# **Tech Initiatives Proposal Form**

Student Technology Fee – AY 2024

**Employee Due Date: March 22, 2024** (revised from March 29)

**Student Due Date: March 22, 2024**  (revised from March 29)

## **Key Proposal Information**

Note: Enter information in the expandable fields directly after the information requested.

## **Project Title:** Expanding research capabilities and class accessibility through true-color camera application for the laser-scanning fluorescent confocal microscope

## **Briefly explain what you are requesting (400 characters max):** Laser-scanning fluorescent confocal microscopy (FCM) is an optical imaging technique that uses specific wavelengths of light to excite fluorescent molecules in a sample which then emit light that can be seen through the microscope's eyepieces or translated into images using the accompanying software. SciTech's current FCM, the Leica Stellaris 8, is already utilized by multiple lab courses and research groups, predominantly biology and behavioral neuroscience. This proposal requests funding for a true-color camera, which allows you to see and capture full-color sample images in conjunction with current FCM capabilities.

## The only current option to capture sample images is via laser-scanning acquisition, which is restricted to greyscale raster images. The only method to view the samples' true color is in real-time through the eye-pieces of the microscope. There is no mechanism for capturing or displaying the existing colors of the sample at this time. With the added capabilities of the true-color camera, full-color sample images can be captured. This will protect samples from photo-bleaching (i.e., fading) and will enable the layering of fluorescent and true-color images.

## A true-color camera will expand the accessibility of demonstrations for classes and community groups (e.g., Compass to Campus) by providing effective visual aid of the samples that can be displayed on the large monitor within the lab space or over virtual means like Zoom. This is a major improvement from the current practice of having students look into the eyepieces one at a time for a full view of the sample with full color.

### **Principal Applicant**

Name: Alyssa Tsukada

Email: alyssa.tsukada@wwu.edu

Phone: (360) 650-7577

Dept/Org Affiliation (Enter “student,” “faculty,” or “staff”): Scientific Technical Services (SciTech or STS)

### **Secondary Applicant**

Name: Steven Emory

Email: semory@wwu.edu

Phone: (360) 650-7437

Dept/Org Affiliation (Enter “student,” “faculty,” or “staff”): Scientific Technical Services (SciTech or STS

## **Important Proposal Notes**

1. Student Technology Fee Mission:

The Student Technology Fee (STF) provides Western students with adequate and innovative technology experiences by:

1. Broadening/enhancing the quality of the academic experience.
2. Providing additional student access to technology.
3. Increasing integration of technology into the curriculum.
4. The STF Committee will accept only complete proposals by the announced deadline. Every section (I-VIII) and all items of this proposal form must be addressed.
5. Disallowed items: The following five items generally **do not qualify** for STF Tech Initiatives funding:
6. Computer lab upgrades. (Existing computer labs are upgraded on a rolling schedule with a separate allocation of STF funds.)
7. Software related to maintenance and/or serial payments.
8. Maintenance contracts on equipment or software.
9. Expendable supplies.
10. Equipment that will not be used directly by students, and/or non-computer equipment or furnishings that are part of the typical classroom environment (such as lighting, portable and fixed media equipment, furniture, chairs, etc.).

## **Proposal Instructions**

### **I. Relationship to STF Objectives / Impact on Student Academic Experience**

1. The STF Committee uses as its primary assessment criteria the three objectives—**quality, access, and integration**—defined in the STF mission (“Note 1” above). Given these criteria, explain how the project would provide positive benefits to students. Focus on what students would gain from the project. Specifically, answer at least one of items a, b, or c below:
2. How would this project *broaden or enhance the quality* of the student’s academic experience through the proposed technology?

A major objective of SciTech’s mission is to “provide access to advanced multi-user scientific instrumentation”; increasing the application and utilization of the newly acquired true-color camera for imaging purposes aligns with this mission, as well as all three of the STF mission objectives. Courses that already use the FCM will gain a new analysis tool, and courses that have not used the FCM may find true-color imaging applications in their curriculum. Students in courses and research will learn how to run the FCM, and they will also learn important imaging techniques and advanced data analysis methods that involve correlating the fluorescence data with true-color images. The FCM is a relatively new instrument to the WWU campus (acquired in 2020) and is quickly gaining interest in many departments. It has a number of applications in future career fields, many with increasing popularity for students, ranging from cancer research to environmental analysis or material characterization. Giving students hands-on time with this broadly applicable imaging technique will be an incredible addition to their Western experience and prepares them up for potential careers in the technology sector.

1. How would this project *provide additional student access* to technological resources?

1. How would this project *increase integration* of technology into coursework?

The true-color camera will be available within SciTech's optical microscopy lab and serve the entire WWU community through supervised or independent use by students, staff, and faculty participating in research or lab courses. New FCM imaging capabilities such as correlating location and intensity of fluorescence with sample pigmentation will be enabled. This broadens research opportunities and offers additional hands-on experience for students enrolled in courses that collaborate with SciTech. Classes such as Introduction to Environmental Sampling and Analysis (ESCI 451), Characterization of Materials (MSCI 410), Behavioral Neuroscience Techniques (BNS 328), Introductory Biology Series (BIOL 204/205/206), Cell and Molecular Biology (BIOL 323), and Cell Microscopy Laboratory (BIOL 484/594) currently utilize SciTech's FCM, and thus benefit from additional imaging capabilities. Upwards of 200 students per quarter across four different departments will benefit from this equipment based on the classes that have utilized the FCM. A true-color camera increases the potential applications and accessibility for larger classes. This will increase the number of students benefitting from the new capabilities and expand our ability to work with students earlier in their college careers at Western, as more introductory courses tend to have larger class sizes. This provides students an earlier exposure to these resources and develops their skills earlier which enhances their Western experience.

1. Would other departments be involved with this project? Enter “No “ or “Yes”. Yes

IF “Yes,” describe. IF “No,” enter “N/A”.

This instrument setup would be utilized by multiple different departments for curricular material but would also assist with research within multiple departments. Classes like those mentioned above, ranging across four departments independent of SciTech, will have the chance to use the new capabilities granted by the addition of a true-color camera. In addition, a large amount of independent student researchers from departments such as Environmental Science, Shannon Point Marine Center, Engineering, Biology, Chemistry, and Behavioral Neuroscience that currently utilize the FCM upwards of 25 hours a week. SciTech also conducts quarterly Optical Microscopy User Group meetings with all staff/faculty involved in class and research usage to provide instrument updates and listen to community input and suggestions on best practices around equitable instrumentation access.

1. Has any part of this proposed project previously been funded by the Student Technology Fee? Enter “No” or “Yes”. No

IF “Yes,” describe. IF “No,” enter “N/A”.

N/A

1. Is the proposed project a pilot project? Enter “No” or “Yes”. No

IF “Yes,” describe. IF “No,” enter “N/A”.

N/A

### **II. 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, along with the impact of that proposed technology on students. Note: Proposals are funded after careful consideration of both the number of students that will be impacted by the technology and by the quality of that impact.

The attached table breaks down the different courses and our independent student researchers that would benefit from adding a true-color camera to our FCM. The number of students per year is based on the class cap for each class during the 2023-24 academic year. The hours of use per year are composed of time spent providing class demos as well as hands-on instrument time used during lab. The table also includes our active student researchers. The number associated with the independent research students is based off SciTech instrument usage records for the 2022-2023 academic year.

The addition of a true-color camera will create more accessible and engaging demonstrations for students in a wide variety of classes. With this new capability, SciTech will be better able to demonstrate key functions of the microscope while tying in with their general knowledge around more basic microscopes. It will also offer a clearer view and comparison of a variety of sample types in conjunction with fluorescence confocal imaging. True-color imaging capabilities will also expand and improve the research done by independent students by providing full-color sample imaging capabilities while protecting samples from photo-bleaching (i.e., fading).

### **III. 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.).

1. Describe how existing equipment is used. Contrast this to projected use, if your proposal were funded.

Currently, the FCM is used for independent researchers, class lab work, and class demonstration. During the 2022-23 academic year, the FCM was used by independent researchers for 985 hours and classes for 51 hours. The hours spent serving classes are mostly comprised of hands-on use by students in their class lab activities. The addition of the true-color camera will improve the accessibility of demonstrations for classes and community groups (e.g., Compass to Campus), therefore increasing the amount of hours the instrument is being used to serve a larger number of classes and students overall. The new data collection techniques provided by the true-color camera would also likely encourage more lab groups

1. Is similar equipment or technology available elsewhere on campus—such as with the Student Technology Center, Classroom Services, Video Services, Western Libraries, a college lab? Enter “No or “Yes”. Yes

IF “Yes, describe why existing equipment does not meet the needs outlined in this proposal. IF “No,” enter “N/A”.

The biology department has a microscope with a color camera attachment with similar capabilities to the true-color camera being requested. However, the value in the true-color camera is how it can build upon the many capabilities the fluorescent confocal microscope has that the microscope within the biology department does not. The true-color camera will enable the layering of fluorescent and true-color images. Additionally, the microscope within biology is not easily accessible to students outside the biology department and resides in a space that would be difficult to provide demonstrations to more than two students at a time.

1. IF this project would involve the replacement of equipment, including computers:
2. Describe the “before and after” configuration changes. (A spreadsheet reflecting these changes may be attached.) Or enter “N/A”.

N/A

1. Describe the costs and benefits of replacing vs. upgrading. Or enter “N/A”.

N/A

1. Would this equipment be available to students outside of your department? Enter “No” or “Yes”. Yes

IF “Yes,” describe the following (in the field below the a-d list). IF “No,” enter “N/A”.

1. How students would gain access.
2. How equipment availability would be publicized.
3. The hours per week when equipment would be available.
4. Any costs that would result from a-c.

SciTech utilizes Facility Online Manager (FOM) as its instrumentation management system. Students email SciTech staff when they are new to the process or if they would like to gain access to a new instrument within our facilities. We then train and give access to the desired equipment. Within FOM there are calendars to see the availability of each instrument or device.  Any FOM user that has access to a specific instrument or device can see its corresponding calendar. To allow staff to prepare and shutdown the instrument, normal operating hours will be set from 8:30 AM – 4:30 PM Monday-Friday. There will be no additional resulting costs.

1. Would this project involve the check-out of equipment to students? Enter “No” or “Yes”. No

IF “Yes,” discuss whether the Student Technology Center/ATUS Loan Pool could be assigned this task. IF “No,” enter “N/A”.

N/A

1. Does the department have adequate operating funds to provide ongoing maintenance and support? Enter “No” or “Yes”. Yes

IF “No,” describe the funding situation. IF “Yes,” enter “N/A”.

N/A

1. Does the department have adequate personnel to provide ongoing staff support for the project? Enter “No” or “Yes”. Yes

IF “No,” describe the staffing situation. IF “Yes,” enter “N/A”.

N/A

### **IV. Space and Site Information**

1. What is the location for installation of equipment or technology? Be as specific as possible.

The true-color camera will be installed on the FCM residing in SciTech’s Optical Microscopy lab in Bond Hall 016.

1. Is this space/location currently assigned to your department or unit? Enter “Yes” or “No”. Yes

IF “No,” describe the current control of the space. IF “Yes,” enter “N/A”.

N/A

1. Would site modification be required? Enter “No” or “Yes”. No  
   Note: “Site modification” addresses site alteration—beyond specific equipment installation addressed in section V, Budget Estimate Table, line 13. Site modification significantly impacts infrastructure. This could include addition/integration of other systems required by the equipment install, such as electrical, air, lighting, security, network access, etc.; conversion of a lab or office; etc.

IF “Yes,” describe the site modification required. IF “No,” enter “N/A”.

N/A

1. Conditional Step 4: If you answered “no” to #2 above, or “yes” to #3 above:

You *may* need to submit a [Space Modification Request](https://app.e-builder.net/public/Processes/StartProcess.aspx?ProcessID=849829b0be0d47c4b6e270345a265b73&PortalTypeID=7) to Capital Planning and Development. The STF Committee will determine if this is necessary during proposal review, and will let you know. The results of the Space Modification Request form would affect lines #15 and #18 of the Budget Estimate Table.

### **V. Project Budget Estimate**

This section details the estimated cost of the project.

Budget Estimate Notes:

1. The STF Committee recognizes 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.
2. The STF Committee may impose special conditions on a proposal before approval. (If interested, see *STF Tech Initiatives Proposal Guidelines, section V, Proposal Modifications*. This document is on the STF website.)
3. Funding is not provided directly to departments for purchases. All purchasing is done via the Office of the VPIT/CIO, and savings are retained in the Student Technology Fee fund.
4. For assistance in preparing your budget, please consult with relevant campus support departments. Four are listed here:

* Academic Technology & User Services (Director), 650-6538
* Budget and Financial Planning Office, 650-4762
* Space Planning and Administration Program Manager, 650-3935
* Purchasing, 650-3340, [Getting Started in the Western Marketplace](https://www.wwu.edu/bservices/purchasing/software.shtml)

1. What funding or contributions are available from your department or other sources? Enter dollar amount, or “N/A”. $1,000

Note: The STF Committee encourages matching funds/funding support. “Contribution” is defined as a monetary contribution. For example, a vendor discount is not considered a contribution.

1. *IF you have more than seven line-item expenses,* create a separate spreadsheet of items to purchase, with a subtotal. (You will attach the spreadsheet to this form later, before submitting.)
2. Complete the **Budget Estimate Table** below.

**IMPORTANT:** To complete the Budget Estimate Table (an Excel sheet) within this form, follow these substeps:

1. Double-click anywhere in the table:
   1. For Macs, the table will open in a new window.
   2. For PCs, the table will open in place.
2. Complete the blue-shaded areas only. The remainder of the form will autofill.
3. *IF you have more than seven line-item expenses*, key the “Items to Purchase” area of *this* Budget Estimate Table as follows:
   1. Item to Purchase: “Subtotal from attached spreadsheet”
   2. Quantity: “1”
   3. Item Cost: [the subtotal from the attached spreadsheet]
4. To exit the table area of this form, single-click anywhere outside of the table.



1. Could this project be divided into discrete elements that could be funded separately? Enter “No” or “Yes”. No

IF “Yes,” summarize and prioritize project elements with a cost estimate for each. IF “No,” enter “N/A”.

N/A

Note: A “no” response to question 3 creates an “all or nothing” proposal. That is, if the STF Committee decides not to fund your entire proposal, it will not consider any elements for partial funding. If elements could be funded separately, the applicant is responsible for prioritizing them before submitting the proposal.

1. Are course or lab fees charged for any of the courses that will use this equipment? Enter “No” or “Yes”. No  
   Note: The total funding requested from the Student Technology Fee must consider the amount collected from course fees for equipment replacement and/or equipment acquisition.

IF “Yes,” describe the course fees. IF “No,” enter “N/A”.

N/A

### **VI. Project Schedule**

Describe your overall implementation schedule. Note that project awards are announced during spring quarter (usually May), and that projects are to be substantially completed by the end of the calendar year.   
IF any site modifications are determined to be involved (see section IV, Space and Site Information), your project schedule will be aligned with the schedule provided by Capital Planning and Development.

If funding is granted, the true-color camera will be installed as quickly as possible. Installation timing will be limited by the vendor and when they will have an engineer available to install the camera. Once the camera is installed, there are multiple sample types that are ready to be used for method development. Research students, faculty, and SciTech staff will be involved in the method development. Through the summer quarter, some samples will likely have been imaged successfully and these images will be used for demonstrations in following quarters. As soon as clear methodology for specific sample types has been put into place, courses could add this type of imaging to their curriculum.

### **VII. 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.)

With any new instrumentation unforeseen issues are bound to occur, but these issues will be learning opportunities and are intentionally a part of the process. Given SciTech’s current service contract with Leica for the FCM, any issues with the true-color camera will be addressed with minimal difficulty.

### **VIII. Submitting the Proposal / Routing Instructions**

1. Access the e-form [Student Tech Fee Proposals: Routing Form](https://esign.wwu.edu/forms/CIO/_student_tech_fee_proposals_routing_1.aspx) and complete the form as instructed.
2. Attach this completed proposal form to the completed e-form.
3. Attach any supporting materials for your proposal to the e-form.
4. Route the e-form as instructed.