

**Innovation in PhD Training**  
**An IGERT at the University of Washington**  
**Mid-Term Program Evaluation**

***Center for Innovation and Research in Graduate Education***

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## **Table of Contents**

### **Evaluation Background**

**What are the program goals and how is the program structured to pursue those goals?**

### **Evaluation Questions**

### **Methodology**

### **Findings**

**Transforming the PhD experience from an individual to a team focus**

**Creating an interdisciplinary approach that permeates the PhD program and begins to influence larger campus**

**Creating interdisciplinary change agents in their fields**

### **Conclusions and Recommendations**

## ***Evaluation Background***

### **IGERTs and CIRGE at the University of Washington**

Supported primarily by a grant from the National Science Foundation's Integrative Graduate Education and Research Traineeship (IGERT) this evaluation is based on one IGERT at the University of Washington that aims to train its students to become disciplinary experts who are also highly skilled in collaborative teamwork and interdisciplinary problem-solving. This is a short version of the original report; names, personal quotes, and program details were eliminated for easier reading and better understanding of a wider audience.

The evaluation was performed at the end of the third year of a five-year grant. As planned, the program has completed its admission of three PhD cohorts. The next two years of the project will focus upon completion of team projects, attendance of all 25 PhD students at the seminar on advanced IGERT topics, and student-team teaching of an undergraduate course.

Since IGERT grants provide student funding but only extremely limited faculty/staff support, the core faculty have designed and implemented this program with no additional financial support. In practical terms, this means that their regular departmental workloads (teaching, serving on committees, etc.) have been only informally reduced to varying degrees to allow them to participate in this program, which in turn have incurred some professional/departmental costs for them.

In addition, the program receives various levels of assistance from a half-time administrator, two part-time post-doctoral researchers, an occasional interdisciplinary research expert from the university's Office of Research, and the university's Center for Innovation and Research in Graduate Education (CIRGE). The administrator and the two post-doc fellows carry a great deal of the organizational and logistical weight for the program, and have also provided considerable support to the students.

CIRGE has provided the innovation consultant who has carried out the teamwork training and support for students and faculty, a critical feature of the program. In addition, CIRGE has informally consulted with and supported the program and is providing the evaluation services that are the focus of this report.

## **Purpose of the Mid-Term Project Evaluation**

- Assessing which project activities are working in pursuit of the goals
- Identifying barriers to achieving the project goals
- Extracting the larger lessons learned for doctoral education and interdisciplinary PhD programs in the first three years of the project
- Providing ideas and recommendations for next steps
- Feedback evaluation in a clear, concise report so it can easily be used in continuous improvement efforts.

### ***What are the program goals and how is the program structured to pursue those goals?***

The program design and structure present an ambitious approach to developing teamwork and interdisciplinary skills. They go well beyond the minimal interdisciplinary model of simply encouraging students to take outside-of-discipline courses by providing training in teamwork and a first-year core course series intended to immediately immerse students in an interdisciplinary approach.

An introductory class provides a basic framework of the field and a series of speakers present real-world situations that student teams may use to inspire their development of two-year research proposals. By the end of the fall quarter, each group chooses a research topic to be carried out in the subsequent courses: Theory and Methods, where the identified research topics drive course content, speakers, etc., and Research (spring), where students are engaged in the beginnings of research with faculty and staff help on request.

For the IGERT PhD students, this two-year project is expected to culminate in a co-written dissertation chapter and publishable article. In addition, beginning in their second year students participate in an advanced seminar on IGERT topics and research, and are also required to create and team-teach an undergraduate course.

Drawing on the original program proposal as well as interviews with faculty and staff, this evaluation design identified three main goals for the IGERT program. The matrix below summarizes the program goals, the activities that support the goals, and the desired long and short term outcomes of the program.

Project/System Goal	Project Activities	Desired Long Term Outcomes (5+ years)	Desired Short Term Outcomes
<p><b>Transforming the PhD experience from an individual to a team focus.</b></p>	<p>Faculty/staff /consultant provide initial teamwork training, ongoing support and modeling.</p> <p>Faculty/staff and students engage in continuous feedback.</p> <p>Students participate in two-year group project.</p> <p>Students team-teach undergraduate course.</p>	<p>Graduates work effectively as member of interdisciplinary problem-solving team as advanced graduate students, and as professionals after graduation.</p>	<p>Students successfully complete team project, with co-written dissertation chapter as product, accepted by committee.</p> <p>Students successfully design and team-teach undergraduate class.</p>
<p><b>Creating an interdisciplinary approach that permeates the PhD program and influences larger campus.</b></p>	<p>Students are immersed in interdisciplinarity through faculty team-taught introductory course series.</p> <p>Students conduct interdisciplinary group projects.</p> <p>National, international, regional and local scholars give seminars and critique group projects.</p>	<p>Producing graduates who use an integrated approach.</p> <p>Beginning of transformation of IGERT field into a coherent, interdisciplinary field.</p> <p>Increasing interdisciplinarity in faculty research</p> <p>Broader campus-level acceptance of and interest in interdisciplinary PhD programs.</p>	<p>Application of interdisciplinary approach to student course work, group project, and/or PhD topic.</p> <p>Completing three years' of teaching introductory 3-quarter course series, using continual feedback to adjust and improve course content and structure.</p> <p>Application of interdisciplinary-related criteria in grading team projects.</p> <p>Increasing larger institutional support for interdisciplinary courses and programs.</p>
<p><b>Creating interdisciplinary change agents in their fields.</b></p>	<p>Students have frequent program contact with outside agency panels and other external specialists.</p> <p>Students conduct group projects that use interdisciplinary approaches to address current problems presented by outside experts.</p> <p>Students present group project findings.</p> <p>Contacts/workshops with PhD programs on campus, around the nation and in other countries.</p>	<p>Understanding and practice of effective participation/collaboration in outside agency problem-solving teams.</p> <p>Creating closer, ongoing working relationships between the program and the outside world that lead to increased impact on real-world problems.</p>	<p>Successful completion of group projects that provide practical ideas for solving real-world problems.</p> <p>Continuing work with outside agency specialists throughout the life of the program and beyond.</p> <p>Sharing interdisciplinary work with other departments/universities at home and abroad.</p>



## ***Evaluation Questions***

The primary purpose of this evaluation was to identify the features of the program that are most successful so that these can be used to develop and improve the project further, and so that others who are interested in interdisciplinary PhD efforts can benefit from the lessons learned in this program to date. The evaluation was also meant to identify key challenges experienced in the first three years of the program so that faculty, staff, and students have the opportunity to generate answers to these challenges. Evaluation activities can contribute to this kind of program-strengthening by using interviews and focus groups to generate ideas for future program development. Finally, some of the larger implications with respect to the roles of university leadership and incentives were also considered, since these issues have such a significant impact on the practice and dissemination of educational innovations.

The evaluation questions therefore focused primarily on the three main program goals: teamwork, interdisciplinarity, and making effective connections outside of academia.

### **Transforming the PhD experience from an individual to a team focus**

- Are the teamwork training and other resources applicable, sufficient, and provided in a timely way for the students' group project and team-teaching needs?
- What are the benefits and costs of doing the two-year group projects, and do students view the value added by the projects as outweighing the costs?

### **Creating an interdisciplinary approach that permeates the IGERT PhD program and begins to influence larger campus**

- From student, staff, and faculty viewpoints, is the program functioning in an integrated, interdisciplinary fashion?
- Is its structure blending smoothly with the broader PhD requirements the students must complete?
- What are the benefits and costs from participation, and do students view the benefits as outweighing the costs?
- Is participation in the program increasing interdisciplinarity in faculty work?

### **Creating interdisciplinary change agents in their fields**

- Is the program effective in making connections for both students and faculty with outside organizations (non-profits, government agencies, other universities, etc.) involved in the field?

This is a longer-term goal that would be best measured by post-graduation career follow-up. In the mid-term evaluation process, the interim measurements focus primarily upon the exposure during the program to outside organizations and specialists, and the apparent impact of those contacts.

## ***Methodology***

The findings of this evaluation were based on a combination of written records, student online surveys and individual interviews, faculty, staff, department, chair, and dean interviews, focus groups, and observations.

### **Student Online Surveys and Individual Interviews**

CIRGE has conducted detailed online surveys with students each of the three program years, and this year also completed extensive individual interviews with most of the IGERT PhD students. All of the individual surveys and interviews were voluntary and anonymous, and their practices were approved by the university's human subject requirements. Response rates for the surveys and for this year's interviews have been good, and the student time given to these activities is greatly appreciated. A total of 19 students were interviewed, out of the total of 25 students in the program. Many of the ideas for program improvement were generated by faculty, students, and staff.

### **Faculty, Staff, Department Chair, and Dean Interviews**

Interviews were held with the core faculty members, the innovation consultant, the interdisciplinary research expert, and the two postdocs, in two rounds. The second round of interviews also included the department chairs and most of the deans for the core faculty, a vice provost of academic planning, an adjunct faculty member, and two panel members from a regional government agency. These latter interviews covered both this IGERT and the broader educational and institutional ramifications of IGERTs in particular and interdisciplinary PhD education efforts in general.

## ***Findings***

### **Transforming the PhD experience from an individual to a team focus.**

The primary means for developing teamwork skills in the IGERT is through the two-year group research project described above. It is highly unusual for a PhD program to require

a group project of this depth, including the provision of teamwork training, a two-year commitment to a substantial research project, and a co-written product that will be a dissertation chapter for each participant.

The group project challenges are considerable. Students are placed into project groups by the faculty team, with the intent of ensuring there is a mix of perspectives and disciplines within each group.

**Are the teamwork training and other resources applicable, sufficient, and provided in a timely way for the students' group project and team-teaching needs? Do students use what they've learned to solve team problems?**

Two-thirds of the students who were interviewed found the teamwork training and some of the related resources to be valuable and useful for group project work. About half reported that they try to use what they've learned from the team training and/or special program handbook in their group project work. Resources that are provided without hands-on training usually go unused.

Almost all of the students felt strongly that the timing of training needed to be better coordinated with actual group formation and development, and that regular follow-up, whether by periodic consultation or workshops, would be a key means of helping them actually implement what they had learned. There is a real desire for training and support that is timed in an early, proactive way.

Other resources have included occasional handouts on teamwork and on group writing, some introductory exercises and a large commercial publication on team functioning that was given to students during orientation. These were rated by the students as having limited value, particularly the large commercial handbook which was simply shelved by most students and never used.

The social activities of the program are also meant to serve a general support and team-building function. Sometimes these events are purely social; other times, they have included a discussion/feedback component that allow students and faculty to check in with each other and provide ideas for improvement. This is also quite unusual for a PhD program, and has generally been viewed positively by students and faculty.

The general consensus seems that the training and handbook are very well done, practical, and useful, and that opportunities for fine-tuning this part of the program lie primarily in planning ahead to ensure that training is provided just before a need arises; that the training content shift over time as group needs shift (for example, helping students towards the end of the project with tools on how to create a written team product, including how to determine lead authorship, etc.); and that training be built into the schedule on a fairly regular basis, perhaps once a quarter, with follow-up help in implementation and problem-solving.

## **What are the benefits and costs of doing the two-year group projects, and do students view the benefits as outweighing the costs?**

Eighty percent of the students interviewed reported that the benefits of the group project outweighed the costs; two felt the costs were too high for the benefits received; and one is still genuinely not sure. It is important to note that both benefits and costs are described as high by many students. They are very interested in finding ways to promote the benefits, since the group work was part of the attraction to the program for many, while significantly reducing the costs. Three key issues emerged in the conversations about the group projects that can allow the program to maximize the strengths and minimize the difficulties in this group work, in addition to the training/timing needs discussed above.

### *Formation of student research teams*

Students are committed to pursuing an interdisciplinary approach to the group projects, but would like more flexibility and voice in group formation.

### *Development of team research questions*

A panel of local, regional, and state professionals from private and public organizations helps by providing students with research ideas by discussing their current issues and related research needs. However, the eventual research question is not necessarily tied to any concrete, real-world problem identified by the panel. This creates a far more open-ended design process and seems to be the focus of considerable struggles in some of the research groups.

### *Availability of student time to work on the group project*

The description of this IGERT program structure implies that most student time during the first year is to be spent on the interdisciplinary activities, with disciplinary time demands to be kept at a relatively minimal level; this balance is supposed to slowly shift so that by year three the students are able to concentrate primarily on disciplinary requirements. In reality, it is a requirement that some first-year students engage in heavy disciplinary fieldwork spending 17-18 hours a day in the field, and this time commitment makes their participation in the group projects logistically very difficult. This has been the subject of repeated discussion with no satisfactory resolution and needs to be resolved in a way that removes it as a source of team tension and energy depletion.

## **Benefits**

Even for many students whose groups have experienced painful struggles, the gains have been significant and represent an experience that is very different than the conventional PhD program where research is often based on predetermined faculty-funded projects and is typically executed by individuals in relative isolation from each other. Students say they have learned how to understand different perspectives, work habits and techniques, to compromise, to use each other's particular skills, and to communicate effectively among people with varying vocabularies and world views. Most feel strongly that the

collaborative team projects provide them with skills they will need in the outside world, and they greatly appreciate being fully funded to do their own research.

## **Costs**

The costs of doing the group projects have been dramatic for some students, and at the very least are noted by most of them. Understanding these specific issues will provide the IGERT program with the opportunity to relieve them and to allow the considerable benefits to fill in the space left by those diminished costs.

Costs seem –as described above- to fall into one of three major themes: the lack of flexibility and student voice in the formation of teams; the relatively open-ended process of developing the research questions; and the significant time limitations described above for the some students who are required to engage in fieldwork during the first year. These three problem areas seem to interact to produce much higher levels of difficulty than might occur if they existed in isolation from each other. While the complexities of group dynamics will simply as a matter of course and human nature produce some difficulties in such work, in a natural work setting the problem tackled by a group is often much more narrowly defined and structured, thus relieving the group of the need to spend a great deal of time and energy on problem definition. In addition, typically that group has direction given to it by a higher-level manager. While individuals in a workplace may or may not have much of a voice in the selection of work teams, those teams are usually selected based on the nature of the already identified problem as well as administrative knowledge of their skill sets. All of these parameters help to structure the activities of a team and reduce some of the ambiguities that can lead to conflict.

The core faculty have worked on the problem definition issue over the three program years, trying to fine-tune the parameters so that the process would be experienced as neither too loose nor too restrictive by students. They know that the process for developing a group research question is a long one and is often where group conflict is high because the process is so open-ended.

These problems could be eased by returning to the original proposal's focus on real-world problems. The students could be presented with a selection of real life problems, and groups could be formed around interests in the various problems, with some limitations to maintain the cross-discipline nature of the groups. Another possibility would be to allow shorter projects with different groups. The gain would be in allowing students to work on several different projects with a variety of peers who share interests and compatibility, rather than being required to work in only one group over two years. The risk would be in losing the depth of work that a two-year, single group project can provide; however, a one-year project could be sufficient. A related option would produce from that one-year project a joint-authored publishable article that stands on its own rather than serving as a dissertation chapter. Because the gains from group work represent a core value of IGERTs, it would be very helpful for such programs to develop some of these "escape valves" that can relieve the stresses of group work without losing its richness.

Most of the core faculty, staff and postdocs report that they came to this program with previous teamwork experience, and often explicit training in this area as well. One faculty member who had no previous training reports significant benefits from this experience, and is using warm-ups, group process techniques, and new facilitation skills at workshops and in classes. Another said that the teamwork training brought group dynamics to the forefront of faculty consciousness, for both the students and for themselves, and that as a working group the faculty have benefited greatly from this.

## **Creating an interdisciplinary approach that permeates the IGERT PhD program and begins to influence larger campus**

This program is involved in the creation of a new field that crosses diverse disciplines. In this way, it is different and perhaps more challenging to put interdisciplinarity into practice than it is in some of the other IGERTs, where the disciplines are somewhat more closely related to each other along a continuum. In contrast, this IGERT attempts to combine several very different ways of thinking in its mix of natural and social sciences.

Experts in interdisciplinarity talk about a continuum of research that crosses disciplines, with the idea that interdisciplinary research goes beyond the inclusion of multiple disciplines to achieve some kind of intellectual integration.

### **From student, staff, and faculty viewpoints, is the program functioning in an integrated, interdisciplinary fashion? What are the benefits and costs from participation, and do students view the benefits as outweighing the costs?**

Program elements to be considered include the IGERT orientation; the first-year course series and related group research project; the advanced seminar beginning in the second year; other program enrichments such as the seminar series, conference presentations, and field trips; the interaction between the IGERT program and the students' disciplinary departments and requirements as well as the university at large.

The students were asked about the benefits and costs from participation in an interdisciplinary program, and whether they felt that the benefits outweighed the costs. Almost all gave an unequivocal yes. While a couple of students were not yet sure how they felt about this, there was not one student who said no. This is an extraordinary result given some of the complexities of the program and the stresses involved in the two-year group projects for many students. These various challenges notwithstanding, the core faculty and students in this program seem to be finding it exciting and rewarding to be breaking ground in a new interdisciplinary field.

### **Orientation**

The IGERT begins its program year with its own orientation. This is in addition to any departmental orientations the students may attend. Each year, IGERT staff and faculty

have incorporated feedback from the previous year's orientation to improve the next one. The 2003 IGERT handbook included comprehensive information on scheduling, requirements, how to track their IGERT and departmental progress, program philosophy, and teamwork principles. The design of this handbook was in direct response to student requests from previous years, and the 2003 students were very satisfied with the information. Most students have enjoyed and appreciated the IGERT orientations, particularly in contrast to departmental orientations which are seen as sparse and not particularly student-friendly

### **Program Structure**

The overall program structure in its abstract form is greatly valued by students. They are aware it will require more work than a standard disciplinary PhD program, but have voluntarily taken on the extra work because of the interdisciplinary rewards they expect.

### **The first-year core series and its group project: content, teaching, and interdisciplinarity**

The IGERT core course series was designed to introduce students to this IGERT program and to have full core faculty participation that demonstrates to students how disciplinary interests coincide, differ, and can be melded. The interviews and surveys in this evaluation asked students, faculty and staff their thoughts on how interdisciplinarity is being practiced in the core series and the associated group projects. The students were split evenly into three clusters on this question. Some saw the program as a well integrated, interdisciplinary approach. Another cluster felt that it had not moved beyond a serial multidisciplinary effort, where each expert presents his or her discipline one after the other, with relatively little success overall in synthesizing the different approaches. The third group seemed to view it as a work in progress that was moving in the right direction, with the efforts to introduce interdisciplinarity successfully chipping away at the disciplinary approaches that all participants brought, to various degrees, with them, but that it was not yet integrated enough to be truly interdisciplinary in nature.

Some students felt that they had had a fairly romanticized picture of how well it would work, and through their experiences in the program so far, were surprised by how entrenched disciplinary thinking really was, in peers and in faculty both inside and outside the program. Most students and core faculty members are bringing pre-existing interests in interdisciplinarity to the program.

Many students would like to see the interdisciplinary reach of the program expand beyond the current disciplinary mix. The core faculty also see this as a major goal and have been actively searching for additional faculty. Adding new faculty to the mix will also help prevent burn-out, since the five core faculty members have been putting in an intensive effort over the last three years.

The peer interactions that occur because of the IGERT are far more frequent and richer than in traditional PhD programs, and are highly valued by students. One opportunity for further development of the program is in promoting cross-research group and cross-cohort work.

### **The advanced seminar**

The seminar provides the opportunity for students and faculty to discuss important theoretical and research papers. Students have been responsible for selecting articles for discussion, and faculty attendance has been quite variable. Both students and faculty say that one of the great assets of this seminar is that they have all been exposed to new and innovative theory and research that they would not have been likely to find on their own, as individuals. The students themselves have proposed a redesign for this seminar in the coming year. Each group will then be responsible for organizing one class session in the quarter: providing relevant readings the week before their session, leading a discussion or other activity on the topic, including time for synthesis at the end of the session; and writing a synopsis of the discussion that identifies major themes emerging from the discussion, knowledge gaps, and issues for further investigation.

### **Faculty assistance and feedback in applying interdisciplinarity to group projects and other work; responses to student feedback**

Most students want more frequent feedback on a regular basis from the faculty. The faculty say they have wrestled long and hard with trying to adjust this to some optimal level, since they have perceived very mixed messages from students. To clarify the “too much—no, too little” confusion, a number of students drew a key distinction between feedback as a relatively neutral provision of relevant information and guidance in thinking through problems, and feedback as summary direction and decision-making about the group work by faculty. They welcomed the former and would like much more and some criticized a few instances of the latter.

### **Is the IGERT structure blending smoothly with the broader PhD requirements the students must complete?**

The University of Washington at the broadest institutional level is seen as being more friendly ground for interdisciplinary work than most universities. However, there are few institutional structures actually in existence to facilitate such arrangements, and many disincentives remain in the system for both faculty and students.

Many students are simultaneously excited and apprehensive about these arrangements. Several said that the innovative co-written chapter idea was part of what attracted them to the program, but they are anxious about how it will fit with their disciplinary work and whether it will be accepted by their committees. The lack of formal university-level acceptance of this requirement is a concern mentioned often in the student surveys and interviews. Non-IGERT faculty and deans from the departments offered their support in favor of the co-written chapter, although two mentioned that they would like more help

from the core faculty in coordinating department requirements in the first two years. Many students agree. Continued work on coordinating and streamlining the dual requirements seems desirable.

### **Is participation in the program increasing interdisciplinarity in faculty work?**

The core faculty of the program were all interested in and engaging in interdisciplinary work well before this IGERT was awarded. All five core faculty wrote a paper in spring of 2003 on the key features of this IGERT's approach to graduate education. Some of the non-core faculty also participate in interdisciplinary courses and research, although these efforts do not appear to stem directly from the IGERT program's work as yet. It cannot be said that these interdisciplinary efforts are resulting from IGERT participation, as the connection is unidirectional.

### **Is larger institutional support for interdisciplinary courses and programs increasing?**

The problem of creating institutional incentives to promote interdisciplinary education, and more important, disarming the disincentives, continues to be largely unchanged. None of the departments involved in IGERT at present provide *official* credit for this kind of interdisciplinary teaching. However, according to their college deans and department chairs, informal release time is being provided to varying degrees for most of the core faculty. It will be important to ensure that these faculty do not pay a large price for doing this kind of innovative work.

All of the department chairs and college deans had very positive views of the IGERT program. They see it as benefiting the departments and the university at large in multiple ways. The deans and chairs see the program as advancing both graduate education and as helping to promote the transformation of undergraduate curriculum. It has encouraged greater flexibility, fewer required courses, and a more transfer-friendly curriculum for undergraduates. The connection to improving undergraduate curriculum is important to them, and they would like to see that continue.

All of this being said, the disincentives for interdisciplinary teaching are still considerable. There still are not specific mechanisms for rewarding faculty who do interdisciplinary work or arrangements for ensuring that they are credited consistently for interdisciplinary teaching. A wholly separate structure with its own faculty lines is generally seen as a net loss and threat by administrators, and to maintain their support, it would be most helpful for them to see larger benefits accruing to their departments on both graduate and undergraduate levels.

In addition, a program like this IGERT, where ambitious and time-consuming efforts have been made to transform PhD culture through teamwork training and group projects, requires far more administrative support than has been provided. There is a general consensus among students, faculty, chairs and deans that the time and energy required to make this particular program work is far greater than in interdisciplinary programs that

simply cross-list classes and permit students to take a few courses outside of their home departments.

While dean and chair level support for the IGERT program is very good, the role of a higher-level champion within the university administrative structure is critical. Interviews for this evaluation made clear that any interdisciplinary program needs to prove that it provides rigorous depth and breadth to their students. The existing financial structure to support graduate education does not fit easily with IGERT funding in this sense: Teaching assistantships are departmental, and interdisciplinary students could find themselves at a relative disadvantage in getting to the top of RA and TA lists, support they will need after the IGERT funding has been used up. This points out again the importance of core IGERT faculty maintaining close working relationships with departments, as is the case with the support necessary to have co-written chapters accepted.

There are a variety of ideas for supporting interdisciplinary education at this broader institutional level. One of the interviewees suggested that the Graduate School, in setting the minimal quality requirements in graduate education, could allow for more out-of-department courses. This person also was cautious about the advisability of delegating all responsibility to one dean for interdisciplinary studies, feeling that this may then allow the entire topic to drop off the radar screens of all other high-level administrators.

### **Creating interdisciplinary change agents in their fields.**

This is one of NSF's ultimate goals for the IGERT initiative, and it has been a major motivator for the core faculty here as well. They want their work to be used by outside organizations and government agencies in program and policy decision-making. This requires not only producing high-quality research that has relevance for the by-nature interdisciplinary problems of IGERTs outside of academia, but also creating and maintaining good working relationships with staff and policymakers from the outside.

The best long-term measure of success in this goal would require post-graduation career follow-up, and it is strongly recommended that the IGERTs program pursue such follow-up. In the interim, the proxy measures chosen for this mid-term evaluation focus primarily on the exposure during the program to outside organizations and specialists, and the apparent impact of those contacts.

**Is the program effective in making connections for both students and faculty with outside organizations (non-profits, government agencies, other universities, etc.) involved in the IGERT?**

### **Outside Panels**

Each of the three program years, a panel of outside experts has come to the first-quarter course. The panel has typically had four to five members, with a mix from government, non-profits, and the private sector. Two of these panel members, who have participated

for at least two of the three years, were interviewed for this evaluation. Both are from government. Both panelists had very positive views of the faculty, the students, and the program.

Students enjoy the panels, although they have found panel feedback to be somewhat limited, since the panels have only a brief one-time, off the cuff opportunity to comment on research ideas.

The panels constitute an exceptionally valuable resource and connection to the outside world that could be tapped more deeply and broadly than is currently happening. That was the original program intent and is still very much a core interest on the part of the faculty. The changes in how the panels have been used have come about partly because of the efforts of the core faculty to try and refine and improve the group project process.

### **The seminar series, funded conference presentations, and national and international collaborations**

IGERT funding provides the program with some exceptional advantages that most traditional PhD programs cannot match in depth and richness. These include a seminar speaker series that includes time to discuss individual research interests with the speakers, funding for students to present their work at conferences, and a network of national and international connections that in several instances are germinating collaborative work.

Students are funded to do one presentation each year at national or international conferences, and all except for the new students have used this funding at least once. Several have done two or three presentations.

The IGERT program also has several national and international collaborations with programs in Arizona, California, Germany, Norway, Poland, Australia, and Russia. The richest relationship to date is with similar program in Germany.

## ***Conclusions and Recommendations***

A summary of short term outcome progress can be seen in the matrix below. The IGERT program has made significant progress for these outcomes.

### **Short-Term Outcomes**

Desired Short Term Outcomes	Progress
<p>Students successfully complete team project, with co-written dissertation chapter as product, accepted by committee.</p> <p>Students successfully design and team-teach undergraduate class.</p>	<p>One group project has been completed and was published in 2004. Not yet fully accepted by committees.</p> <p>Achieved Winter 2004, although logistical problems yielded a small class. Detailed account of lessons learned was presented in Spring 2004 to faculty and the students who will be teaching this year.</p>
<p>Application of interdisciplinary approach to student course work, group project, and/or PhD topic.</p> <p>Completing three years' of teaching introductory 3-quarter IGERT course series, using continual feedback to adjust and improve course content and structure.</p> <p>Application of interdisciplinary-related criteria in grading team projects.</p>	<p>Achieved in course work and group projects. Too early to establish for PhD topics.</p> <p>Achieved. Faculty continue to refine/rethink this course series, even after the three-year completion.</p> <p>Grading criteria are not explicitly stated and feedback is limited. This could be a more powerful tool with defined interdisciplinary grading criteria and more regular feedback.</p>

<p>Successful completion of group projects that provide practical ideas for solving real-world problems.</p>	<p>Not yet achieved. Group project approach has become less directly connected to real-world problems as faculty have tried to improve the group project process. Faculty say they are likely to return to a real problem-based model when they teach this course again.</p>
<p>Continuing work with outside agency specialists throughout the life of the program and beyond.</p>	<p>Achieved. This resource could be much more richly tapped.</p>
<p>Sharing interdisciplinary work with other departments/universities at home and abroad.</p>	<p>Achieved. Students presented their work at national and international conferences. Working national and international collaborations with other programs.</p>

The results achieved by the IGERT program after its first three years of a five-year grant show a program that is vastly different than a conventional, disciplinary PhD program. IGERT students have participated in teamwork training that they enjoyed and found valuable; they are in various stages of conducting two-year group research projects that are the culminating product of a three-quarter interdisciplinary course series; and they experience an extraordinary amount of interdisciplinary exposure to regional, national, and international academicians, practitioners, and policymakers.

The IGERT program has established a solid foundation in the three program goals—teamwork, interdisciplinarity, and becoming change agents outside of academia—that presents a rich platform for further development. The three cohorts of students are an extremely valuable resource for program improvement and refinement. The core faculty, who have met weekly throughout the three years, have devoted considerable thought to how the program can be not only refined for better results, but used to further the development of the intellectual and theoretical framework of a new field.

Drawing upon all of these resources, this evaluation yields the following recommendations.

## Recommendations

### Curriculum and Pedagogy

- Provide regular teamwork training and follow-up on a proactive schedule, including a hands-on team building workshop before the group project begins. Given the three years' worth of student experiences and opinions about timing of teamwork training, it should be easy to determine an effective schedule.
- Consider providing local, but external to the program, help with group facilitation. For example, one student suggests that graduate student interns from the School of Social Work could act as neutral group facilitators who could also be readily available for quick help with problems as they arise.
- Streamline the group project process by providing more clearly defined, real-world problems for student selection, and allowing some self-selection of groups. This would reduce the lengthy efforts to define a research problem and the group conflicts that often accompany the definition process. It would also revitalize the program's relationships with its outside panelists and other area practitioners and policymakers, returning the program to its original focus on creating change agents and affecting policy and programs.
- In developing a cohesive curriculum, consider that the timing of research between social sciences and natural sciences runs in different tracks; thus, collective teamwork for both will be difficult to arrange. The timing of this needs to be thought through in the program structure and schedule. Plan the structure, curriculum, and activities well in advance of the next program year. Consider additional training in project and organization management to help achieve this.
- Finding a research question is one of the most difficult phases in a doctoral program. Provide more systematic faculty support during this phase, whether it is for the group projects or for any related dissertation development.
- Consider including undergraduates in the first quarter only, and extending the formal coursework through the second quarter. This would allow time for more in-depth teaching of various disciplinary methods, more team teaching and interactive discussion, and further investigation of the theoretical model and current research, which both faculty and students are eager to do. It would also provide much more time for faculty and IGERT students to consciously apply interdisciplinary approaches to both the student work and to systematic, explicit evaluation of that work.
- Discuss early on the conventions of co-written chapters and joint authoring with IGERT students to avoid conflicts at later stages.

## **Program Structure**

- Ensure that the feedback cycle between students and faculty is two-way and continuous, including updates on how feedback is being used.
- Provide structured meetings or peer mentoring among different student cohorts.
- Enlarge number of core faculty to avoid burnout during the five year duration and to continue developing the field by expanding its disciplinary coverage.
- Hire a full-time professional program manager or coordinator. Include a request for funding for this position in any grant application.
- Define the roles and functions of postdocs. The students will then have a clearer idea of the kinds of help they can reasonably expect from these staff. This will also help to ensure that the postdocs are able to pursue their own professional advancement.

## **Campus Relationships**

### Home Department

- Seek more departmental involvement and support for serving undergraduates. The IGERT program has provided considerable faculty and staff support for undergraduates. The departments benefit from undergraduate inclusion in the first-year IGERT course and could in turn provide some teaching and advising support for those undergraduates.
- During IGERT proposal development, work with the home department to guarantee financial support once IGERT funding runs out.
- Convene regularly with home departments to improve coordination and streamlining of IGERT and departmental degree requirements.

### Graduate School, Administration, and Deans

- Make a concerted, organized effort to gain official approval for a co-written dissertation chapter.
- Complete the ongoing efforts to obtain approval of a formal interdisciplinary credential to be added to student disciplinary PhD degrees.

- Consider convening a task force including high-level administrators from the Graduate School to develop practical alternatives to current incentive structures for interdisciplinary teaching.