2024 Technology Fee Full Proposal Submission Form

Full Proposals are to be completed and approved by a core UFIT Director (listed below) by the published deadlines for the Technology Fee Advisory Committee to review and select those Full Proposals to be forwarded to the CIO for funding recommendation. This Committee acts in an advisory capacity to the CIO, who will decide on projects to be funded and implemented.

Process:

This is the second stage of the grant process.

1) As a PI you are invited to submit a full proposal. It must still strictly adhere to the requirements below and submitted to the Committee by the required deadline.
2) The Committee will review the proposals and forward those selected with a recommendation for funding to the CIO.
3) The CIO will make a final decision on project proposals to be funded.

Requirements:

1) Full Proposals must address the criteria below and listed on https://it.ufl.edu/community/technology-fee/scoring-criteria/.
2) Full proposals must be submitted in the required template.

*The core UFIT units and their respective contacts are:

- **Academic Technology (AT)**, The Office of Academic Technology (AT) provides resources, technical assistance, and equipment to assist the University of Florida faculty, staff, and students. The three general divisions of AT include support for media services, instructional technology, and teaching/learning.
  ***Mark McCallister**, Director markm@ufl.edu*
- **Applications, Development and Integrations (ADI)** supports, builds and integrates university-wide cloud and on-premise applications in support of UF's faculty, staff and students.
  Nicole Jeffers, Director ngarvey@ufl.edu
- **Customer Experience & Resources Planning (CERP),** informs the university of IT services, support, and systems, conducts a year-round feedback and listening program, servers as campus advocates for enterprise IT improvements, and manages enterprise-wide technology projects for UF. Alicia Turner, Director, aliciatu@ufl.edu
- **Data Platform and Analytics (DPA),** provides reporting and visualizations, analytics, data engineering, master data management, application integration platform, database administration, and data science services to the university. ***Jim Freymann**, Director, jim.freymann@ufl.edu*.
- **Infrastructure & Communication Technology (ICT)** manages the UF Data Center and delivers hosted server, storage, virtualization, database, email, and related system and connects the University of Florida campuses and UF to the world via high-speed data, video, Wi-Fi, telecommunications, and VoIP services.
  ***Saira Hasnain,** Associate CIO and Senior Director, saira.hasnain@ufl.edu*
- **Information Security (IS)**, Information Security has a mission to preserve the confidentiality, integrity, and availability of restricted and critical data of the University.
  Rob Adams, Chief Information Security Officer, Information Security, rob@ufl.edu
- **Research Computing (RC)**, Research Computing, and the High-Performance Computing Center provides high-performance computing resources and support to UF faculty whose research depends on large-scale computing.
  *Erik Deumens, Director deumens@ufl.edu*Scoring Criteria

Full proposals will be scored using the following criteria:

Scoring Criteria for Technology Fee Full Proposals	
Criteria	Points
The project promotes an exceptional academic environment through the innovative use of technology.	Required[1]
A college dean or director certifies that the project serves the institutional mission and is aligned with the University of Florida strategic plan.	Required[1]
A UFIT associate CIO or director[2] certifies that the proposal is technically feasible, and the initial budget request is a reasonable first approximation of funds required for success.	Required[1]
If the project requires recurring resources, the concept paper and proposal must include a viable sustainability plan[3].	Required[1]
The project is innovative in delivering a new service, resource, implementing a concept or delivery method, and not simply upgrading existing services or facilities.	Required[1]
The 2-year project budget includes only technology items and does not include salary, services, facilities, furniture, and similar items.	Required[1]
The project meets all ADA[4] requirements and complies with the UF Electronic and Information Technology Accessibility Policy.	Required[1]
The project outlined in the concept paper improves student learning experiences.	
The project improves the capacity to create, innovate, and high-quality learning environments.	
If the project is to be used in or by courses, it includes the involvement of course instructors utilizing the technology.	
The project can reach students, faculty, and staff across the University and beyond to achieve a common good.	
The project outlined in the concept paper efficiently uses existing resources and services (does not duplicate services or infrastructure).	
The project improves the technical skills, competency, and success rate of students.	

[1] Proposals not meeting this requirement will not be considered.
[2] These are direct reports to the CIO.
[3] Recurring funds must be provided by the unit of the proposer or generated by the project.
[4] The American Disabilities Act (ADA) requires that Web and other resources provide individuals with disabilities an equivalent experience to individuals without disabilities

Instructions:

In filling the attached template make sure that the requirements in the Scoring Criteria Table are met. Concept Proposals not meeting the requirements will not be considered. Also note how the full proposals are scored and address each of the scoring criteria in your proposal.

The template includes the following items:

1) **Title**: Make sure that the title is descriptive and short. Avoid technical jargon and focus on the benefits of the project.
2) **Proposer**, affiliation and, contact information: Make sure that a contact person is clearly identified, as well as the person's affiliation and contact information (***email, department, unit or organization, physical address, and phone***).
3) **Purpose**: What is the proposal intended to improve or facilitate? Why is it important to do so? What are the expected outcomes? How is this project innovative, and could it be scaled in the future? Clearly outline the objectives of this project so that it can easily be determined if they are achieved by the end of the project.
4) **Impact/Benefit**: Who benefits? In what ways? What are the implications of how this project is innovative? Does it leverage existing resources?
5) **Sustainability**: If the project requires recurring resources, how will these be acquired? Who will be responsible and is committed to providing these resources.
6) **Timeline**: What specific activities are to be carried out, and when is each objective/benchmark achieved?
7) **Budget & Budget Narrative**: What is the expected cost of the project? Include startup costs, operating costs, and equipment costs when appropriate. A maximum of two years is allowed for budget.

Items 1-7 must not exceed four (4) pages. Do not alter the font or the margins.

Items 1-7 must be submitted electronically in the attached template to alallen@ufl.edu.

All materials must be received by the advertised deadline. Materials not received by April 7, 2024, will be returned to the proposer for submission in the next cycle

2024 Technology Fee Full Proposal

Title: Astronomy Experiential Learning: Radio and Optical Astronomical Spectroscopy Lab

Proposer: Adam Ginsburg, Associate Professor, adamginsburg@ufl.edu, 352-295-1879

Sponsoring Organization: Department of Astronomy, Bryant Space Science Center

Purpose and Specific Objectives:

Spectroscopy, the measurement of the intensity of light at different wavelengths, is the most fundamental way astronomers study the physics of the cosmos. We propose to introduce a new set of lab modules to enable students to perform spectroscopic measurements spanning the electromagnetic spectrum from optical to radio wavelengths. This proposal is to obtain new instrumentation to deploy on UF's fleet of radio and optical telescopes. Students will use these new instruments both at the Campus Teaching Observatory and across the county with the mobile radio telescopes.

The Department of Astronomy operates several small telescopes out of the Campus Teaching Observatory. These telescopes do not presently have any spectroscopy capability: this proposal is to introduce a spectrograph for use on these telescopes. The department also operates ten small radio telescopes (pictured right) that similarly lack the ability to perform radio spectroscopy. This proposal will add that capability to these telescopes for use in lab courses.

The Radio Lab: Observing hydrogen from our Galaxy: The Milky Way Galaxy glows at radio wavelengths, 21cm or 1.4 GHz, and we can detect that glow with radio telescopes. In this lab, students will use our radio telescopes to observe the Milky Way Galaxy as it transits overhead. They will observe neutral Hydrogen in the Galaxy and, by combining multiple observations, produce an all-sky image and measure the rotation curve of the Galaxy. The students will gain experience with advanced radio astronomy and spectroscopy techniques and will apply physics knowledge to obtain mass estimates of the Galaxy. This measurement allows students to directly reproduce a measurement that shows that dark matter exists in the Galaxy.

A key feature of the radio astronomy lab is that it can be done anywhere, and it is best done at rural sites where there is no radio interference. Our radio telescopes are designed to be easy to disassemble and reassemble anywhere, enabling students to perform astronomical measurements in the field (on private, secured property like individual backyards and patios). The image above shows one of the telescopes set up at a student's home with a lab assistant included for scale. The Department of Astronomy has ten of these telescopes for student use.

Students have demonstrated the possibility of running this lab using privately owned hardware. This proposal is to obtain the appropriate tools, in the form of spectrometers and rugged, portable laptop and power setups, to enable students to run the laboratory using only class-provided hardware. We need the broad bandwidth provided by the AIRSPY R2 (picture on the left) to obtain a good measurement of Galactic rotation. With this proposal, we will provide the hardware for all students in the class to perform these measurements.

The radio telescope hardware is already in possession of the department, so we do not need any new telescope material. We need new laptops, as no laptops are available to run the radio spectrometers. We need rugged laptops with weatherproofing so that the telescopes can be deployed at remote, unpowered sites. These laptops need to be high-performance machines running windows or linux since the software-defined radio (SDR) technology requires running many fast fourier transforms to obtain the spectra.

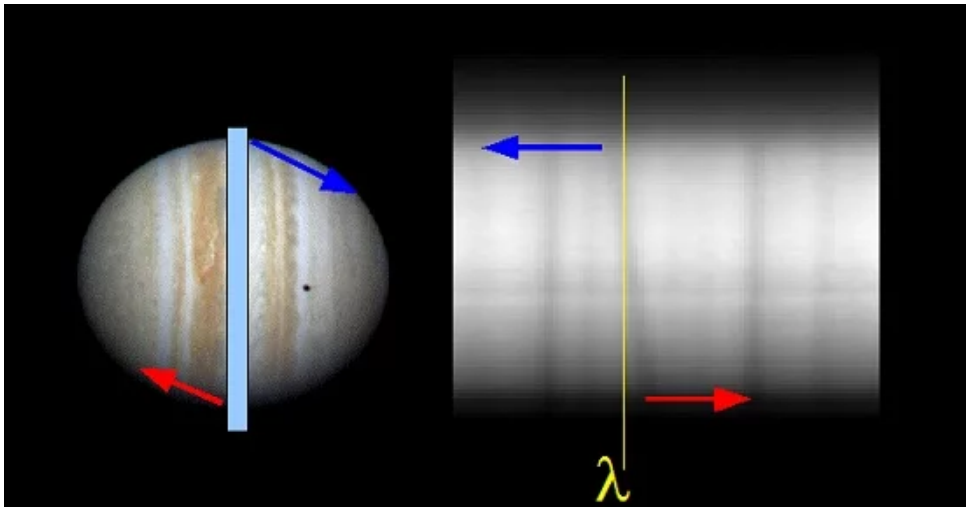
The radio observations are done by staring at one position on the sky and letting the Earth rotate to change what goes overhead. We therefore need to operate the telescopes and spectrometers continuously for 24h. To support the remote lab setups, we therefore need batteries. We have identified ~300Wh batteries that will be able to supply >48h of power for the laptops and spectrometers, enabling long full-sky scans.

Optical Spectroscopy Lab: Optical spectroscopy is the main method by which astronomers determine the composition of distant bodies (stars, planets, and galaxies). We use spectroscopy to measure how things move, and therefore to find new planets around other stars. The UF Campus Teaching Observatory does not presently have spectroscopy capability, though, so we propose to introduce this new capability to our university to train students in the acquisition and processing of spectroscopic data.

To support this lab, we will obtain an optical long-slit spectrograph, the LHIRES-III. This spectrograph is designed to work with the F/10 optical systems that we have on each of our Meade and Celestron telescopes at the Campus Teaching Observatory. The spectrograph is capable of supporting several different modes with the suite of gratings we will purchase: it can do high-resolution, which is good for measuring kinematics (how things move), and low-resolution, which is good for measuring composition.

Unlike previously-tested spectrographs, which were limited to point sources as input (i.e., only stars), the LHIRES-III will allow long-slit, high-resolution spectroscopy that will enable doppler velocity measurements, including experiments like measuring Jupiter's rotation (the figure below shows the signature of a rotating planet) and measuring the mass of eclipsing binary systems.

The selected spectrograph has been widely used at other universities and is well-tested to work on telescopes like ours. Its simple and lightweight design means that it can also be brought into the classroom to show the physical layout and mechanics of a spectrograph, which is an important part of the teaching experience: while the telescope operates at night, it is difficult to see what all the parts are doing in the dark.



Astronomical Data Processing: All of the data we acquire with modern astronomical instruments comes in a digital form, either as images on charge-coupled devices and their kin or as streams of data as from the radio spectrometers. These data sets come in a raw form and need to be processed to make nice images or perform measurements. The suite of laptops we will acquire will serve a second purpose of being both on-site and after-the-fact data processing units.

An exceptional academic environment through the innovative use of technology: The proposed program provides students the unique opportunity to do radio astronomy and optical spectroscopy. While many universities have access to optical telescopes, very few have radio telescopes or spectrographs at any wavelength. Students using these telescopes are able to run them autonomously from sites on and off campus, enabling students to additionally learn how to perform site characterization that is a key component of new telescope development. Setting up a telescope and obtaining data at remote sites is a valuable and transferable skill.

Sustainability: No recurring resources are required for this program. Updates and replacement parts will be funded through lab equipment fees which we will collect each semester. Back-up funds from the Department's maintenance budget will be used when necessary. Upgrades due to advancements in technology will be evaluated on a 5-year timescale. The lifetime of the acquired hardware should be at least 5 years for the radio spectrographs and for the laptops. The optical spectrograph is expected to remain useful for a much longer time since it is purely analog hardware.

Innovative Delivery: The project is providing new spectrometers and hardware to run the spectrometers. There is not presently available hardware capable of performing these measurements and running this lab. This hardware will provide students with new opportunities and training that will prepare them for jobs as data analysts, lab technicians, and observatory operators.

The project budget covers only technology items and does not include salary, services, facilities, furniture, and similar items.

ADA Compliance: The project meets all ADA requirements and complies with the UF Electronic and Information Technology Accessibility Policy.

Impact and Benefit: The proposed program benefits students of the AST 3722, 4723, and 6725 classes, including astronomy majors and graduate students directly by providing them with new laboratory experience. The teachers of these classes include the PI of this project and several colleagues, Jamie Tayar, Jason Dittmann, and Sarah Ballard, who regularly teach one or more of these courses. They have been involved in testing and vetting the proposed technology.

Additionally, components of the proposed project may be used in other astronomy classes as lab demos, using the radio or optical spectrographs, or in conjunction with other department telescopes like the astrophotography telescopes. Our department's lab manager, Triana Almeyda, will integrate these spectrographs into lab demos for the large AST 1022 courses.

The project leverages existing resources: the Department of Astronomy has built a set of 10 radio telescopes that are available to use with these new spectrometers. The radio telescopes have been upgraded by our engineering department to operate at 21cm, and they have been demonstrated to be capable of performing the required measurements with the requested spectrometers.

The department of Astronomy runs a suite of 8", 10", 11", and 14" telescopes at the Campus Teaching Observatory (CTO) that are capable of holding the optical spectrograph. This spectrograph will add a completely new capability never before available at CTO, allowing students to measure the motions of the cosmos. We note that the department possesses a fiber-fed spectrograph system that runs on the Rosemary Hill Observatory, a 45 minute drive from campus, but the spectrograph in this proposal serves a different set of students and the public; far more students use CTO than RHO. The spectrograph at CTO will allow the department to share spectroscopy with a much broader swath of the public via our Friday night open houses.

Timeline: All hardware will be purchased for delivery before the start of the Fall 2024 semester.

Budget:

Laptops and Batteries: We request 10 laptops with adequate processors to run the SDR software and the image processing software. Dell Latitude 5430 laptops with rugged cases available on myufmarket for $2500 each will fit this need. Total: $25,000.

We need a suite of batteries to support operation of the laptops and telescopes at remote sites. A 288 watt-hour battery can support a laptop plus spectrometer for >50 hours. It can support a Meade telescope plus detector system for at least >3h (the Meade telescopes run tracking motors that take more power, but typical observing runs are only a few hours). This suite of batteries will make our telescope suite fully mobile. For 10 batteries, the cost is $3,000.
(https://www.amazon.com/Jackery-Explorer-Generator-Traveling-Emergencies/dp/B0CFV93GZM?ref_=ast_sto_dp&th=1)

Radio Spectrometers: We request 10 AIRSPY-R2 broad-band SDRs. (https://airspy.com/airspy-r2/). These cost $170 each from https://v3.airspy.us/ . We base our parts list on the guide provided by Jonathan Williams at University of Hawaii (https://github.com/interstellarmedium/HI_telescope/blob/main/InstructionGuide.pdf). Total: $1700.

Optical Spectrograph: We request one LHIRES-III spectrograph with additional medium- and low-resolution (broad-bandwidth) gratings and a GPS-enabled guide camera.
(**https://www.shelyak.com/wp-content/uploads/DC0004A-Lhires-III-User-Guide-English-1.pdf)**

LHIRES-III: €5100 https://www.shelyak.com/produit/spectroscope-lhires-iii/?lang=en

Two additional gratings: €720 each, €1540 total
https://www.shelyak.com/produit/test-reseau-lhires-iii-choix-multiple/?lang=en

Guide Camera: €1404 https://www.shelyak.com/produit/el0254-qhy-174-m/?lang=en

Spectrograph Camera: €3072 https://www.shelyak.com/produit/camera-zwo-asi-2600-mm-pro/?lang=en

LHIRES slit & slitholder: €210 and €136 https://www.shelyak.com/produit/se0194a-fente-photometrique/?lang=en

Total for LHIRES: €11,462, or about $12,600

All totaled: $42,300

Technology Fee Full Proposal Template Sponsor Signature Form

Title: Astronomy Experiential Learning: Radio and Optical Astronomical Spectroscopy Lab
Proposer's Name: Adam Ginsburg

Note: By signing this form the sponsor is making a commitment to support the project. This may include providing startup, recurring or equipment replacement resources as presented in the attached budget.

Signature of sponsor: College Dean, or Unit Director, or VP for Student Affairs.

_____ _____

David E. Richardson **Date**
Dean – College of Liberal Arts & Sciences

Note: By signing this form the UF IT unit is making a commitment to manage the project if selected for submission of a full proposal. This may include providing startup, recurring or equipment replacement resources as presented in the attached budget.

Signature of unit UFIT Director of a core unit:

_____ _____

Mark McCallister **Date**
Director – Academic Technology

Date