

REPORT OF THE TASK FORCE ON INTERDISCIPLINARY GRADUATE EDUCATION

March 21, 2008

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Executive Summary

The Task Force was charged with assessing interdisciplinary graduate education, and in particular contrasting intercollege versus department-based programs; identifying institutional encumbrances and possible solutions; and providing recommendations to further promote interdisciplinary graduate training.

Conclusions of the Task Force:

1. *Collaborative, interdisciplinary graduate education must be an institutional priority in order to meet societal needs, prospective student interests and demand, and to ensure that Penn State remains competitive in securing extramural research funding into the future.*
2. *A sample of intercollege programs evaluated at a single snapshot in time, versus department-based programs, tended to have more students supported on external fellowships and traineeships, a characteristic of program quality according to the National Research Council assessment of research doctorate programs.*
3. *A variety of mechanisms to offer interdisciplinary training to graduate students already exists at Penn State. In benchmarking with other institutions, in general, there were no unique models for which Penn State did not already have a direct analogy or more desirable approach, the most desirable being the dual-title model.*
4. *IGERT-launched training programs brought in significant resources to support students and related research activities, fostered cross-disciplinary training through coursework and research, and promoted faculty collaboration. Although these led to some institutionalization by means of a minor and a dual title program, a limitation identified was the lack of institutional resources to perpetuate the full range and capabilities of the funded programs.*
5. *Desirable characteristics of interdisciplinary programs include:*
 - *Addresses complex and novel/important problem*
 - *Creates faculty/department/college synergy and collaboration*
 - *Builds on institutional strengths*
 - *Attracts high quality students*
 - *Provides credit to faculty (including a formal mechanism for evaluative feedback during the P&T process)*
 - *Engages in continuous self-study of sustainability and viability*
 - *Provides students with an avenue to satisfy diversity of professional career interests*
 - *Provides value-added scholarship for the student*
 - *Allows for flexibility in terms multiple sources of student entry and exit/placement*
6. *Existing institutional structure of resource allocation through colleges/departments is limiting to the proliferation, scope and impact of intercollege programs; a mandate to colleges to support and invest in such programs, as well as central resources for incentives are needed.*

Institutional encumbrances to intercollege, interdisciplinary graduate education identified:

1. *Stand-alone intercollege programs are often viewed as competing with departmental programs for resources, students and recognition/credit.*
2. *Institutional support (e.g., assistantships, fellowships) for students (especially first-year) in intercollege programs is very limited and constraining.*

3. *Although student rotations within intercollege programs provide educational value, they require the student to locate a research home and advisor after admission. This approach reduces the risk for faculty, but raises it for students.*
4. *As intercollege programs do not receive instructional budgets, the primary mechanism for institutional support of graduate students (i.e., TAs) is dissociated from these programs.*
5. *Resources are needed for intercollege, interdisciplinary course development and instructional support across units.*
6. *Administrative responsibility, costs and space for collaborative, intercollege programs are not easy "fits" within the existing college/department structure of the institution.*

Recommendations to address institutional encumbrances and promote collaborative, interdisciplinary graduate training:

1. *Collaborative, interdisciplinary graduate education should be a priority reflected in strategic planning at the highest level. As such, Colleges should be given a mandate to more formally promote and support participation and leadership by their academic units and individual faculty in intercollege graduate programs, and to remove disincentives to such participation, and these should be reflected in College strategic plans.*
2. *Where a proposed new programmatic area in graduate education is interdisciplinary and has potential for integration with existing fields of study at Penn State, the dual-title should be employed as the preferred graduate degree model.*
3. *In areas where the rotation model is common, intercollege programs should not require rotations, but ascertain that a member of the program faculty is willing to serve as an advisor and provide financial support to each prospective student who meets admissions requirements, prior to extending an offer of admission. Otherwise, programs should reserve sufficient resources to subsidize students who do not find an advisor after their first year, with the consequence of admitting fewer new students.*
4. *The hierarchy of existing approaches/models to support interdisciplinary training of graduate students available at Penn State needs to be better delineated as a special web page.*
5. *An intercollege, interdisciplinary graduate center should be created within the Graduate School to oversee allocation of resources and functions related to the following:*
 - a. *Incentives for academic units to develop and offer interdisciplinary graduate courses*
 - b. *Incentives for academic units to host intercollege, interdisciplinary graduate programs*
6. *Focus on a "Student-Centered Interdisciplinary Graduate Education Initiative" that would prioritize fellowships for intercollege, interdisciplinary graduate students as a Graduate School development effort. Penn State's research mission and standing are best served by heavy investment in endowed fellowships. An endowed graduate college, similar to the Rackham Graduate School at the University of Michigan, should be pursued as a valuable major investment for the University.*
7. *The research institutes should be encouraged to more deliberately promote and support interdisciplinary graduate training (e.g., sponsor seminars and workshops for graduate students; support graduate student travel related to interdisciplinary research and training; sponsor value-added skills training for graduate students; etc.).*
8. *The Graduate School should provide opportunities for enabling models to be shared with graduate programs.*

Abbreviated Charge to the Task Force:

- I. Contrast intercollege and department-based graduate degree programs...
- II. Assessment of interdisciplinary models we currently employ...
- III. IGERT-launched models... successful? by what measures?
- IV. Benchmarking with other institutions....
- V. Moving forward:
 - a. Effective existing models? Why/Why not?
 - b. Institutional encumbrances to success? What changes might alleviate these problems?
 - c. Other models we should be promoting?

Preamble:

The research mission of major land grant universities increasingly includes the need for multidisciplinary approaches to graduate education that enables students to contribute to the resolution of global problems. The problems that will need to be faced over the next 50 years continue to involve global health and education, land use, environmental change, and population growth, amongst others. Creative solutions to these issues will likely come from individuals, and groups of individuals, who are trained to put aside the jargon and targeted thinking of one discipline or sub-discipline, and are willing to embrace the reality that many disciplines must be called upon to causally affect outcomes. Students must be trained who can, for example, work as team members with economists, nutritionists, educators, geneticists, ecologists, agronomists, supply chain and transportation specialists, and public health epidemiologists to propose novel solutions to the certain crises in food supply within the next 30 years. These are the approaches that large philanthropic foundations are now taking to address world-wide shortages of potable water, malaria and HIV control. Similarly, these new interdisciplinary scholars need to be challenged in their education to “think outside the box” by utilizing problem solving approaches that may be mainstream in one discipline, but have never been applied to problem solving in other fields. These realities underline the strategic importance of prioritizing collaborative, interdisciplinary graduate education and institutional efforts to broadly promote and facilitate it.

I. Contrast of intercollege versus department-based graduate programs:

The Task Force identified five intercollege graduate degree programs (IGDPs; Acoustics, Ecology, Plant Biology, Integrative Biosciences (IBIOS), and Demography) that represented several broad disciplinary areas (engineering, life sciences, social sciences) and program models (stand-alone IGDPs; dual-title program; umbrella program with options) for contrasting with department-based programs. Task Force members discussed at length the criteria for selecting programs that would constitute appropriate contrasts, and chose to contrast each IGDP against the department programs of the majority of faculty who participated in the respective IGDP, or who had similar curricular and research interests. Thus, for example, Acoustics was contrasted with Aerospace Engineering, Computer Science and Engineering, Electrical Engineering and Mechanical Engineering. The Task Force was provided with a variety of metrics for each program (e.g., number of applications and offers; degrees conferred; median GRE scores; average GPA; time to degree (TTD); enrollments; diversity indicators; for AY 2001/02-2005/06), as well as sources of funding for students enrolled in the program for a single snapshot in time (Fall, 2005). (See attachments for complete data).

Ultimately, the Task Force members determined that it was impossible given the time constraints of the study to legitimately compare metrics for different programs due to a multitude of confounding factors. For example, different programs may have very different missions, inherent markets (e.g., the magnitude difference in numbers of applications for Acoustics versus Computer Science & Engineering was not a valid indicator of differences in program quality but rather a function of the market demand for computer/technology-related training); resource constraints (e.g., enrollments in an IGDP may be smaller only because resources for first-year students may be more constrained than department-based programs with available TAs); and even the structural model (e.g., metrics such as degrees

conferred in a dual-title program such as Demography are constituents of the same metrics in department programs with which the dual-title is to be contrasted).

For indicators that were more indicative of student quality (GREs and GPA), with a few exceptions there were no substantial differences between IGDPs and department-based programs.

The one difference that was considered potentially meaningful was that the IGDPs generally (though with a few exceptions) had a greater percentage of students funded on external fellowships and traineeships than department-based programs. (Notably, an early indication is that the National Research Council has identified these same measures as important indicators of research doctorate program quality as well.) It was acknowledged that this difference might reflect the generally more constrained institutional resources available to IGDPs, such that faculty may be more motivated to promote external fellowships to their students, and pursue training grant opportunities for the programs. However, it was also recognized that the collaborative intercollege, interdisciplinary programs may in general be viewed more positively by external funding agencies, in that they effectively bring faculty together from diverse disciplinary homes, which can facilitate research collaborations and interdisciplinary training experiences for graduate students. It was beyond the scope of this study to distinguish among these or other hypotheses.

Overall, the Task Force concluded that given the compelling realities expressed in the Preamble above, collaborative, interdisciplinary graduate education must be an institutional priority in order to meet societal needs, prospective student interests and demand, and to ensure that Penn State remains competitive in securing extramural research funding into the future. Given their strategic importance, the Task Force proposed the following desirable features of collaborative, interdisciplinary programs that should be promulgated by the Graduate School and inculcated within colleges and departments:

- Addresses complex and important problems that may be novel in nature
- Creates faculty/department/college synergy and collaboration
- Creates the opportunity for developing new knowledge along frontiers not explored by disciplinary-focused programs
- Builds on institutional strengths
- Attracts high quality students
- Provides credit to faculty (including a formal process for evaluative feedback during the P&T process) and departments providing support
- Provides students with an avenue to satisfy diversity of professional career interests (i.e., prepare students to be competent as future researchers/scholars/practitioners in the field)
- Provides value-added scholarship for the student
- Allows for flexibility in terms of multiple sources of entry and exit/placement (multidisciplinary nature allows for such flexibility)

II. Assessment of existing programmatic mechanisms for interdisciplinary, collaborative graduate education at PSU, listed in order of simplest approach (e.g., seminar or elective course) to complex degree models:

- Special Seminars; Co-Hosted Invited Lectures; Hosted Conferences
 - diversity of offerings at large, research-intensive institution
 - availability not tied to student's own program
 - possible extra costs
 - largely matter of opportunity and initiative on the part of the student
 - rapid response to new trends in interdisciplinary fields

- Elective Courses Outside Major Program
 - many advisors actively encourage/require courses from other disciplines
 - facilitated as degree requirement by major program
 - may be constrained if not degree requirement (e.g., if slows time-to-degree; TTD)
 - not structured for student's own program (e.g., prerequisites, etc.)
 - provides interaction with other disciplinary paradigms or approaches

- Credit Certificates
 - developed primarily for outside markets (visibility/access to degree students highly variable)
 - limited number and diversity of offerings
 - if offered off-site or by distance delivery, can provide training to students not on-site at University Park or other Penn State graduate centers.

- Graduate Minors
 - visible on transcript
 - value-added curriculum for student
 - development of collaborative, intercollege, interdisciplinary minors independent of an existing graduate major constrained by lack of resources for course development/instructional support and academic unit ownership/administrative support

- Options
 - tracks of curricular specialization
 - visible on transcript and diploma as credential
 - can be adopted by other major programs
 - existing courses required for option require concurrence of offering unit
 - new courses required for intercollege, interdisciplinary option may require resources for course development and instructional support

- Stand-Alone Intercollege Graduate Degree Programs (IGDPs)
 - Academically similar to department-based programs
 - Faculty membership crosses department, college and often campus boundaries; provide greater diversity/interdisciplinary flavor to student committees
 - Required core courses (e.g., colloquium) often informed by diversity of faculty participation, resulting in greater interdisciplinary emphasis
 - Ability to offer program-specific courses limited by lack of instructional budgets
 - May be difficult to provide students with sense of program identity due to dispersion of faculty and individual research homes in different departments around the university
 - Administrative support and first year support for students often difficult to obtain
 - Stand alone IGDPs often viewed as competing with departmental programs for resources and best students

- Concurrent Degrees
 - recognized training in both fields (two degrees)
 - some curricular economies ($\leq 20\%$ of total course credits for both degrees)

- separate thesis/dissertation and other requirements must be met for each degree
 - may substantially increase TTD and cost
 - concurrent masters and doctorate/masters allowed (concurrent doctorates not allowed)
 - both fields not integrated into research/thesis (i.e., separate culminating experience required for each degree)
 - if integrated with degree from another institution, may afford opportunity for developing valuable partnerships with institutions outside the U.S.
- Dual Title IGDPs
 - unique model that fully integrates two fields of study into single research/thesis problem (i.e., interdisciplinary in terms of both coursework and research/scholarship)
 - students enrolled simultaneously in both primary and dual title programs, with each having equal stature and credit (e.g., dual title programs at PSU submitted to NRC assessment as separate degree programs with own data and recognition)
 - visible credential (noted on transcript and diploma)
 - major advisor for primary and dual title programs same individual - ensures both fields represented in research/thesis
 - both fields represented/explored in candidacy, comprehensive and final examinations
 - eliminates competition between primary and dual title programs for best students
 - funding primarily secured through primary program – less competition for resources
 - availability for dual-title training used strategically to recruit most competitive students – asset to primary programs and faculty research
 - same faculty in primary programs and dual-title recruit for both programs
 - dual title can be adopted by any number of primary programs; particularly suited to fields that interface with broad number of other disciplines
 - requires cultivated relationship and ongoing successful partnership with primary programs (multiple academic units)
 - considerable value-added scholarship, enhanced methodological/ analytical skills and expanded employment/career opportunities for students
 - adds some TTD so student may need additional financial support, but less than concurrent degrees
 - publicizes new fields of growing interest and strength at Penn State

III. IGERT-Launched Models:

- a) Center for Education in Many Body Applications (CEMBA) – Funded by NSF with \$3.5 million for a six-year period. Brought students (~30) and faculty together from various departments including Chemistry, Physics, Computational Science and Engineering, Aerospace Engineering, Chemical Engineering and Polymer Science with common interest in many-body problems and large computational needs. Interdisciplinary interactions promoted by:
 - Weekly/bi-weekly Seminars and meetings (most important)
 - Co-advisors (second most important)
 - Co-location of students (“mildly effective”; most students spent more time in home department)

- High-speed, massively parallel computer system (camaraderie through shared need)
- Several cross-discipline courses in field

The program contributed in part to creation of a graduate Minor in Computational Science.

- b) Biogeochemical Research Initiative for Education (BRIE) – Funded by NSF with \$2.5 million. BRIE was designed to foster cross-disciplinary collaboration and training in geological, environmental, agricultural, and chemical sciences. Students (~48) and faculty were drawn from environmental engineering, geochemistry, soil science, chemistry and microbiology to investigate questions related to how biota interact with earth materials. Each student had two advisors and completed coursework and research that crossed disciplinary boundaries. In addition, students completed teaching modules that incorporated outreach into their degree program.

Due to the success of BRIE, a Biogeosciences dual-title program was proposed by the Department of Geosciences and approved by Graduate Council spring, 2008. The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences, College of Agricultural Sciences, College of Engineering, Eberly College of Science, and the Intercollege Graduate Degree Programs.

Both IGERT-based programs brought in significant resources to support students and student-related research activities, fostered cross-disciplinary training through coursework and research, and promoted faculty collaboration and new faculty funding opportunities. Although both led to some institutionalization by means of existing models of interdisciplinary graduate education at Penn State (e.g., a minor and a dual title program), a limitation identified was the lack of institutional resources to perpetuate the full range and capabilities of the funded programs.

IV. Benchmarking With Other Institutions:

Information related to interdisciplinary graduate education at other institutions was gathered from web sites and by contacting some institutions directly (see Appendix I). ***In general, there were no unique models that did not already have a direct analogy or more desirable model at Penn State.*** For example, Purdue admits students into an interdisciplinary graduate program (IGP) directly, but the students eventually graduate from the departmental program of the major professor. The departments agree to waive their own requirements for students in the IGP. Thus, students receive training in the IGP field, whereas the department programs receive credit for the degree conferred. It appears, however, that students do not receive a degree that reflects their IGP training, and are not receiving the integrated training of both the departmental program and IGP. Such interdisciplinary programs include Comparative Medicine, Ecological Sciences and Engineering, Food Science, Information Security, and Life Sciences. In contrast, the dual-title degree model at Penn State integrates both a primary field of study and an interdisciplinary field in terms of both coursework and research, with the degree awarded in both and credit for the enrollment and degree given to both programs.

V. Institutional Encumbrances:

- A. Within broad disciplinary categories, ***stand-alone intercollege programs are often viewed as competing with departmental programs for resources, students and recognition/credit.*** Many unit leaders feel compelled to “protect” the unit-based graduate program at the expense of support or openness to embracing students from intercollege programs who are mentored by unit faculty.

- B. Many collaborative, intercollege programs allow new students to rotate amongst faculty research programs during their first year, before identifying an advisor. Subsequent years in the program are usually supported on faculty grants and contracts. ***Institutional support (GAs, Fellowships) is needed for first year students, until an advisor is identified.***
- C. A concern with the model of rotations as applied to intercollege programs is that students are admitted by the program with no commitment from a faculty member before they are accepted. Absent the safety net of a department (with TAs) or commitment by a college (such as the College of Medicine does), a student who might not find a match with a lab/mentor by the end of his/her rotations is left at considerable risk. ***Although rotations are reported by some faculty to be intended to provide educational value, many acknowledge the purpose is for the student to locate a research home and advisor. This approach reduces the risk for faculty, but raises it for students.***
- D. Most institutional support for graduate students is in the form of TAs that are derived from instructional budgets allocated to colleges (and from colleges to departments) to meet instructional needs for delivering courses. However, there is a “silo” effect that limits the flow of resources from departments. ***As intercollege graduate programs do not receive instructional budgets, the primary mechanism for institutional support of graduate students (i.e., TAs) is dissociated from these programs.***
- E. Courses proposed for intercollege, collaborative models (minors, options, programs) often require faculty expertise across diverse academic units, each of which may already have priorities for faculty teaching time. ***Resources are needed for course development and instructional support across units.*** (Note – Faculty positions co-funded by the research institutes may address some of this need, but needed faculty expertise often lies outside co-funded positions).
- F. ***Administrative responsibility, costs and space for collaborative, intercollege endeavors are not easy “fits” within current department/college structure of the institution.***

VI. Recommendations:

- A. ***As articulated above in the Preamble to the Task Force report, collaborative, interdisciplinary graduate education is of strategic importance to fulfilling Penn State's mission into the future, and efforts to broadly promote and facilitate it should be a high priority for the institution and reflected in strategic planning at the highest level. As such, Colleges should be given a mandate to more formally promote and support participation of and leadership by their academic units and individual faculty in intercollege graduate education, which should be reflected in College strategic plans,*** including the use of college resources (e.g., General Funds assistantships; block funds allocated to colleges for graduate student recruitment, top-ups and fellowships, etc.) for intercollege program students advised by college faculty; college recognition of the equivalency of students enrolled in intercollege and departmental programs advised by college faculty; formally recognizing the equivalency of value of advising students in and providing leadership to intercollege and departmental programs by college faculty (e.g., with respect to P&T, annual performance evaluation, resource allocation, etc.); encouraging academic units to offer membership in department-based graduate programs to faculty from outside the unit who have relevant interdisciplinary interest and expertise; redirection of college resources to incentivize and enable academic units in the college to host intercollege, interdisciplinary graduate programming across all available models (courses, minors, IGDPs, etc.); and communicating an expectation that new faculty hires in the college will

participate in intercollege graduate programs, including teaching intercollege, interdisciplinary courses.

- B.** In contrast to the stand-alone graduate program (departmental or intercollege), the dual-title degree is a unique model that not only allows the student to receive value-added training in another field that is reflected in specialized coursework, but ensures the additional field is integrated into the research problem and thesis/dissertation to provide for truly interdisciplinary training. Because students must be enrolled in a primary program before admission into a dual-title field, they are anchored to an academic unit that generally provides physical and administrative assets (e.g., office space, computer access, staff assistance) and financial support, but ultimately pursue both degrees simultaneously and in a truly integrated fashion. The student receives a single diploma titled in both fields of study, and is acknowledged to have the degree in both areas. Importantly, unit leaders and primary program heads do not feel the dual-title program competes with departmental programs, and both are equally and fully credited for the training they provide to the student. For these reasons, the dual title degree is viewed as an excellent approach that is underutilized and not well recognized. The Task Force recommends that ***where a proposed new programmatic area in graduate education is interdisciplinary such that it has potential for integration with and application to one or more existing fields of study at Penn State, the dual-title be employed as the preferred interdisciplinary graduate degree model.*** As such, it should also be better promoted and “advertised”.
- C.** Although rotations provide educational value to the student and afford an opportunity for both students and faculty to evaluate each other as a potential match, the risk to students (that an advisor might not be found) is a significant concern. ***It is recommended that, in areas where the rotation model is common, intercollege programs not require rotations, but rather ascertain that at least one member of the program faculty is willing to serve as an advisor and provide financial support to each prospective student who meets admissions requirements to the program, prior to extending an offer of admission.*** With such an approach, program resources can then be used to leverage support by departments (e.g., first year support provided by the program to TA in the department of the advisor, with a second year of matching support provided by the department). ***Otherwise, if rotations are required, the intercollege program should reserve sufficient resources to subsidize students who do not find a match after their first year, with the consequence of admitting fewer new students.***
- D.** ***The diversity/hierarchy of existing approaches to support interdisciplinary training of graduate students available at Penn State needs to be more transparently delineated;*** a special page on the Graduate School web site is recommended that consolidates information regarding available interdisciplinary models (e.g., “Mechanisms/Models for Interdisciplinary Graduate Training”). By carefully crafting the organization and verbiage, this would have dual benefit by reflecting to prospective students the emphasis on and diversity of approaches to interdisciplinary graduate training available at the institution, as well as facilitate efforts by faculty to develop new interdisciplinary graduate education initiatives.
- E. Create an intercollege, Interdisciplinary Graduate Center within the Graduate School to oversee allocation of resources and functions related to the following:**
- 1. Incentives for academic units to develop and offer interdisciplinary graduate courses:***
Establish a central budget for support of intercollege, interdisciplinary course development and buyout of faculty time for instructional support. Funds provided to academic unit(s) in which course is developed for one semester of initial course development, plus three

years of instructional support. New courses must be cross-listed as departmental courses, and department(s) maintains support for the course after the first three years of offering. An annual budget of \$210K to fund development of up to three new courses and instructional support of nine continuing courses is recommended.

2. Incentives for academic units to host intercollege, interdisciplinary programs:

Establish a central budget from which to allocate funds to academic units willing to provide a “home”, administrative support and academic oversight to IGDPs. Funds would be transferred on an annual basis to the unit (e.g., \$15K for part-time staff and technical support; \$15K salary supplement for program chair; \$5K miscellaneous costs = \$35K) for as long as the program is hosted by that unit, and remains viable (e.g., in terms of enrollments and quality) and intercollege (as reflected by distribution of students across participating departments). Program would be the responsibility of that academic unit and related college, but function as an IGDP in terms of faculty membership and student advising. Academic unit to host IGDP should be the one whose faculty advise the majority of students in the IGDP from among all participating units (for new IGDPs, unit with greatest faculty membership in the inaugural program would host). Over time, if students in the IGDP advised by faculty in that unit constituted $\geq 70\%$ of all graduate students advised in the program, the unit would assume the cost of administration for the program. An annual budget of \$350K to fund up to 10 new intercollege programs on a continuing basis is recommended.

Along with the creation of the above intercollege, Interdisciplinary Graduate Center, ***an ongoing advisory group whose members have a strong interest and participation in intercollege, interdisciplinary graduate education should be established to provide input related to interdisciplinary graduate education issues, recommendations regarding resource allocation, and assistance with implementation of initiatives for the Center.***

- F. Graduate School Development Effort – Focus on a “Student-Centered Interdisciplinary Graduate Education Initiative” that would prioritize fellowships for intercollege, interdisciplinary graduate students.** The theme of the next capital campaign is to make PSU the best “student-centered” university possible. The research institutes have facilitated interdisciplinary research for the faculty, but most have not become involved to as great an extent in improving such opportunities for graduate students. As a result, interdisciplinary opportunities are very much faculty-centered. Endowed fellowships that are held and controlled by the students rather than the faculty would provide interdisciplinary research opportunities that are much more student-centered. For example, a student holding a fellowship can freely choose among laboratories that participate in a research institute or center. Penn State’s research mission and standing is best served by heavy investment in endowed fellowships. ***An endowed graduate college similar to the Rackham Graduate School at the University of Michigan should be pursued as a valuable major investment for the University.*** It would position Penn State to be far more competitive in recruiting the best graduate students and benefit from having top caliber talent at the core of the University’s research efforts. Endowed graduate fellowships would require some teaching within the discipline for the purpose of promoting professional development, and thereby also positively impact undergraduate education.
- G.** The research institutes (Huck, PSIEE, MRI, etc.) provide important opportunities that promote interdisciplinary research collaborations among faculty. These in turn contribute to development of interdisciplinary graduate training themes and initiatives driven by the research. ***The research Institutes should be encouraged to more deliberately and strategically prioritize opportunities to promote interdisciplinary graduate training (e.g., sponsor seminars and***

workshops specifically targeted for graduate students across programs related to the Institute mission; support graduate student travel related to interdisciplinary research and training; and sponsor value-added skills training for graduate students, including workshops related to interdisciplinary pedagogies that recognize the unique pedagogical factors inherent in interdisciplinary graduate education and provide opportunities to explore and gain proficiency with forms such as problem-based learning, etc.). The Population Research Institute is a model for these best practices (<http://www.pop.psu.edu/>).

A specific idea encouraged by the Task Force was a special workshop or featured symposium each year on a contemporary problem relevant to the respective Institute theme that would be funded by the Institute, but which would be organized by graduate students across relevant programs. Students would identify and invite the featured speaker(s); arrange travel, organize marketing of the event; host the speaker(s); lead discussion groups around the presentations; etc. This would not only bring students from different but related graduate programs together in a dynamic manner, but empower them to become more directly engaged in their scholarly fields; increase the visibility of our graduate students with recognized scholars in the field; and foster important networking opportunities for graduate students.

- H. **The research institutes should make it a priority that all faculty co-hires funded through the institutes support intercollege, interdisciplinary graduate courses** (e.g., proposals submitted to the institutes for co-funded faculty positions would be required to identify specific existing or new intercollege program courses that would be taught by the individual filling the position). Continued funding of any filled position would be contingent upon continued instructional support of at least one intercollege, interdisciplinary course per year.
- I. **The Graduate School should provide opportunities for enabling models to be shared with graduate programs.** For example, host workshops led by graduate students and their faculty mentors who have been successful in procuring NSF Fellowships, to discuss preparation of the application and in particular the research project. Discuss strategies by which the most successful institutions that capture large numbers of NSF Fellowships succeed. Host workshops led by faculty who have been successful in procuring predoctoral training grants (e.g., NIH) as presenters, in conjunction with information related to Graduate School incentive programs. Particularly compelling presentations should be recorded and the video clips available for viewing on the Graduate School web site. Wherever possible, invite sponsoring program directors to visit and meet with graduate program faculty seeking to apply for training grants.

VII. Other Ideas That Were Discussed (for Informational Purposes Only):

- Central budget for fellowships for first year IGDP students not otherwise funded. As fellowships, no teaching obligations unless academic requirement of graduate program.

or

- Central budget for teaching assistantships (TAs) for new (first-year) intercollege (IGDP) students not otherwise funded (e.g., through existing Graduate School or research institutes support), with number required based upon the number of new (i.e., first year) enrollments in these programs that can be correlated to shifting enrollments in related departmental programs (e.g., over five-year period). IGDP TAs would carry provisos that the students must teach courses in these related departments (i.e., specific IGDP TAs earmarked for specific departments that must provide undergraduate courses in fields related to the IGDPs) for the year in which TA held. Would need central oversight to monitor and adjust for changing patterns of IGDP student advising (i.e., location of academic advisor for each IGDP student, in order to determine extent of academic unit participation in IGDP).

➤ *Source of funds:*

- Propose to central administration as new budget priority.
vs.
 - Cost-shared with colleges/departments that benefit from TAs
vs.
 - Reduce related college/department instructional budgets proportionately over time.
- Alternative approach: Create large umbrella graduate program in broad disciplinary field (e.g., life sciences) that serves as admissions program for multiple IGDPs and related department program. Requires that first year course requirements are identical for all participating programs. Students funded by General Funds TAs allocated to the department that hosts umbrella program, and that has large service course obligation. Students assigned to teach undergraduate courses as needed, and do research rotations among faculty within the graduate program(s) of interest during first year. Thereafter, students identify faculty advisor, change enrollment to specific IGDP or department graduate program, and are supported by faculty grants and contracts. Carries risk identified earlier for rotations if student does not find an advisor. Occasional bridge funding might be provided as additional semester or year of TA from umbrella program.
 - Challenges - admissions criteria and decisions; enrollment management; possible conflicts with respect to instructional needs vs. graduate faculty research needs (e.g., applicant with compatible research interests and strong research qualifications for a given IGDP but poor fit or qualifications for instructional needs)
 - Interdisciplinary, collaborative graduate seminar hosted by multiple graduate programs (would rotate). Seminar would focus on contemporary and complex/multi-dimensional problem(s) requiring diverse expertise, and informed by faculty speakers from relevant disciplines.