

**2008 IGERT Project Meeting  
Session VI: Technical Session  
Sustainability and Climate Change**

**PI Responses**

- **How to ensure IGERTs are leading the way on transformative interdisciplinary research?**
  - Transformative at three levels: students, faculty and institutions:
    1. Students: transformative by filling in the “white spaces” to affect where the field is going. Many students come into programs with a strong sense of social responsibility and interest in policy implications of their field. Some IGERTs address integration of fields by having joint dissertation chapters. A key aspect of student experience is providing students with opportunity to conduct independent research from their advisor(s). Students value independence very highly—a major draw for student recruitment and retention.
    2. Faculty: IGERT does not provide real support for joint research with other faculty but uses students as the bridge between labs and departments. Some of these barriers to faculty interaction reduced by traveling together to common research sites or having annual meetings/joint seminars. In other cases have faculty advisors for teams to co-advise groups of students involved in interdisciplinary research projects built around a field site.
    3. Institution: Institutions respond to changes in funding structure. IGERT important in convincing institutions to accept things like joint dissertation chapters, changes in funding levels for students and changes in funding for overseas research partners.
  - Sustainability means different things to different disciplines: In Philosophy, sustainability may mean that resources are viewed as limited in some ways whereas in economics, market forces and technological development are viewed in some quarters as indicating that resources may not be limiting to development.
- **How to optimally integrate interdisciplinary research and education?**
  - Faculty involvement is built around small groups of faculty, often there are difficulties in getting buy-in from faculty outside this core group since resources are directed mainly toward students.

- Student interaction is important and can be facilitated by having common offices, common seminars or courses, student-directed seminars, and joint research projects.
  - Sustainability and climate change are naturally interdisciplinary fields and tend to self select for students interested in designing interdisciplinary research programs. One effective strategy to integrate fields has been to use comparative research study sites where students and faculty compare issues of policy, natural science and social issues between field sites.
- **How has globalization of interdisciplinary research in your topic area had an impact on graduate education and research?**
- Field research trips including faculty and students. Impact on disciplinary divisions among foreign researchers.
  - Nature of students changing? (wanting to work on sustainability issues in developing countries).
  - Europe has attained much greater integration of full education system (pre college, college, grad school, research) – they are viewed to be “post-IGERT”; China considering adopting new models to replace current (narrower) doctoral student training (“pre-IGERT”) US-IGERT has not become fully institutionalized because it is not vertically integrated.
  - Internationalization is different from globalization. Students may want international experiences yet not have a global perspective.
- **What are the career opportunities for Trainees, and how are Trainees being prepared to be successful?**
- Trainees appear to be better prepared for / more competitive for positions in industry and other aspects of the private sector (ngos), even if not a stated goal of IGERT programs. Related issues: student preparation, student goals (more activists now), current state of academia in US – not so attractive to students, not so easy to obtain position or to do interdisciplinary research in academia in us (getting promoted, getting credit, getting funding)
  - Team work training and other career development benefiting students and opening career opportunities (industry, etc.)
  - Suggest that regional IGERT or main IGERT offer professional development workshops for all IGERT students rather than each IGERT attempting to address career skills training.

- Career opportunities coming in the area of sustainability: municipalities, industries who are attempting to “go green”; campuses; some students creating consulting firms.
  - Diverse career paths require diverse preparation pathways.
- **What role does the interdisciplinary research in your topic area play in recruiting and retaining a diverse group of trainees? (Please think: Broadening participation)**
- Interdisciplinary research is overall a hindrance to recruiting URMs (except in the case where a URM population resonates with the issues being addressed by a specific IGERT program.
  - Generally, it seems to help in recruiting women into doctoral degree programs, and it can be helpful in recruiting some URMs into undergrad programs and internships. However, it’s very difficult to sway URMs from professional schools (medicine, dental, pharmacy, law, business) to career paths that are not currently seen as viable.
  - NSF needs to focus on building the pipeline. Should consider broadening definition of diversity to include socioeconomic, education status. Key to have this sort of diversity when addressing questions of sustainability.
  - Diversity in international students also helps in representative discussion of global issues.
  - Success in recruitment appears to be a function of institutional practices, geographic location, and the specific theme of the IGERT. The interdisciplinary aspect of IGERTs may or may not be attractive to minorities. We recommend that NSF needs to restructure the IGERT program to recognize the importance of supporting aspects of a pipeline. Such restructuring might feature undergraduate REUs, MS students, and the need for increased durability of an IGERT in order to create a more lasting presence that would attract and retain a greater diversity of students.
  - Retention problems often arise as a result of differences in disciplinary graduate program and program/faculty expectations. Some best practices might be accumulated so that they could be shared across IGERTs.

- **How can the IGERTs in this topic area collaborate or cooperate to further the goals of each IGERT?**
  - This group has demonstrated the value of the inter-IGERT collaboration (the supplemental award was critical in supporting the joint meeting (Conference for Sustainability IGERTs) of October 2007 in Alaska. A follow-up meeting in Fall 2009 is currently being planned and organized). Students were particularly positive in their responses to the Alaska meeting. They consistently cited the value of having an extended ID community. This group recommends the following: similar to the current supplements supporting international activity, there should be supplements available for (1) inter-IGERT group meetings and (2) student exchanges.
  - Some other near-term opportunities for collaboration:
    - September 16-18 meeting in coupled human-natural systems in ecology and health
    - the upcoming EcoHealth Forum (Dec. 1-5, 2008) in Merida, Mexico ([www.ecohealth2008.org](http://www.ecohealth2008.org))
  
- **PLEASE feel free to add any other questions you wish and provide your input!**

Overall comment: vertical integration would assist most aspects of IGERT – recruiting, institutionalization, career opportunities as perceived by grad students, building the pipeline.

## **Trainee Responses:**

- **How to ensure IGERTs are leading the way on transformative interdisciplinary research?**
  - Conduct problem-oriented research
  - Different Disciplines should be involved in defining the problem/questions addressed
  - Have a critical mass of individuals from each discipline (faculty and trainees)
  - Have opportunities to create deliverables (i.e. workshops, white papers, presentations) to get the name and the research of the IGERT trainees out to the community and different organizations. Additionally, having these projects focus on communication between disciplines to complete them.
  - Have a social networking or blog for IGERT and sustainability
  - List departments and IGERT titles on conference badges
  - Experiences outside discipline including internships, classes and collaborative projects
  - Many barriers to interdisciplinary collaboration is more an institutional than IGERT problem
  - Encourage science/engineering to study environment and sustainability from a social science perspective as much as social scientists studies from a scientific / engineering perspective.
  - Get more buy-in to IGERT programs by departments within universities by issuing longer renewals and fewer IGERT programs that are longer lived, thereby promoting more institutional trust of the program
  
- **How to optimally integrate interdisciplinary research and education?**
  - Diverse core course requirements that involve different disciplinary perspectives, methods and theory
  - Establish links between departments/programs/disciplines at the university and create *clearly defined mechanisms* for collaborations

- REAL interdisciplinary courses: start from the ground up, don't just tack on another discipline to the end of a class. Either have interdisciplinary teachers teaching it, or a team of teachers
- Have IGERTs be flexible for IGERT fellows to be able to graduate and be successful rather than having program requirements become a burden
- Ensure that courses are inter-disciplinary, not just multidisciplinary – 3 profs from different fields who each teach 1/3 of a course is not the same thing as three profs who work together to cross departmental lines.
- Encourage student-led collaborative projects – these can be outreach projects that do not necessarily result in publishable research but nonetheless encourage students to integrate their distinct expertise.
- **How has globalization of interdisciplinary research in your topic area had an impact on graduate education and research?**
  - Foster international collaborations/connections in IGERT programs → these benefit the programs and the students in a huge way (e.g. students gain ability to work across cultures). NSF should prioritize this!
  - Make opportunities available for non-U.S. or int'l students to collaborate w/ IGERT programs. Ways to do this: 1) expand or provide more emphasis on int'l Associates; 2) Couple with other grants that support int'l students (e.g. Fulbright); 3) get int'l post-docs involved w/ IGERT programs, 4) make mechanisms for int'l student involvement clear when advertising IGERT programs to students
  - IGERT provides the money, freedom, and opportunity that allows for international research to take place. Some even have requirements that research outside of the base institution be conducted
  - Bringing in international speakers
  - Find some way to involve international students in IGERT
  - Make international experiences more accessible by allowing money for international travel and flexibility in classes to make time for international work
  - Because IGERT is limited to US citizens, it is difficult to get sustained interaction from other countries
  - Hyper-specialization within the US

- IGERT is exposing us to more global research
- Fosters opportunities; opens a wider job market
- **What are the career opportunities for Trainees, and how are Trainees being prepared to be successful?**
  - Create an IGERT Alumni Association
  - IGERT programs should have “career opportunities” workshops/symposia, or at least a listserv for career opportunities sent to the trainees
  - Externships (internships that are necessarily outside of academia) allow trainees to do test drives of different careers than academia. Additionally, this creates a network for the trainee
  - Bring in speakers from different careers to give their perspective on issues
  - More information on non-governmental organization (NGO) careers at the conference
  - IGERT is an invaluable asset when looking for a job
  - More in program career advice (one successful program in this area had speakers from different industries come in to do seminars)
  - Small grant competitions give students experience in grant writing for their research careers
  - Technical communication courses – teach trainees how to present their research across fields
  - International experience/ collaboration
  - Panels, speakers, etc that represent career options from each sector – gov’t and nonprofit in addition to academia and industry.
- **What role does the interdisciplinary research in your topic area play in recruiting and retaining a diverse group of trainees? (Please think: Broadening participation)**
  - Raise awareness of IGERT programs so that a diverse & large number of applicants apply – this will broaden the applicant pool

- Prioritize the involvement of students with diverse backgrounds, experiences, career paths
  - Exhibiting interdisciplinary products as a draw to others with an interdisciplinary mindset to join the program.
  - IGERT inherently draws a different, more diverse crowd. It draws folks that already are thinking interdisciplinary and often times this means they have a different background of experiences that lend themselves to a different way of thinking.
  - More undergraduate involvement/outreach
  - Need for more faculty involvement across departmental lines
  - Think about how IGERTs in ecology/sustainability can improve conditions for underrepresented minorities and have projects in these areas
  - Fosters capacity to listen to unique viewpoints and reach across differences
  - Recruit students at the UNDERGRADUATE LEVEL – recruiting graduating seniors and recent graduates in addition to those already in Ph.D. programs. Many excellent, competent undergrads are leaving academia because they don't realize the funding opportunities which exist. By recruiting senior and informing juniors, you can get a more diverse crowd into the IGERT in specific and more US citizens into Ph.D. programs in general.
- **How can the IGERTs in this topic area collaborate or cooperate to further the goals of each IGERT?**
    - Create a dynamic IGERT “Information Network” (perhaps via a web-based platform)
      - Use this to link IGERTS through detailed information on programs and research that is ongoing at programs (& individuals); could have topic-oriented email listservs
      - Info network should have mechanisms for tiered involvement in collaborations (programs, → research groups → individuals)
    - Encourage/foster Conferences or Symposia that involve multiple IGERT programs, research groups or individuals, and create mechanisms for IGERT programs to KNOW what is happening at other IGERT programs (e.g. through a topic-oriented session at the PI Meeting)
    - Connections between different IGERT institutions; sub-conferences (i.e. sustainability conference in Alaska)
    - Internet based conferences and internet resources to share successes and problems can help new IGERTS be successful.

- Creating connections to go past graduation – post-Docs at other IGERT institutions
  - Supporting interaction between PIs, Trainees, and IGERT programs generally by hosting IGERT groups at conferences (ex: ASME), hosting interactions between IGERT programs at other institutions, and generally raising awareness and the ability to contact IGERT trainees/PIs at other institutions
  - There should be regional conferences in addition to the large national meeting (similar to SWE, ASME) – only one PI and one trainee can come to the national meeting, but if there were a regional meeting (say within a two hour drive of campus), entire labs could go – thus a much greater proportion of involved students would reap the benefit of the interaction with IGERTs in very different areas.
  - Organize breakout groups and posters by research topic area so people can more readily interact with the trainees/PIs whose research is most important to them.
- 
- **PLEASE feel free to add any other questions you wish and provide your input!**