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International Perspectives on Research Ethics and Scientific Integrity – At Home and Abroad

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My work receives no financial support from any proprietary organization.

My husband is the president and majority owner of the privately held Anesthetic Gas Reclamation, LLC, which has no relation to my work or the current presentation.

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Objectives

- Identify the many forms of contact and collaboration between US and international researchers and research trainees;
- Describe points of ambiguity and conflict in assumptions about and formal standards of research integrity internationally; and
- Outline effective practices for talking about, negotiating, and teaching research ethics and scientific integrity in international contexts.

International collaborative research and research training are increasingly important in academic medicine and biomedical science.

International trainees in US programs

- Undergraduate students (pre-med, pre-science)
- Graduate students (bench and translational research)
- Medical trainees (preclinical and clinical students, residents)
- Postdoctoral fellows (clinical and bench research)

US trainees in international programs

- Graduate students (bench, translational)
- Medical trainees (preclinical and clinical students, residents)
- Postdoctoral fellows (bench, epidemiologic, clinical, translational)

US and international trainees/faculty in multinational projects with multiple sources of funding

International trainees are a large and important population in US biomedical research.

- In 2010, 24% of grad students and 50% of postdocs in US science, engineering and health programs were on temporary visas (*NSF-NIH Survey,* NSF13-314, 2013).
- In 2011, 66% of international S&E doctoral degree recipients expected to stay in the US after graduation (NSF *Doctorate Recipients: 2011*, 2012).
- In 2009, 62% of international S&E doctoral degree recipients were still working in the US 5 years after graduation (NSF *S&E Indicators*, 2013).

Top 10 Countries of Origin for All International Students in the US: 2011-12 (Total=764,495)

China	194,029	+23.1
India	100,270	- 3.5
South Korea	72,795	- 1.4
Saudi Arabia	34,139	+50.4
Canada	26,821	- 2.6
Taiwan	23,250	- 6.3
Japan	19,966	- 6.2
Vietnam	15,572	+ 4.6
Mexico	13,893	+ 1.3
Turkey	11,973	- 1.7

Source: IIE, Open Doors Data 2010-2012; www.iie.org

Top 10 countries for international trainees earning S/E doctorates in US: 2002–12

	2002	2007	2012
China	2,170	4,308	3,900
India	630	1,921	2,129
South Korea	820	1,128	1,129
Taiwan	457	477	579
Turkey	322	409	351
Canada	265	352	298
Thailand	317	235	239
Mexico	176	172	184
Japan	144	210	178
Germany	166	128	155

SOURCE: NSF, NIH, USED, USDA, NEH, NASA, Survey of Earned Doctorates

Top 10 nations for visiting US trainees: 2010–12, all fields

	2010-11	20011-12
UK	33,182	32,660
Italy	30, 361	29,645
Spain	25,965	26,480
France	17,019	17,168
China	14,596	14,887
Germany	9,018	9,370
Australia	9,736	9,324
Costa Rica	7,230	7,900
Ireland	7,007	7,640
Japan	4,134	5,283

SOURCE: www.iie.org

US and international medical trainees also seek international experiences in biomedical research.

- By 2007, almost all US medical schools had some form of global health instruction in their curricula and over 25% of U.S. medical school graduates entered residency with some global health experience (Acad Med 2007;82:226–230)

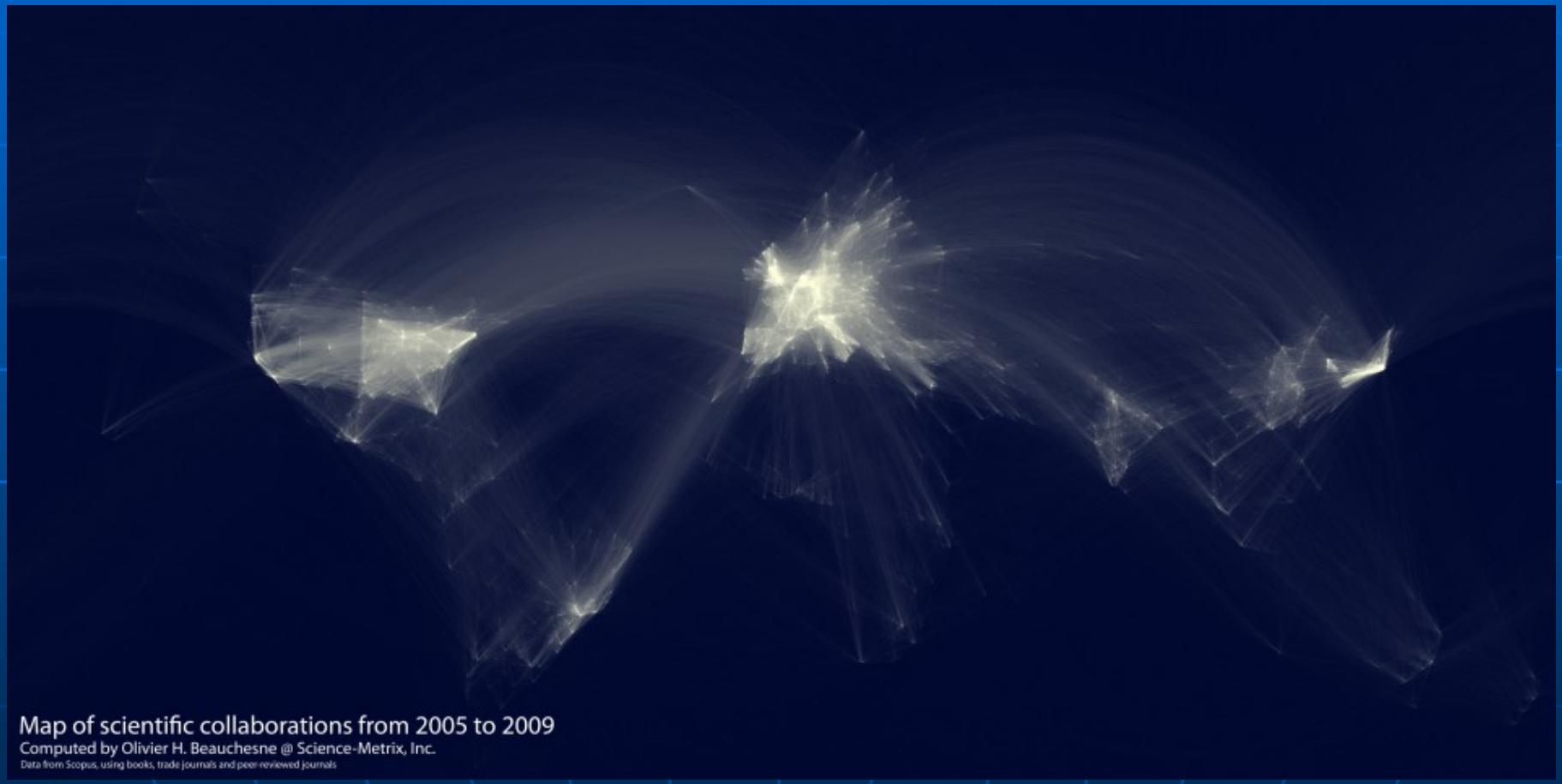
- For several years, some 10,000 medical students from around the world participated annually in bilateral medical student exchanges sponsored by the International Federation of Medical Student Associations; over 2000 med students from over 60 countries participate in IFMSA research programs each year (www.amsa.org)

Forces in International Collaboration in Biomedical Research

- Growth of biomedical science (R&D) in “BRICK” countries (Brazil, Russia, India, China, Korea) and wide distribution of BRICK trainees and graduates in research intensive countries.
- Globalization of the economy generally and biomedical R&D specifically
- Increased international awareness of global health challenges (infectious disease, environmental health)
- Increased ease of international communication and travel (Internet, spread of English, economic prosperity, peace)

European Commission, 2009, EUR 24195 EN

Publications from international research collaboration boomed in the past decade.



http://flowingdata.com/2011/01/27/map-of-scientific-collaboration-between-researchers/

Collaborating investigators and research educators must recognize such assumptions to prevent misunderstandings and ethical conflict in their work or convey new standards of integrity to trainees.

- Trainees learn foundational lessons about “research” beginning with their earliest exposures to science and academic inquiry, particularly in high school and undergraduate science courses.
- Trainees’ knowledge of research is grounded in cultural lessons and educational practices that vary across countries and disciplines. Many such lessons are “wrong” or in conflict with standards in the US.

Differences in academic and scientific experience:

Perception of academics, science, and engineering

- National standing and pride in certain disciplines
- Funding (e.g. theoretical vs. experimental physics)
- Goals of international study and collaboration
- Relative importance of school, work, family, community

Academic logistics – classroom, laboratory, clinic

- Size / setting of classes shapes evaluation and engagement, which shape perception of goal of science & teamwork
- Faculty and students' roles shape perception of academic "authority" and original (individual) work

Curricular materials carry important messages

- Lab books and workbooks teach method; want answers
- Language (English, native language, mix)

Since 1989 NIH has required NRSA training grants to provide instruction in RCR to funded trainees. Some institutions do not provide RCR instructions to international trainees because NSRA grants limits eligibility to US citizens. However, since 1994 NIH policy has promoted RCR instruction for all graduate students and post docs, regardless of the source of support.

Reminder and Update: Requirement for instruction in the responsible conduct of research in National Research Service Award Institutional Training Grants, NIH GUIDE, Vol. 23, No. 23, June 17, 1994

Today both NIH and NSF call for training and oversight in ethics and the responsible conduct of research for all trainees supported by federal funds, including in international research.

NSF, Responsible conduct of research, *Fed Reg* 74(160); 2009

NIH Update on the Requirement for Instruction in the responsible conduct of research, 2009.

NIH's Fogarty International Center has grants to develop culturally and linguistically tailored curricula in research ethics and RCR for research trainees outside the US.

www.fic.nih.gov/programs/pages/bioethics.aspx

Responsible conduct of research depends on knowledge and understanding of multiple factors affected by national culture:

- "How to" issues and procedural aspects of good research, according to professional standards
- Institutional policies, governmental regulations, and professional norms
- Recognition, analysis, application, and reinforcement of ethical values and questions in research
- Professional socialization, including collegial engagement in discussion of standards and ethics

Points of International Ambiguity and Conflict in Standards of Research Ethics and RCR

Human research

- Multiple oversight structures, multiple levels of complexity
- Variable inclusion of women, children, “minority populations”
- Variable definition and recognition of “vulnerable” populations
- Restrictions on payment and/or medical care for participants
- Restrictions on taking or sharing tissue, DNA, data

Animal research

- No regulation or structures in many lower/middle- income countries
- Cultural views of human use of animals generally
- Cultural views of the social role of specific animal species

Biosafety

- Professional standards but limited regulation, oversight structures, or resources in many lower- and middle- income countries
- Variable perception of “clean” and biological risk

Points of International Ambiguity and Conflict (cont.)

Misconduct / responsible conduct

- Variable definition of key concepts of acceptable conduct
- Variable existence of policies and review
- Where corruption is prevalent, research misconduct seems trivial
- Variable cultural interpretations behind perception of misconduct (e.g., Plagiarism: text, data, ideas or none of the above)

Authorship and publication

- Hegemony of English language journals
- Limited skills in written English for many
- Limited access to high-quality journals limits familiarity with style
- Differing professional roles and hierarchies
- Dual-use research and access to methods and data (export controls)

Points of International Ambiguity and Conflict (cont.)

Conflict of interest

- Expectation of exchange and meaning of gift giving
- Variable levels of monetary value and average income
- Perception of US wealth; perceptions of developing nations' poverty
- Variable access to drugs and equipment
- Corruption and expectations of bribes or kickbacks

Mentor/trainee interactions

- Variable professional and social roles and hierarchies of faculty
- Aiming to please at any cost
- Apprenticeship, plantations, and sweatshops
- Scientific social climbing
- Mentors as culture brokers in an international context
- Trainees as culture brokers in an international context

Points of International Ambiguity and Conflict (cont.)

Collaboration

- Collaboration and access to resources, privilege, and power
- Variable interpretations of reciprocity
- Perspectives on time, distance, and communication

Peer review

- Variable social hierarchies and close social relationships
- “International peers” of different backgrounds, context, language

Data management

- Variable concepts of documentation
- Language for record keeping – variable precision in English
- Access to paper and computerized records and storage
- Variable concepts of privacy and confidentiality of data
- Dual-use research and access to methods and data

Points of International Ambiguity and Conflict (cont.)

Scientist in society

- Scientists as elites
- Science in service of the state
- Science and economic development (personal and national)
- Global science and export controls (economic espionage)

Environmental impact of research

- Cultural perceptions of waste
- Variable standards for disposing of hazardous materials

Strategies for talking about standards of practice, negotiating values, and teaching research ethics and integrity in international collaboration

- Make time to talk regularly, in depth
  - Start with face to face discussion whenever possible
  - Be patient with colleagues' accents and vocabulary
  - Negotiate time zones respectfully
  - Recognize linguistic and technologic limitations of email, Voice-over-Internet calls, Internet conferencing
- Supplement conversation with written materials
  - Provide and review institutional policies at the start of the collaboration and at relevant intervals
  - Exchange written materials in advance
  - Prepare a draft agenda for regular calls
  - Appoint a note taker to send a summary of discussion

A word about English as the universal language of science: CAUTION !!

Any “universal language” may hide subtle differences when used by people from different cultures and native languages.

- Translation of concepts for which other languages have no word, only one word, or multiple words
- Jargon and “shibboleths”
- Political implications and local usage
- Acronyms and the reification of complex concepts

Studies in comparative standards and values in RCR are essential to promoting research integrity in global education and research. Some priorities include:

- The role of publication in academic success and plagiarism among individuals with limited proficiency in English
- How teaching and mentoring practices, including academic hiring practices, affect role modeling
- Effects of US funders' policy on responsible conduct, ethics, and safety are viewed and implemented in international settings

Most new trainees and some faculty are unfamiliar with research policy and formal standards of practice; many *international* trainees come to the US from countries with limited policy on research. For international collaboration, they all need to know:

- How policy works (and doesn't work) in the US, including why policies change
- Specific policies and standards that govern their research and related disciplines
- Cultural values that shape these standards
- The role of US policy in research abroad in their specific international collaboration

Scientific advance requires looking for new perspectives on old questions.