



International Opportunities for U.S. Students

National Science Foundation

WHERE DISCOVERIES BEGIN

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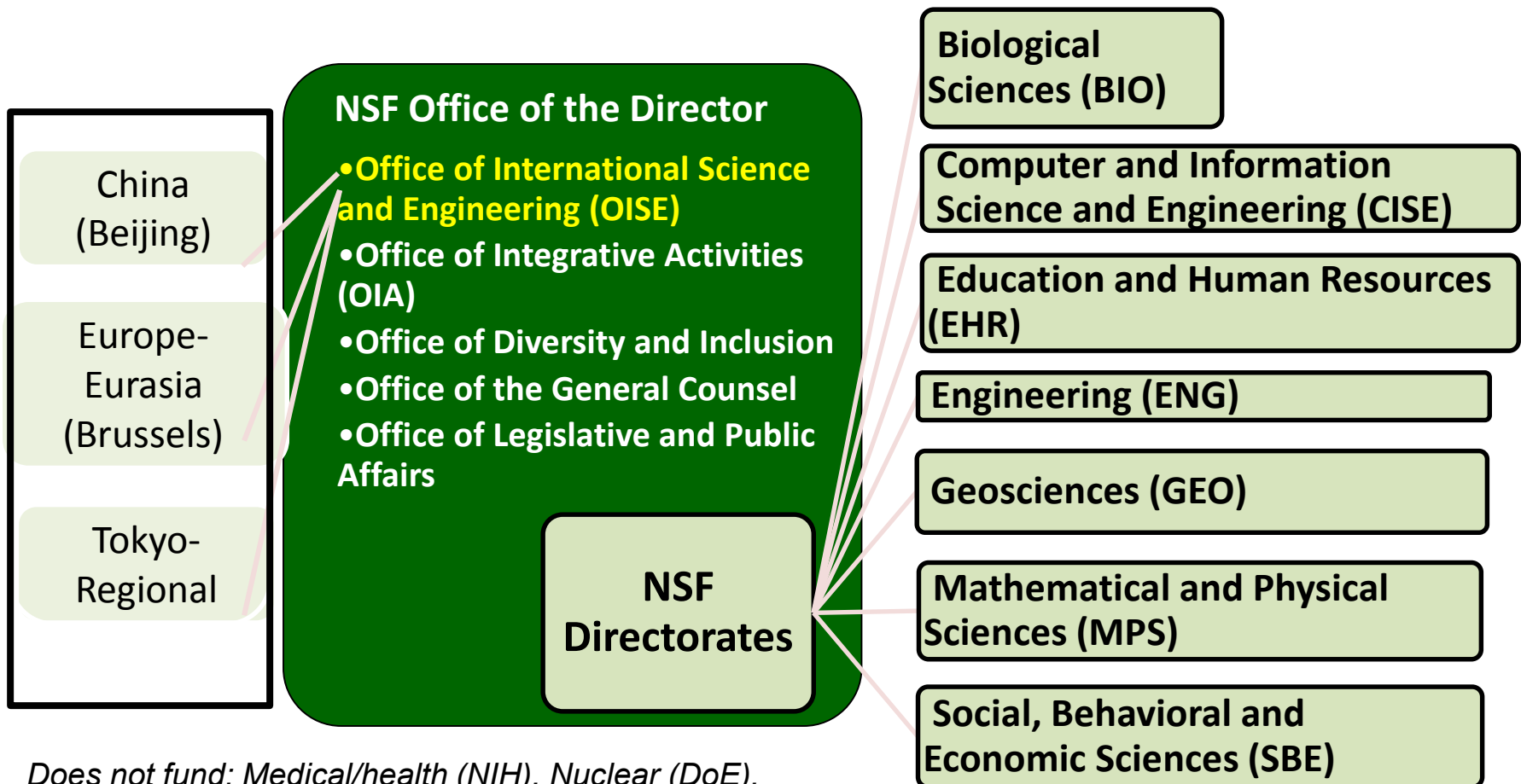
U.S. Government Science Agencies





NSF is organized like a university

*NSF is organized according to scientific areas.
FY17 budget was \$7.5B; Administration's FY18
budget request is \$6.65B*



*Does not fund: Medical/health (NIH), Nuclear (DoE),
Space-based research (NASA), Agriculture (USDA)*



Major Changes in World Science – Last 10-15 years

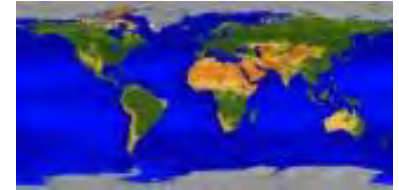
--in the major players and focus areas

-investments

-outputs

-innovation

-science diplomacy



--in patterns of participation and cooperation

-co-authorship

-higher education

-internet access

-mobility

--in scope and potential

-new technologies

-global challenges

-development

-big science

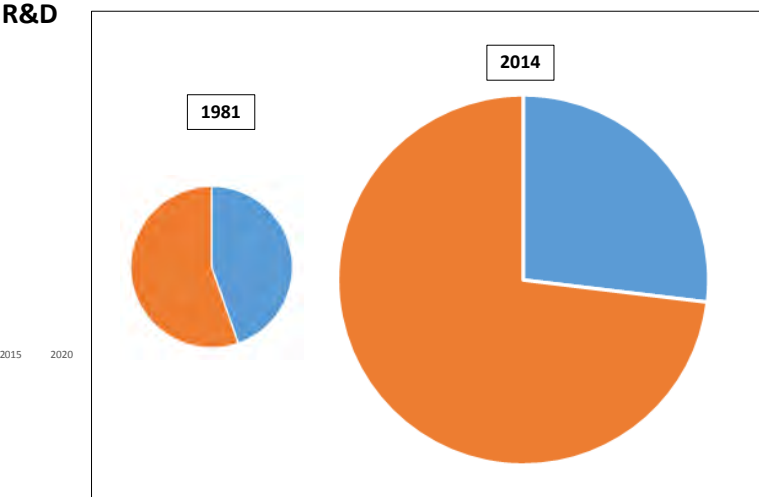


Science = science and engineering



60,000 foot Perspective: U.S. Science in a Global Context

U.S. R&D (blue) as percent of World R&D



International science collaboration

→ national need

→ tremendous opportunity for U.S. universities



What Does OISE Do?

Internal

External

**Supporting NSF
Directorates/
Offices**

Programs

**Engaging
U.S. Research
Community**

**Leveraging
Resources and
Expertise**



**Strengthening
Partnerships
with Foreign
Counterparts**

Testing New Models

Data

**Partnering with
U.S. Government
Agencies**



International Research Collaborations

- Advance the FRONTIERS of Science and Engineering
 - ACCESS to unique expertise, facilities, and phenomena
 - LEVERAGE limited resources
 - EXCHANGE insights and techniques
 - ADDRESS national, transnational and global challenges
- Prepare a GLOBALLY-ENGAGED U.S. S&E workforce
 - NURTURE capable young researchers with strong networks overseas
 - DEVELOP a global perspective
 - FACILITATE mobility and brain circulation

NSF funds the US-side of international collaborations



U.S./NSF research and education funding different than in many countries

- Most U.S. research funding is **project-driven and merit based**: money awarded for specific project, not track-record
- U.S. has **no** centralized Ministry of Science and Technology
- All U.S. Universities are State-run or private, **not** National
- International collaboration is **not** sufficient to gain funding
- U.S. funding often takes a long time to obtain
- Intellectual Property Rights (IPR) important
- Research and technical excellence expected!
- **NSF funds only the U.S. side!!**





NSF international research for students

Now being re-organized; multiple NSF units now considering these dimensions:

- career stage – undergrad, grad student, post-doc
- activity –research, research-related advanced study institute, internship
- independent vs. cohort

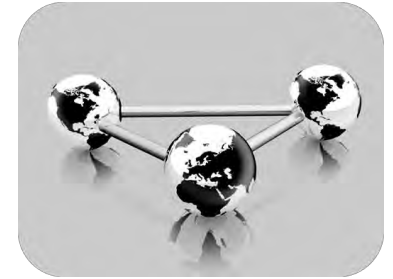


Justification -- not just the results for students who go– but emergent knowledge from across the program

→ Share with the nation the Evaluation Metrics, Best Practices, New Models

Stay tuned: <https://www.nsf.gov/dir/index.jsp?org=OISE>

Thoughts on Global E3 (personal, not official NSF)



Remarkable consortium

- Size and collective wisdom and experience
- Focus on youth and future
- Diversity and strengths of many nations and institutions
- Rarity - usually independent, bottom-up, competitive

Has great potential to share and have an impact far beyond its membership as a synthesizer, multiplier!

Embrace Opportunities!

IIE or sets of members could share insights on

--**evaluation metrics/results, best practices, lessons learned, models** – available to all on website

--**scaling up to greater numbers**

-**ethics across nations**

tap into Center for Engineering, Ethics, and Society (CEES) at the National Academy of Engineering (NAE) -- manages the Online Ethics Center

-**science diplomacy** – your people as ambassadors – for countries, for science and engineering, for international S&E

-**inclusion and diversity** for citizenry and workforce, unleash full potential of next generation

Embrace Opportunities!

IIE or sets of members could share insights on

- S&E communication*** – check out resources at Alan Alda Center for Communicating Science
- networks and STEM diasporas*** –use foreign students, faculty (diaspora) on campus, and alumni of your programs
- Sustainable Development Goals*** – the world has problems that need solving – GE3 is training just the right type of people to help solve pressing global problems!

Embrace Opportunities!

GE3 is a treasure

-Great institutions: people, research, facilities, centers, research and teaching spaces, hospitals, industry partnerships....

-Trust and relationships among institutions that are very valuable!

Think beyond undergraduates... Look to the future...

IIE or sets of members could

Map where great research and teaching partnerships can be done together

Use analytics to map engineering research strengths, overlaps, complementarities → so many great potential partnerships

Examine how GE3 strengths match up in areas at **future engineering horizons** ([NSF 10 Big Ideas](#), science foresight reporting, e.g., by EU, Finland, Singapore)

Spur partnerships using GE3 as a springboard to international institutional relationships of great promise and great mutual benefit for the people, institutions and nations involved!

International Science Engagement Institutional Strengths/Potential Beneficiaries

Scientific	<ul style="list-style-type: none"> -faculty -facilities -programs -research networks 	Economic	<ul style="list-style-type: none"> -nearby industry -specific expertise -natural resources -facilities
Educational	<ul style="list-style-type: none"> -programs, history -students/alums -centers/Title VI 	Health-related	<ul style="list-style-type: none"> -hospitals -community needs -public health
Societal	<ul style="list-style-type: none"> -ethics/faith priorities -demography -local challenges 	Geography	<ul style="list-style-type: none"> -proximity -diaspora groups -cross-border issues

For more information, see Lyons, EE *et al.* 2016.

[How Collaborating in International Science Helps America](#) in *Science & Diplomacy*.