

## Summer Undergraduate Research Fellowship Program 2015 Projects

Project Title: Biogeochemical Cycling in Pacific Northwest Forest Systems		
Faculty member(s)	Email	Campus phone
Abir Biswas	biswasa@evergreen.edu	360-867-6433
<p><b>Project Description:</b> In this project, student(s) will contribute to research investigating trace metal (particularly mercury) and nutrient cycling, and soil formation processes, in lowland and higher elevation forest ecosystems in the Pacific Northwest. This research will include sampling in forests in the Evergreen Ecological Observation Network (EEON) and in long-term forest monitoring plots at Mt St Helens, as well as sample processing and chemical analysis in the laboratory.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> Potential researchers should have lab or field experience (hopefully both), strong skills in scientific writing and working with primary literature, and be able to commit 20-40 hours/week to this project.</p> <p>Analytical experience, particularly a driver's license to use the ICP-MS, is preferred though experience using other analytical instruments or SEM could also be relevant. Student(s), who are interested in developing biogeochemical sampling and analysis skills over this summer (and hopefully into the future), could also develop laboratory skills while focusing on studies of mercury (a bio-accumulating toxin), to quantify its distribution in different ecosystem compartments in these regions, toward studies assessing its potential for uptake into local food webs.</p> <p>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><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> Student(s) will have a responsibility in conducting fieldwork to collect soils and could contribute to identification of forest plant communities (though plant identification skills are not required). The student(s) would process soils collected during this and the previous field season (cutting soil cores into increments, sieving, homogenizing) to prepare them for analysis of mercury, carbon, and metals/nutrients. These components of the project will help students develop field-sampling skills and they will learn standard sample preparation techniques in biogeochemical studies.</p> <p>Ideally the student would join the project with analytical experience, preferably with a driver's license to use the ICP-MS or with experience in mercury analysis, in which case the student would analyze samples for mercury and/or metal content. Students with less analytical experience would have the possibility of learning analytical techniques and could work toward a earning a driver's license for the ICP-MS.</p>		
<p><b>Number of Fellows the Project Can Accommodate:</b> 1-2. This is a long-term project with sampling planned in forest ecosystems at Mt St. Helens and in the Evergreen Ecological Observation Network (EEON). The additional fellow would allow the project to conduct additional field sampling, particularly at Mt St. Helens, and will allow the research group to analyze samples in a timelier manner as we work toward submitting this research to peer-reviewed journal.</p>		
<p><b>Additional Information (if provided):</b></p>		

## Summer Undergraduate Research Fellowship Program 2015 Projects

Project Title: Archaeological Field Supervisors and Researchers for the Preliminary Archaeological Excavation at the Bush Farm in Tumwater: Rediscovering Washington State's Original Homesteaders		
Faculty member(s)	Email	Campus phone
Ulrike Krotscheck	<a href="mailto:ulrikek@evergreen.edu">ulrikek@evergreen.edu</a>	X6017
<p><b>Project Description:</b> Aided by a Faculty Foundation Grant, I am launching an archaeological field school at the site of the first local homestead, owned by George Bush. This project will be part of the summer curriculum. We have been given lab and storage space at Evergreen in which to conduct our post-fieldwork study of the artifacts. Associated with this project will be a number of unprecedented opportunities for undergraduate research in local history and archaeology. The student fellows would help with the setup and organization of the field school and be responsible for at least the completion of one published field report and one conference talk. Pending finds, however, more opportunities for research and publication may become available. My goal is to train one or two student fellows in all aspects of running an archaeological field school, including the publications resulting from the finds and the conservation and display of any artifacts.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> The fellows should have college-level experience in history or anthropology and should be able to demonstrate solid academic writing and research skills. GIS and mapping experience is preferred but not required. More important for the applicants than formal academic training is the ability to handle a large amount of responsibility independently and to be curious about local history and community outreach.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> The fellows will be expected to prepare the field school with the faculty member in the first summer session. This consists of setting up a finds database, mapping out the site, and assembling all equipment. In the second session, they will assist with excavation, processing, and documentation of any finds. Finally, they will help prepare the excavation report and a conference paper. Depending on the results of the excavations, this project may well result in a number of independent research projects and a continuation of the field school in summer of 2016. This opportunity will work best for students who are interested in pursuing a career in anthropology, history, museum studies, or Pacific Northwest studies, and who are looking for opportunities to publish co-authored papers about our local history, as well as present independent research at one or more academic conferences in 2016. The experience the fellows will gain includes, but is not limited to: independent research project design and implementation; field supervision; conservation and documentation of finds; publication of finds; conference paper presentation and submission; and possible independent subsequent research projects.</p>		
<p><b>Number of Fellows the Project Can Accommodate:</b> This project could accommodate a maximum of two fellows for the entire summer. Since I will be also supervising a large group of incipient archaeologists, as well as teaching archaeological methods in both theory and practice in the associated summer course, I need help on the finds processing and publication side of the project. During the excavation, the fellows will take turns assisting in the field and processing finds in the lab. Both of them will collaborate on the ultimate publication of the report, on the presentation of finds, on public outreach, and on the conference paper.</p>		
<p><b>Additional Information (if provided):</b> My own specialization lies in ancient Mediterranean, not historical, archaeology. The methods and techniques of archaeological excavation are quite similar in temperate, terrestrial sites in any region, so as a technician, I am perfectly qualified to head this exploration. The narrative that arises from it, however, ought to be owned collectively, by our community, with a wide variety of participants and stakeholders. I hope this opportunity will draw a diverse pool of interested students. This project is not traditional historical archaeology, dealing with the effects of European colonization, but also encompasses the history of African American settlers in the region, as George Bush was described as such. Giving the students a large role in the interpretation of finds and in the publication</p>		

**Summer Undergraduate Research Fellowship Program  
2015 Projects**

of the report will help diversify the ultimate historical narrative. This opportunity will give them a chance to explore the options of representation and interpretation of this part of our regional history.

## Summer Undergraduate Research Fellowship Program 2015 Projects

Project Title: Stream Ecology Research		
Faculty member(s)	Email	Campus phone
Carri LeRoy	leroyc@evergreen.edu	867-5483
<p><b>Project Description:</b> 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 UT, AZ, CA, WA, NV, and Siberia (<a href="http://academic.evergreen.edu/l/leroyc/">http://academic.evergreen.edu/l/leroyc/</a>). Her research mainly focuses on the interactions between forests and streams and 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 on established in-stream leaf litter decomposition experiments as well as participate in the long-term monitoring of the 5 watersheds in the Evergreen State College Forest Reserve.</p> <p>A major focus of the fellows' research on this project will be the surveying, monitoring and exploration of the five streams on Evergreen's forested campus. We have just over 1000 acres of forest on campus and there are both developed terrestrial and stream monitoring sites (EEON – Evergreen Ecological Observation Network; <a href="http://blogs.evergreen.edu/eeon/">http://blogs.evergreen.edu/eeon/</a>). As part of EEON, we established long-term sites in 2014 and will continue to monitor them throughout the summer of 2015.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> Students should be at the intermediate level, having completed at least one year each of college biology and chemistry. Additional experience in field ecology is preferred, but not required.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> The specific measurements for this project include: assessing algal production (chlorophyll-a analysis by spectroscopy), collecting and identifying aquatic macroinvertebrates, analysis of nutrients (nitrate and phosphate), dissolved oxygen (DO) and carbon dioxide content (pCO<sub>2</sub>), 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 will also contribute to long-term leaf litter decomposition studies in WA and AZ. Samples will be dried, weighed, ground, and analyzed for C, N, ash-free dry mass and overall decomposition rates.</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>		
<p><b>Number of Fellows the Project Can Accommodate:</b> This proposal can support up to two students. There is quite a lot of work to be done both in terms of monitoring our established EEON stream sites and in terms of working on other research projects in the LeRoy Aquatic Ecology Lab. Although one student would be fine, having more than one student available for in-field support is very nice. A lot of the work will be done in the field and having a “buddy” in the field is an excellent safety protocol. More than one student will allow more research and more frequent monitoring to take place.</p>		
<p><b>Additional Information (if provided):</b> The SURP fellows will have opportunities to learn about experimental design, data collection and archiving, statistical analysis and scientific writing through workshops and interactions with faculty members and other fellows. Successful research projects may be written and/or presented to diverse audiences at conferences.</p> <p>Fellows will be expected to meet weekly with other fellows doing field ecology research to discuss progress, challenges and present findings.</p>		

## Summer Undergraduate Research Fellowship Program 2015 Projects

<b>Project Title: Trouble</b>		
<b>Faculty member(s)</b>	<b>Email</b>	<b>Campus phone</b>
Naima Lowe	<a href="mailto:lowen@evergreen.edu">lowen@evergreen.edu</a>	X6755
<p><b>Project Description:</b> This summer I will be writing the script for a short experimental narrative film called "Conversing With Sparrows." The fellow(s) will support me in completing a series of drafts of the script by providing formal critique, assisting with formal analysis of other films and screenplays that will act as models and inspiration for this project, assisting with research on character development and help me complete a series of camera tests and other visual experiments related to the development of the visual style of the film.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> The fellow(s) will need skills in creative writing, HD video production and visual art. The student should also be well versed in principles of feminist and decolonial art and literary studies. Preparation for this position would include programs such as Mediaworks, Non-Fiction Media, Creating Dangerously: Experiments in Feminist and Diaspora Art, or other programs and courses that combine studies in the theory and practice of experimental media.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> Fellow(s) will offer formal critique on various stages of a screenplay, do formal analysis on related films and screenplays, provide assistance in the creation of short videos related to the screenplay, and do library based research on topics related to the screenplay. The student will gain experience in experimental narrative screenwriting in theory and practice, gain experience working with an interdisciplinary visual artist, and deepen their research skills.</p>		
<p><b>Number of Fellows the Project Can Accommodate:</b> This project could accommodate up to three fellows. Working with one student, I would primarily work on the screenplay and research elements of this project. Working with two or three students, I would have the necessary support to do short video shoots that will support the visual research element of this project.</p>		
<p><b>Additional Information (if provided):</b> In the last several years I have become increasingly preoccupied with the relationship between "Blackness" and "The Pastoral." I am interested in these terms as sociological/geographical categories, and as ways to demarcate specific visual and textual languages. Most fundamentally, I am interested in helping to reframe how we understand the relationship between these two categories by creating work that places the Black relationship to the pastoral in historical, cultural and personal context. I have been exploring these themes using my ever-broadening set of visual and linguistic skills, and now I am ready to return to my roots as a scriptwriter and filmmaker. <b>To that end, I am proposing a project that explores how Blackness shapes the Pastoral, and vice-versa, through writing the script for a short experimental narrative film, tentatively titled: Conversing with Sparrows</b></p> <p><b>Research Agenda</b></p> <p><i>My primary artistic and research agenda of late has been tied together by three distinct yet interrelated questions.</i></p> <ul style="list-style-type: none"> <li>• Why do we think about Black people and Black aesthetics as being fundamentally tied to urban spaces, despite the deep historical ties to rural and agrarian life? (OR. Is there such a thing as a Black Pastoral aesthetic?)</li> <li>• How is a relationship to land defined by people who have experienced dislocation, dehumanization and displacement through slavery and colonialism? (OR, Do U.S. Black people have a land to call their own?)</li> <li>• How does my personal history, and the history of my family, parallel a broader African-American experience of relating to land and landscape? (OR, how can I assert a Black Pastoral aesthetic that is rooted in my specific history and my relationship to the broader traditions of African-American cultural production?)</li> </ul> <p>Over the past several years I have produced a series of interconnected works that deal with the questions above, and I am excited to continue this work during the summer of 2015. <b>My work for that time period will be writing the script for a short experimental narrative film that centers on a central character, Violet (Vy) a young African-American woman living in Western Washington, as she plans a cross country road trip to visit</b></p>		

## Summer Undergraduate Research Fellowship Program 2015 Projects

**her dying great-aunt Emma Ruth (known as Auntie Sparrow by her family) in rural South Carolina on the occasion of Emma**

**Ruth's 85<sup>th</sup> birthday.** This narrative will center around a phone conversation between Vy and Emma Ruth, during which Vy explains that her reasons for visiting hinge on her desire to explore her ancestral roots in the southern United States. Emma Ruth frustrates Vy's desire to discuss definitive plans for the trip by instead using the phone call as an opportunity to recount the reasons that she came to have the nickname Sparrow. The film will have a circular call and response structure, will be highly intimate in its exploration of relationships between black women, and it will be as allegorical as it is personal. In this script I am attempting to use black aesthetic traditions that are as enduring and they are nimble and contemporary.

In the last several years of research related to this topic, I have created a visual vocabulary that ties together the various themes that I will explore with this piece. This includes specific plants and animals (Sparrows will feature prominently) to create the vision of the rural south that Vy has created in her mind. I have also been refining some of my experimental HD video and 16mm film techniques designed to evoke a textured, tactile and gritty nostalgia using hand processed film, direct animation, and rotoscoping. I have also imagined a sound score for the film that will rely heavily on the disembodied voices of people speaking on the phone, giving a sense of the technological and actual distance between this young woman and her ancestry.

My research on this topic has also included personal and family histories. This film is semi-autobiographical, in the sense that I am a (youngish) woman living in Western Washington, with family currently rooted in the urban Northeast. I had the pleasure of visiting and getting re-acquainted with my great-aunt Emma Ruth in 2006, a few years before her death in the small South Carolina town where she spent most of her life. Members of my family have moved back and forth between various parts of the semi-rural south and the urban northeast since the turn of the last century. I am the first generation to venture west, which has given me a vantage point on our family history that is allowing me to create this film. While here, I have consistently reflected on the ways that our family history mirrors so much of the experience of African-Americans navigating our lives as descendants of slaves within a country intent on the fiction of a post-racial society.

Since moving to Washington in 2010, I have felt a sense of longing for a connection to family history that I've been only able to explore in conversations on the phone, through Skype and via email. With this film I will explore the ways that distance and reliance on communications technologies have created a diasporic experience for my family, despite the fact that all of my known relatives live within the same country. I will base some of the conversations within the script on actual recorded conversations I've had with family members, and the characters (while fictional) will have personality traits and character histories that closely resemble real people in my life.

This project is exciting to me because it is the culmination of many years of related research and writing on this topic. It is also giving me a chance to combine my range of intellectual and creative interests into a single project. I will ultimately produce and direct this film, but first I have to get it written. As I develop this work, I can see opportunities to not only deepen my skills as a screenwriter, but also to think about how to teach experimental approaches to screenwriting, an area of the Evergreen curriculum that is currently very underdeveloped. I know that this writing process will challenge me to articulate these concepts in a narrative form, having previously shied away from this approach in favor of documentary.

## Summer Undergraduate Research Fellowship Program 2015 Projects

Project Title: Interactive Computer Animations; Illuminating Mathematical Ideas		
Faculty member(s)	Email	Campus phone
Paul R. McCreary	<a href="mailto:mccrearp@evergreen.edu">mccrearp@evergreen.edu</a>	3032
<p><b>Project Description:</b> In this project we will design and produce interactive computer animations. The purpose will be to make certain ideas in advanced mathematics more understandable. Depending on interests and skills, participating students may focus on one or more of the following areas of investigation: 1) design of animation figures and “stories”, 2) study of advanced mathematical concepts, and 3) creation of computer code for animations. These three areas of focus are further described below. Activities in the summer will also center around communicating scientific/mathematical ideas that we investigate. Some of our writings will contribute to a paper that will be submitted to a national scientific journal. All group activities will take place in Tacoma. Independent work can be carried out anywhere <i>Mathematica</i> software is available</p> <p>1. Designing the graphic images and creating a story-line that conveys the “stories” behind mathematical ideas. When designing an interactive animation, one must consider the order of events, the method and manner in which one expects others to interact with the animation, the ways that details are knit together to reveal the whole, how to use colors, shading, texture, and motion to convey meaning, reveal relationships, and illuminate underlying principles. For example, certain special functions that we wish to describe are important because they connect particular single <i>points</i> with a whole class of <i>surfaces</i>. How can we use computer screen images to reveal the relationship between single points and entire classes of surfaces? Which details to incorporate in the “story”? Too many details will only cause confusion and stand in the way of learning. These decisions must be made throughout the production process of interactive animations. Arrangement of interface icons is also an important factor in the design of effective software for interactive animations.</p> <p>2. The mathematics to be illuminated by our animations are mappings of Riemann surfaces. Those surfaces can be thought of as parallelograms or as doughnut shaped surfaces. There is an infinite variety of doughnut shaped surfaces. Characterizing these types of surfaces was the central theme of all mathematics in the late 1800's, early 1900's. Indeed, this was the last period in which all existing mathematics could be understood and held in the mind of single individuals. Since that time, mathematics has exploded into such broad, divergent, and numerous fields that it often take teams of mathematicians to investigate and handle even a small portion of all mathematics known to humankind. The area of Riemann surface theory is a field of deep interest to professional and student mathematicians. It presents a valuable historical context. It also points towards important connections across many current fields that have grown out of the mathematical work since then. For example, the geometric nature of complex numbers leads to the physical particle models currently used to describe quarks, etc. in physics. Complex numbers also provide the context for functions with multiple periods. Think of a sine function that has three or four (or more) periods instead of just one.</p> <p>3. We use the software package <i>Mathematica</i> to produce stand-alone modules that can run animations on individual computers. We will learn how to use the functions available in <i>Mathematica</i> and also learn how to modify them or create new ones to produce our visualizations. The coding of interactive animations combines all of the available graphics features, many of the computational features, and several of the classical coding features, such as Do loops, For loops, and the capacity for defining (new/unique) functions to serve our graphics needs. We also make use of special features to govern the interface between human users and graphics displays.</p> <p>Creating interactive computer animations is a process of translating what we see in our mind's eye onto a computer screen. The computer screen becomes our canvas and the computer code our paints and brushes.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> To qualify for participation in this project the most essential requisite is an excitement to learn and explore one of the three main areas, namely animation design, mathematical ideas, and computer coding. Any experience would be useful, but not necessary.</p>		

**Summer Undergraduate Research Fellowship Program  
2015 Projects**

**Responsibilities of Fellows and Knowledge to Be Gained:** Each student will be expected to participate in weekly group meetings as well as several tutorial/learning sessions each week. Further project assignments will be explored throughout the summer.

*Project #6, continued*

**Number of Fellows the Project Can Accommodate:** The project could accommodate two fellows. With one, a research article draft will be completed. With two, the article will definitely be co-authored with the students and additional future projects will be developed.

**Additional Information (if provided):** Examples of interactive animations can be found at the following website: <http://academic.evergreen.edu/m/mccrearp/>.



## Summer Undergraduate Research Fellowship Program 2015 Projects

Project Title: Bovine Mastitis Bacteriophage Lab		
Faculty member(s)	Email	Campus phone
Mike Paros, DVM	parosm@evergreen.edu	X6406
<p><b>Project Description:</b> Bovine mastitis is one of the most common forms of disease in dairy cows worldwide. Gram negative coliform bacteria are typically associated with severe clinical mastitis and <i>Escherichia coli</i> is often isolated from acutely affected cows while also playing a role in recurring subclinical intramammary infections. The widespread and routine prophylactic use of intramammary antibiotics on dairies is now under public scrutiny due to concerns over the transfer of antibiotic resistant genes to human pathogens. Bacteriophages are viruses that can infect bacteria and suppress their growth. A number of animal studies have demonstrated the safe and efficacious use of phages against <i>E. coli</i> infections. Utilizing a grant from the Washington State Dairy Products Commission, we have successfully isolated bacteriophages against mastitis causing <i>E. coli</i> strains, measured host range specificity, and have generated a cocktail of phages that could infect a variety of clinical coliform mastitis strains. We have tested the ability of phage cocktails to suppress <i>E. coli</i> growth in raw milk with a number of different carrier agents, as a necessary pre-cursor to clinical trials that would examine the use of bacteriophages to prevent <i>E. coli</i> mastitis. Finally, our lab has used a bovine mammary cell culture line to observe bacteriophage inhibition of intracellular invasion by mastitis pathogens. We currently have a grant proposal in to perform a challenge test with our bacteriophage in cows. In addition we are interested in studying how bacteriophage and <i>E. coli</i> interact in mammary cells over a long period of time in order to understand phage-bacteria-eukaryotic cell interactions that occur in physiologic systems.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> Priority will be given to students with some basic laboratory skills in microbiology, and completed course work in upper level biology and chemistry courses.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> A summer student research intern would be expected to work approximately forty hours a week where he or she would help design and execute experiments.</p>		
<p><b>Number of Fellows the Project Can Accommodate:</b> Our laboratory can accommodate up to two fellows.</p>		
<p><b>Additional Information (if provided):</b> Over the past four years, our laboratory has helped over a dozen Evergreen undergraduate students gain important research and laboratory skills in microbiology. A number of them are now doing graduate research in the biological sciences.</p>		

## Summer Undergraduate Research Fellowship Program 2015 Projects

Project Title: Human Rights, Resettlement, and Belonging: Southeast Asian Arrivals to the Pacific Northwest		
Faculty member(s)	Email	Campus phone
Eric Stein	<a href="mailto:steine@evergreen.edu">steine@evergreen.edu</a>	6434
<p><b>Project Description:</b> The project explores the early years (1975-1985) of Vietnamese and Cambodian resettlement in the Pacific Northwest, drawing on archival records, oral history, and a range of published sources. The violent upheavals of the Vietnam War and Khmer Rouge eras in Southeast Asia resulted in the arrival of several hundred thousand refugees throughout the U.S., including substantial migrations to the Pacific Northwest. We will seek to understand how new arrivals to the region forged lives and communities within a social and political terrain that was adapting to their presence. The project will consider a series of questions:</p> <ul style="list-style-type: none"> <li>• How did new possibilities emerge in those early years for various associations and partnerships with longer standing residents in the region?</li> <li>• What sort of anxieties and tensions arose out of the presence of new arrivals? How did various institutions—public health, transportation, social work—respond to the needs of these communities?</li> <li>• How was the language of human rights evoked in public discussions over the taking in of Southeast Asian “refugees”?</li> <li>• What steps did people take toward the crafting of unique Vietnamese American and Cambodian American identities?</li> </ul> <p>Historical research during the summer of 2015 will involve visits to several regional archives, museums, and cultural organizations, with some travel to the Seattle area, as well as library research on the campus of The Evergreen State College. The majority of time will be spent at TESC reading through documents, taking notes, and developing preliminary answers to the key project questions.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> Intermediate or advanced level students are preferred, with prior studies in the social sciences and humanities and some research experience in those areas. Students should be willing to develop a general understanding of the history of mainland Southeast Asia, human rights, and U.S. refugee and immigration policy as part of the summer work.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> Fellows will collaborate with the faculty leader to develop a comprehensive research plan, compile bibliographies of published scholarly sources, conduct primary source research at regional archives and online at Evergreen, analyze sources, and build a foundation for continued long-term research. Students will learn about the late twentieth century history of Southeast Asia and the Pacific Northwest, social policy related to refugee resettlement, oral history research, archival research, and the academic research process. Participating in the project will prepare fellows for conducting capstone undergraduate research or graduate research in the social sciences or humanities, particularly in history or anthropology.</p>		
<p><b>Number of Fellows the Project Can Accommodate:</b> The project could reasonably accommodate two fellows, roughly divided into different pathways: 1) An archival pathway focused on various state archives; and 2) An oral history pathway focused on existing oral history recordings with the potential for conducting new, original oral history interviews. As the project is largely inductive and is still in an exploratory stage, two fellows will enable more extensive progress through the many available sources.</p>		
<p><b>Additional Information (if provided):</b> The project seeks to combine my two decades of studies, research, and teaching related to Southeast Asia with more recent interests in Pacific Northwest ethnography and history. In the long term, the aim is to develop a line of research that will result in the publication of scholarly articles, collaboration with local community partners, and the development of curricula around issues of human rights, migration, heritage, and place.</p>		

## Summer Undergraduate Research Fellowship Program 2015 Projects

Project Title: Summer Research in Field Ornithology		
Faculty member(s)	Email	Campus phone
Alison Styring	<a href="mailto:styringa@evergreen.edu">styringa@evergreen.edu</a>	x6837
<p><b>Project Description:</b></p> <ul style="list-style-type: none"> <li>• <b>Monitoring Avian Productivity and Survivorship (MAPS).</b> 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.</li> <li>• <b>Breeding biology of the Pacific Wren (<i>Troglodytes pacificus</i>).</b> The ornithology has begun research to track 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.</li> <li>• <b>Determining bird locations using microphone arrays and acoustic monitoring of birds in the Evergreen Forest.</b> The ornithology lab is working on a new area of research in the field of avian monitoring and wildlife acoustics: localizing birds using microphone arrays. Subtle differences in the arrival times of songs and calls can be used to determine the position of an animal when it made the sound. Currently, research on this topic has focused on two-dimensional (map) locations. This project will focus on determining two-dimensional and potentially three-dimensional locations of birds in the campus forest.</li> </ul>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> Successful applicants will be expected to work on all projects. Desired qualifications: experience/training in MAPS protocol, proficiency with field recording, prior coursework in data analysis (upper division statistics), and experience with canopy access methods.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> Successful applicants will be expected to work on all projects. Successful applicants must commit to conducting field work from 4:45 am to as late as 4 pm on field days. 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. Array work involves setting up microphone arrays, testing array efficacy, downloading, analyzing, and archiving recordings, entering location estimates and relevant habitat information into spreadsheets/databases, and running analyses.</p>		
<p><b>Number of Fellows the Project Can Accommodate:</b> I am looking for 1-3 qualified individuals to work on the projects. If I have one student, I expect that substantial progress will be made on the array work (since that is the project I will also be spending a lot of time on). Depending on qualifications, the student may work on the MAPS project regularly and assist with data entry and checking. I don't anticipate the Pacific Wren project to progress a great deal with only one student, but they may be able to at least try and make observations of banded individuals. With two students, I anticipate increased progress on the Pacific Wren project (habitat data collected, some nest-searching, and potentially some banding of fledglings). With three students I anticipate all three projects would progress substantially with full participation in the array project, MAPS project, and Pacific Wren project. I am completely fine working with any number (no more than three of course – that would be too much for me anyway) of students.</p>		
<p><b>Additional Information (if provided):</b> I plan to begin working on the projects as soon as classes end. The SURF fellowship doesn't start until beginning of summer session, but I will expect any of my students to be prepared for a very full workload (specifically field work, but also data entry) during the first 3-4 weeks of the fellowship (dawn – late afternoon). After that, the field work may wane just a bit (but there will still be plenty) and the focus should start to move toward project selection (for their research piece) and data analysis/write up.</p>		

## Summer Undergraduate Research Fellowship Program 2015 Projects

<b>Project Title: Ecological Physiology of Marine Invertebrates</b>		
<b>Faculty member(s)</b>	<b>Email</b>	<b>Campus phone</b>
Erik V. Thuesen	thuesene@evergreen.edu	X6584
<p><b>Project Description:</b> Organisms that live in estuaries experience a wide range of environmental and ecological parameters, and fluctuating conditions of temperature, salinity, oxygen concentration, etc. pose physiological challenges that need to be overcome. These conditions also have ecological consequences that can be overcome in a variety of ways. This project will examine the response of whole animals to changes in various environmental or ecological parameters. Working with one or two specific species commonly encountered in Puget Sound, this project will examine/ecological parameters that the species can tolerate. Appropriate species will be chosen based on mutual interests of the student/faculty and on the availability of specimens. Past research in this lab has focused on crustaceans, cnidarians, ctenophores, nemerteans, polychaetes, chaetognaths and molluscs.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> This project is appropriate for 1-3 students. Students will need to have completed course work in marine sciences and/or zoology and possess a working knowledge of lab chemistry and microscopy. This project contains both lab and field components, and students should feel comfortable carrying out investigations in both situations.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> Students will collect animals in southern Puget Sound, maintain them in seawater aquaria and examine physiological characteristics of target species in the lab. A final report will be written describing the results. The student involved with this project will benefit through gaining experience in marine fieldwork, learning to identify marine invertebrates, learning to use sophisticated lab equipment, analyzing data and preparing figures using statistical and graphing software.</p>		
<p><b>Number of Fellows the Project Can Accommodate:</b> This project is appropriate for 1-2 students.</p>		
<p><b>Additional Information (if provided):</b></p>		

## Summer Undergraduate Research Fellowship Program 2015 Projects

Project Title: EDURange: Creating Computer Security Exercises		
Faculty member(s)	Email	Campus phone
Richard Weiss	<a href="mailto:weissr@evergreen.edu">weissr@evergreen.edu</a>	867-6871
<p><b>Project Description:</b> EDURange is an ongoing project with the goal of building Cloud-based, interactive computer security exercises (games). Games are an effective tool for active learning. The desired outcome is the creation of a suite of exercises for faculty and students that will be engaging and will teach computer security skills and concepts, 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. The exercises in EDURange focus on highly interactive, competitive, and dynamic scenarios. Intrusion detection is topic which lends itself to this type of exercise.</p> <p>Intrusion detection is a particularly important and active area of exploration in cybersecurity. A major security breach occurs almost every month, and computer security is one of the fastest growing areas in computer science today, with an estimated 400,000 jobs to be created in the next few years. The most serious problems are from stealthy exploits, where an attacker gains entry to a computer system and is able to read sensitive data over a long period of time. An intrusion is defined as any set of actions that attempts to compromise the integrity, confidentiality or availability of the resources of a computer system. Typically this is caused by malicious software and may be designed for the exfiltration of private data. What makes this so difficult to detect is that while it is generally possible to model normal activity, abnormal activity due to malware and exploit technology keeps changing. Being able to distinguish anomalous behavior from normal behavior requires flexible models that can adapt over time. Machine learning has been applied to this problem in some special cases, and this would be a good area for a student to define a new exercise based on previous research that would engage users as both attackers and defenders.</p> <p>EDURange currently has four exercises that have been tested at Evergreen and other schools, and several more that are being developed. A new exercise based on intrusion detection could be built on top of two of the current ones. One of them requires students to examine network traffic and deduce which computers are talking to each other. The other one requires students to analyze what system resources a program is using. For this particular summer research project a student will adapt machine learning algorithms to use these two sources of data.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> 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.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> A student who participates will be able to achieve a deep understanding of the security skills and concepts taught by the games that they develop. They will also learn the skills needed to configure virtual machines and networks using the latest tools on Amazon's EC2. They will need to install and configure the software on these virtual machines to create the vulnerabilities that make the games instructive and interesting. They will also become more familiar with some basic techniques in machine learning, such as decision trees, neural networks, and Bayesian networks, and they will learn to apply them to practical situations. The student will be part of a collaborative effort. There will be discussions and design reviews with students and faculty from Evergreen and other schools, including Lewis &amp; Clark College, The University of Calgary and Wellesley College. There will be a two-day hackathon at the beginning of the summer to form working groups. The EDURange project has had twelve refereed publications in the last two years. Students will be expected to participate in writing scientific papers on their work suitable for publication. This is a collaborative project supported by a grant from the National Science Foundation and an educational grant from Amazon. The student will be able to pursue original research that combines machine learning with computer security. More information can be found at <a href="http://blogs.evergreen.edu/edurange">http://blogs.evergreen.edu/edurange</a>.</p>		

## Summer Undergraduate Research Fellowship Program 2015 Projects

**Number of Fellows the Project Can Accommodate:** This project can accommodate two fellows, one working on the game and the other contributing to the game and the EDURange framework. Thus, with one student, we would be able to create a new game, in which a player would attempt to attack a vulnerable system and try to avoid the intrusion detection system. With two students, we would add more features to the game, including the defender role and make improvements to the automated scoring system, which is important for providing immediate student feedback.

**Additional Information (if provided):** [One student] worked on this project last summer and has continued this year. Another student...is developing exercises in winter quarter, and will be graduating at the end of the quarter. He has been offered an internship at [a University of California campus]. Last year, [a third student] worked on the project and was accepted into [a selective private institution's] Ph.D. Program. This type of research is valuable for students applying to graduate school.

## Summer Undergraduate Research Fellowship Program 2015 Projects

PROJECT #12		
<b>Project Title: Solar Evergreen</b>		
<b>Faculty member(s)</b>	<b>Email</b>	<b>Campus phone</b>
E.J. Zita	zita@evergreen.edu	
<p><b>Project Description:</b> Building on research done by students since 2014, our team will finish site studies, work with Evergreen offices, and write a proposal to Bonneville Energy Foundation for solar PV and solar thermal installations on most large roofs on campus. These could meet about half of our outstanding electricity needs on campus.</p>		
<p><b>Student Requirements (Knowledge, Skills, Abilities, Coursework, etc.):</b> Students with science skills, organizational and analytic skills, and excellent writing skills can all contribute to aspects of our project. Knowledge and interest in solar energy will motivate all team members. Analysis or installation of solar systems will be particularly useful to our effort.</p>		
<p><b>Responsibilities of Fellows and Knowledge to Be Gained:</b> Students can learn and apply theory and practice of solar energy physics; use simple and powerful professional quality diagnostics to measure solar power availability; analyze data and synthesize evidence; research grant requirements and help write sections of a grant proposal; research data available and process requirements from Evergreen offices; and work with a team to significantly reduce carbon emissions on campus.</p>		
<p><b>Number of Fellows the Project Can Accommodate:</b> 3 students: 1-2 in science, and 1-2 in research on grant and Evergreen requirements.</p>		
<p><b>Additional Information (if provided):</b> See our work to date at <a href="http://academic.evergreen.edu/curricular/energy/1314/">http://academic.evergreen.edu/curricular/energy/1314/</a>. Proposal to be written to Bonneville Energy Foundation: <a href="http://www.b-e-f.org/our-solutions/energy/solar-4r-schools-program/">www.b-e-f.org/our-solutions/energy/solar-4r-schools-program/</a>.</p>		