
- 9:45 Coffee Break
- 10:00 Dr. Geoffrey L. Main, Office of Naval Research, "Navy Applications of Basic Research in Structural Dynamics."
- 10:45 Dr. Dexter Johnson, Structural Dynamics Branch, NASA Lewis Research Center, "Research and Funding Opportunities at NASA."
- 11:30 Dr. Daniel B. Hodge, Program Director, National Science Foundation, Teaching and Faculty Development Section of the Division of Undergraduate Education.

1:00 PM - 5:15 PM Session II. Hot Topics in Controls

Co-chairs: Dr. Garcia and Dr. Hastings

- 1:00 Invited speaker, Dr. James E. Hubbard Jr., Senior System Engineer, Boston University, "A Smart Skin for the Active Control of Vibrating Structures."

Participant presentations.

- 1:50 Dr. Anthony K. Amos.....II-1
- 2:00 Dr. Andrew Alleyne.....II-3
- 2:10 Dr. Christina L. Bloebaum.....II-6
- 2:20 Dr. Michael Bridges.....II-9
- 2:30 Ms. Virginia T. Byrd.....II-10
- 2:40 Dr. Xin Chen.....II-12
- 2:50 Dr. Juan C. Cockburn.....II-15
- 3:00 Break
- 3:15 Dr. Victoria Coverstone-Carrol.....II-17
- 3:25 Dr. Enrique Del Castillo.....II-19
- 3:35 Dr. Brian C. Fabien.....II-21
- 3:45 Dr. Nicola J. Ferrier.....II-24
- 3:55 Dr. Norman Fitz-Coy.....II-26
- 4:05 Dr. Roberto Horowitz.....II-28
- 4:15 Ms. Mary Kasarda.....II-31
- 4:25 Dr. Patricia F. Mead.....II-34

4:35	Dr. Cheryl B. Schrader.....	II-36
4:45	Dr. Fredrick A. Tasker.....	II-39
4:55	Dr. Dawn Tilbury.....	II-42
5:05	Dr. Gregory Washington.....	II-45

6:30 PM - 7:30 PM Evening Presentation

Dr. Albert J. Tucker, Director, Ship Structures and Systems S&T Division, Office of Naval Research, "Team Based Integrated Research."

THURSDAY 9/21/95

7:30 AM - 12:00 PM Tours

Technical tours of research laboratories at NIST.

1:00 PM - 3:55 PM Session III. Hot Topics in Vibrations and Acoustics

Co-chairs: Dr. Hastings and Dr. Hubbard

1:00 Invited speaker, Dr. Ephraim Garcia, Associate Professor, Vanderbilt University, "Finding Your Niche in Vibrations and Acoustics."

Participant presentations.

1:30	Dr. Daré Afolabi.....	III-1
1:40	Dr. Marcelo C. Algrain.....	III-4
1:50	Dr. Diann Brei.....	III-6
2:00	Dr. Emmanuel G.Collins, Jr.....	III-9
2:10	Dr. Janice D. Downer.....	III-12
2:20	Dr. Thomas Kashangaki.....	III-15
2:30	Dr. Kathryn W. Lilly	III-18
2:40	Dr. Paul A. C. Mason	III-21
2:50	Dr. Tesfay Meressi	III-23
3:00	Break	
3:15	Dr. Arthur G.O. Mutambara	III-26
3:25	Dr. Lucy Y. Pao	III-29
3:35	Dr. Kim D. Reisinger	III-32
3:45	Dr. Ann W. Stokes	III-34

4:10 PM - 5:50 PM Session IV. Hot Topics in Dynamics Diagnostics

Co-chairs: Dr. Garcia and Dr. Hubbard

4:10 Invited speaker, Dr. Mardi Hastings, Assistant Professor, The Ohio State University, "Dynamic Systems Diagnostics and Signal Processing."

Participant presentations.

4:40	Dr. Jennifer T. Bernhard.....	IV-1
4:50	Dr. Fahmida N. Chowdhury	IV-4
5:00	Dr. Raul G. Longoria	IV-6
5:10	Dr. Sally A. McInerny	IV-8
5:20	Dr. Denise Nicoletti	IV-11
5:30	Dr. Mirna Urquidi-MacDonald	IV-16
5:40	Dr. Melvin Ramey.....	

FRIDAY 9/22/95

7:30 AM - 12:00 PM Tours

Technical tours of NRL and NSWC research laboratories.

1:00 PM - 2:30 PM **Session V. Small group discussions**

Group facilitators: Drs. Flatau, Garcia, Hastings, Hubbard & Ramey.

1:00 Topics: Networking and establishing contacts; Juggling family and academics; How to sell an idea; and Collaborative research

1:45 Topics: Mentoring; Tenure, funding and diversity issues; Interdisciplinary research funding; and Networking

2:30 Break

2:45 PM - 3:30 PM **Session VI. Summary Panel**

Panel members: Drs. Garcia, Hastings & Hubbard.