# **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:** Ray Gun Research Experiences for Undergraduates: How an X-Ray Fluorescence (XRF) Spectrometer Can Integrate (and Expand Access to) Cutting-Edge Technologies in Teaching and Research

## **Briefly explain what you are requesting (400 characters max):** We request funding for a handheld X-Ray Fluorescence (pXRF) spectrometer, an instrument that facilitates the determination of the elemental composition of solids and liquids. The benefits of pXRF include nondestructive analysis, low operational costs, and real-time results. The pXRF will broaden student access to cutting-edge technology in courses across multiple programs, with applications in two active research projects that include student participation.

### **Principal Applicant**

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Dept/Org Affiliation (Enter “student,” “faculty,” or “staff”): Anthropology

### **Secondary Applicant**

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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?

A handheld XRF analyzer will broaden and enhance student access to cutting-edge technology in both classroom and research contexts. As a portable XRF instrument provides real-time results, the technology is particularly well-suited for classroom applications and student projects. The pXRF will allow students to acquire hands-on experience with cutting-edge technology for elemental composition analysis with clear links between research goals, activities, and results. Near-instantaneous results are ideal for course curricula, facilitating activities that create a meaningful connection between research goals and data collection methods. The testing process does not involve the application of gasses, liquids, or acids, making the instrument a highly adaptable technique for on-site use in different locations. As this method is non-destructive and non-invasive, the pXRF will have a very wide range of applications, including use with delicate artwork and archaeological collections. The portability, ease of use, and efficiency of the instrument will facilitate shared use between programs.

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

The pXRF instrument would be an important resource for undergraduate and graduate student research projects across multiple fields. In the Anthropology program, the instrument would be a valuable resource for student research relating to materials in the WWU Archaeological Repostory. The pXRF also has applications in two active research projects directed by WWU faculty. Dr. Abel (Department of Urban & Environmental Policy & Planning) collaborates with dozens of students using moss as a biomonitor of air pollution disparities for toxic metals like arsenic, chromium, and lead. While traditional moss biomonitoring research demands tedious sample preparation and outsourcing of destructive analysis to certified labs costing over $100 per sample, a pXRF instrument can accomplish non-destructive and rapid elemental composition analysis of moss with no sample processing. The pXRF instrument also has applications in a community-based participatory archaeological project conducted by the Department of Anthropology. Dr. Ek co-directs an Indigenous-led archaeological project undertaken as a partnership between the Stillaguamish Tribe Cultural Department and the WWU Archaeological Field School. The Archaeological Field School is a 6-week intensive summer program with approximately 25 students involved each year. A component of this collaboration will explore changing patterns of raw material acquisition for stone tools at sites in traditional Stillaguamish lands. As descendant communities generally prohibit the implementation of destructive analytical methods with objects of cultural patrimony, XRF provides an ideal pathway to braid Western scientific and Indigenous perspectives. This research will intersect with cultural revitalization activities organized through the Stillaguamish Tribe Cultural Resource Program. All of the endeavors outlined above generate consistent opportunities for student training and participation in active research.

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

The efficiency and low cost of use make this technology particularly well-suited for classroom contexts. The broad range of applications of pXRF will facilitate the integration of technology into the curriculum of courses across multiple programs. Faculty from Anthropology, Environmental Sciences, Environmental Studies, Geology, and Urban & Environmental Planning & Policy can integrate XRF analysis into multiple courses with variable enrollment sizes, including:

1: Introduction to Archaeology (ANTH 210) - 80 students

2: Field Course in Archaeology (ANTH 312) - 25 students

3: Archaeological Analysis and Interpretation (ANTH 410) - 16 students

4: Applied Archaeological Analysis (ANTH 510) - 4 students

5: Archaeometry (ANTH 497/597, currently in development) - approximately 14 students

6: The Soil Environment (EVNS 327) - 70 students

7: Soil Landscpes (ENVS 427) - 20 students

8: Environmental Disturbances (ESCI 302) - 60 students

9: Environmental Sampling & Analysis (ESCI 451) - 14 students

10: Environmental Toxicology (ESCI 455) - 26 students

11: Environmental Impact Assessment (UEPP/ENVS/ESCI 493) - 20 students

12: Senior Project (UEPP 498c) - variable enrollment

This list of courses is far from exhaustive, with strong potential for inclusion into existing and future classes across multiple programs, including Geology, Fine Arts, Engineering, and Biology.

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

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

We have verified interest in using the pXRF in current/planned courses and field research in Anthropology, Environmental Studies, Geoology, and Urban & Environmental Policy & Planning. The pXRF would have teaching and research applications in the Biology, Chemistry, Engineering, and Fine Arts departments.

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 number of students that would be impacted by this technology are outlined in Section 1c of this document. The frequency and duration of uses in course curricula would be variable given the extensive list of relevant classes outlined above. For the Anthropology courses listed, the use of the instrument in high-enrollment courses (ANTH 210) would be limited to in-class demos that would be limited to 1-2 meetings per term. ANTH 210 is offered 3-4 times each academic year. In lab-based classes (ANTH 410/ANTH 510), the instrument would be used in exercises for 1-2 weeks per term. As part of the WWU Archaeological Field School (ANTH 312), the use of the instrument could include extended activities over 2-3 weeks within the 6-week field season. For courses in Environmental Sciences, Environmental Studies, and Urban & Environmental Policy & Planning, we would expect a similar relationship between enrollment size, course format, and intensity/duration of use. For student and faculty research, the intensity/duration of use would be highly variable, but we could expect check-out times ranging from a few hours to more engaged activities extending up to a few weeks.

### **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, students cannot access XRF technology on our campus. Access to other instruments for scientific research are facilitated through Scientific Technical Services in the University Instrument Center. However, the proposed purchase would not overlap with existing equipment currently available at WWU. As pXRF has very low operational costs and can be easily shared between programs, this investment in instrumentation will expand student access to cutting-edge technologies with minimal impact to university resources and personnel. The primary impacts to university resources and personnel would be management of student/faculty access. The two options for facilitating access are the Scientific Technical Services (STS) University Instrument Center and the Archaeometry Lab (Arntzen Hall 346). For the latter, checkout would be facilitated by Anthropology Department staff. The latter setting would facilitate access to computer workstations and lab space ideal for use of the pXRF. We plan to prioritize broadest student access in the final decisions on the location of the instrument.

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”. No

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

N/A

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.

a: Students and faculty would be able to check out the instrument for appropriate educational and research applications; b: to publicize the availability of the instrument to students and faculty we plan to directly contact faculty in programs in which the equipment would have applications, including Anthropology, Biology, Environmental Sciences, Envirnonmental Studies, Engineering, Chemistry, Fine Arts, and Geology; c: the instrument would be available for checkout, with flexibility in hours dependent on the nature of use (i.e. longer-term checkout for more engaged applications); d: the only costs would be time devoted to the management of access, as the instrument does not incur costs for use beyond the initial purchase price.

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

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

We have two options to facilitate check-out. The ideal solution would be to make the instrument available through the University Instrument Center managed by Scientific Technical Services (STS). However, we need to verify that conditions in the STS University Instrument Center are amenable for the pXRF instrument. This determination will be made in consultation with Bruker or Thermo Scientific support staff prior to and during delivery/setup. This support is included in the attached quotes. If the STS is not an ideal location, the instrument can be housed in the Archaeometry Lab (Arntzen Hall 346), with checkout facilitated by the Anthropology Department. The latter location also includes lab space and computer workstations for use of the XRF in a controlled environment.

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.

Archaeometry Lab (Arntzen Hall 346) or Scientific Technical Services (Environmental Studies 508), with the decision prioritizing student accessibility while also weiging recommentations for the ideal setting by Bruker/Thermo Scientific technicians (see above).

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”. We plan to apply for supplementary support from the Frazier Endowment Fund ($5,000)

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”. Yes

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

It might be possible to purchase calibration packages separately, although this would limit applications of the instrument.

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.

The use of the instrument in courses is flexible, with implementation into course curricula when available.

### **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.)

A broader range of applications for the pXRF instrument beyond those outlined in this proposal might require additional calibration packages. The itemized budget above includes four calibration packages, which should facilitate a wide range of applications. Additional calibration packages cost $2,250-$2,700.

### **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.