National Directors of Graduate Studies in Pharmacology and Physiology Meeting

“Fostering Discipline Visibility at the National Level as a Tool for Recruitment”

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Discipline Pipeline: Challenges and Threats
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Decrease in visibility of disciplines at undergraduate level

Decrease in number of discipline based graduate programs

Decline in discipline visibility within interdisciplinary graduate programs

Decline in institutional support of graduate stipends

Imbalance between institutional and individual pre-doctoral grants at NIH institutes

Decline in extramural research funding at NIH, NSF, etc

Decline in career opportunities in academia and industry

Perceived oversupply of PhD graduates in biomedical sciences
Discipline Pipeline: Are we training enough graduate students to maintain our discipline?
United States: What shall we do about all the PhDs?

The annual number of science and engineering doctorates graduating from US universities rose to almost 41,000 in 2007 (left), with the biggest growth in medical and life sciences. It took a median of 7.2 years to complete a science or engineering PhD (middle) — yet the proportion finding full time academic jobs within 1-3 years of graduating is dwindling (right).
Concern about post-ARRA funding “cliff”

Last week, in his first budget defense as NIH director before a House Appropriations subcommittee, Francis Collins was asked about the poststimulus problem. He showed a graph of NIH’s budget over the years with a label at the point where the stimulus money runs out and the total will drop $4 billion in 2011, assuming NIH gets the $32.2 billion President Barack Obama has requested…

- Science, 5/7/10
What’s a PhD worth?

People with a PhD aren’t much happier...
Number satisfied with their job 6–10 years after achieving their highest qualification.

...they gripe about benefits, but like the intellectual challenge...

Scale of dissatisfaction

...and most aren’t much richer.
Average salary 6–10 years after achieving highest qualification.
Distribution of Biomedical Science PhDs by Sector of Employment

Source: http://sestat.nsf.gov/
Percent of US Biomedical Science PhDs Holding Tenure or Tenure-Track Positions 5-6 Years Post-PhD

Source: http://sestat.nsf.gov/
Medical School Faculty Members by Degree and Department Type

Source: http://www.aamc.org/data/facultyroster/reports.htm
Increasing number of PhD in clinical departments

Source: http://www.aamc.org/data/facultyroster/reports.htm
Membership grew steadily through 2003; has plateaued in recent years.

Source: APS Membership Database
International membership growing

Source: APS Membership Database
Percentage of female members continues to trend upwards

Source: APS Membership Database
Racial diversity increasing over time

Note: Inconsistent data from 2000-2001, 2004 excluded from race due to membership database transition and fiscal year change, respectively.
Source: APS Membership Database
Society membership appears to be aging

Source: APS Membership Database
Graduate student membership APS is not growing

Source: APS Member Database
What is APS doing to fostering the discipline pipeline?
APS is actively involved in pipeline programs spanning K - Professional
K-12 Programs

• Science Fair Awards
• Teacher Professional Development
• Physiology Understanding Week
APS Science Fair Awards

- Intel International Science and Engineering Fair Special Awards for Physiology Research
- APS Local Science Fair Awards
  - Up to 100 local awards each year!

Figure 1. Number of APS members presenting Science Fair Awards to date.
• Involve more physiologists in outreach to the students and teachers in their communities

• Increase student interest in and understanding of physiology in their lives

• Increase teacher recognition of physiology in their science curriculum

• Introduce students to physiology as a possible career
Website
www.phunweek.org

- Basic program information
- Promotional items order form
- Downloadable resources
Middle & High School Science Teachers Program

- Develop materials for inquiry into the science classroom
- Build working relationships with research scientists
- Promote adoption of national standards for K-12 content and pedagogy
- Increase teachers’ skills in integrating online resources into inquiry-based teaching
Undergraduate

- Minority Travel Fellows Program
- Undergraduate Summer Research Program (24)
- Undergraduate Poster Session
- David Bruce Award
APS Minority Web Site

- Supporting Minority Training and Education Since 1968
- Resources just for minority trainees
- Awards/fellowships
- Career development materials
- Teacher/faculty opportunities
APS Career Web Site

• APS Professional Skills Listing for Trainees
• Resources for developing skills
• Meeting presentations relevant to careers
• Resources for dealing with issues relevant to postdocs (family issues, finding a job, career info, networking)
APS/ACDP List of Professional Skills

Major Skills Categories
- Core Biomedical Science Knowledge
- Professional Ethics
- Laboratory-related skills
- Research/Analytical Skills
- Communications Skills
- Teaching and Mentoring Skills
- Personnel and Management Skills
- Lifelong Learning Skills
- Career Development Skills
Professional Skills Training Courses

- Courses for graduate students and postdoctoral fellows on Writing and Reviewing and Presentation Skills
- Held in Orlando in January as well as online throughout the year
Discipline Pipeline
What are our future plans to foster our discipline pipeline?
APS Strategic Plan

• Increase efforts to ensure awareness of, and advocacy for, the discipline of Physiology

• Actively work to attract, meet the needs of, engage and retain membership subgroups

• Develop strategies to strengthen the Society’s publications in a changing world

• Enhance opportunities for scientific interaction and exchange

• Increase the visibility of physiology in life sciences and health sciences education
APS Strategic Plan

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APS Strategic Plan

Actively work to attract, meet the needs of, engage and retain membership subgroups (Trainees)

• To develop resources to attract undergrads to the field of physiology and work with educators to distribute these materials to their students – an effort that could tie into the curricula development proposal described below.

• To encourage trainees at all levels to become APS members, the Society could streamline the membership process, removing the requirement for sponsorship and making the process a simple, one-click procedure.

To provide more opportunities for trainees to interact with the Society. This could include a trainee-only topic session at EB and more trainee involvement in featured topic sessions overall, opportunities for trainees to co-chair symposia, and the development of trainee presentation platforms at chapter meetings and conferences.
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• The Society could also support trainee career development by creating additional online courses and materials for professional skills training (e.g. a short workshop on peer review).

• To encourage the active participation of trainees at all levels, including reserved space for trainee editorials in the journals, opportunities for trainees to serve on APS committees, and a concerted effort to leverage sections and chapters to disseminate trainee-specific information created by the Trainee Advisory Committee and the Society more broadly.
Increase the exposure to physiology in life sciences and health sciences education

• Physiology is disappearing from many undergraduate curricula

• Develop comprehensive undergraduate physiology curricula
Medical School Admission Requirements

- Biochemistry
- Cell and Molecular Biology
- Physiology

% of Medical Schools Requiring Course

- [1970]
- [2010]
Increase the exposure to physiology in life sciences and health sciences education

- Physiology is disappearing from many undergraduate curricula
- Develop comprehensive undergraduate physiology curricula
- Develop APS driven online course in physiology for undergraduate
- Leverage chapters as centers for disseminating these curricula by offering local workshops and courses to undergraduate educators.
- Encourage undergraduate educators to become APS members and become partners in the continued development of educational resources.
AAMC-HHMI Scientific Foundations for Future Physicians

*Changing undergraduate curriculum for health science majors*

*An opportunity!*

- Utilize “science competencies, rather than specific academic courses, as the basis for assessing the preparation of medical school applicants

- Many of the competencies are related to physiological concepts

- Undergraduate universities are developing new curricula and developing new health science majors (ex. U of MN –Rochester)

- Develop comprehensive undergraduate physiology curricula

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Increasing interest in MS in Biomedical Science programs
-potential pipeline into PhD programs and increase revenue to support graduate PhD programs
Discipline Pipeline
Challenges, Threats, and Opportunities
First grandchild and future physiologist!