

Academic Program Review
Global Change Graduate Interdisciplinary Program
The University of Arizona

Academic Program Review Team

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INTRODUCTION

The University of Arizona has an exceptional reputation for promoting interdisciplinary research. Faculty conducting research in global change are national and international leaders in the field and stand out as an example of the University's success in fostering interdisciplinarity. University of Arizona global change research probably ranks in the top ten, perhaps the top five, of all universities in the United States. It is therefore not surprising that the University administration has identified global change as one of the themes of Focused Excellence.

Although it is clear that the reputation of University faculty research in global change is excellent, the status of interdisciplinary graduate education in global change is less certain. In response to a mandated seven-year Academic Program Review (APR), the Provost, George Davis, asked an APR Team to visit the University to assess the strengths and concerns of the Interdisciplinary Program Ph.D. Minor in Global Change (GC IDP) and to make recommendations that might further strengthen the program or alleviate these concerns. The APR Team consisted of Brent Yarnal (Chair, Pennsylvania State University), William Wright (Columbia University), Andrea Yool (University of Arizona), and Harry Ayre (University of Arizona). This team discussed the GC IDP with Jolene Gruener, Associate Director of Graduate Interdisciplinary Programs, and Timothy Finan, Professor of Anthropology, Director of the Bureau of Applied Research in Anthropology, and Chair of the GC IDP on Thursday, 27 March 2003. The following day, 28 March, after receiving their charge from Vice-Provost Elizabeth Ervin, the APR Team visited the GC IDP. They met with the GC IDP Chair and Executive Committee,

as well as some of the faculty and a group of Ph.D. Minors in the GC IDP. In addition to the information provided by the GC IDP Chair, faculty, students, and others, the APR Team received important input from the self-study document. Finally, the team met with the Provost at an exit interview.

It is essential to note that the State of Arizona was going through a grave financial crisis at the time of the APR, necessitating significant reorganization and reallocation of resources at the state-subsidized University of Arizona. The financial situation colored the review, presenting both constraints and opportunities.

OVERALL ASSESSMENT OF THE IDP

The APR Review Team's overall assessment of the GC IDP is extremely positive. The faculty and students in the program are excellent. There are over 50 faculty associated with the GC IDP, with approximately half being active to very active in the program. Many of the GC IDP faculty are recognized nationally and internationally for their research. Some are active on National Academy of Science panels on global change, many are recipients of prestigious awards, and overall the faculty demonstrates a record of strong research productivity. The faculty interviewed by the APR Team demonstrated an enthusiastic commitment to enhancing the GC IDP program.

Although little information was available regarding academic and research achievements of the students, five students came to meet with the APR Team and proved to be knowledgeable, articulate, and passionate about their commitment to global change

studies. All praised the advising they receive. Most plan to make global change studies an integral part of their academic careers and to teach in disciplines emphasizing global change.

The GC-IDP program receives strong leadership from its Chair, Timothy Finan, and the program's Executive Committee. The excellence of this leadership is reflected in the quality of the self-study, the quality of the students in the program, and the number and quality of the faculty associated with the GC IDP.

Despite the excellence of the faculty, students, and leadership, the GC IDP currently serves a small number of students: approximately 12. The GC IDP has relatively low visibility on campus, perhaps because there are no resources supplied by the University for administrative support. Nearly all work on the GC IDP results from faculty volunteerism and from extremely limited, but essential administrative support from the Institute for Study of Planet Earth (ISPE). The APR team is impressed that the IDP is healthy and succeeding in spite of these impediments.

The APR Team sees global change as an emerging research and academic emphasis for university campuses across the nation that will continue to gain momentum in the coming decades. It is the APR Team's opinion that—with a relatively modest investment—the University has the opportunity to develop an academic global change emphasis that matches the level of excellence demonstrated in faculty research. Since the University recognizes the importance of Interdisciplinary Programs in general, and the importance of global change in particular, there is a compelling case for investing new resources or redistributing existing resources to provide an essential minimum level of support to the GC IDP. After presenting concerns facing the GC IDP, the APR Team

provides a set of recommendations as a guide to this minimum level of support, as well as ideas for larger, long-term investments in graduate global change education at the University.

GC IDP CONCERNS

In interviews, faculty and students were remarkably consistent in their concerns about the GC IDP. One major obstacle continues to be the lack of administrative support for the GC IDP. There are many negative consequences of the failure of the University to support the program even at a nominal level. Nearly all administrative responsibilities fall to busy faculty, ensuring that these critical functions are given minimal attention. Coordination of program administration and of the curriculum is nearly absent. The essential tasks of recruiting students to the program and establishing and maintaining a Web presence are nil. A mechanism for monitoring and facilitating student progress does not exist. There are no exit interviews. Student outcomes are unknown. (An Internet search using names of GC alumni, done by one of the APR Team members, suggests that a number of GC IDP graduates have gone on to successful careers.) Student-faculty interaction is limited both by a lack of identification of students pursuing the minor and by a lack of dedicated space to facilitate those interactions. Individual advising by faculty is excellent, but there is little coordination among faculty. Faculty and students alike do not know precisely how many students ~~are students~~ are pursuing a Global Change PhD minor, where they are, and who they are. There is little cohesion in the

academic program, which is ironic in a research area known for collaboration. All agreed that there must be somebody other than the faculty to support these functions.

Another concern also relates to lack of cohesion. Nearly all GC IDP faculty are associated with ISPE. ISPE provides free, but necessarily limited administrative support to the GC IDP. A few of the GC IDP students have Graduate Research Assistant appointments with projects running through ISPE and therefore have research space at the institute. ISPE even claims to be home of the IDP in some of its literature. Yet, there is no formal link between ISPE and the GC IDP, despite mutual interest to develop an official connection. A formal link would give the GC IDP a home, providing space for an administrative assistant and giving faculty and students a physical space where they could meet, learn, and work collectively.

An additional concern is the lack of access that GC IDP students have to Graduate Teaching Assistantships (GTAs). Several of the GC IDP faculty teach sections of the very successful Natural Sciences 101 course on global change. The obvious graduate students to assist in this course are GC IDP students. Surprisingly, because a student's minor cannot be used as a consideration when assigning assistantships, these students usually do not get to work in this course. Faculty and students agree not only that this is a waste of a valuable resource, but also that undergraduate students do not necessarily have the best GTAs available.

Faculty and students do not find the balance of research expertise among faculty actively participating in the GC IDP matches the breadth of global change research and, consequently, do not find the topical balance of the curriculum in line with student needs. Universally, they call for the human dimensions of global change to be a more significant

part of the curriculum, including the economic, policy, sociocultural, ethical, and other social science dimensions of global change. The absence of this crucial topical area is easily remedied by bringing in faculty at the University who are particularly noted for research expertise and leadership in the human dimensions of global change. With this re-balancing, the GC IDP should be able to improve its ability to draw social science students into the minor. It is also worth noting that the University has produced several Ph.D. students who specialized in the human dimensions of global change in the past several years but who did not participate in the minor.

Students find that the curriculum could do a better job of meeting their needs. They find that the curriculum is not well planned and coordinated; they have difficulty taking some required core courses because they are offered infrequently. They find the heavy emphasis on the physical dimensions of global change creates significant overlap among the courses that are offered. Few social science courses appear on the list of elective courses. All the students interviewed by the APR Team think that GEOS 578, Global Change, which they each chose to take as an elective, is an especially useful course to all global change students and do not understand why it is not part of the core curriculum. They also would like more hands-on research that involves collaboration and real-world problem solving. The biggest complaint regarding the curriculum relates to an overall concern about the GC IDP: students would like to meet and interact with each other and, especially, with all faculty doing global change research at the University. They see coursework as the ideal way to formalize this interaction.

Some faculty wonder if the curriculum should be split into separate tracks, such as climate, biogeochemical cycles, and human dimensions of global change. Students

resoundingly disapprove of this idea. They want more integration, not less—for them, integration across disciplines is one of the great attractions of global change research.

Faculty and students alike would like to see global change become a major. With a few exceptions, however, they think that it is too early to do so because today's faculty hires are nearly always by traditional disciplines. Thus, until there is greater formal acceptance of interdisciplinarity built into the structure of academe, they think it is wise to require University of Arizona students to pursue traditional disciplinary majors and to keep the GC IDP a degree minor. All think that the question of a global change major should be revisited periodically in conjunction with ongoing monitoring of the acceptance of interdisciplinary topics, such as global change, within university curricula.

In looking to the future, faculty and students want to see the GC IDP minor expand and to see the program involve greater faculty-student interaction. All endorse the idea of having dedicated carrel or office space for the students and dedicated space for required core courses, brown bag seminars, and social gatherings. In the end, they see global change as a research area that is dependent on interdisciplinary collaboration, so interaction should be part of the educational experience. They would like to see such interaction extend beyond the walls of the University, involving interaction with local and regional stakeholders and interactions with non-University of Arizona global change experts.

RECOMMENDATIONS

Based on the concerns of the GC IDP faculty and students, in addition to the APR team's knowledge of the global change community and University context, the APR team presents the following recommendations. The APR Team separates its recommendations into two categories. The Team concludes that the short-term recommendations are necessary for continued health of the program and should be implemented in less than two years. The long-term recommendations are necessary if the aim is to enlarge and enhance the University's graduate program in global change significantly.

Short-term recommendations

- Formalize the integration of ISPE and the GC IDP *make explicit & unambiguous*
- Tie several GTAs for Natural Sciences 101 to ISPE and dedicate those GTAs to GC IDP students *Instruct in the GC IDP*
- Increase the representation of the human dimensions of global change in the GC IDP by increasing the participation of faculty and students with this specialty
- Hire a dedicated half-time staff member with a graduate degree in global change or a closely related field; if the program grows, then switch this position to full time as soon as possible. This position should be housed in ISPE. The duties of this person should include:
 - Coordinating the minor

- Assisting with administrative coordination of core curriculum courses, in collaboration with the faculty instructors who would determine course content and format
- Advising students with regard to planning and progress through the minor
- Monitoring and facilitating student progress, conducting exit interviews, and monitoring outcomes
- Conducting outreach and recruitment, including developing and maintaining a Web presence
- Teaching the workshop course (if this person has a Ph.D.; coordinating the course if s/he has a masters degree)
- Facilitating faculty-student interactions (e.g., brown bag seminars, receptions, retreats)
- Make the following curriculum changes (see the appendix for a summary):
 - Encourage teaching faculty to review and coordinate the academic content of all core curriculum courses annually
 - Maintain and enhance an integrated curriculum for all minors; do not split the curriculum into separate tracks
 - Add a required human dimensions course that includes economic, policy, sociocultural, ethical, and other social science dimensions of global change
 - Remove the elective from the core curriculum (not because it is undesirable, but because of the need to add a human dimensions course, the real limits on the number of credits available, and the need to maintain

an integrated curriculum. However, removing the elective eliminates one of the main reasons for non-core course faculty participation in the Global Change program, so elements of the workshop course, GC 597A and Student Forum will help to keep faculty involvement)

- Broaden the list of courses presently identified as ‘electives’—especially by adding social science courses—and present this list to students as ‘recommended’ courses that they could add to their major
- Require the GEOS 578, Global Change course as part of the core curriculum
- Teach the required GC 597A, Global Change Workshop course each year (with the proposed staff person as instructor or coordinator, depending on the level of her/his graduate degree)
- Make the required workshop course, GC 597A, a two-credit course with a significant practical, problem-solving component involving stakeholder interactions
 - Invite the minor committee members of each participating Global Change minor student to co-teach the workshop class, with teaching credit going to their home departments.
 - Require human-subjects training of all GC students because they will need it not only for this course, but also for future places of employment

- Require a choice between the current biophysical courses GC 530, The Climate System and GC 572, Global Biogeochemical Cycles as part of the core curriculum
- Require a one-credit Student Forum; this course should be run by the GC IDP students with faculty guidance and be comprised of ~~comprise~~ weekly student, faculty, and guest-expert presentations and/or roundtables

Long-term recommendations

- Provide carrel/office space for students and seminar space for the suggested Student Forum, the workshop course, and other academic interactions in the proposed Environmental Sciences Building II. This space should be housed within ISPE
 - Insure that members of ISPE are part of the design committee for the new Environmental Sciences Building II office space so that they can organize the ISPE/GC IDP space to maximize student-faculty interaction
- Require the GC IDP to develop a long-term strategic plan, with an eye towards developing a global change major within five to ten years.
 - Assuming the program decides to develop a major, hire perhaps three faculty in GC IDP with primary responsibilities of developing the major and teaching the core courses in the major curriculum
 - Develop opportunities for a GC IDP semester abroad (or for those cases in which students cannot travel, e.g., for family reasons, provide

opportunities to conduct significant work with a local governmental, non-governmental, or corporate entity)

CONCLUSIONS

The GC IDP is a program that is unique in the United States. In addition, the APR Team is convinced that global change is an important and necessary component of graduate education at the University of Arizona. Because of its significance and distinctiveness, the APR Team therefore finds the GC IDP worthy of special consideration. Yet, the GC IDP receives less support than the minimum level needed to maintain the health of the program. At the same time, other IDPs receive disproportionately larger levels of support. Thus, at this critical juncture in the University's history—when reallocation of resources is not only possible, but also necessary—the opportunity exists for raising the support level of the GC IDP. The APR Team strongly urges the University to do so.

APPENDIX

The following summarizes the recommended required core curriculum for the GC IDP:

- GEOS 578, Global Change (3 credits)
- GC 530, The Climate System, or GC 572, Global Biogeochemical Cycles (3 credits)
- GC 597A, Global Change Workshop (2 credits)
- GC 5XX, Global Change Student Forum (1 credit; new course)