**FACULTY TECHNOLOGY ADVISOR COMMITTEE**

**TECHNOLOGY GRANT APPLICATION**

**EXECUTIVE SUMMARY**

**Principle Investigator Contact:**

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1. **Description of Technology of Technology Program:**

The technology I am requesting to purchase with this grant will include equipment for the HPPE biomechanics lab. The equipment consists of:

* Two (2) PASCO PASPORT 2-axis force plates: These force platforms have the ability to measure forces on the human body, specifically the normal reaction force and the parallel or sideways force. The platform can be set up on the ground, or on the wall for a different way of quantifying force applied to the human body. The force of walking, vertical jumping, leaning, and impulse are a few examples of what could be directly measured using these platforms.
* PASCO Capstone software: This program is compatible with the force platform (new and existing), and is used for data acquisition, display, and analysis. It is also compatible with any other PASCO product.
* MATLAB software and training: This programming software allows for numerical computation, visualization, and application development. For our purposes, we would use MATLAB for analyzing data and creating algorithms. This will allow us to get more use of the data we collect off our instruments, like the force platform and the BTS wireless EMG system, by analyzing the data in ways we cannot with just a basic spreadsheet like Excel. MATLAB is already present on the computers in Porter Hall at ASU.

1. **Project Description:**

Most recently, the exercise science program at Adams State has acquired space for a biomechanics lab and room for new biomechanics equipment. Our lab is now equipped with two (2) basic PASCO force platforms, a Myotest accelerometer, a Velotron cycle, two (2) video cameras for motion capture, and the BTS wireless electromyography system. Although we now have an array of equipment that parallels to that of a larger university, we do not have a way of processing the large amount of quantitative data that we are capable of producing from these instruments, especially our force platforms. We do not possess any kind of software to allow us to use these instruments to their full potential. Students can only be taught the very basics due to the lack of software to process and analyze the data.

We currently are equipped with two (2) PASCO one-dimensional force platforms, which have been very useful for student learning, both graduate and undergraduate. However, most institutions have force platforms that can measure more than one direction of force, which is most applicable to a biomechanics and sport setting. With only two (2) basic force plates as of now and a large number of students in class, each group has to wait their turn during a lab period to get the chance to use them. With the addition of two (2) more advanced force platforms, students would get more one-on-one time using the technology, and additionally class time would be used more efficiently.

Based on the issues we face in our laboratory, this technology would improve student learning by transitioning basic learning into more advanced learning that is more applicable to real-life scenarios. This addition of software and equipment would also open up the possibility for more participation in research projects to all students in HPPE.

1. **Project Evaluation:**

All students perform laboratory sessions in their biomechanics class and learn to use the force plates. Students write lab reports based on their experiment and findings. This addition of technology to our lab could be evaluated based the student’s ability to correctly use the force plates and analyze the data properly, and by assessing the quality of the lab reports they write. Additionally, we could survey students and ask if they found the new equipment and programs helpful, and if they feel competent using the basic functions of these software programs. We could also evaluate this project by looking at the outcome and interest to use this equipment in regards to the master’s thesis projects in our department.

1. **Project Sustainability (if successful):**

The license for the PASCO capstone software and MATLAB software is perpetual; therefore the licensing fee is one-time only. If we decided other add-ons to the software would be beneficial for student learning or research, we could expand the software at any time (additional fees would be required for the specific add-on). PASCO provides a five (5) year warranty for any product purchased; MATLAB provides one year of technical support for their software, with the option to purchase technical support on a year-by-year basis for 20% the amount of the original software purchase price. However, the lab in Porter hall is already equipped with MATLAB, and computing services and AITC are able to provide support with this program.

1. **Budget(s) (include new technology, software and hardware, to be purchased or used):**

* Two (2) PASCO PASPORT 2-axis force platforms: $459.00 x 2 = $918.00
* One (1) PASCO Capstone college/university license, which allows for the use of this software on all computers within our department: $695.00
* Twelve (12) MATLAB academic licenses (one for each computer in the computer lab; one for the computer in the biomechanics lab): $50.00 x 12 = $600.00
* One (1) Individual MATLAB license (for research purposes – for the biomechanics professor’s ASU laptop): $500.00
* MATLAB online training courses for the biomechanics professor (MATLAB fundamentals, MATLAB programming techniques, MATLAB for data processing and visualization): $450.00
* Other costs: Taxes, shipping: ~$200.00
* TOTAL: ~$3363.00

1. **Population Groups Served:**

With more force platforms and the addition of PASCO capstone and MATLAB to the computers in the HPPE lab, we will essentially serve all students in our exercise science program, including both undergraduate and graduate students at Adams State. The addition of MATLAB, specifically, could also be beneficial to students pursuing degrees in physics or mathematics, as this program is widely used within these fields too. HPPE faculty and graduate students wishing to pursue research in the biomechanics lab will be able to process large amounts of data, and get more meaning out of this data when using both of these software programs. Undergraduates enrolled in biomechanics will have the opportunity to learn how to use more advanced force platforms, and the basics of each of these software programs (which would be a desirable attribute when entering the work force or continuing education). Exercise science graduate students would also have the opportunity to learn how to operate these software programs within their biomechanics class, which in turn would expand the possibilities for their master’s thesis research. The advanced force platforms will also be more applicable to real-life scenarios, and again widen the possibilities for master’s thesis projects (or any research project performed here, for that matter). Any student who learns to use these more advanced force platforms, and the basics of data processing via these two (2) software packages would be undoubtedly be much more prepared for continuing on and working in the field of biomechanics and exercise science, as these technologies are used virtually everywhere within this field.

1. **List of Key Faculty and/or Staff Members Participating:**

Megan Nelson, MS – Visiting Assistant Professor of Biomechanics and Exercise Science; Dr. Beez Schell – HPPE Professor and Department Chair, email: beezschell@adams.edu

1. **Computing Services and/or AITC Support Contact(s):**

Christine Streeter – Computing Services, christinestreeter@adams.edu

1. **Results Dissemination Plan:**

With the addition of new equipment and software, our students have more to work with when it comes to addressing their own curiosities and pursuing research projects. Our plan for dissemination of results is to have more students take part in student scholar days to present their findings, and additionally present at other conferences like the rocky mountain American College of Sports Medicine conference in Denver, CO.