2019-20 INVESTMENT FUNDS FULL APPLICATION #165

PROPOSAL SUMMARY	
Project Lead Name	Dawn Newman
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Project Lead Division	Academic Affairs
Project Lead Department	Biology
Proposal Title	Equipment Replacement and Improvement for required high-enrollment Biology I (BIO201), Biology II (BIO202), and upper level/graduate course; Developmental Biology (BIO404/504)

A. PROPOSAL DESCRIPTION

A-1. Describe the proposed project/initiative

This proposal is for the purchase of dissecting microscopes, micropipets, and digital microscopes for the high-enrollment courses; BIO201 and BIO202 (Biology I and Biology II), required by all Biology majors, and also an upper/graduate level biology lab, BIO404/504 Developmental biology.

BIO201 and BIO202 consistently have full sections of lab, 24 students, or more. The upper level BIO404/504 has an average of 18 students. During the current academic year there are; 9 sections of BIO201 (216 students), 6 sections of BIO202 (144 students) and one section of BIO404/504 (18 students).

The equipment summarized above services approximately 340 Biology majors per year (undergraduate/graduate).

• The hands-on nature of these laboratory courses necessitates one dissecting microscope per student. The existing microscopes are over 17 years old. Heavy use has resulted in only one microscope per 2 students at this point in time.

o Note: The existing dissecting can be "handed-down" to BIO111 - Principles of Biology, which is in dire need. The microscopes in the BIO111 lab are over 20 years old.

BIO111 students only require one microscope per two students, so this would fulfill the needs of the BIO111 lab.

• Micropipets are required for more than 50% of the experiments done in BIO201/202, and 404/504. Intense use of these necessary instruments results in the need for some replacements every year. Since suppliers change models frequently, there is a "hodge-podge" assembly of several different models of micropipets used to teach these essential lab courses. This makes it difficult to instruct these labs since it causes confusion on the part of the student, and inconsistencies in lab manual instructions. A uniform set of micropipets would improve instruction, and in turn, improve learning.

• Digital microscopes have an attached tablet for viewing the specimen. We purchased 2 of these last year with department funds and they have proven to be a hit, both with the students and instructors. Visual imagery has evolved into the use of tablets, Students (and many times instructors), are more comfortable looking at an image on a tablet adapted

to a microscope rather than looking through the traditional ocular lenses. This is the new "NORM".

*** In reference to the first two bullet points above ,the dissecting microscopes and micropipets, the following weighed heavily in my decision to pursue this proposal:

First, the year-by-year replacement of a few microscopes, or micropipets is impractical because suppliers change models frequently, and teaching labs with variations in model type within the class causes confusion on the part of the student, and inconsistencies in lab manual instructions for experiments using them.

Second, the lack of an appropriate number of dissecting microscopes and micropiptes leads to curricular decisions such as having students work in pairs instead of individually during lab experiments. Many times, one of the two students in a "pair" will just sit back and let their "partner" do all the lab work, thus learning nothing themselves. This results in students entering upper level biology courses underprepared, and lacking essential skills.

B. TYPE OF FUNDING

B-1. What type of funding have you been invited to apply for?	**Core Needs, Facilities & Alterations -** to provide one-time temporary funds to support pressing unbudgeted or under-supported academic/operational/administrative needs, facilities and alterations, and initiatives that build long-term capacity, such as staff development, investment in infrastructure, and risk management initiatives.
B-2. Applications for Strategic Priorities funds must indicate which ONE of the following measures of success the project/initiative addresses:	

C. STRATEGIC ALIGNMENT

C-1. Outline the ways in which the proposed project will contribute to the College Strategic Plan, and the specific Measure of Success you selected in question B-2.

Your narrative must:
(1) Identify the measure of success you selected in question B-2 above, and
(2) Be explicit in describing *how* the project contributes to that measure.

D. OBJECTIVES & ASSESSMENT MEASURES
Successful applications must include well-defined assessment plans that include clear measurable objectives and specify the measures/data that will be used to determine if each objective has been met.

D-1. Short-term Goals/Objectives:
What measurable goals or objectives do you hope to achieve with this project in the short-term, meaning within the one-year time frame for which funds are available (fiscal year 2019-20)?
Objective #1 – Each student has access to a dissecting microscope. BIO210/202 consistently have full sections, 24 students. This means the lab requires 24 dissection microscopes.

Objective #2 – Each pair of students has a set of micropipets, and the whole class is using the same model. This eliminates inconsistencies in lab manual instructions making it easier for instructors to teach the lab. This will allow students to successfully learn how to use micropipets in BIO201/202, which will improve performance in upper level biology courses.

Objective #3 – Decreased replacement, maintenance and repair costs.

The microscopes chosen are "student-friendly". They have limitations that prevent damage from improper use. The bulbs they require are easily available, and inexpensive. Other parts to repair them will be available for several years.

The micropipet model chosen is a "repairable" model. They will be purchased from LPS who also services them at their facility for $38.00. The "throw-away" micropipets we have been forced to buy due to budget constraints are $140 each. Each time one breaks we have to spend that much again to replace it.

Objective #4 – "Handing-down" the existing dissecting microscopes to BIO111 - Principles of Biology, which is in dire need. The microscopes in the BIO111 lab are over 20 years old (the light source is actually separate from the microscope body – that is really the "dark" ages!).

BIO111 students only require one microscope per two students, so this would fulfill the needs of the BIO111 lab.

D-2. In the previous question, you identified the measurable short-term objectives you hope to achieve with your project. For each objective listed, explain what measures or data you will use to determine if that goal has been met.

Objective #1

• Tracking the availability of microscopes, compared with the ideal ratio of one microscope per student.

• Comparison between the number of students that answered questions associated with the use of a dissecting microscope correctly on lab exams in previous semesters with semesters after receiving enough dissecting microscopes allowing one per student.

Objective #2

• Tracking the availability of working micropipets, compared with the ideal of one set per pair of students.

• Surveying lab instructors to determine if it is easier to teach lab properly when all the micropipets are the same model, and if there is improvement in student understanding.

• Comparison between the number of students that answered questions associated with the use of a micropipet correctly on lab exams in previous semesters with the semesters after receiving enough micropipets of the same model to allow one set per pair of student.

Objective #3 – Comparing the replacement, maintenance and repair costs of the microscopes, and micropipets in previous years to future years.

Objective #4 – The existing 14 microscopes will be "handed-down" to BIO111 lab. They have several more good years of use in them. BIO111 coordinators/instructors have already expressed gratitude for this possibility.

This saves the college money by eliminating the need to buy new dissecting microscopes for BIO111.

This will be assessed by surveying BIO111 coordinators/instructors to determine if it is easier to teach lab properly with the newer updated dissecting microscopes, and if there is improvement in student understanding.

D-3. Long-term Goals/Objectives:

What measurable long-term goals or objectives (if any) do you hope to achieve with this project in the long-term, meaning beyond the one-year time frame for which funds are available (fiscal year 2019-20)?

• Curricular Improvement and Student Success –The availability of proper updated lab equipment will allow the instruction of these important Biology labs to improve by providing a higher quality, more relevant biology lab learning. Lab experiences provide invaluable, practical laboratory skills, that can't be replaced by images on a page.

• Economic Impact – The dissecting microscopes, micropipets and digital microscopes proposed can be used for many years to come. BIO201/202 are offered Fall and Spring semesters, BIO 404/504 is offered in the Fall, so the proposed items are used year-round. The equipment I have chosen is "student friendly" in the sense that it is easily maintained, and repaired.

• Institutional Reputation – Student satisfaction with laboratory equipment is more important than one may think. As a Biology lab coordinator/instructor I have personally heard derogatory comments regarding the condition, availability, and level of the equipment. As an institution of higher education, we compete with other institutions for students. The quality of our lab equipment can be a reflection of our commitment to a modern science education.

E. IMPLEMENTATION PLAN

E-1. Identify the specific activities to be funded from the Investment Fund along with an estimated timeline for implementation. All activities and expenditures must occur within the stated one-year period of fiscal year 2019-20.

This proposal will provide the funds to purchase twenty-four (24) Zoom Stereo Microscopes (Dissecting microscopes), twelve (12) p200 Micropipets, twelve (12) p1000 Micropipets, and six (6) Wolfe® DigiVu™ DVM 6.0 Digital Microscopes.

These items will be purchased as soon as the funds become available so their use can be implemented starting with the Fall 2019 semester. The students taking BIO201 and BIO202 (Biology I and Biology II), and BIO404/504 Developmental biology labs will be the first of many students to benefit from the purchase of this important laboratory equipment.

F. CONSULTATION & AUTHORIZATION FORMS

F-1. This proposal includes (check all that apply):

F-1b. Upload the signed Stipend Authorization Form here.	
F-2. For requests involving technology. The Chief Information Officer (Bob Cushman or his designee) has reviewed this proposal.	✔ Not Applicable
F-3. For requests involving alterations of facilities, the Vice President for Administration & Finance (Jim Wall or his designee) has reviewed this proposal.	✔ Not Applicable
F-4. Upload the signed Technology and/or Facilities Consult Form(s) here.	
G. BUDGET	
G-1. Upload your itemized budget here. Use the Excel Budget Spreadsheet sent to you in your notification email.	2019-20 Investment Fund Budget Template - Dawn Newman.xlsx
G-2. Total Amount Requested from Investment Funds	$33654.60

G-3. Please provide a narrative explanation for your budget. Provide further detail than what is included in the spreadsheet and offer a justification for expenses.

***I wasn't able to address the purchase of the Digital microscopes in the Short term objective area due to the word limit so I would like to mention them here.

Digital microscopes have an attached tablet for viewing the specimen. Students, and even instructors, are more comfortable looking at an image on a tablet on a microscope rather than using the traditional ocular lenses. This is the new "normal", and the best way to be a successful lab instructor is to "adapt" to the needs of the students as quickly as possible. Many faculty members believe this is the type of microscope that will be in all biology teaching labs very soon. The purchase of these would contribute to the long term impacts outlined below.

• This proposal includes the purchase of twenty-four (24) Zoom Stereo Microscopes (Dissecting microscopes) @ $995.00 each (1 per student). The hands-on nature of BIO201, BIO202 and BIO404/504 laboratory courses necessitates one dissecting microscope per student. The microscopes are over 17 years old. Heavy use has resulted in only one microscope per 2 students at this point in time.

o Note: Existing dissecting can be "handed-down" to BIO111 - Principles of Biology, which is in dire need. The microscopes in the BIO111 lab are over 20 years old (the light source is actually separate from the microscope body – that is really the "dark" ages!).

The good news is, BIO111 students only require one microscope per two students so this would fulfill the needs of the BIO111 lab.

• This proposal includes the purchase of twelve (12) p200 Micropipets and twelve (12) p1000 Micropipets (1 of each size micropipette per pair of students). Micropipets are required for more than 50% of the experiments done in BIO201, BIO202, and BIO404/504. The type of micropipet I have chosen can be repaired unlike the cheaper "throw-away" ones we are usually forced to buy. This means these labs will have a matching set of micropipets for students for several years to come.

• This proposal includes the purchase of six (6) Wolfe® DigiVu™ DVM 6.0 Digital Microscopes. Digital microscopes will bring the BIO201, BIO202, and BIO404/504 into the 21st century. We purchased 2 of these last year with department funds and they have proven to be a hit, both with the students and instructors. Visual imagery has evolved into the use of tablets, Students (and many times instructors), are more comfortable looking at an image on a tablet adapted to a microscope rather than looking through the traditional ocular lenses.

G-4. Does your budget include an application for an internal loan?	No

G-5. Please explain why the proposed project cannot be self-funded from existing Department, School or Division resources.
First, $33K is too large of an expense for our Departmental Budget.

Second, it is very unlikely this request to our annual equipment replacement will be funded through the Dean's account. The equipment replacement allowance for the School of Arts and Sciences really doesn't allow for one $33K expenditure, because the available funds are spread across the needs of many departments.

Also, there are, as yet, no external funding opportunities for a non-research, small equipment educational purchase such as this.

H. ADDITIONAL INFORMATION

H-1. Use this space to provide any additional information to assist in the review of the proposal.

Upload up to 3 supplemental files here.

Project Lead Signature

Entry Info

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