# **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:** Increase liquid chromatography mass spectrometry (LC-MS) instrumentation data analysis capabilities with spectral libraries.

## **Briefly explain what you are requesting (400 characters max):** SciTech manages multiple different mass spectrometers. Between classes and research, the instrument with the most usage is our liquid chromatography quadrapole time of flight mass spectrometer (LC-QTOF). This instrument, acquired in 2020, is incredibly versatile in its capabilities and gets used by many different departments ranging from the Behavioral Neuroscience to Environmental Science. This user group is established and is using the instrument effectively, however, there is much room for growth on the data analysis side of the instrumentation. Having access to a small molecule and National Institute of Standards and Technology (NIST) library would greatly improve the flow of data analysis.

## There are many types of data processing pipelines, sets of analysis tools used in a specific order to reach a desired outcome, and many of them include a scan through libraries to determine potential matches to known compounds. We have access to multiple of these previously mentioned tools, however we do not have access to this broad of a library. The small molecule library would include 6,000 compounds and the NIST library close to 50,000. Combining both libraries with our set of tools for data processing would improve our processing pipeline options immensely.

## These requested mass spectral libraries would be used heavily by many different research groups from different departments, but also add a very applicable element to many classes that already utilize this instrument. SciTech as a department emphasizes hands on experience with instrumentation and in addition it is incredibly important to understand how these data that are collected are analyzed. The addition of these libraries would give many students a glimpse of the intricacies of mass spectral data analysis.

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## **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?

SciTech strives to provide access to advanced multi-user scientific instrumentation with the hopes that students will have valuable experiences on highly technical instrumentation and gain skills to benefit their futures. This goal falls right in line with the Student Technology Fee mission.

In this specific request not only are, the mass spectral libraries going to enhance student’s hands on applicable experiences on an already highly utilized instrument but also these libraries will easily integrate into already existing laboratory and course curriculum. Allowing many students to experience complete sample analysis starting with sample prep, through instrumental analysis and finally with more comprehensive data analysis aided by the mass spectral libraries.

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

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

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

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

These mass spectral libraries would be greatly beneficial to many different departments not only for their curricular materials but also for research within the department. Specifically, this additional capability would be added to the workflow for the instrument and therefore would be covered in demonstrations for Instrumental Analysis, Environmental Sampling and Analysis, Biochemistry, Honors General Chemistry, Environmental Toxicology, Organic Chemistry, Organic Spectroscopy and Techniques in Behavioral Neuroscience. While these are courses that would immediately benefit from this additional tool, there are several courses within Biology and Behavioral Neuroscience that are gaining interest in utilizing the Q-TOF for their courses and this additional analysis tool will certainly help. Along with these courses, several research groups from multiple departments would also benefit from these libraries, e.g. imidacloprid quantification in agricultural water runoff and CBD quantification in mouse blood.

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.

There is a table attached to this proposal,"Class Use Table". This table breaks down the different courses that would benefit from the addition of the mass spectral libraries to our LC-QTOF data workflow. Hours are listed for either a full lab version or a demo. Some courses may choose to do one or potentially both, if applicable. This table does not include research students, who will also be highly involved with this instrument. Currently, there are seven research groups that would benefit from these libraries. Between all these groups there are 14 students that would use these libraries as soon as they were installed.

### **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.

The LC-QTOF has one of the highest usage rates within STS. Last year the instrument was used for class and research data collection for nearly 1500 hours. The majority of these hours were completed by students that had been trained to run the instrumentation without supervision, and once the instrument had acquired all the needed data, those data then also need to be analyzed. Those hours are not tracked but can take much longer than the runs themselves.

Currently, some common assumptions need to be made to ascertain molecular masses. However, if we have the opportunity to add these libraries to our toolkit, we will be processing data more similarly to larger research facilities or many industry laboratories. Thus, giving students a full scope, hands-on experience of mass spec analysis.

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”.

There are instruments on campus that have similar libraries. However, these libraries are specific per type of instrumentation and there is no other instrument like the LC-QTOF on campus.

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.

STS utilizes Facility Online Manager (FOM) as its instrumentation management system. Students email STS 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. These small molecule libraries would simply be an additional tool that would be trained on the LC-QTOF.

Within FOM there are calendars to see availability to each instrument or device. Any FOM user that has access to a specific instrument or device can see it’s corresponding calendar.

To allow staff to prepare and close spaces hours will be from 8:30 AM – 4:30 PM Monday-Friday.

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.

These libraries would be installed on the LC-QTOF data processing computer located in ES 504/505. This is the same SciTech laboratory where the LC-QTOF is housed.

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”. Scientific Technical Services: $500

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”. Yes  
   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”.

Most lab courses that utilize STS instrumentation have lab fees, however the lab fees are associated with the parent department, not STS.  At times these fees are used to replace consumable materials related to equipment/instrumentation, but these fees are not used to purchase new instruments or software.

### **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.

### **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.)

If funding is granted, the libraries will be installed as quickly as possible. Once the order with Agilent is made the software installation package should come very quickly and the installation should take no more than a few hours.

Once the libraries are installed, there are multiple research groups that are ready to utilize the additional tool. Through these groups, specific workflows will be created to navigate the use of the libraries. Research students as well as STS staff will be involved in this work.

### **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.