The Imes-Moore Fellows Program: A Bridge-to-PhD Program Aimed to Enhance Diversity in Applied Physics

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“The interdisciplinary program spans the Physical Science Division of the College of Literature Science and the Arts, the College of Engineering, Medical School, School of Public Health, School of Natural Resources and offers graduate studies leading to the Doctor of Philosophy (Ph.D.) degree in Applied Physics. Coursework and research are structured to meet individual goals so that the program is appropriate for students intending to pursue careers in research, industry, academia, or government service.”
Goals

- Ph.D. level training bridging science and technology
- Preparation for careers in:
  - industry
  - entrepreneurship
  - academia
  - national labs
- Facilitate interdisciplinary collaborations
Participating Departments

- Aerospace Engineering
- Atmospheric, Oceanic and Space Sciences
- Biomedical Engineering
- Chemistry
- Chemical Engineering
- Electrical Engineering/Computer Science
- Geosciences
- Internal Medicine
- Materials Science and Engineering
- Mechanical Engineering
- Nuclear Engineering and Radiological Sciences
- Physics
- School of Public Health
Research Scope

- Huge range of research projects:
  - photonics/laser physics
  - nanoscience and technology
  - quantum information
  - space physics
  - materials science
  - energy and environment
  - physics in the life sciences
  - microelectromechanical systems
- 110 faculty in 13 participating departments
Key Elements for Success

(1) Flexibility

(2) Meeting the students where they are

(3) Mentorship

(4) Family structure
Minority PhDs in UM Applied Physics
Data From Last 12 Years
Applied Physics 25th Anniversary Celebration

THE UNIVERSITY OF MICHIGAN APPLIED PHYSICS PROGRAM IS PLEASED TO ANNOUNCE A ONE DAY SYMPOSIUM

Celebrating 25 Years of Excellence and Diversity in Graduate Education and Research

MONDAY, OCTOBER 15, 2012

Location: Horace H. Rackham Graduate School
Time: 9:00 AM-5:00 PM
Reception: 6:00 PM, University of Michigan Art Museum
Dinner immediately following

Keynote Speakers:
Dr. Millie Dresselhaus, Emeritus Professor, MIT
Dr. Roy Clarke, Founding Director of the U-M Applied Physics Program
Dr. Shirley Malcolm, Head of the Directorate for Education and Human Resources Programs, AAAS
Dr. James J. Duderstadt, President Emeritus of the University of Michigan

SAVE THE DATE TO JOIN US TO CELEBRATE THIS WONDERFUL, PIONEERING ACHIEVEMENT.

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http://www-applied.physicslsa.umich.edu
Bridge-to-PhD Programs at the UM

- Ecology & Evolutionary Biology: Frontiers Masters Program (launched in 2007)
- Applied and Interdisciplinary Mathematics: Marjorie Lee-Brown Scholars Program (launched in 2010)
- Applied Physics: Imes-Moore Fellows Program (launched in 2010)
Key Considerations Prior to Launching a Masters Bridge Program

- Make sure your PhD Program is in a healthy state
- Make sure there is strong support from the administration and key faculty in your unit
- Establish human connections to recruit students
- Be willing to take risk
A Master’s Program aimed to prepare students for doctoral research in interdisciplinary research in applied physics, physical sciences and engineering.
Admissions Criteria

Students will be admitted into the Imes-Moore Fellows Program based on their
(a) academic promise
(b) potential to benefit from a broad-based training program
(c) contribution to enhancing diversity of students in applied physics.

This last criterion will be assessed by the student’s background in one or more of the following areas:

- An educational, cultural, or geographical background that is underrepresented in applied physics
- Demonstrated commitment to fostering diversity
- Experience of financial hardship
- First generation U.S. citizen or first-generation college graduate
Key Components of Imes-Moore Program

- Active recruitment
- Summer Institute (8 week program prior to first year, run by Rackham Graduate School)
- Flexibility in courses
- Close mentoring (peer, faculty, tutoring)
- Full integration with AP PhD students
- Transitioning to research in second year
Flexibility in Coursework Choices

- Incoming students sometimes not well prepared for beginning graduate studies. May not have covered all the courses the program expects.
  - students from varied backgrounds, including non-traditional students, returning to school after a prolonged period (in industry, armed forces personnel, family commitments, etc.) such students often need a semester or two extra time to get up to speed.
- Flexibility is needed! and (fellowship) funding needs to be available, hard to come by.
- Need to periodically review progress towards fulfilling the course requirements;
- **Entry interview** to identify any gaps in their undergraduate background and suggest corrective action.
Early years of the graduate student experience in any program are very stressful:

- balancing difficult coursework with research
- transition from passive receptor, to active creator, of knowledge, is particularly difficult.
- demands of graduate studies must be met against the turbulent backdrop of personal relationships and family responsibilities.
- not all students are good at multitasking
- some students are unaware of their lack of preparation for graduate work until they find themselves falling behind in the first-year required courses.

Grad program must therefore be an ACTIVE PARTNER in the graduate education process.
Status of Current Imes-Moore Students

- We had a total of 10 Imes-Moore Students
- Internal surveys indicate that the students are very happy
- The students want to continue at UM
- 2 of the students form the class of 2011 have successfully transitioned into our PhD program
- All the first year students are fully engaged in research
The additional support structures created for Imes-Moore (e.g., tutoring) are also available to PhD students.

Having a diverse group of students helped us recruit students from underrepresented groups into our PhD program.
Conclusions

• The nontraditional & highly flexible approach of the UM Applied Physics program benefits all grad students including students from underrepresented groups

• It is possible to increase diversity through Bridge-to-PhD programs