

2018 Summer Undergraduate Research Fellowship (SURF) Program Proposed Faculty Projects

Project Number 1			
<i>Biogeochemical cycling in Pacific Northwest forest ecosystems</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Abir Biswas	biswasa@evergreen.edu	(360) 867-6433	3
Project Description			
<p>This project seeks students working on aligned studies investigating nutrient and trace metal cycling in forest ecosystems in the Pacific Northwest. The SURF student(s) would contribute to analyses of samples that have been collected in plots across long-term forest research plots at Mt St Helens and possibly within the Evergreen Ecological Observation Network (EEON). The samples are related to ongoing studies of (i) phosphorus availability and cycling in old-growth forests and adjacent recently clear-cut forests in the tephra-fall region of Mt St. Helens, or (ii) tree-species-specific mercury inputs to stream ecosystems in 2nd growth temperate rainforest (within EEON). Faculty have additional on-going projects related to mercury and phosphorus cycling at these sites and backgrounds of students could support expansion of the ongoing research projects at either site.</p> <p>Students will have significant responsibility in conducting careful and detailed sample processing and sample analyses in the laboratory. Students with prior chemistry experience in the laboratory, or analytical experience, or an interest in developing these skills would be preferred. Students are likely to be asked to support or conduct analyses of samples for mercury content (using the Nippon MA-3 at Evergreen) or for phosphorus and other nutrient content (by ICP-MS, using Evergreen’s Perkin Elmer Elan DRC-e), and prior experience with either or both instruments would be particularly relevant. Ideally, students would be interested in developing analysis skills over this summer (and hopefully into the future), with the end-goal of working toward producing paper(s) that will be submitted to peer-reviewed journals in the future.</p>			
General Expertise Required of Fellowship Applicants			
<p>Potential researchers should have lab experience (ideally within programs focusing on chemistry, geology, or soils), strong skills in scientific writing and working with primary literature, and be able to commit 20-40 hrs/week to this project. This project can support students at intermediate and advanced levels of study, and perhaps beginning-level students-- students ideally will have prior experience in the chemistry laboratory, or analytical experience, through Evergreen coursework or other research opportunities. Interested students are strongly encouraged to contact the faculty (Biswas) directly to discuss how their academic backgrounds and/or previous research experience fit with these studies and would allow them to be successful in this research framework.</p> <p>While training to use the mercury analyzer can be conducted in the summer, ideally students would either be trained on and/or have prior experience with analyses of samples for mercury content (using the Nippon MA-3000 at Evergreen) or for phosphorus and other nutrients (by ICP-MS, using Evergreen’s Perkin Elmer Elan DRC-e).</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Students will have significant responsibility in conducting careful and detailed sample processing and sample analyses in the laboratory. Students with prior experience in the laboratory, or analytical experience, or an interest in developing these skills would be preferred. Students are likely to be asked to prepare small soil and/or litter samples for laboratory analyses and attention-to-detail and detailed laboratory notes and very important. For the litter-mercury study, students may also need to sort litter samples—in which case training will be provided. Students would ideally support or conduct analyses of samples for mercury content (using the Nippon MA-3 at Evergreen) or for phosphorus and other nutrient content (by ICP-MS, using Evergreen’s Perkin Elmer Elan DRC-e), and prior experience with either or both instruments would be particularly relevant. Ideally,</p>			

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students would be interested in developing analysis skills over this summer (and hopefully into the future), with the end-goal of working toward producing research paper(s) that will be submitted to peer-reviewed journals in the future.

Anticipated Progress on Faculty Work

The anticipated progress will depend on the backgrounds of the students (as well as the number of students) seeking to work on this project.

If student(s) with prior experience using Evergreen's ICP-MS join the project, we will conduct intensive analyses of phosphorus availability in Mt St Helens tephra and soils (using the methods developed by 2017 SURF students). If student(s) with prior experience using Evergreen's mercury analyzer join the project, we will focus on intensive analyses of litter samples collected in litter traps over EEON streams over a recently-completed year-long study. In both cases, with 1 student a subset of the samples will be analyzed, and with additional students we will be able to complete analyses of the full set of samples we previously collected.

Please note that if 2-3 students with different backgrounds joined the project, they would join a collaborative laboratory environments wherein they would be expected to take the lead on their individual "project" while simultaneously support the other lab members in making progress on their projects. This lab-intensive research lends itself well to multiple students working together developing laboratory and analytical skills. These projects represent interdisciplinary work with other Evergreen faculty (Mt St. Helens with Fischer; EEON stream with LeRoy) and completion of these analyses is required to make progress on (and complete) the respective projects.

Additional Information

The faculty on this project will work in collaboration with the student(s) on these projects, though students are expected to be comfortable working independently in the laboratory. Faculty will provide necessary laboratory training for the research projects and will meet with the student(s) weekly to reevaluate project design and progress. Meetings early in the season will be particularly important to set up the research designs, schedules, and appropriate use and access to equipment.

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Project Number 2			
<i>Assessment of the Ability of Natural Organic Matter to Complex Heavy Metals Under Oxidative Stress</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Robin J. Bond	bondr@evergreen.edu	(360) 867-6747	1
Project Description			
<p>In situ contaminant oxidation (ISCO) is a method of breaking down long-lasting hydrocarbon contaminants such as polycyclic aromatic hydrocarbons (PAHs) in soils without removing those soils from their natural habitat.</p> <p>One of the issues with using ISCO is that it can cause mobilization of toxic metals into the groundwater. Many heavy metals in soil exist in complexes with natural organic matter (NOM). Previous research has shown that the majority these complexes remain intact for the initial burst of ISCO chemicals; it is only after prolonged exposure to oxidants that substantial amounts of metal mobilize into groundwater.</p> <p>A thorough knowledge of the mechanism by which the organic matter breaks down may lead to development of an ISCO process by which PAHs and other organic contaminants can be broken down without risking the heavy metal contamination of groundwater. This project seeks to understand that mechanism by characterizing the functional groups of NOM as a function of exposure to the oxidants used in ISCO.</p>			
General Expertise Required of Fellowship Applicants			
<p>Candidates should have a working knowledge of data analysis and the equivalent of one year of general chemistry by the beginning of the summer. Candidates must be able to work independently. Ability to use analytical instrumentation (GC-MS, IR, ICP-MS, UV-Vis) is desirable but not required. Experience collecting and processing field samples is a bonus.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Students would be expected to show proficiency or be trained on GC-MS, IR, ICP-MS, and UV-Vis spectroscopy. Initial work on this project will consist of exposing natural organic matter to a strong oxidant (a) measuring amounts of dissolved organic matter (via UV-Vis spectroscopy) and (b) characterizing that organic matter (via IR and GC-MS). Work will eventually expand to understand how organic matter oxidation leads to mobilization of trace metals (evaluated via ICP-MS).</p> <p>When a basic protocol has been established for lab/control samples, it is hoped that similar characteristics can be evaluated from field samples taken from local sites. If the project progresses to this point, students will be trained in field sampling techniques.</p>			
Anticipated Progress on Faculty Work			
<p>The proposed work advances a project begun at a previous institution. One fellow should be sufficient to perform the basic work mentioned in this proposal, although it is unclear whether we will be able to get to field samples in the allotted time. Because of the details of the methodology it has been difficult in the past to have more than one student working on this project at a time.</p>			
Additional Information			
<p>Student fellows will have opportunities to become familiar with a variety of instrumentation and learn about method development and testing. Students will get first-hand knowledge of statistical analysis, reading scientific literature, and technical/scientific writing. It is expected that results of this research project will be written and/or presented at a conference.</p>			

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Project Number 3			
<i>Field Guide to the Vascular Plants of the South Sound Prairies</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Frederica Bowcutt	bowcuttf@evergreen.edu	(360) 867-6744	1
Project Description			
<p>Update the first edition of the field guide entitled Vascular Plants of the South Sound Prairies published by The Evergreen State College Press in 2016. We will bring the scientific nomenclature and classification up-to-date and add 50 to 100 plant species for a total of 200 to 250 taxa covered. If funding allows, we also hope to add color photographs of the most common wildflowers. Over forty students from The Evergreen State College contributed to the first edition, as well as scientists from Evergreen, Centralia College, and the Center for Natural Lands Management. The second edition will allow the addition of botanical illustrations produced since the first edition was published. The second edition will also allow us to update the list of the voucher specimens that are maintained at the Evergreen Herbarium. The second edition will further improve this easy-to-use field guide to locally threatened prairie and oak woodland ecosystems and assist with important restoration and conservation work.</p> <p>Evergreen is fortunate to be one of the closest four-year colleges to unusual and rare prairies found in the south Puget Sound region, which puts us in a unique position to take a leadership role in research and conservation efforts. Since 2003, Evergreen students have been conducting field research for this field guide. They have produced meticulous, print worthy botanical illustrations and hundreds of herbarium specimens housed in the Evergreen Herbarium. Access to these specimens is available to the public. In addition to being accessible to a lay audience, the resulting second edition of the illustrated field guide will provide needed support to multiple local organizations and researchers involved in restoring these threatened ecosystems in our region. We hope that this project, which integrates botanical illustration and service learning, will inspire other educators and students to imagine how they can make valuable contributions in the world through citizen science.</p>			
General Expertise Required of Fellowship Applicants			
<p>Knowledge of InDesign, Illustrator, PhotoShop and other Adobe graphic arts tools required. Demonstrated skill in graphic design, including creative ability to combine text and images for book layouts. Intermediate knowledge of plant taxonomy. Botany: Plants and People or Field Plant Taxonomy are the required coursework prerequisites. Other required characteristics of the successful applicant include excellent library research, communication, and time management skills.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>The responsibilities of undergraduate fellow include creating an InDesign print-ready layout for the second edition of the Field Guide to the Vascular Plants of the South Sound Prairies. Fifty to a hundred new images and associated descriptive text of represented plant species need to be edited and added to the first edition. The new text needs to be edited to insure accuracy and clarity. The bibliography needs updating as does the scientific nomenclature and classification using the new flora of our region which is being republished in an updated form in spring 2018. The fellow will also write a grant proposal to seek funding to cover increased publication costs to add color photographs for the most common wildflowers. Demonstrated photography experience preferred as the fellow will have the opportunity to do some of their own photo documentation as well as screen existing photographs available for use by various biologists who conduct research on the prairies. The student will also update this wiki: http://wikis.evergreen.edu/pugetprairieplants/index.php/Main_Page.</p>			
Anticipated Progress on Faculty Work			
<p>With one fellow our anticipated progress on the project includes at a minimum preparing the document for its second printing without color photographs.</p>			

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Additional Information

The first edition of the field guide was edited by Dr. F. Bowcutt and Dr. S. Hamman. Their qualifications are described below.

Frederica Bowcutt, Ph.D., has taught floristics and field plant ecology at The Evergreen State College for nearly twenty years. She has published multiple floras on state parks in the North Coast Range and Central Valley of California. As an undergraduate, she illustrated a masters thesis by an ethnobotanist at Humboldt State University. She published her first book last year with University of Washington Press.

Sarah Hamman, Ph.D., is a restoration ecologist with the Center for Natural Lands Management with over seven years of experience in prairie and oak woodland restoration in the South Puget Sound region. She has fifteen years of experience in grassland and forest ecology research throughout the United States.

The printing will be done by Gorham Printing in Centralia, Washington. They have been in business for forty years and specialize in book printing. All of the work will be completed in the U.S., not outsourced overseas. For more information go to: <http://www.gorhamprinting.com/index.html>.

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Project Number 4			
<i>Ecophysiology of Pacific Northwest Lichens and Bryophytes</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Lalita Calabria	calabril@evergreen.edu	(360) 867-6415	2
Project Description			
<p>Ecophysiology is the study of the physiological mechanisms underlying an organism's ability to adapt and respond to a changing or unfavorable environment. In this project, fellows will choose one of two areas of emphasis in ecophysiology research: 1) examination of the growth-altering effects of lichen extracts on native prairie plant seed germination and viability or 2) studies of symbiotic associations between forest-dwelling bryophytes and nitrogen-fixing bacteria</p> <p>Fellows who choose to study the growth-altering effects of lichen extracts on native prairie plant germination and growth will participate in field-based experiments focusing on prairie lichen and prairie plant interactions, seed germination bioassays in growth chambers and chemical and nutrient analysis of lichen extracts. This project has the potential to contribute to the conservation of rare and endangered prairie plants and lichens, as well as, the development of new germination protocols for native prairie plants.</p> <p>Fellows who choose to study the forest-dwelling bryophytes and nitrogen-fixing bacteria project will participate in field and laboratory experiments to address the question: How do nitrogen-fixation rates of moss-dwelling cyanobacteria vary among forest stands with different levels of habitat continuity and plant community structure? Data collection in the field will include collecting moss samples and recording plant community data from forest stands on the Evergreen campus as well as the Olympic Peninsula. Laboratory work will include analyzing moss samples collected in the field via acetylene reduction assay and gas-chromatography-flame ionization detection (GC-FID) for quantifying N₂-fixation rates. This project has the potential to increase our understanding nutrient cycling in temperate rainforests as well as, how forest fragmentation and plant community structure influence plant-bacterial symbiosis.</p>			
General Expertise Required of Fellowship Applicants			
<p>This Fellowship is for advanced students who have completed one year of college level biology and chemistry coursework with labs and one quarter of botany. Fellows are also required to have upper-division coursework in either lichenology, bryology or ecology. Fellows will need to obtain an operator's license on the epifluorescence microscope and the theory portion of GC-MS (for bryophyte-focused research) prior to the start of summer and this process will need to be coordinated and approved by the Science Support staff prior to the beginning of summer. Strong scientific writing skills and familiarity with statistics and data analysis and/or GIS would be very helpful, but faculty is willing to work with potential fellows to improve skills in these areas. Interested students are strongly encouraged to contact the faculty directly to discuss how their academic backgrounds and/or previous research experience fit with these studies and would allow them to be successful in this research framework. The position requires a commitment of 20-30 hours/week.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Fellows focusing on experiments in lichen and prairie plant ecophysiology will spend ~8 hours a day, two-three days a week helping to collect data from established plots at prairie field sites during the first three weeks of the fellowship. Thereafter, fellows will be expected to spend ~10-15 hours a week in the lab collecting data on seed germination bioassays and analyzing nutrient content or plant community data collected in the field.</p> <p>For the bryophyte-cyanobacteria project fellows will be expected to spend 4-6 days a month in the field collecting samples and plant community data at multiple forest sites. Fellows will spend approximately 10 hours a week in the lab processing samples and conducting the acetylene-reduction assay on moss-cyanobacteria</p>			

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samples. Fellows will make a bi-monthly trip to University of Washington to our collaborators lab where they will spend a day running samples on the GC-FID to quantify nitrogen fixation rates.

In general, fellows should expect to spend 2-4 hours per week with data entry and analysis. The last few weeks of the fellowship may require additional hours for data analysis and preparation of a poster for the SURF celebration in September 2018. The fellows will be expected to work independently for some part of the time spent in the lab and the field. However, faculty will provide training and regularly meet with fellow(s) to troubleshoot data collection, analysis and writing progress.

Anticipated Progress on Faculty Work

If two fellowship positions are granted, the qualifications and desired area of emphasis for each applicant would be considered to determine which of the two areas of research emphasis to focus on. If only one fellowship was granted, priority would be given to the study of growth-altering effects of lichen extracts on native prairie plant germination because this project requires less college resources and staffing to proceed successfully (ie. SIT support for instrumentation and training, access to specialized equipment etc).

If only one fellowship was awarded, then only one of these projects would be viable in regards to workload because both research projects require time-sensitive and lengthy lab experiments. For example, the seed bioassay experiments require weekly measurements of radical length for 120 individual seeds per plant species. Moreover, for the bryophyte-cyanobacteria project, the acetylene reduction assay requires sample preparation in 7 minute intervals over a 5-hour period with no breaks.

Other benefits of having two fellows include the opportunity for them to broaden their research experience by assisting each other in the lab and field, thereby being exposed to a wider range of methodologies and experiences. Science doesn't happen in a vacuum and the opportunity to cultivate collaboration and communication skills is invaluable to a developing scientist. In addition, two fellows would be safer in both a lab and field setting.

Additional Information

These are ongoing research projects in my lab and students who participate in the summer fellowship may have the opportunity to continue with the project during the 2018-2019 academic year through advanced undergraduate research (see academic catalog). There may also be opportunities to contribute to the preparation of a manuscript for submission to a peer-reviewed journal or to attend a regional science meeting during Spring 2019 to present research in the form of a poster or a talk.

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Project Number 5			
<i>Building Quantum Optics Experiments</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
John Caraher	caraherj@evergreen.edu	(360) 867-6101	2
Project Description			
<p>The proposed project work has two chief threads. The most important thread is to establish a functional quantum optics laboratory. This entails working with diode lasers, single photon counting modules (SPCMs), conventional and nonlinear optics, and data acquisition hardware and software. A minimum objective is to set up a source of entangled photon pairs generated by spontaneous parametric downconversion and perform at least one (but preferably several) standard investigations in quantum optics (such as the violation of local realism via a Bell inequality or Hardy's test, or measurements of heralded single photons such as the Grangier experiment). Extensions could include building a Hong-Ou-Mandel interferometer to measure the temporal correlations between entangled photons.</p> <p>The second thread involves investigating the feasibility of creating versions of these experiments that could be controlled through a web browser. The reach of quantum optics experiments, with their powerful implications for the interpretation of quantum theory and their applications in emerging technologies (such as quantum computing and secure encryption key generation and distribution), has expanded to reach undergraduate physics majors at many universities. The capability of running these experiments remotely, using a web browser, can expand the reach of real quantum mechanics experiments beyond well-funded upper-level undergraduate physics program to a potentially enormous audience, contributing to the democratization of science education by extending the capability to perform cutting-edge experiments to people who lack in-person access to the relatively exclusive spaces of university labs. This would be accomplished through the web services features of the LabVIEW software that will be used to run experiments.</p>			
General Expertise Required of Fellowship Applicants			
<p>This project is suitable for intermediate or advanced students in the physical sciences, particularly those with strong backgrounds in physics, mathematics or computer science. A student participating in this project should have completed a full year of calculus-based physics (whether in a program like Matter and Motion or through courses) with an exceptional level of achievement, or an advanced program such as Physical Systems and Applied Science with strong work. An ideal student would have completed coursework in quantum mechanics and have skills in optics, electronics and computer coding, but my expectation is that those skills will largely be developed through the project work.</p> <p>The student should be able to take on independent work, both in the lab environment and in working on necessary background readings and exercises. They should be effective communicators, able to report clearly, precisely, and promptly, both verbally and in writing (including email), on their work, challenges and problems that arise, as well as any unexpected events that might affect their work schedule. They should be reliable and punctual.</p> <p>Highly detailed protocols will be the exception rather than the rule, so this project places a premium on the ability to faithfully record lab activities, understand deeply the function of a given piece of optics or electronics, and make sound plans regarding experimental procedures, data analysis, software development, etc. Very little work will be routine.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Students will be responsible for reading and understanding any background materials provided concerning experiments and the principles behind the operation of various lasers, optics, detectors, electronics, and</p>			

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interfaces. They will be expected to conduct their own research on technical aspects of the pieces of scientific apparatus we use, including contacting manufacturers for specifications and recommendations. They will be responsible for following up on, and perhaps initiating, purchases of supplies relevant to the project, and become familiar with any pertinent policies and procedures. They will be responsible for working in the lab at agreed-upon times and communicating with the faculty sponsor about progress via email as needed, and ideally at least once a week in person. They will be responsible for observing any and all safety rules, both college-wide and those specific to the lab. They will be responsible for collecting and analyzing data, and drawing appropriate conclusions from any experiments. This includes reporting these results, informally as the summer progresses as well as at the end of the 12 weeks.

Students will learn how to work with research-quality optics, detectors, diode lasers, electronics and computer-based experiment control and data acquisition, including creating and modifying LabVIEW code. They will develop broad knowledge in optics, with a special focus on polarization optics. They will also extend their knowledge of quantum mechanics.

Anticipated Progress on Faculty Work

I generally find that having at least two students is really important to the student experience in ways that are somewhat decoupled from a quantitative measure of the overall progress. In optics, it's also very often the case that a second set of eyes is essential (for instance, when steering a laser beam with a mirror and needing to see the effect someplace you can't easily see from where you need to be in adjusting the mirror).

In terms of the threads I outlined, it is likely that with just one student, I would make no progress on the second thread at all, and just get to the point of creating and detecting downconverted photon pairs. With two, I'd expect that progress would be substantially faster, and include completing 2-3 of the experiments mentioned, with substantial progress on the web interface issues (especially if coding is a particular interest of at least one student). I would offer each student a clear area of primary responsibility (optics for one, computers and data acquisition for the other) with the understanding that they will be expected to know enough of the other person's area to be an effective helper.

Additional Information

This project would be excellent preparation either for lab-focused graduate study in physics, electrical engineering, optics or computer science, or for work in industry pertaining to the control of scientific instruments, optics, or electronics.

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Project Number 6			
<i>Molecular Analysis of “Super-Spreader” Bacteriophages: Assessing the Ability of Different Coliphages to Spread Plasmids to Unrelated Bacteria</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Clarissa Dirks Betty Kutter (Emerita)	dirksc@evergreen.edu kutterb@evergreen.edu	(360) 867-6612	3
Project Description			
<p>As antibiotic resistance escalates, interest is growing in applying bacteriophages - viruses that exclusively infect bacteria – as an alternative treatment for antibacterial resistant infections. This technique was first developed in France in the 1920s and 1930s, and is still used clinically today, particularly in Eastern Europe. Though bacteriophages are the most abundant organisms on earth, much about them is still unknown, especially their role in driving evolution in natural microbial communities.</p> <p>While not currently available in the United States except in rare “compassionate use” cases, the practice of phage therapy continues to develop globally. However, greater understanding of how phage infection progresses in environmental conditions and the potential impacts of these infections on the broader microbial community will be important in achieving full regulatory approval here in the US, and developing more effective therapies. One area under investigation is the recently described phenomenon of the “super spreader” phenotype of at least one group of professionally lytic E.coli phages. These phages have been reported to facilitate the transmission of bacterial plasmids through their inability to break down circular plasmid DNA and its subsequent uptake by unrelated, naturally competent bacteria. While the role that temperate phages play in the horizontal transfer of bacterial genes through transduction is well understood, the possibility of transmission of antibiotic resistance through transformation after plasmid release by phage lysis is an important new consideration in the context of selecting phages for phage therapy. In order to better characterize existing therapeutic phage preparations, and to explore the possibility that such “superspreader” phenotype phages may exist in currently commercially available therapeutic cocktails, we have metagenomically sequenced the four major commercially available therapeutic phage cocktails from the Republic of Georgia and the Russian Federation. The focus of the next phase of the project is to isolate and test a number of E.coli phages from these preparations for the “super spreader” phenotype, in order to better understand whether this phenomenon could be a concern in currently produced phage preparations.</p>			
General Expertise Required of Fellowship Applicants			
<p>Students who wish to engage in this work should have had General Biology with Laboratory and General Chemistry with Laboratory. Having advanced course work may help in better understanding the research objectives but is not necessarily needed for such work. A motivated student who is interested in discovery and participating in real research would be a very valuable asset to the project, and might well go on to be involved in the Phage Lab during later years at Evergreen. However, to be successful in this work students must have very good organizational and collaborative skills as demonstrated in their previous course work.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>This research project was designed to support students who wish to participate in cutting-edge research that could lead to significant findings in the fields of virology and phage therapy. This work will happen in collaboration with the Kutter lab and build upon their work in this area, taking very important advantage of Dr. Dirk’s extensive experience working with bacterial transformation and gel electrophoresis analysis of restriction digests as well as equipment and space available in the Dirk laboratory as well as expanding the broad work of the phage lab in molecular biology directions. This joint effort will help the young investigators to further their work in molecular biology and microbiology and support their passion for research. It will help students gain proficiency at doing research and develop their laboratory and science process skills. They will also be playing a</p>			

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key role in answering an important question relevant to phage biology that has recently arisen. The work entails phage isolation and characterization, DNA isolation, restriction digestion analysis, bacterial transformation, and pulse field gel electrophoresis. Students will also gain many science communication skills by learning to read, analyze, discuss and interpret the scientific literature.

Anticipated Progress on Faculty Work

During weeks 1- 3, fellows will learn how to implement sterile technique, make media, monitor the growth of bacteria using a spectrophotometer, titer the concentration of bacteria and phage using serial dilution and plating. They will also carry out a basic transformation procedure, introducing a standard plasmid into a host bacterial cell. In addition, they will read and discuss basic information about the properties of bacteriophages and the ways that phages are initially isolated worldwide from such sources as sewage. In addition, they will see videos about current phage therapy work in Belgium and the Republic of Georgia from last summer's Evergreen International Phage Meeting and engage in reading the primary literature.

In weeks 4 and 5, each student will then isolate at least 2 phages targeting *E. coli*, one each from a wound-targeting Pyophage cocktail and an Intestiphage cocktail from either Russia or Georgia. They will be shown and discuss our recent detailed metagenomic data about the complexities of the phages in the Intestiphage and Pyophage therapeutic cocktails from both Russia and the Republic of Georgia.

In weeks 5 to 6, they will grow up and titer stocks of their various *coli* phages, and learn to carry out studies of the phage infection process. They will also extract DNA from those phages, and then work in the Molecular Biology lab to carry out restriction digests with several different restriction enzymes, one of them very specific for cytosine rather than hydroxymethylcytosine in the DNA, which will let them distinguish between T4-like phages and all the other groups of coliphages.

In weeks 7-12, they will test their isolated phages for the superspreader phenotype with a protocol we have adapted from Keen et al. 2016 involving extracting all DNA from phage infections of plasmid containing *E. coli*, followed by the transformation of the extracted DNA into plasmid-free *E. coli*. Time allowing, students will have the opportunity to test additional scientifically or clinically relevant phage isolates with this protocol after they complete their testing of their initially isolated phages.

If we have more than one fellow, we will be able to isolate, characterize and test a larger number of phages from each of the cocktails and/or some from local sewage, and more quickly be able to draw conclusions as to how broadly the superspreader phenotype is spread and whether it is a potential problem in any of these cocktails as currently prepared in Russia and Georgia – a very important piece of information as work progresses toward phage therapy in this country and elsewhere.

Additional Information

Research will be conducted in collaboration with Evergreen's very long-standing Bacteriophage Lab, headed by Emeritus faculty member Betty Kutter, and will include personnel from each lab. We intend to have weekly meetings to discuss the progress and implications of the research and allow everyone to share their findings in a timely fashion. Please expect that this work will be very collaborative and engaging! In the following months, we will be continuing this important work in the phage lab, and these students will have opportunities then and on into the following summer, at the end of which we will be putting on our 23rd Evergreen International Phage Meeting; the one last summer drew 250 people from 41 countries.

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Project Number 7			
<i>Research Experience in Forest Ecosystems and Plant Community Ecology</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Dylan Fischer	fischerd@evergreen.edu	(360) 867-6509	2
Project Description			
<p>In this project, students will evaluate forest carbon flux and responses of forest understory plants to volcanic disturbance at high elevation old-growth forests.</p> <p>On the Evergreen State College campus forest, students will measure carbon flux in soils, adding to a decade-long data-set on forest soil carbon flux in the Evergreen Ecological Observation Network (EEON). We will match these data with detailed resurveying of vascular plants in the EEON plots. This work will require experience with taxonomy and use of dichotomous keys. The project will also require a willingness to learn how to use advanced equipment for measuring soil CO₂ flux. Students will also have the opportunity to participate in a long-term study of Douglas fir root growth in south-western Washington in collaboration with the U.S. forest service PNW research station.</p> <p>Students in this project will also work on a project at Mount St. Helens (WA) comparing recovery of vegetation in old growth forests versus clear cuts following the 1980 eruption. They will answer questions about how plants and soils have responded to volcanic debris over the past 30 years. This project will require extended field time away from the Evergreen campus, especially later in the season.</p> <p>Fellows should expect to work an average of 20-40 hours per week on the projects, with a schedule that includes intensive weeks where a large amount of time is required, followed by “down weeks” where research activities will not be scheduled. Faculty on this project will work side-by side with the student(s) on aspects of both of these projects, provide all training for the research projects, and will be meeting with the student(s) weekly to reevaluate project design and progress. Frequent meetings early in the season will be especially important as they will set up the research designs, schedules, and appropriate use and access to equipment.</p>			
General Expertise Required of Fellowship Applicants			
<p>Applicants should have some experience in both field and laboratory approaches to science, excellent note-taking skills, and training in upper division ecological science. This work will require experience with taxonomy and use of dichotomous keys. The project will also require a willingness to learn how to use sensitive scientific equipment. Students should have access to their own transportation or be comfortable driving large vans and trucks. Students should expect to camp during these field excursions, and be prepared for all weather conditions, mosquitoes, and work in both exposed high elevation sites and remote old-growth-sites.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Students will be responsible for weekly data collection, operation of scientific instrumentation, independent project management, data integrity, working in a group setting, following scientific protocols, and analyzing and writing up final project results associated with independent projects.</p>			
Anticipated Progress on Faculty Work			
<p>Students can expect to complete a full research project at either of the field sites mentioned above worthy of publication in a scientific journal. Regardless, they will gain experience in both ecosystems. Students will complete data analysis of initial research by September, 2018, and present data with the goal of completing a first draft of a scientific manuscript on their work by October, 2018. If only one fellow is chosen, the same opportunities will be available, but the student will complete an independent project at the site of their choice.</p>			

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Project Number 8			
<i>Mercury in your mouth: A sociological investigation of dental amalgam fillings and normative dentistry</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Shawn Hazboun	hazbouns@evergreen.edu	(360) 867-6084	1
Project Description			
<p>Mercury amalgam fillings (also known as “silver fillings”) have been used for decades in the United States to fill and cap dental cavities in adults and children. The use of mercury amalgam filling has been heavily debated amongst the global medical community for decades, and recent medical research has linked the use of amalgam fillings with kidney damage and a variety of neurological disorders. Mercury is additionally a known environmental toxin that persistently bioaccumulates at various trophic levels, and additions of mercury into the environment from disposal of used amalgam fillings is significant. Proposals to ban the use of mercury amalgam in dental fillings have emerged in recent years, most notably the 2013 Minamata Convention on Mercury, an international binding treaty agreement that contains a provision about the voluntary phase-down of dental amalgam. The World Health Organization has also called for a phase-down of mercury, and the European Union has issued a ban on amalgam fillings in children and pregnant or breastfeeding women. Despite numerous petitions to the U.S. Food and Drug Administration to ban amalgam fillings, the FDA in 2015 again classified amalgam as safe.</p> <p>While use of amalgam fillings remains common practice amongst American dentists, some voluntarily elect to provide alternative filling options or stop using mercury amalgam altogether. This research uses the tools and theory of sociology to analyze the knowledge, attitude, and practices related to use of mercury amalgam fillings amongst dentists in Washington State. While scholars of medical sociology have paid some attention to the sociology of dentistry, none to date have examined the issue of dental amalgam fillings in the context of professional dentistry. This research will draw conceptually from the sub-disciplines of medical and environmental sociology to understand the dynamics driving continued use of mercury amalgam in the U.S., despite the backdrop of international concern and debate.</p>			
General Expertise Required of Fellowship Applicants			
<p>Fellows should meet the following requirements:</p> <ul style="list-style-type: none"> ▪ Junior or senior student status (sophomores with an excellent application will be considered) ▪ Basic familiarity with the discipline of sociology (at least one Evergreen course or program with sociology credit equivalency) ▪ Willingness to learn to read peer-reviewed research from a variety of disciplines ▪ Clear and organized writing ability ▪ Intermediate or advanced typing ability (for transcribing interviews) ▪ Familiarity with Microsoft Excel 			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>This is an opportunity for a student to engage directly in sociological research with both qualitative and quantitative methodological approaches. The student will be considered a junior member of the research team and will have the opportunity to engage in research process decisionmaking, rather than simply filling a technician-type role. Furthermore, the student (if interested) will be invited to be a co-author in writing and submitting a manuscript to a scholarly journal.</p> <p>The chosen fellow will have five primary responsibilities, detailed below.</p> <ol style="list-style-type: none"> 1. Reviewing and organizing scholarly research in three areas (ongoing): 			

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- Professional dentistry practice related to dental amalgam use
- Public health outcomes of amalgam fillings (iatrogenic effects)
- Environmental impacts of amalgam disposal

2. Compiling dentist database for Thurston and Mason Counties (and possibly others).

3. Transcribing & qualitative coding of audio recordings of key informant interviews with local dentistry offices that offer alternatives to amalgam fillings (conducted by faculty member).

4. Constructing and administering a survey instrument to measure Washington State dentists' professional practices & perspectives related to the use of amalgam fillings.

5. Creation of policy database detailing governmental and non-governmental organization statements / positions on dental amalgam fillings at multiple geographic scales (World Health Organization, U.S. FDA, Moms Against Mercury, American Dental Association, etc).

Anticipated Progress on Faculty Work

Significant progress is anticipated on this faculty research project with the help of a student research fellow. This research is currently at the exploratory stage (as of Winter Quarter, 2018), but significant attention and time will be needed to advance the research, including conducting thorough literature reviews, compiling databases of dental offices and official policies and positions, transcribing and coding key informant interviews, and constructing and administering a survey instrument – all of which a student fellow would be engaged in.

By the end of the research fellowship, it is anticipated that the following tasks would be accomplished:

- Literature review
- Dentist database
- Policy database
- 5-10 key informant interviews transcribed and coded
- Survey instrument finalized
- Survey sample identified from dentist database
- Survey instrument mailed to sample

If interested, students will be invited to be involved in the survey analysis (once surveys are returned) and manuscript write-up in Fall and Winter 2018/2020.

Additional Information

The weekly research schedule is flexible, and students may work from whatever location they wish (including in the faculty's office when faculty is on campus), but they must be available for at least one 1-2 hour weekly check-in.

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Project Number 9			
<i>A critical examination of climate mitigation policy in the Global South, focused on biogas and forest-related projects in Nepal</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Shangrila Joshi	joshis@evergreen.edu	(360) 867-6505	3
Project Description			
<p>This research project seeks to examine how international climate mitigation policies are being employed in the Global South, and the ecological and social justice implications of these policies. Specifically, the policies that will be examined are the so-called Clean Development Mechanism (CDM), and Reducing Emissions from Deforestation and Forest Degradation (REDD+) in Nepal. Much critical research in political ecology and other academic fields has problematized the efficacy of these two climate solutions – increasingly characterized as neoliberal fixes with harmful implications for social and ecological wellbeing, but there remain critical gaps in the literature that this research project seeks to address. For CDM projects, much of the critical literature focuses on large-scale projects – it is not clear from the published literature if small-scale projects are deemed problematic as the others. My initial research on CDM- registered bio-gas projects in Nepal indicated certain limitations and benefits, and in this research project, my goal is to conduct a more thorough analysis of collected data to make a more conclusive analysis. For REDD+ projects, the critical literature points to land grabs and other forms of disenfranchisement that accompany these projects designed to mitigate climate change. What is largely absent in the published literature is whether REDD+ projects could possibly be conducted in socially just environments, such as in the context of community forestry in Nepal, where local forest user groups are empowered to have important roles in forest governance. My intention in this regard is to develop a better understanding of the landscape of REDD+ implementation in Nepal, and the ways in which this intersects with the lived experience of rural communities living near national parks and community forests. The overarching goal for this research project is to assess whether and to what extent the critique of these climate solutions are warranted.</p>			
General Expertise Required of Fellowship Applicants			
<p>The successful applicant may be a student at beginning, intermediate, or advanced stages of undergraduate study, but should have at least one term of academic work including qualitative research methods, and at least one term of academic work emphasizing social dimensions of environmental issues. Specific requirements include the experience of conducting primary research, including the analysis of qualitative data, and writing a research paper demonstrating strong analytical ability. Preferred knowledge, skills and abilities include familiarity with international climate policy or discourse, political ecology or political economy, sustainable development, and coding qualitative data using Atlas.ti. A desirable skill would be familiarity with the Nepali language (for the purposes of transcribing recorded interview data). Students should be prepared to articulate their experience in these areas in a written application, supported by a letter of recommendation from a faculty member who has supervised the research project that the student has experience with. A relevant program evaluation may take the place of the letter of recommendation.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Fellows chosen for this research project may have a subset of the following responsibilities:</p> <ul style="list-style-type: none"> ▪ Undertaking a coding workshop after reviewing assigned reading material. ▪ Undertaking an Atlas.ti familiarization workshop, and curiosity about further developing abilities in its various analytical tools ▪ Engaging in a rigorous transcribing process of recorded interview data (if Nepali language skills present) ▪ Engaging in a rigorous coding process of provided transcribed interview data or other textual data 			

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- Ensuring confidentiality of any personal information about research subjects that the fellow has access to
- Ensuring conscientious and ethical practices in the handling and protection of interview data fellow has access to

Fellows can expect to leave the project with the following knowledge and experience:

- A thorough understanding of climate mitigation in the context of carbon trading in a country in the Global South
- A thorough understanding of biogas/CDM and/or REDD+ projects in the Nepalese context
- Introduction to theoretical and conceptual frameworks in political ecology, climate justice, and sustainable development
- Experience analyzing qualitative data from interviews or texts using systematic coding procedures
- Experience using qualitative data analysis software Atlas.ti
- If a fellow distinguishes themselves with their analytical abilities, there is a possibility of joint authorship with faculty member in presenting at a conference and/or pursuing publication in a research journal

Anticipated Progress on Faculty Work

I anticipate being able to make relatively greater progress with any fellow support I get for 12 weeks of the summer, than I would working on my own. Anticipated project accomplishments based on the form of support received can be outlined tentatively as follows for three possible scenarios. For each of the scenarios, if one of the fellows has Nepali language skills, part of the work accomplished will include transcriptions of recorded interviews (approximately 60 hours). If such a fellow isn't available, I would accomplish the transcriptions myself or with hired help.

3 Fellows: Fellow 1 (CDM focus), Fellow 2 (REDD+ interviews focus) 3 (REDD+ documents focus):

- Preliminary coding/analysis of CDM interviews
- Preliminary coding/analysis of REDD+ interviews and textual documents
- First/partial drafts of papers on CDM and REDD+ written

2 Fellows: Fellow 1 (CDM focus), Fellow 2 (REDD+ documents focus):

- Preliminary coding/analysis of CDM interviews
- First/partial draft of paper on CDM written
- Preliminary coding/analysis of REDD+ textual documents

1 Fellow (CDM focus)

- Preliminary coding/analysis of CDM interviews
- First/partial draft of paper on CDM written

Additional Information

This is a research project that is part of a larger project that will culminate in a book publication, drawing on other research already completed and published (faculty member's dissertation research). Student work contributions will definitely be acknowledged in any such publication. In addition, if the student's analytical work is outstanding, it is possible that student and faculty seek to publish a co-authored research paper in a research journal, outside of the book project. There is also the possibility of co-presenting the research at an academic conference.

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Project Number 10			
<i>Organic Tomato Field Trial: Plant, Insect and Flavor Ecologies</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Angelos Katsanis	katsania@evergreen.edu	(360) 867-6633	2
Sarah Williams	williasa@evergreen.edu	(360) 867-6561	
Project Description			
<p>In this project, fellow(s) will first participate in a field study according to specifications from the Northern Organic Vegetable Improvement Collaborative (NOVIC) to address organic farmers' seed and plant breeding needs. Fellow(s) will gather data on approx. 11 tomato varieties (<i>Lycopersicon</i> spp.) concerning growth habits, plant leaf curl and cover, disease and insect pest infestations. In addition, data will be gathered on the maturity and grading of harvested fruit, picking eases and overall yield and harvest potential. NOVIC partners with more than 30 organic farmers throughout the country to breed and identify the best performing varieties for organic agriculture, and educate farmers on organic seed production and plant variety improvement.</p> <p>This field study will be a continuation from the successful field study conducted at the Organic Farm of The Evergreen State College in 2017, the results of which can be found at http://blogs.evergreen.edu/fieldstudy-patrick/. Alongside NOVIC's already established parameters, fellow(s) will gather data on pest reproductive rates following the methodology by Katsanis et al. (2016), and will also measure leaf toughness, and chlorophyll fluorescence in the leaves in order to determine the rate of photosynthesis. The fellow(s) will also have the opportunity to analyze the plant defensive compounds (i.e. alkaloids) by using Gas Chromatography-Mass Spectrometry (GC-MS).</p> <p>This project will help advance our understanding of an otherwise minimally studied field of multi-trophic interactions and the host plant toxicity that affects them. This project will become a capstone example of organic farming practices for the program that Dr. Katsanis will offer in the 1st summer session, 'Insect Ecology and Biological Control'. Simultaneously, the field trial as well as the harvested fruit from this project will be utilized by the Practice of Organic Farm Program (POF). Our participation in a national field trial will enhance POF's curriculum regarding market farming as well as Dr. Williams' introduction of tasting labs to POF. The tomato tasting labs will follow the sensory evaluation protocol developed by Lane Selman of Oregon State University for the Culinary Breeding Network, which unites plant breeders, growers, chefs, and eaters (see references below for more information about NOVIC and the CBN).</p>			
General Expertise Required of Fellowship Applicants			
<p>Potential fellow(s) should have upper division coursework in ecology and experience with ecological data collection (especially in the field) and data analysis. Proficiency with using an accurate balance and ability to handle live plants and insects, both in the lab and in the field, is required. Advanced instrumentation training including GC-MS is strongly preferred. Strong scientific writing skills, familiarity with statistics and data analysis would be helpful. However, faculty are willing to work with the potential fellow(s) to improve those skill sets. Students, interested in this project, are strongly advised to contact the faculty to discuss how their academic background and prior research experience can fit into the needs of the project. The project may require a commitment of 20-30 hours/week.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Fellow(s) will be first expected to set up the field experiment at the Organic Farm of The Evergreen State College. They will plant seeds and partially transfer seedlings to bigger pots. Students will have different duties as the season progresses. They will spend their work hours between the lab and the field, where they will collect data as mentioned in the description of this project. Students will gain experience in basic ecological research methodologies, ranging from data collection for all the measurements mentioned in the description</p>			

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above, to chemical analyses using GC-MS and scientific writing/data analysis. Part of student duties will be to maintain colonies of insect pests in the lab, which will be used for experimentation purposes. The fellow(s) should expect to spend approx. 5h/week maintaining those colonies. Fellow(s) will then spend 15 h/week monitoring the field experiment and documenting all necessary data. Fellow(s) will be expected to spend 3-4h/week studying relevant reading material, writing and analyzing gathered data. Student(s) should also anticipate some hours of training and work analyzing plant and insect samples using the GC-MS towards the end of the project. Faculty will provide training for all necessary procedures and will meet regularly with the fellow(s) to gather regular data reports and consult on data analysis and writing. Meetings early in the project will be necessary to lay out the research design, schedules, and proper use of lab and field equipment.

Anticipated Progress on Faculty Work

If one fellow is appointed for this project, it is expected that they would be able to plant seeds, transplant, collect data and fruit from 8 plants per variety of tomato tested (11 total). However, two fellows would allow for better management of duties in terms of preparing the plot, planting, monitoring, and sampling data. Two fellows would also allow greater flexibility to explore further questions on plant toxicity effects on predator performance and their defensive mechanisms. In summary, the project would greatly benefit from two set of eyes and hands while working in the lab and field to troubleshoot any issues that inevitably come up when conducting scientific experiments. If two fellows are selected, there would be a broader range of skills and experience to enhance the experimental parameters of the project.

Additional Information

The faculty recognizes issues of diversity and equity in sciences and therefore especially encourages applicants from under-represented groups including: women, racial/ethnic minorities and LGBTQA individuals. Of course, all eligible applicants will be considered and are welcome to apply. Given the anticipated length of the growing season, applicants will be encouraged to consider working with either or both faculty in some capacity during the spring and fall quarters, either through their programs, through the SOS: Food and Ag, or through an ILC.

Cited material:

Katsanis A, Rasmann S and Mooney KA (2016) Herbivore diet breadth and host plant defense mediate the tri-trophic effects of plant toxins on multiple coccinellid predators. PLoSOne, 11 (5), e0155716.

NOVIC <http://eorganic.info/novic/>

Culinary Breeding Network <http://www.culinarybreedingnetwork.com/>

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Project Number 11			
<i>Bush Homestead Archaeological Project: Final Field Excavation Season</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Ulrike Krotscheck	ulrikek@evergreen.edu	(360) 867-6017	3
Project Description			
<p>This SURF project would support an intensive and focused archaeological excavation to complete a project begun in 2015. Summer undergraduate research fellows would help write the excavation permit application to the state, finish the excavation of artifacts left in the ground at the end of the most recent excavation season, preserve and curate those artifacts, conduct non-invasive sub-surface survey to determine other possibly archaeologically sensitive areas on the site, and write and submit a report to the Washington Department of Archaeology and Historical Preservation (DAHP) on the findings.</p> <p>Evergreen's first archaeological field school (summer 2015/ 2016) took place at the site of the George and Isabelle Bush homestead, founded in the mid-19th century in what is now Tumwater, WA. The Bush family came with the Simmons wagon train, and were among the first non-native residents to settle permanently in the area. Their choice of the southern Puget Sound was dictated by the circumstance that George Bush, a Black man, could not settle in Oregon due to recently enacted "Lash Laws." This archaeological site is therefore enormously important for the history of our local community, in particular for the purpose of highlighting the history of diversity in our state and the role and importance of people of color.</p> <p>Results from previous Evergreen field schools yielded a large amount of archaeological remains from the mid-late 19th and early 20th century. These include metal, ceramic, and glass artifacts. At the end of the 2016 field school season, the team had discovered a deposit of burned material not far from our main area of excavation. Partial excavation of this deposit showed extremely sensitive and important archaeological remains, including carbonized paper (which almost never survives burial), some of which could be dated to the late 19th century. We were unable to excavate the full extent of this deposit at that time and seek to finish the project in 2018. In addition to the responsibilities outlined above, SURFs would also, if they choose to, have the opportunity to research, publish, and/or present at academic conferences data gathered from the farmstead, and/or to do community outreach and education.</p>			
General Expertise Required of Fellowship Applicants			
<p>This opportunity should attract students who are interested in history, archaeology, community work, museum studies, conservation, public archives or history, or anthropology.</p> <p>Essential skills:</p> <ol style="list-style-type: none"> 1) Archaeological field experience or formal coursework in archaeological field methods 2) The ability to work long hours outside in a variety of conditions 3) Strong writing and research skills 4) The ability to work collaboratively <p>Optional skills:</p> <ol style="list-style-type: none"> 1) Experience with GIS or other mapping applications 2) Experience with Excel and other data analysis 3) Experience in museums or artifact conservation 			

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It is further helpful if the SURF has or will acquire a college van license for transportation between the site and the lab.

Responsibilities of Fellows and Knowledge and Experience To Be Gained

SURF responsibilities are varied, and the knowledge gained within this fellowship will be valuable to any student who wishes to engage in public history, primary source research, advanced research, writing, and publication in history and archaeology, and possibly even (depending on the desire of the fellows) community outreach and education or presentation at professional conferences. In addition, any student considering graduate school in the social science or humanities would benefit from the skills acquired through this fellowship.

Fellows would help write the excavation permit application to the state, finish the excavation of artifacts left in the ground, map this excavation using GIS, preserve and curate artifacts, conduct non-invasive sub-surface survey to determine other possibly archaeologically sensitive areas on the site, and write and submit a report to the Washington Department of Archaeology and Historical Preservation (DAHP) on the findings.

In addition, SURFs would have the opportunity to research, publish, and/or present at academic conferences data gathered from the farmstead, and/or to do community outreach and education at schools and local historical societies, as well as libraries and other community venues.

Anticipated Progress on Faculty Work

With three fellows we would be able to accomplish all outlined above; with two fellows I expect to complete the excavation and the report, but not further survey of the site or comprehensive study and publication of the artifacts. I do not think this project is feasible with one fellow.

Additional Information

TESC has been involved in the Bush Homestead project since 2015. We need to complete the gathering of data before the site can be fully published. I would like for the study and publication of this site to be student-led, to give students opportunities for original research and publication that undergraduates at other institutions lack. My hope is to attract students who will take the lead on studying, presenting, and publishing the report on this unique and historically important site even beyond the term of the SURF (through ILCs).

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Project Number 12			
<i>Stream Ecology Research with Field Work at Mt St Helens</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Carri LeRoy	leroyc@evergreen.edu	(360) 867-5483	2
Project Description			
<p>This research experience will be focused on learning techniques used to understand the structure and functioning of stream and river ecosystems. Dr. LeRoy is a stream ecologist who has done research on streams, rivers, and lakes in WA, UT, AZ, CA, NV, and Siberia (http://academic.evergreen.edu/l/leroyc/). Her research mainly focuses on the interactions between streams and their landscapes, as well as the input of terrestrial carbon to headwater streams through leaf litter fall. Fellows involved in this summer research experience will have the opportunity to work with her surveying streams that were newly formed after the eruption of Mt St Helens, streams recovering from lahar flows on other volcanic mountains in the central and southern Cascade Mountains, and monitoring three watersheds on campus as part of the Evergreen Ecological Observation Network (EEON; http://blogs.evergreen.edu/eeon/). We have just over 1000 acres of forest on campus and there are both 44 long-term terrestrial and 9 stream monitoring sites.</p> <p>The SURF fellows will have opportunities to learn about experimental design, data collection and archiving, statistical analysis and scientific writing through bi-weekly workshops and interactions with other faculty members and other fellows. Fellows will have the opportunity to take the lead on one aspect of the research in the field and lab as an independent research project. Successful research projects may be written and/or presented to diverse audiences at conferences. Fellows will be expected to meet bi-weekly with other fellows doing field ecology research to discuss progress, challenges and present findings.</p>			
General Expertise Required of Fellowship Applicants			
Students should be at an intermediate or advanced level, having completed at least one year each of college biology and chemistry. Additional experience in field ecology and statistics is preferred, but not required.			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>The specific measurements for this project include: collecting algal samples, assessing algal production (chlorophyll-a analysis by spectroscopy), collecting and identifying aquatic macroinvertebrates, analysis of nutrients (nitrate and phosphate), dissolved oxygen (DO), dissolved organic matter, and alkalinity, riparian vegetation, and canopy cover, quantifying the amount of coarse and fine particulate organic matter, and determining the composition of this material (C:N ratios). Students will also measure basic hydrological variables in streams (slope, sinuosity, substrate type, depth, discharge).</p> <p>Fellows can expect to spend significant amounts of time in the field and the laboratory. Some of this time will be supervised and some will be independent. Fellows should be self-motivated, eager to learn and excited to participate in a variety of research projects.</p>			
Anticipated Progress on Faculty Work			
<p>Having student collaborators on these projects in the summer will be beneficial to the overall research project. We will be able to cover more ground in the field, carry more gear and samples, sample from more locations, and increase the number of measurements collected at each site. With two fellows we will have a full field crew (including myself and my major collaborator, Shannon Claeson with the US Forest Service). A full field crew will allow us to do the field work we have outlined for the upcoming summer. If we have one SURF fellow, we will be able to increase our capacity beyond just the two of us, but field work and collections will take longer. Laboratory work will be less efficient if there is only one fellow, but two fellows would be able to collaborate in the lab and get more lab work finished.</p>			

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Additional Information

This proposal is ideal for two students. Two students would allow them to work together in the field and follow our safety protocols. There is often more gear to carry than one person can carry alone, and many students feel more comfortable in the field when accompanied. I have found that having two students in the field allows more flexibility and is safer. In terms of our ability to complete field work, having two student fellows would significantly increase the pace of our work during intense field work at Mt St Helens. In addition, for quality control in the lab, it is often necessary for one student to check the other's work (in particular when sorting and identifying aquatic insects).

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Project Number 13

Sculptural Work in Stone: A New Multi-Part Outdoor Work and Other New Works

Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Robert T. Leverich	leverich@evergreen.edu	(360) 867-6760	2

Project Description

This project is a continuation of my ongoing sculptural work in stone. I've been working with stone for the past nine years, continuing to ground myself in the medium technically and conceptually, and exploring larger scaled, site-specific work in community contexts. With the help of two SURF recipients last summer, I was able to complete the bulk of the work on a large five-part granite piece for the grounds of Vashon Island High School, a commission from the Washington State Arts Commission, installed just after Christmas last year. With their assistance, I also completed a new two-part work and installed it and eight other stone works as part of a show at the Vashon Center for the Arts in July. This year, I'd like to make another I two-part outdoor work using stone remaining from the Vashon commission.* These stones are suited to further exploration of the horizontal, landscape-inspired themes that are part of the Vashon commission, as well as the multi-part work on the grounds of the Wilson Museum in Castine, Maine, completed when I took part in the Schoodic International Sculpture Symposium in 2014. Along with the large two-part work, I'd like to complete at least three other medium-scaled stone works to continue working with landscape themes, as well as other figurative and narrative themes that I've used elsewhere in my work and in proposals for other projects.

My work with found stone – boulders and talus (the geological term for rock that has broken from cliff faces and escarpments) – calls for a more intuitive and immediate process based on the stone choice (generally granite), the original shape of the block, and how that particular stone responds, or “moves” with hand and power tools. My outdoor, multi-part pieces present conceptual challenges of working with environments and communities. These works also provide technical challenges relating to scale, stone handling, carving, and finishing, as well as site design, logistics, and construction coordination. These conceptual, technical, and contextual challenges provide a unique opportunity for students interested in careers in the arts, sculpture in particular, to gain insight and hands-on experience in the design, coordination, and fabrication of such works, in both studio and public contexts.

I anticipate that we will once again take several field trips: to visit stone and tool suppliers, to meet other artists working with stone, and to collect stone from Pilchuck Creek and Skokomish River gravel bars. I also plan to take SURF other interested students to the annual Northwest Stone Sculptors Association Symposium near Belfair, Washington, and we will host Symposium attendees who want to visit Evergreen and our work site.

Mark Kormondy and Jeanne Rynne in Facilities have graciously afforded me outdoor space to work in the Facilities Yard – this is a convenient location for work with students. I envision offering each fellow the opportunity to make a stone work of his or her own, working outside the fellowship hours, to take advantage of the space and tools available (largely my own), to advance conceptual and technical skills, to broaden the dialogue, and to increase enthusiasm for all of us working on site.

Last summer was an intense and rewarding experience for all of us – myself, my two SURF students, and the five or six other Evergreen students who came to work or help out at different points during the project. We traveled to Seattle, visited suppliers, and met other stone sculptors there; we visited Vashon, the project site, and the Vashon Center for the Arts; we attended a day at the NWSSA Symposium meeting artists from across the country and Canada; we hosted four sculptors from Japan, and one from New Zealand, learning from all of them; and we toured our Japanese guests around Evergreen and the Indigenous Arts Gathering that was happening on campus last August. We shared a lot of meals, worked very hard and very well as a team, learned a lot, and produced a major public work! And we showed a lot of people, on campus and off, Evergreen, and

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Greeners, at their best! I'm very proud of and grateful to my SURF students and their peers and grateful for the support afforded to all of us. I believe it was a very worthwhile educational experience for them, and I hope to be able to repeat it with other students this summer.

*I've had an initial discussion with Amanda Walker about making a work that might serve as a centerpiece for the Evergreen Memorial Garden, and I plan to continue exploring that possibility.

General Expertise Required of Fellowship Applicants

Level of Study: Intermediate to Advanced

Prerequisite Coursework: The student should have the equivalent of at least one year of course work in 3D art forms (sculpture, metalworking, woodworking, ceramics, etc.) and previous course work in 2D drawing and design. Prior coursework in art history is desirable.

Skills and Abilities:

- Strong commitment to excellent workmanship
- Able to follow directions in detail
- Able to communicate ideas and information clearly and quickly through drawing
- Demonstrated eye/hand skills, i.e., visual problem solvers, attentive to detail and finish, skilled in hands-on work
- Experience with basic hand and power tools (wood and metals shops). Welding ability is desirable. Experience with stone hand and power tools is desirable, but not expected.
- Ability to effectively use a digital camera to document events, processes, and work. Ability to use a video camera also desirable.
- Ability to work effectively with Microsoft Office (Word, Excel, and PowerPoint)
- Driver's License
- Ability to communicate effectively with the public (Evergreen staff, individuals associated with projects and galleries, visitors, etc.)

Responsibilities of Fellows and Knowledge and Experience To Be Gained

- Fellows will be provided with and learn to use appropriate safety gear to protect eyes, ears, lungs, and hands. They will learn best practices to keep themselves and others safe while handling and working with stone.
- Fellows will gain an overview or conceptualizing works in stone, working in dialogue with the material and tools, responding to particular stones and particular sites, and addressing, communicating, and collaborating with others with vested interests in public sculptural works.
- Fellows will assist in the carving and shaping of stone using a variety of hand and power tools including: hammers and carbide-tipped hand chisels (point, flat, rondel, toothed, frosting, tracer, hand set, rocko, etc.), pneumatic hammers, angle grinders and stone saws with diamond blades, diamond chain saw, diamond cup wheels, carborundum wheels, etc.
- Fellows will assist in finishing and polishing of stone with hand polishing tools, and with pneumatic or electric-powered water polishers with diamond pads, gaining technical skills and insight into the choices inherent in finishing materials to signify intent and express meaning in the work.
- Fellows will learn and assist in use of safe and efficient methods to move stone using both hand tools and power equipment, and will observe and learn in the strapping, moving, transport, positioning, and installation of large stones.
- Fellows will observe and learn from the design and coordination challenges of engineering, site work and foundations, crane work and transport logistics, and installation of large multi-part stone works.

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- Fellows will learn and assist in documentation of the work, and in interfacing with the public (primarily visitors to the work site), Evergreen staff, various stone and equipment suppliers, and other artists.
- Fellows will learn more about stone and stone sources in the Pacific Northwest and the region's basic geology. They will also learn where and how to acquire tools and equipment for their own projects, and make connections with important resource individuals and organizations.
- As noted above, Fellows will be encouraged to each make a stone work of their own, to advance their technical and conceptual skills.

Anticipated Progress on Faculty Work

Based on my experience last summer, completing the large two-part piece and 2-3 medium scaled pieces is possible over the course of the summer, with two fellows. With one fellow, I'd anticipate completing less work, perhaps either the two-part piece or the 2-3 smaller works. In either case, I'd plan to do the work over summer quarter and the first two weeks of September. I found I had to coordinate around the Fellows' other summer plans last year; both attended had workshops to attend and family vacation plans. We were able to work out hours and schedules accordingly, so that each one more than fulfilled their time commitments to the Fellowship program.

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Project Number 14			
<i>Generational Immigration to the Pacific Northwest: A Case Study</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Maria Isabel Morales	moralema@evergreen.edu	(360) 867-5121	1
Project Description			
<p>The purpose of this research is to examine the migration story of a previously identified family in Wenatchee, WA in an effort to shed light on the experience of Mexican American immigration in Washington State. Using qualitative research methods such as interviews, this research will tell the story of three generations of farm working migrants in order to understand the: a) Socioeconomic motives for leaving their hometown in Michoacán, Mexico, b) various pull (political, familial, & economic) factors that brought them to Washington c) their experiences as (im)migrants in a time of heightened attention to immigration (e.g. anti-immigrant rhetoric). Moreover, in gathering these stories, we hope to give attention to the various social and economic contributions this family (of over 200 people) brings to the community in which they reside. The end goal will be to publish the research in both an academic journal as well as a community platform that is accessible to the family and community.</p>			
General Expertise Required of Fellowship Applicants			
<p>Student fellows should have understanding of qualitative research methods, particularly: preparing and conducting in-depth interviews, transcription, coding, and preliminary thematic analysis. Or an interest in developing these skills would be preferred. Students should also have an intermediate understanding of the research process and ethics involved in conducting research with human participants (i.e. ethics). Furthermore, students should have an interest in community-based research and the areas of: migration studies, Latinx Studies, ethnography, Cultural Studies, as well as narrative inquiry. The research conducted in the selected community will likely require extended field time away from the Evergreen campus. Especially in the middle to end of the season.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Students will support in the preparation of a literature review that examines the history of Mexican immigration to the Pacific Northwest. Students will collaborate in the data collection process (interviewing participants and coding). By the end of this project, students will have in depth understanding of conducting empirical research.</p>			
Anticipated Progress on Faculty Work			
<p>One fellow with fluent Spanish speaking skills would be ideal in this research. During the 12-week period, I expect that we will conduct a few interviews, transcribe, and being preliminary analysis of themes. This project, however, is but a case study that will be part of an on-going research.</p>			
Additional Information			
<p>The research requires the student fellow to speak, read, and write Spanish fluently.</p>			

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Project Number 15

CANCELLED

2018 Summer Undergraduate Research Fellowship (SURF) Program Proposed Faculty Projects

Project Number 16			
<i>Ethnographics: Visualizing Cultural Fieldwork</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Eric Stein Karen Gaul	steine@evergreen.edu gaulk@evergreen.edu	(360) 867-6434 (360) 867-6009	3
Project Description			
<p>Our project is to generate a creative, illustrated handbook to guide observational field research in anthropology, sociology, cultural studies, and related areas. The book, entitled <i>Ethnographics: Visualizing Social Fieldwork</i>, will serve as a guide for all levels of undergraduate field studies. The full project aims to incorporate SURF students in field exercise testing as well as illustration of the project. The project will also draw insights from a number of Evergreen faculty with experience guiding qualitative research projects, and will involve consulting with them.</p> <p>The text will be “visual” in its use of strategies inspired by new, creative works of “sequential art” (especially in the form of graphic novels) that allow for provocative ways of representing theory and social action. This approach follows anthropologist Michael Taussig’s call, from his recent book <i>I Swear I Saw This</i>, for the use of illustration in field notebooks as a way to render frames of perception that are beyond the grasp of language. Photography, which remains a staple of ethnographic texts but rarely receives methodological attention, will also figure into our visual approach, taking inspiration from Ovie Carter’s portraits in Mitchell Duneier’s <i>Sidewalk</i>. Other groundbreaking graphic works, such as Richard McGuire’s beautiful spatio-temporal commentary <i>Here</i>, Alison Bechdel’s psychoanalytic life history <i>Fun Home</i>, and Lynda Barry’s practice-centered guide <i>Syllabus</i>, provide models for the sort of creative work that we will feature. We anticipate including graphic representations of various “fieldwork stories” from student perspectives; drawn commentaries on ethics and representation; and visual depictions of specific fieldwork techniques. We have found these visual approaches to resonate with students and offer a lucid way to emphasize the critical, interpretive process of fieldwork.</p> <p>We will combine the visual work with text-based, sequential chapters that explore recent debates and best practices in qualitative field studies. Possible topical and imaginative areas to be included are: cultivating skills in the practice of multi-dimensional observation and documentation; interrogation of central concepts such as culture and ethnocentrism; crafting good research questions and building sound interview structures; considering the material dimensions of people’s lives; exploring the less tangible aspects of sound, smell and other aesthetic evocations; designing processes to facilitate community-driven research; social media as a highly relevant ethnographic field, and more.</p>			
General Expertise Required of Fellowship Applicants			
<p>We are seeking students working at the intermediate or advanced level ideally with experience successfully completing coursework in qualitative social sciences or cultural studies. Some knowledge of anthropology, sociology, cultural studies, philosophy is preferred. Although we are primarily interested in working with students skilled in illustration, we will also consider students skilled in printmaking, graphic design, photography, or related media translatable to a 2-D format.</p> <p>We will be working both collaboratively and independently throughout the summer. Students should have a high capacity for self-directed work and a commitment to meeting deadlines and expectations. Students will need to work successfully with a team of peers and faculty to coordinate activities, readings, and creative work. Students should be capable of both giving and receiving constructive critique on each aspect of the project. Students should have a willingness to undertake field studies—possibly overnight—in Seattle and/or Portland. Mature upper-level students capable of some social analysis and a willingness to dedicate quality effort to the project are preferred.</p>			

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Responsibilities of Fellows and Knowledge and Experience To Be Gained

We will meet with SURF students several times per week to generate ideas and materials for the project. We will hold a weekly, dedicated seminar to read ethnographies, social theory, and fieldwork guides. We will also engage in field research with our SURF students, carrying out the various ethnographic activities we plan to feature in our text—such as neighborhood studies, audio field recordings, and mapping— in the region. Finally, we will spend a substantial amount of time designing the illustrations and other creative work that provide the visual component of the text.

In addition to weekly seminars, fellows will meet with the faculty team each week (potentially 2-3 times a week) to advance the work on the project. Students will need to be in close contact with the faculty for some intensive work sessions. Meeting times will be used to consider how to best illustrate concepts, theories and practices.

Students will gain knowledge of social theory, ethnographic methods, and research ethics; build skills in illustration or other media; and develop experience in collaboration and project planning.

Anticipated Progress on Faculty Work

The summer of 2018 will be the first of two summers that we hope to work on the project with SURF students. In summer 2018, we plan to finalize chapter content and themes; test and document field exercises; and complete panels depicting ethnographic theory, field studies, and related visual elements. Our end-of-summer SURF presentation will highlight these illustrated panels, which we hope to incorporate into our final book project.

In our second summer working with SURF students, we will finalize the creative components of the text, completing the illustrated and photographic portions of the final work. Eric has applied for a sabbatical for winter/spring 2020; during that time we will complete the writing and revision of the narrative portions of the text and submit it for review to an editor. We anticipate having a final version ready for publication by the end of spring 2020.

With three students we will be able to make significant progress developing the graphic elements of the text and have the ability to experiment with multiple media and styles of representation. As we are still in an early, exploratory phase of the project, having this breadth will help us sketch out a more finalized project vision to pursue as we continue our work. Three students would allow rich critique sessions that incorporate a range of perspectives.

While working with two students would still move us toward each of the above goals, it would limit the breadth of the work, reduce the productivity of the creative output, reduce collaboration, and slow the progress of the project as a whole.

One student would eliminate the collaborative element between students and could potentially affect the project's planned schedule of completion, which has been structured into our sabbatical requests. However, it would still allow us to have dedicated time to progress forward on the long term project.

Additional Information

We are requesting three student fellows. Because we are working on a book length project that will incorporate an extensive amount of material created in different media and styles, having multiple students will contribute to the success of the project. As two faculty, we have the capacity to work closely with and supervise the work of three students.

The ultimate goal of this project is to produce a creative, unorthodox, and engaging book on field research that incorporates interdisciplinary insights into ethics, representation, knowledge, and collaboration. Student assistants will have the potential to be published illustrators/artists for a critically important project. This project aims to capture and feature some of the "best practices" of community field studies that we have

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developed for our students over the years, making it available to broader audiences, including educators, students, and community organizations. Karen and Eric have been planning for the work for the past two years, meeting on a weekly or bi-weekly basis to generate ideas and plan out the scope and timeline for the project. We're passionate about the work and seek to learn from each of our student fellows!

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Project Number 17			
<i>Decarceral Studies (with a special focus on the teaching & learning of critical & creative reading behind bars)</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Eirik Steinhoff	steinhoe@evergreen.edu	(360) 867-5368	3
Project Description			
<p>This multidisciplinary “Decarceral Studies” research project concerns liberal arts and liberation education in prison in collaboration with students and teachers behind bars.</p> <p>The project’s hypothesis comes from Victor Hugo: “[Anyone] who opens a school door closes a prison.”</p> <p>A recent RAND study shows that for every \$1 spent on education behind bars, \$4-5 are saved on future incarceration. Evidence from the Bard Prison Initiative (founded 2001, with some 400 graduates) suggests that an intensive liberal arts curriculum, in particular, leads to an astonishing reduction in recidivism (2% vs 20-40%); this comes as a consequence not of focusing on recidivism per se but rather on the life-changing power of the liberal arts. This project intends to build on these recent findings in collaboration with a student organization developed by the Black Prisoner Caucus called TEACH (which stands for “Taking Education and Creating History”), in order to discover the possibilities for combining TEACH’s liberation education praxis with key elements from Evergreen-style liberal arts (in-class writing, seminars, essays, etc.).</p> <p>The research involved includes the following elements:</p> <ul style="list-style-type: none"> ▪ teaching an intensive reading and writing workshop at the Washington Corrections Center (in Shelton) and at Stafford Creek (near Aberdeen) ▪ development of a signature liberal arts & liberation education curriculum for incarcerated students ▪ an inventory and analysis of current projects at the College (Gateways, SPP, ad hoc faculty projects) ▪ research on similar prison education projects at other institutions (FEPPS, BPI, CLAP, PUP, P2CP, etc.) ▪ research on the kinds of infrastructure required for the sustainability of such projects ▪ development of PR materials ▪ research into potential funding sources (perhaps in collaboration with the Grants office) ▪ research into current DOC and JJRA policies ▪ research into the past, present, & future of hyperincarceration ▪ • site visits to prisons in the South Sound region 			
General Expertise Required of Fellowship Applicants			
<p>This Fellowship is ideal for intermediate and advanced students with strong backgrounds in critical and creative reading and writing.</p> <p>A general understanding of the premises of a liberal arts education, on the one hand, and a familiarity with the liberation education models of Paulo Freire, et al, on the other is desired but not required; same for familiarity with the issues related to hyperincarceration: but a willingness and an ability to get up to speed on these areas of study is a must. (Relevant reading will be supplied.)</p> <p>Strong interest in writing pedagogy is especially valued. Knowledge of design (online and off) is a plus.</p> <p>Ideal candidates will be autonomous learners capable of collaboration, improvisation, and imagination. Although Fellows will not be required to participate in all elements of the research, the expectation is that they be willing and able to pursue more than one thing closely related to the research agenda outlined above. This</p>			

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means the ideal candidates will demonstrate the abilities both (a) to compartmentalize and focus on the tasks at hand as well as (b) to synthesize and invent new questions for us to pursue.

Annotated bibliographies, synthesis essays, and research reports (with charts and diagrams) will be a primary means through which this research is conducted, with seminars as a primary mode of metabolization. Our findings will become part of an emerging adult prison education program at the College.

Responsibilities of Fellows and Knowledge and Experience To Be Gained

Fellows will be responsible for developing a research program in close collaboration with the faculty sponsor. Ideal research itineraries will build on the Fellow's strengths while also venturing into new territory. Fellows will be responsible for presenting their findings in seminar-settings with each other and with the faculty sponsor.

Hyperincarceration is a crisis that requires interdisciplinary analysis and solutions. This collaborative scholarly work needs to happen both on campus and behind bars -- and beyond bars and campus in the world-at-large. In other words, Fellows will gain both knowledge and experience in translating theory into practice as well as in theorizing about our practice.

Disciplines involved in this research include (but are not limited to): the scholarship of teaching and learning (SOTL); sociology; composition studies; poetics; political economy; public policy; statistics; history.

Anticipated Progress on Faculty Work

This research will be as intensive and comprehensive as possible.

With 1 Fellow the research will begin to inform (a) the faculty sponsor's contributions to the Prison to College Pathway Initiative (PCPI), & (b) his teaching in Shelton and Stafford Creek this summer (where he will be leading critical and creative writing workshops)

With 2-3 Fellows the research will more dynamically inform (a) + (b), while also (c) contributing to the Gateways program for 2018-19 (which the faculty sponsor will be teaching), as well as (d) more deeply to a culture of Decarceral Studies at the College

Additional Information

The faculty sponsor is part of a staff and faculty team at Evergreen initiating a Prison to College Pathway that builds on the signature programs of Gateways for Incarcerated Youth and the Sustainability in Prisons Project, as well as a variety of individual projects that have been undertaken by individual faculty over the years, often in collaboration with other prison education initiatives.

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Project Number 18			
<i>Summer Research in Field Ornithology</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Alison Styring	styringa@evergreen.edu	(360) 867-6837	1
Project Description			
<p>I am looking 1 qualified student to work on the following summer research projects.</p> <p>Monitoring Avian Productivity and Survivorship (MAPS): In collaboration with the Center for Natural Lands Management (CNLM), the ornithology lab has established a MAPS station at Glacial Heritage Preserve: a remnant native prairie site 23 miles south of campus. MAPS is a network bird banding stations across North America that collect standardized data on key indicators of avian health and survival. I am looking for students to participate in station activities and collect the fifth season of data. Work will include conducting habitat assessments; setting mist-nets; banding birds; collecting information on body condition, sex, breeding status, molt, and age; entering data into spreadsheets/databases; running analyses; and preparing/submitting reports to the Institute for Bird Populations and state/federal wildlife agencies.</p> <p>Breeding biology of the Pacific Wren: The ornithology lab is studying the breeding biology of Pacific Wrens in the campus forest. We are looking to better understand ecological processes that influence territory size, mating strategy, and reproductive success in this species.</p> <p>Bioacoustic research and monitoring of birds in the Evergreen Forest: The ornithology lab is working on a project aimed at determining bird locations and behaviors using microphone arrays and handheld recorders. This project will focus on monitoring long-term population trends of breeding birds in the campus forest and also determining locations of birds in the campus forest and assessing detection differences between canopy-based and ground-based surveys. Work involves navigating to 44 long-term monitoring stations and taking acoustic recordings, setting up arrays, testing efficacy, downloading, analyzing, and archiving recordings, entering location estimates and relevant habitat information into spreadsheets/databases.</p>			
General Expertise Required of Fellowship Applicants			
<p>Applicants must have completed at least two quarters of college-level biology and at least one quarter of college-level math. Desired qualifications: experience/training in MAPS protocol (including mist net deployment, bird banding, and related data collection), proficiency with field recording, and prior coursework in data analysis (upper division statistics).</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Successful applicants will be expected to work on all projects and must commit to conducting field work from 4:45 am to as late as 4 pm on field days. The faculty will work with students in the field and lab during the first weeks of the projects and will meet regularly throughout summer. Field work includes hiking in uneven terrain using map and compass, identification of bird species by sound and sight, observation of behavior, tracking in roadless areas and maintenance/basic repair of field gear. In addition, students must scan and enter (in excel) all field observations within 24 hours of each field outing. A final research poster focused on one or more of the labs projects is should be completed by the end of the fellowship and should include a comprehensive literature review of the topic, description of field and analytical research methods, a results section clearly presenting quantitative analysis and visual representation of the analysis and a discussion of the broader meaning of the</p>			

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project. Successful completion of coursework in field research, scientific writing, and statistical analysis will be beneficial to the applicant.

Anticipated Progress on Faculty Work

This work will allow several of my ongoing local research projects to continue. These projects are starting to truly represent a long-term scale and the value of continued research on the projects increases each year.

Additional Information

Interested students should contact Alison Styring (styringa@evergreen.edu) for more information on the projects, qualifications, and expectations.

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Project Number 19			
<i>Ecophysiology and Functional Diversity of Ctenophores</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Erik V. Thuesen	thuesene@evergreen.edu	(360) 867-6584	2
Project Description			
<p>Ctenophores, also known as comb jellies, are marine predators found in all oceans, inhabiting both deep and shallow seas. Although fragile and difficult to study, they are biologically important, in part because they appear to have been the first group of animals to split off from all other organisms during evolution, even before sponges and jellyfish. Over evolutionary time, many marine organisms have transitioned their home ranges to and from the deep sea despite the tremendous differences between these two habitats, including light, temperature, and hydrostatic pressure. Such habitat shifts required significant genetic and physiological changes to these animal lineages over time. The relationships between comb jelly species indicate that species from a variety of different families have evolved to live and thrive in the deep sea. This project compares closely related deep and shallow species at biochemical, physiological and genetic levels to understand how these transitions came about. The main objective for this SURF project is to investigate adaptations of ctenophore enzymes to high hydrostatic pressures in the deep sea to confirm theory-based predictions of how gene sequence affects the properties of enzymes. Other possible projects include collaborating in a survey of the enzymatic activities across the phylum Ctenophora and investigating the role of creatine kinase in the performance of ctenophore cilia.</p>			
General Expertise Required of Fellowship Applicants			
<p>Coursework and lab experience in chemistry and biology equivalent to a year of INS is necessary. Further knowledge, lab experience and interests in biochemistry, molecular biology and evolutionary biology is preferred. Experience with marine biology and/or zoology is beneficial.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Students will carry out biochemical assays of ctenophore enzymes at different hydrostatic pressures. We will be working with enzymes extracted from shallow and deep-sea species as well as cloned enzymes generated from orthologous genes.</p>			
Anticipated Progress on Faculty Work			
<p>This project is taking place during the third year of my 5-year NSF project (http://deepc.org). This coming summer, we are continuing our work with cloned enzymes under pressure. We are analyzing several enzymes of numerous species, and students will work with different enzymes/species to accomplish the goals of the NSF grant. MES students in my lab will also be working with the SURF students, and I expect to also have a high school teacher funded through the Murdock Trust "Partners in Science" program. There are enough parts of this project that I can use a two SURF students. However, even one student will have fellow collaborators in the lab. I would likely have a second SURF student focus on examining CK in ctenophores using cilia preps in vitro.</p>			
Additional Information			
<p>We are conducting the comparative biochemistry component of the project described in this article: http://www.biochemist.org/bio/03906/0026/039060026.pdf.</p>			

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Project Number 20			
<i>Documentary Film as an Exploration of Social and Environmental Justice, Resilience and Legacy</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Suree Towfighnia	towfighs@evergreen.edu	(360) 867-5878	3
Project Description			
<p>In this project, fellow(s) will support a variety of tasks in areas related to documentary/film research, development, producing, post-production and outreach for ongoing faculty projects. As a documentary filmmaker, there are many ongoing projects to continue work on this summer, including two opportunities on non-fiction films and one on a book exploring film language. Undergraduate fellows will be highly involved, working under the direction of the faculty to accomplish specific tasks (that are developed with the fellow) over the course of the summer. Fellowship opportunities are centered in contemporary explorations of social and environmental justice, indigenous sovereignty, human rights, media representation, women’s history, and/or documentary language. The fellow(s) will be expected to meet with the faculty to develop a plan and schedule, and then will work in a self-directed environment with weekly phone/online check-ins and three additional on or off campus meetings (in my office/studio). These fellowships provide experience for students interested in working on professional projects related to film and non-fiction projects. The fellow can have an active role in creating a practical fellowship that not only supports our project needs, but also the fellows desired learning interest.</p>			
General Expertise Required of Fellowship Applicants			
<p>Students should have experience in media and an understanding of key ethical and practical considerations in non-fiction film theory, history or practice. This opportunity is best suited for advanced students who are comfortable in interdisciplinary research, writing and critical thinking. It is important that fellows can follow through on a task to completion. The fellowship is ideal for students working in upper division programs or fieldwork, and can support professional development for those looking to gain practical experience supporting entry-level professional work in a field related to media/film production.</p> <p>Specific Skills, Interests and Abilities:</p> <ul style="list-style-type: none"> ▪ Strong interest in social and environmental justice and documentary films that work in parallel with movements ▪ Ability to follow detailed directions, and complete specific tasks, while working independently ▪ Advanced research skills (primary and academic sources, film history/texts, media archive) ▪ Solid communications skills ▪ Interest or experience in post-production file and project management, researching/downloading archive, assembly and trailer editing ▪ Interest in fundraising and grant writing ▪ Access to a computer and internet and ability to use Microsoft Office and or Premiere ▪ Social media and outreach on ongoing projects ▪ Fellows may have opportunity to support field productions at their own expense <p>Interested fellows are strongly encouraged to contact the faculty directly to discuss the projects and how their academic backgrounds and interests can fit within the fellowship possibilities.</p> <p>If you have taken Mediaworks, Non-fiction Media or an equivalent rigorous media or research program, this should appeal to you.</p>			

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Responsibilities of Fellows and Knowledge and Experience To Be Gained

Fellows can expect to be involved in a variety of tasks related to Associate Producing, Assistant Editing, and possibly Production. Specific research will be developed with fellows, but may include:

- Associate Producing (research and development on new and current films, historical research on documentary movements and language, working on outreach and engagement projects around already completed films, grant and fundraising research and writing);
- Assistant Editing (transcription and footage logging, organizing archive and media, assembling footage in Premiere, researching and acquiring archive, working on a new trailer);
- Production (sound and camera recording on locations related to new and on-going productions).

Anticipated Progress on Faculty Work

My projects are ongoing and require dedicated fellows who are skilled at collaborating. With three fellows, we can accomplish all of the following, which is divided per fellow. Depending on how many fellows are interested and/or selected, the specific projects and roles might become more defined or blend more.

- A fellow will work on the documentary short Standing Silent Nation, which is a follow up to a PBS television feature that aired on POV in 2007. A decade later, we are making an update on the story a Native American family who was at the forefront of the hemp movement, yet has been sidelined due to federal and treaty regulations that limit their sovereignty and ability to make a living growing hemp. Last year, was the first year since 2002, that the White Plumes grew hemp. We documented some footage, but need to continue working on the project, which is scheduled for completion late fall of 2018. This update will chronicle what has happened in the past ten years, as this new chapter unfolds. Fellows will help edit some scenes, gather additional footage and construct a revamp on our online and social media presence that will support screenings and outreach planned for next year.
- 2 fellows would support the above work and continued work on a new feature/multi-part documentary I am currently developing. Which project the fellow works on is slightly dependent on their experience and background given the subject matter, which range from: a documentary centered around key historical and contemporary women in social movements in Mexico, Poland and Iran; a documentary feature about the role, impact and legacy of a journalist whose life was taken and who subsequently became used a mascot for the continued warmongering in the Middle East; or a documentary about the impact of pesticides on children of coastal farm workers who are from central and southern Mexico. All three of these new films are in development. Fellows would be involved in researching, producing tasks, archival gathering and potentially some filming and editing.
- 3 fellows would support the above work and development on a new book that explores a more zen approach in film terminology and practice. This project is in the preliminary stage and a junior fellow should expect to be highly involved in researching historical texts, scripts, and films, as well as interviewing film historians and contemporary filmmakers.

Additional Information

This SURF opportunity is designed for students who are interested in honing fundamental skills essential to non-fiction film making or writing. Students who have a positive attitude and are able to be self-driven will enjoy this opportunity. This fellowship is for those seriously interested in gaining experience in film, media arts, community work, grassroots movements, indigenous studies, communication, or other related fields. Interested students are invited to contact me for more information or links to projects.

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Project Number 21			
<i>Research in Cybersecurity: Creating Cybersecurity Games in EDURange</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Richard Weiss	weissr@evergreen.edu	(360) 867-6871	2
Project Description			
<p>The EDURange project was begun in 2012 to provide a framework for creating hands-on cybersecurity exercises (games). Games are an effective tool for active learning. EDURange uses Cloud technology, which makes it widely accessible and flexible for students and faculty. The exercises have all been written by students from Evergreen and Lewis and Clark College. For research projects, students would be working with EDURange to answer important pedagogical questions.</p> <p>One of the goals of the summer research is enhance existing exercises and develop new ones that teach introductory and advanced concepts in cybersecurity, most significantly the security mindset. Having the security mindset implies that one can understand a system both from the standpoint of a builder and an attacker. Thus, the security mindset provides the conceptual underpinnings for a student to reason in both defensive and offensive situations. In addition, the exercises must be scaffolded and multi-level so that students with a range of backgrounds will be able to make progress and learn from them.</p> <p>Another important goal of the project is providing tools for faculty to better help students. Cybersecurity is a vast subject and brings together knowledge from many different areas of computer science. Students often have gaps in their knowledge and may get stuck when solving complex problems. It can be helpful for faculty to provide guidance at those times. The EDURange project has started to develop tools for real-time assessment of student progress through an exercise. These currently include visualizations of a student's activities, and they rely on the instructor's knowledge of the solutions to an exercise in order to see when a student could use help. Future research will include machine learning techniques in order to alert the instructor. Students working on this project will use existing machine learning tools and apply them to this new problem.</p>			
General Expertise Required of Fellowship Applicants			
<p>Students who apply should have good programming skills and some understanding of computer networking, security, and machine learning or data mining. The level of study is intermediate to advanced. Students will study advanced techniques in security, including intrusion detection and prevention, and data loss prevention. Good mathematical skills will be an advantage. Evidence for this expertise could be successful completion of programs Student Originated Software or Computability and Language Theory.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>Students will be working with a large code base to add new exercises and improve existing ones. They will learn good software engineering practices and test-driven development.</p> <p>Students will be developing scaffolded exercises (games) that are intuitive and easy-to-use.</p> <p>Students will be collecting data and applying machine learning algorithms to detect incorrect solution paths.</p>			
Anticipated Progress on Faculty Work			
<p>For one student, we would be able to create one new exercise or extend one existing exercise and start to apply machine learning. With two students, we would be able to work on multiple exercises and make more progress on applying machine learning. With two students, we have a very good chance of having enough data for a publication at the the Northwest Consortium for Computing in Small Colleges (CCSC)</p>			

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Project Number 22			
<i>Caucusing as a pedagogical tool</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Elizabeth Williamson	williams@evergreen.edu	(360) 867-6015	1
Project Description			
<p>Caucusing has been used within activist circles for many years, and has more recently been adopted as a tool for supporting student learning. Several Evergreen faculty—myself included—have incorporated caucusing into our teaching with strong results. But there is relatively little scholarly literature on the use of caucusing, and even fewer internet resources for those interested in bringing this practice into their classrooms.</p> <p>Together with a colleague from the University of New Mexico, I am currently pursuing research for an article on the use of caucusing in writing-intensive literature classes. Both of us are passionately interested in making literary study more relevant to diverse groups of students, while making room for students to connect with others who share the life experiences that inform their understanding of the texts. We are particularly interested in how we, as white faculty, can better support students from a variety of racial and ethnic backgrounds. We are planning to coordinate our teaching in the fall and winter so that we can use some of the same activities and assessment methods, and thus develop a more robust understanding of how well caucusing works for different groups of students at two very different institutions.</p> <p>For obvious reasons, having a student play a prominent role in designing and implementing this research would be invaluable.</p>			
General Expertise Required of Fellowship Applicants			
<p>Successful collaboration on this project would require:</p> <ul style="list-style-type: none"> ▪ A strong academic background in cultural studies, including critical race theory (more than one course or program) ▪ A strong understanding of the cultural wealth traditionally underserved students bring with them to the college classroom (from personal experience or academic study) ▪ A strong interest in teaching and an equally strong understanding of the politics of education in the 21st century (which might include demonstrating a pattern of leadership in Evergreen courses and programs) ▪ Other desired (but not required) characteristics: <ul style="list-style-type: none"> ▪ Interest in pursuing advanced study in literature and/or writing ▪ Familiarity with Evergreen students as a larger community—both their strengths and the challenges they face in pursuing higher education 			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>The student collaborator participating in this project would have three primary tasks:</p> <ol style="list-style-type: none"> 1) to help us continue our review of existing publications on this topic; 2) to help us refine the pedagogical tools and assessments we will use in the fall and winter quarters; 3) to help us explore opportunities for presenting and ultimately publishing our findings. <p>These tasks would allow the student to practice research skills and academic citation, become familiar with curriculum planning and the Human Subjects Review process, and learn about the process of preparing materials for presentation (at academic conferences) and publication (in peer reviewed journals).</p>			

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The student would be welcome to continue with the project as a TA during the academic year, and would be invited to pursue other related tasks as we move toward publication, depending on their personal skills and expertise.

Anticipated Progress on Faculty Work

Having a student collaborator support our work for 20 hours/week during the summer would allow us to:

- Create a full annotated bibliography and an online archive of resources
- Reach out to other scholars who have published on the topic
- Fully develop our proposed learning activities and assessments for the fall and winter quarters
- Complete all required HSR paperwork related to those assessments
- Develop a plan for writing up our findings in Spring/Summer 2019
- Research various opportunities for presenting and publishing our findings

Additional Information

Who am I? My Ph.D. is in English literature, and I have been teaching at Evergreen since 2005. I had the honor of working with two SURF fellows in the Summer of 2014.

What is caucusing? In this context, caucusing is the practice of temporarily dividing a group of students based on an identity they hold (which could be race, gender, class, religion, or any other identity), so that they can do particular kinds of work with each other before coming back together as a whole group. Caucusing often works best as an activity that happens regularly throughout the quarter.

For instance, when I taught a program called "Prison Writing" in the Spring of 2016, more than half of the participants were students of color with an extensive understanding of the effects of mass incarceration on their communities. Caucusing allowed those students to have a conversation that acknowledged and built on that deep expertise, while allowing me to support white students around what it meant to be respectful co-learners.

I believe identity is self-determined, and always encourage students to choose the group they feel fits them best, depending on the context and their comfort level. No identity exists in a binary, and if there are enough students to support a multiracial caucus, for example, this can be an important addition to "white" and "POC" groups.

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Project Number 23			
<i>Neoliberalism in the Neighborhood: Olympia, Tacoma, Seattle & Portland - A Place-Based Political Economy of Our Times</i>			
Faculty Project Leader(s)	Email	Campus phone	Number of Positions Requested
Anthony Zaragoza	zaragozt@evergreen.edu	(253) 680-3055	3
Project Description			
<p>Since the early 1970s, the U.S. (like countries around the world) has experienced a process of economic restructuring, based in expanded corporate free trade, and resulting in deindustrialization across the country, financialization of the economy, and the development of global economic governance structures such as free trade agreements and international bodies, which enable the unrestricted movement of commodities. This has led to a massive growth in inequality. The term "neoliberalism" is used to describe the package of economic policies, political priorities and ideological justifications that create and enable these changes. Though regional implementation varies, the package of policies usually includes de/reregulation, tax cuts/austerity, privatization, and market rule, and is accompanied by political policies that handle the resulting economic polarization, labor precariousness, and instability through the growth of a law-and-order state anchored in increasingly militarized policing, mass incarceration, and further military expansion. Ideologically, there is a dominant tendency to undermine civil society, collective action, and public governance, while fostering personal responsibility, punitive culture, glorification of wealth and fame, and the amplification and harnessing of fear. This restructuring redistributes wealth upwards while lowering wages, cutting the safety net, and redesigning public institutions to facilitate profitability; the negative impacts disproportionately hit women, people of color and poor and working-class people. "Neoliberalism in the Neighborhood" research examines the political economy of the world around us from a variety of angles, helps to expand and deepen our understanding of the policies and priorities shaping it as well as the capacities necessary to develop an alternative political economy. We will gather traces of various local manifestations of neoliberalism, especially in Olympia, Tacoma, Seattle, and Portland.</p>			
General Expertise Required of Fellowship Applicants			
<p>Fellows will need to have a working understanding of neoliberalism and political economy, as well as research experience and skills necessary to find information relevant to the project. Also, intimately connected with this research is a Prezi (an online space curating the findings). It's a key tool for composition and to share the project in a visual, textual, etc. way. Influenced by the work of Sebastiao Salgado, an economist turned photographer, the project seeks to concretely show neoliberalism in the neighborhood. Salgado found that what was happening in the global economy could not be adequately captured by numbers alone; so, he became a photographer to show the changing world economy. The NeoHood Prezi uses photos, graphs, text, relationships, timelines, etc. to show how neoliberalism operates and its human and environmental impacts. Fellows will help add local case studies to the 4-part NeoHood Prezi. I will need political economy detectives who will find photography, quantitative data analyses, journal database articles, archival materials, among others of their own invention. I need people who are willing to develop creative research methodologies, build the prezis (or other online digital tools), and design the interface and teaching tools.</p>			
Responsibilities of Fellows and Knowledge and Experience To Be Gained			
<p>The changes from neoliberalism are noticeable in how the structure of things around us changes, and we can research these changes right in local cities, towns and neighborhoods. It is important to document these changes and collect data up-close. This work is extremely valuable to an overall understanding of neoliberal capitalism as well as more in-depth knowledge of its impacts on specific places. Research fellows will assist with in-depth research in Olympia, Tacoma, Seattle and Portland to continue to deepen this project and connect it to communities here. This research would involve digging for the fundamental economic, political, social, and cultural changes since the early 1970s. Key activities would be: visiting local archives; capturing neoliberalism in</p>			

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photos; interviewing organizers and service providers, business leaders, educators, and public officials; exploring city council records, newspapers, laws, charitable organizations, and demographic changes; examining aerial photos from the last 40 years to compare with current satellite maps. Such research time would provide the opportunity to begin to gather key information and continue to innovate research methods around this project. Research fellows will also improve their ability to read their surroundings and understand the historical forces that have contributed to shaping them.

Anticipated Progress on Faculty Work

Having three fellows would be ideal, and it would be preferable for them to come from or live in the localities under investigation. First, it would make a good research team of four, including me that would allow us to have good conversations about these topics, brainstorm methodologies together, and share findings and resources. Second, with three fellows, I would be able to finish a draft of the prezi textbook and add at least three of the four local case studies.

Having two fellows would mean less progress on the Prezi and covering only two of the four sites.

And one fellow would mean one site and minimal development of the Prezi.

Additional Information

There is a real possibility that some of this work will get published and at the very least I will present it at conferences and fellows will be invited to join me.