Supporting International Collaborations for U.S. Researchers at the National Science Foundation

Regional Grants Conference
Providence, RI
April 7, 2008

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Why collaborate internationally?

International Collaboration at NSF
- Integrated throughout the Foundation
  - Research and Education Directorates
  - Office of International Science & Engineering

Types of Support
- Programs for Faculty
- Programs for Postdoctoral Researchers
- Programs for Undergraduate and Graduate Students
“International cooperation in science is not a luxury; it is a necessity – and the foundation for the future.”

Arden L. Bement, Jr.
NSF Director
May 2006

Strengthen the nation’s collaborative advantage by developing unique networks and innovative partnerships...both nationally and internationally, to leverage intellectual capabilities.
Why International Collaboration?

- International collaboration is commonplace
- About 20% of the world’s scientific and technical articles in 2003 had authors from two or more countries, compared with 8% in 1988
- One-quarter of articles with U.S. authors have international coauthors, similar to the percentages for Japan, China, and the Asia-8.
### Why International Collaboration?

**Student Flows to/from the U.S.**

<table>
<thead>
<tr>
<th>Students</th>
<th>To U.S.</th>
<th>From U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>582,984</td>
<td>223,534</td>
</tr>
<tr>
<td>India</td>
<td>83,833</td>
<td>2,115</td>
</tr>
<tr>
<td>China</td>
<td>67,723</td>
<td>8,830</td>
</tr>
<tr>
<td>Korea</td>
<td>62,392</td>
<td>1,267</td>
</tr>
<tr>
<td>Japan</td>
<td>35,282</td>
<td>4,411</td>
</tr>
<tr>
<td>Taiwan</td>
<td>29,094</td>
<td>194</td>
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</tbody>
</table>

NSF support for international collaboration aims to:

- **Advance** the FRONTIERS of Science and Engineering
  - ACCESS to unique expertise, facilities, and phenomena
  - LEVERAGE limited resources

- **Prepare** a GLOBALLY-ENGAGED U.S. S&E workforce
  - DEVELOP understanding of science abroad
  - NURTURE capable, confident, adaptable young researchers with strong networks overseas
Support for International Activities

...is integrated throughout NSF

- Supplements to existing NSF grants

- Integral part of new proposals to NSF research or education programs

- New proposal to the Office of International Science and Engineering
Support for International Activities

Examples of NSF support for international activities are numerous.

To name just a few...
Materials World Network

- Mathematical & Physical Sciences Directorate
- Concurrent submissions to NSF and overseas funding agency
- FY2007 investment: $10 million in 80 awards (new & continuing) with 25 countries
- OI SE co-funds most awards
International Research & Education for Engineers

Engineering Directorate

Supplemental awards to promote international collaboration and student international engagement

In FY2007, more than 100 supplements awarded, most with OISE co-funding

International Collaboration in Chemistry

- Mathematical & Physical Sciences Directorate
- Bilateral collaborations with Germany, U.K., China (more countries in future)
- Single proposal, joint decision-making

Research Experiences for Undergraduates (REU)

- NSF-wide
- New awards (“sites”) or “supplements” to existing awards
  * Both welcome international
Office of International Science & Engineering

- 5 Geographical Groups + Cross-cutting Teams
  - Africa, Near East and South Asia
  - Americas
  - East Asia & Pacific
  - Europe/Eurasia
  - Global Initiatives
- 3 NSF Overseas Offices – China, Europe, Japan

Budget: 
- FY07 - $40.61 Million
- FY08 - $41.34 Million (Estimate)
International Activities at NSF

Office of International Science & Engineering

Key elements for OISE funding

- Collaborative
- Synergistic
- Catalytic
- Engage students & junior researchers
Office of International Science & Engineering (OISE)

Important Notice

International science and engineering research and education activities are funded by all NSF directorates and offices.

Investigators seeking funding for international collaborative research may include an international component in new proposals submitted to their relevant NSF research program, or request supplemental funding to add international collaboration to projects supported by current NSF grants.

OISE works closely with other NSF directorates and offices to co-fund innovative, catalytic new awards and supplements that promote research excellence through international collaboration and develop the next generation of globally engaged U.S. scientists and engineers. OISE criteria for co-funding include:

- True intellectual collaboration with a foreign partner (The foreign partner’s 2-page biographical sketch, communication outlining their role in the project, and a letter of endorsement from the foreign institution should be included.)
- New international collaborations, as opposed to well-established ones;
- Benefits to be realized from the expertise and specialized skills, facilities, and/or resources of the foreign collaborator; and
- Active research engagement of U.S. students and junior researchers at the foreign site.

Investigators should consult early in the application process with both the relevant disciplinary program manager and OISE country program manager.
Outline

- International Collaboration at NSF
- Support for Faculty
- Programs for Postdoctoral Researchers
- Programs for Undergraduate and Graduate Students
Planning Visits ($20,000 max., NSF 04-035)
Workshops ($25,000 – 60,000, NSF 04-035)
Pan-American Advanced Studies Institutes program (PASI) ($100,000 max., NSF 03-506)
Partnerships for International Research and Education (PIRE) ($2.5 million max., NSF 06-589)
Trips by U.S. researchers in promising new areas to get new research collaboration off the ground

Detailed preparation for collaborative research
  • Fully assess foreign expertise, facilities, equipment, data, experimental protocols, sites, etc.

Intended outcome: Research proposal to NSF Directorate

7-14 days on average

$20,000 maximum budget

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12815&org=OISE&from=home
**Example:**

- “Humanoids-based Multidisciplined International Teaming and Large Scale Systems Integration”; PI Paul Oh, Drexel University

- To develop a concrete plan for collaborative research on humanoid robotics.

- PI and 4 students spent 1 week at KAIST.

- Spawned PIRE award.
Workshops, NSF 04-035

- Small-scale, focused meetings co-organized by U.S. and foreign investigator to identify areas of joint research interest and develop new collaborations
- NSF supports U.S. faculty and students
- Intended outcome: research proposal to NSF research directorate
- Priorities vary by region
- $60,000 max
Example:

- “U.S.-China Workshop: Rapid Bridge Replacement after Extreme Events”; PIs Yong Bai and Steven McCabe, U Kansas. Civil Engineering.
- Purpose: To discuss new developments in rapid bridge replacement after extreme events, such as hurricanes, earthquakes, or terrorist strikes.
- Ten days of meetings to be held in three cities in China.
Short courses (2-4 weeks) at the advanced graduate and post-doctoral level.

Involve distinguished lecturers and active researchers in the field, preferably from the Americas.

PASIs aim to disseminate advanced scientific knowledge and stimulate cooperation among researchers of the Americas in the mathematical, physical, and biological sciences, and in engineering fields.

http://www.nsf.gov/funding/pgm_summ.jsp?pi ms_id=5327&org=OISE&from=home
Examples:

- Modern challenges in statistical mechanics - Argentina
- Study of surfaces, interfaces and catalysis - Venezuela
- Physics at the nanometer scale - Argentina
- Green chemistry - Uruguay
- Quantum information - Brazil
- Materials for energy conversion and environmental protection - Brazil
- Process Systems Engineering - Argentina
Objectives

- Frontier research that requires international partnership
- Unique, complementary expertise of international partners
- Student engagement in international research

5-year awards of up to $2.5M each
32 active awards across all NSF disciplines
Next competition: FY2009

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=12819&org=OISE&from=home
U.S.-Japan Cooperative Research and Education: Ultrafast and Nonlinear Optics in 6.1-Angstrom Semiconductors – PI: Junichiro Kono, Rice University
Remote Sensing for Hazard Mitigation and Resource Protection in Pacific Latin America - PI: Gregg Bluth, Michigan Tech University
Outline

- International Collaboration at NSF
- Support for Faculty
- Programs for Postdoctoral Researchers
- Programs for Undergraduate and Graduate Students
Postdoctoral Researchers

- Inclusion in NSF disciplinary awards
- Disciplinary Postdoctoral Fellowships
- International Research Fellowships (NSF 06-582)
International Research Fellowships

- NSF 06-582
- Designed to introduce young scientists to international research opportunities
- Provides support for research at S&E establishments in foreign countries for 9-24 months
- Applications from women and minorities, and for work in developing countries are especially encouraged.
International Research Fellowships

- U.S. citizenship/permanent residence
- Have Ph.D. by the time IRFP tenure begins
- Applicants cannot have had their Ph.D. longer than two years at the time of application
- Deadline: Second Tuesday in September

http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5179&org=OISE&from=home
Outline

- International Collaboration at NSF
- Support for Faculty
- Programs for Postdoctoral Researchers
- Programs for Undergraduate and Graduate Students
Undergrads and Grad Students

- Participation in NSF disciplinary awards
- Integrative Graduate Education and Research Traineeship (IGERT) Program
- Graduate Research Fellowships
- Participation in OISE planning visits or workshops
- Doctoral Dissertation Enhancement Projects (DDEP)
- East Asia and Pacific Summer Institutes (EAPSI)
- International Research Experiences for Students (IRES)
- International REU’s
- PIRE and PASI
Doctoral Dissertation Enhancement Project

- NSF 04-036
- Provides travel support for doctoral research overseas
- Must be collaborative, with evidence of intellectual involvement of foreign institution
- U.S. faculty mentor is PI on proposal
- $15,000 max.
- No deadlines: Proposals welcome year-round
Example:


How do we manage ecological systems which cross international borders? Although original grant was small and just for this student, collaboration has blossomed. Work helped to seed a multi-institutional study.
East Asia and Pacific Summer Institutes

- NSF 07-584
- Individually tailored overseas research experience
- ~ 8 weeks
- Australia, China, Japan, Korea, New Zealand, Singapore and Taiwan
- Application deadline: December 2008
East Asia and Pacific Summer Institutes

Eligibility
- U.S. citizen or permanent resident
- Enrolled at U.S. institution in a research-oriented masters or Ph.D. program
- Fields of science or engineering supported by NSF and represented among host institutions

Support
- $5,000 stipend
- Travel
- Local housing and living allowance
Example:

A behavioral biology student from Texas A&M university established a live Web “panda cam,” at China’s Wolong nature reserve, and completed a preliminary study on the ability of giant pandas to recognize their kin. Through EAPSI, she opened a door for researchers and the broader public around the globe to observe the behavior of pandas in their natural habitat.
International Research Experiences for Students (IRES)

- NSF 04-036
- Graduate and/or undergraduate students
- Supports small groups of students for focused research experiences overseas
- $150,000 max ($50,000 per year for up to 3 years)
- Deadlines: 9/15 and 2/15
Example:

Award to Cal State Northridge for a collaborative project in mathematics with the State University of Campinas in Brazil. PI is Helena Noronha.

Seven advanced undergrads/beginning grads spend summer working in pairs with Brazilian students on applied math each year for three years. Builds on existing REU program.
Effective International Collaboration

For more, see the OISE publication

Looking Beyond the Borders:
A Project Director’s Handbook of Best Practices for International REU’s

The Bad News...

*OISE Does Not Typically Fund*

- **Travel grants**
  - Research-related travel costs should be included in standard research proposal

- **Sabbaticals**

- **Costs of the foreign counterpart**
  - In rare cases, exceptions may be possible
    - Discuss with country program manager before submitting a proposal
  - NSF does NOT have a foreign assistance mission
If you don’t find what you want...

- Contact the appropriate OI SE program manager to discuss options

http://www.nsf.gov/od/oise/country-list.jsp
Thank You!

http://www.nsf.gov/oise

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