

**The Case to Increase the Support of Doctoral Students
Across the New Brunswick-Piscataway Campus of
Rutgers, The State University of New Jersey**

Jolie A. Cizewski, Holly Smith and Harvey Waterman
Graduate School – New Brunswick

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Executive Summary

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Graduate student education and research are central to the mission of a research university and a measure of the excellence of that institution. Graduate students are students first, and it is the responsibility of a research university and graduate programs to provide them with the background and guidance they need as they evolve into scholars. Graduate students play important roles in the research mission of the University and help to recruit and retain research-active faculty members who want to work with and teach talented graduate students. At the same time, graduate students serve as instructors of undergraduates in laboratory, discussion, and skill sections of introductory courses, with the most experienced graduate students developing their own advanced courses for undergraduates. Often graduate students also participate in the service mission of the University. Graduate students bring enthusiasm and intellectual vitality to the university community and models of success for undergraduate students. Not least, the graduate students go forth to take up positions in industry, government, and academia from which they not only contribute to society but also refer others back to the place in which they did their graduate work. They become some of our best recruiters of future graduate students and advocates of our research.

The graduate students who play some of the most central roles are those working toward the Ph.D. degree. They are highly recruited nationally and internationally. It typically takes five to seven years of full-time study and research to complete a Ph.D. degree, requiring graduate students to put future careers on hold. Few students have the personal or family resources to support themselves for so long, while simultaneously maintaining the immersion in their studies necessary for their full development as independent researchers and teachers. For that reason, at all research universities, it is considered essential that “full” support for at least five or six years be provided to doctoral students. Given the cost of living, the alternative paths students can choose, and the international competition for these students, the support provided must meet minimal standards for decent maintenance, health insurance, and remission of tuition and fees.

However, at Rutgers, and in particular on the New Brunswick/Piscataway campus, graduate education faces considerable challenges because of the quality and quantity of support provided to graduate students at all stages of their studies. These challenges not only compromise our ability to rise to the next tier of public research universities, but if not corrected may compromise our ability to sustain the current level of excellence. This report documents the need to enhance the support of Ph.D. students in all forms, throughout their careers as students, across the New Brunswick/Piscataway campus, and proposes a timeline for significant increases in the quality of support we provide. The arguments address concerns shared by deans and faculty members across the campus, and include data from programs at peer AAU research universities.

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A. Principles and Challenges

The following goals guide the case we are making to enhance the financial support of Ph.D. (doctoral) students:

- Provide compensation packages, including medical benefits and tuition and fee remission, sufficient to enable doctoral students to live decently in the local area, for the duration of a typical course of study, with minimal impediments to focusing on their studies and research;
- Provide compensation packages and funds to recruit doctoral students that address the competitive pressures we face and enable us to attract the most talented candidates for doctoral studies;
- Remove barriers that deter faculty members from supporting doctoral students on external grants and contracts, including training grants;
- Provide sufficient resources to ensure that all doctoral students can be offered at least minimal teaching experiences.

There are several challenges to following these guidelines:

- High cost of living in the New Brunswick/Piscataway area and on campus

Currently, on-campus housing for a single graduate student is 44% of the gross minimum salary of a teaching or graduate assistant. On-campus housing costs increase much faster than the cost of living in the local community, averaging 7% per year in recent years.

- Insufficient resources to support Ph.D. students on University fellowships

Only a fraction of first-year, and a tiny fraction of dissertation-year, Ph.D. students are currently supported on fellowships. Because the budgets for fellowship stipends have not risen as rapidly as the increases in the cost of living and the stipends in peer programs, the number of students supported on University fellowships has decreased over the past decade, as resources are cannibalized to offer fewer students fellowships with higher stipends. Additional funds are needed in the very near term to sustain minimum stipend levels above the cost of living, provide stipends that meet the competition, provide health benefits for fellows, and to provide fee remission (or to provide higher stipends to compensate for lack of fee remission). In the longer term, additional funds are needed to increase the number of students supported on fellowships in their first, and in many disciplines also the final, years of study.

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- Insufficient number of teaching assistant positions

Teaching assistants (TAs) play a central role in the delivery of undergraduate education at a research university, providing trained and committed instructors for discussion, laboratory and skills sections associated with large courses. Experienced TAs often teach their own courses. Support as a TA is also a key component of graduate student support, complementing support on a fellowship or on a research grant, providing the scholar in training with the skills required for success within the academy, as well as outside of the academy where a high level of communication skills is expected. However, at Rutgers we lag far behind our peer AAU public universities in the ratio of TA to tenure-track faculty positions. Many units do not have the resources to offer the small sections normally associated with large undergraduate courses that would ideally complement the lecture format. Much of the current small-section teaching is being done by part-time-lecturers, who often are graduate students who may not have the benefit of close interaction with faculty members that teaching assistants enjoy. Finally, we are far from the number of TA positions needed to encourage all Ph.D. candidates to have a teaching experience as part of the requirement for the degree.

- Insufficient number of graduate students supported on research and training grants

Support on external grants, either as a graduate research assistant (GA) or on a training grant, is also an important component of doctoral student support, especially in the sciences and engineering. However, the cost to support a GA on an external grant is perceived to be high, because to support a GA requires salary and fringe benefits and overhead, as well as tuition and fee remission, with tuition charged quite often at the non-resident rate. Therefore, faculty investigators either find it difficult to identify sufficient resources to provide the full support for a GA, or prefer to support a post-doctoral scholar. An alternative form of external support is via a training grant, but faculty members often find it difficult to develop successful, competitive proposals for such funding. Therefore, it is appropriate to reduce the barriers and thereby encourage more faculty members to support graduate student GAs on their grants, as well as provide the infrastructure to help them develop competitive training grant proposals.

- Insufficient resources to recruit top doctoral students and support their research and studies

Currently there is a very small investment in funds to recruit new doctoral students, including those with backgrounds that have traditionally been under-represented in graduate education and research. To attract these students requires funds to bring them to campus, as well as to provide packages of support that are competitive with peer programs at other institutions. These support packages must include not only 5 or 6 years of basic support, but must also include opportunities for support during the summer, modest research accounts, and access to funds to support their travel, for example to develop dissertation proposals or for archival or field special study or to present their research at professional conferences.

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B. Proposal to enhance support for doctoral students over the next decade

The elements of our proposal include the following key items:

- Increase the number of TA positions in New Brunswick/Piscataway

We propose that at least 250 TA positions could be realized by providing tuition and fee remissions and extra monies to existing state lines, as well as making the case to the State for additional lines to enhance the delivery of undergraduate education. At the same time, the salaries, including competitiveness pool enhancements, would need to increase to compensate for increases in the local cost of living.

- Adopt policies and resources designed to increase the number of doctoral students supported on external research and training grants

This proposal could be realized by communicating realistic costs of supporting a graduate student, and reductions in the tuition and fee charges, including only charging in-state tuition for students supported on external grants. In addition, sufficient tuition remission resources would need to be available to provide remission when a funding agency does not provide such remissions or when support for an individual student is coming from several sources. To encourage training grant applications, a grants specialist should be supported who would work closely with the Graduate School and individuals or groups of faculty members in developing competitive proposals.

- Dramatically increase resources to support graduate students on fellowships:
 - To sustain stipends at competitive levels,
 - To provide health benefits and fee remission,
 - To increase the number of fellowships.

The first phase of the proposal would be to provide sufficient resources to sustain stipends above the cost of living, and to start to address stipend pressures in the most competitive programs. This phase needs to be enacted immediately to stop the erosion of the number of students supported on fellowships. At the same time, health benefits for all fellows need to be phased in over the next few years, as recommended by several university committees. In future years, we propose to start to increase the number of fellowships towards the goal that all first year Ph.D. students would be supported on fellowships, with a sufficient number of dissertation fellowships to meet the needs in appropriate disciplines. Funds for new fellowships would come from a dramatic increase in endowed funds for graduate student fellowships, targeted in the next capital campaign, as well as University resources.

- Increase funds to recruit high-quality doctoral students and support their research and study:
 - Funds for programs to support on-campus visits and other recruiting activities,
 - Funds to enhance support packages,

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- Travel funds to present research at conferences and for pre-dissertation research and special study.

We propose that the University significantly enhance its investment in doctoral education by providing considerably more funds to recruit highly-talented students to the most competitive Ph.D. programs. Such funds would include direct support of program efforts to recruit new Ph.D. students, including bringing prospective students to campus, as well as supplemental funds to enhance support packages, such as summer compensation or research accounts, that address competitive pressures. Additional funds to support travel could come from increases in private funds associated with the next capital campaign.

C. Ten years from now

When this proposal to increase the support of Ph.D. students is realized, we will have increased our success in attracting the top doctoral students to our programs of highly-talented faculty members, while at the same time attracting and retaining faculty members who want to work with these students. Our Ph.D.s will then go on to faculty positions or work in the research institutes at the frontiers of discovery or serve in government or industry or non-profit organizations. Their success, in turn, will help to attract future cohorts of doctoral students who will repeat the cycle. In this way, Rutgers – New Brunswick will come to be recognized as one of the top public research universities.

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I. Introduction

Graduate student education and research are central to the mission of a research university and a measure of the excellence of that institution. Graduate students are students first, and it is the responsibility of a research university and graduate programs to provide them with the background and guidance they need as they evolve into scholars. They play important roles in the research mission of the University and help to recruit and retain research-active faculty members who want to work with and teach talented graduate students. At the same time, graduate students serve as instructors of undergraduates in laboratory, discussion, and skill sections of introductory courses, with the most experienced of them developing their own advanced courses for undergraduates. Often graduate students also participate in the service mission of the University. Graduate students bring enthusiasm and intellectual vitality to the university community and models of success for undergraduate students. Not least, the graduate students go forth to take up positions in industry, government, and academia from which they not only contribute to society but also refer others back to the place in which they did their graduate work. They become some of our best recruiters of future graduate students and advocates of our research.

The graduate students who play some of the most central roles are those working toward the Ph.D. degree. They are highly recruited nationally and internationally. It typically takes five to seven years of full-time study and research to complete a Ph.D. degree, requiring graduate students to put future careers on hold. Few students have the personal or family resources to support themselves for so long, while simultaneously maintaining the immersion in their studies necessary for their full development as independent researchers and teachers. For that reason, at all research universities, it is considered essential that “full” support for at least five or six years be provided to doctoral students.

The American Association of Universities (AAU) and Association of Graduate Schools in the AAU included in a 1990 policy report that:

“... the provision of adequate, reliable financial support is necessary to attract talented students - who have many other career options available to them – into doctoral programs. ... Students who lack subsidized support in the form of fellowships, traineeships, and teaching and research assistantships must rely on loans, work, or personal finances to pay for their education. A heavy reliance on loans is inappropriate for students who are adults (often with dependents), who frequently are already burdened with indebtedness from undergraduate loans, and who are embarking on extended courses of study at a point when most college graduates begin regular employment. Students who must rely on work outside their academic program as their primary means of support will almost unavoidably extend their times-to-degree. ... Although we recognize the financial constraints on universities, we also urge university administrators to increase support of doctoral study, particularly at such critical junctures as the dissertation stage.”

Given the cost of living, the alternative paths students can choose, and the international competition for these students, the support provided must meet minimal standards for decent maintenance, health insurance, and remission of tuition and fees.

Many of the programs in the Graduate School – New Brunswick have joined the ranks of the top programs in their disciplines. Philosophy is regularly recognized as one of the field's best. English and History too are highly ranked, in several sub-fields the best. Eight programs were ranked in the top 20 in the most recent survey by the National Research Council (NRC), the above programs as well as Art History, Geography, Mathematics, Physics, and Statistics. Many of our programs have attracted the best classes they have seen in recent years, in such fields as Mathematics, Physics, English, and the Molecular Biosciences. The ability to attract top candidates for doctoral studies is coupled to our ability to attract and retain top graduate faculty members.

However, at Rutgers, and in particular on the New Brunswick/Piscataway campus, graduate education faces considerable challenges because of the quality and quantity of support provided to Ph.D. students at all stages of their studies. These challenges not only compromise our ability to rise to the next tier of public research universities, but if not corrected may compromise our ability to sustain the current level of excellence. This report documents the need to enhance the support of Ph.D. students in all forms, throughout their careers as students, across the New Brunswick/Piscataway campus, and proposes a timeline for significant increases in the quality of support we provide. The arguments address concerns shared by deans and faculty members across the campus, and include data from programs at peer American Association of Universities (AAU) research universities. This report concludes with examples of the roles played by graduate students in the research, education and service missions of the University, and highlights alumni/ae of the Graduate School – New Brunswick who now play leadership roles in the State, the nation, and the world.

The following goals guide the case we are making to enhance the financial support of Ph.D. (doctoral) students:

- Provide compensation packages, including medical benefits and tuition and fee remission, sufficient to enable doctoral students to live decently in the local area, for the duration of a typical course of study, with minimal impediments to focusing on their studies and research;
- Provide compensation packages and funds to recruit doctoral students that address the competitive pressures we face and enable us to attract the most talented candidates for doctoral studies;
- Remove barriers that deter faculty members from supporting doctoral students on external grants and contracts, including training grants;
- Provide sufficient resources to ensure that all doctoral students can be offered at least minimal teaching experiences.

II. Current Status and Challenges

In this section we provide an overview of the current patterns of graduate student support and outline the challenges that need to be addressed to realize the goals that guide our case to enhance support of Ph.D. students.

Goal: Provide compensation packages, including medical benefits and tuition and fee remission, sufficient to enable doctoral students to live decently in the local area, for the duration of a typical course of study, with minimal impediments to focusing on their studies and research.

A. Funding modes for graduate students

The goal of AAU research universities is to provide funding for Ph.D. students during the nominal course of study. Over the course of graduate studies, the funding for an individual student will typically come in several forms: fellowships, teaching and research assistantships, and support on a training grant.

The same AAU report cited above provided guidance on how to balance the forms of graduate student support:

“... Excessive reliance on teaching assistantships for financial support also may extend completion times. Recent data indicate that, of those who complete their dissertations, students supported on fellowships, traineeships, and research assistantships have the shortest times-to-degree. Students supported on teaching assistantships take longer to complete their degrees, and students supported by loans and personal income have the longest times-to-degree. Clearly some combination of grants and assistantships which include teaching would provide optimal support over the course of doctoral study; a careful analysis is needed to identify the optimal combinations by field.”

1. Fellowships from University, private and external sources

Funding in the first, and often last, years of study is most commonly in the form of a fellowship. Support as a Fellow in the initial years of study allows the doctoral student to focus on course work and preparing for candidacy examinations, to explore the research opportunities in the discipline, and to be trained to become an instructor in the undergraduate classroom or laboratory, without having to teach or work on the project of a particular faculty member. Support as a Fellow in the final year of study allows the student to focus on completing the dissertation project, while exploring and identifying a career beyond graduate school. While most fellowship opportunities come from university resources, including private gifts, graduate students successfully compete for and receive prestigious external fellowships from government sources and private foundations, as highlighted in Appendix I.

Currently about 200 doctoral students are supported in their first year of study on a fellowship from University resources. In contrast, about 450 first-year doctoral students are enrolled each Fall across the New Brunswick/Piscataway campus. In graduate programs that report to the

Dean of Faculty of Arts and Sciences (FAS) or the Dean of the Graduate School (inter-unit graduate programs, including those joint with the University of Medicine and Dentistry of New Jersey - UMDNJ), the minimum stipend for Fall 2004 was \$16,000. While almost all first-year doctoral students in the FAS humanities programs are supported on fellowships in their first year, a very small fraction of first-year students in the mathematical and physical sciences and in programs that report to other deans receive fellowship support. The Graduate School and FAS are grateful that up to the 2004-05 academic year the Central Administration has provided sufficient moneys so that fellowship stipends have kept pace with increases in the cost of living at Rutgers and the number of fellowships offered each year no longer has to be reduced to enable higher stipends. In contrast, the moneys provided by the Central Administration for fellowship stipends in other decanal units have not kept pace with the increase in the cost of living for graduate students in New Brunswick/Piscataway. Smaller decanal units do not have sufficient flexibility to increase fellowship stipends and many have opted to cannibalize their fellowships to enable higher stipends, unless they have been able to significantly enhance fellowship stipends from private funds. All tuition remission moneys for Fellows are managed by the Graduate School, which also provides a modest number of tuition remissions to faculty members to enable them to support graduate students on external grants, as well as a very few tuition awards for entering students.

Currently, students on university excellence fellowships do not receive medical benefits, although some individual programs provide some benefits using their own accounts. Doctoral students who receive prestigious individual awards are provided health benefits (outside of the plan available to state employees) from a Graduate School gift account.

2. University and State supported TA positions

Teaching assistants (TAs) play a central role in the delivery of undergraduate education at a research university, providing trained and committed instructors for discussion, laboratory and skills sections associated with large courses. Experienced TAs often teach their own courses. Support as a TA is also a key component of graduate student support, complementing support on a fellowship or on a research grant. Time spent as a TA also provides the scholar in training with the skills required for success within the academy, as well as outside of the academy where a high level of communication skills is expected.

Currently about 825 doctoral students are supported on TA positions provided by the University (all from State funds). The students holding such positions are considered employees and receive benefits through the State Health Benefits Plan (SHBP). In some fields (in particular the mathematical and physical sciences and engineering) a majority of doctoral students are supported as TAs in their first year.

3. Externally funded research GA positions

Doctoral students in the sciences and engineering are often supported as research graduate assistants (GA) on the externally funded grant of a faculty member. Usually, but not exclusively, this project is directly related to their dissertation research. Faculty members also successfully

compete for training grants from external, mostly federal, funding agencies and support graduate students as trainees on these grants, as summarized in Table 1.

Graduate research assistants are employees and, therefore, are eligible for health benefits through the SHBP. Students supported on training grants are not employees and therefore are not eligible for health benefits through the SHBP. Departmental funds are sometimes used to provide all trainees in a cohort with major medical benefits or health benefits through the plan offered through the Graduate School.

Currently faculty investigators pay the GA salaries and fringe benefits, and the indirect costs on these. In addition they pay student and computer fees and tuition, which is usually charged at the non-resident rate because of the large number of international students in these fields.

B. Challenges to providing compensation packages

The primary challenge is provide sufficient compensation, either salaries as TAs or GAs or stipends as Fellows, to be able to live on the Rutgers New Brunswick/Piscataway campus. This compensation should include medical benefits and tuition and fee remission.

1. Cost of living on the New Brunswick/Piscataway campus

The minimum cost of living for graduate students on the New Brunswick/ Piscataway campus, summarized in Table 2, was developed by the Graduate School working with the Graduate Admissions and International Student Services Offices. This model is used because international students are required to document that they have sufficient financial resources to cover such costs of living and education before they can receive the I-20 form necessary to apply for a visa. International students do not qualify for in-state tuition; they are also required to purchase major medical insurance if not supported as a TA or GA. The cost of living for unsupported international students, students supported as a TA or GA (includes health benefits and fee remission) and supported as Fellows (no health benefits and no fee remission) are given. International students on F-1 visas can only work at Rutgers, with few exceptions, and can only work a maximum of 20 hours/week. (TA or GA appointments are for 15 hours/week). These restrictions severely constrain access to any additional sources of income by international graduate students. Spouses or other dependents of students on F-1 visas cannot work.

The costs in Table 2 are for the Academic Year (AY) Tuition, Student Fees, Computer Fees and major medical health insurance (for international students who are not TA/GAs). Housing and “full” meal plan dining for a Calendar Year (CY) are given. We also estimated basic book and miscellaneous expenses; the miscellaneous expenses do not include the cost of owning a car or any travel. In estimating cost of living in the out years, we projected 10% tuition increases in non-resident rates, 6% student fee increases, 9% major medical insurance increases, 6% housing increases, 4% dining increases, and 3% increases for miscellaneous expenses.

The cost-of-living outlined in Table 2 includes only minimal miscellaneous expenses, such as clothing and books, and provides no flexibility to afford a car and associated expenses, or travel to return to their home communities or countries. A measure of how the flexible income from

TA/GA salaries has eroded over the past decade is displayed in Figure 1. While in 1991 30% of an entry-level TA salary went to university housing, in 2003-04 over 45% of the TA salary went to housing; the current percentage is 44%. Alternatively, including fees and housing as fixed costs, over 53% of a TA salary in 2003-04 went to these fixed costs, compared to 35% in 1991, as summarized in Fig. 1b. With the new contract, some flexible income has been restored to TA and GA salaries, since fees are remitted. However, the challenge remains for students supported as Fellows. With minimum stipends of \$16,000 for new Fellows in FAS and inter-unit graduate programs in Fall 2004, 53% of the fellowship stipend goes for fixed costs of housing, student and computer fees, and major medical insurance, required of all international fellows. (Note that moneys from Central for fellowships in other decanal units have not kept pace with the cost of living, requiring fellowship stipends to be supplemented from other sources.) A challenge to sustaining the compensation levels of graduate students has been that the cost of on-campus housing in recent years has risen faster than the increase in TA and GA salaries or fellowship stipends. (We are grateful that the administration is recommending only 4.5% housing increases for single graduate student housing, and no increase in family student housing, for the 2005-06 fiscal year.)

2. Access to health benefits and fee remission for Fellows and trainees

The Graduate School has identified a health benefits package, similar to that offered to UMDNJ Medical students, that provides coverage for a single individual for \$2200/year in 2004. Because of the lack of medical benefits for Fellows, continuing graduate students increasingly decline fellowship support in favor of a TA or GA position for which they have to work. While some teaching is desirable, too much diverts students from their doctoral studies and lengthens their time-to-degree, as documented by the AAU. The lack of medical benefits for Fellows also introduces a marked disparity between graduate students who have fellowships (with no medical benefits and have to pay fees) and TAs and GAs (who receive benefits and fee remission), despite the assumption that a fellowship is the more prestigious award. Access to medical benefits also needs to be extended to students supported on training grants, who are not employees.

Currently, the minimum first-year fellowship stipends in FAS and inter-unit graduate programs are comparable to the minimum TA and GA salaries. However, because fees are remitted for TAs and GAs, there is a difference of over \$1170 in the flexible income of Fellows compared to TAs or GAs. To minimize the difference in funds for living expenses, either fees would need to be remitted for Fellows or the fellowship stipends would need to be higher to allow the Fellow to pay for fees, yet sustain the same standard of living.

Goal: Provide compensation packages and funds to recruit doctoral students that address the competitive pressures we face and enable us to attract the most talented candidates for doctoral studies.

There are several components of the compensation packages and funds to graduate programs that are necessary to successfully recruit students for doctoral studies. These include:

- Stipends for Fellows and salaries for TAs and GAs that are comparable to those offered by peer programs in a specific discipline;
- Promise of several years of support to sustain the student during the nominal course of study;
- Supplemental forms of support including support during the summer, modest research accounts, and funds for travel;
- Funds to programs to recruit the most promising students to Rutgers.

A. Discipline-specific pressures

The challenge is to offer sufficiently high stipends and salaries in a multi-year commitment, augmented by supplemental funds, to match offers from peer programs in the specific discipline. Examples of benchmarks to which stipends and salaries at Rutgers can be compared include stipends of prestigious fellowships in the sciences (Table 3) and the base TA and GA salary levels at select AAU institutions (Table 4). The minimum TA and GA salaries at Rutgers for 2004-05 are included in Table 4 for comparison. The stipends of prestigious fellowships establish goals that peer programs, especially in the sciences, are striving to attain.

To help meet competitive pressures in top graduate programs, there is a competitiveness pool (CP) of funds in the American Association of University Professors (AAUP) contract for TA/GA appointments on lines from the State. These CP funds are allocated to the Deans with responsibilities for competitive programs, who then distribute them to programs. In the current AAUP contract, a CP-enhancement to a student's TA/GA salary becomes the permanent base of that student's salary for future TA or GA appointments. For 2004-05 a pool of \$660,000 was distributed to Deans on all three campuses of Rutgers.

The support packages offered to students vary from discipline to discipline, but the goal is to provide support for the nominal 5-6 years of study for the Ph.D. degree. In the humanities, students would typically be supported by a combination of fellowship and TA appointments. In the sciences and engineering, support as a research GA is common, and often combined with years as a TA or a Fellow or on a training grant. In the social sciences, opportunities for support as a research GA depend upon the tradition of the discipline, but students would usually be supported as Fellows and TAs.

In many programs there are not sufficient TA or fellowship resources to offer five years of support, in particular outside of the FAS and inter-unit programs. Of course, all offers of support in out years are contingent upon the student maintaining satisfactory progress towards the Ph.D. degree.

Because the competitive pressures are discipline specific, and the peer institutions are different in different disciplines, the following discussion is broken down by discipline. Anecdotes of specific competitive pressures are included.

1. Humanities

The typical pattern of support is 2-3 years of fellowship and 3-2 years of TA (or at private universities, teaching fellow), for a 5-year package. First-year students are supported on fellowships, as well as during the year of concentrated dissertation writing. Our current fellowship stipends and TA salaries are lower than or similar to those offered by peer programs in most fields. However, most peer programs are now guaranteeing 2 to 4 summers of support and health insurance for all years.

Our highly ranked programs in Philosophy, English, and History are able to provide 5-year packages for their incoming students. Only Philosophy has the resources to offer 3 years of fellowship support. Smaller programs, especially in the languages, do not have sufficient fellowship resources to recruit a graduate class of critical size. Therefore, they often offer TA positions to first-year students. Because of the limited number of TA positions, most small programs are unable to offer 5-year packages.

The following are examples of the pressures felt by some of our humanities programs.

English. The fellowship stipends we offered for Fall 2004, \$16,000, are slightly below similar awards at the other top schools. In addition, we are able to provide 5-year packages: initial year of fellowship support, 3 years of TA support, and 1 year of dissertation TA or fellowship. However, the offers are not competitive because we do not have the resources to guarantee summer support. Typical peer programs, such as Michigan, offer 4 summers of support and health insurance.

Philosophy. This program is consistently ranked at the top in the world, with NYU and Princeton the competition. The package for Fall 2004 was 3 years of fellowship support, with stipends of \$18,000, plus 2 years of TA (or occasionally GA). NYU and Princeton offer fellowships that start at \$20,000 per year, plus several years of summer support and health insurance.

2. Social and Behavioral Sciences

The typical pattern of support for a graduate student in these programs is a first year or two of fellowship followed by subsequent years of TA, external GA and/or another year of fellowship support. While most of our programs offer multi-year packages, many of them are only for 4 years of support, and not all entering students are offered such packages. Many of the students in these programs are required to conduct dissertation research in the field away from campus, and therefore apply for prestigious dissertation research fellowships. The Graduate School's Chaser program has helped students across the campus successfully compete for external fellowships, for a total of about \$0.85 million in external funds each year. In fields, such as Psychology, in which support of students on grants is a potentially important source of funding, Rutgers faculty members are often reluctant to support students because they are too expensive in proportion to the relatively modest size of social and behavioral science research awards.

Social and behavioral sciences programs in Arts and Sciences. Most programs at peer universities offered fellowship stipends of \$18,000 for Fall 2004. At the major private universities and the most competitive publics, such as Michigan, Berkeley and UCLA, these stipends are guaranteed for five years and include health insurance. The awards are accompanied by a guarantee of summer support for the first two years and a high likelihood of summer support or teaching for the next two. Some of these schools provide supplementary awards and/or significant raises in TA salaries for years of experience (with salaries up to \$24,000 at UCLA). We regularly lose students who are interested in coming to Rutgers, but who find that our offers fall far behind those they get elsewhere in total value.

Ph.D. programs based in the professional schools generally face even grimmer realities at Rutgers than those in FAS. They have few fellowships and few teaching assistantships and their students usually have to take on a good deal of work to sustain their progress to the Ph.D. The competition tends to be better endowed and to offer full support for longer periods. Programs here have coped with this by limiting doctoral admissions to very small numbers and in some cases serving a primarily regional clientele.

3. Biomedical Sciences

The graduate programs in the Molecular Biosciences are joint with UMDNJ. They have a common admissions and recruiting process and a required core curriculum for all first-year graduate students. Only after completing 2 or 3 rotations is a graduate student expected to select a research advisor, and therefore a graduate program (and university) for his/her enrollment. For Fall 2004 all entering students in the Molecular Biosciences graduate programs were offered stipends of \$22,500. These stipends meet competitive pressures, approximated by \$4000 above to NIH training grant stipends. However, the Molecular Biosciences have only been able to meet these competitive pressures by cannibalizing the number of new fellows, going from 25 in Fall 2002 to 22 in Fall 2003. Stipends for Fall 2005 in these joint programs will be \$24,000.

The compensation for graduate students after their one year of fellowship support can be maintained when they go on research grants only by large supplements to the standard research GA salary. Following the significant increase in fellowship stipends that began in Fall 2003 (when stipends increased by \$3500 from the previous year), some faculty advisors are finding it difficult to maintain the number of graduate students on their grants, especially in the final year of the grant's funding cycle. Should a biomedical science graduate student teach, there are not sufficient funds in the CP allocation for FAS and inter-unit graduate programs to provide comparable salaries when supported as TA. Rather, compensation levels are sustained by (voluntary) supplements from external grants, mostly during the summer months.

4. Life Sciences outside of Biomedical Sciences

Few entering students in the other life science programs, most of which report to the Dean of Cook College, are supported on fellowships. The Dean of Cook College is only allocated 11 fellowships, which are offered to top students across his programs. In addition, Cook College has relatively few TA positions (37, about 60% of the immediate need). Therefore, a large fraction of entering graduate students in these programs are offered no support as part of their

recruitment package. Some of these students are supported as TAs in the introductory Life Science courses that are taught by FAS faculty and staff. Very few, if any, students receive multi-year packages, although many of the graduate students are eventually supported on external grants, or as GAs provided by the experiment station.

The stipend pressures in all of the Life Science programs are similar, about \$4000 above NIH training grant stipends. Cook College does not have sufficient private resources to supplement fellowships to meet these pressures, and therefore has reduced to 6 the number of fellowships it now offers. Also, because all grant-supported GAs need to have tuition remitted, it is very difficult to identify the resources, including tuition, to fund more graduate students, especially in their first year of studies.

Similar concerns are felt in other life science programs that report to the Dean of Pharmacy and inter-unit programs such as Toxicology.

5. Mathematical and Physical Sciences

Relatively few entering students in these programs are supported on fellowships. The most common form of support is as a teaching assistant, even though a large fraction of the students in these programs are international. In Chemistry all entering students are supported as TAs, with access to fellowships in their second year of studies for the top candidates. Most of the entering students are supported for 5 years, with a combination of TA and research grant GA appointments.

The competitive pressures for compensation are most keen in these programs, and they also have the most variation. Because of the competitive pressures, essentially all of these programs receive funds from the competitiveness pool to modestly increase salaries of state-supported TA/GAs. Typical enhancements are \$1000 per student. Since some of the funding agencies do not provide tuition remissions, the Graduate School often provides tuition remission for PIs in the mathematical sciences.

The following are examples of the pressures felt by some of our mathematical and physical science programs.

Computer Science. The competition in Computer Science is especially keen. A target for support is the NSF fellowship stipend, currently \$30,000. Because of this intense pressure on stipend levels, all fellowship resources allocated to Computer Science are cannibalized to supplement TA salaries for incoming graduate students. As part of the enhancement, TA salaries are modestly supplemented (\$1000 per year) from the Competitiveness Pool. The level of first-year support determines the level of support of externally supported GAs. Since many graduate students are able to find summer opportunities off campus, summer support is not needed as part of initial offers.

Mathematics. The stipend levels for US students in mathematics is set by the NSF VIGRE Fellow awards, \$22,500, compared to \$20,000 for our fellowship offers in mathematics for 2004-05.

Physics and Astronomy. Only a small fraction (20%) of an entering class is offered Graduate School fellowship support. Most of the entering students are supported as TAs, or on a training grant from the Department of Education Graduate Assistance in Areas of National Need (GAANN) program. The Graduate School fellowship stipend is \$20,000. The target for top U.S. students is the NSF stipend of \$30,000. Not only is Physics and Astronomy unable to offer sufficiently high stipend levels, the best programs are offering entering students research accounts: \$2000 to cover costs of books, supplies, and miscellaneous education costs (Harvard and Princeton Astronomy offer up to \$25,000 in such accounts). TAs receive \$1000 in CP enhancements, which have been used to define the rate for externally supported GAs.

Chemistry. Currently all entering students in Chemistry are supported as TAs, even though several students in the entering class are not certified to teach in the classroom and therefore are graders. Top candidates for admission are offered fellowships for the second year of study, with stipends of \$20,000 for students entering in Fall 2004.

Torrey Fellows. To attract top U.S. students in the science, math and engineering disciplines who have the credentials to compete for prestigious external awards, such as NSF Graduate Research Fellowships, the Graduate School offers Torrey Fellowship supplements of \$4000, that require a \$2000 match from the program. These Fellows receive 2 years of fellowship support (unless they are successful in receiving NSF Fellowships), after which their support dramatically decreases to the TA/GA level, with a modest (\$1000) CP enhancement. Mathematics recruited 8 Torrey Fellows in Fall 2003; Physics and Math were both successful for Fall 2005, offering \$27,000 stipends.

6. Engineering

The targets for most engineering programs are \$25,000 for assistantships; top schools offer more, e.g., \$26,500 at Southern California and \$29,500 at Chicago. Engineering currently is allocated 14 fellowships with stipends of \$12,000. Therefore, few fellowships are offered to incoming doctoral students and stipends have to be supplemented from private resources. Because there are only a few TA lines in engineering, and faculty members are reluctant to put first-year graduate students on external grants, a large number of the first-year doctoral students in engineering are not supported. Most doctoral students are eventually supported on external grants of research advisors. Many engineering graduate students, especially in master's degree programs, are partially supported as part-time-lecturers (PTLs) in FAS departments, such as mathematics and physics. At peer engineering schools (and the target in all fields), all doctoral students have a guaranteed minimum stipend during their careers, rather than compensations that fluctuate depending on TA or research GA or fellowship support.

B. Supplemental funds for recruiting packages

While competitive stipends and salaries with health benefits and multiple years of support are the core of attractive packages to recruit new Ph.D. students, our peer programs are providing supplemental funds to attract the top prospects.

Summer support. Increasingly the top programs outside of the sciences and engineering are including multiple summers of support (2 to 4) as part of the recruitment packages. We do not have the funds to provide such summer support, except to advanced students who qualify as instructors during the summer session. After the first year of study, few if any students are prepared to teach during the summer session, when no TA training and minimal supervision is available. Students entering the dissertation year would benefit from a summer without teaching duties so they can focus on the writing of the dissertation to be competitive on the job market and complete the Ph.D. in a timely fashion.

Research accounts. Increasingly the top programs in the sciences, especially the physical sciences, are offering modest research accounts to recruit their top prospects. We do not have such funds to supplement recruitment packages. These accounts would be activated upon matriculation and would be available for expenses related to the research and study activities of the student.

Travel support. Doctoral students need access to funds to support their travel. Many students, especially outside of the sciences and engineering, need funds to support their travel, for example, to develop dissertation proposals or to travel to archives for special study. Through gift accounts, the Graduate School provides modest funds, on a competitive basis, to support such travel. The Graduate School hosts Chaser – The Center for External Graduate Student Resources, which helps students identify and develop proposals for external support. Much of the success, summarized in Appendix I, of our students in receiving such external awards is due to the modest investment the Graduate School makes by providing funds for these students to travel to develop dissertation proposals. However, at best 50% of the deserving requests for such travel funds can be awarded.

All Ph.D. students need access to funds to enable them to travel to present the results of their research, and only some students in the sciences and engineering have access to such funds from the grants of their advisors. Our best graduate students should travel to conferences to present their research results, not only to promote their research and explore future employers, but their presentations highlight research conducted at Rutgers. Through gift accounts, the Graduate School provides modest funds, on a competitive basis, to support such travel. However, at best 30% of the deserving requests for funds can be awarded.

C. Funds to programs to recruit new Ph.D. students

There are very limited funds available to recruit graduate students for study at Rutgers. For FAS and inter-unit graduate programs a budget of \$35,000 is available, compared to \$3.4 million in fellowship stipends.

Goal: Remove barriers that deter faculty members from supporting doctoral students on external grants and contracts, including training grants.

A. External Graduate (research) Assistants

In the sciences and engineering, doctoral students are attracted to Rutgers by the possibility to work in collaboration with our top scholars in their research at the frontiers of discovery. The research of these doctoral students is often intimately connected with the research of their faculty advisors. And these faculty advisors are responsible for much of the education of these doctoral students, since so much of their education is outside of the formal classroom. Therefore, it should be expected that the doctoral students with dissertation research directly related to an externally funded project be supported by that project to maximize their engagement: it leads to timely completion of the degree as well as realization of the research goals. At the same time it is appropriate that faculty members be held accountable for advising and supporting doctoral students as part of fulfilling their teaching responsibilities.

Graduate faculty principal investigators (PIs) across the campus view the high cost of supporting a graduate student on their external grant to be a barrier to providing support to students. Barriers include:

- Costs to support a GA: salary, fringe benefits, indirect costs, tuition and fees;
- Perception that more cost effective to support a postdoctoral scholar;
- Difficulty in pooling funds from several (smaller) sources to support a graduate student, because fee and tuition funds must be identified;
- Difficulty in identifying fee and tuition remissions when potential funding agencies that do not allow fees and tuition to be charged to awards, although they would provide graduate student support and may be willing to pay some indirect costs.

Today there are about 635 students in the Graduate School – New Brunswick supported as GAs. Almost all of these are supported by non-State funds and almost all are doctoral or doctoral track students. Although support as graduate research assistants, GAs, is a critical component of the support packages for Ph.D. students, in particular in the science and engineering fields, faculty members are concerned about the high cost to support students on external grants, and perceive that it is more cost-effective to use external funds to support post-doctoral scholars. They are concerned about the high cost of tuition (perceived as 12 credits per semester) and now fees (over \$1170 in 2004-05) charged as direct costs to grants.

A summary of the recent history of external grants on the New Brunswick campus and the number of GAs is presented in Fig. 2. There has been a dramatic (67%) increase in external funding over the past decade, reaching over \$250 million in the past two years. During this time period there has also been a 40% increase in the number of GAs, although the number is down more than 5% from the peak in 2002. In spite of these increases, there has been a steady decrease in the number of GAs supported per \$1 million in external funds, illustrated in Fig. 2c.

The actual costs to support a graduate student are less than the perceptions of many faculty investigators and are in fact significantly less than the costs to support a postdoctoral scholar. It

currently costs about \$42,600 to support a graduate student as a GA on an external grant, assuming that the student is registered for 6 course or research credits a semester with tuition charged at the non-resident rate. Faculty investigators often compare the salary plus tuition and fees (about \$26,500) for a graduate student to the stipend for an entry level postdoc. Using the NIH recommended stipend for an entry-level postdoctoral scholar of \$37,000, the full cost to support a postdoc is over \$73,300. The numbers show that it is significantly less expensive to support a GA rather than a postdoc.

However, a postdoc works full time on a project. A GA only works 15 hours/week on a project, although if the student's dissertation involves the goals of the project, the student may contribute significantly more time. A more appropriate comparison could be the full costs to support a GA compared to 50% of the costs to support a postdoc, i.e., \$42,600 to support a GA compared to \$36,650 for one-half of a postdoc. Because tuition increases more rapidly than salaries and stipends, and grants must also now remit fees, the difference between the costs to support a GA and half of a postdoc are projected to continue to increase. Therefore, it is likely that many more faculty investigators will prefer to support a postdoc rather than a graduate student. As an example, the number of graduate students supported on external grants in Physics and Astronomy has been at best flat over the past decade, while the number of postdocs has almost doubled. It is difficult to count the number of postdocs in New Brunswick, because of the large number of job titles held by individuals in these apprentice positions. However, that the ratio in Fig. 2c of the number of GAs to external grant dollars has decreased, and that a large fraction of grant moneys go to salaries, reinforces the argument that faculty investigators are supporting personnel, other than graduate student GAs, on their grants.

More troubling is the new cap on graduate student support in the social science directorate of NSF, which has just recommended a maximum support level of \$20,000 (salary+fringe+tuition) for a graduate student. This could not only further reduce the number of graduate students supported on external grants, but could compromise the viability of such proposals, since graduate student support is often central to the project. In the longer term, the costs of GA support in the life sciences could also reach a maximum set by NIH that is tied to the salary of an entry-level postdoc.

B. Training grants

There has been a long tradition of faculty members in the life sciences applying for and being successful in receiving NIH training grants to support graduate students, in particular to work in areas that cross traditional disciplines. However, Rutgers-New Brunswick/Piscataway has not been as successful as programs of comparable quality in competing for these awards, partly because of administrative complications when these programs are joint with UMDNJ. The training grants for 2004-05 are summarized in Table 1. In recent years there has been new success in winning training grants outside of NIH, with 5 Department of Education Graduate Assistance in Areas of National Need (GAANN) projects across the campus and the first successful NSF Integrated Graduate Education Research and Training (IGERT) project in biointerfaces and a new for Fall 2005 grant in Pharmaceutical Engineering. Several other IGERT proposals have been submitted recently.

In addition to the administrative complications in developing competitive training proposals in the biomedical sciences where much of the research and training of students crosses two universities, there are other barriers that discourage faculty members from applying for training grants. All training grant proposals need to document the past history of the institution in meeting the goals of the project, as well as the prospects for future success. Much of this documentation reflects the demographics of the graduate students, and tracking of their paths after support. Currently the Graduate School provides some support in providing the requested documentation. However, the limited staff resources at the Graduate School, and the need to tailor the documentation in response to the particular call for proposals, means the Graduate School does not have the resources to provide the level of help faculty investigators often request before developing complicated training grant proposals.

Goal: Provide sufficient resources to ensure that all doctoral students can be offered at least minimal teaching experiences.

Across the New Brunswick/Piscataway campus there is a tremendous need to increase the number of TA positions to address the goals for undergraduate education.

In Fig. 3 we summarize the ratio of TA to tenure-track faculty positions at Rutgers and compared to the average of 34 AAU public universities. While in 2001 this ratio was about 2:1 at our AAU peer public universities, at Rutgers this ratio is less than 0.75:1. This ratio is 1:1 for FAS-NB, the unit with the largest responsibility for undergraduate education, providing about 75% of the instruction in New Brunswick. The demands for undergraduate instructors is increasingly being met by part-time-lecturers (PTLs), as displayed in Fig. 4a. At peer institutions the ratio of TA/PTL positions was 5:1 in 2001, while overall at Rutgers the TA/PTL ratio was less than 2:1, and 1:1 in FAS-New Brunswick. (6 credits of instruction per year for a PTL was considered equivalent to a 10-month TA appointment). Some PTLs are professionals in the community, providing unique perspectives for the students in their classrooms. However, at Rutgers – New Brunswick a large fraction of the supplemental instruction is provided by current graduate students without adequate funding, and many without having experienced training in pedagogy. In Fig. 4b we illustrate the change in the delivery of undergraduate education, documenting the dramatic increase in the reliance on PTLs, rather than faculty or TAs, for undergraduate instruction since 1995. In FAS alone there is a need for at least another 250 TA positions to reduce the reliance on PTLs to the 1995 levels, or 650 TAs to bring Rutgers to the level of TA to faculty ratios at our peer public universities.

Across campus, not just in FAS, there is a need for more TA positions to enhance the educational experience of the undergraduates: to offer discussion sections in large lecture courses, to reduce the size of discussion and laboratory sections, to increase the number of courses in which students are asked to write papers, to reduce the size of foreign language classes, to facilitate the development of new laboratory courses, and to realize the more student-centered learning environments that require smaller sections and laboratories. TAs, as part of the university community, are available for extra help and mentoring outside of the formal classroom, can serve as near-peer role models, and can participate in developing innovations in undergraduate education. TAs are required to participate in training activities to enhance their effectiveness in the classroom. The TA experience not only helps prepare Ph.D. students to be future faculty

members, but also enhances their communication skills, required in all careers. Corporate employers often expect their new hires to have had such experience, since not only does this experience enhance communication skills, but their new hires are also likely to be instructors in the corporate work environment.

In addition to enhancing the undergraduate educational experience, TA appointments are a key component of the support packages for graduate students across the campus. Many programs do not have the TA resources to provide 5-year packages for their students. Other programs have limited the size of their classes of doctoral students because of the lack of sufficient TA funding, some to levels that challenge the viability of their program. Most have the capacity to effectively mentor a somewhat larger cohort of doctoral students. Some students, especially in the programs based in Cook and Engineering, receive a Ph.D. never having been supported as a TA, because of the lack of TA lines in their discipline, or related disciplines.

Many of our peer, especially state AAU institutions, are able to offer all Ph.D.s a year-long teaching experience as part of their degree studies. We currently do not have enough TA positions to offer this, especially in the sciences and engineering.

III. Proposal to enhance support for doctoral students over the next decade

Our long term vision is that all Ph.D. students would be provided with a first year of fellowship support with health benefits and fee remission, all doctoral students would be offered 5-year packages (4 years for students arriving with a master's degree), and the compensation would be sufficient to meet discipline-specific competitive pressures (not only for stipends but also for supplemental support). In addition, all doctoral students would be offered the opportunity to teach for at least one year during the course of their studies towards Ph.D. degree.

The following is a proposal for how we could start over the next decade to realize this vision.

A. Increase the number of TA positions in New Brunswick/Piscataway

We have presented the need to increase dramatically the number of TA positions: to provide better support for graduate students, to enhance the undergraduate educational experience, and to start to bring Rutgers to a level of TA support realized at our peer public universities. We recognize that a TA position requires salary, benefits, and tuition and fee remission. Although in the past some TA positions have been created out of supplemental instructional funds, such funds never include tuition and fee remissions, and only include benefits if taken from existing state lines, for example those currently providing compensation for PTLs. We feel that many of the new TA positions in the long term would appropriately come from the State and are prepared to work with the Administration to help present such a case to increase the number of TA positions. In other cases, we would recommend that tuition and fee remissions, as well as the necessary additional salary dollars, be attached to TA positions that can be created from existing state lines, that are supporting PTLs. One state line provides the benefits for three TA positions.

As documented in Fig. 4b, the number of TA positions in FAS-NB, the unit providing the largest fraction of undergraduate instruction, has been flat over the past decade. At the same time the number of part-time-lecturers has increased significantly. The PTLs added by FAS over the past decade are doing the equivalent teaching of about 250 TAs. While some of the instruction by PTLs is appropriately being provided by individuals with Ph.D. degrees who are experts in the discipline, much of this instruction is provided by under-funded graduate students. A realistic goal, then, is to create about 250 new TA positions over the next decade. This would replace the current instruction by graduate students supported as PTLs with graduate students on TA appointments, who are required to participate in training to become effective instructors and have demonstrated proficiency in English language skills. It would start to restore the ratio of TA to PTL appointments in FAS to values realized in the early 1990s. It would also make a significant difference in the quality of support offered to Ph.D. students. This would also start to increase the ratio of TA to tenure-track faculty appointments towards the values that are common at peer public AAU universities, allowing Rutgers to adopt the models of undergraduate instruction realized by our peers. Although the data have been collected for FAS, there is a need for additional TA positions across the campus. An informal survey of units outside of FAS suggested at least 100 TA additional positions would be appropriate to meet *current* instructional needs.

The proposed 250 new TA positions would be created from a combination of existing state lines and new lines for undergraduate instruction. We estimate that about 130 TA positions can be created from existing lines that have been stripped to the minimum salary necessary to preserve the line. FAS alone has a goal of creating 100 new TA positions from existing lines over the next 5 years. It seems reasonable to estimate that there could be another 10 lines across the campus that could be converted to another 30 TA positions. To realize these new TA positions would require extra monies on each line, tuition and fee remissions, and additional funds to sustain the current full-time-equivalent in instruction.

A state line can support 8 PTLs or 3 TAs. A typical PTL receives about \$7000 to teach two 3-credit courses, which is a 1-year assignment for a TA, who receives almost \$16,000 in salary. Therefore, to create TA positions from existing lines would require about \$9000 per TA in today's funds to provide sufficient salary for the TAs and to provide supplemental teaching funds to maintain the current number of credit hours of instruction. Tuitions and fees would be remitted centrally, as is done now for TA positions. Starting in 2008 the hope is that new state lines would be created to enhance the delivery of undergraduate instruction and be used for TA positions. Again, tuition and fees would be remitted centrally.

The costs of this proposal to increase the number of TA positions are summarized in Fig. 5. In projecting the base TA salary budgets for out years, an annual 5% increase in TA salaries and the Competitiveness Enhancement (CP) Pool was assumed in years beyond the current contract. The incremental costs to add 250 TAs through existing lines and new lines from the state are a tiny fraction of the projected costs to maintain the current number of TA positions with salaries and CP enhancements projected to increase modestly in future years.

When the number of TA positions across campus is sufficient, which will take more than ten years, the Graduate School would work to encourage a year of teaching as part of their studies towards the Ph.D., a common practice at peer public universities. This would include doctoral students from across campus being eligible for TA appointments in departments that are not directly related to their degree program, of course assuming the individual has the background, including English language skills, to teach in that course. Examples include Ecology and Evolution students (Cook College) to teach in FAS Life Science courses, or engineering students to teach in FAS Calculus courses. Should administrative disparities be reduced between Rutgers and UMDNJ in Piscataway, such teaching would also be available to doctoral students in biomedical sciences, without regard to the university where they are formally registered.

The Graduate School is prepared to work with the Central Administration to strengthen the case to increase dramatically the number of TA positions. Appendix II highlights ways in which graduate students now make important contributions to undergraduate instruction.

B. Adopt policies and resources designed to increase the number of doctoral students supported on external research and training grants

Support as graduate research assistants, GAs, is a critical component of the support packages for Ph.D. students, in particular in the science and engineering fields, and these doctoral students play important roles in realizing the research proposed for external funding. However, faculty

members are concerned about the high cost to support students on external grants, and perceive that it is more cost-effective to use external funds to support post-doctoral scholars. They are concerned about the high cost of tuition (perceived as 12 credits per semester) and now fees (over \$1170 in 2004-05) charged as direct costs to grants.

The projected costs to support a graduate student on an external grant are summarized in Fig. 6. These projections assume a 5% increase per year in GA salaries (with no enhancement above the minimum AAUP salary) and include projections of tuition and fees and fringe benefit and indirect (F&A) cost charges. Since many faculty investigators compare the cost to support a GA to that of supporting an entry-level postdoctoral scholar, the full cost to support a GA are compared to 50% of the costs to support a postdoc. The postdoctoral stipends are projections of the current entry-level NIH postdoc stipends, assuming a 4% increase per year, which has been the recent trend. In the out years it is projected that the GA costs will increase more rapidly than the costs of half of a postdoc. We already illustrated in Fig. 2c that an increase in external grants does not lead to the same increase in the number of GAs. Without incentives to reduce the costs to support graduate students on external grants, it is likely to become difficult to maintain the current number of GA positions, in a climate where more, rather than fewer, packages are needed to support doctoral students during their course of study.

Therefore, several incentives are proposed to not only increase the number of graduate students supported as research GAs on external grants, but to stop the erosion of this important form of support for Ph.D. students. The goal is to decrease the difference in the costs to support half of a postdoc compared to a graduate student GA, while at the same time maintaining the services provided for graduate students and providing appropriate income to the University.

The following is a proposed timetable to change how external grants are charged when supporting graduate student GAs.

- 2004-05. Change the information that the Office of Research and Sponsored Programs (ORSP) provides regarding tuition on external grants to reflect realistic tuition charges.

Many faculty investigators (and often their business managers) felt it was necessary to budget for full, 12-credit per semester tuition at the non-resident rate for all GAs supported on external grants. Starting in December 2004, the information posted by ORSP to guide the development of external grant proposals has been changed to reflect more realistic models of the actual tuition costs to support GAs, with projections of costs in the out years that reflect historical averages. This information will be updated as new tuition rates are announced. The Graduate School has also made several presentations to business managers from across the campus and University to discuss these models.

- Spring 2005. Adopt the change in minimum number of credits, so that advanced graduate students who have completed all of their degree requirements need register for only 1 credit of tuition.

In the past all doctoral students in residence in the tri-state area were required to register for a minimum of 3 credits per semester for every semester until they completed their degree. As of Spring 2005 this minimum requirement has been dropped to 1 credit for all students who have completed all credit requirements for the degree. This change has been posted on the ORSP website and communicated to graduate program directors and business managers.

- 2005-06. Eliminate charging computer fees to grants.

Currently, all grants are charged a \$125 per semester computer fee for every GA. External grants provide computer hardware for their researchers and these grants contribute to the overall computer networks of the University. While these fees support computer labs and access for students, including undergraduates, faculty investigators and their GAs derive relatively little benefit from the computer resources these fees provide. Therefore, it would be appropriate that this fee not be directly charged to external grants. Student fees would continue to be charged to external grants, since these fees provide services enjoyed by all students.

- 2006-07. Charge tuition at in-state, rather than non-resident rate for all GAs

A large fraction of graduate students are international scholars, who can never qualify for in-state tuition rates. In addition, most first-year graduate students, while they may be U.S. citizens, are not New Jersey residents, so they, too do not qualify for resident tuition rates. To qualify for New Jersey residence status, U.S. students must register their car in New Jersey. Because of the high costs to maintain a car in New Jersey, many students are reluctant to apply for New Jersey residence.

In many states, all graduate students supported on grants are charged tuition at the in-state, as opposed to non-resident rate. These include: Indiana, Iowa, Kansas, Maine, Maryland, Michigan, Minnesota, Missouri, Nevada, New Mexico, North Carolina, Ohio, Oregon, Texas, Virginia, and Washington. In others, tuition for non-residents is charged at a blended rate, between resident and non-resident rates. Rutgers is currently one of only a few state universities that continues to charge full, non-resident tuition to graduate students supported on external grants. To be in line with other states, and not at a competitive disadvantage when seeking external funds, we recommend that a mechanism be developed so that all GA tuition be charged at the resident rate.

- 2010. Start to reduce tuition credits charged to grants:
 - By 2012 charge only 3 credits per semester, with other credits waived.
- Beyond 2013. Only charge 1 credit per semester; other credits would be waived.

The proposal would start by reducing the charge of research credits to grants, and only in the out-years would course credits no longer be charged to grants. However, to sustain the incentive, “tuition” charges to grants at the end of the decade would need to be reduced to 1 credit per semester of tuition (at the in-state rate) plus student fees, projected to be over \$1400 per year in 2014. Since students will still be required to complete 72 credits for the Ph.D., at least 24 of

which must be research credits, tuition would have to be waived for all other credits required for the degree.

Figure 7 summarizes the projected costs of supporting a GA under the current model (assuming 6 credits of non-resident tuition each semester), supporting a GA under the proposed model to phase in a dramatic reduction in tuition costs, and a projection of 50% of the costs to support a postdoc with no years of experience. With the proposed model, the total costs to support a GA rise at a similar rate to the costs to support a postdoc, and the GA salary+tuition+fees rise at a similar rate to the stipend of a postdoc. We feel that these changes could be sufficient for faculty members to start to preferentially support GAs rather than postdocs on their grants. In some programs, such as in the mathematical and physical sciences, it is possible that as many as 50% more graduate students could be supported. While this could displace some postdoctoral support, some funds would be newly awarded to Rutgers to support graduate students. A specific example is mathematics, where external grants are small, supporting postdocs is not part of the tradition, but faculty would be willing to apply for external funding for graduate students (even for one semester per year) if the total budget on the grant proposal could be minimized.

Although these proposed changes are considerable, the difference in income to the University could be relatively modest. Without incentives, it is likely that the number of graduate students supported on external GA positions could decrease from the current level of about 635 per year, continuing the pattern seen in the past year. With the proposed changes, we anticipate that the number of students supported as GAs would increase. To estimate the flexible revenue for the University (tuition, fees, and indirect costs) without and with the proposed changes, we have assumed that with no incentives the number of GAs would stay constant, and with the proposed changes, the number of GAs would increase modestly (3% a year) over the next 10 years. (This may not be unrealistic since Congress has authorized a doubling of the NSF budget over the same time period. Also in 2004 we saw a 5% decrease in the number of GAs compared to the previous years, although University grants were essentially constant).

In Fig. 8 we summarize the projected flexible income of the University (tuition and fees and overhead) in the current model (and no projected increase in the number of GAs) and with the proposed model of changes (and a 3% per year increase in the number of GAs). Over the next decade we project relatively little change in the flexible income of the University, while providing incentives to encourage faculty investigators to support more graduate students on external grants.

- Provide remissions of all tuitions for external awards from funding agencies that do not normally provide tuition (such as private foundations), or when two or more funding sources have been identified to support an advanced graduate student.

To encourage faculty members to be creative in putting together resources to provide salary and fringe benefits for students, we recommend remissions of all tuition and fees for external awards from funding agencies that do not normally provide tuition remission (such as private foundations), or when two or more funding sources have been identified to support an advanced graduate student. The Graduate School currently provides only a small number of tuition remissions for such cases. Expanding the policy would require either a new tuition remission

account or a substantial increase in the tuition remissions now budgeted to the Graduate School. We estimate that the number of full-time equivalent tuition remissions for such matching opportunities would need to double over the next decade.

The pressures to provide tuition remissions are expected to increase. In the mathematical sciences there is a long tradition of providing a tuition remission when a faculty member is able to identify external support for a graduate student. With the new recommended cap in the social sciences at NSF, tuition remissions will be necessary to enable a student to be supported, and without graduate student support the proposal itself may not be viable.

- Support a grants specialist to help develop training grant proposals.

The Graduate School – New Brunswick is developing a proposal to create a position for a grants specialist who would work with faculty members as they develop applications for training grants. This specialist would work with the Graduate School and Institutional Research to obtain the data on graduate students, and their placement, requested in the specific call for proposals, as well as work with faculty members in finalizing proposals using past successful grants as models. This individual would also work with faculty members in the Molecular Biosciences on grants that would be joint with UMDNJ. Funding agencies would include: NIH, NSF, Department of Education, Department of Agriculture, and private foundations such as Howard Hughes.

- Synergies between doctoral education and research

Doctoral students often play critical roles in realizing the research goals of external projects. When supported on a project that includes their dissertation work, they are able to focus on their research, shortening the time to degree, as well as helping to realize the research results in a timely manner. At the same time their research supervisors are engaged in the education and training of these future scholars. We would like to suggest that mechanisms be established that recognize and hold accountable faculty advisors for supporting doctoral students on their grants, as well as mentoring them in their research.

- State or university supported TA/GA positions for advanced graduate students

An alternative adopted at some institutions is that graduate students, even in the laboratory sciences, spend many years supported as Teaching Assistants. We do not recommend this route, since we feel that graduate students should have the flexibility to focus on their research, especially in the sciences, rather than teaching duties. Supporting advanced graduate students as TAs in fields where faculty could attract external funds to support graduate students is, therefore, a University subsidy of research, without increasing the potential for indirect cost recovery. We would prefer that the University minimize tuition costs for graduate students on external grants, rather than increase the time graduate students, especially in the laboratory sciences, spend as TAs.

C. Dramatically increase resources to support graduate students on fellowships:

- To sustain stipends at competitive levels,
- To provide health benefits and fee remission,
- To increase the number of fellowships.

In 2004-05 there are about 290 Fellows supported by state funds in the Graduate School – New Brunswick. About 260 are in FAS and inter-unit programs and about 30 in other schools, in particular Engineering and Cook. Although funds for fellowship stipends have been distributed to the academic deans, the Graduate School – New Brunswick retains the tuition remissions. Tuition remission funds are fungible, i.e., they can be used for stipends, to provide matching fellows for training grants, as well as tuition remissions and scholarships for individual graduate students, in particular those who have received fellowships with external funding for which they have successfully competed. The Graduate School maintains a separate account for tuition remissions for students supported on external and training grants of faculty investigators.

The goal is to offer every entering Ph.D. student a fellowship and to have a sufficient number of dissertation fellowships to support students in their final year of study with minimal need to work, for example as a Teaching Assistant. In addition, in many disciplines it is appropriate, with sufficient funds, to support students on fellowships for the first two years of study, for example to prepare them for TA positions that require a higher level of scholarly maturity. At best this goal could be realized in 10 years, requiring about 500 fellowships for new students and at least 300 fellowships for continuing fellows, in their dissertation year, as well as in the second year in specific disciplines.

Role of private funds. Increasing the number of fellowships, and providing stipends that meet competitive pressures, is a long term vision that we hope could be fully realized over the next ten years. Some of the resources to realize this goal would appropriately come from income from a sizeable endowment for graduate student fellowships. Just as several of our peer institutions (Duke, Michigan, Stanford) have targeted up to \$200 million for graduate student fellowships as the sole or featured goals of their current capital campaigns, we would like to recommend that at least \$200 million be the target for graduate student fellowships in the next campaign. A \$200 million endowment would yield about \$9 million each year in income to enable the number of fellowships to be dramatically increased. Endowed fellowships should come with health benefits and remission of tuition and fees by the University.

Role of external fellowships. In addition to providing fellowship support to doctoral students from University and private resources, the Graduate School would continue to work through Chaser, The Center for External Graduate Student Resources, with top graduate students to assist them in obtaining external funding. Such funding takes the form of external support for entering graduate students, especially in the science and engineering fields, and dissertation research support for students in the humanities and social sciences, especially when their projects require them to work off campus. To enhance the success rate for external dissertation research support requires pre-dissertation summer support, which could be part of recruitment packages. Students supported on external fellowships often need access to tuition and fee remission, as well as a fellowship during the dissertation year to facilitate timely completion of the degree.

1. Sustaining stipends at competitive levels

We propose the following timeline to increase funding for stipends for Fellows:

- 2005-06. Increase and sustain minimum stipends above the cost of living

The proposal is first to increase fellowship budgets so that the stipends can be sustained at the cost of living in New Brunswick/Piscataway. Even this level of budget increases has been challenged in the past decade. The projected cost of living, stipends for Fellows and salaries for TAs are summarized in Fig. 9. We project that the minimum TA salary and stipend for Fellows, both increasing about 5% a year, should remain slightly above the projected costs of living on campus.

- 2005-06. Start to provide additional funds for the most competitive programs

Our most competitive programs, especially in the sciences and engineering, need to offer stipends at a significantly higher level than the cost of living to be competitive in attracting top students. The benchmark is the NSF Fellowship stipend, which is \$30,000 in 2004-05; we anticipate it will slowly rise over the next decade. Since the most competitive programs, especially in the sciences, use the NSF benchmark, we project that stipends in our most competitive programs, such as in the physical sciences, need to approach, but not necessarily attain, this level. The projected stipends in a competitive program and the NSF benchmark are summarized in Fig. 9.

- 2006-07. Start to increase the number of Fellows supported by University and private sources.

In addition to increasing stipends, including to meet competitive pressures, it is important to increase the number of fellowships being offered. While much of the needed funds in the long term should come from private resources, it will take at least 10 years to realize a goal of \$200 million in endowed funds for fellowships (corresponding to \$9 million in annual income from private sources). Therefore, we are proposing in the near term that central resources also be used to start to increase the number of fellowships, at appropriate stipends.

In Fig. 10 we summarize the proposed costs to increase fellowship stipends, as well as increase the number of fellows. Both university and private sources for fellowship stipends are projected. This figure also includes an extrapolation beyond the next 10 years to show the leveling off of the increases. In Fig. 11 we summarize the breakdown in the number of fellows: the current base, the proposed new University fellows, and the proposed new fellowships from private funds. In 2014 we project that there would be about as many fellows supported from private funds as today are supported by University funds.

2. Providing health benefits and fee remission

Medical Benefits. The immediate need is to provide medical benefits for all doctoral students on fellowships, not only those receiving prestigious external awards. This was recommended by the University Senate in 2002 and endorsed by the New Brunswick Faculty Council in December 2004. We recognize that today this costs over \$1 million, but hope that such moneys can be identified from present resources in the very near term. Every year continuing graduate students decline fellowships, with no benefits, preferring to work as TAs or GAs because of the medical benefits such employment provides. We anticipate that this trend will only increase as the cost of private medical insurance continues to rise. Currently, Fellows have access to student health services, if they pay full-time student fees, and for a relatively modest fee (\$450/year) have major medical coverage. International Fellows are required to have this level of health coverage.

Currently the Graduate School – New Brunswick uses funds from private accounts to provide health benefits for single individuals through an arrangement with Aetna. Originally established to provide health benefits for recipients of prestigious external awards, this same arrangement could be extended to other graduate students, provided that all members of a given cohort are included (for example, all Fellows in a Department, or all students supported on a particular training grant). We propose that an arrangement, similar to that developed with Aetna, be extended within 5 years to all Fellows and trainees.

The following timeline is proposed to provide health benefits for Fellows and graduate students supported on training grants:

- 2004-05. The Graduate School provides Aetna single health benefits for external fellows from private accounts.
- 2005-06. The University provides single health benefits for all students on training grants and major medical for all other fellows. The Graduate School continues to provide benefits for external fellows from private accounts.
- 2006-07. The University provides single health benefits for all students on training grants and continuing fellows and major medical for all new fellows. The Graduate School continues to provide benefits for external fellows from private accounts.
- 2007-08. The University provides single health benefits for all students on training grants and all fellows supported by University or private accounts. The Graduate School continues to provide benefits for external fellows from private accounts.
- 2008-09. The University provides single health benefits for all students on training grants and all Fellows.

We propose that first the University identify the resources to provide benefits to students supported on training grants, as part of an incentive to encourage faculty members to continue to seek such support for their students. The next cohort to be included in the benefits package would be continuing students. These students appreciate the quality of medical benefits

available to TAs and GAs under the State Health Benefits Plan, since many of them have been already supported as TAs or GAs. It is these continuing doctoral students, who may have the opportunity for support on a fellowship during the dissertation year, that are increasingly declining a fellowship because of the lack of benefits. However, as soon as possible medical benefits need to be provided for all fellows, including new students, to maintain packages that are competitive with our peers, who today are offering medical benefits.

The projected costs for the proposed implementation of health benefits for Fellows are summarized in Fig. 12. In projecting the cost of health benefits, the current plan for single coverage (\$2200/year) was used, and a major medical cost of \$450 in 2004-05. Health benefits are projected to increase by 8% a year, major medical by 3% a year.

Fee remission. As of 2004-05, the student and computer fees are remitted for all students supported as TAs or GAs. Currently, students supported as Fellows pay fees (\$1171 in 2004-05) and have no health benefits, yet support as a Fellow is considered to be the more prestigious award. To reduce the disparity between funding as a Fellow compared to as a TA or GA, we propose that Rutgers adopt a policy increasingly adopted by peer institutions: that fees be remitted for Fellows. Alternatively, the fellowship stipends should be increased to cover the cost of fees. We propose that starting in 2005-06 the computer fee be remitted, and that all fees charged to Fellows be remitted as of 2006-07. Because student fees, in particular, provide services for graduate students, the University should maintain its support of these services.

The projected costs for fee remission are summarized in Fig. 13.

3. Managing fellowship resources

Currently fellowship resources are allocated from the Vice President for Academic Affairs to each decanal unit, although all tuition remissions remain with the Graduate School. A very large fraction (about 85%) of the fellowships are managed by the Graduate School, for programs that report to the Executive Dean of FAS, as well as inter-unit programs that report to the Dean of the Graduate School. The dollars associated with fellowships that are allocated to other decanal units have remained constant at the 1996 level. For other units, not only is there no provision for increasing the stipends, there is no mechanism to increase the number of fellowships (including those for programs that currently have none). We would like to recommend that a process be established that would allow for increased allocations of fellowship resources to other decanal units, as well as a mechanism that would examine how many fellowships should be allocated to these units. Such a possible process might involve the Dean of the Graduate School working more closely with the Academic Vice President or new Vice President for Research and Graduate Education in determining the allocation of fellowship resources across the campus.

The Graduate School is prepared to help manage the dramatic increase in private fellowship funds, by helping to write specifications of endowed accounts (to ensure that they are appropriate for graduate student fellowships, rather than undergraduate scholarships), working with specific programs to ensure funds are used appropriately to support graduate students, and helping with the stewardship of the donors and their families.

D. Increase funds to recruit high-quality doctoral students and support their research and study:

- Funds for programs to support on-campus visits and other recruiting activities
- Funds to enhance support packages
- Travel funds

Competitive stipends and salaries with health benefits and multi-year support packages are the core to developing attractive support packages. Increasingly, our peer programs are providing supplements to these core packages to attract their top prospects for doctoral studies.

We propose that the University significantly enhance its investment in doctoral education by providing considerably more funds to recruit highly-talented graduate students to the most competitive Ph.D. programs. Such funds would include direct support of program efforts to recruit new graduate students, including bringing prospective students to campus. Funds to enhance support packages, such as summer compensation or research accounts, that address competitive pressures, are also needed. Additional funds to support the travel by the students could come from increases in private funds associated with the next capital campaign.

Recruitment Costs

Although the University spends almost \$4 million each year in fellowship stipends and at least \$13 million on TA salaries, there is only a small investment (less than \$35,000 in FAS and inter-unit programs) to recruit top Ph.D. students to New Brunswick/Piscataway. Given these large investments in graduate student support, it is important to provide funds to recruit the best students to our programs. The most important component is to provide moneys for the top prospective students to visit campus. Funds are also needed to develop recruiting materials. We currently estimate that \$350 is needed to bring a prospective student to campus. Assuming a 50% yield (i.e., for every 2 students who visit, only one matriculates), we estimate \$700 is needed today to recruit one student that matriculates. The proposal is to reach this goal of (an inflated) \$700 per new doctoral student who matriculates, within 10 years.

Summer support and research accounts

Today top programs are offering between 2 and 4 summers of support for Ph.D. students in the humanities, which would be \$3000-\$6000 per student in today's dollars. In the sciences, many top programs are offering research accounts (of \$2000-\$5000) to attract the top prospects. The goal in ten years would be to provide each new Ph.D. student in the sciences and engineering with a one-time flexible account of \$2000 in today's dollars, and every new student outside of the sciences with 2 summers of support.

The projected costs needed to significantly increase the investments in recruiting new Ph.D. students are summarized in Fig. 12. They include funds to bring students to campus, as well as funds, such as research accounts and opportunities for support during the summer, needed to attract the top graduate students to Rutgers.

Travel support

Considerable support for graduate student travel is needed. Students need funds to travel to develop dissertation proposals, which can include everything from travel to a prospective site for

field research or to visit an archive. Currently such support is provided by gift accounts and has been critical in the success of many of our students in successfully competing for external dissertation fellowships. Our best graduate students should travel to conferences to present their research results, not only to promote their research and explore future employment opportunities, but their presentations highlight research conducted at Rutgers. Only students in the sciences routinely have access to such funds from the external grants of the research advisors. Requests for conference travel support are currently about 3 times the available funds, from gift accounts. The proposal is to increase conference travel support as quickly as possible to meet current demands, and sustain that level of support. Support for travel for pre-dissertation and other special study also needs to increase significantly, about a factor of two. Travel support appropriately should continue to be awarded competitively and much of these funds could come from private accounts. These projected costs are summarized in Fig. 14.

IV. Summary of the Costs and the Opportunities

Today we make a sizeable investment in doctoral student education. In Fig. 15 we project the University's current level of commitment in TA/GA salaries and stipends for Fellows. In addition the University provides about 1100 tuition remissions for TA/GAs on state lines, for fellows, and about 50 full-tuition equivalent in matching remissions, as summarized in Fig. 16. From this investment, the University has grown in its recognition as one of the top state public research universities. It is able to attract and retain top research faculty, its doctoral students are successfully competing for prestigious external fellowships, and increasingly our programs are able to attract a stronger cohort of entering Ph.D. students.

To sustain this level of excellence and aim towards enhancing our recognition as one of the top few public graduate schools will require a significant investment in funding for doctoral education. In this report we have presented a proposal to:

- Increase the fellowship support for Ph.D. students:
 - Offering competitive stipends,
 - Providing health benefits and tuition and fee remission,
 - Increasing the number of fellows;
- Increase the number of TA positions;
- Adopt policies and identify resources to increase the number of doctoral students supported on external research and training grants.

The costs of this proposal are summarized in Figures 16-19. In Fig. 16 we summarize the new tuition remissions required as part of the proposals to increase the number of Fellows, the number of TAs, and to double the number of full-tuition equivalents in matching remissions. The new stipends and salaries are summarized in Fig. 17. These include moneys to convert existing lines to TA positions, as well as salaries for new TA positions. We also project the costs to sustain fellowship stipends above the local cost of living, to provide higher stipends to meet competitive pressures, and the stipends for new University fellowships. In Fig. 18 we summarize the University's costs for health benefits and fee remission for fellows and fee remissions for new TAs. Finally, Fig. 19 summarizes all of the projections for new costs to the University. These proposed new costs are significant, especially when projected for the next decade. However, they reflect the need to sustain the investments we are already making in doctoral education, summarized in Fig. 15.

In Fig. 20 we summarize one of the tangible results of this proposal: an increase in the number of graduate students supported for Ph.D. study and research on the New Brunswick/ Piscataway campus. The goal is to transform the under-funded Ph.D. students (some of whom joined our programs with no guarantee of support) into the top candidates for Ph.D. study. These new Ph.D. students will have been attracted to Rutgers – New Brunswick because of the quality of our programs and will be successfully recruited because we offered them competitive support packages for their course of study and research. By the end of the 10-year period, we will also

have increased by about 20% the total number of Ph.D. students on our campus. This increase in the quality of our graduate students will also help to attract and retain graduate faculty members.

Ten years from now we foresee the New Brunswick/Piscataway campus of Rutgers, The State University of New Jersey as one of the top five public graduate research universities in the U.S. We will have attracted and retained the top research faculty, committed to mentoring and supporting our talented Ph.D. students. We will have reached this level of recognition because of the high quality of Ph.D. students we are able to attract for study and the leadership roles our Ph.D. alumni/ae are playing in the academy, in research laboratories, in industry, and in service to governments at all levels.

V. Acknowledgements

This report reflects discussions with administration and faculty leaders across the New Brunswick/Piscataway campus. We would like to thank the Deans of the School of Engineering, Cook College, School of Pharmacy, Bloustein School, Mason Gross School of the Arts, School of Social Work, Graduate School of Education, School of Communication, Information and Library Science, School of Management and Labor Relations and many of their faculty for taking the time to meet with JAC to discuss the challenges in supporting Ph.D. students in the programs in these professional schools. We would also like to acknowledge important discussions with the leadership in the Life Sciences, Toxicology and the FAS programs in History, English, Italian, Anthropology, Political Science, Psychology, Physics and Astronomy, Mathematics, and Computer Science. Finally, we are indebted to Michael Beals for his analysis of the roles of TA and PTLs in undergraduate instruction in FAS departments, and his comparison with peer AAU universities.

The outline of the goals and timelines have been endorsed by the

- Executive Council of the Graduate School – New Brunswick
- Graduate Program Directors of the Graduate School – New Brunswick
- The deans responsible for graduate education in New Brunswick (Deans of FAS, Engineering, Cook, SCILS, GSE, SMLR, Bloustein, Mason Gross)
- Graduate School Dean's Advisory Council (alumni/ae and friends who are leaders in the public and private sectors in the tri-state area)
- Department Chairs in FAS.
- New Brunswick Faculty Council

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Table 1. Training Grants at Rutgers – New Brunswick 2004-2005.

Project	Funding Agency	Principal Investigators	Rutgers Unit
Biotechnology	NIH	Pedersen, Shatkin	CABM, Chemical Engineering
Molecular Biophysics	NIH	Olson	Chemistry + BioMaPS
Environmental Health Sciences	NIH	Reuhl	Toxicology
Building a Learning Community	NSF-GK12	Scott	Cell+Developmental Biology
Biointerfacial Engineering	NSF-IGERT	Moghe	Chemical & Biochemical Engineering
Pharmaceutical Engineering	NSF-IGERT	Muzzio	Chemical Engineering + Pharmacy
Graduate Assistance in Areas of National Need	Dept of Education - GAANN	Williams + Ransome	Physics & Astronomy
		Cotter	Chemistry & Chemical Biology
		Zylstra	Microbial Biotechnology
		Papathomas	Biomedical Engineering
		Levy	BioMaPS
		Robock	Atmospheric Science
UMDNJ-Rutgers Pipeline Program*	NIH – Initiative for Minority Student Development (IMSD)	Leibowitz, UMDNJ	UMDNJ + RU Molecular Biosciences
Bridge to the Doctorate*	NIH	Leibowitz, UMDNJ	UMDNJ + RU Molecular Biosciences + Univ of PR
Bridge to the Doctorate*	NIH	Leibowitz, UMDNJ	UMDNJ + RU Molecular Biosciences + Montclair State

*Principal institution is UMDNJ-Graduate School of Biomedical Sciences, Piscataway

Table 2. Cost of living analysis for Graduate School – New Brunswick students 2002-2007.

Costs of living on campus for graduate students supported as TA/GAs(TA), supported as Fellows (Fel), and without support (None). Actual expenses for 2002-2005 and projections for 2005-2007 are given.

	2002-03-TA Actual	2002-03-Fel	2002-03-None		2003-04-TA Actual	2003-04-Fel	2003-04-None
AY Tuition	\$-	\$-	\$12,040		\$-	\$-	\$13,124
AY Fees	\$782	\$782	\$782		\$878	\$878	\$878
Computer	\$200	\$200	\$200		\$200	\$200	\$200
Insurance(internat)	\$-	\$357	\$357		\$-	\$375	\$375
CY Housing	\$5,958	\$5,958	\$5,958		\$6,482	\$6,482	\$6,482
CY Dining	\$3,818	\$3,818	\$3,818		\$4,009	\$4,009	\$4,009
Book, Misc	\$2,800	\$2,800	\$2,800		\$2,884	\$2,884	\$2,884
Total	\$13,558	\$13,915	\$25,955		\$14,453	\$14,828	\$27,952

	2004-05-TA Actual	2004-05-Fel	2004-05-None
AY Tuition	\$-	\$-	\$14,371
AY Fees	\$-	\$921	\$921
Computer	\$-	\$250	\$250
Insurance(internat)	\$-	\$414	\$414
CY Housing	\$6,858	\$6,858	\$6,858
CY Dining	\$4,169	\$4,169	\$4,169
Book, Misc	\$2,971	\$2,971	\$2,971
Total	\$13,998	\$15,583	\$29,954

Table 2. Cost of living analysis for Graduate School – New Brunswick students 2002-2007.

	2005-06-TA Projected	2005-06-Fel	2005-06-None	2006-07-TA Projected	2006-07-Fel	2006-07-None
AY Tuition	\$-	\$-	\$15,808	\$-	\$-	\$17,389
AY Fees	\$-	\$976	\$976	\$-	\$1,025	\$1,025
Computer	\$-	\$250	\$250	\$-	\$250	\$250
Insurance(internat)	\$-	\$451	\$451	\$-	\$492	\$492
CY Housing	\$7,269	\$7,269	\$7,269	\$7,706	\$7,706	\$7,706
CY Dining	\$4,336	\$4,336	\$4,336	\$4,510	\$4,510	\$4,510
Book, Misc	\$3,060	\$3,060	\$3,060	\$3,151	\$3,151	\$3,151
Total	\$14,665	\$16,343	\$32,151	\$15,367	\$17,134	\$34,523

In projecting expenses the following assumptions were made for annual increases

- Non-resident tuition: 10%/year
- Student Fees: 6%/year
- Computer Fees: Constant in 2005-06 and 2006-07 at 2004-05 rates
- Major Medical insurance: 9%/year
- On-campus housing: 6%/year
- On-campus meals: 4%/year
- Books+Miscellaneous: 3%/year

Table 3. Federal Fellowship Stipends 2004-05

Program	Stipend	Comments
NSF Graduate Research Fellow	\$30,000	\$10,500 institutional payment GSNB health insurance
NSF Training Grants (IGERT, GK12)	\$30,000	\$10,500 institutional payment No health insurance
Dept of ED GAANN Fellow	\$30,000	Stipend based on need \$11,000 institutional payment No health insurance
NSF VIGRE (Mathematics)	\$22,500	\$10,500 institutional payment No health insurance
NIH Training Grants	\$20,772	No health insurance

Table 4. Base TA/GA Salaries at Selected AAU universities, 2003-04.

School	TAs		GAs	
	Sci/Eng	Hum/SS	Sci/Eng	Hum/SS
Columbia	17000-20000+	17000	17000-20000	17000
Duke	14500-21000	14500	16000-22000	14500
Georgia	18000-20000	9500-13500	16000-20000	
Illinois	13500-16500	11500-14000	14000-17000	11500-14500
Minnesota	15000-15500	10500-13000	15000-15500	10500-13000
MIT	17000-19500	17000	17000-19500	17000
Princeton	19000-20500	19000-20500	17500-18500	17500-18500
Rutgers	15300*	14300	15300*	14300
Stony Brook	11500-22000	11500-14000	22000	11500-14000
UCLA	14000-16500	14000-16500	28500	
Washington U	14000-21500	14000-16000	18500-21500	14000-16000
Yale	21500-22500	16000+	21500-24000	16000+

*Assumes \$1000 competitive pool enhancement.

All salaries are for 10-month, Academic Year, appointments. Similar data were reported in the Chronicle of Higher Education, October 2004.

Figure 1. TA Salaries and Costs of Graduate Education and Life 1991-2004

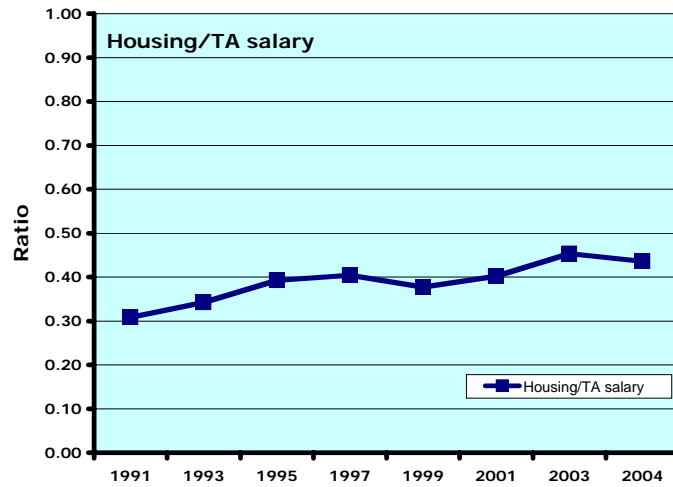


Figure 1a. Ratio of costs of single graduate student housing to entry-level TA salaries, 1991-2004. While housing costs accounted for about 30% of an entry-level TA salary in 1991, they now account for over 44% of TA income, after a high of 45% in 2003.

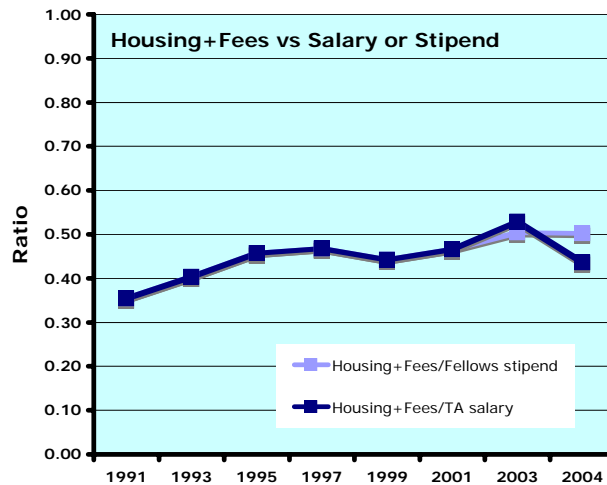


Figure 1b. Ratio of costs of single graduate student housing plus full-time fees to TA salaries or fellowship stipends, 1991-2004. While housing costs and fees accounted for 35% of an entry-level TA salary in 1991, they reached a maximum of over 53% of TA income in 2003. With the current AAUP contract, there has been some restoration of flexible income for TAs. However, since stipends for fellows are comparable to TA salaries, and fellows continue to have to pay fees, 50% of a fellowship stipend is needed to pay fixed costs of housing and fees.

Figure 2. External grants and GA support 1995-2004

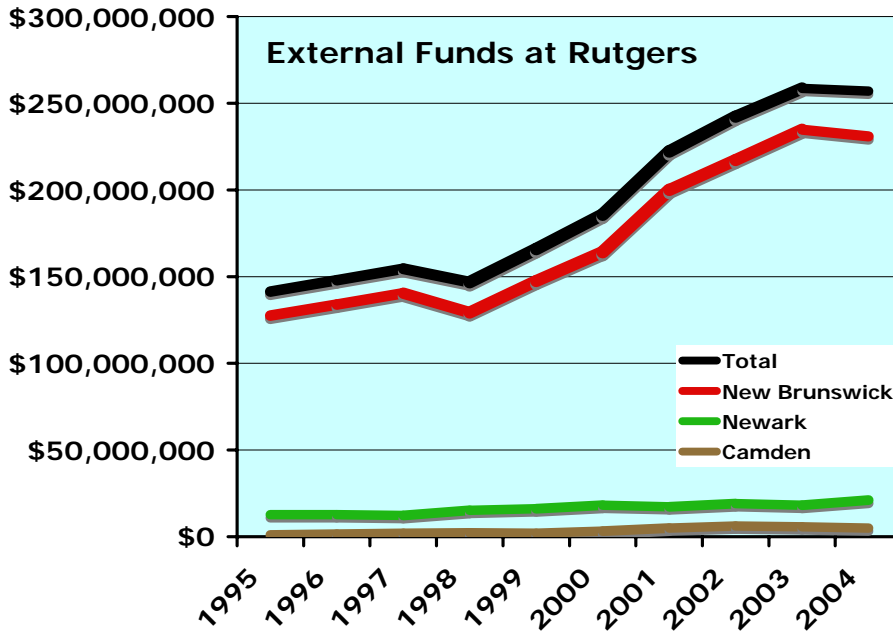


Fig 2a. Total external grants at Rutgers, and broken down by campus.

External grants for the New Brunswick, Newark, and Camden campuses are given, as well as for the University as a whole.

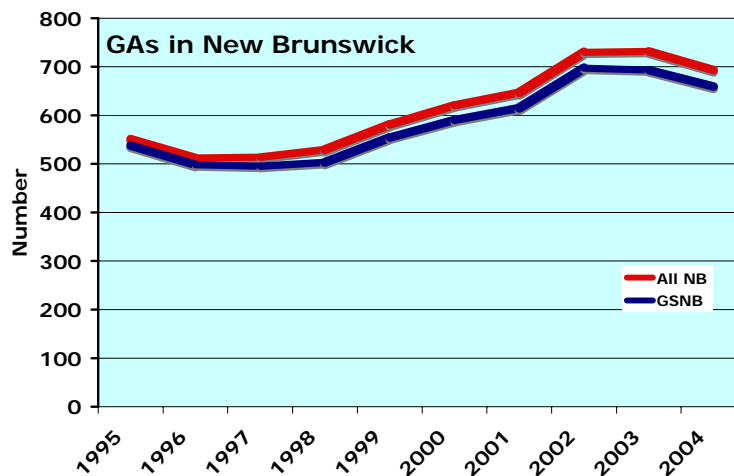


Fig 2b. Number of Graduate Assistants (GAs) on the New Brunswick/Piscataway campus.

Number of GAs registered in Graduate School – New Brunswick, as well as across the New Brunswick campus. Almost all GAs are GSNB students.

Figure 2. External grants and GA support 1995-2004

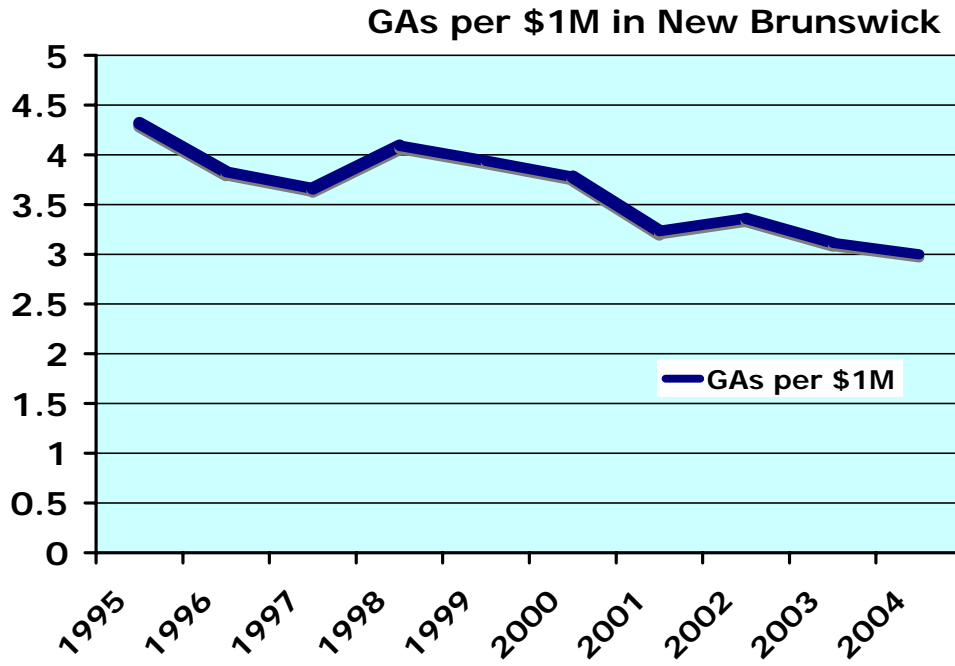


Fig. 2c. Number of GAs per \$1 million in external grants on the New Brunswick campus.

Figure 3. Ratio of TA to Tenure Track Faculty positions at Rutgers overall, FAS-NB, and an average of 34 AAU Public research universities. Data compiled by M. Beals, FAS-NB.

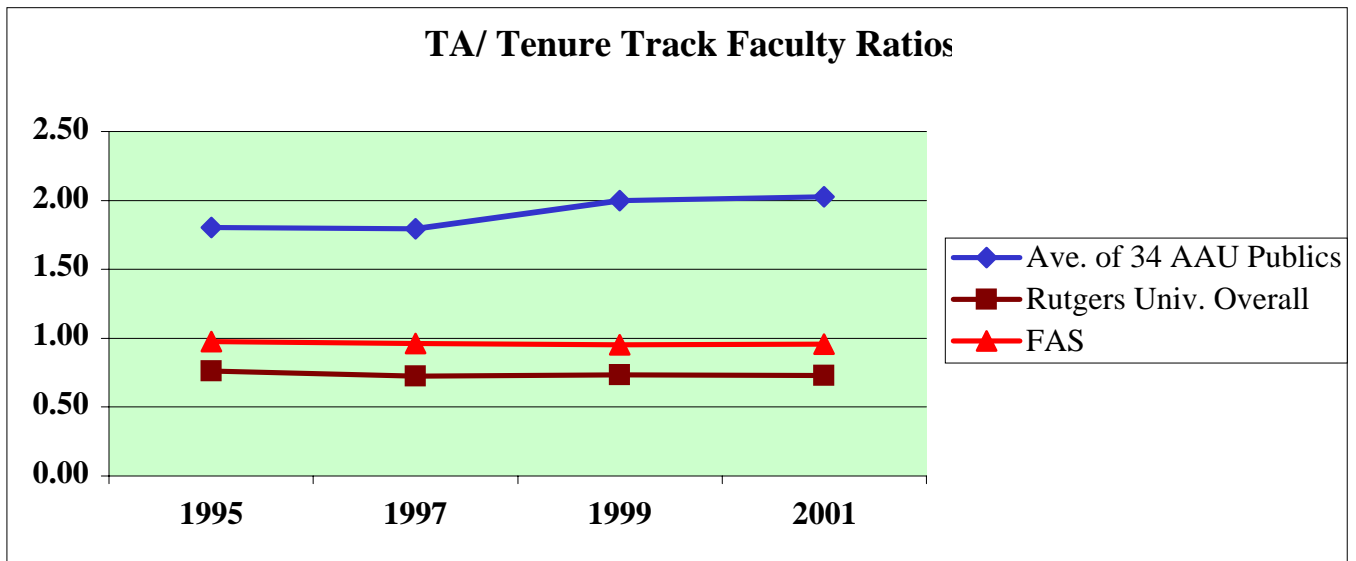


Figure 4. Comparisons of number of TAs and PTLs.

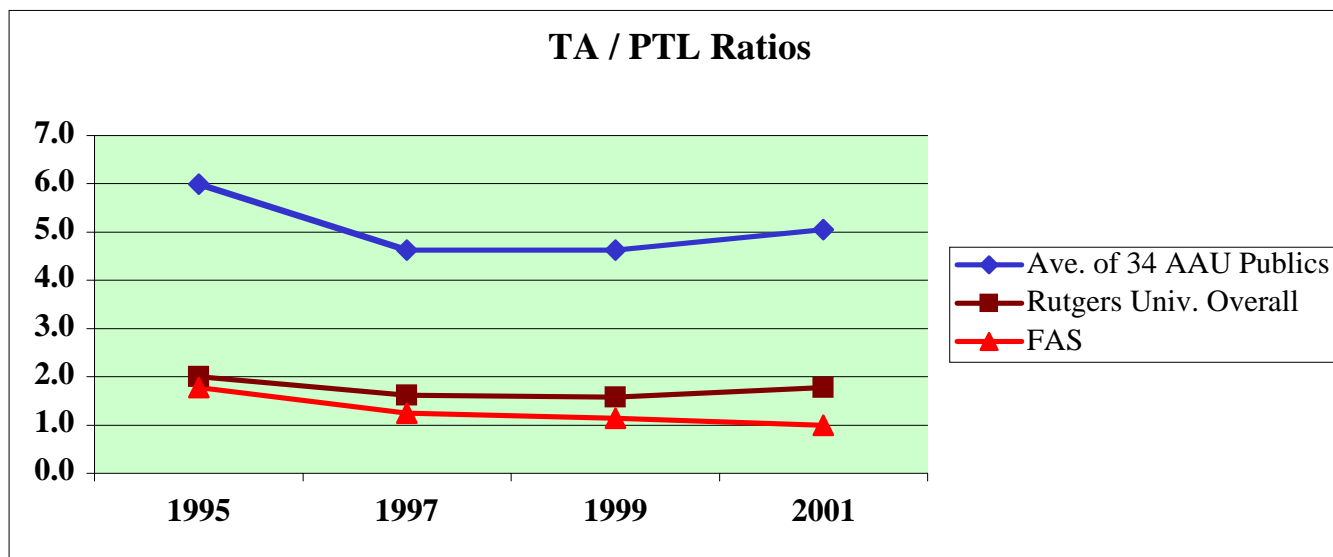


Figure 4a. Ratio of TA to PTL positions for Rutgers overall, in FAS-NB, and an average of 34 AAU Public research universities. Data compiled by M. Beals, FAS-NB.

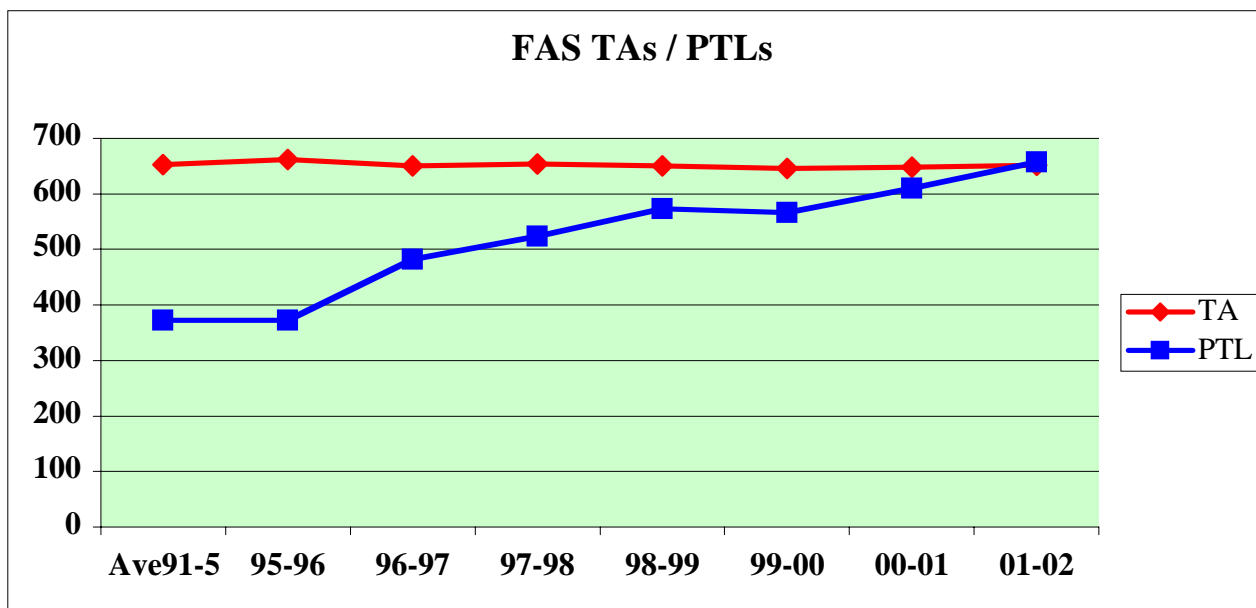
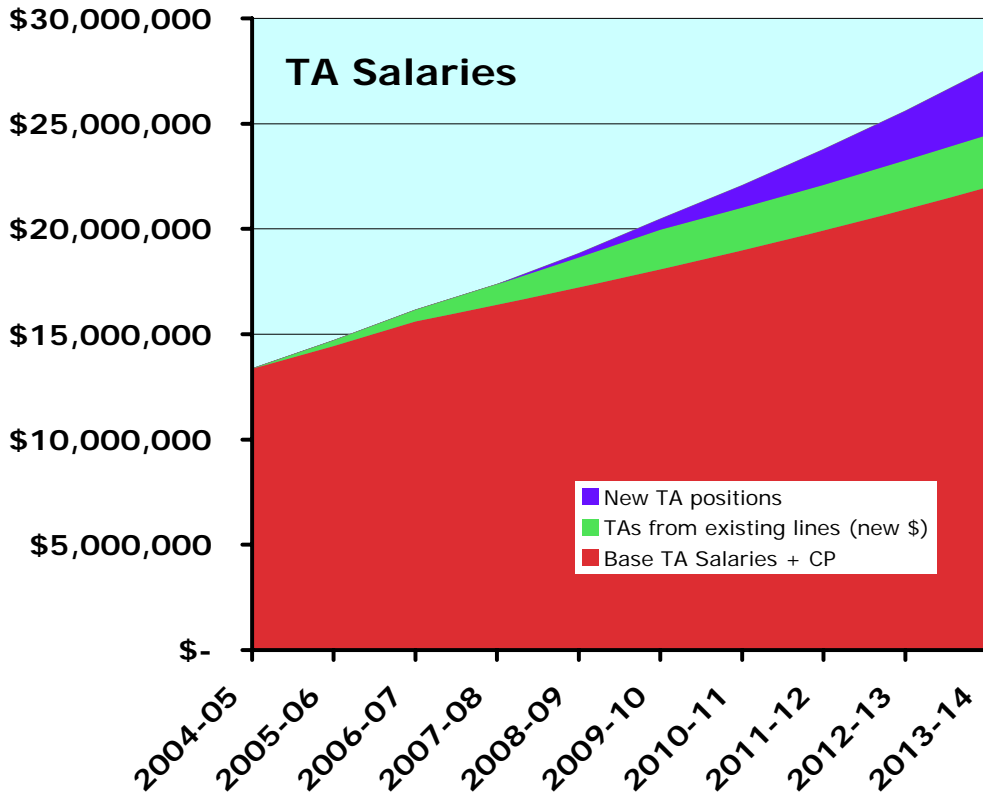


Figure 4b. Number of TA and PTL appointments in FAS-NB from 1991 to 2001-02. Data compiled by M. Beals, FAS-NB.

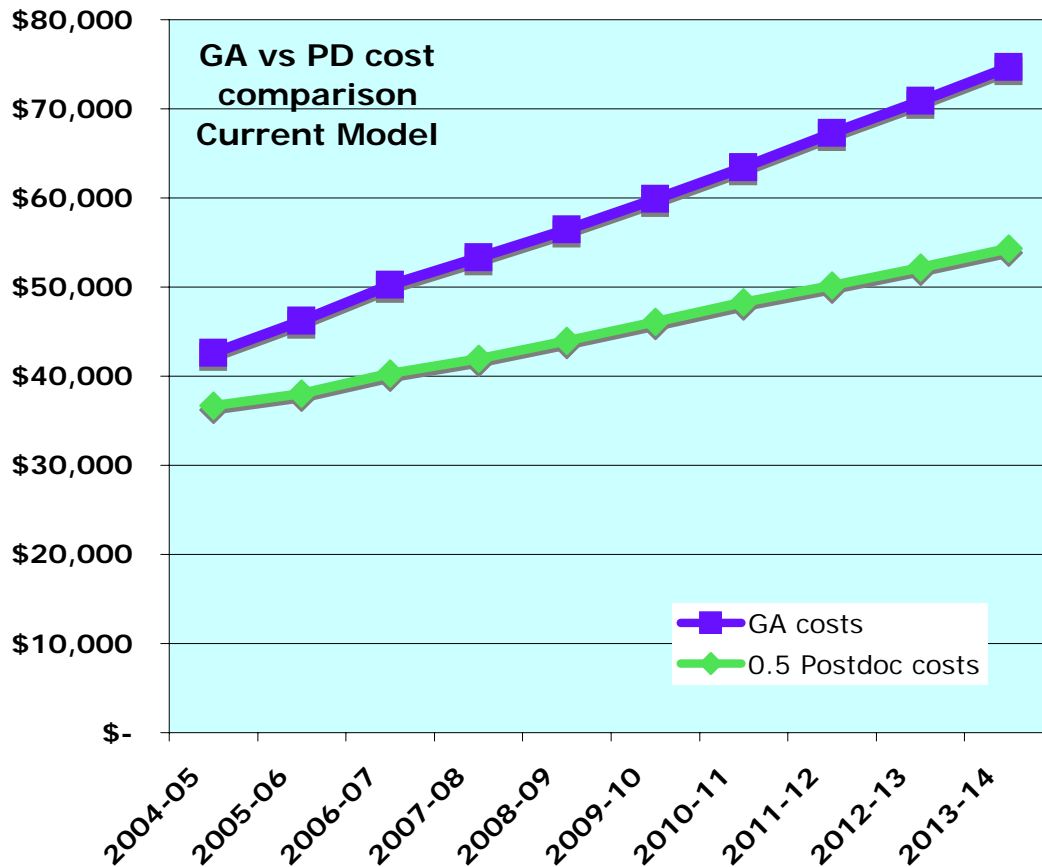
Figure 5. Projected costs of TA salaries.



The base TA salaries, including CP, and are projected to increase 5% per year after the current contract. We estimate that about 130 TA positions can be created from existing lines, but will need additional salary dollars. An additional \approx 120 new TA positions would require new lines, as well as additional funds.

Figure 6. Projected GA costs with current model of charges compared to postdoc costs.

The total costs to support a GA (salary + fringe + F&A + tuition + fees) are compared to the total costs (stipend + fringe + F&A) to support 0.5 postdocs with 0-years of experience.



In projecting costs to grants the following assumptions were made for annual increases:

GA salaries: 5%/year after current contract

Postdoc stipends: 4%/year

Non-resident tuition: 7%/year

Student + Computer Fees: 5%/year

Fringe benefit and F&A rates were taken from the ORSP web pages (and extrapolated based on the posted rates).

Figure 7. Projected GA costs with proposed model of charges and compared to postdoc costs.

The total costs to support a GA (salary + fringe + F&A + tuition + fees) in the proposed model of changes are compared to the total costs (stipend + fringe + F&A) to support 0.5 postdocs with 0-years of experience. As reference, the total GA costs without incentives, the current model, are included.

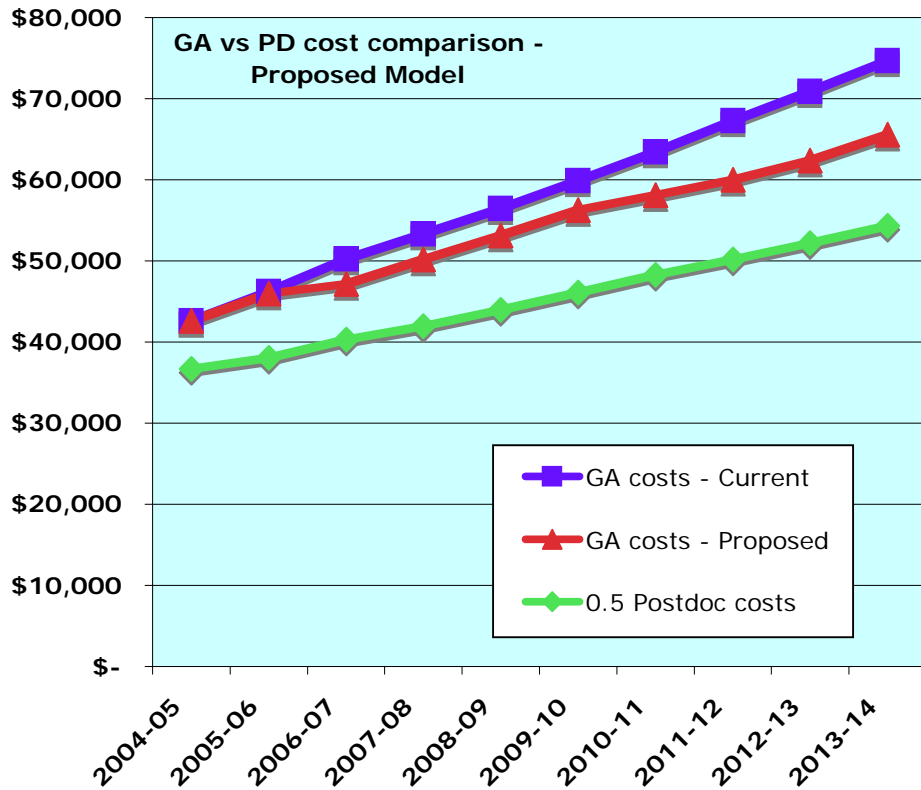


Figure 8. Comparison of flexible income to the University from GAs supported on external grants with the current model and with the proposed model of changes.

Flexible income is defined as indirect costs (F&A) plus tuition and fee income. We have assumed there would be a 3% increase per year in the number of GAs supported on external grants should the proposed model of changes be adopted.

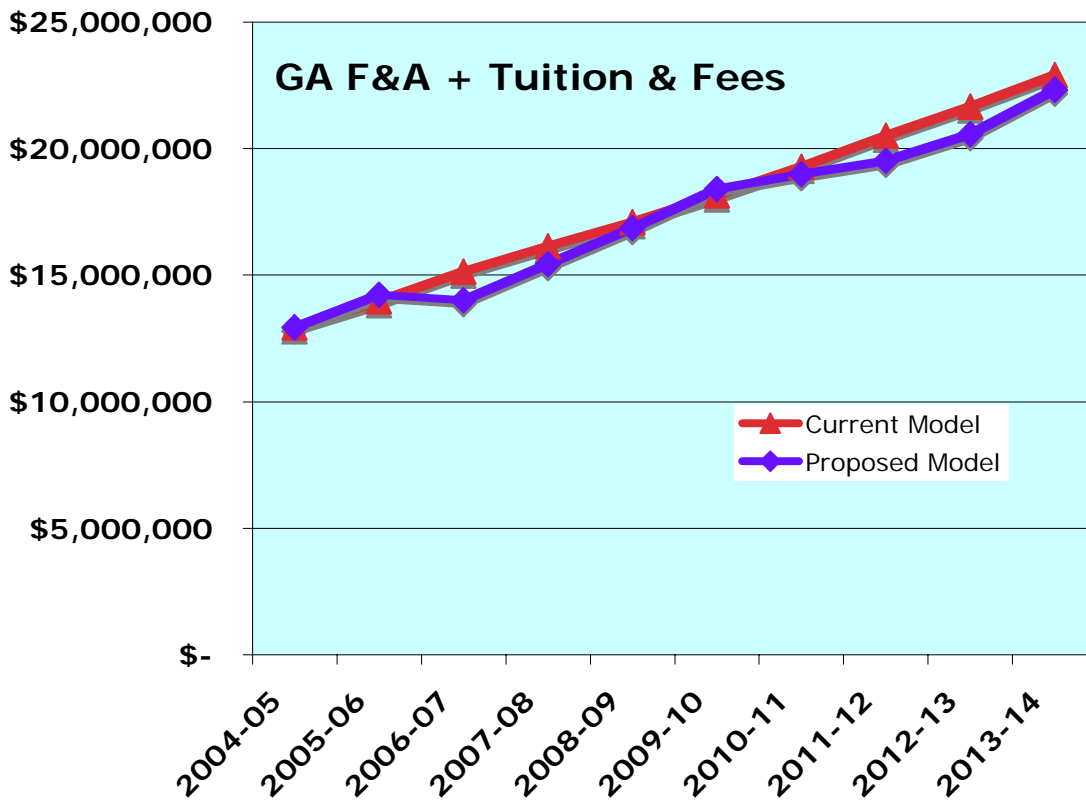


Figure 9. Projected salaries and stipends for TAs, Fellows, and NSF Fellows, compared to projected cost of living at Rutgers – New Brunswick. A projection for an appropriate competitive stipend in the physical sciences is included.

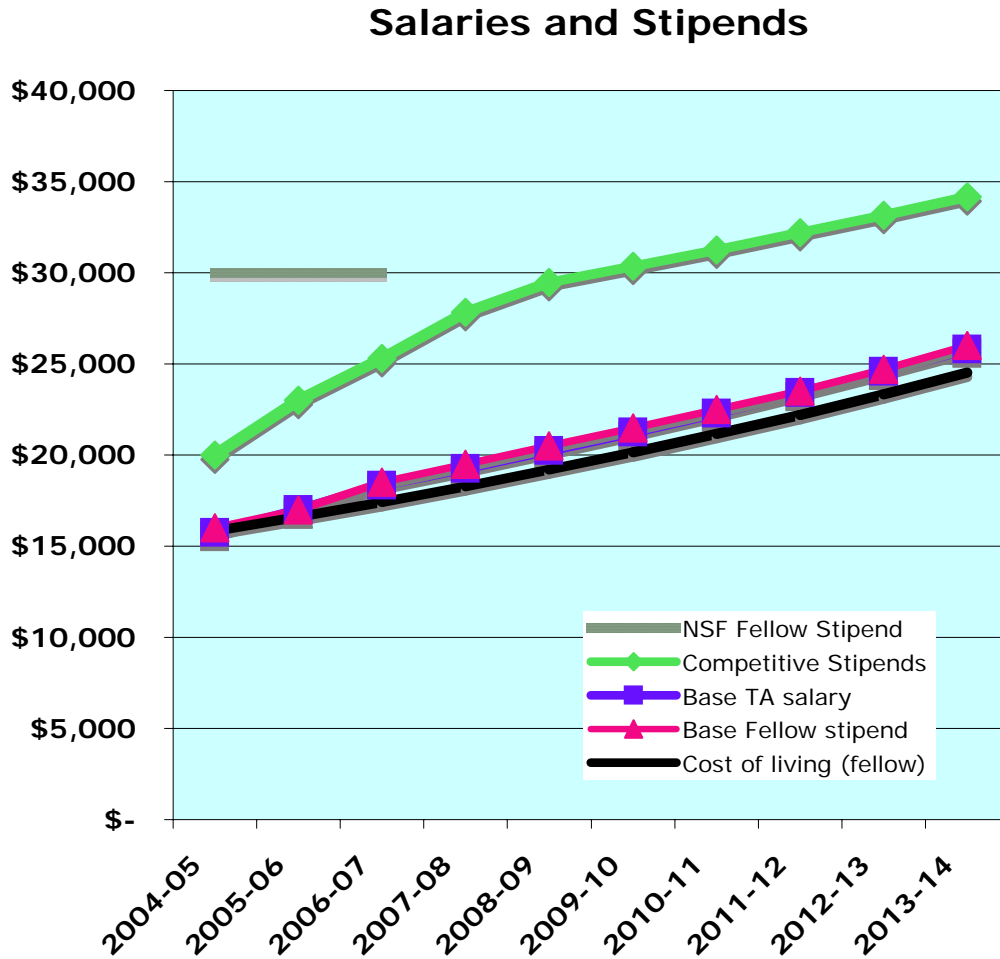


Figure 10. Projected costs of stipends for Fellows. Includes 2004-05 base support for fellows, costs to sustain stipend levels above the cost of living on campus, costs to increase stipend levels in select programs to meet competitive pressures, the costs to the University for new fellows, and the funds available for new fellows from private accounts. Projections beyond the current proposal are included to illustrate the reduction in the rate of increase.

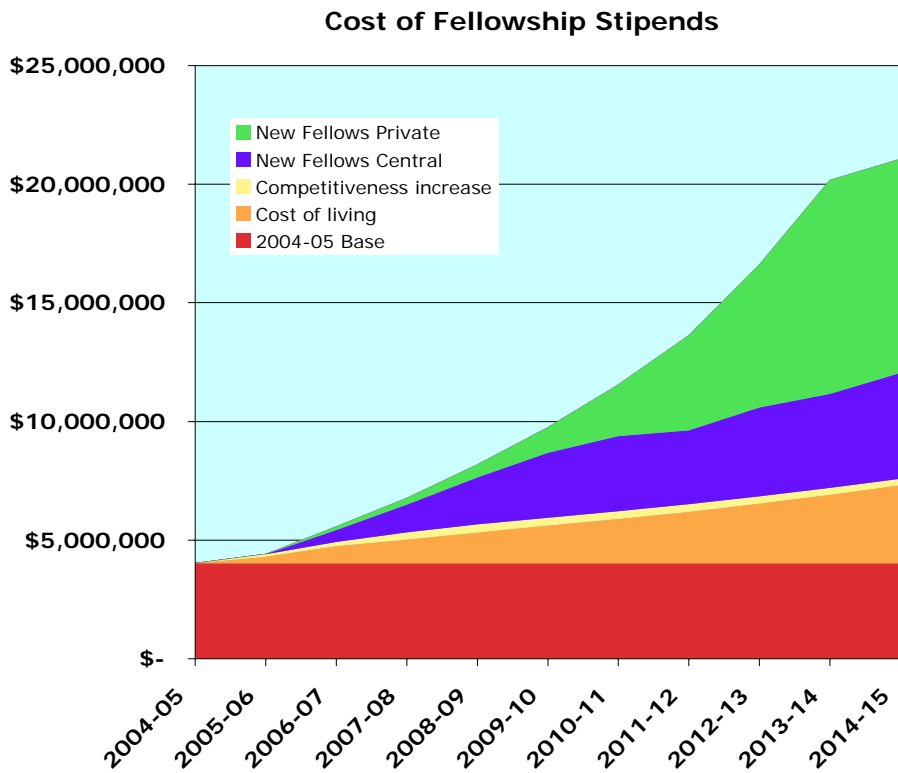


Figure 11. Proposed increase in number of Fellows.

Displays base number of Fellows in 2004-05, and proposed number of Fellows from University and private sources. Projections beyond the current proposal period are included to illustrate the reduction in the rate of increase.

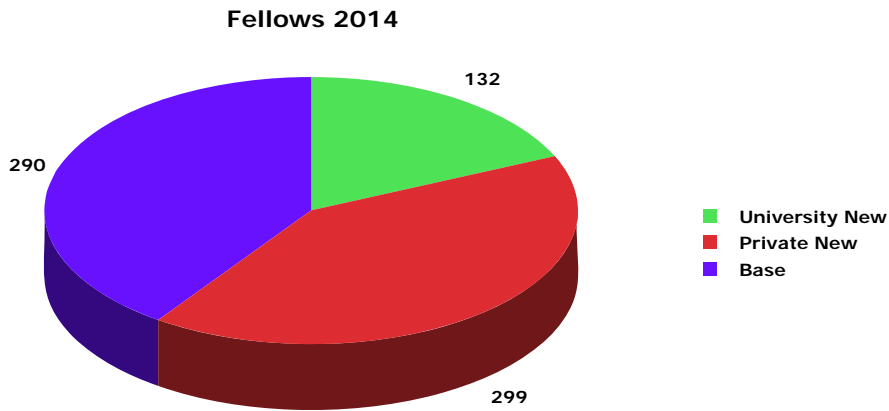
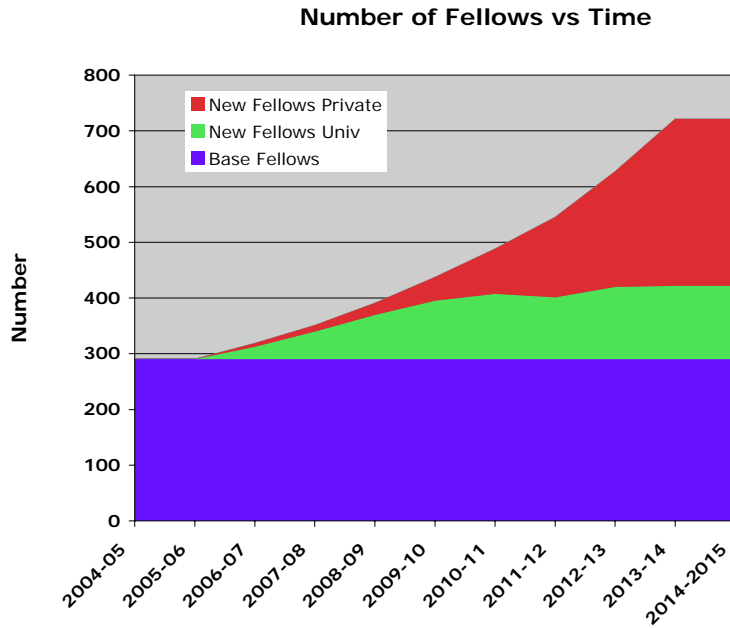


Figure 12. Projected costs of health benefits for Fellows 2004-2014.

Health benefits would be phased in over a period of 4 years starting in 2005. All fellows and trainees would be included as of Fall 2008. Health benefit premiums are projected to increase 8% a year.

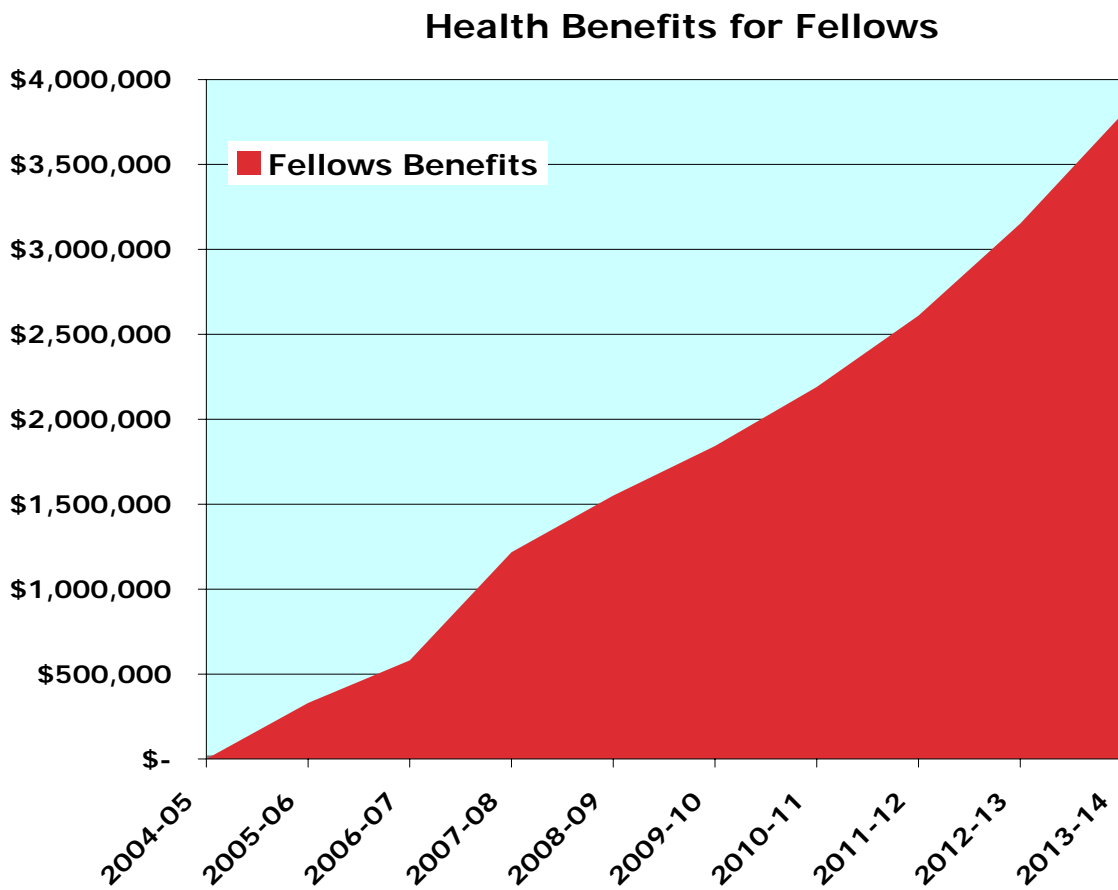


Figure 13. Projected costs of fees for Fellows and to recruit doctoral students. Student fees are projected to increase 5% per year. Recruitment costs include costs to programs to bring prospective students to campus and funds to supplement support packages (research accounts in the sciences and engineering and summer support in other fields).

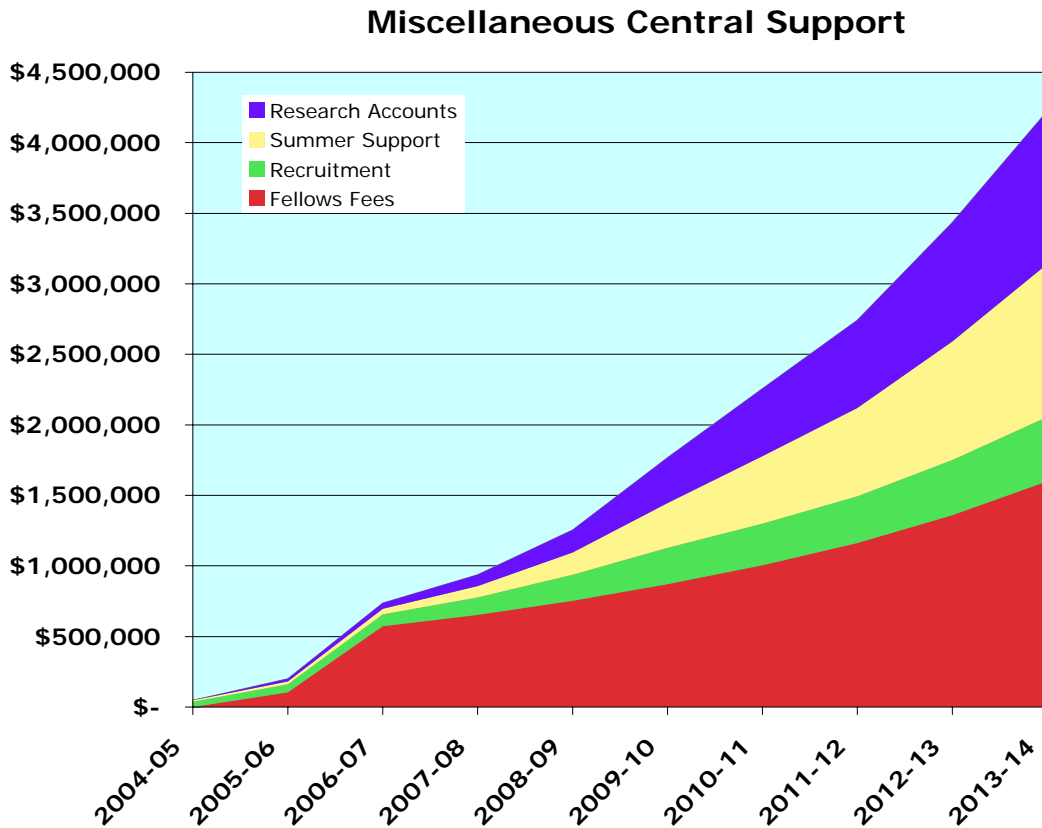


Figure 14. Projected costs to support doctoral student travel. These costs include pre-dissertation and special study travel awards, as well as funds to present research results at professional conferences. It is appropriate that such funds come from private sources.

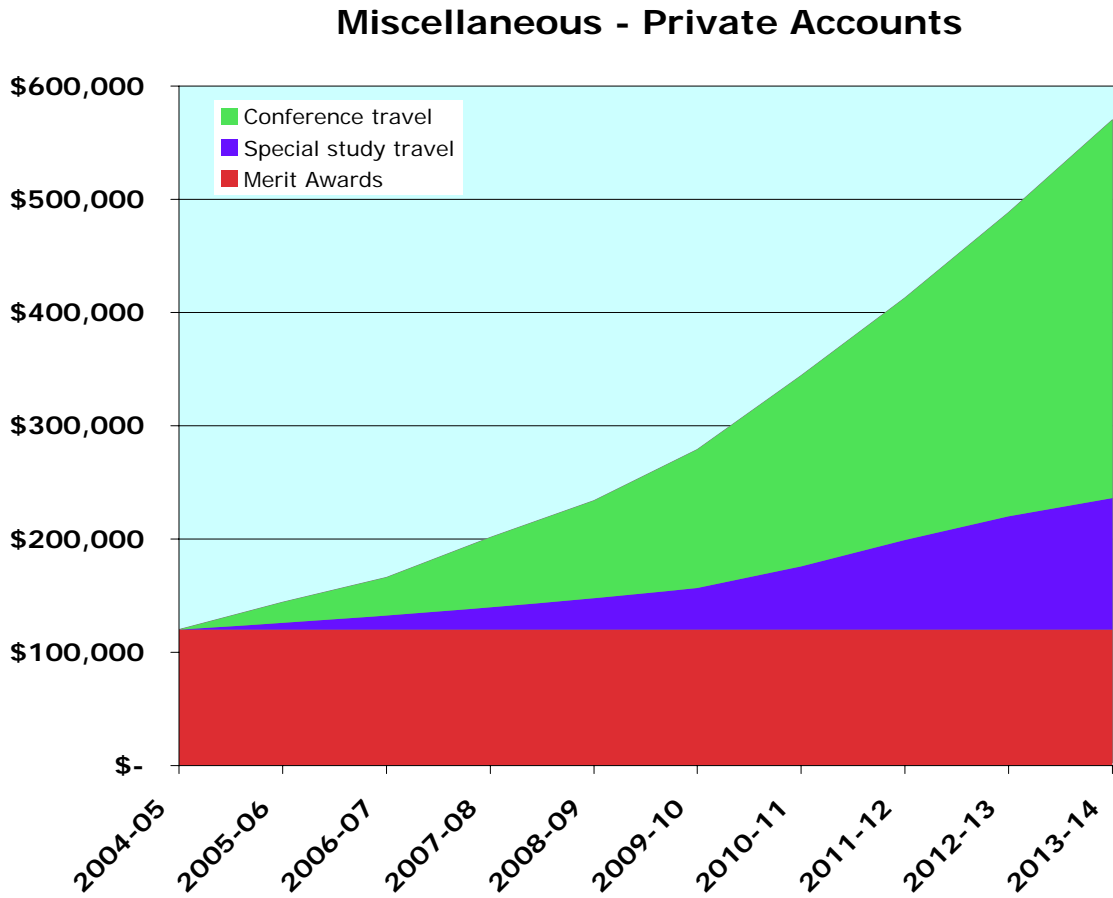


Figure 15. Projected salaries for current number of state TA/GA lines and fellowship stipend funds with no increases. The number of TAs would remain constant, but the number of fellows would decrease because fellowship stipends need to keep pace with the local cost of living.

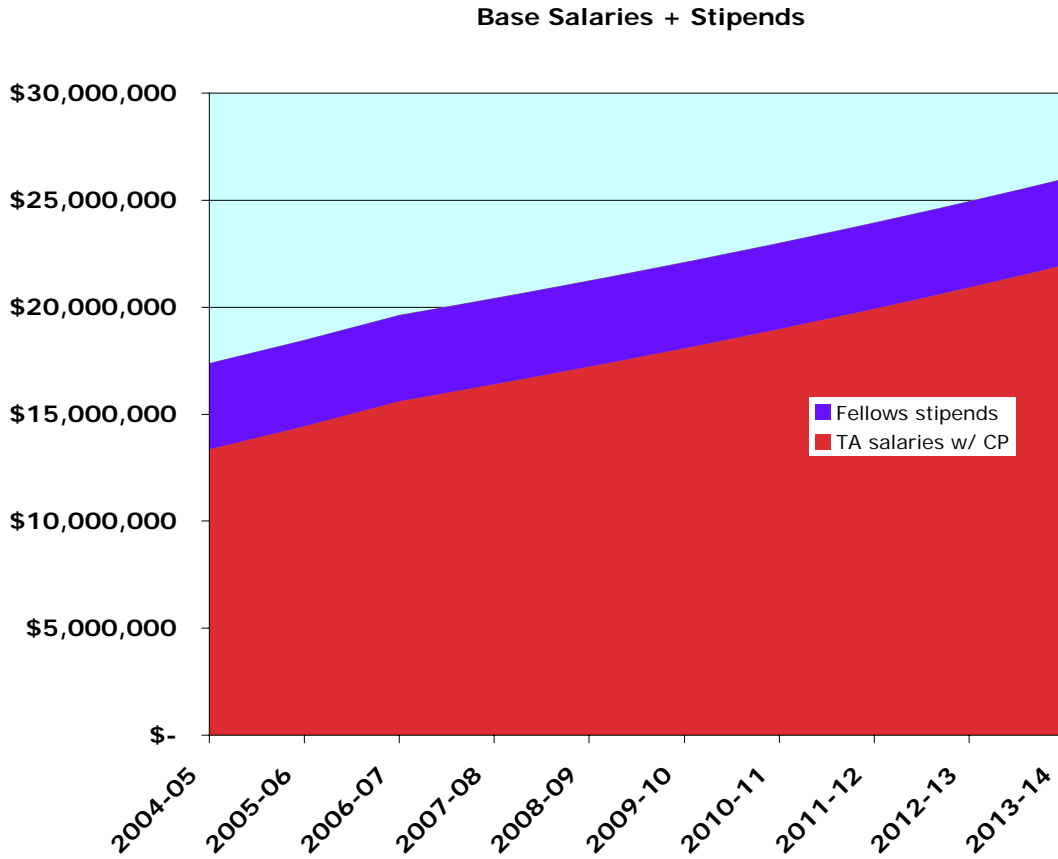


Figure 16. Current and projected number of tuition remissions for state TA/GAs, University and Endowed Fellows, and full-time equivalent tuition remissions to match external awards.

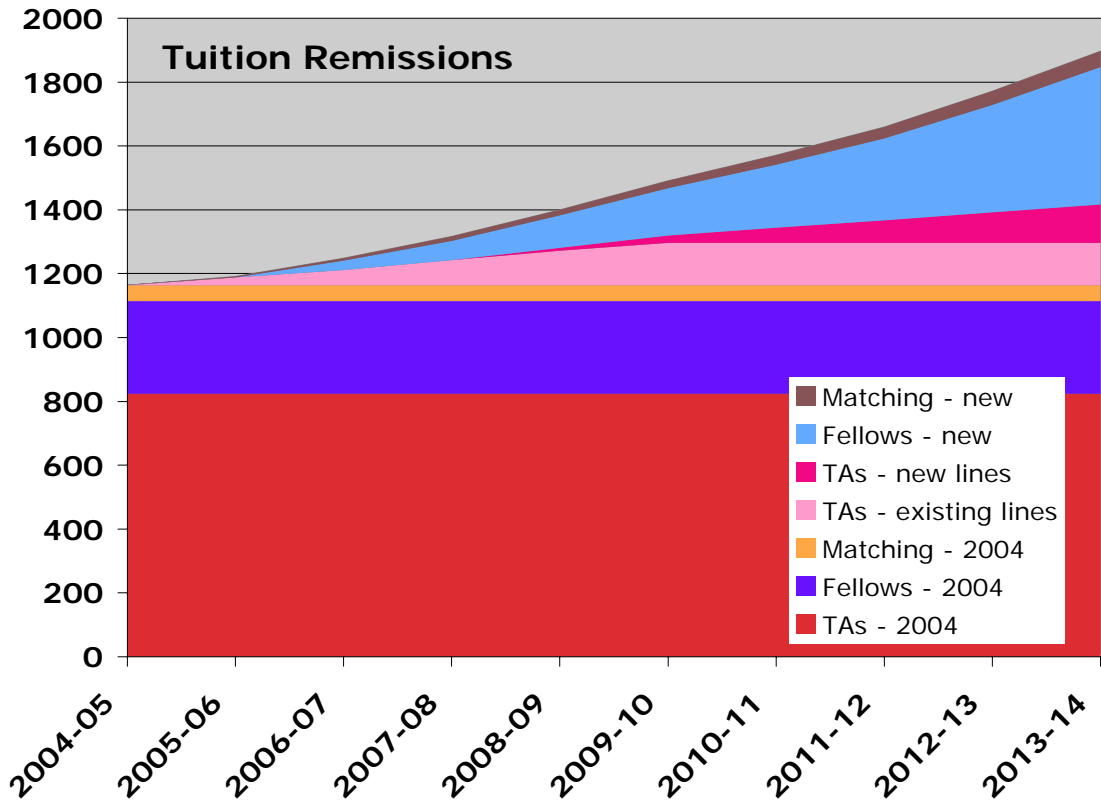


Figure 17. Summary of proposed salary and stipends costs to the University. Includes present Fellowship stipend funds and projected increases in salaries for number of TA/GA positions, as well as stipends for proposed increases in number of TAs, fellowship stipends and number of Fellows.

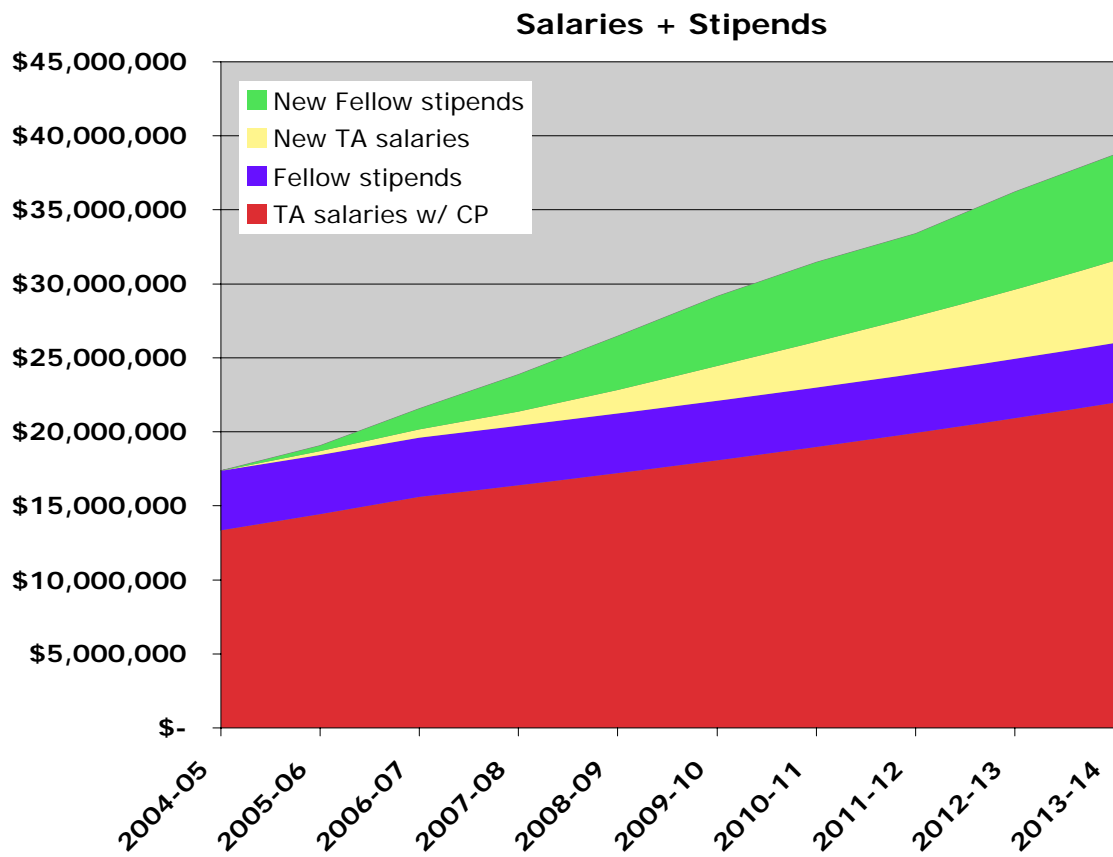


Figure 18. Projected costs to provide health benefits and fee remission for Fellows and fee remission for new TA positions.

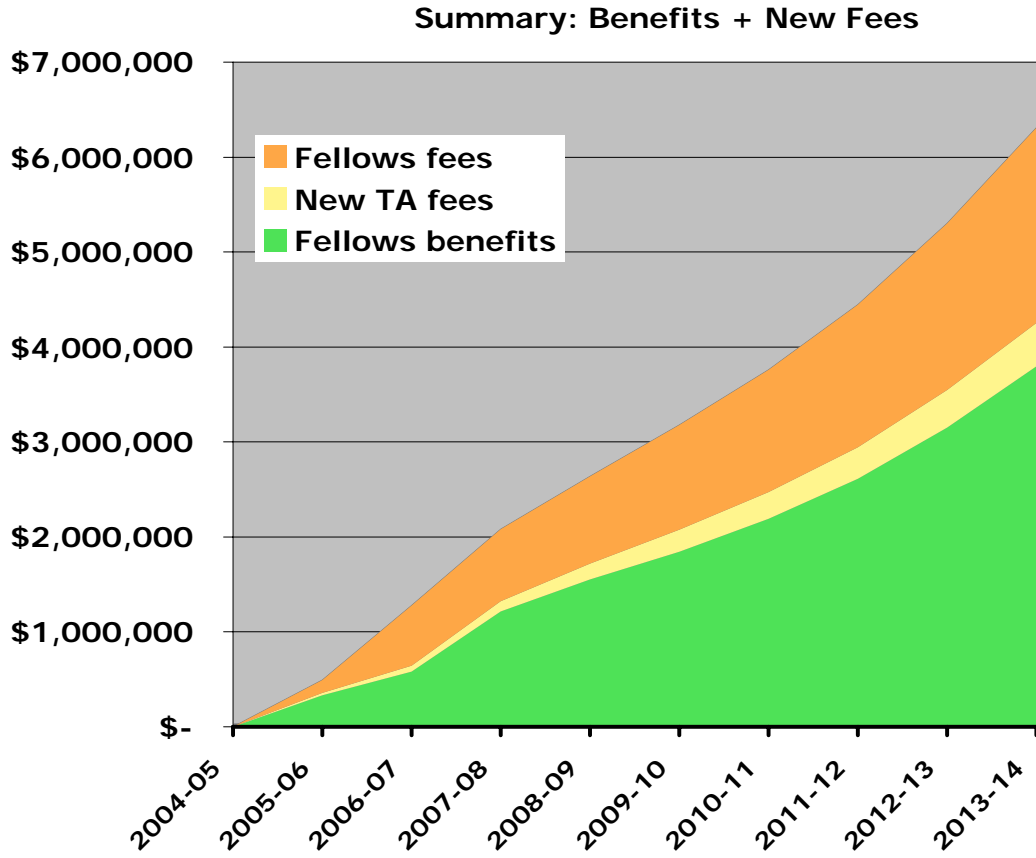


Figure 19. Summary of the projections of the new costs proposed in the case to enhance support of doctoral students.

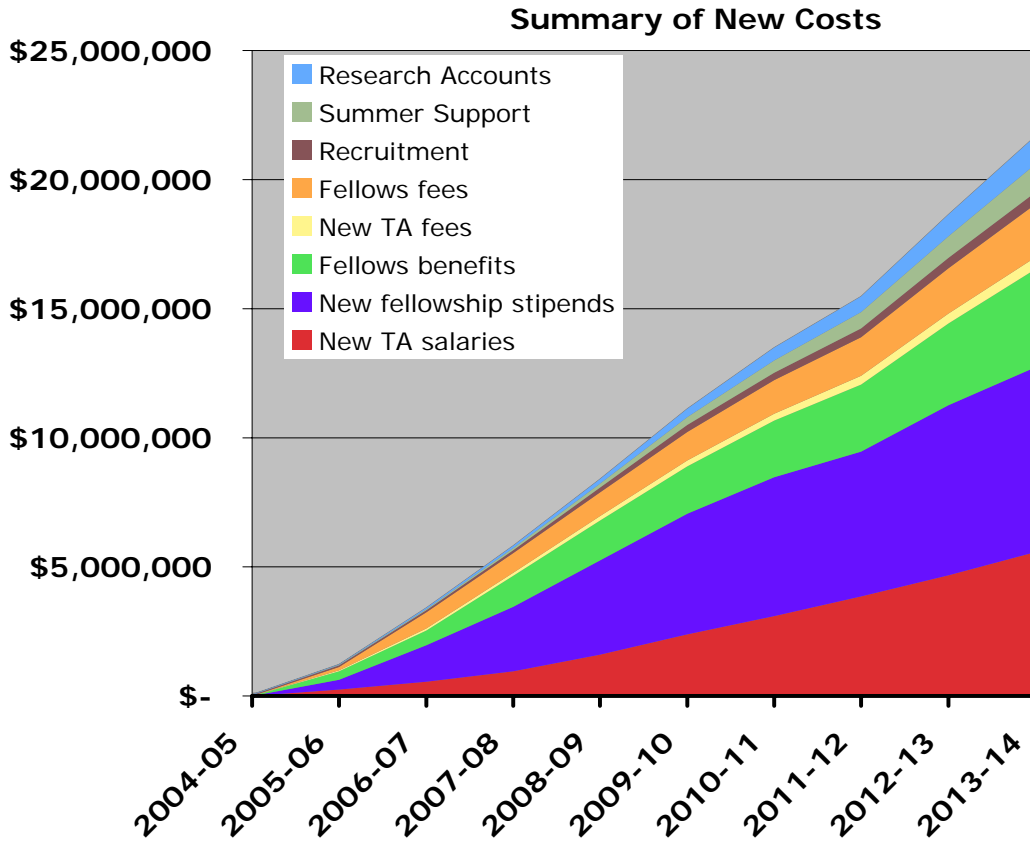
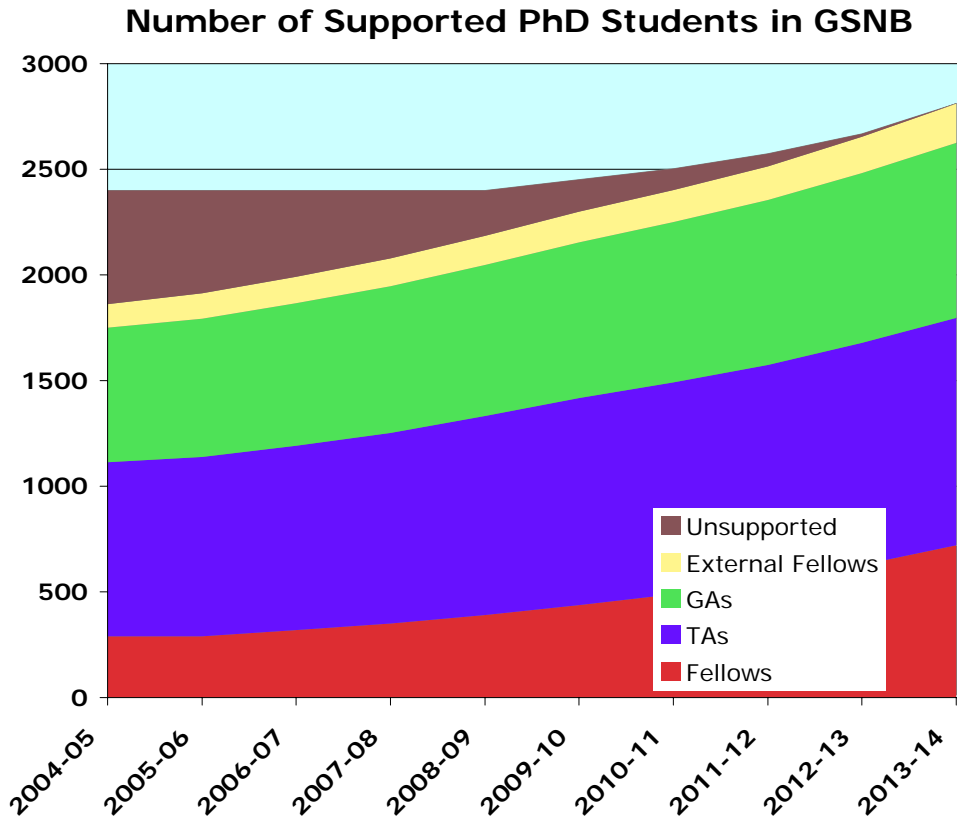


Figure 20. Projected change in the number of Ph.D. students and forms of support.



APPENDIX I: GRADUATE STUDENT AWARDS 2004-2005

Academica Sinica Dissertation Fellowship

Ju-chen Chen (Anthropology)

American Antiquarian Society Short-term Fellowship

Alexandra Socarides (Literatures in English)

American Association of Petroleum Geologists Grants-in-Aid

Mark Baum (Geological Sciences)

Jennifer Elder Brady (Geological Sciences)

American Association of University Women Dissertation Fellowship

Jennifer Schenk (Political Science)

Margaret Sumner (History)

J'aime Wells (Philosophy)

American Council of Learned Societies East European Language Training Grant

Amy Bryzgel (Art History)

American Heritage Center (University of Wyoming) Travel Grant

Michael Dobe (History)

American Historical Association Beveridge Research Grant

Jacqueline Castledine (History)

American Institute for Indian Studies Junior Research Fellowship

Arpita Chakrabarti (Anthropology)

American Physical Society—Magnetism Group 2005 Outstanding Dissertation Award

Namjung Hur (Physics and Astronomy)

American Psychological Association Minority Fellowship

Lisa Pugh (Psychology)

American Research Institute in Turkey Fellowships for Intensive Advanced Turkish Language Study

Jennifer Miller (History)

American-Scandinavian Foundation Dissertation Research Grant

Linda S. Fair (Geography)

American Society for Eighteenth-Century Studies/William Andrews Clark Memorial Library Fellowship

Kathleen Lubey (Literatures in English)

Baden-Württemberg Scholarship (Konstanz)

Melanie Holm (Comparative Literature)

Charlotte Newcombe Dissertation Fellowship

Corinne Noirot (French)

Chateaubriand Scholarship (French Embassy to the United States)

Kathleen Keller (History)

Community Forestry Research Predissertation Summer Fellowship

Sharon Baskind (Anthropology)

Council on Library and Information Resources Mellon Fellowship

Meghan Callahan (Art History)

Dirksen Congressional Center Congressional Research Award

Jennifer Schenk (Political Science)

Environmental Protection Agency STAR Fellowship

Emilie Stander (Ecology and Evolution)

Executive Women of New Jersey Graduate Merit Award

Laura Broadhurst (Music)

Dominique Padurano (History)

Fonds Québécois de la Recherche sur la Nature et les Technologies Fellowship

F.-J. Fortin (Physics and Astronomy)

Ford Foundation Community Forestry Program Grant

Sharon Baskind (Anthropology)

Foreign Language and Area Studies Summer Fellowship

Chelsea Booth (Anthropology)

Franklin and Eleanor Institute Travel Grant

Jacqueline Castledine (History)

Fulbright Fellowship

Amy Bryzgel (Art History) (Latvia)

Noelle Molé (Anthropology) (Italy)

Marc Shur (Anthropology) (Kenya)

Fulbright Visiting Fellowships

Pablo Angulo Ardoy (Spain) (Mathematics)

Guillermo Cantor (Argentina-LASPAU) (Sociology)

Maria Del Pelos Garavito Galofre (Colombia) (Microbiology and Molecular Genetics)

Johanna Jochumsdottir (Iceland) (History)

Yevgen Nazarenko (Ukraine) (Environmental Sciences)

Selva Pereda (Argentina) (Biomedical Engineering)

Ignacia Perugorria (Argentina) (Sociology)

Fulbright-Hays Doctoral Dissertation Research Fellowships

Gregory Swedberg (History) (Mexico)

Brenda Werth (Spanish) (Argentina)

Geological Society of America Graduate Research Grant

Alissa Henza (Geological Sciences)

German Academic Exchange Service (DAAD) Short-term Grant

Ulrich Groetsch (History) (declined)

German Marshall Fund Dissertation Fellowship

Noelle Molé (Anthropology)

Greek Government Fellowship

George Christopoulos (Psychology)

Harvard University Short-term Grants for Research in Atlantic History

Kristen Block (History)

HUD Doctoral Dissertation Research Grants

Kristen Crossney (Urban Planning and Policy Development)

Matthew Cuddy (Urban Planning and Policy Development)

Inter-university Consortium for Political and Social Research Clogg Summer Fellowships

Parina Patel (Political Science)
Phillip Streich (Political Science)

John Carter Brown Library Short Term Research Grant

Kristen Block (History)

Kennedy Library Research Grant

Tomas Tolvaisas (History)

Land Institute Graduate Research Fellowship

Jo Anne Crouch (Plant Biology)

Leakey Foundation Research Grants

David Braun (Anthropology)
Jennifer LeClair (Anthropology) (*declined*)
Jack McCoy (Anthropology)
Marc Shur (Anthropology)

Library Company Andrew Mellon Short-term Fellowship

Charles Foy (History)

Massachusetts Historical Society Benjamin Stevens Fellowship

Margaret Sumner (History)

McNeill Center for Early American History (University of Pennsylvania)

Dissertation Fellowship

Jennifer Manion (History)

Mellon Fellowships in the Humanities

Jenna Lewis (Literatures in English)
Jennifer Nado (Philosophy)
Andrew Sepielli (Philosophy)
Karen Shanton (Philosophy)

Mellon Huntington Library Fellowship

Kathleen Lubey (Literatures in English)

Mellon Mentored Fellow (Rhodes University)

Michele Ruiters (Political Science)

Metropolitan Museum of Art Polaire Weissman Fellowship

Heather Hess (Art History)

Microsoft Algorithm Invitational Finalist

Xiaomin Chen (Computer Science) (five of 3,300)

Mystic Seaport Museum Paul Cuffe Memorial Fellowship

Charles Foy (History)

National Aeronautics and Space Administration Fellowship

Nathan Greenhut (Industrial and Systems Engineering)
Ana Sever (Ceramic and Materials Science and Engineering)

National Defense Science and Engineering Graduate Fellowship

Bradley Bowden (Ceramic and Materials Science and Engineering)
Philip Matchett (Mathematics)

National Garden Club Scholarship

Jennifer Momsen (Ecology and Evolution)

National Science Foundation Dissertation Improvement Grant

Tim La Pira (Political Science)

Jack McCoy (Anthropology)

Julie Silva (Geography)

Wendy Weisman (Anthropology)

National Science Foundation Graduate Research Fellowship

Jennifer Lee Cooper (Psychology)

Philip Matchett (Mathematics)

Yuri Núñez (Cell and Developmental Biology)

NSF Summer Institute for Research Design in Cultural Anthropology Grant

Montserrat Soler-Cruz (Anthropology)

National Society of the Colonial Dames Tri-State Scholarship

Margaret Sumner (History)

New Jersey Commission on Spinal Cord Research Graduate Student Fellowship

Jason Maikos (Biomedical Engineering)

Wenying Zhang (Neuroscience)

New Jersey DAR Graduate Student Award

Charles Foy (History)

New York University Wagner School Visiting Scholar Fellowship

Stacey Sutton (Interdisciplinary: Sociology/Urban Planning and Policy Development)

North American Conference on British Studies-Huntington Library Fellowship

Kathryn Steele (Literatures in English)

Northeast Consortium for Faculty Diversity Dissertation-Year Visiting Fellowship (Middlebury College)

Christopher Mag Uidhir (Philosophy)

Organization of American Historians Merrill Travel Grant in Twentieth-Century American Political History

Jacqueline Castledine (History)

Polk Fellowship (Grand Canyon National Park)

Joanne Tactikos (Anthropology)

Portuguese Government Fellowship

Fernando Louro (Mathematics)

Princeton University Office of Population Research Pre-Dissertation Research Grant

Jennifer Miller (History)

Princeton University Program in Urbanization and Migration Summer Research Grant

Dillon Mahoney (Anthropology)

Manjusha Nair (Sociology)

Debarati Sen (Anthropology)

Michal Shapira (History)

Radcliffe Institute for Advanced Study at Harvard Schlesinger Library Dissertation Grant

Jacqueline Castledine (History)

Andrea Estepa (History)

Emily Zuckerman (History)

School of Criticism and Theory (Cornell)

Michal Shapira (History)

Smith College Archives Caroline D. Bain Scholar-in Residence Award

Jacqueline Castledine (history)

Smithsonian American Art Museum Fellowship

Kimberly Curtiss (Art History)

Social Science and Humanities Research Council of Canada Fellowships

Meghan Lau (Literatures in English)

Karen Routledge (History)

Patricia Young (Political Science)

Social Science Research Council IDRF Award

Kathleen Keller (History)

Rebecca Scales (History)

Society for American Archaeology Student Paper Prize

David Braun and Briana Pobiner (Anthropology)

South Asian Summer Language Institute FLAS Grant

Chelsea Booth (Anthropology)

Spain. Ministry of Foreign Affairs. Dissertation Research Grant

Kristen Block (History)

Thai Government Fellowship

Taweechai Jiaranaikhajorn (Bioresource Engineering)

UC-Santa Cruz Dickens Universe Fellow

Kristie Allen (Literatures in English)

Devin Griffiths (Literatures in English)

University of Michigan Clements Library Jacob M. Price Visiting Research Fellowship

Margaret Sumner (History)

University of Vermont Minority Dissertation Fellowship

Christy Maghuider (Philosophy)

Urban Land Institute Kenneth M. Good Fellowship

Justin Hollander (Urban Planning and Policy Development)

Vietnam Educational Foundation Fellowship

Tienphong Huynh (Chemical and Biochemical Engineering)

Thang Le (Computer Science)

Luc Le Nguyen (Mathematics)

Wenner-Gren Foundation Professional Development International Fellowship

Emmanuel Ndiema (Anthropology)

Woodruff Library Research Fellowship (Emory University)

Soyica Diggs (Literatures in English)

CONTINUING AWARDS

Canadian Studies Fellowship (Canadian Embassy)

Katherine Albert (Geography)

Consejo Nacional de Ciencia y Tecnología (Mexico) Fellowships

José Espírito (Industrial and Systems Engineering)

Heidi Taboada (Industrial and Systems Engineering)

Eisenhower Transportation Fellowship

John Renne (Urban Planning and Policy Development)

EPA STAR Fellowship

Zoe Finkel (Oceanography)

Ford Foundation Minority Fellowship

Rosana Grafals (Geography)

Fulbright Visiting Fellows

Ignacio Infante (Spain) (Comparative Literature)

Boosaree Titapiwatanakun (Thailand) (Plant Biology)

Howard Hughes Medical Institute Predoctoral Fellowship

Janet Bowne-English (Physiology and Neurobiology)

National Aeronautics and Space Administration Fellowship

Lori Dibble (Anthropology)

Jennifer Adams Krumins (Ecology and Evolution)

Loretta Dibble (Anthropology)

Nathan Greenhut (Industrial and Systems Engineering)

National Cancer Institute Ruth L. Kirschstein National Research Service Award

Individual Fellowship

Yari Marin (Microbiology and Molecular Genetics)

Alejandro Toro (Chemistry and Chemical Biology)

National Institutes of Health MARC Fellowship

Andre Hudson (Plant Biology)

National Institutes of Health National Research Service Award

Benedetta Leuner (Psychology)

National Science Foundation Graduate Student Fellowships

David Braun (Anthropology)

Arthur Congdon (Physics and Astronomy)

Briana Pobiner (Anthropology)

Bethany Weber (Psychology)

UNCF-Merck Fellowship

Etzer Darout (Chemistry and Chemical Biology)

Appendix II. Examples of Contributions of Ph.D. Students to the Research, Teaching and Service Missions of the University

A. Contributions to the research mission of the University

Life Sciences

Zoe Finkel (Oceanography)
Wendy M. Iwanyshyn (Food Science)
Song Jin (Pharmaceutical Science)
Christian Kazanecki (Molecular Biosciences)
Anna Knapinska (Pharmacology)
Irving Vega (Biochemistry)

Mathematical and Physical Sciences and Engineering

Kathryn DeLaurentis (Mechanical and Aerospace Engineering)
Augusto Ponce (Mathematics)
Ram Sharma (Chemical Engineering)
Karen Steege (Chemistry and Chemical Biology)
Harini Sunderaraghavan (Biomedical Engineering)
Adam Wasserman (Chemistry and Chemical Biology)

Humanities

Art History: Brian Clancy
J. Patrick Cesarini (English)
Danielle McGuire (History)
Lucia McMahon (History)
Corinne Noirot-Maguire (French)

Social and Behavioral Sciences

Susan Bagley Koyle and
Carey Currey (Communication, Information, and Library Studies)
Robin Haber (Psychology)
Jackson Njau (Anthropology)
Nia Parson (Anthropology)

B. Contributions to the teaching mission of the University

Humanities

English: Trinyan Paulsen Mariano
German: Kai Artur Diers
History: Danielle McGuire

Social and Behavioral Sciences

Anthropology: David R. Braun
Communication, Information, and Library Studies: Joanne Cattafesta
and Marc Leverette
Industrial Relations and Human Resources: Ibraiz Tarique
Psychology: David Waxler

Life Sciences

Animal Sciences: Mary Beth Gordon
Ecology and Evolution Jennifer Momsen
Ecology and Evolution: Matthew I. Palmer

Molecular Biosciences: Barbara Akum, Kristin Listner, and Joe Porter

Mathematical and Physical Sciences and Engineering

Mathematics: David Galvin

Mechanical and Aerospace Engineering: Kathryn DeLaurentis

Physics and Astronomy: Jessica Sawyer and Aaron Warren

Dissertation Teaching Awards

Anthropology: Mona Bhan

Art History: Tracy Fitzpatrick

Comparative Literature: Sanja Bahun

Comparative Literature: Yianna Liatsos

Literatures in English: Alexandra Socarides

French: Aya Tanaka

C. Contributions to the service mission of the University

Connecting to the Italian-American community:

Doctoral students in Italian

Working with local middle school teachers:

Doctoral students in Math, Operations Research, and Engineering

Research activities that serve the needs of the State:

Industrial Relations and Human Resources

Plant Biology

Urban Planning and Policy Development

A. Contributions to the research mission of the University

Life Sciences

Zoe Finkel (Oceanography) is a physiological ecologist who works in areas that span from biological oceanography to evolutionary biology. The theme of her research is the role size plays in the ecology and evolution of aquatic phytoplankton, work that has been published in the *Proceedings of the National Academy of Sciences*, *Nature*, and other premier journals.

Wendy M. Iwanyshyn (Food Science) studies the effects of zinc availability on lipid metabolism. Zinc is an essential element required for the growth and metabolism of eukaryotic cells. She found that the deprivation of zinc from the growth medium resulted in alterations in the composition of neutral lipids at the expense of phospholipids.

The research of **Song Jin (Pharmaceutical Science)** has led to the design of a project that has been incorporated into a major corporation's (Fujisawa) clinical research trial on its immunosuppressive drug Tacrolimus. This is the first Clinical Trial funded in the Department of Pharmaceutics, and will hopefully serve as the foundation for the establishment of a training curriculum in the area of Translational Research.

The research of **Christian Kazanecki (Molecular Biosciences)** brings together concepts from cell biology and materials engineering to study the biology of bone tissue. He is investigating the role that osteopontin plays in cell signaling, cell differentiation, and biomineralization.

The research of **Anna Knapinska (Pharmacology)** studies how integrin helps to mediate interactions between cells and between cells and a surrounding matrix. Her work brings together cell adhesion studies and the engineering of cell responses to biointerfaces.

Guoliang Qing (Microbiology and Molecular Genetics) studies regulation of the transcription factor NF-kappaB which is important to immunity and tumorigenesis, with applications to certain lymphomas.

Irving Vega (Biochemistry) identified a unique regulatory protein in nerve cells of the brain. He determined that this protein associates with a complex, which is involved in the formation of the branched growth of neurites from different points in the nerve cell body. His further studies indicate that this protein appears to function during nerve cell differentiation by controlling the outgrowth of neurite branches. His work helps us understand the process by which nerve cells make connections with other nerve cells as the brain is wired during development and during the continuous process of learning and memory.

Mathematical and Physical Sciences and Engineering

The research of **Kathryn DeLaurentis (Mechanical and Aerospace Engineering)** focuses on robot design, using shape memory alloys and other smart materials to actuate the joints of robotic systems for applications in space exploration and medical rehabilitative devices. In order to accomplish her objectives, she has developed unique methodologies for smart material actuation

and rapid fabrication of prototypes. Her accomplishment as an NSF Fellow was used as part of the justification for the NSF FY2004 budget request. Her groundbreaking concepts are part of the successful patent “Prosthetic, Orthotic, and Other Rehabilitative Robotic Assistive Devices Actuated by Smart Materials,” Constantinios Mavroidis (Engineering), PI.

The dissertation of **Augusto Ponce (Mathematics)** focuses on understanding the singularities of solutions of non-linear partial differential equations, at the core of mathematics with implications for physics, astrophysics, and topology. Mr. Ponce has made very deep contributions to mathematics, his proofs are elegant and he uses techniques not usually employed in his field.

The research of **Ram Sharma (Chemical Engineering)** integrates the design of polymeric materials and cell and tissue engineering to design dynamic interfaces between cells and biomaterials to activate cell motility and promote the healing of wounds.

The research of **Karen Steege (Chemistry and Chemical Biology)** focuses on drug delivery systems. She brings together concepts of physical organic chemistry, pharmacokinetics, and biomaterials materials to probe these systems using very fast (femtosecond) laser fluorescence in the laboratory of Ed Castner (FAS, Chemistry).

The research of **Harini Sunderaraghavan (Biomedical Engineering)** brings together techniques from fluid mechanics, cell bio-mechanics, and neurobiology. She is developing microfluidic arrays to optimize in-vitro designs of implantable biomaterials for spinal cord regeneration.

The thesis work of **Adam Wasserman (Chemistry and Chemical Biology)** centers on the development of an entirely new approach to calculating low-energy electron-molecule scattering using time-dependent density functional theory. These calculations are crucial to understanding plasma etching of semiconductors, ozone depletion and CO₂ buildup in the atmosphere, as well as several key questions in astrochemistry. In addition to the primary focus of his dissertation, he is probing the foundations of density functional theory and its relationship to chemical reactivity theory.

Humanities

Brian Clancy (Art History) studies the architecture of American opera houses in the late nineteenth and early twentieth centuries, work that is poised to make a significant contribution to the field of architectural history. He has given prestigious presentations at the Frick and the Metropolitan museums, is active in historic preservation, and performs as a tenor in a major choral ensemble.

The dissertation of **J. Patrick Cesarini (English)** entitled “Reading New England’s Mission: Indian Conversion and the Ends of Puritan Rhetoric in the Seventeenth Century” focuses on a series of pamphlets that were used by Puritan missionaries in converting the Indians. These pamphlets reflect the major problems and concerns of the colonial era.

Danielle McGuire (History) received the Pelzer Prize for the best essay submitted by a graduate student from the Organization of American Historians. The prize includes publication in the prestigious *Journal of American History*. Her article “‘It Was Like All of Us Had Been Raped’: Black Womanhood, White Violence, and the Civil Rights Movement” is from her ongoing dissertation project “At the Dark End of the Street: Sexualized Violence, Community Mobilization and the African American Freedom Struggle”.

The dissertation of **Lucia McMahon (History)**, “The Harmony of Social Life: Gender, Education, and Society in the Early Republic,” examines women’s education and the rules of social discourse between women and men in the early 19th century in the Boston-Philadelphia-New York area. She is concerned with what women actually read and how they were educated, as well as what men and women made of women’s education. Her, possibly controversial, conclusion is that education reshaped both women’s identity and the lifetime relationship of wives and husbands.

Corinne Noiro-Maguire (French) thesis will be the first general analysis of plain style rhetoric in French Renaissance poetry, important to French literature studies, work already recognized by the Modern Language Association.

Social and Behavioral Sciences

Susan Bagley Koyle and Carey Curry (Communication, Information and Library Studies) have contributed substantially to a research project funded by The Robert Wood Johnson Foundation. They conducted valuable research on how to motivate nonsmokers to protect their health by speaking up about smoking in non-smoking areas. They also helped establish a website on nonsmokers' rights.

The research of **Robin Haber (Psychology)** examines a new subset of emotion communication: chemosensory emotional communication. Her work is some of the first to examine the human ability to manage (and sometimes, not to manage) chemosensory information. Fine fragrances, odors associated with events or childhood, as well as naturally occurring odors such as leafy odors and human emotion odors are considered. The psychology of chemosensory communications is important in many aspects of industry in New Jersey (for example, the fine fragrance industries with headquarters in NJ), as well as being an important environmental consideration.

Jackson Njau (Anthropology) is a Tanzanian national whose research, focused on crocodile damage to fossil bones, has changed long-held tenets of paleoanthropology, work that has been published in *Science*. Upon completing his dissertation, Mr. Njau will become director of the National Natural History Museum in Arusha, Tanzania and a director of the Olduvai Project.

Nia Parson (Anthropology) works in Santiago, Chile on her project “Gender, Trauma and Healing: An Ethnographic Examination of Domestic Violence”. She investigates the influences of social, cultural, political and economic contexts on the experiences of women who have survived domestic violence and recovery. Her research has been supported by several major

fellowships, including a Fulbright-Hays Grant from the US Department of Education and a Fulbright IIE grant from the US Department of State.

B. Contributions to the teaching mission of the University

Humanities

As a TA in the Writing Program, **Trinyan Paulsen Mariano (English)** has excelled as an instructor in “Expository Writing”, regarded by many students as one of the most challenging courses they take at Rutgers, but critical to their future success in writing while at Rutgers and their future careers. A central part of being an instructor in the Writing Program is grading the assignments, where Ms. Mariano has shown unusual commitment to communicating how the students can improve performance while encouraging intellectual growth. She also helps the students develop the tools to be effective as a peer reviewer and using peer comments to revise their own work. She is committed to using technology to teach writing, using online bulletin board spaces to help students learn how to write and encouraging student voices that may be silent in the classroom. More recently she has played a lead role in developing and teaching a Justice Administration section of Research in the Disciplines, English 201, where students develop the tools for 10-15 page research papers that take a position in a scholarly debate of a test case.

Kai Artur Diers (German) has taught sections of Advanced German and a 300-level course in advanced language practice. In the Advanced German sections he challenges the students with difficult material and handles questions with great skill and flexibility, bringing wit and charm to his classes. In the 300-level course he has added new units on contemporary German politics and society, often linked with a creative use of internet resources, inspiring his faculty mentors to follow his lead. Mr. Diers has assumed the directorship of the new Rutgers College “German House”, where he serves as graduate advisor to undergraduates who have chosen to live there to learn more about German and European culture and politics, as well as leading three weekly “German tables” which provide students the opportunity to learn about current German and European cultural issues, while improving their German language skills. He is the founder and organizer of the weekly German film night on the College Avenue campus, bringing a wide variety of contemporary German cinema to Rutgers, viewing that include faculty presentations.

In Summer 2001, after completing her M.A. at the University of Wisconsin and before joining Rutgers, **Danielle McGuire (History)** had the major responsibility for organizing and realizing “Freedom Ride 2001”, that took students back to some of the locations of the original Civil Rights-era Freedom Ride. She has taught as an assistant in the U.S. survey course, the Development of the United States, which included substituting for the faculty lecturer when the professor was seriously ill, and she taught her own course in African-American history. She has also taught the special Gateway Section, for students at risk, of the U.S. Survey course. As a discussion leader she engages her students by inspiring them to link past and present, effectively using small group interactions and contrasting opinions to extend the thinking of the students.

Social and Behavioral Sciences

The dissertation research of **David R. Braun (Anthropology)** focuses on the changing patterns of landscape and tool use amongst our earliest ancestors (≈ 1.8 million years ago) in Kenya. As part of his field work in Kenya, he served as a teaching assistant in the Koobi Fora Field School,

where undergraduates are fully integrated into archaeological field work, as well as take courses and hear presentations on evolutionary anthropology. As a TA he played the lead role in preparing for the Summer School at Koobi Fora, a 4-day trek from Nairobi, organizing the cooks and mechanics, overseeing acquisition of supplies and inventory of equipment, and coordinating travel and lodging arrangements for the students in Nairobi, as well as at campsites between Nairobi and Koobi Fora. During the Summer School he gave lectures on his research, teaching undergraduates field techniques, as well as holding review sessions for their exams at the end of the School. Many of the undergraduates use this experience as the centerpiece of their senior honors theses, often presenting their work at national meetings. By participating in the Koobi Fora Field School, Mr. Braun was also able to conduct the preliminary work for his own dissertation project, including learning the techniques required for prehistoric field work. This preliminary work, and the access to the Koobi Fora for his research, enabled him to receive considerable external support for the field studies for his dissertation, including several fellowships from the National Science Foundation, a Fulbright-Hays Fellowship, and research grants from the Leakey Foundation and the Wenner-Gren Foundation.

Ph.D. students in **Communication, Information, and Library Studies** are invaluable to making the large classes in the Communication Department strong educational experiences for undergraduates. For instance, in Communications 101 (with 450 students, taken by more than 50% of Rutgers undergraduates), two TAs meet regularly with students to go over course material and exams, and hold review sessions before exams. **Joanne Cattafesta** was one of two winners of the Rutgers Teaching Excellence Award. Additionally, she won a Margaret Yardley Fellowship from the New Jersey State Federation of Women's Clubs in 2003, and the New Jersey Association of Realtors Educational Foundational Award, New Jersey Association of Realtors. She was awarded a Civic and Service Education (CASE) Curriculum Development Grant to develop a new course with a civic engagement component. **Marc Leverette** has taught "International Media and Development of Mass Media" in the Department of Journalism and Media Studies and Communication and Popular Culture in the Communications Department. He has also had teaching appointments at both Rutgers-Newark and St. Peter's College, served as the student representative to the Research Development Committee at SCILS, and was recently appointed program planner for the annual conference of the Media Ecology Association Division of the Eastern Communication Association.

Ibraiz Tarique (Industrial Relations and Human Resources) is providing cross-cultural training to the University's incoming class of international graduate students, building on his master's thesis work that focused on how to facilitate cross-cultural adjustment. The training he provided during orientation provided incoming students with tools to help speed their adjustment process, in general, but it also helped to address their specific needs. As part of the research, this student conducted interviews with international students who had arrived the year before in order to determine the issues that were most difficult for them (e.g., dealing with landlords, getting bank accounts, understanding the U.S. teaching style). His research showed that students who attended the training and orientation session that he designed and delivered adjusted more quickly to their new situation.

David Waxler (Psychology) has taught the large, challenging core lecture course Physiological Psychology. As Head TA of the Conditioning and Learning Laboratory, he served as peer mentor

of other graduate student teaching assistants. He was also responsible for upgrading the instructional laboratory equipment and helping to train new instructors for the course.

Life Sciences

A student of equine exercise physiology, **Mary Beth Gordon (Animal Sciences)** has been the TA for Animal Nutrition, Research in Animal Science, and Microtechniques and Tissue Culture. She has co-authored an online web course on Horse Management and taught students from pony clubs and various youth groups visiting the Ag Museum and various Cook College farms.

Jennifer Momsen (Ecology and Evolution) is an experienced teaching assistant for two key introductory Rutgers courses, General Biology as well as the Principles of Ecology. Ms. Momsen's passion for teaching has taken her beyond the undergraduate classroom: as coordinator of the Graduate School's Teaching Assistant Program, instructor and coordinator for the 12-week seminar "Introduction to College Teaching", and traveling to Moldova State University to offer teacher training to college faculty and graduate students.

The dissertation work of **Matthew I. Palmer (Ecology and Evolution)** focuses on plant diversity in the New Jersey Pinelands. He brings his exceptional command of the natural history of the area and remarkable enthusiasm for sharing the information to the classroom, as TA in the "Plant Ecology" and "Vertebrate Zoology" courses for majors, the survey "Principals of Applied Ecology" course, and as instructor in "Wildflower and Shrubs" and "Edible Plants." These latter two courses would not have been offered, except for the initiative of Mr. Palmer, and are especially important to the Ecology department's focus on organismal biology and field instruction. He brings expert knowledge of the plants of the state and habitat types to his classes, which include extensive field trips to all parts of the state. On these field trips he uses interesting stories and anecdotes to bring his subject to life. In the Zoology course, outside of his dissertation concentration, he introduced a special evening laboratory session to enhance the experience for the undergraduates. In addition to his extensive classroom activities, Mr. Palmer established the undergraduate organization Rutgers Naturalists and has played a key role in the Northeast Ecology and Evolution conference. The Rutgers Naturalists, whose activities are stimulated by Mr. Palmer, is a group dedicated to learning more about the natural history of New Jersey. Field trips have included: Island Beach State Park, Jenny Jump State Forest, the bat cave at Wildcat Ridge, the nature trail in Highland Park, the NJ Pine Barrens, and the Hawk Watch at Chimney Rock in Martinsville.

Molecular Biosciences doctoral students serve as "hands on" laboratory advisors to approximately 100 undergraduate research and honors projects each year in the Division of Life Sciences. These graduate students provide daily mentoring for the undergraduate students' research projects. For example, undergraduate research students Justyna Dudaronek and Paula Brown in Monica Driscoll's (FAS, Biochemistry) laboratory were supervised by graduate student **Kristin Listner** on a research project involving aging in the nematode. The three students are listed as co-authors of a featured paper published in *Nature*. In Bonnie Firestein's (FAS, Cell Biology and Neuroscience) lab, **Barbara Akum** mentored undergraduate student Monica Hanson, one of the students in the Success in Sciences program. Ms. Akum is also an active mentor in the minority undergraduate programs in the Life Science Division. In David

Denhardt's (FAS, Cell Biology and Neuroscience) lab Shunlui (Janet) Shen was a Henry Rutgers Scholar who worked with graduate student **Joe Porter**. Both students are authors on a paper in the *British Journal of Cancer*.

Mathematical and Physical Sciences and Engineering

David Galvin (Mathematics) was the main force behind setting up WeBWork, a web-based homework system for Calculus I (Math 135). Graduate students in mathematics also mentor undergraduate students in the NSF support Research Experience for Undergraduates (REU) who do research at DIMACS or in the Math Department.

The research of **Kathryn DeLaurentis (Mechanical and Aerospace Engineering)** focuses on robot design. In addition to her considerable research accomplishments, including participating in a successful patent, she has served as co-instructor in senior undergraduate courses in Mechanical Engineering: "Design of Assistive Devices" and "Design of Mechanical Systems". She brought her multi-disciplinary background and capabilities to her role as lecture and supervised the research and design projects of 10 undergraduate and 5 high school students. She is committed to increasing the involvement of other women in science and engineering, and has served as a mentor in the Minority Academic Careers Undergraduate (MAC-UG), Ronald E. McNair Program, the Douglass Science Institute, and For Inspiration and Recognition of Science and Technology (FIRST) at New Brunswick High School. She has served as a judge for the Engineering Experience for Minorities (TEEM) and an instructor for the Academy at Rutgers for Girls in Engineering and Technology (TARGET I & II), as well as an advocate for Rutgers at Graduate Student Advocacy Day on Capitol Hill.

Graduate students in **Physics and Astronomy** play key roles in developing new courses for non-majors, in particular those in which the curriculum is evolving to include more student-centered activities and courses for students at risk. **Jessica Sawyer** and **Aaron Warren** were two of the TAs in Physics for the Sciences, taught on the Douglass Campus for life science majors; more recently Mr. Warren was lecturer. This is a relatively new course in which the lecture, laboratory, and workshop materials are fully integrated. As TAs Ms. Sawyer and Mr. Warren teach both laboratory and workshop sessions, play lead roles in the weekly meetings of all instructors, and help to develop the WebAssign programs. The development of this course was supported by an NSF grant.

Dissertation Teaching Awards

Every year several advanced doctoral students are awarded support to teach an undergraduate course based on their dissertation research. The following summarizes courses offered in recent years by exceptional doctoral students.

Mona Bhan (Anthropology) in 2005-06 will teach "The Anthropology of Conflict: Perspectives from South Asia". This course, especially relevant to the large constituency for South Asian Studies, will engage in the study of the interaction of state, culture, ethnicity and development and their effects on conflict.

Sanja Bahun (Comparative Literature) taught “Cityscapes of Modernism” which mapped European and American modernism through visits to its urban spaces through the writings of the above writers as well as Joyce, Dos Passos, and Proust, as well as through photography and film, music and dance.

Tracy Fitzpatrick (Art History) taught “American Art and Architecture in the Age of the Machine,” an innovative course that focuses on artistic responses to social and political dualities between freedom and constraint, public and private space, and the machine and the body. The course builds on her dissertation, “Tunnel Vision” based on images of the New York subway, 1904-1941. Her seminar was particularly timely, since the centennial celebration of the New York subway was in October 2004.

Yianna Liatsos (Comparative Literature) taught “Post-Apartheid Memory in the South African Novel: Multidisciplinary Perspectives,” a survey of the literature of memory in post-Apartheid South Africa. Her syllabus covers the literatures of five ethnic communities in post-Apartheid South Africa and features works of fiction that engage and represent the country’s traumatic past from a number of ethnic, political, and aesthetic perspectives. Her work brings together materials from political science, history and literature, using the insights of trauma studies and holocaust studies to demonstrate the power of fictional memory to complicate the historical memory of victims of political violence, as well as transcend the limitations of ideologies of justice.

Alexandra Socarides (Literatures in English) in 2005-06 will teach “How to Make a Poem: The History, Theory and Practice of American Poetry” which will encourage students to look at the material side of the making of poetry, learning to read a poem in the context of its production, circulation and reception.

Aya Tanaka (French) in 2005-06 will teach “Imagining the World in Eighteenth-Century France” to show how travel literature changes with the dawn of the age of discovery and address such questions as how the rise of scientific travel accounts change the representation of reality and the intertextual relationship of the novel with travel accounts.

C. Contributions to the service mission of the University

Connecting to the Italian-American community. Doctoral students in the **Italian** graduate program help to strengthen ties to the Italian American community. **Sara Teardo** served as a liaison to the Italian and Italian American Heritage Institute. **Catherine Giambanco Vignale** is extremely active in the Italian American Heritage Commission Higher Education Committee (in charge of drafting the Community Education Project) and served on the Advisory Council to the Italian and Italian American Heritage Institute. She was also an Officer and Trustee of the Italian Teachers Association of New Jersey.

Working with local middle school teachers. Several graduate students in science, mathematics, and engineering fields work in partnership with teachers in local middle schools, supported by the NSF GK12 grant of Professor Kathy Scott (FAS, Cell Biology and Neuroscience). In the past 2 years 10 graduate student fellows have involved. **Klay Kruczek (Mathematics)**, a GK12 fellow for three years, worked with science and math 7th and 8th grade teachers in Old Bridge and Edison. His activities span the spectrum, from developing a lesson on cleaning up an oil spill, to helping students do power point presentations, to computer based activities that bring mathematics into science classes. He has also worked at Crossroads Middle School in South Brunswick and presented workshops in discrete mathematics for all middle school mathematics teachers in that district. **Devon Morrese (Operations Research)**, a GK12 fellow for two years, worked with 7th and 8th grade math and science teachers at Crossroads Middle School in South Brunswick. With the science teacher he developed activities on genetics, solutions, isotopes, and weather monitoring. With the math teacher he helped students learn how to use graphing calculators and has developed computer based laboratories. **Pedro Romero (Mechanical and Aerospace Engineering)** worked for two years in Maxson Middle School in Plainfield, continuing at the Hubbard School in 2004-05. He worked with the 7th grade science teacher on a variety of physical science activities, including his favorite, an application of Bernoulli's principle. Mr. Romero described his experience in the middle school for an article for the Society of Hispanic Professional Engineers. In addition to their activities in the schools, these graduate fellows have given workshops and served as demonstration leaders for the Exhibit area of the Math and Science Learning Center when groups of K-8 students visit.

Research activities that serve the needs of State agencies:

Doctoral students in **Industrial Relations and Human Resources** conduct research that provides useful information to local organizations, who are the host for their research. **Yunhyung Chung** is studying how the social networks of working women and minorities influence their career outcomes. This research will improve our understanding of the experiences of women and minorities, and at the same time help the host organization improve its management practices to ensure that women and minorities are able to achieve their full potential. **Maryanne Hyland** conducted her research on the topic of flexible work schedules. The host organization was interested in understanding how employees felt about a new policy that allowed professionals to work from home a few days per week. The organization found that many people who said they would like to take advantage of the new policy actually never used it. The student's research revealed some of the barriers that were causing people to not use flex-

time schedules, and offered suggestions for how to ensure that the new policy was implemented more effectively.

Thomas Molnar (Plant Biology) is a tree-breeder who focuses on genetic improvements of ornamental nut trees. Although he has collected specimens in Russia, Ukraine, Uzbekistan and Kyrgyzstan, Mr. Molnar's work also benefits the state economy, since fruit trees are one of the major crops in New Jersey.

John Renne (Urban Planning and Policy Development) worked on multiple projects that have been funded by the New Jersey Department of Transportation and New Jersey Transit. He completed a study of commuting patterns and transit use by New Jersey riders, and he worked on a survey of transit-oriented developments in New Jersey. (These are settlements built around a train or bus station.) He is helping to survey the impact of the new Secaucus Transfer Station on mode of travel (funded by the Regional Plan Association and Centers for Disease Control and Prevention). Mr. Renne's dissertation is a national study of transit-oriented developments.

Appendix IIIA. Graduate School – New Brunswick Alumni/ae who play a leadership role in the State

Pharmaceutical and Biotechnology Industries
Technology
State and Local Governments and Agencies
Finance and Services
Communications and Public Relations
Education

Pharmaceutical and Biotechnology Industries

Abraham Abuchowski (Ph.D. 1975, Biochemistry) is a pioneer who creates drugs to treat childhood diseases. He co-founded Enzon, Inc., the first New Jersey biotechnology company to receive Food and Drug Administration approval for a biopharmaceutical. He was also the founder and first chairman of the Biotechnology Council of New Jersey, and co-chaired the New Jersey Legislative Task Force on Biotechnology. He now leads Prolong Pharmaceuticals, a company committed to developing novel biopharmaceuticals using pioneering drug delivery technology. He is a member of the Rutgers Hall of Distinguished Alumni and lives in Califon.

Sol Barer (Ph.D. 1974, Chemistry) is President and Chief Operating Officer of Celgene Corporation, a development-stage biopharmaceutical company with headquarters in Summit. He is well known for recognizing that thalidomide could have positive therapeutic values, for example in the treatment of a severe inflammatory conditions associated with leprosy. He lives in Westfield and is Chair of the GSNB Dean's Advisory Council.

John Czapor (M.S. 1978, Environmental Science) is Vice President of Environmental Services, Conti Environmental, based in Edison. Conti Environmental is a civil construction firm, privately owned, that specializes in environmental remediation. He lives in Manalapan.

Richard Dewling (Ph.D. 1977, Environmental Science) is a former commissioner of the NJ Department of Environmental Protection and a former US EPA regional administrator. Before founding his current company, Dewling Associates, he was Chairman and CEO of Metcalf & Eddy, Inc., where he directed the company's services, including air pollution control consulting, process design of water supply, and on-site and off-site remediation of solid and industrial wastes. He was an inaugural recipient of the Dennis Fenton Graduate Alumni Awards at Cook College and lives in Union.

Elias K. Hebeke (Ph.D. 1963, Bacteriology & Public Health) is Executive Vice President of Operations for Revlon. He lives in Park Ridge.

Theodore J. Passon (M.S. 1978, Biology) is Owner and President of Pure Earth Environmental Laboratories, an environmental testing laboratory specializing in microbiology, based in Pennsauken. He lives in Haddon Heights.

Alexander Simone (Ph.D. 1983, Food Science) is currently the head of Technical Microbiology for Colgate Palmolive, working in Global Technology, where he is responsible for developing and implementing global strategies for testing and coordinating global microbiology initiatives. He holds 8 patents, mostly related to oral care. He lives in Somerset, and is a member the GSNB Dean's Advisory council.

Kris Venkat (Ph.D. 1972, Chemical and Biochemical Engineering) has been associated with numerous high tech and pharmaceutical companies, as scientist, manager, and entrepreneur. He is currently chairman of Morphochem, Inc., Transvivo Inc., and Automated Cell, Inc., and serves on supervisory boards of several pharmaceutical firms in Germany. He lives in Somerset.

The doctoral studies of **H. Boyd Woodruff (Ph.D. 1942, Agricultural Education)** resulted in the discovery of actinomycin, the first actinomycete antibiotic. In recent years he has been studying the influence of environmental factors on the efficiency of discovery of new microbial natural products, working in cooperation with academic and industrial laboratories where the chemical steps involved in natural product isolations are carried out. He is a member of the National Academy of Science and a member of the Rutgers Hall of Distinguished Alumni. He lives in Watchung.

Mark Zimmerman (Ph.D. 1985, Biomedical Engineering) is now a Vice President and Scientific Director at LifeScan, a Johnson and Johnson company focusing on biomaterials products, such as UltraScan for measuring blood sugar levels. He lives in East Brunswick.

In the past 10 years 179 Master's degrees and 280 Ph.D. degrees have been awarded through the **Molecular Biosciences Graduate Programs**, that are joint with UMDNJ. Of these graduates, at least 36 Ph.D. and 26 M.S. alumni/ae have industrial positions in New Jersey. Since this cohort includes relatively recent alumni/ae, over 100 of the Ph.D. recipients are still in post-doctoral positions. Earlier bioscience graduates have become leaders across the nation and the world.

Technology

Dr. Vladimir A. Aksyuk (Ph.D. 1999, Physics and Astronomy) has been a leader in developing optical Micro-Electro Mechanical Systems (MEMS) for use in the telecommunications industry. For his dissertation Dr. Aksyuk developed new, scaled-down mechanical force and torque sensors which could be used for measurements of magnetization. These micromechanical sensors impact almost every area of science and technology in fields as different as wireless communications to basic research in materials science. He holds over 23 patents for his designs. He is now the technical manager in Microsystems Integration Research at Bell Laboratories, Lucent Technologies in Murray Hill, NJ and resides in Piscataway.

Jay Brandinger (Ph.D. 1968, Electrical Engineering) is President and CEO of JA Brand Associates Inc. He has served on the New Jersey Commission of Science and Technology and on the Science and Technology Council of the States, a working group of Science and Technology advisors to governors sanctioned by the National Governors Association. He is a member of GSNB Dean's Advisory Council and lives in Pennington.

Cynthia Sikora (Ph.D. 2001, Communication, Information, and Library Studies) is a Technical Manager for Lucent Technologies – Bell Labs where she focuses on audio algorithms and techniques. She is a Certified Human Factors Professional and a member of the Human Factors and Ergonomics Society.

Elaine J. Weyuker (Ph.D. 1977, Computer Science) is currently an AT&T Fellow and Technology Leader at AT&T Labs in Florham Park. She is a leader in software engineering and has been an important force for improving the environment for women and minorities in research and industrial settings. In 2003 she chaired the Information Technology section of Governor McGreevey's Commission of Jobs, Growth, and Economic Development for New Jersey. She is a member of the National Academy of Engineering and was awarded the YWCA Woman of Achievement Award. She is a member of the GSNB Dean's Advisory Council and lives in Metuchen.

State and Local Governments and Agencies

Arthur R. Brown, Jr. (M.S. 1977, Horticulture) has served as a county agricultural agent with Rutgers Cooperative Extension, currently as associate director for outreach with Rutgers' Food Policy Institute. He has also served as New Jersey's Secretary of Agriculture over a period spanning 20 years and several governors. His legacies include the Jersey Fresh marketing program, the Farmland Preservation Program, and the Garden State Trust Fund. He is a member of the Rutgers Hall of Distinguished Alumni and lives in Egg Harbor.

Alex Boyd (Ph.D. 1971, Library Service) is Director of the Newark Public Library. Currently he is president of the Black Caucus of the American Library Association and served in 1997 as President of the New Jersey Library Association.

Francis Hoffman (Ph.D. 2001, Urban Planning and Policy Development) is currently the Brownfields Program Director for the NJ Department of Community Affairs.

Ellen Karcher (M.A. and Ph.D. candidate, Political Science) is the New Jersey State Senator for district 12. She has also served on the Marlboro town council.

Margaret E. Nordstrom (M.A. 1972, Political Science) is a Freeholder (Republican) for Morris County, living in Long Valley. She is a member of the GSNB Dean's Advisory Council.

Robert Smith (M.S., Environmental Science) is the New Jersey State Senator for district 17. Previously he served as Mayor of Piscataway and was a Professor at Middlesex County College.

A large number of Graduate School alumni/ae are in State or Local government, often serving in the Department of Environmental Protection or on local environmental commissions.

Finance and Services

Joseph Karas (M.S. 1979, Statistics) is a Vice President at Morgan Stanley, focusing on private wealth management. He is a member of the GSNB Dean's Advisory Council and lives in Bernardsville.

Sean M. Pattwell (M.A. 1991, Labor Studies) is a leader in the insurance industry and currently is Director of Herbert L. Jamison & Company. He is a member of the GSNB Dean's Advisory Council and lives in Middletown.

Communications and Public Relations

Steve Adubato (Ph.D. 1997, Communication and Information Studies) is a four time Emmy Award-winning anchor for Channel 13/WNET (PBS). In addition to his work on public television, Steve has been an expert commentator for MSNBC, The Fox News Channel and ABC/7 in New York. He was the creator of Stand & Deliver, a professional development, training and executive coaching company and lives in Montclair.

Ruth Ann Burns (M.A. 1975, Political Science) has led a distinguished career in public television, rising to Vice President and Director of Thirteen/WNET's Educational Resources Center. She is now president of the Burns Group, a digital education and telecommunications group, working with e-learning initiatives, marketing, and public affairs for universities, foundations, and corporations. She is a member of the Douglass Society, Hall of Distinguished Alumni, and received a New Jersey Woman of Achievement Award. She lives in Manalapan.

Jack H. Jacobs (M.A. 1972, International Relations) earned the Congressional Medal of Honor in 1968 for exceptional heroism on the battlefields of Vietnam. He has served on the faculties of the U.S. Military Academy at West Point and the National War College in Washington, D.C. He is a member of the Council on Foreign Relations, a director of the Medal of Honor Foundation, and the McDermott Professor of Politics at West Point. He is also a military analyst for MSNBC. He is a member of the Rutgers Hall of Distinguished Alumni and lives in Millington.

Mark A. Schulman (Ph.D. 1980, Political Science) is President and Founder of Schulman, Ronca and Buculalas, Inc. He has served as President of the American Association for Public Opinion Research. His work has spanned both market and public policy research for major corporations, banks and other financial institutions, insurance companies, the media, foundations, public transportation organizations, universities, and government. He lives in Edison.

Robert G. Sommer (M.A. 1984, Political Science) is Executive Vice President and Founder of MWW Strategic Communications in East Rutherford, a recognized leader in public relations, that holds the contract for Continental Airlines. He is a member of the GSNB Dean's Advisory Council and lives in Ridgewood.

Education

George C. Hamilton (Ph.D. 1985, Entomology) is currently an Extension Specialist in Pest Management associated with Rutgers University. All of his professional life has been devoted to service to Rutgers and the citizens of New Jersey. He understands the practicalities of insect control, while at the same time doing research and education on the safe use of pesticides, focusing on environmental and health protection. He received the New Jersey Agribusiness Association “Man of the Year” award in 1996.

David Rebovich (Ph.D. 1978, Political Science) is Managing Director of the Rider Institute for New Jersey Politics, based at Rider University, and is a regular commentator on New Jersey Political Issues. He currently ranks 18th among the top 100 most influential people in state politics and writes a weekly column for PoliticsNJ.com. He lives in Trenton.

Thomas Schenk (Ph.D. 1973, Microbiology 1973) is Professor, Chair and Howard Hughes Investigator in the Department of Molecular Biology at Princeton University. His research focuses on human cytomegalovirus, a member of the herpes virus family, that can be especially virulent in individuals with compromised immune systems. He lives in Princeton.

Alumni/ae of the graduate program in **Mathematics** provide the backbone of the teaching force in New Jersey Colleges and Universities. Recent Ph.D.s include Paul O'Donnell at Drew University, John Nahay at Monmouth University, Darko Volkov at NJIT, and David Reimer at The College of New Jersey. **Charles Schwartz (Ph.D. 1977)** is chair of the Mathematics and Physics Department at Rider University. He continues to do research in algebraic geometry and leads workshops for high school teachers.

Appendix IIIB. Graduate School – New Brunswick Alumni/ae who play a leadership role in the Nation

**Science and Technology
State and Federal Governments and Non-profit Organizations
Finance and Services
Communications and Public Relations
Education**

Science and Technology

Roger G. Ackerman (M.S. Ceramic Engineering, 1962) recently retired from leadership positions, including CEO, of Corning Incorporated. During his tenure Corning became one of the world's leading producers of fiber-optic cable and other optical technologies. He is in the Rutgers Hall of Distinguished Alumni.

John Ballato (Ph.D. 1997, Ceramic and Materials Science and Engineering) is a Professor of Materials Science and Engineering and Director, Center for Optical Materials Science and Engineering Technologies at Clemson University. Although early in his career he has been principal investigator on about \$10 million in external funding and has made significant contributions to the development of optical materials. He developed the research center he now heads, has developed strategic partnerships with other universities, and has received a state-wide award for his contributions to economic development.

Douglas Perry Boyd (Ph.D. 1968, Physics) helped develop electron beam tomography as a postdoctoral scholar at Stanford University. He subsequently founded Imatron, Inc. which is now part of GE Healthcare. Heartscan, originally developed as a subsidiary Imatron, continues to provide detection and treatment of early stage cardiovascular disease and cancer.

C. Jeffrey Brinker (Ph.D. 1978, Ceramic and Materials Science and Engineering) is a Senior Scientist at Sandia National Laboratories. A member of the National Academy of Engineering, he is the recipient of the E.O. Lawrence Award of the Department of Energy for his innovations in sol-gel chemistry to create nanostructured materials. He has published over 200 articles in refereed journals, including *Science* and *Nature*.

Terry Hart (M.S. 1978, Electrical Engineering) is president of LORAL Skynet, a leading satellite communications provider that operates the Telstar satellite fleets. He served at the Johnson Space Center in Houston as the broadcast "voice of mission control" for four missions of the space shuttle Columbia, flying on the space shuttle Challenger in 1984. He is in the Rutgers Hall of Distinguished Alumni and serves on the FAS Dean's Advisory Council.

Kevin Jones (Ph.D. 1983, Physics) is the leader of the Dynamic Experiment Division at Los Alamos National Lab. He had previously served as deputy division leader of LANSCE, the Los Alamos Neutron Science Center.

Alan Leshner (Ph.D. 1969, Psychology) is the Chief Executive Officer of the American Association for the Advancement of Science, where he is also Executive Publisher of *Science*. A leader in establishing the relationship between hormones and behavior, he is a member of the Institute of Medicine, a Fellow of the AAAS, and a member of the National Science Board. In 1996 he received the Presidential Distinguished Executive Rank Award.

John A. Pino (Ph.D. 1951, Zoology) was a senior research fellow at the National Academy of Sciences where he led a study on the management, conservation, and use of genetic resources. He is a member of the Rutgers Hall of Distinguished Alumni.

Peter Schultz (Ph.D. 1967, Ceramics) and two colleagues invented an optical fiber that has become the basis of the internet. He is the retired president of Heraeus Amersil, Inc., an Atlanta-based glass manufacturer, the key supplier of fused silica glass for the optical and semiconductor industries. He was awarded the National Medal of Technology by President Clinton and has been inducted in the Rutgers Hall of Distinguished Alumni.

State and Federal Governments and Non-Profit Organizations

David Abrams (Ph.D. 1981, Psychology) is Associate Director for Behavioral and Social Sciences Research and Director of the Office of Behavioral and Social Sciences Research at the National Institutes of Health.

Spencer Crew (Ph.D. 1979, History) is Director of the National Underground Railroad Freedom Center in Cincinnati, Ohio. Previously he had served as the first African-American director of the National Museum of American History, where his dissertation work on African-American migration is now one of the permanent exhibits. He is a member of the Rutgers Hall of Distinguished Alumni.

Michael B. Levy (Ph.D. 1979, Political Science), Distinguished Teaching Professor at Georgetown University, was senior advisor to Treasury Secretary Robert Rubin, assistant secretary for legislative affairs under Treasury Secretary Lloyd Bentsen. He specializes in public policy, business and business ethics, with a current focus on campaign finance and corporate citizenship.

Mark Powell (Ph.D. Ecology & Evolution, 1991) is a Fellow at the Center for Risk Management at Resources for the Future in Washington, DC.

Finance and Services

John Regazzi (Ph.D. 1983, Library Services) is Managing Director for Market Development for the scientific publisher Elsevier. He has extensive experience in data collection, systems and programming, new product development, and strategic business development. Prior to joining Elsevier he was President and CEO of Engineering Information, Inc. (Ei), and led the integration of Ei into Elsevier.

Communications and Public Relations

Kenneth Dautrich (Ph.D. Political Science) is Director of the Center for Survey Research and Analysis at the University of Connecticut, an increasingly important voice in the tristate political world, including New Jersey. His research focuses on public opinion and the news media.

Kathleen Frankovic (Ph.D. 1974, Political Science) is Director of Surveys and Producer at CBS News. She is recent past-President of the World Association for Public Opinion Research and past-president of the American Association for Public Opinion Research. She is widely quoted and published as one of the premier leaders in her field.

Education

Bernard A. Eskin (M.S. Zoology, 1949) is Professor of Obstetrics/Gynecology and Reproductive Endocrinology/Infertility and Director of the Menopause-Geripause Center at the Drexel University College of Medicine in Philadelphia, PA. He is author of “The Menopause: Comprehensive Management”, which is now in its fourth edition. He is a member of GSNB Dean’s Advisory Council and the 2005 recipient of the RAA Meritorious Service Award.

Leonard Feldman (Ph.D. 1967, Physics) is Stevenson Professor of Physics at Vanderbilt University and a Distinguished Visiting Scientist at Oak Ridge National Laboratory. He is a Fellow of the American Physical Society and American Vacuum Society and holds 14 patents related to thin film growth and hetrostructure formation.

Philip Goode (Ph.D. 1969, Physics) is distinguished professor of physics at New Jersey Institute of Technology and director of the Big Bear Solar Observatory in California.

E. Ann Kaplan (Ph.D. 1970, Comparative Literature) is an international figure in cultural and cinema studies. Professor of English and Comparative Literature and Founding Director of The Humanities Institute at SUNY at Stony Brook, she is known for bringing feminist approaches and psychoanalysis to the study of film and popular culture.

William E. Kirwan II (Ph.D. 1964, Mathematics) is Chancellor of the University of Maryland System. He has a national reputation for raising academic standards, attracting outstanding faculty members, and making minority diversity an institutional reality. He has been inducted in the Rutgers Hall of Distinguished Alumni.

Eva J. Pell (Ph.D. Plant Biology) is Vice President for Research and Dean of the Graduate School at Penn State University. Her research has focused on effects of air pollution effects on vegetation.

John Belden Scott (Ph.D. 1982, Art History), Professor of Art History at the University of Iowa, is one of the most decorated art historians. He has received the Rome Prize, has been a fellow at the Institute for Advanced Study, the National and the Stanford Humanities Centers, and received the Charles Rufus Morey Award of the College Art Association, the most

prestigious honor in the field of art history. His work is primarily in the history of Italian art and architecture of the baroque period.

Concetta Stewart (Ph.D. 1989, Communication, Information and Library Studies) is Dean of the School of Communications and Theater at Temple University. Her research focuses on communication and information technology. She lives in Ringoes, NJ.

Dennis Thiele (Ph.D. 1978, Microbiology) was Professor of Biological Chemistry at University of Michigan Medical School, before becoming Professor of Pharmacology and Cancer Biology at the Duke University Medical Center. He is an internationally recognized leader in the study of the role of copper and other heavy metals in biological processes and regulation. He received Michigan's Distinguished Faculty Achievement Award in 2001. He has contributed immensely to the scientific community as a teacher, mentor, and colleague and is an editor of the Journal of Biological Chemistry.

John Trefny (Ph.D. 1968, Physics) is President of the Colorado School of Mines. He is a recognized leader in education, including an award from the Colorado Alliance for Science for his leadership in science, technology and mathematics education.

H. Allen Tucker (Ph.D. 1963, Dairy Science) is recognized as one of the most important figures in dairy science and mammary physiology of the last 30 years. His work has directly benefited dairy production as well as human nutrition and health throughout the world, including our understanding of metabolic and developmental diseases of the mammary gland, with applications to the understanding of breast cancer in women. Dr. Tucker recently retired from Michigan State University after mentoring over 20 Ph.D. students and numerous postdoctoral scholars and visiting scientists.

Appendix IIIC. Graduate School – New Brunswick Alumni/ae who play a leadership role in the World

Dr. Ganesan Balachander (Ph.D. 1995, Ecology and Evolution) is Head of South Asia Programs for the Ford Foundation, based in New Delhi. Throughout his career he has been engaged in practical conservation projects, first in a program working on tropical forests and coral reefs, most recently working with Ford Foundation recipients in areas affected by the 2004 tsunami. His conservation projects have been based on the support and encouragement of small enterprises that provide rewards to participants.

Khadga Basnet (Ph.D. Ecology & Evolution, 1990) is a Professor of Zoology at Tribhuvan University in Kathmandu, Nepal.

Prasert Chitapong (Ph.D. 1983, Soils & Crops) is President of Prince Songkla University in Thailand.

Henrik Kajueter (Ph.D. 1996, Physics) is Marketing Director for DHL Europe. He had previously worked at McKinsey and Company.

Chun-Sik Lee (Ph.D. 1988, Physics) is chair of the Department of Physics at Chung-Ang University in Seoul, South Korea.

Ratemo Michieka (Ph.D. 1978, Plant Biology) is director-general of the National Environmental Management Authority in Kenya and vice chancellor of Jomo Kenyatta University College of Agriculture and Technology in Nairobi, Kenya. Mr. Michieka chairs the Kenya Agricultural Research Institute. He has held administrative positions at the World Bank and the United Nations Environment Program. He also has consulted for CARE and the Swedish International Development Agency. He is in the Rutgers Hall of Distinguished Alumni.

Doracie Zolenta-Nantes (Ph.D. 1999, Geography) is Chair of the Department of Geography at the University of the Philippines. She does research on community displacements due to large-scale natural disasters.

Appendix IV: Statement endorsed by the New Brunswick Deans responsible for graduate education.

April 27, 2005

To: Deans responsible for education of Ph.D. students in New Brunswick

From: Holly Smith, Dean, Graduate School – New Brunswick
Jolie A. Cizewski, Vice Dean, Graduate School – New Brunswick

Re: The case to enhance support of doctoral students

In the Fall of 2005 President McCormick adopted, as one of his Areas of Emphasis and Effort for 2004-05, the goal of “creat[ing] a plan to increase financial support for graduate programs.” The work of creating that plan for Ph.D. students on the local campus has been assumed by the Graduate School-New Brunswick in consultation with faculty and administrators across the New Brunswick-Piscataway campus who are engaged in doctoral education.

On April 6 Vice Dean Jolie Cizewski presented the latest draft of the plan to you and your colleagues. We appreciate your participation in the meeting, and your helpful comments both during the meeting and in correspondence afterward. With the help of your advice, and advice from other interested groups, we are now preparing the final proposal for presentation to President McCormick and Vice President Furmanski. The essentials of the proposal have been endorsed by the Executive Council of the Graduate School, the Graduate Program Directors, the FAS Department Chairs’ Council, and the Graduate School Dean’s Advisory Council. In order to assist President McCormick and Vice President Furmanski as they work with their colleagues and with the Rutgers Boards and the New Jersey Legislature, we would like to bring the proposal forward to them with as much support as possible, and are hoping that we will receive your endorsement along with those of these other bodies.

As you will realize, achieving the level of support needed merely to sustain the current excellence of our Ph.D. programs, not to mention making them even stronger, is substantial. However, we believe that these resources can be garnered over the next ten years from a combination of university policy changes, internal reallocations, increased state funding, and private fundraising.

We hope that you have had some time to consider in more detail the presentation we made on April 6, and the timeline we proposed for developing significant increases in the support of Ph.D. students on our campus. We are now inviting you to endorse the principal goals and strategies envisioned in this plan:

1. Principal Goals

- Provide compensation packages, that include medical benefits and tuition and fee remission, sufficient to enable doctoral students to live decently in the local area, for five years, the nominal duration of a typical course of study, with minimal impediments to focusing on their studies and research;

Appendix IV: Statement endorsed by the New Brunswick Deans responsible for graduate education.

- Provide compensation packages and funds to recruit doctoral students that address the competitive pressures we face and enable us to attract the most talented candidates for doctoral studies;
 - Remove barriers that deter faculty members from supporting doctoral students on external grants and contracts, including training grants;
 - Provide sufficient resources to ensure that all doctoral students can be offered at least minimal teaching experiences.
2. Principal Strategies to implement these goals over the next 10 years
- Increase by at least 250 the number of TA positions in New Brunswick/Piscataway through a combination of securing additional state TA lines and increasing the funding available to convert some existing state PTL lines to support TA positions.
 - Adopt policies and resources designed to increase the number of doctoral students supported on external research and training grants.
 - Minimize the tuition charges to doctoral students who have completed all of their degree credits (already implemented),
 - Charge in-state tuition rates for all grant-supported GAs,
 - Reduce fee and tuition charges to grants, and
 - Provide staff support needed to decrease the administrative burden of applying for training grants.
 - Dramatically increase resources to support doctoral students on fellowships:
 - To sustain stipends at competitive levels,
 - To provide health benefits and fee remission to all fellowship students, and
 - To increase the number of fellowships.
 - Increase funds to recruit high-quality doctoral students and support their research and study:
 - Funds for programs to support on-campus visits and other recruiting activities for prospective students,
 - Funds to enhance support packages, including summer support and research accounts, for students in competitive programs for which this is a national norm, and
 - Travel funds for pre-dissertation research or special study and conference travel.

For your convenience, we are also attaching the draft of the Executive Summary of the longer report.

If you have questions, please contact Vice Dean Jolie Cizewski at (cizewski@rutgers.edu) or Dean Holly Smith at hsmith@fas.rutgers.edu. To endorse, withhold endorsement, or abstain from endorsing, the principal goals and strategies of the plan, please respond to this email BY

Appendix IV: Statement endorsed by the New Brunswick Deans responsible for graduate education.

FRIDAY, MAY 6 and check the appropriate box below.

We appreciate all the support you have given this process.

I endorse the goals and strategies of the plan: _____

I do not endorse the goals and strategies of the plan: _____

I abstain: _____

Name: _____

Additional comments or suggestions:

Appendix V. Resolution of the New Brunswick Faculty Council May 6, 2005

RESOLUTION ON GRADUATE STUDENT SUPPORT
New Brunswick Faculty Council
May 6, 2005

Whereas the New Brunswick Faculty Council has already resolved to support the development of a capital campaign to generate funds for fellowships to support graduate students, to endorse the development of health insurance benefits for fellows comparable to those for TA and Gas, and to have student fees for fellows paid by the university;

And, whereas the quality and prestige of the university, and therefore the ability of the university to recruit and retain excellent faculty members and provide outstanding education to its students, depend in considerable measure on its success in sustaining its ability to recruit and retain graduate students of the highest caliber;

And whereas our ability to sustain our recent successes is in serious jeopardy in the absence of an infusion of additional funds;

Therefore be it resolved that the Faculty Council endorses in principle the plan proposed by the Graduate School-New Brunswick to create, over the next several years, more teaching assistantships and fellowships, to keep salaries and stipends competitive, to provide health benefits, fee remissions and other supplementary forms of graduate student support, and to provide incentives to the faculty to support students on external research grants and contracts.