Graduate programs in the Department of Molecular Physiology and Biophysics offer opportunities for training and research leading to the Ph.D. and Masters degree. Faculty in the Department of Molecular Physiology and Biophysics have a strong research focus on the cellular and molecular mechanisms of physiological processes. Students join an active group of faculty members and advanced students at an exciting time of expanding interdisciplinary research in molecular and cellular biology and the neurosciences at The University of Iowa. During the first and second years, students take courses and participate in faculty research in one or more laboratories. After satisfying course and comprehensive examination requirements, students devote their full time to thesis research under faculty supervision. All degree candidates gain experience in classroom instruction as part of their training. Graduate students come to the department from diverse backgrounds and a variety of undergraduate institutions both domestic and foreign. Most students join our program because of a desire to conduct research with a particular faculty member or because of their interest in one of the research areas emphasized by our faculty. Students looking for a quality program will find a history of productive departmental faculty with an outstanding ability to prepare students for a successful career in biomedical research and education.

Molecular Physiology and Biophysics maintains two graduate programs, one leading to the Ph.D. and the other to the Masters degree. Both have similar overall goals, with the major difference related to the depth of research and coursework expected. The vast majority of our students are enrolled into the Ph.D program (17 / 18 of our current graduate students), with only occasional students enrolled into the Masters program (1 / 18 of our current students, a former Research Assistant who desired to complete further formal education). Our comments below refer specifically to the Ph.D. program, but largely hold true for the Masters program as well.

MISSION: The goal of the Graduate Program of the Department of Molecular Physiology and Biophysics is to prepare students for careers in physiology encompassing both research and teaching. The program is designed to provide the student with a basic knowledge of physiology and biophysics that will serve as the foundation for the student's academic, scholarly, and research endeavors, the necessary practical, methodological, and technical expertise to perform original experimental work in an area of physiological research, experience in the presentation and publication of original research, and training and practical experience in teaching, including lectures and conferences.

ADMISSION PROCESS AND CRITERIA: Graduate students are recruited and admitted to our program through three mechanisms:

Biosciences. Students typically enter our graduate program through the Biosciences program. The Biosciences program is a multidisciplinary entry program for 14 Ph.D. degree granting programs at The University of Iowa. The Biosciences program provides students the flexibility of investigating several disciplines including biomedical and basic sciences prior to affiliating with a specific degree program. Following the completion of three required research rotations in the first year, it is expected that graduate students will be able to select a research laboratory and program affiliation. Applicants accepted into the graduate program automatically receive a 12-month stipend and full tuition support from the Biosciences program, with subsequent years of support coming from the mentor. The Biosciences is a highly selective program, in recent years
receiving over 200 applications and resulting in a typical class size of 15-20 students per year. There are typically 2-3 students classified as URM per class. Of our current graduate students in the Ph.D. program, 9 / 17 entered through Biosciences.

Medical Scientist Training Program (MSTP). Many students also enter our graduate program through the Medical Scientist Training Program. The Iowa MSTP program provides training for both the M.D. and Ph.D. degrees in an environment that integrates graduate research training with clinical studies. Following the completion of two years of medical school training, MSTP students select a research laboratory and program affiliation for completion of the Ph.D. Applicants accepted into the MSTP program automatically receive stipend and full tuition support from the MSTP program during the clinical aspects of their education, with support during the graduate school years coming from the mentor. The MSTP is a highly selective program, in recent years receiving over 125 applications and resulting in a typical class size of 10 students per year. There are typically 2-3 students classified as URM per class. Of our current graduate students in the Ph.D. program, 5 / 17 entered through MSTP.

Direct Recruitment. Although our department does the vast majority of our recruiting through the Biosciences and MSTP programs, we do maintain a separate direct recruitment process for students with advanced research skills. Students do not perform research rotations and must therefore identify a mentor able and willing to financially support 100% of the costs associated with their training. Typical applicants include former Research Assistants and exchange students performing practicums. Applications are assessed by a three faculty committee (consisting of the DGS, DEO, and one additional faculty member) who evaluate the applicant’s undergraduate coursework, GRE scores, and research experience. Because this mechanism encourages mentors to recruit students who impress them, the students have invariably had excellent existing research experiences prior to entering graduate school. With many students using this mechanism coming from foreign countries, it also promotes internationalism and diversity within our department. Of our current graduate students in the Ph.D. program, 3 / 17 entered through direct recruitment.

PROGRAM OUTCOMES:

Degree completion and time-to-degree. Our department is generally doing well with recruiting quality students who are dedicated to achievement of a Ph.D. and who are capable of doing so within reasonable time frames. The majority of students entering our Ph.D program complete the Ph.D. degree. Students opting to leave with no degree are relatively rare, those graduating with the Ph.D. outnumber those switching to a Masters degree approximately 3:1. For students who have graduated since 1998, the average time to graduation for Ph.D. students was 5.7 years and M.D./Ph.D. students was 5.9 years (the time to graduation for MSTP students includes the final year of medical school training following completion of Ph.D. research). We currently have no students who are in more than their 5th year of graduate school. We also remain a popular department for MSTP students to perform their graduate work, a strong sign of our reputation for enabling shorter timeframes to graduation.

Graduate student fellowships, awards, honors, and publications. A significant goal of our program has been to build a culture of grant writing and shared responsibility for seeking fellowships. Among our current returning students, 10 / 12 have applied for external funding from agencies such as the National Institutes of Health, Department of Defense, and American Heart Association. Two students currently hold fellowships from the American Heart Association and one from the National Institutes of Health. Among the first year students, 2 / 8 are already supported from training grants and we anticipate the other students will begin applying shortly.
Many students in our program are recognized with honors and awards for their research and teaching. In 2009, Adam Ziemann, a 2009 graduate from Michael Welsh’s laboratory, received the D.C. Spriestersbach Dissertation Prize for the Biological and Life Sciences. Several of our students regularly receive travel awards, both internally and externally, to attend National and International Meetings. Every year, the department recognizes the most outstanding teaching achievement by a graduate student with awarding of the Schottelius Award.

All students in our program publish their work in peer-reviewed journals. To encourage publication, our department publically awards a graduate student “Paper of the Year”. Student publications are also discussed at yearly thesis committee meetings. From the eight most recent graduates, all had peer-reviewed publications. Combined, the group had 24 papers, with several still under consideration or in various stages of revision.

Graduate student placements. Nearly all of our graduating students (>95%) move on to postdoctoral positions. Many obtain positions in academic departments within 3-5 years following completion of their Ph.D. In addition, graduates find a wide variety of positions available within government agencies, pharmaceutical and biotechnology firms, biomedical writing & publishing companies, consulting firms, and in business development and sales.

PROGRAM CHARACTERISTICS:

Size. The size of our program size is largely defined by the external grant funding environment. At today’s expense levels (salary, fringe, and tuition for 5.7 years), the anticipated cost per student is approximately $186,000 (or more, if costs of consumable materials and reagents are also included). Accordingly, financial sustainability plays a large role in determining our program size. Our Ph.D. program currently includes 17 students.

Comparison with peer group programs. Based on recent internal and external reviews of our department, our Ph.D. graduate program is comparable to national trends.

Strengths and weaknesses. Amongst our strengths, we have excellent faculty at all levels, from several newly recruited junior investigators with growing research programs to established senior faculty. The department has two HHMI Investigators, both also members of the National Academy of Science (Drs. Kevin Campbell and Michael Welsh). Despite economically troubled times, our department is well funded by external grants, empowering students to perform cutting edge research in their training. A weakness of our program is that the brunt of the costs associated with graduate education still falls on the mentor. Although some students find spots on training grants (currently three students supported by the Pharmacology and Pain Training Grants), there are not enough openings to assist all students.

Opportunities. Like many programs, our department has traditionally had difficulty recruiting a diverse student cohort. However, we are fortunate to have rich diversity among our faculty, including several highly successful women and minority scientists. Thus, the diversity of our faculty should help our efforts to attract increased diversity amongst our students.

CONCLUSIONS: Overall, our department presents superb training opportunities for our students. We are cognizant of the goal for decreasing time to Ph.D. outlined by the University of Iowa Strategic Plan and are working to address it on multiple fronts. Financing of graduate education tops our list of concerns and increasing student diversity is among our top opportunities for further strengthening our program.