Project Title: Huxley College Teaching Lab Microscope Upgrade

Department/Organization: Huxley College

Name(s) of Project Applicant(s)

Name Leo Bodensteiner  MS 9181  Email: leo.bodensteiner@wwu.edu  Phone 7375
Name Jim Helfield  MS 9181  Email: james.helfield@wwu.edu  Phone 7285
Name April Markiewicz  MS 9180  Email: april.markiewicz@wwu.edu  Phone 6137
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Principal Contact:

Name F. Scott Wilkinson  Email: fraser.wilkinson@wwu.edu  Phone x3667

Amount Requested for Project

Proposed Budget:

1. Equipment total  $ 99689.92
2. Plus site preparation (not STF funded)  +  
3. Total Project Cost (spreadsheet total from part IV of this form, Total Project Budget)  =  $ 99689.92
4. Less organization’s contribution  –  $ 1,000
5. Less site preparation  –  $ 0
6. STF Grant Request  =  $ 98,689.92

PREREQUISITES

1. Review the policies (two) and procedure (one) below for using lab fees to purchase equipment. You may decide that this option is more effective for funding your proposal.

   - POL-U1400.03 Establishing and Changing Course and Lab Fees
   - POL-U1400.04 Administering and Spending Course and Lab Fees
   - PRO-U1400.03A Establishing a Course or Lab Fee, or Changing the Amount or Purpose of an Existing Course or Lab Fee, Fixed or Variable

2. Read the updated II. STF Proposal Form and Instructions on the Student Technology Fee website.

IMPORTANT NOTES

1. Disallowed Proposals:
a. Proposals for computer lab upgrades – Existing computer labs are upgraded on a rolling schedule, and the Student Technology Fee continues to fund these upgrades.

b. Combined proposals – The STF Committee accepts single, distinct proposals only.

c. Proposals for software related to maintenance and/or serial payments

2. THE STF Committee will only accept complete proposals by the announced deadline. Every section (I–IX) and all items of this proposal format must be addressed.

I. Executive Summary (800 words max)

Provide a summary of the project and the benefits to be derived. Explain what the students would gain from the project, and how the acquisition would meet the Student Technology Fee mission.

Huxley College of the Environment provides upper-division instruction in a variety of multi-disciplinary programs associated with the environment including environmental sciences, environmental studies, environmental policy, planning, and education, geography, GIS and spatial analysis, environmental toxicology, and watershed studies. As a small college separate from the College of Sciences and Technology, our financial resources are much more limited, which affects our ability to purchase quality laboratory instruments that are standard equipment in the other teaching laboratories on campus. Specifically, most of the microscopes our students use in ESCI laboratory classes are 20 (or more) years old. The optics in them are scratched from heavy use over the years and the light sources are still reliant on standard light bulb technology. In 2007 we were successful, through an STF proposal, in replacing 16 compound microscopes and 16 binocular stereo zoom (dissecting) microscopes which were at that time 15 years old. Now we would like to finish the job and upgrade the remainder of our 20 year old microscopes so that all Huxley students have the opportunity to use high quality modern equipment.

We are requesting funds to purchase 20 good quality educational grade binocular compound microscopes and 20 binocular stereo zoom (dissecting) microscopes. The 40 microscopes will be shared by the faculty in both the Department of Environmental Sciences and the Department of Environmental Studies for use in their respective laboratory and lecture courses, such as ESCI 457/557, ESCI 458/558, ESCI 411, ESCI 440, ESCI 430/530 and ESCI 315. They would replace the 16 compound and 16 dissecting microscopes that are currently still being used in ES 331 and ES 322. We are asking for 20 of each microscope since these two labs have recently be remodeled to accommodate 20 students each. It would also be worthwhile to have a few extra microscopes available since class use is heavy and breakage occasionally occurs, leaving us a microscope or two short. Furthermore, many students, both undergraduate and graduate, frequently need to borrow both compound and dissecting microscopes for individual projects.

II. Relationship to STF Objectives / Impact on Current Academic Programs

The STF Committee will use as its primary assessment criteria the three objectives—access, quality, and integration—defined in the STF mission. Given this criteria, describe your proposed project in detail.

1. Tell us—focusing on what the students will gain from the project—how the project would provide positive benefits to specific courses or instructional programs. Specifically:

   a. How would this project provide additional student access to technological resources?
There are currently 16 Olympus CH2 compound and 27 Spencer dissecting microscopes that are still being used within Huxley College. The microscopes are housed in ES 322 (all 16 of the compound and 16 of the dissecting microscopes) and ES 331 (11 dissecting microscopes) and are occasionally transported via carts to another laboratory classroom and assigned to that room. This system of using a pool of microscopes to supply our laboratory classes works well enough. It does mean though that the microscopes are heavily used over the course of the year. The microscopes described above are at least 20 years old and whatever technological advantages they once had are gone (see figure 1). The lenses and stage plates are scratched (see figure 2) and they lack the optical resolution that is standard on current microscopes. The light quality is poor, with pre-halogen bulbs, so internal structures of cells, for example, are hard to see and often have a false color due to the quality of the optics and the light source (see figures 3, 4 and 5). More specifically, complaints recently came in (November 2012) regarding the quality of the dissecting scopes in ES 322. Leo Bodensteiner (Limnology professor) stated: "The optics on some scopes could not clearly distinguish the features needed to identify them, other than to say they appeared to be blurry blobs." Moreover, the microscopes are heavy and bulky, making them difficult to transport between the various laboratory classes. In fact, we do our best to avoid transporting microscopes out of assigned rooms at all, since experience has shown that this is when damage to microscopes is most likely to occur. A previous (2007) STF proposal was granted, providing Huxley College with 16 compound and 16 dissecting microscopes. Our goal with this proposal is to bring all of our microscope equipment up to date so that working with inadequate equipment is no longer an option for any Huxley student.

This project will provide additional student access to technological resources in two ways: 1) by increasing the number of compound and stereo zoom microscopes available for student use and 2) by providing microscopes that have the latest technological advances in construction, working parts, and design (e.g., improved quality of optics, filters, light source, ergonomic construction to reduce strain and discomfort in using them, and a vibration resistant construction that is lightweight for easy transport, but built for long-term use) This project will provide students with access to the basic level of technological tools that are essential for the types of experiments conducted in laboratory courses and are of comparable quality to those currently used in the other science departments on campus.

b. How would this project broaden or enhance the quality of the student’s academic experience through the proposed technology?

The quality of the student’s academic experience is directly related to the quality of the technological tools provided in the classroom. Microscopes are one of those technological tools that can open up a whole new world to the student, revealing cellular structures, individual organisms, and microscopic communities and their interactions in organic samples, as well as crystalline structures and mineral contents in inorganic samples. Just as microscopy is a key and basic technological tool used in biology, geology, and the other earth sciences, so too in certain geography disciplines and in the environmental sciences. Environmental science is defined as the study of how the physical, biological, and chemical components in the environment interact. Many of the interactions that affect organisms occur at the molecular and cellular levels. Microscopes are therefore the crucial tools that provide students and professionals alike with the ability to observe and record those interactions and effects as they occur.

This project will provide all the students who take laboratory classes in Huxley College and use microscopes in their assigned coursework comparable quality of
microscopes currently used in the other science departments on campus. Students
deserve to receive a consistent, high-quality learning experience using current
technological tools similar to those used in the other sciences on campus, as well as
in the professional fields, which this project will provide to Huxley College students.
(Within the University, science departments have Nikon E200 compound microscopes
(Biology), a Zeiss Photomicroscope, a Zeiss reflectance microscope, and a Wild
stereomicroscope (Geology), and Olympus model CH30FR13 compound and Olympus
model SZ-4045 stereo microscopes (Shannon Point Marine Center). This project will
provide those technological tools. Upgrading the compound and stereo zoom
microscopes to today's technological standards will directly enhance the student's
educational experience by providing magnified images at a variety of ranges with
excellent resolution and contrast to reveal clearly defined details quickly and easily.
Identification of microscopic structures, organisms, minerals, etc. will be easier to
attain, thereby making the hands-on learning experience one of exciting discovery for
the student rather than the frustrating, difficult experience it is for our students
currently.

c. How would this project integrate technology into coursework?

Though computers are becoming the primary source of information for students in
today's world, direct observation is still the primary method by which students
integrate and learn to apply the information they have acquired in their coursework.
Microscopes are key technological tools that enable students to directly view micro-
scale organisms, structures, and relationships in situ, i.e., within the physical
"universe" of that object whether it is organic or mineral. By integrating these
technological tools in the student's coursework, the student learns substantially more
within a short period of time and retains that information longer than s/he would with
only the classic instructional methods based on lectures, class assignments, and
tests. This project will ensure that the students have the quality of tools they need to
maximize their learning experience while taking Huxley laboratory and lecture
courses, including: ESCI 457/557, ESCI 458/558, ESCI 411, ESCI 440, ESCI 430/530 and
ESCI 315. Their learning experience in these courses will in turn complement their
coursework in the lecture class, contributing to a higher quality educational
experience than if they had not had access to the technological tools provided by this
project.

2. Will other departments be involved with this project?

   No  ☐    Yes  ☒ If yes, describe.

The Department of Environmental Sciences and the Department of Environmental Studies, Policy,
Planning, Education, and Geography in Huxley College of the Environment will be involved in this
project. Faculty from both departments will be sharing the 40 microscopes for their respective
laboratory and lecture courses requiring the use of compound and/or stereo zoom
microscopes. Classes identified that will be using these microscopes are ESCI 457/557, ESCI
458/558, ESCI 411, ESCI 440, ESCI 430/530, ESCI 315, though there will likely be others as well.
These microscopes will be maintained by the College's scientific instructional technician and will be
available to all faculty within the two departments that require the use of the microscopes.

3. Has any part of this project previously been funded by the Student Technology Fee?

   No  ☐    Yes  ☒ If yes, describe.
As stated above, a 2007 STF proposal did provide for 16 new compound and 16 new dissecting microscopes; now we would like to finish the job and replace the remainder of the college's outdated microscopes.

4. Is the proposed project a pilot project?

   No [x]   Yes [ ]

III. Utilization

List the anticipated number of times and duration per each use—per quarter or per academic year—that students would use the proposed technology. The committee is looking for total student hours and total number of unique students who would use the technology in that time period. Explain how you arrived at this utilization.

See attached spreadsheet (figure 6) for estimated total hours of student use and related breakdown. These numbers are based on estimates by instructors who have taught the relevant classes previously.

IV. Total Project Budget

This section details the estimated cost of the project. Include costs that would be covered—by your department or another source—for ongoing costs such as personnel or operating expenses.

To assist you in preparing your budget, please consult with relevant campus support departments (ATUS, Purchasing, Space Administration, etc.). For more information about these contacts, see the beginning of “II. STP Proposal Form and Instructions” on the STF website.

Attach Excel spreadsheet if you have additional details.

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<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>Item Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SZ61 microscope body w/esd capability</td>
<td>20</td>
<td>$932.20</td>
<td>$18,644.00</td>
</tr>
<tr>
<td>WHSZ10x-H eyepiece w/ES D capability, focusable</td>
<td>40</td>
<td>$101.90</td>
<td>$4,076.40</td>
</tr>
<tr>
<td>SZ2-ILST-6; Trans &amp; Ref light LED ILL Stand</td>
<td>20</td>
<td>$745.45</td>
<td>$15,089.00</td>
</tr>
<tr>
<td>UYCP-11; US Style 3-Prong power cord</td>
<td>20</td>
<td>$10.27</td>
<td>$205.40</td>
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<tr>
<td>Cover-018; Dust cover, Hood Type for BX2 Scopes</td>
<td>20</td>
<td>$16.59</td>
<td>$331.80</td>
</tr>
<tr>
<td>CX41RF-5; Microscope w/5 Place nosepiece</td>
<td>20</td>
<td>$578.28</td>
<td>$11,565.60</td>
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<tr>
<td>6V30W Halogen bulb for BX 20</td>
<td>20</td>
<td>$14.22</td>
<td>$284.40</td>
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<tr>
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<td>$497.52</td>
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<tr>
<td>Tax (8.7%)</td>
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<td><strong>Total</strong></td>
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<td></td>
<td><strong>$99,689.92</strong></td>
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This budget total (or your attached spreadsheet total) should match the projected budget figure on page 1 of this proposal. (See box on page 1, line 6.)
Note: We recognize your proposed budget as an estimate. Final funding for successful projects will be established after thorough technical review; some costs may need adjusting due to price changes. The STF Committee may impose special conditions on a project; see the STF Program Overview.

1. What funding or contributions are available from your department or other sources?

   **Note:** “Contribution” is defined as a monetary contribution. A vendor discount, for example, is not considered a contribution.

   $1,000 from the Huxley College of the Environment

2. Could this project be divided into discrete elements that could be funded separately?

   **Note:** A “no” response to this question creates an “all or nothing” proposal. That is, if the STF Committee decides against funding your entire proposal, it will not consider any elements for partial funding. If proposal elements could be funded separately, the applicant is responsible for prioritizing these elements before submitting the proposal.

   No ☐ Yes ☒ If yes, summarize and prioritize project segments with cost estimate for each segment.

   Obtaining dissecting microscopes is more of a priority since they are used more frequently in ES 331 and 322, and the quality of the currently-used dissecting microscopes is lower than that of the currently-used compound microscopes. Thus, if this proposal can only be partially funded, replacing the dissecting microscopes is a higher priority. The quoted price for 20 compound microscopes (and all related equipment) is $61,139.32. The quoted price for 20 dissecting microscopes (and all related equipment) is $38,550.60. Also, if funding is especially tight we would be willing to reduce the request from 20 dissecting microscopes to 16, since the higher figure is to meet the best case scenario of increasing class size which may or may not happen in the future. Obtaining only 16 dissecting microscopes would reduce the cost from $38,550.60 to $30,677.28.

3. Are lab fees charged for any of the courses that will use this equipment?

   **No** ☐ **Yes** ☒ If yes, please note: The total funding requested from the Student Technology Fee must reflect the amount collected from course fees for equipment replacement and/or equipment acquisition. All proposals asking for course fees will be reviewed by the Academic Budget Office.

   Lab fees are charged by most, if not all, of the classes that would utilize the microscopes, but those fees would fall far short of funding new microscopes.

V. Impact on Existing Resources

Your proposal must address the project’s potential impact on existing resources. Give special attention to the impact on data transmission networks (e.g., sources accessed, networking equipment, etc.), and personnel (e.g., staffing, administrative support, faculty support, etc.).

Any proposal that includes replacement of computers should specifically address the feasibility and cost effectiveness of upgrading the computers rather than replacing them.

1. Describe how existing equipment is used. Contrast this to projected use if your project were funded.
There are currently 16 Olympus CH2 compound and 27 Spencer dissecting microscopes available for students taking laboratory classes in Huxley College. When needed for a specific class the required number of microscopes are transported via carts to the classroom and kept there for the duration of the quarter. When no classes are being conducted, which occurs sometimes during the summer, the microscopes are stored in a locked cabinets in ES 322 and ES 331. The Huxley College scientific instructional technician maintains the microscopes and oversees the distribution of the microscopes to the class locations as directed by the teaching faculty. This system of using a pool of microscopes to supply our laboratory classes works well, given the average number of students who enroll in our laboratory classes each quarter and when there is only one class needing the microscopes per quarter.

If this project is funded the new microscopes would be used as the existing, outdated microscopes are currently used when there is not concurrent need for the microscopes in more than one course. In the event that courses requiring the microscopes occur in the same quarter, the microscopes will be transported between the labs as needed, making the new microscopes available to all students. Ideally we would have enough microscopes to keep them housed in the labs where they are needed so that they are not transported from the rooms at all, reducing the possibility of breakage.

2. Is similar equipment or technology available elsewhere on campus—such as the Student Technology Center, Classroom Services, Video Services, Western Libraries, a college lab?

No ☐ Yes ☒ If yes, describe why the existing equipment does not meet the needs outlined in this proposal.

There are similar microscopes, both instructional and classroom, on campus, however they are owned by the departments and as such are only available for use by students taking classes in those departments. This was confirmed with the Scientific Instructional Technicians in the Biology Department, who indicated that the Department microscopes are fully booked and utilized by faculty in classrooms. The Geology Department has three high-end research microscopes, and Shannon Point Marine Center has sufficient quantity of microscopes, but their location off campus would make regular sharing of the microscopes impossible.

3. If this project involves the replacement of equipment:

a. Describe the “before and after” configuration changes. (A spreadsheet reflecting these changes may be attached.) Or, write “N/A.”

   This project will replace the existing compound and stereo zoom microscopes on a one-to-one basis for a total of 40 microscopes (20 plus 20). Total number of microscopes being requested is 40.

b. Describe the costs and benefits of replacing vs. upgrading. Or, write “N/A.”

   The existing microscopes are 20 years old and are not constructed to allow the upgrading necessary to bring them up to current technological standards. Thus upgrading is not an option.

4. Will this equipment be available to students outside your department?

No ☐ Yes ☒ If the proposed technology would be used by students outside of your
department, describe how they would gain access, how equipment availability would be publicized, the hours/week when equipment would be available, and any costs that would apply.

Students outside of Huxley College's Departments of Environmental Sciences and Environmental Studies are able to take laboratory classes in either department if they have fulfilled the required prerequisites. As students enrolled in these classes, they will gain access through general classroom assignments. Students outside of the College not taking these classes may also gain access to the microscopes on a case-by-case basis with permission from a Huxley College faculty. Students may contact the department or the instructor directly to find out how to go about scheduling access to (and training if needed) in using the compound or stereo zoom microscopes. There are no costs associated with using either of these microscopes.

5. Does this project involve the check-out of equipment to students?
   
<table>
<thead>
<tr>
<th>No ☒</th>
<th>Yes ☐</th>
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<tr>
<td>If yes, discuss whether or not the Student Technology Center could be assigned this task.</td>
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   6. Does the department have adequate operating funds to provide ongoing maintenance and support?
   
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<tr>
<th>No ☐</th>
<th>Yes ☒</th>
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<td>If yes, describe.</td>
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   Huxley College’s full time scientific instructional technician will provide ongoing maintenance of the microscopes as needed. Should additional resources and/or funds for maintenance and support be required, Huxley College and its Department of Environmental Science and Department of Environmental Studies will provide the necessary funds from their operating accounts.

   7. Does the department have adequate personnel funds to provide ongoing staff support for this project?
   
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<th>No ☐</th>
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<td>If yes, describe.</td>
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   Four to five full-time tenure and tenure-track faculty members in Huxley’s Department of Environmental Sciences and Department of Environmental Studies teach all the laboratory classes identified in this proposal and, when needed, the departments have the personnel funds to hire qualified technical staff to teach the laboratory classes.

**VI. Space and Site Information**

This section addresses any space alteration or site preparation necessary for the proposed project. Site alterations include painting, holes in walls, security systems, carpeting, construction, lighting changes, or conversion of a lab or office.

   **Special Note:** If this project would require any site preparation, or if this project would use any space not currently under your department’s control:
   
   - You must submit a draft proposal to Space Administration by **November 28, 2012**.
   - Space Administration and Facilities Management will then conduct a site survey and respond to you by **December 12, 2012** about project feasibility, cost, and schedule.
   - You must include the site survey response with your final proposal.

   1. Location for installation of equipment or technology.
2. Would site modification be required?

No ☐ Yes ☐ If yes, describe the modifications (electrical, air, painting, lighting, security, network access, etc.).

This project does not require any site preparation or installation. When not being used in any of the Huxley College laboratory classes the microscopes will be stored in cabinets in ES 322.

3. Would this project use space not currently assigned to your department or area?

No ☐ Yes ☐ If yes, describe.

VII. Project Schedule

Describe your overall implementation schedule. (Remember that project awards are announced during spring quarter, and that projects are to be substantially completed by the end of the calendar year.) If any site preparation is involved (see section VI above), align your project schedule with the schedule provided by Space Administration and Facilities Management.

Once informed that the project has been awarded funds, the vendor will be contacted shortly thereafter to obtain an updated quote for the microscopes, including tax and shipping. During early summer we will work with the Purchasing Department to finalize criteria for the bid proposal to go out to the vendors. Once the bid is awarded to a vendor we will work with them on delivery to the Environmental Studies building, and if needed work with Transport Services to ensure the microscopes are moved into the Environmental Studies building by late summer. We anticipate having the microscopes operable and available for classes by the beginning of Fall 2013 quarter.

VIII. Constraints

List or describe any external or internal factors/constraints that could affect your project schedule, project objectives, or the project budget (e.g., if external approval is required for curricular changes, or if funding must be received by a certain date).

The price quotes obtained from Olympus America Inc. expires on December 20th 2012, but can easily be newed. We anticipate obtaining the same rates if quotes do need to be renewed.

IX. External Funding

This section must be completed for any projects over $100,000. For project budgets of this scale, the applicant should investigate opportunities for obtaining external funding for all or part of the proposed project.

1. Describe the external organization(s) able to provide funding in support of this project.

   This section does not apply. This project is just below $100,000.

2. Describe the funding cycle for these requests (submission dates, projected award dates).
3. Indicate the amount of external funding that would be requested.

4. In cases where joint funding is requested, what would happen if the Student Technology Fee award is made and the external grant is not awarded?

5. Has a grant proposal already been submitted for all or part of the proposed Student Technology Fee project?