Bethesda, MD - The American Physiological Society (APS) hosted a third seminar in its series on Sharing Strategies in K-12 Science Education on September 24, 2009 on the campus of the Federation of American Societies for Experimental Biology (FASEB). The presentations and discussions were facilitated by Gina Schatteman, APS member and Associate Professor in the Department of Integrative Physiology at the University of Iowa. She is currently an AAAS Science & Technology Policy Fellow in the Office of Science Education at the National Institutes of Health (NIH).

Debra Felix, a Science Education Program Officer with the Howard Hughes Medical Institute (HHMI), shared her organization’s challenges in their Precollege Science Education award program. Surprisingly in a recent competition, more than half of the nearly 300 invitations to biomedical research institutions to submit a proposal did not apply for the $14 million available. Feedback from those institutions were identified as lacking interest, resources, or capacity for creating outreach programs.

Schatteman then asked the group to identify ways that universities can be enticed to support K-12 education. The group discussed messages could be used to help universities recognize that supporting K-12 education was in their own best interest. They also considered what small first steps universities could be asked to take to help faculty outreach efforts. Finally the group discussed how university cultures at the level of the faculty inhibit K-12 outreach. Schatteman plans to use the ideas discussed to develop a framework for a larger discussion with university leaders. A summary of many of the ideas discussed at this and related forums can be found at http://science.education.nih.gov/SciEdNation.nsf/Partnership3.html?OpenPage Comments or suggestions can be addressed to schattemangc@od.nih.gov.

The attendees represented other education program directors and/or executive directors, program officers, or university faculty from the APS, American Association of Immunologists, American Society for Biochemistry and Molecular Biology, American Society for Microbiology, American Society of Plant Biologists, Carnegie Academy for Science Education, Catholic University, FASEB, and the Society for Developmental Biology. Representatives from the National Center for Research Resources (NCRR), the National Institute of General Medical Sciences, and the National Heart, Lung and Blood Institute at the NIH were also in attendance.

The seminar series is supported by an NIH NCRR Science Education Partnership Award (www.ncrsepa.org) as part of the APS’ Six Star Science Frontiers in Physiology program (www.frontiersinphys.org). Programmatic information for the seminar series and presentations are available at: www.frontiersinphys.org/pages/page04g.shtml.

The next seminar will be scheduled in January 2010 as a roundtable discussion on sharing K-12 outreach programs at annual or regional scientific meetings.

For further inquiries, email Mel Limson, APS K-12 Education Programs Coordinator: mlimson@the-aps.org.
Interact with a panel of speakers coordinated by Gina Schatteman, Ph.D. to identify the strategies in convincing universities to care about precollege science education. You are invited to share your experiences in working in a supportive environment, creating a supportive environment, or coping in a difficult situation.

Consider the following questions in preparing for the seminar discussion:

- What do your members perceive as institutional barriers to K-12 science education outreach?
- Would your members benefit from additional logistical, monetary, or personnel support for initiating K-12 science education outreach programs from their university?
- Do your members collaborate with members of the college of education?
- Do your members receive institutional support to improve pedagogy (faculty development programs)?
- Do your members feel that good teaching is valued highly during tenure, promotion, and salary deliberations?
- Do your members feel that outreach activities are valued highly during tenure, promotion, and salary deliberations?
- **What can societies do to encourage universities to value and support K-12 education?**

The presenters and audience will discuss issues related to enhancing university support for science education. Ideas and best practices will be incorporated into materials being developed by the NIH. Dessert and coffee will be provided.

**Please RSVP no later than Friday, September 18th**, by our Evite system (preferred) by clicking: [http://www.evite.com/app/publicUrl/WARVLBEUZBEO/WJFAWJ/K/090924FrontiersSSS Seminar](http://www.evite.com/app/publicUrl/WARVLBEUZBEO/WJFAWJ/K/090924FrontiersSSS Seminar) or by directly emailing Mel Limson in the APS Education Office at mlimson@the-aps.org.

**Program information is posted at**: [http://www.frontiersinphys.org/pages/page04g.shtml](http://www.frontiersinphys.org/pages/page04g.shtml)

Feel free to share this invitation with appropriate colleagues in the K-12 science education community within the metropolitan DC region.

Other questions? Email Mel: mlimson@the-aps.org
How do we Support Research Universities as Partners in Science Education?

Debra Felix
Howard Hughes Medical Institute
Division of Precollege and Undergraduate Grants
September 24, 2009
Mission of HHMI’s Precollege Initiatives

- Promote public understanding of science
- Inspire and nurture the next generation of scientists
Current Method

Fund science-rich institutions to:

- Share the excitement of discovery
- Impart scientific knowledge
- Find and encourage talent
Why Fund Precollege Outreach?

U.S. Department of Labor Reports:

The study of Science is declining at all levels.

The number of university students in engineering and physical sciences has declined by 25% in the past 25 years (1980-2004).
50 Years of Sci-Ed Reform

October 4, 1957- Sputnik

“Cherrypicking”

April 1983- “A Nation at Risk”

“Science for All Americans”

Today- NCLB & ACI
2005 NAEP Grade 4 Science by Race/Ethnicity, Nation

Percent of Students

- African American: 62% Proficient/Advanced, 26% Basic, 12% Below Basic
- Asian: 31% Proficient/Advanced, 35% Basic, 34% Below Basic
- Latino: 34% Proficient/Advanced, 56% Basic, 30% Below Basic
- Native American: 38% Proficient/Advanced, 47% Basic, 18% Below Basic
- White: 38% Proficient/Advanced, 43% Basic, 19% Below Basic

PISA 2006 Science Study

The chart shows the percentage of students at different levels of science achievement in various countries. The countries are listed along the x-axis, and the y-axis represents the percentage of students below Level 1 to Level 6. The USA is highlighted, indicating its performance compared to other countries in the study.
Test Scores vs. Economic Growth

Annual Growth Rate (% of GDP/ Capita)

Teaching the New Basic Skills

- By Richard J. Murnane and Frank Levy
- Skills need for a Middle Class Job
  - Read at a 9th grade level
  - Math at a 9th grade level
  - Solve problems where hypotheses required
  - Ability to work in groups with diverse people
  - Ability to communicate effectively, both orally and in writing
  - Ability to use personal computers for basic tasks

50% (or more) of students will not get these skills
The number of jobs requiring science degrees is growing at three times the rate of other jobs.

Unfortunately,

While the need for scientifically literate citizens is growing, the education system is producing fewer scientifically prepared workers.
More on our current methods

$14M+ per year to colleges, universities, medical schools, research institutions, etc.
Funding Emphasis, Current Grantees

Emphasis on K-12 Outreach

% of Total Budget

% Grantees

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<thead>
<tr>
<th>% of Total Budget</th>
<th>COLL</th>
<th>UNIV</th>
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<td>0-10</td>
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<td>Objective</td>
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<tr>
<td>Research Experience</td>
<td>Students or teachers engaging in research with faculty mentors</td>
<td>Provide experiences for K-12 students or teachers to engage in scientific research</td>
</tr>
<tr>
<td>Curriculum Development</td>
<td>New courses or modules, new curricula, adapting to K-12 standards</td>
<td>Develop curricula for improved or expanded K-12 science education</td>
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<tr>
<td>Enrichment</td>
<td>Science demonstrations, on- or off-campus programming</td>
<td>Increase awareness of and interest in science among K-12 children and families</td>
</tr>
<tr>
<td>Professional Development</td>
<td>Summer academies, workshops, seminars</td>
<td>Enhance or expand training and competencies for future or current teachers</td>
</tr>
<tr>
<td>Educational Tools</td>
<td>Websites, published resources, kits</td>
<td>Resources developed to enhance science instruction and learning</td>
</tr>
<tr>
<td>College Preparation</td>
<td>Math and science preparation, summer academies, after school programs, pre-matriculation bridge programs</td>
<td>Enhance or expand skills and knowledge among K-12 students in preparation for college level work</td>
</tr>
<tr>
<td>Mentoring</td>
<td>Established mentor relationships over time with faculty and/or students</td>
<td>Provide support for K-12 students for success in educational transitions</td>
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Why Universities Do Outreach

- A Champion or Person at the Top Pursues it (Personal Satisfaction, Giving Back)
- Outreach Meets an Institutional Objective (Admissions)
- The Structure and Expectation is already in place
But Not All Invitees Apply for a Grant

Why is it that some universities do not support precollege outreach?
From our last competition (2007)

- 298 were invited
- 171 did not apply
We asked, “Why not?”

- 108 responded:

“We are not interested in creating the type of outreach program this grant funds.”
Other Reasons Given

- 18 No resources to apply or run a program, even with funding
- 11 No reason
- 6 Not competitive
- 5 Not ready/too busy
- 2 Already have enough money
Why Universities Do Not Do Outreach

- Lack of resources
- Not their focus/mission
- Drain on Resources
- Structural Impediments
- Gaining interest and acceptance of K-12 systems
- Little return
- Institution not set up to do this
Summary

- Low Value
- High Risk
Lessons Learned: What Really Matters

- Context
- People
- Planning
Context: Recognize That

- State and national standards are important
- Family needs and culture influence student possibilities
- Teacher resources and available time vary dramatically
- Geography matters
People

- Know all stakeholders
  - Administrators, teachers, parents, students
  - Higher education departments and faculty
  - Community leaders and supporters
  - Scientists
- Encourage communication among all
People

- Recruit committed, capable staff
- Include realistic participant requests and rewards
  - Time, distance, credit, support
Are we asking the right question?

Consider…

- Fund Individual Champions
- Fund Preservice Teacher Training
- Work with Students Directly
- Etc.
Link to Best Practices Talk

Creating a Path to Improved K-12 Science and Math Literacy

A Workshop Convened by the Oak Ridge Center for Advanced Studies
April 18-19, 2006

Battelle has provided partial support for this workshop
Distribution of Programs Supported by HHMI
Programs with Indirect and Direct Student Involvement

Type of Impact

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<th>Type of Impact</th>
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<th>PROF</th>
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</tr>
<tr>
<td>Direct Impact</td>
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<td>30</td>
<td>50</td>
</tr>
</tbody>
</table>

% Total Programs

0 10 20 30 40 50 60 70

Indirect Impact

Type of Impact

Direct Impact
University Support of K-12 Education: How and Why?

Gina Schatteman

schattemangc@od.nih.gov
Questions to be addressed

• Why should universities support K-12 education?

• Who can entice universities to support K-12 education and how?

• How do universities inhibit activities that support K-12 education?

• How can universities support K-12 education?
Why should universities support K-12 education?

• Recruitment/retention, especially women and minorities
• Enhance education university wide
• Provide alternate career paths for graduate students
• Economic development
• Additional sources of funding
• Improve university cohesiveness
Who can entice universities to support K-12 ed and how?

- Internal pressure
  - Bottom up - faculty/students working via deans
  - Top down - presidents/deans rewarding faculty and students
  - Special cases - Bruce Alberts, Carl Wieman

- External pressure
  - Business
  - Legislatures
  - Professional societies
  - Board of Regents/Trustees
How do universities inhibit activities that support K-12 education?

- Tenure/promotion/salary policies
- Publications not weighted equally
- Grants devalued because fewer $$
- Faculty/graduate students actively discouraged from participating
- No support for education grants
- Collaboration w/college of education discouraged or not valued
How can universities support K-12 education?

- Outreach office
- University sponsored programs
- Publicize for outreach grant opportunities
- Tenure/promotion/salary policies
- Opportunities for graduate students
- College of education & science dialogue
- Website
Websites matter

- http://www.stem.vt.edu
- http://www.scienceoutreach.org