

Facilities and Other Resources

A. Laboratory

The PI's laboratory comprises a 700 sq ft research space and an adjoining copper shielded room (300 sq ft) that are located in the Department of Physical Therapy. These areas will be used to conduct the experiments. Additionally, there is a shared space of 300 sq ft of office space for research assistants and associates.

B. Clinical

N/A

C. Animal

N/A

D. Computer

Three computers are housed in the PI's research laboratory: One 1.6 GHz Pentium IV processor with 19 inch monitor and two 3.0 GHz Pentium IV processor, one with a 19 inch monitor and the other with a 17 inch monitor.

E. Office

The PI has office space of 120 sq ft located within the Department of Physical Therapy, adjacent to the research laboratory.

F. Other

This laboratory is one of many NIH-funded research laboratories within the well established Integrative Neuroscience Research Center, College of Health Sciences at Marquette University.

1. Profile of the students of the applicant school/academic component

During the period 2001 – 2005 (the most recent timeframe for which nationally comparable data is available), Marquette University ranked among the top 10% of institutions whose undergraduates go on to complete the Ph.D. A total of 228 students from Marquette University went on to receive the doctorate degree during that period. (Source: <http://webcaspar.nsf.gov> utilizing the NSF Survey of Earned Doctorates/Doctorate Records File data source accessed 02/01/2007. Please note that professional degrees such as the M.D., D.D.S., O.D., D.V.M., and J.D. are not covered by the survey of earned doctorates.) Of these 228 students, **82 received a doctorate degree in a "health-related science."**

The Marquette University Department of Physical Therapy has an enrollment of 176 students in the Doctor of Physical Therapy program and 220 students in the undergraduate programs in Exercise Science and Athletic Training. Within the last 5 years, the graduate rate for our Doctoral Program in Physical Therapy has exceeded 90% and 100% of the senior Exercise Science students earned their baccalaureate degree. Among the undergraduate students, 90% go on to earn an advanced professional degree in health-related sciences.

Approximately 15% of the students in our programs come from minority or disadvantage populations. Our department has consistently received recognition for its high quality students, who have the highest admission profiles entering Marquette University and the highest academic performances in the College of Health Sciences.

On average, our students rank in the 92nd percentile of their high school graduating class and carry a 3.34 university grade point average (out of 4.0 maximum).

2. Description of the special characteristics of the school/academic component that make it appropriate for an AREA award.

The Marquette University Department of Physical Therapy is committed to excellence in teaching, research, and service. The commitment is reflected in our national reputation for Physical Therapy education. We are ranked among the top 20 of all academic physical therapy programs in the United States (US News and World Report College Guide).

One of the remarkable aspects of Marquette University is its **commitment to increasing cultural diversity in health sciences and biomedical research**. A major effort of the Department of Physical Therapy and Exercise Science Program is to educate students from **underrepresented minority populations** and **disadvantaged backgrounds**. For example Marquette's Health Careers Opportunity Program in Physical Therapy (HCOP) was a clear result of this mission. HCOP, a formally federally-funded program, was a comprehensive program to recruit, prepare and retain students in Physical Therapy, Dentistry, and Physician Assistant Studies. HCOP students had access to a variety of academic services, including career exploration for disadvantaged high school and college students, mentoring, career counseling, and field trips. HCOP also provided preliminary education to build science skills in disadvantaged high school students. This funding was cut from the federal budget but has been recently reinstated and Marquette hopes to reapply for this funding.

We also offer summer programs for disadvantaged physical therapy students in the professional phase of the program. The Student Educational Services Office provides retention services and academic support for an undergraduate student including tutorial support for many difficult courses, for example chemistry and physics. A writing specialist is also provided at no cost to the student or the Department. Our own HCOP staff meets regularly with students for advising, counseling and tutorials. The University's Education Opportunity Program (EOP) and the Freshman Frontier Program (FFP) have provided academic support, summer skills building program, counseling, and tuition support for HCOP students.

Other characteristics of the program that make it appropriate for an AREA award are outlined below:

(1) Strengthen the research environment of schools that are not research intensive.

A goal of the Department of Physical Therapy is to support a growing number of Physical Therapist researchers who are making substantive contributions to the rehabilitation body of knowledge. We have an emerging PhD program that is scheduled to admit students in the fall of 2007. Marquette University has an Office of Research and Sponsored Programs that is very supportive of research and in particular new and emerging investigators. The goal is to support researchers through the entire process of research; they provide editorial, budget, and grant writing service as well as bring researchers from around the campus together to foster interdisciplinary research.

(2) Expose students in such environments to research.

The Department of Physical Therapy is eager to involve undergraduates and professional students in research. There are numerous opportunities within the

curriculum for students to take directed study courses, which are often research-based education experiences. During a directed study, students may work with a PI for a semester and be involved in planning experiments, collecting and analyzing data, or performing a literature review. Often, there is a capstone project that involves an oral or poster presentation. These experiences are designed to increase student exposure to research and encourage enrollment in PhD programs. They can also result in student abstract submissions and authorship on peer-reviewed publications.

(3) Provide support for meritorious research

Meritorious research is awarded at Marquette University by a variety of small intramural awards by recognition across campus by means of newsletters, newspapers, roundtables, and seminars. Research achievements are also very important in the tenure and promotion process. Teaching relief, laboratory space, and funding for equipment is also provided to individuals in the University who are striving for excellence in research.

3. Description of the likely impact of an AREA award on the principle investigator and the school/academic component.

Impact on the PI

The impact of this award will be substantial for the PI. Dr. Hunter is an emerging investigator, and funding would launch a program of research to identify mechanisms of muscle fatigue in old adults during tasks that are functionally relevant and effective techniques for rehabilitation in old adults. The proposed line of investigation is novel; yet it is the next logical step in building on the knowledge gained during her post-doctoral training and work from small grants awarded previously. This work will also help the PI advance her long-term objective of developing more effective treatments of decreasing fatigue in old adults. The proposed research has the potential to help the PI become a leader in the field of the neural control of muscle fatigue and function in aging populations.

Completion of the study will enable the PI to improve her writing skills by publishing numerous articles related to the outcomes of the study. In addition, the PI's public speaking skills and visibility in the scientific community will be enhanced by presenting her work at national and international meetings. Completing this study will improve the PI's teaching ability by increasing her knowledge of the mechanisms that contribute to muscle fatigue and the research process. These topics are particularly relevant to her teaching Advanced Exercise Physiology which teaches research based skills and Exercise for Special Populations which includes older adults.

Impact on the School/Academic Component

Funding for this project from the AREA program will have a positive impact on academics and research at Marquette University. The Department of Physical Therapy launched a new pilot PhD program. The goal of this program is to train Physical Therapy practitioners in biomedical research. Having a funded research program, such as the one proposed by Dr. Hunter, will enhance the PhD program. High quality students will be attracted to this important research area and will be able to complete their dissertation work in a well funded and properly equipped research environment.

Students in Dr. Hunter's classes will be exposed to "work in progress" related to her research. This includes state of the art approaches for studying neural control of

movement in young and old people. The overall academic environment is strengthened by a strong program in research and scholarship.

How will the AREA Award Expose Students to Research?

Students will have an opportunity to participate in the research proposed in this application through independent study, laboratory work, literature review, and internships from their Exercise Science clinical experiences. For each year of the 3-year funding period, Dr Hunter will recruit 1 student to a 16-week independent study in the laboratory. During this educational experience, students will participate in experimental design, data collection, analysis, and interpretation. Students will also attend laboratory meetings, journal clubs, and research seminars where they will be encouraged to give oral presentations and contribute to discussion. It is expected that these contributions will result in student co-authorship on abstracts, poster presentations, and manuscripts. Funding from this project will allow these students to attend local and national scientific meetings.

Finally, during the funding period, the PI will invite a PhD student to join the laboratory. Funding from the AREA award will ensure a strong research program in which students can obtain their scientific training.

Statement of Institutional support for the proposed research project

Marquette University and the Department of Physical Therapy strongly support research enhancement. Marquette has committed funds that Dr Hunter has used to purchase equipment for this and other projects. The University has also assigned Dr Hunter over 800 square feet of remodeled laboratory space, and 300 square feet of office space for students and research assistants in the Department of Physical Therapy which has been tailored for her use. To allow time to accomplish her research, Dr Hunter has a modest teaching load of two classes and is allowed 50% of her time to pursue research and scholarship activities. The Department of Physical Therapy and the Exercise Science Program will provide secretarial support and grant account management services for purchasing, publication and other support services.