

The Program

The Biomedical Sciences Graduate Program (BSGP) at UNM is an interdisciplinary graduate program within the Health Science Center (HSC) that provides research education and training towards a PhD, MD/PhD, or MS degree. Substantially reorganized in 1997, the BSGP has since certified the successful completion of 55 MS and 87 PhD degrees. Presently, faculty and students are distributed among diverse academic departments within the HSC as well as at affiliated extramural partnering organizations including the nearby Lovelace Respiratory Research Institute (LRRI) and National Laboratories (NL). Oversight for the BSGP is provided by a Program Director with a 3 year term in conjunction with a Steering Committee; the latter meets monthly and includes representatives from participating departments and affiliated non-departmental units. In 2006, the BSGP Steering Committee developed and implemented a new strategic plan. Separately, Academic Program Review (APR) of the BSGP (as required by the UNM) was last completed in 1996. The present APR included a comprehensive programmatic self-study that assisted the external review committee by facilitating the recognition of key strengths as well as the identification of topics for consideration for future enhancement of this already successful graduate program.

The Students

Overview

This interdisciplinary graduate program currently has approximately 100 students and enrolls 14-18 new students each year. Following an introductory, course-intensive year, students select a research mentor. The Graduate Student Society (GSS) was instrumental in establishing a student-based mentoring program for in-coming, 1st year students. The GSS also provides a vital conduit for consideration and transmittal of student issues/concerns to the BSGP Steering Committee and provides a representative to the graduate student organization on the main campus (across the “Lomas Divide”).

The quality and numbers of applicants into this program has significantly improved following reorganization of the BSGP almost a decade ago. For the past 5 years, focused enhancements in student recruitment have contributed to expansion and diversification of the applicant pool. As a result, well-qualified applicants have been identified and admitted into this program which provides competitive stipends and benefits. The collective outcome of these efforts is clearly reflected in the overall success of students in this research training program, e.g., timely completion of degree requirements, publications, and placement positions after completion of predoctoral training.

Strengths

1. The program attracts and sustains well-qualified students that complete the training program with significant accomplishments.
2. The program includes a MD/PhD training component; the background and perspectives of MD/PhD students provide positive contributions to the educational and research missions of the BSGP.
3. The Student Research Day enhances and highlights student achievements.
4. The size and diversity of the student body in combination with the scope of student research projects contribute to an outstanding environment for education and research training.

Weaknesses

1. The budget for Student Research Day has not been consistently established prior to organizational and planning efforts by the students.
2. The educational, clinical, and research scheduling and incorporation of MD/PhD students into the activities of the BSGP do not address the entire interval of MD/PhD training; rather, the BSGP focuses primarily upon activities that occur only during the PhD (research) training component.

3. Student advising has been variable; some students sense that they have “no where to go” for problem resolution. This has been of consequence with respect to educational/research activities as well as student services. It seems likely that these issues may affect the outcome of recruitment efforts, an important program activity. Examples of these concerns include:
 - Inconsistencies in enforcement of programmatic policies among departments and/or student committee members.
 - Staff turnover in the BSGP office.
 - Misalignment in main campus and HSC administrative offices, *i.e.*, difficulties in registration and enrollment, issuance of health care cards, interruption in the timely provision of stipend payments.
4. The size of the student body has been static over the past decade despite substantial increases in the research training faculty and available research funding. There is no strategic plan to address the size of the student body relative to the overall research programs of BSGP faculty.

Recommendations

1. Establish a budget (in advance) for Student Research Day activities to facilitate the organizational efforts of students.
2. Develop a more comprehensive integration of MD/PhD students into the GBSP throughout their entire training. This will require careful consideration of clinical training activities during research-intensive intervals as well as of research-related efforts during clinical education and training.
3. Establish a program-based advisory process for students, *i.e.*, identify and assign an advisor to each student to provide oversight that begins with student matriculation and continues throughout student tenure in the program. An advisor need not necessarily align with the area of research interest of a given student, but, advisors must be available to advisees, aware of BSGP programmatic rules and policies, and willing to interface with the BSGP Steering Committee on behalf of the students. Sharing of successful mentoring plans from various departmentally-based efforts could facilitate a thoughtful programmatic solution.
4. Establish a long-range plan for defining the optimum size and expansion of the program commensurate with faculty size and funded research programs. This planning will require careful consideration of important fiscal constraints associated with student recruitment and 1st year stipend support as well as mechanisms to sustain matriculated students if research funding is lost.

The Curriculum

Overview

BSGP students pursuing a MS, PhD, or combined MD/PhD degrees enroll in core courses contained within the first year curriculum. The first (Fall) semester of the curriculum consists of 2 core courses, BIOMED 507 (that provides a comprehensive knowledge base in cellular and molecular biology) and BIOMED 508 (that provides students with the basic skills of reading and critically evaluating the scientific literature; a major component of the literature is focused on the molecular basis of diseases). Through these courses, students are also introduced to the basic concepts of hypothesis development and testing. All students that successfully complete these courses transition to second semester “core selective” courses focused on their individual interests which may include cancer biology, neurobiology, physiology, immunobiology, molecular genetics and genomics, pharmacology as well as molecular toxicology. Concurrent with coursework, students complete three research rotations with the primary goal of identifying a research mentor by the end of the Spring semester. The selected mentor and research site are from one of six research divisions or affiliated extramural partners, *i.e.*, Biochemistry and Molecular Biology, Cell Biology and Physiology, Molecular Genetics and Microbiology, Neurosciences, Pathology, Toxicology and Environmental Disease, and the LRR and NL. Once a student identifies a laboratory where their research

will be conducted, additional selective courses in their area of interest are taken. Should students desire experience in developing teaching skills, they can enroll in a BSGP-organized program designed to provide experiential instruction in teaching science at the university level. The award of a certificate documents successful completion of this instructional teaching program.

Strengths

1. All BSGP students are required to complete specified core courses thus ensuring development of a uniform knowledge base in the subject areas considered to be important by the BSGP faculty.
2. Advanced students unanimously agreed that the core courses prepared them for the qualifying examination which is administered at the end of the first year.
3. Students also commented that the combination of research rotations and selective courses taken during the second semester exposed them to relevant subject areas and allowed them sufficient time to identify laboratories consistent with their research interests.
4. The Certificate in University Science Teaching program is extremely valuable and equips students with a knowledge base and experience that will increase their marketability in an academic setting.

Weaknesses

1. Regular assessment of the entire curriculum is not undertaken; similarly, the content of individual courses and faculty performance in teaching are not routinely evaluated. The current curriculum, approved by the UNM Faculty Senate in Spring 2002 and implemented in the Fall 2003, is considered to meet the present needs of the students, however the BSGP program has grown significantly since 2003. Although the faculty who participate in the two major core courses are revising/updating the content of these courses, this includes neither oversight by the BSGP Steering Committee nor significant input from faculty in the major divisions of the BSGP.
2. The availability of selective courses is limited. Both faculty and students expressed concern regarding this situation. For example, some students noted that the availability of an advanced biochemistry course would enhance the quality of the curriculum. Likewise, the availability of selective courses in the area of pathology would augment the student's knowledge base in mechanisms of disease. Further, the emergence of career interests in translational research also warrants implementation of curriculum review and revision.
3. Some advanced students indicated that qualifying and comprehensive examinations lacked adequate or consistent rigor. At the same time, most students commented that the core courses prepared them for these examinations.
4. The length, format, and scheduling of the comprehensive examination appears to be inconsistent among students.
5. Not all graduate students participate in a multidisciplinary course on the Responsible Conduct of Research; the current BSGP course is only offered every other year.
6. Whereas the external reviewers were impressed with implementation of the Certificate in University Science Teaching program, it was not clear that all students were informed about the opportunities to participate in activities that would provide experience in developing teaching skills. It was noted that teaching assistantships associated with stipend supplements were available in various departments, and, a number of the students indicated their involvement in instructional activities associated with problem-based learning experiences in the medical school, however, it did not appear all of the BSGP students were made aware of all of these important opportunities.

Recommendations

1. A process for the regular review/revision of the entire BSGP curriculum is essential. The external reviewers suggest establishment of a Curriculum Subcommittee consisting of members from the 6 academic BSGP research divisions and the extramural partners, LRRRI and LANL. This subcommittee should be charged with performing regular reviews of the core courses and selectives to ensure that these offerings are meeting the needs of BSGP students. In this process,

involvement and/or input of students from each of the BSGP research divisions is critical. Recommendations from the Subcommittee would then provide a basis for further consideration by the BSGP Steering Committee.

2. The manner in which the qualifying and comprehensive exams are administered should be carefully reviewed to ensure that all committees incorporate rigor in both examinations. Steps should be taken to ensure that the format of the comprehensive examination is consistent among all students.
3. A multidisciplinary course on the Responsible Conduct of Research should be provided on an annual basis and be required for every BSGP student. In this course, the participation of representative faculty from each of the research divisions would be extremely beneficial.
4. Students should receive information and engage in discussions about alternative careers in science.

The Faculty

Overview

The program currently has over 100 faculty members, spread across several departments, as well as at the LRRRI and College of Pharmacy. In general, the faculty are carrying out excellent, well-funded research in areas consistent with the perceived strengths of the Institution, as reflected by the Signature programs. Several new research initiatives by the faculty have resulted in additional funding to the School of Medicine, contributing to a growing national reputation in research. Faculty have established key collaborations with scientists on the Main Campus and in the National Laboratories, and many of the students in this program have played critical roles in the success of these interdisciplinary efforts.

Strengths

1. The faculty are excited about their research programs and have conveyed this to the graduate students. Most of the faculty are actively engaged in graduate education, and are either already serving as supervisors for existing graduate students, or are interested in attracting students to their labs.
2. Participation in graduate student research training by junior faculty is particularly encouraged through membership on the BSGP Steering Committee, inclusion in the curriculum, and opportunities to present their research to the new graduate student class through a "brown bag" series.
3. The program has maintained a large, very active core faculty, spread relatively well across the participating departments and other units. This is facilitated by the efforts of the Program Director and a relatively large steering committee.
4. Within departments, there is some tendency for graduate students to "cluster" to a relatively small number of faculty supervisors, but for most of the departments, this was not the case. Students are distributed across departmental faculty members relatively equally. Exceptions appear to be the Department of Biochemistry and the Department of Molecular Genetics and Microbiology, but in both of these departments, there are efforts by some of the faculty to proactively address this concern.
5. There are few, if any, barriers to collaborations among faculty in different departments. The structure of the School of Medicine works well with the interdepartmental nature of the BSGP, creating unique opportunities for student and faculty interactions.
7. The program has made efforts to maintain and increase faculty diversity and participation at all levels.
8. In the previous review, there were concerns about the level of faculty salaries, and these have apparently been adequately addressed.
9. There is a real sense that the faculty are dedicated to the institution and to the improvement of graduate education. They are generally united and willing to work towards common goals.

Weaknesses

1. The faculty may not be well informed of program requirements, policies, and procedures. Informal polling of students clearly indicated that there was a lack of information about the format and conduct of the comprehensive exam which appeared to reflect inconsistent exam scheduling and administration.
2. The faculty uniformly believe that their efforts in graduate education are not recognized by the administration. Participation in graduate education is not thought to be an important consideration for promotion and tenure decisions. The consensus of the faculty was that participation in (and even directing) a graduate course is considered to be a "volunteer" effort, even though this effort can at times be substantial.

Recommendations

1. The Program Director needs to ensure that faculty are better informed about program requirements, particularly those concerning the comprehensive exam. This could take the form of scheduled sessions in departmental faculty meetings, though there could be many alternative strategies.
2. The School of Medicine and/or the OGS needs to better monitor and credit faculty effort in graduate education, similar to that which is apparently already in place for crediting faculty effort in medical professional education. The departmental and school administration need to recognize the value of faculty efforts in both formal lecture hours and less formal, but equally important, individual mentoring of graduate students. The School should recognize that faculty efforts in graduate education are of comparable value to that of medical education for a Tier 1 research institution.

The Facilities

Strengths

1. Available research space and equipment for BSGP students are extensive. Across departmental components of the BSGP, faculty were generally quite positive about resources for conducting their research and training graduate students.
2. Allied research facilities, including the MIND and BRAiN Institutes, SNL, LANL, the Main Campus offer exciting opportunities that could be further developed. For instance, the recent award for health planning studies from the Robert Wood Johnson Foundation, which will allow new faculty hires in the social sciences on the Main Campus will also help develop interdisciplinary research and education opportunities.
3. The five Signature Programs are crucial avenues for directing interdisciplinary training opportunities and are very well thought out. They offer the potential to integrate very diverse components of UNM research and training.

Weaknesses

1. Faculty from the Department of Neuroscience indicated that the lack of research/training space as a major faculty in limiting growth and development.
2. The signature programs could benefit from greater involvement of other training/research opportunities, including such groups as the MIND Institute, Main Campus departments, and the National Labs. This requires much development work at the level of individual faculty members, but also flexibility and support at an administrative level, if facile interactions are to emerge.

Recommendation

One of the clearest examples this issue is in the Brain and Behavioral Illness program, in which the Department of Neurosciences is a very central player. Establishing an interdisciplinary research center in this area should be carefully considered, one that coordinates research, grant administration, and

training efforts with the Main Campus, MIND Institute, the labs, and other entities. Although funds appear to be earmarked for construction of a new facility adjacent to MIND Institute that would house translational neuroscience research from the Departments of Neurology and Psychiatry, it is unclear as to whether this new facility would directly support the more basic neuroscience research components critical to the BSGP.

The Administration

Strengths

1. Dr. Angela Wandinger-Ness, Assistant Dean for Graduate Studies, heads the BSGP program. Faculty and students alike view her as an effective and dedicated Director. Currently, this job is allocated at 25% effort. Dr. Wandinger-Ness is currently in the second year of a three year term. Given the central and difficult role of coordinating such a multi-faceted program, it will be critical to identify another strong Director to take over for Dr. Wandinger-Ness. No specific individuals were identified to the review team, but it is perhaps not too early to begin consideration of who will replace her.
2. The BSGP program is administered under the auspices of the Office of Research, directed by Senior Associate Dean for Research, Dr. Richard Larson. This seems to be an advantageous arrangement, as the Research Office is able to provide administrative support, including accounting services. It also provides “gap” funding for graduate students whose research support has been eliminated due to losses in extramural funding.
3. The Director’s staff consists of one office manager, two program coordinators, and two student assistants. There is a general perception that these staffing levels are adequate. However, there has been a great deal of turnover in these positions, hampering office efficiency. While this may simply reflect random events, it is worth considering whether there may be some more systematic factors related to job dissatisfaction that leads to high turnover.
4. A Steering Committee, comprised of two members from each department and student representatives, meets monthly and serves many functions, most centrally, running the admissions process (including weekly meetings prior to admissions). By all accounts, this is a dedicated and collegial group.

Weaknesses

1. The BSGP program coordinates with many other UNM administrative units. Discussions with both students and faculty revealed some frustration in interactions with the Office of Graduate Studies (OGS). In particular, students reported several episodes of not getting paid in a timely fashion. Further, they complained that getting disenrolled for late tuition payment coverage was not uncommon. However, OGS worked effectively with the MD/PhD program to handle instances of students finishing their dissertation before completing all course requirements. Additionally, the rather complicated set of transactions required for enrollment, requiring interactions with the Registrar, Bursar, Financial Aid, and OGS, places strains on students and program staff alike. Clearly, this problem is not unique to the BSGP.
2. Funding from the Office of Research supports 14 first year stipends.
3. Many concerns were voiced regarding the current funding structure of the BSGP program. The faculty and administrators report that tuition funds generated by their students (approximately \$1,000,000 per year) are not in any way returned to the SOM or the program. However, the Provost reported that these funds were returned to the SOM.
4. Student tracking within the BSGP appeared to be inadequate.
5. There also appears to be a need for more and better designed office facilities. Ideally, appropriate space for confidential advising, as well as a student gathering area, should be provided.

Recommendations

1. The extensive administrative activities of the Program Director suggest that 50% time commitment would be more appropriate.
2. The BSGP strategic plan suggested that one position of Program Coordinator be changed from exempt (hourly) to non-exempt status. Given the need to coordinate diverse activities outside the regular workday (*i.e.*, recruitment), this would seem to be a good idea.
3. Centralized data tracking is an issue that emerged in several discussions. Tracking of current BSGP students as well as program graduates would significantly aid in the development of competitive training grants.
4. The BSGP Steering Committee could be better utilized. Based on input to the review committee, two recommendations seem warranted. This group should continue to work on developing a sense of program identity (in addition to departmental identity) for BSGP students. Second, they might profitably direct more attention to regular program evaluation, data tracking of individual students, and utilizing more formal reviews of teaching effectiveness and course coverage. Greater use of subcommittees might be an effective mechanism towards achieving these goals (*e.g.*, Recruitment Subcommittee, Admissions Subcommittee, and Curriculum Subcommittee).
5. Based on input from several sources, greater budgetary autonomy and authority for the Program Director would be helpful.
6. Regarding tuition return, greater transparency in the process would be highly desirable. At the very least, this might help to alleviate a rather widespread perception of “unfairness”. If more tuition funds could flow to the program, it could be very effectively utilized to increase the number of stipends offered to first year students, a critical need identified by faculty. The precise details of how tuition is handled should be explored and widely disseminated to faculty.

The Future

The planned development of a Clinical Translational Science Center (CTSC) represents both a challenge and an opportunity for the BSGP. The inclusion of graduate studies in translational research should add a new dimension to this established interdisciplinary program; new faculty and courses should strengthen existing graduate education and research training activities. Nevertheless, the challenge of establishing expanded graduate studies within the SOM will require considerable, thoughtful, and coordinated planning. However, this effort will likely result in an enhanced research environment for training current and future BSGP students.

An additional challenge for this graduate program reflects more general concerns regarding the future of NIH funding levels and the inherent commitments of this program in the research training of its students. Thus, while the NIH likely will remain a key player in support of student (and faculty) research activities, alternative sources of stable revenue should be considered to stabilize the program. As outlined above, the strength of collaborations with individuals, departments, and agencies outside of the SOM should lead to continued growth and success.