"The nation's commitment to research will ... take on a more globally connected context as the major issues and problems we face know no boundaries."

Subra Suresh
Director NSF
Annual U.S. R&D Spending is ~$500 Billion

- Global R&D increase projected (government, industry, academic), up 1.8% to $1.496 trillion
- Asia is driving growth
- Internationalization of R&D will continue
U.S. STEM Graduate Degrees are Flat

Doctoral degrees in natural sciences and engineering, by selected region/country: 2000 to most recent year

Natural sciences

Thousands

Selected EU
U.S. total
China
India
U.S. temporary resident
Russia
Japan

Engineering

China
Selected EU
U.S. total
U.S. temporary resident
Japan
Russia

U.S. permanent resident

Note: Natural sciences include physical, biological, environmental, agricultural, and computer sciences, and mathematics.

North American Student Mobility is Flat

Figure 1.20: Evolution in the number of students enrolled outside their country of citizenship (2000, 2009)
This figure shows the growth of foreign tertiary student enrolment, by regional grouping, over the past nine years.

Highly cited (top 1%) scientific articles by type of collaboration 2006-2008
As a percentage of highly cited scientific articles worldwide

Source: OECD calculations, based on Scopus Custom Data, Elsevier, December 2009
Stethlink: http://dx.doi.org/10.1787/888932747406
Drivers for International Research Collaboration

**Resources**
- **Access** to unique facilities and equipment
- **Share** costs and risks
- **Exchange** techniques and insights

**Capacity**
- **Strengthen / Expand** knowledge base
- **Attract** talent
- **Enhance** S&T-led economic performance

**Objectives**
- **Address** national, transnational or global problems
- **Foster** science diplomacy
- **Access** foreign markets
- **Pursue** personal / professional goals
• Intellectual partnerships and mutual benefit are clear
• U.S. students and junior researchers are engaged internationally
• Global networks linking expertise and resources are common
Most international research and education activities are **funded by NSF disciplinary programs:**

- As part of regular awards
- As supplements to regular awards
These recently announced NSF programs include an explicit international dimension...

**BIO**  Metabolomics; Dimensions Of Biodiversity; BREAD

**CI SE**  Collaborative Research in Comp Neuroscience; GENI

**GEO**  Integrated Ocean Drilling Project; Belmont Forum

**EHR**  GRF Nordic Supplement; IGERT Traineeship

**ENG**  Earthquake Research; Synthetic Biology; Nanotech.

**MPS**  ICC; MWN; Astronomical Observatories

**SBE**  S&T Statistics; Science of Science and Innovation Pol.

**GEO/ OPP**  Antarctica and Arctic Research and Education

**CI SE/ OCI**  International Research Network Connections

**OIIA**  INSPIRE
These NSF programs have one or more external funding partners:

- Basic Research to Enable Agricultural Development (BREAD)
- International Collaboration in Chemistry
- Materials World Network
- Dimensions of Biodiversity
- Partnerships for International Research and Education (PIRE)
- G8 HORCS/Belmont Forum
NSF programs for an internationally engaged workforce

- (International) Research Experiences for Undergraduates* (iREU)
- Graduate Research Fellowship Program – GRFP/GROW
- Integrative Graduate Education and Research Traineeship (IGERT) Program
- East Asia Pacific Summer Institutes (EAPSI)
- Pan-American Advanced Studies Institutes (PASI)
- (International) Postdoctoral Research Fellowship Program *

*Alignment of ISE programs with NSF-wide programs
Advancing NSF's International Interests

Internal
- Supporting NSF Directorates/Offices
- Leveraging Resources and Expertise
- Testing New Models

External
- Oversight
- Engaging U.S. Research Community
- Strengthening Partnerships With Foreign Counterparts
- U.S. Government Agency

ISE
In addition to the solicitations listed below, investigators may also include international components in new proposals submitted to any relevant NSF programs, or request supplemental funding for projects already supported by NSF. Investigators should consult early in the application process with both the disciplinary program manager and OISE program manager. OISE works with all NSF areas to co-fund new awards and supplements that meet these criteria:

- True intellectual collaboration with foreign research partners. (Foreign partner’s 2-pg letter of communication outlining project role must be included. If foreign institution will provide resources, also include an endorsement letter from the foreign institution.)
- New international collaborations, as opposed to well-established ones;
- Clear benefit to U.S. science/engineering community from expertise, facilities, or resources of the foreign collaborator, and
- Active research engagement of U.S. students and junior researchers at the foreign site.

OISE does not provide support for U.S. scientists and engineers to participate in international conferences; nor does it provide support for such meetings. OISE can support workshops that immediately precede or follow a larger-scale conference when they add an international dimension focused on building research collaboration (see NSF Grant Proposal Guide II.D.8.3.9).
• Catalyzing New International Collaborations (CNIC)
• Science Across Virtual Institutes (SAVI)
• Graduate Research Opportunities Worldwide (GROW)
• Partnerships for Enhanced Engagement in Research (PEER-Science)
Catalyzing New International Collaborations (CNIC)

Supports initial phases of new international collaboration
- Planning visits
- Initial data gathering activities
- Proof-of-concept
- Single or multiple research visits
- *Not workshops*
- supplements are possible

Maximum 1 year, $10k-$100k max

Expected to lead to a follow-on full Directorate proposal
(Prior to a CNIC submission, *PIs must establish communication with the cognizant NSF Directorate PD*)
Science Across Virtual Institutes (SAVI)

- SAVI provides a platform for teams of NSF-funded investigators to **network** with partners abroad, **leverage resources** to advance shared research interests, and **engage students** in international collaboration.
- SAVI is a mechanism, not a stand-alone program
Graduate Research Opportunities Worldwide

- GROW offers opportunities to NSF Graduate Research Fellows for 3-12 month international research collaborations
- Eight partners in 2013: Denmark, Finland, France, Japan, Korea, Norway, Singapore, Sweden
- Expanding partnerships for future
- Contact: grow@nsf.gov
Keys to Success for International Proposals

• Explain how the international collaboration enhances your research
• Involve U.S. students, junior researchers
  ▶ Prepare, mentor, and assess
  ▶ Pay them: travel, living costs, stipends
• Include key supplementary documents
  ▶ Biosketch of key international collaborator(s)
  ▶ Letter(s) of support from collaborator(s)
• Know and observe special rules
  ▶ Fly America Act
  ▶ Visa regulations
• Consult ISE program officer early in process