FACILITIES AND OTHER RESOURCES

Laboratory:

The Human Motion Analysis Laboratory is located on the main floor within the Department of Physical Therapy at East Carolina University (ECU) in the Health Sciences Building. This 2100 sq ft facility includes 2 Qualisys 3D motion analysis systems. One system has 8 cameras integrated with 6 AMTI force plates with a 65 ft. runway. The second system includes 10 cameras integrated with a Bertec Fully Instrumented Treadmill for analysis of walking and running mechanics. The laboratory space allows for data acquisition, data processing and analysis, and clinical examination. A full-time lab manager will be available to handle technical issues within the laboratory. All laboratory equipment is fully functional and up to date to allow for the completion of study aims within the proposed timeframe.

Clinical:

ECU Physical Therapy Clinics, housed under the ECU Department of Physical Therapy administratively, employ 5 licensed physical therapists who are affiliated with ECU Department of Physical Therapy. Both clinics are located within walking distance to the Human Motion Analysis Laboratory. The therapists evaluate and treat many types of musculoskeletal injuries, including patellofemoral pain. Due to the close proximity of the clinic to the clinical biomechanics laboratory, researchers have successfully collaborated with clinicians on previous projects and recruited participants who would meet the inclusion criteria for this proposed project. We intend to advertise for participants in a similar fashion for this project. The Chair of ECU Department of Physical Therapy, Walt Jenkins, PT, DHS, ATC, LATC, provides oversight for these clinics and has authored numerous publications as a result of his direct involvement in clinical research. Additionally, 3 other therapists working in this clinic are actively involved in musculoskeletal clinical research. A letter of support for the aims of the proposed research from the administrator of these clinics, Jacob Thorp, PT, DHS, MTC, OCS, is included in the application packet.

Computer:

The Human Motion Analysis laboratory has 13 networked workstations, data storage on the university server (1 TB) and one networked printer. Research data is stored on password protected network drives. Software for data collection (motion capture and force platform) is housed on two main computers. Additional software for data processing is installed on 13 computers. All computers have programming, spreadsheet, word processing and statistical analysis capabilities. All project staff have a workstation in their office with the following capabilities: programming and data processing, spreadsheet capabilities, word processing and statistical analysis. Continued maintenance and standard upgrades to existing computer workstations and software enable timely completion of data processing and analysis by multiple users.

Office:

The Human Motion Analysis Laboratory contains an office for Dr. Willson and a laboratory manager. Drs. Meardon and Willy have a primary office on the second floor of the Health Science Building, immediately above the laboratory. Office space within the laboratory houses workstations for investigators. Offices are easily accessible to students and staff and offer a proximity that will foster collaboration between researchers, staff and students.

Other:

Consultation and Support
Available for consultation are 5 orthopedic physical therapists (1 with clinical specialist certification) on the Physical Therapy faculty. A laboratory manager will be available to: assist with computer programming needs, data collection and analysis, maintain day-to-day operations of equipment in the biomechanics laboratory, communicate with university Information Technology Services, and maintain computer hardware, software and internet services. We will be collaborating with the Department of Biostatistics which is housed in the Health Sciences Building. Specifically, Dr. Paul Vos will serve as the statistician for this project. Photocopying services are supported by the Department of Physical Therapy. William E. Laupus Health Sciences Library is located within the Health Sciences Building and provides student and faculty resources for research. These consultative and support services offered by ECU and the Department of Physical Therapy promote intellectual collaboration and increase the likelihood of success by providing the necessary resources for successful completion of the aims of this research proposal.

**University Support for Research and Scholarly Activities**

East Carolina University (ECU) is the third largest campus in the 16-campus University of North Carolina system (NC System), having more than 27,000 students including more than 21,000 undergraduate students, 6,000 graduate and doctoral students, and more than 300 medical students. ECU offers 100 Bachelor degree programs, 85 master’s degrees, 21 doctoral degrees, and doctorates in medicine, dental medicine and physical therapy. In its mission statement, NC system declares a commitment to discovery, transmission and application of knowledge and ideas to address the needs of individuals and society. This mission is accomplished through instruction as well as “through research, scholarship, and creative activities, which advance knowledge and enhance the educational process.” As part of its mission, ECU further expects faculty and students to “discover new knowledge and innovations to support a thriving future for eastern North Carolina and beyond” and to “transform health care, promote wellness, and reduce health disparities.” The large number of ECU students participating in faculty-mentored research speaks to how this mission is put into action. According to the National Survey of Student Engagement, 34% of ECU seniors indicated that they had or will participate in research with faculty outside of course or program requirements, which is higher than the 25% nationwide participation rate at similar Carnegie class institutions. It is no coincidence that the university has built a strong academic reputation when research plays such an integral role within students’ educational experience.

Founded as a teaching college, thereby having a strong commitment to student success, public service and regional transformation, ECU is well known for its medical and health sciences programs. The Brody School of Medicine, College of Allied Health Sciences, College of Nursing, and School of Dental Medicine are located on a health science campus. The health sciences campus sits on 206 acres with nearly 1.3 million square feet of academic and research space in 62 buildings. Also in close proximity is Vidant Medical Center, an 861 bed Level I Trauma center and the flagship hospital of Vidant Health Systems. The consolidation of the ECU’s biomedical research and training facilities and the local healthcare enterprise promotes interdisciplinary collaboration and interaction on a regular basis. The College of Allied Health is housed within a modern and expansive 303,000 sq. ft. Health Sciences Building on the ECU Health Sciences Campus, adjacent to the Brody School of Medicine. It includes well-designed research and clinic space, including the state-of-the-art labs occupied our group.

In addition to a philosophical commitment and the physical resources in which to conduct research, the university provides administrative and financial support for faculty-mentored student research. Dr. Ron Mitchelson, Vice Chancellor for Research and Graduate Studies, has strategically implemented sweeping changes to strengthen the university’s research and graduate studies infrastructure. Those changes included expansion of the central grant offices to assist faculty and students in research-related activities including
proposal development, post-award management, and compliance. The Vice Chancellor is investing internal funds for pilot projects and providing competitive start-up packages. In 2013-14, Division of Research and Graduate Studies (RGS) in partnership with the Divisions of Academic Affairs and Health Sciences has made commitments totaling $4.1 million to 82 faculty members across campus with 76% of the funding coming from RGS and 24% from the hiring units. In addition, ECU holds a competitive faculty grant application process each fall in support of research with awards totaling approximately $585,000 in the last 3 years. These funds are intended to support faculty at all professional levels and include monies for the involvement of students in the proposed research. Support for faculty-student research is further augmented by the university’s direct support for research conducted by undergraduate and graduate students. For example, 45 Undergraduate Research and Creative Activity awards were funded in FY 2012-13 at an average $1254 per award. Results of these research projects were presented at multiple venues including the State of NC Undergraduate Research and Creativity Symposium hosted by Duke University, ECU’s Research and Creative Achievement Week, the National Conference for Undergraduate Research, and regional or national discipline-specific conferences. Additionally, travel funds and undergraduate research assistantships are available. ECU also offers Graduate Scholar Awards and funds graduate assistantships on a yearly basis with a total expenditure of $12,118,544 in 2012-13.

The university’s commitment to faculty-mentored student research is echoed by the College of Allied Health and its Dean. College level support is evident through contributions to new faculty startup packages and financial support for Graduate Research Assistants and Clinical Research Scholars Awards. The researchers on this grant have received more than $275,000 in university and college support for their research agendas in the form of startup funding. The college dedicates approximately $600,000 yearly to Graduate research assistantships and Clinical Research Scholar Awards, which are often accompanied by tuition scholarships and student health insurance. The College of Allied Health foundation also supports student research on all levels. For example, foundation efforts support 4 doctoral level graduate research assistantships for students working on Operation Reentry North Carolina, a research initiative in support of military service personnel, veterans and their families. In addition to financial support, the college has an Associate Dean for Research to strategically expand the research culture and to provide college level administrative grant support to faculty members, post-doctoral fellows and graduate students. To support this office, we have a grant and contract administrator who directly assists faculty members, graduate students and post-doctoral fellows with grant-related transactions and serves as an interface to central university grant offices.

At the departmental level, research is supported financially by the purchase of equipment and supplies through the annual department budget, the college research and creativity budget, and the university creativity budget. Research assistantships are awarded to students through the support of the ECU Graduate School for the first two years of their Doctor of Physical Therapy program. Up to ten assistantships are awarded during this period. Students may also apply for graduate assistantships supported by the department in the third year of the program. Travel support is provided to students presenting research at state and national conferences. Finally, each year DPT students apply for scholarships and are granted scholarships to support a variety of activities including research. Involvement of students and funding provided at the departmental level, along with time allotment for research, helps ensure the success of our research track faculty.

**Student Participation in Research**

ECU has 16 doctoral degree programs, 4 first professional degree programs, and 77 masters degree programs. Approximately 50% of ECU’s graduate students are enrolled in health-related fields, both clinical and research. We offer doctorates in medicine (MD), dentistry (DMD), physical therapy (DPT), health psychology (PhD),
audiology (combined AuD/PhD), medical family therapy (PhD), nursing (PhD), rehabilitation & clinical counseling (PhD) as well a range of biomedical science PhD programs including biochemistry & molecular biology, bioenergetics & exercise science, microbiology & immunology, physiology, pharmacology & toxicology, psychology, and biomedical physics. As a result of our extensive graduate training programs in health-related fields, we also attract a large number of undergraduate students interested in these areas. While our undergraduates continue on to graduate/professional study at a wide range of institutions, a significant number remain at ECU for graduate and professional study in health-related fields. Over the last five years in the College of Allied Health Sciences, approximately 15% of undergraduates have gone on to pursue doctoral degrees in the health-related sciences at ECU. A comparable percentage of our undergraduates have gone on to health-related doctoral programs at other institutions.

The Department of Physical Therapy has two programs linking undergraduate research opportunities with Doctoral of Physical Therapy (DPT) degree training. These are the Integrated Bachelors/Graduate Degree Program and the Early Assurance Admission Program. The Department of Physical Therapy has an entrance agreement with the Exercise Physiology Degree Program, part of the Department of Kinesiology, to allow matriculation of undergraduate students into the graduate program in Physical Therapy. Students will enter ECU as freshmen and, by following a predetermined path of study, may earn a BS in Exercise Physiology and a DPT in a total of six years. As part of the BS degree completion, students are required to complete an independent study. Researchers from our department typically engage 4-5 of these students every year as fulfillment of this requirement, forging a link between undergraduate research training and clinically relevant research associated with the DPT program.

The Honors College at ECU provides a diverse learning community for academically talented students. Undergraduate students admitted to this college are provided with the opportunity to immerse themselves in service-learning, undergraduate research, and pre-professional experiences. As part of their learning experience, students are required to complete a Senior Honors Project. Researchers from the Department of Physical Therapy serve as research mentors on 2-3 of these projects every year. Students in the Department of Physical Therapy serve as research mentors on 2-3 of these projects every year. Students in the Department of Physical Therapy at East Carolina University are also invited to apply for an Early Assured Admittance to the Doctor of Physical Therapy program. Two seats of the 30 seats available are reserved four years in advance for qualified merit scholars who have entered ECU as freshmen. This early exposure to clinical research, combined with early admittance to our DPT program, lays the foundation for research oriented clinicians.

In addition to the DPT program, the Department of Physical Therapy provides infrastructure, staffing and financial support for the Human Movement Analysis Laboratory and 2 ECU Physical Therapy Clinics. Researchers and clinical partners work together toward a common goal of movement-related research and clinical practice. Together, we assist the DPT program at ECU in accomplishing its objectives as a graduate program within the university system to advance clinical research. We aim to stimulate the graduate students' ability to critically analyze clinical research questions which examine and provide information to the knowledge base of the profession. We also promote scientific inquiry and provide service and collaboration with other faculty, clinicians and organizations within as well as outside the college and university.

The Physical Therapy program and its faculty have a long history of active involvement in student research training. Students will directly benefit from the proposed project through increased opportunities to participate in faculty-mentored research. It is expected that graduate students will be dedicating 20 hours per week to these studies. Additionally, it is expected that 3 DPT students serving as part-time research assistants will receive research training each year by participating in this study. Finally, we expect at least 3 undergraduates to obtain valuable research experience during each year of this study. These opportunities will enrich their educational experience by exposing them to research techniques, equipment, and issues of concern to the broader scientific community. Faculty mentoring will provide more intensive, individualized instruction to encourage dialogue and spark
further interest within the discipline. Firsthand experience gained through participation in the proposed research will enhance students’ understanding of the concepts explored by the project and the methods used to explore those concepts. They will acquire research skills through hands-on experience, and this training will in turn prepare them to be scholarly clinicians who utilize and contribute to evidence based practice as well as for successful entry into advanced degree programs. In the last 2 years, 2 DPT students from ECU have pursued PhD training. Participating in the publication of research results will connect them to the scientific community at large, extending their grasp of the subject matter far beyond the classroom and helping them to understand its implications within a much broader context.

In turn, faculty participating in the proposed project will have the opportunity to engage in research that will inform both their professional development and pedagogy. The proposed research will enhance teaching skills and increase the depth of faculty’s own knowledge. Mentoring participating undergraduate and graduate students will provide a pathway for connecting to students one-on-one, allowing for more intensive instruction and interaction that lends itself toward an enhancement of faculty’s instructional delivery methods. Faculty will also be afforded the opportunity for professional development, to advance knowledge within the field, and to participate in and contribute to the broader scientific community. Faculty-mentored research is integrated in the physical therapy curriculum, is included in each investigator’s typical workload, and is considered a key resource for the successful completion of this grant.

In summary, the physical resources, the institutional support and the intellectual rapport between collaborating partners and students significantly increases the probability of success of the proposed studies. The Department of Physical Therapy has a commitment to evidence based practice, as demonstrated by identified curricular threads. Additionally, scholarly outcomes are important aspects of the Physical Therapy strategic plan. While teaching is a priority, the faculty and the university value and support research productivity by providing abundant resources and valuing student involvement in research. Here at ECU, DPT students actively receive research training as part of their degree requirement and the researchers submitting this grant proposal are committed to student discovery. Since 2012, 18 students have authored or co-authored peer-reviewed manuscripts, and 23 students have presented at national conferences in collaboration with the investigators of this grant. The attainment of an AREA grant would help to further support meritorious research in the biomedical sciences within a department that has not been a major recipient of NIH research grant funds. This would ultimately enhance our ability to offer advanced research training opportunities for students and continue to strengthen the research environment of our department, college, and university.