

2009 Student Technology Fee Proposal Form

Title of Project: Remote Sensing Software

Department/Organization: **Environmental Sciences**

Name(s) of Project Applicant(s)

Name **David Wallin MS 9181**

Phone **7526**

Name MS

Phone

Name MS

Phone

Name MS

Phone

Principal Contact person:

Name **David Wallin**

Phone **7526**

Amount Requested for project: **6,597**

Contribution by Requesting Organization: **1,000**

Important note: Before completing this form, please read the Proposal Form Instructions located on the STF website:

<http://www.wvu.edu/stf/>

I. Project Abstract

Give an overview of existing environment, and summarize the items being requested. Include a brief explanation as to how the requested technology will improve student access to technological resources and/or enhance the *quality* of the student academic experiences through the use of technology and/or increase the *integration* of technology into the curriculum.

With this proposal, I am requesting funds for the purchase new image analysis software for use in my ESCI442/542, Introduction to Remote Sensing course. This software will also be used to a lesser extent in the various Geographical Information System (GIS) courses that are offered through the Departments of Environmental Studies and Geology. I have taught the ESCI 442/542 course for over a decade. The course provides an introduction to the concepts and techniques for monitoring earth surface features using imagery provided by a variety of airborne and spaceborne sensors. The labs provide students with hands-on training in the use of this imagery to map and monitor land use and land cover and to quantify various aspects of vegetation structure and composition. The LANDSAT series of satellites is one of the most widely known and widely used sources of imagery for this type of work. Students in my class use LANDSAT data extensively and also gain experience using imagery from a variety of other sensors. The use of remotely sensed imagery is expanding dramatically in a wide variety of environmental fields. In order to stay competitive, our students need experience with a variety of imagery and the skills to apply increasingly sophisticated image analysis techniques.

Remote sensing is very computer intensive and requires the use of specialized software that has a steep learning curve. For the past seven or eight years, I have

been using an image processing software package called ERDAS Imagine. This software has been the industry standard for the past 15 years or so. I've been able to negotiate a deal with the company to provide us with a 30-seat license for about \$2800 per year. With their licensing model, we need to pay this fee every year to keep the software operating. This leaves us quite vulnerable when budgets are tight.

I would like to switch to a competing image analysis software package called ENVI. ENVI has been around for over a decade and it has been steadily improving during this time. It is now viewed as being comparable to ERDAS, and perhaps somewhat better. One of the newest faculty members in my department came here from a research institute that is widely known for their work in the field of remote sensing. He reports that "everyone over the age of 35 uses ERDAS but everyone under the age of 35 uses ENVI." This anecdote speaks volumes about the status of these two software packages and the direction that the field is moving. We can purchase a 25-seat ENVI license for \$7000 and the annual support and update costs (after the first year) are about \$1400. The big advantage to ENVI is that, after the initial purchase, the software will continue to operate even if we are unable to pay the annual S&U fee. This provides a big cushion in a tight budget year. Furthermore, after the initial purchase, the annual S&U fee is low enough that I will be able to cover this with course lab fees. The \$2800 annual fee for ERDAS is simply too high to cover with course fees and we are very vulnerable in a tight budget year. Keeping the software operational this year has been a huge challenge.

II. Relationship to STF Objectives and Impact upon existing Academic Programs

Describe your proposed project in detail. Tell us how it will provide positive benefits to specific courses or instructional programs.

1. From a student perspective:

- a. How would this project provide additional student access to technological resources?

Without STF funding, I will probably be forced to discontinue this class or at least discontinue the laboratory portion of the class. The ERDAS Imagine software that we are currently using is quite expensive and we simply cannot afford to continue using it. In past years, course fees have covered only a small fraction of the \$2800 annual cost and the remainder has been paid for by the Dean's office. With shrinking budgets, my Dean is no longer able to cover this cost.

STF funding would enable me to continue to offer this course. In subsequent years, I will be able to cover the annual support and update costs using course fees (primarily from ESCI 442/542 and with the remainder coming from fees for the GIS courses). The software would be used primarily in the Huxley Spatial Analysis Lab but it could also be installed in other labs on campus with the 25 licenses "floating" among labs as needed. In particular, Geology is in the process of setting up to teach their GIS courses in another

lab. We will work with them to insure that the ENVI software can be accessed from this new lab.

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

The analysis of spatial data is central to virtually all environmental fields. Although this has always been the case, recent technological advances have revolutionized the power and scope of these analyses. In the field of remote sensing, there are new spaceborne sensors launched every year and improved airborne sensors that provide very high resolution data are also becoming more widely available and more widely used. The analysis of data from these sensors requires increasingly sophisticated techniques. Remote sensing also nicely complements other spatial analysis technologies including GIS, Global Positioning Systems (GPS), Computer Cartography and Computerized Visualization (e.g., Google Earth and 3-D visualizations).

ERDAS and ENVI are the industry standards for working with remotely sensed imagery. Although ERDAS was historically viewed as the industry leader, ENVI has emerged as the new leader over the past few years. Any job that involves remote sensing requires expertise with either ERDAS or ENVI with. Although there are other software packages for working with remotely sensed imagery, these other packages are not as widely used. They are not as widely used because they have limited functionality and they are more cumbersome. If we want our students to be in the best possible position for employment upon graduation, they need to be familiar with the most widely used software. ERDAS and ENVI are currently used for teaching remote sensing courses at a number of competing universities, including the University of Washington, Washington State University and even Central Washington University.

- c. How would this project integrate technology into coursework?

I could offer a lecture-only remote sensing course with no laboratory component. I am not eager to do this because I feel that it is critical to provide students with hands-on experience working with remotely sensed imagery. In past offerings of the course, students have invariably reported that the lab exercises were the most valuable part of the class.

The purchase of the new ENVI software through this STF project will maintain and enhance the integration of remote sensing into our other spatial analysis coursework. Although the focus of my course is on remote sensing, many of my lab exercises also require the use of GPS units and GIS. Similarly, the focus of the GIS courses is on GIS but students in these courses also do some lab exercises that utilize remotely-sensed imagery. In the past, I have worked with the faculty who teach the GIS courses to make imagery available and to help them, and their students, use the ERDAS software.

As part of my effort to convert to the ENVI software, I have applied for, and received, a Summer Teaching Grant for 2009. This grant will enable me to completely update all of my lab exercises for ESCI442/542 and develop a few remote sensing exercises for use in the GIS courses. The intent of this Summer Teaching Grant is to update my lab exercises using the ENVI software that I hope to purchase with funds from this STF proposal.

2. From a **faculty perspective**, explain how this project will enhance your ability to help students meet their educational goals.

The focus of this proposal is to enhance my ability to keep students abreast of the latest developments in the field of remote sensing. This is an important part of the tool set that they need to address environmental problems in a wide variety of fields. The GIS courses teach students to use specialized software to manipulate and analyze spatial data (digital maps). The kinds of analyses that my students do with remotely sensed imagery often yields data layers that can integrated with other spatial data (including information logged in the field with GPS units) and further analyzed with the GIS software. There are similarities and important differences between the software used in the GIS courses and my remote sensing course. For this reason, the GIS and remote sensing courses complement one another. One of my goals is to expand the use of remote sensing techniques in the GIS courses.

In order to facilitate this, I will spend a portion of my time this summer developing a few exercises with ENVI that the GIS instructors can use in their courses. The instructors in the GIS courses usually demonstrate the remote sensing software and have the students do a few simple operations with it. The exercises that I develop this summer will enable these instructors to continue and expand this practice with the new ENVI software. I have discussed this proposal with these instructors and they are eager to use the exercises that I develop. I plan to work with the various GIS instructors (in both the Departments of Environmental Studies and Geology) to help them use the new ENVI software in their classes.

Finally, the remote sensing software has been used extensively for undergraduate and graduate research projects. We now have a large archive of satellite imagery, and imagery from airborne sensors, available for student use. This imagery is available through our network and it is used extensively. I frequently provide instruction to individual students on special projects that are based on the use of this imagery.

3. Will other departments be involved with this project? If so, please describe.
Yes. Although my course, ESCI442/542, will be the primary user of this course, the software will also be used for a few exercises in GIS courses offered through both the Departments of Environmental Studies and Geology. Furthermore the remote sensing course and the GIS courses also draw students from Biology, Anthropology and Fairhaven College.

4. Has any part of this project previously been funded by STF?

No Yes (Please describe):

No STF funds have been used for the purpose of purchasing remote sensing software. However, STF funds have been critical in building the capacity to offer courses that contribute to the analysis of spatial data. STF funds have supported the creation and several upgrades of Huxley's Spatial Analysis Lab (SAL). STF funds have also enables us to purchase GPS units that are used extensively in the GIS and remote sensing courses.

III. Utilization

1. Please list the anticipated number of times and duration per each use, per quarter, that the proposed technology will be used by students.

My ESCI442/542 class will be the primary user of this software and the lab portion of the class (4 hours per week) is based almost entirely on the use of this software. The students also spend many hours in the lab each week working with the software on their own in order to complete lab assignments. This class is offered once a year and usually has an enrollment of 20-25 students. Geology offers two GIS courses per year with an enrollment of about 25 students in each class. Environmental Studies offers 19 sections of GIS courses per year with an average enrollment of about 20 in each section. Each of these GIS courses will spend 1-3 class periods using the ENVI software.

IV. Project Budget

This section of the proposal details the estimated cost of the project. Please include costs that will 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, see this page on our website: <http://www.wvu.edu/stf/instructions.shtml>

ATUS has developed standard configurations for desktop and laptop PCs and Macs. Your project is not limited by these standards, but these figures may be helpful. Standard configurations can be found on the Student Technology Fee website: <http://www.wvu.edu/stf/instructions.shtml>

Please complete all of the following sections (attach Excel spreadsheet for any additional details).

Item	Quantity	Item Cost	Total
25-seat license for ENVI Image Processing Software	1	7000	7000

Shipping (taxable)			
Tax (8.4%)			

We recognize your proposed budget as an estimate. Final funding for successful projects will be established after through technical review; some costs may need adjusting due to price changes. The STF Committee may impose special conditions may upon a project. See Sections B.7 & B.9 of the STF Mission Statement <http://www.wvu.edu/cms/WWU.STF/mission.html>

1. What funding is available from your department or other sources?
\$1000
2. Could this project be divided into discrete elements that could be funded separately?
No **Yes** Please summarize and prioritize project segments with cost estimate for each segment.
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 STF 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.

All courses that use this software charge lab fees. The revenue from these fees is specifically designated for lab consumables (paper, ink, projector bulbs, etc.), software support and update fees and computer maintenance. Although these fees are sufficient to pay the ongoing support and update costs for the ENVI software, they are not adequate to pay for the initial purchase. ESCI442/542 will be the primary user of this software with the GIS courses also making limited use. The current course fee for ESCI 442/542 is set at \$17.70. I have filed paperwork to increase this fee to \$50. With a projected enrollment of about 20 students, this would enable me to cover most of the \$1400 annual support and update cost. The remainder would be paid using a portion of the fees from the GIS courses that will make limited use of the software.

V. Impact on Existing Resources

The proposal should address your project's potential impact on existing resources. Special attention should be given to 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 the replacement of computers should specifically address the feasibility and cost effectiveness of upgrading the computers rather than replacing the computers.

1. Describe how existing equipment is used. Contrast this to projected use if your project was funded.

My ESCI442/542 is currently based on the use of the ERDAS Imagine software. See my lab webpage:

http://myweb.facstaff.wvu.edu/wallin/envr442/442_lab_index.html

for a list of current lab exercises. If I receive funding for the ENVI software, I will use my 2009 Summer Teaching Grant to rewrite all of these lab exercises for the ENVI software. I will also prepare a few exercises for use in the GIS courses that are offered by Geology and Environmental Studies. This will facilitate expanded use of remotely sensed imagery in these classes. If this STF grant is not funded, I will decline the Summer Teaching Grant. I will also be forced to choose between either permanently canceling my class or offering the class in a lecture-only format. At the same time, use of remotely sensed imagery in all of the GIS classes will decline and there will be fewer opportunities for use of this technology in student research projects.

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? If so, please describe why the existing equipment doesn't meet the needs outlined in this proposal.

No

3. If this project involves the replacement of equipment:

- a. Describe the 'before and after' configuration changes. A spreadsheet reflecting these changes can be attached.

Before (Current): 30-seat license for ERDAS Imagine is installed in SAL.

After: 25-seat ENVI license will be installed in SAL and in the lab that Geology uses for their GIS courses.

- b. Describe the costs and benefits of replacing vs. upgrading (if applicable).

The ERDAS Imagine software that I currently use costs about \$2800 per year for a 30-seat license. Historically, this fee has been paid using funds from the Provosts office and by the Dean of Huxley. In recent years, Huxley has paid all of this. The upfront cost of switching to ENVI is higher but ultimately we will save a considerable amount by making this change. The cost for ENVI during the first year is \$7000 and the annual support and update fee (after the first year) is about \$1400. The costs for both ENVI and ERDAS have not changed at all over the past 3-5 years. Assuming no change in cost for either ERDAS or ENVI, switching to ENVI will result in a net cost savings after four years. Beyond this, the cost savings for ENVI become quite large.

Year	ERDAS Annual	ERDAS Cumulative	ENVI Annual	ENVI Cumulative
2009	2800	2800	7000	7000
2010	2800	5600	1400	8400
2011	2800	8400	1400	9800
2012	2800	11200	1400	11200
2013	2800	14000	1400	12600
2014	2800	16800	1400	14000
2015	2800	19600	1400	15400
2016	2800	22400	1400	16800

4. Will this equipment be available to students outside your department?
 No Yes
5. If the proposed technology will be used by students outside your department, please describe how they would gain access, how the availability of the equipment will be publicized, the hours/week when the equipment will be available, and any costs that would apply.

The software will be made available to any student in any department who chooses to take either ESCI 442/542 or any of the GIS courses offered through Geology or Environmental Studies.

6. Does this project involve the check-out of equipment to students?
 No Yes If yes, please discuss whether or not the Student Technology Center could be assigned this task.
6. Does the department have adequate operating funds to provide on-going maintenance and support?
 No Yes Please describe.
See section IV, part 3.
7. Does the department have adequate personnel funds to provide on-going staff support for this project?

No Yes Please describe,

Yes. Huxely has a fulltime IT lab manager and a GIS specialist. They provide both hardware and software support for the SAL and will take care of the technical aspects of installing and maintaining this software. We will coordinate with Geology to insure that the software is available in their lab as well.

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 requires any site preparation, or if this project uses any space not currently under control of the department, a draft proposal must be submitted to Space Administration by **Friday, November 14, 2008**. Space Administration and Facilities Management will conduct a site survey and respond back to you with information concerning project feasibility, cost, and schedule. This information must be included in the final project proposal.

Proposals for projects that involve any site preparation will be considered only after the required site survey by Space Administration and Facilities Management has been completed.

1. Location for installation of equipment or technology.
 AH16 and the computer lab used by Geology
2. Is site modification required?

No Yes Please describe. (Electrical, air, painting, lighting, security, network access, etc.)

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

No Yes Please describe.

VII. Project Schedule

This section describes your overall implementation schedule. Project awards will be announced by the end of spring quarter. It is anticipated that projects would be substantially completed by the end of the calendar year. If there is any site preparation involved, please align your project schedule with the schedule provided by Space Administration and Facilities Management.

The schedule is very straightforward. As soon as we receive funding, we will purchase the software and install it. As discussed above, I have already been awarded a Summer Teaching Grant for 2009 to learn the software and rewrite all of my lab exercises for ENVI. I anticipate completing this task by the end of the summer.

VIII. Constraints

This section should list any external or internal factors 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).

1. Please describe any constraints to this project.

None

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.

None

2. Describe the funding cycle for these requests (submission dates, projected award dates).

N/A

3. Indicate the amount of external funding that would be requested.

N/A

4. In cases where joint funding is requested, what will happen if the STF award is made and the external grant is not awarded?

N/A

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

N/A

Quotation



ITT Visual Information Solutions

Quote No.: 342366
Date: November 24, 2008
Valid Until: November 13, 2008
View via Web at: <https://www.ittvis.com/ssl/quote.asp?OID=342366>

Brian Farr
 4990 Pearl East Circle
 Boulder, CO 80301
 Tel: +1 (303) 402-4670
 Fax: +1 (303) 786-9909
 BFarr@ittvis.com

David Wallin
 Western Washington University
 Western Washington Univ.
 Attn: David Wallin
 ES522 516 High St.
 Bellingham, WA 98225-9181

ITT Visual Information Solutions is pleased to provide the following quotation for software products and services.

Part #	Description	Qty	Unit Price	Extended Price
21EDULBLIC	ENVI (no IDL included) Lab License - 25 Seats	1	7,000.00	7,000.00
* Sales tax will be added to orders shipped to CA, CO, DC, IN, KS, MD, MI, NY, OH, PA, TX, VA, WI, WA				Subtotal
				7,000.00
Remit purchase orders to: ITT Visual Information Solutions Fax: +1 (303) 786-9909 4990 Pearl East Circle Tel: 303-786-9900 Boulder, CO 80301				Shipping & Handling
				8.00
				* Sales Tax
All prices in US Dollars				Total
				7,008.00

NOTE: We offer TRAINING CLASSES at our Boulder, CO, and Vienna, VA offices, in addition to various other locations throughout the U.S. and the world. We also offer standard or custom on-site classes at your facility. For More Info: <http://www.ittvis.com/training/schedule.asp>

TERMS: Net 30 Days. Shipping is FOB Boulder, Colorado USA
 Delivery is 30 days ARO or by agreement.

The information contained in this document pertains to software products and services that are subject to the controls of the Export Administration Regulations (EAR). All products and generic services described have been classified as EAR99 under U.S. Export Control laws and regulations, and may not be re-transferred to any destination expressly prohibited by U.S. laws and regulations. The recipient is responsible for ensuring compliance to all applicable U.S. Export Control laws and regulations.

Remittance Information:

- Send payments to:
 ITT Visual Information Solutions
 15513 Collections Center Drive
 Chicago, IL 60693

- Include the reference number: 342366 on all checks or purchase orders.
- If paying by purchase order, please fax a copy to us upon its completion.
- You may renew via Credit Card by calling us or by using our secure website (link shown above).
- We accept the following credit cards: VISA, MasterCard and American Express.