

UNIVERSITY OF LOUISIANA AT LAFAYETTE

STEP Committee

Technology Fee Application

Modernizing and Streamlining Computer
Workstations for Six Biology Courses

Title

**Brad Moon, Karen Smith,
Sophie Plouviez, Kelly Robinson, &
Scott M. Duke-Sylvester**

Name of Submitter
(Faculty or Staff Only)

Dept. Biology, UL Lafayette

Organization

Title: Professor Date: 7/12/18
Name (Contact Person): Brad Moon
Address: Department of Biology, UL Lafayette
Phone Number: 482-5662 Email: Brad.Moon@louisiana.edu
Department/College/Org: Biology/Sciences/UL Lafayette

ABSTRACT (250 words or less):

We plan to modernize and streamline computer workstations for six biology courses by combining two sets of old computers (26 in total) currently distributed between two classrooms into one new set (of 17) in a single classroom. This project will help separate wet labs and dry labs, use our space more efficiently, and reduce costs compared to maintaining separate sets of hardware and software. The department will provide minor room renovations and purchase course supplies each semester, but does not have money for major equipment and is prohibited from purchasing computers and software using lab fees.

One set of 9 computers and software was purchased using a Board of Regents grant in 2009 for our required comparative physiology course. These computers need upgrading to support modern operating systems and software for our Comparative Physiology and Neurobiology courses that provide students with hands-on experience making physiological measurements, such as those taken by health-care professionals and diverse scientists in biomedical research.

The other set of 17 computers is from 2007 and no longer supports the uses we need. Their replacements will support courses in programming for biologists, bioinformatics, statistical ecology, and spatial data analysis and management, which are fast-advancing fields with increasing demands for computing skills and computational power.

Modernizing this instrumentation will allow us to continue providing a high-quality, state-of-the-art education and hands-on experience that helps prepare students for diverse careers in biological and biomedical sciences, and streamlining it will improve space usage and reduce costs.

PROJECT DESCRIPTION:

a. Purpose of grant and impact to student body as a whole

We plan to modernize and streamline computer workstations for six biology courses (listed below) by combining two sets of old computers currently distributed between two classrooms into one new set in a single classroom.

The courses are BIOL 360 (Principles of Ecology, Dr. Duke-Sylvester), BIOL 424 (Neurobiology Laboratory, Dr. Karen Smith), BIOL 454 (Molecular & Cellular Engineering Laboratory, Dr. Sophie Plouviez), BIOL 482 (Comparative Physiology, Dr. Brad Moon), BIOL 495/595/528 (Spatial Data Analysis and Management, Dr. Kelly Robinson; the separate course numbers are treated here as the same course content), and BIOL 595 (Computer Programming for Biologists, Dr. Sophie Plouviez).

The Biology major currently includes approximately 900 undergraduate students, making it one of the largest majors on campus. The courses involved in this project serve approximately 110 students, with most (75%) being undergraduates. It is likely that the workstations supported by this project will have increased usage in the near future because enrollment in the biology major has been growing rapidly and we have hired new faculty (Drs. Mark Genung and Loren Sackett) who could use this classroom and the new workstations after they arrive in 2018–19.

We plan to remove the 26 old computers from Wharton Hall Rooms 409 and 411, and house the 17 new computers in Room 411. (Room 409 will continue to be used for other courses that involve wet labs.) This move will help separate wet labs and dry labs, use our space more efficiently, and reduce costs compared to maintaining separate sets of hardware and software.

Modernizing this instrumentation will allow us to continue providing a high-quality, state-of-the-art education and hands-on experience that helps prepare students for diverse careers in biological and biomedical sciences, and streamlining it into a single classroom will improve our space usage and reduce costs.

b. Projected lifetime of enhancement

Based on Microsoft's calendar for the Windows 10 operating system, we anticipate that these new computers will last for at least 7 years until 2025, and perhaps as long as 10 years based on our experiences with the current computers in our course laboratories.

c. Person(s) responsible for

i. Implementation

Dr. Brad Moon will oversee this project, and will purchase the computers and software requested in this proposal.

ii. Installation

iii. Maintenance

Drs. Brad Moon, Scott Duke-Sylvester, and Sophie Plouviez will oversee computer and software installation and regular maintenance. Dr. Kelly Robinson will oversee special installation by university IT personnel of Geographic Information Systems software, for which the university already has licenses.

iv. **Operation**

Drs. Duke-Sylvester, Moon, Plouviez, Robinson, and Smith will all use the laboratory, computers, and software on a schedule that we will set to avoid scheduling conflicts. Most of the schedules for the courses in this project have already been coordinated to be compatible with one another and use of the shared classroom.

v. **Training (with qualifications)**

Dr. Scott Duke-Sylvester is our departmental IT liaison and teaches BIOL 360 (Principles of Ecology). He oversees the allocation of administrator access to departmental computers and triages equipment and software problems for classroom computers.

Dr. Brad Moon teaches BIOL 482 (Comparative Physiology) and has administered the 10 computers used for it since 2009. Dr. Moon's qualifications include 17 years of administering computers for laboratory research and 9 years of administering computers for use in courses. Dr. Moon has trained to Dr. Smith in use of the shared computers for BIOL 424 and 482 for the past several years.

Dr. Sophie Plouviez teaches BIOL 454 (Molecular and Cellular Engineering Lab) and 595 (Computer Programming for Biologists), is the departmental equipment coordinator, and has administered 16 computers used for those courses since 2017.

Dr. Kelly Robinson teaches BIOL 495/595/528 (Spatial Data Analysis and Management). Dr. Robinson's qualifications include 10 years of administering computers for laboratory research.

Dr. Karen Smith teaches BIOL 424 (Neurobiology and Neurobiology Lab), which uses the classroom and computers administered by Dr. Moon

d. **The narrative of the proposal must include the purpose and justification for each of the items listed in the Budget Proposal.**

Computer skills are increasingly critical in modern life. The sciences, in particular, depend on computer skills for nearly all stages of research and teaching, including running equipment for data collection, analyzing diverse data sets from human and animal physiology to coastal and other environmental management and restoration, to programming for many of the special applications required in the sciences. The Department of Biology incorporates computers into most of our classrooms, maintains them and associated laboratory equipment, and provides supplies for laboratory classes and student research projects. Hence our teaching labs provide students with direct, hands-on experiences with technology that is used in health care, biomedical and other biological research, and analyses of large data sets associated with genetics, physiology, and environmental projects.

To reduce purchasing and maintenance costs, improve efficiency in our classroom usage, and continue to provide state-of-the-art education in biology and biomedical sciences, we plan to remove 27 old computers currently distributed between two classrooms into one set of 17 computers with updated software in a single shared classroom. We have already coordinated our class schedules to be compatible with one another and the shared laboratory room, and can easily make adjustments to the class schedules to ensure continued scheduling compatibility.

We originally used \$120,000 in external grant funding in 2009 to purchase computers, associated equipment for data-collection, and software for running the equipment. The equipment is maintained and supplies provided using student lab fees; hence, most of the data-collection equipment is still working well. However, the computers and software are at the end of their useful lifespan. The software has

begun to freeze up during data collection, causing delays, frustration, and data loss. Students complain that these interruptions affect their focus and progress in completing the lab experiments. The Department of Biology will fund minor room renovations from its operating budget, and will use lab fees to provide supplies, transducers, and replacement parts for these courses. Unfortunately, we are specifically prohibited from purchasing computers and software with funds from student lab fees. Hence, we are requesting funds to replace old computers and the software used to run the lab equipment.

Some of the key concepts to be supported by the shared classroom equipment are listed below.

BIOL 360 (Principles of Ecology, Dr. Duke-Sylvester)

Ecology as it is practiced today is a highly quantitative science making use of both advanced statistical techniques as well as sophisticated simulation models. Computers and the accompanying software are used to reveal patterns in large data sets that would be difficult or impossible to comprehend otherwise and to identify the ecological mechanisms that are responsible for creating observed patterns. Statistical analysis, using software such as SAS JMP, R or SPSS, is at the heart of modern ecological research. As computers have become more powerful, statistical software has branched out into progressively more advanced sophisticated approaches. Simply linear regression has been extended to generalized linear models, non-linear models and structural equation modeling. Data sets have also grown in volume over the past decade. Environmental monitoring projects, such as Louisiana's Coastwide Reference Monitoring System, produce hundreds to thousands of gigabytes of data. Analyzing these large dataset has been made possible by increased computing power available. One of the goals in Principles of Ecology is to provide students experience with advanced analysis techniques and prepare them for careers where expertise with these systems isn't just an advantage, it is the norm.

BIOL 424 (Neurobiology Laboratory, Dr. Karen Smith)

Brain and nerve structure and function, including nerve sensitivity, transmission properties, conduction velocity, sensory-to-motor coordination, sensory perception, and brain wave analysis.

BIOL 454 (Molecular & Cellular Engineering Laboratory, Dr. Sophie Plouviez)

Analysis of genetic data, including gene sequences in genetic engineering for use in research, medicine, and industry. Specifically, computers are used for designing primers for sequencing DNA and analyzing chromatograms of DNA sequences.

BIOL 482 (Comparative Physiology, Dr. Brad Moon)

This required course draws heavily on the computers and LabStation software that runs data-acquisition hardware we already have for student experiments. Key topics studied in the lab for this course include:
Cardiovascular function (including heart rates, blood pressures, and changes with activity)
Energy metabolism during rest and exercise (including the effects of temperature on metabolism)
Muscle physiology, including force and endurance
Neurophysiology (including nerve sensitivity, transmission properties, conduction velocity)
Sensory perception and physiology (touch, taste, vision, hearing, balance, and the mechanisms that support them)
Ventilation and gas exchange (breathing rates, volumes, and changes with activity)

BIOL 495/595/528 (Spatial Data Analysis and Management, Dr. Kelly Robinson)

Collection, management, analysis, and presentation of geographic data related to biology

BIOL 595 (Computer Programming for Biologists, Dr. Sophie Plouviez)

Programming for accessing and managing data, analyzing large data sets, and simulation and numerical modeling

In addition to primary usage in the courses described above, the computers and equipment in this classroom will also be available for undergraduate and graduate research projects in BIOL 410 (Individual Project), 561 (Advanced Problems in Zoology), and 595 (Special Projects, including various topics over time in addition to Dr. Robinson's course listed above).

Modernizing and streamlining these classroom computers and software will help us continue providing hands-on learning experiences in highly active and integrative fields that have applications throughout biology and medicine. The learning experiences will help students gain better analytical and technical skills, including the use of computer-controlled biomedical equipment and experimental problem solving. This will provide our students with better preparation for graduate and professional schools and programs, including biological, biomedical, environmental, conservation, and management programs and career paths.

Budget Proposal

1. Equipment \$20,910 (17 enhanced computers @ \$1,230 each)

Sixteen computers for students and one for instructors, to be purchased through the university's PC Depot (price quote attached). Enhanced computers are needed for processing the large data sets used in BIOL 495/595/528 (Spatial Data Analysis and Management), and will benefit the other courses as well for acquiring and analyzing large data sets. All 16 computers will be used by BIOL 360 (Principles of Ecology), 454 (Molecular & Cellular Engineering Laboratory), 495/595/528 (Spatial Data Analysis and Management), 595 (Computer Programming for Biologists). As noted below under **Software**, BIOL 424 and 482 will use 10 of these computers initially, and eventually all 16 as part of our planned growth after we request funding in a future grant cycle for additional data-acquisition kits and software.

2. Software \$14,950 (for 10 computers @ \$1,495 each)

For BIOL 424 (Neurobiology Laboratory) and 482 (Comparative Physiology), we currently have 10 data-acquisition kits that use special software (LabStation) for data collection from the various transducers in the kits. Hence, we are requesting funds to upgrade the LabStation software for only 10 of the computers at this time (price quote attached from ADInstruments). As part of our planned growth in BIOL 424 and 482, we plan to seek additional support in a future grant cycle for additional data-acquisition systems and LabStation software for the 6 additional computers available in the classroom. Software requirements for other classes will be fulfilled through UL Lafayette's site-licensed software.

3. Supplies \$0

The Department of Biology will provide supplies for use in the courses involved in this proposal. Hence, we are not STEP requesting funds for supplies.

4. Maintenance \$

The Department of Biology will contribute to maintenance and repairs as needed. Hence, we do not anticipate needing STEP funds for maintenance.

5. Personnel \$

We are not requesting any STEP funds for personnel.

6. Other \$600 (for one classroom)

Installation of licensed ArcGIS (geographic information systems) software by university IT personnel.

TOTAL: \$36,460

ADDITIONAL INFORMATION:

<https://helpdesk.louisiana.edu/pcdepot/store/desktops>

Desktop Enhanced - Dell Optiplex 7050 with Monitor



- i7 Processor (Quad Core, 3.6Ghz).
- Case Size.
- 16 GB main memory.
- 500 GB hybrid hard drive.
- DVD/CD Burner.
- 6 USB 3.0 (2 front/4 rear-1 with PowerShare), 4 USB 2.0 (2 front/2 rear-1 front with PowerShare), 1 Internal USB 3.0 with smart power on, 1 RJ-45, 1 P2/Serial, 2 Display Port 1.2, 1 HDMI, 1 UAJ.
- 5-year warranty.
- 23-inch monitor with USB Soundbar.
- Windows 10.
- Office 2016.
- Sophos Security Suite.

1230.00

Quote Reference Q17-74945
 Expiration Date 8/12/2018

Created Date 7/12/2018

Prepared By Rachel House
 Phone (719) 306-0313

Email r.house@adinstruments.com

Customer University of Louisiana
 Prepared for Dr. Brad Moon

Mailing Address Department of Biology
 300 E. Saint Mary Blvd, Rm 106
 Lafayette, Louisiana 70504
 United States

Quotation Items

Product Code	Product	Long Description	Quantity	Sales Price	Total Price
LS001	Lt LabStation	Lt LabStation is a laboratory-based education platform designed to be used with PowerLab. It enables educators to create their own experiments for their students to complete in the lab. Lt LabStation also allows educators access to an online library of high-quality lessons that can be edited to suit their laboratory course. Developed using the same technology as our online learning solution (Lt), Lt LabStation gives educators and their students a modern lab experience. Developed using the same technology as Lt, our online learning solution, Lt LabStation gives educators and their students a modern lab experience.	10.00	USD 1,495.00	USD 14,950.00

Totals

Total Price	USD 14,950.00
Freight Cost	USD 0.00
Tax Payable	USD 0.00
Total Inc Tax	USD 14,950.00

Availability, Shipment and Payment

Product Availability 30 days from date of order Shipment Method UPS Ground
 Payment Terms 30 days from date of invoice Shipment Terms FOB Destination (Prepay & Add)

Terms and Contitions

CONFIDENTIAL:

The prices contained in this quotation are confidential between ADInstruments, Inc. and the client and must not be disclosed to any other company without the express permission of ADInstruments, Inc.

Quotations and purchases from ADInstruments, Inc. are subject to the following terms and conditions. Please read carefully before continuing with your purchase.

Validity: The price(s) quoted is(are) valid for 30 days. Please include a copy of this quote with your purchase order to ensure prompt processing of your order. Sales taxes are estimates and may be added or modified at the time the order is placed. Prices not included on a formal ADInstruments quotation are subject to change without notice.

Currency: Prices quoted are in US dollars unless otherwise noted.

Return Policy: ADInstruments PowerLabs and Signal Conditioners that have not been opened may be returned within 15 business days of the invoice date. A re-stocking fee equivalent to 15% of the value of the item will be assessed for all returned items. If a purchase order is used, items must be returned prior to payment of an invoice: ADInstruments will not issue refund checks. If an item is returned after an invoice has

PREVIOUS FUNDED STEP PROJECTS:

Dr. Moon has not applied for STEP support before.

Dr. Smith has not applied for STEP support before.

Dr. Plouviez was awarded STEP support in the fall of 2017 for the following project:
Yi-Hong Wang & Sophie Plouviez, Upgrading a Molecular Biology Teaching Lab, \$29,392.20

Dr. Robinson has not applied for STEP support before.

Dr. Scott Duke-Sylvester has not applied for STEP support before.