Undergraduate Research Opportunities For Environmental Majors – 2018/2019

Students are encouraged to seek out research experience while pursuing their undergraduate degree. Students desiring a research experience should review the list of faculty research projects provided below and see what opportunities are available. Students must contact faculty directly to express their interest and get more information. Students may earn academic credit for their research experience.

The following faculty members are eager to work with undergraduate students majoring in environmental disciplines who want practical research experience, integrating basic and applied science working towards solutions to real world problems facing our environment.

Basic Instructions:

1) Student should review list of available projects below, and then contact faculty members directly (or other individual listed) to learn more about project expectations and qualifications (if any) that are needed. **Mark your subject line of your email as "Undergrad Research Inquiry" and in your email provide the following information:**

   ***Student name, class year, GPA, list of any relevant course work completed, number of hours available to work on project each week; specific skills/experience/training required for the project.**

2) **Priority deadline for applications is Friday, September 7th.** Faculty will contact qualified students to arrange for interviews as appropriate. Selection of interns (for most projects) will occur by Friday, September 14th.

2) To earn academic credit, an ENVSCI Independent Study contract must be completed and signed by both the student and the sponsoring faculty member. This form is available on-line at http://eco.umass.edu/wpcontent/uploads/2011/11/ENVSCI_IndepStudyForm_fields.pdf

3) Instructions for completing the form are provided on-line within the same document link. Be sure to indicate the number of credits being earned for the research experience.

4) Please note that all Independent Study projects (ENVIRSCI 296, 396, 496) **must be letter graded.** Student can choose to enroll in Internship/Practicum credits (ENVIRSCI 298, 398, 498), but these courses are mandatory Pass/Fail.

5) **The completed Independent Study Contract must be delivered to the ENVSCI Program Office at 310 Holdsworth Hall prior to the close of the Add/Drop period.** (If form is received after the end of the Add/Drop period, the ENVSCI Office will initiate the paperwork for a Late Add request, and the student will be required to hand-carry this paperwork across campus for the necessary approval signatures.)

SEE LIST OF FACULTY RESEARCH INTERESTS BEGINS ON NEXT PAGE.

~ Environmental Research Opportunities ~ Fall 2018~

Alison Bates, Lecturer — **Renewable Energy**
Environmental Conservation — **awbates@eco.umass.edu**
209 Holdsworth Hall, 413-545-1768

Project description: Our group is seeking to understand issues related to the adoption of renewable energy technologies in the US and US territories.

- In one project, we are seeking to understand the impediments of the wide scale adoption of tidal energy in the US, when it is being adopted rapidly in other countries. We are looking at a case study from a failed project in Maine to learn whether it is public concern about tidal energy, or economic factors that are holding back this industry.

- In a second study, we are examining renewable energy preferences after the collapse of the electric grid in the Caribbean after Hurricanes Maria and Irma. We have conducted surveys and recorded interviews with stakeholders.

We are seeking several students to support this project by helping with data entry. This will include entering survey responses into a database, listening to digital recordings, and transcribing the interviews into written text. Students may also have the opportunity to help analyze data after it is entered and transcribed. Attention to detail and careful typing required.

Qualifications: Helpful to have some experience with human-centered data such as surveys and interviews, although not required. Attention to detail and excellent typing are required.

Time Commitment: 3 – 10 hours per week, depending on student interest and availability

Compensation: Practicum (P/F) academic credits, 1-3 credits, depending on hours worked

To apply: email to Alison Bates, awbates@eco.umass.edu, including resume and statement of interest (up to 1 page)

Bethany Bradley, Associate Professor — **Spatial Ecology & Invasive Species**
Environmental Conservation — **bbradley@eco.umass.edu**
318 Holdsworth Hall, 413-545-1764

Project 1: Invaders for Sale -
Quantifying the availability of invasive plants in the U.S. nursery industry

Project Description: Invasive plants have well-documented, negative ecological and economic impacts. Ironically, humans deliberately introduce the majority of invasive plants by importing and planting exotic species as ornamentals in our homes and gardens. Although over 1300 exotic plants have been identified as invasive in the U.S., many of these species remain commonly sold by nurseries. This project aims to quantify the numbers and types of readily available invasive plants currently for sale in the U.S. Ultimately, these results highlight nursery industry practices and government regulations that can be changed to reduce the spread and impact of invasive plants.

For Fall 2018, we are seeking 1-2 students to join our ongoing project. Students will assist with data collection by searching the Internet for online vendors of invasive species and recording geographic information about these vendors. In doing so, students will gain experience in standardized data collection, learn about invasion ecology, and have the option to participate in weekly lab group meetings to learn about the latest research on invasive plants and their spatial distributions.

Qualifications: No previous experience is needed, but experience with excel, organization skills, and attention to detail are important. This project is ongoing, so there is opportunity for continued involvement (such as a thesis or summer work) once the dataset is completed.

Compensation: 2-3 independent study or practicum credits (6-9 hours/week depending on # credits).

Contact Information: Interested students should contact Eve Beaury (PhD student in Bradley lab) (ebeaury@umass.edu) with a resume, transcript, and a few sentences about why they are interested in research/this project.

Project 2: Global Invaders Project

Project Description: Invasive species reduce biodiversity and are considered a major threat to ecosystems worldwide. Despite general knowledge of their widespread impacts, we still lack a consistent list of which species are invasive, where they have been studied, and what sorts of specific impacts have been identified. This information is critical for understanding the conditions that lead to invasion and informing effective monitoring and management. Students joining this project will have the opportunity to contribute to a multi-year effort in the Spatial Ecology Lab, which is compiling a comprehensive global database of invasive plants ("the Global Invaders Project"). Students will gain experience reading scientific literature in invasion ecology and will participate in weekly lab group meetings to learn about cutting edge research on invasive plants.

Duties/Qualifications: For the Fall 2018 semester, we seek 2 students to join our ongoing project. Duties will include reading peer-reviewed literature and extracting information outlined in an existing database. No previous experience is needed, but good organization skills and attention to detail are important.

Students participating in this project will gain experience in efficiently reviewing scientific literature, as well as data collection – skills that are invaluable for those looking to continue scientific research beyond their undergraduate academic career. Participants will also acquire knowledge in invasive species ecology.

Time Commitment/Compensation: This is a 3-credit independent study position (9 hours/week). Opportunities to continue with this project for academic credit in subsequent semesters.

To Apply: Interested students should email a transcript (unofficial) and a resume to graduate student supervisor, Brittany Laginhas (blaginhas@cns.umass.edu).

Raymond Bradley, Distinguished Professor **Climate System Science**
Climate System Research Center
Department of Geosciences **rbradleyu@geo.umass.edu**
Morrill Science Center, 413-545-2120

Project Description #1) Research on sediment cores from the Arctic (Svalbard) to better understand the links between climate change and sediment deposition in lakes. The research will involve lab work on the sediment characteristics, and the long-term climate records from this part of the Norwegian Arctic. Will be working with and reporting to Dr Fancois Lapointe, post-doctoral Research Associate & Prof. Raymond S. Bradley

Qualifications: Ideally, some background in geology and competence in data analysis

Time Commitment: ~6 hours per week. To be determined based on student's schedule. Possible to extend past Fall term, but not strictly required.

Compensation: Academic Credits (1-2 credits). Practicum (P/F) or Graded Independent Study- to be determined based on student's interests and goals.

To Apply: Contact Prof. Raymond S. Bradley: rbradleyu@geo.umass.edu

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Project Description #2) Leverett Pond – Video Project Seeking a student interested in working collaboratively with other students from across the 5-colleges to produce a video documenting both the natural and cultural history of Leverett Pond. Themes would be drawn from the role of Leverett Pond in the 240 year history of Leverett. Early the role was in the primary economy, agriculture, fishing and ice extraction, later came the industrial phase of a tannery on the small canal outflow from the dam and saw mill activity, and now the tertiary economic phases of recreation and real estate development all of which have had and continue to have importance for the economic activity of the town. Another theme is around the environmental aspects of the pond from the abundant wild life to management of invasive weed species.

Time Commitment: flexible, but anticipate 3-9 hours per week. Project will likely continue into Spring semester.
Compensation: Academic Credit. 1-3 credits, graded project preferred, but practicum credits also possible.
To Apply: Contact Prof. Raymond S. Bradley with your interest and to receive more information about the project: rbradleyu@geo.umass.edu

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Dwayne Breger, Extension Professor **Clean Energy Extension**
Department of Environmental Conservation **dbreger@umass.edu**
209 Agricultural Engineering Building, 413-545-8512

Project Description: UMass Clean Energy Extension (CEE) conducts applied research and outreach work related to advancing energy efficiency and renewable energy development in the state of Massachusetts. We are looking for a student intern to work on several projects utilizing GIS mapping software. One major project will consist of working with CEE and the Western Mass Community Choice Energy group (WMACCE) to complete a renewable resource assessment of Amherst, Northampton, and Pelham. The assessment will focus on identifying suitable solar PV sites, as well as sites suitable for other forms of renewable generation.

Analysis will include location and capacity of potential sites on rooftops, parking lots, brownfields, and landfills, as well as identification of sensitive environmental/geographic features, existing renewable energy infrastructure, and three-phase power line locations, if available. A major component of the project will include documentation of the methodology of the assessment, so that the same methods can be used to conduct resource assessments for other towns in the state. Additional projects may include mapping of existing renewable energy infrastructure statewide, proper siting of electric charging stations, and related data.

Qualifications: Introductory course in GIS, additional GIS experience preferred. Basic competency in Excel. Good research and communication skills.

Time Commitment: 3-5 hours per week. Option will likely be available to extend project into the spring semester.

Compensation: Academic Credit, or paid hourly position.

To Apply: Please submit a resume and brief cover letter to Zara Dowling, zdowling@umass.edu, Postdoctoral Research Assistant.

Brett Butler, Adjunct Professor
US Forest Service, Family Forest Center, Co-Director
Environmental Conservation
201 Holdsworth Hall, 413-545-1387
bbutler@eco.umass.edu

Forest Inventory & Analysis

Project Description: Are you interested in learning about real-world conservation practices, working with people, improving wildlife habitat, and traveling to Vermont? If so, you might make a great research assistant working with a graduate student, Meg Harrington, on her master's project. We are studying how we can improve federal and non-federal programs that help private landowners conserve their woodland and promote wildlife habitat. To do so, we will be conducting approximately 25 interviews with private landowners in Vermont.

We are seeking a student to help with these interviews. Specific tasks include:

- Accompanying graduate student mentor on up to 25 interviews, which will require travel to the landowner's homes in Vermont.
- note-taking during interviews
- transcribing audio recordings of interviews into writing
- assistance with driving/navigation

Qualifications: Student must be available either Mondays or Fridays, plus occasional weekends, to allow for travel to Vermont. The ideal assistant needs to be personable, organized, and detail-oriented.

Time Commitment: An average of 6 hours/wk. Slightly more hours in the beginning of the semester while we are conducting interviews, slightly less in the second half when we are transcribing interviews.

Compensation: Practicum (2 credits) or paid hourly ($12/hr, but federal work study is required).

To Apply: Contact Meg Harrington (meharrington@umass.edu). Please provide a resume.

Timothy Cook, Research Associate Professor — Geomorphology, Land-use Analysis

Department of Geoscience tcook@geo.umass.edu

Project Description:
This project is investigating the sensitivity of the New England landscape to disturbances (floods, landslides, forest fires, human activity, etc.) and evaluating how sensitivity changes in response to changing climate, land use, and land surface characteristics. Research may involve a combination of field and laboratory work ultimately focused on quantifying spatial and temporal (over the past several thousand years) variations in sediment yields in a network of watersheds located throughout New England. Fieldwork primarily involves the collection of sediment cores from lakes. Laboratory work will focus on the analysis of these sediment cores (e.g. particle size analysis, compositional analysis, geochronological analysis, and geochemical analysis). Additional or alternative options for work could include GIS analysis of geomorphic features within study watersheds, analysis of instrumental climate and hydrologic data, collection and analysis of historical records and historical maps documenting land use change and past disturbances.

Qualifications: Preferred qualifications include coursework in physical geology, sedimentology, geomorphology, and/or GIS, although all interested candidates with at least two semesters of geoscience coursework should apply.

Time Commitment: Dependent on student interest in availability, options could range from ~6-12 hours per week. Some opportunity for field work with an additional time commitment is possible.

Compensation: Students may choose from independent study or practicum credits. Total credits available will depend on time commitment. Graded credits require a substantive project/report.

Project duration: Participation through the spring semester is desirable but not required.

To Apply: Please submit a brief letter describing your interest in the position, qualifications, and what you hope to gain from the experience. Please comment on the number of hours per week you are interested in committing to the project and whether you are looking for a one or two semester project. Also include a resume and unofficial transcript or list of relevant classes (including geoscience, environmental science, math and other science courses). Applications should be sent via email as a single PDF file to Tim Cook (tcook@geo.umass.edu).

Theodore Eisenman, Assistant Professor — Urban Greening

Landscape Architecture and Regional Planning teisenman@umass.edu
333 Design Building, 413-577-0858

Project Description: Professor Eisenman and Ph.D. student Alicia Coleman are seeking Spanish-speaking students this Fall. They are studying pedestrian perceptions of street tree health and personal safety in Holyoke, MA, and plan to survey participants (10 sessions max) in largely Spanish-speaking neighborhoods through September and early October. Transportation will be provided. Data entry work will be possible following the survey sessions.

Qualifications: Must be fluent in Spanish and comfortable translating survey material to participants in Holyoke. Excitement for local urban greening, social-environmental research, and talking with locals a plus.

Time Commitment: approximately 3 hours/ week for 13 weeks. The day and time of the on-site survey sessions may be flexible to your schedule.

Compensation: This work can qualify as Pass/ Fail practicum credits. If interested, you will also have the chance to participate in future research on this topic and will receive acknowledgement in the scholarly publication of this study. Independent study options will be considered on a case-by-case basis.

Number of positions available: 2-4

To apply: Please indicate your interest by e-mail no later than 9/7/18 to teisenman@umass.edu and afcoleman@umass.edu

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Christine Hatch, Assistant Professor **Water Resources & Climate Change**
Department of Geosciences **chatch@geo.umass.edu**
233 Morrill Science Center, 413-577-2245

Project Description: Tidmarsh Farms is a wetland restoration site on a retired cranberry farm in Plymouth, Massachusetts. It is the largest freshwater restoration project in Massachusetts to date. The property is divided into two sections, Tidmarsh East (now Tidmarsh Wildlife Sanctuary) and Tidmarsh West. Tidmarsh East (retired in 2010) has already undergone extensive restoration, and is now owned and run by Mass Audubon as a wildlife sanctuary. Tidmarsh West (retired in 2015) has been purchased by the town of Plymouth and has yet to undergo restoration. Dr. Hatch and I, along with many collaborators from other institutions, are working to collect pre-restoration data from Tidmarsh West. This will help inform the restoration process, as well as measure the efficacy of the future restoration; metrics that are of keen interest to MA DER, which has just developed a whole new program for these kinds of restorations.

Part of our pre-restoration site assessment has included selecting about 60 plots at Tidmarsh West to survey vegetation and collect soil cores (4 samples from each plot). We are have already completed a number of chemical analyses on these soil samples, and are now beginning to work on particle size analysis. We are looking for an organized, detail-oriented student with good data keeping skills that may be interested in gaining some lab experience to help us conduct the particle size analysis and possibly measure some additional parameters with a probe on the core samples (as well as help analyze data if desired).

Responsibilities/qualifications: The student must have the ability to work independently and be responsible, and the lab instrumentation requires acute attention to detail for successful measurements. Enthusiasm and patience are also a plus!
Time Commitment: This will require an average of 5 hours per week, but may be irregularly distributed throughout the semester, and are flexible by arrangement. **Duration:** This project may have the possibility for extension into the Spring Semester.

Compensation: This will be a 2-credit independent study (or practicum if desired), and the student will be expected to submit organized and complete field/ lab notes, as well as write up the methods used and all of the results with some data interpretation by the end of the semester.

To Apply: Contact Christine Hatch, chatch@geo.umass.edu, (413) 577-2245 or graduate student, Erika Ito, eito@umass.edu . Please send a brief statement of interest and resume to be considered for this position.

Adrian Jordaan, Assistant Professor **Phenology Changes in Coastal Ecology**
Environmental Conservation **ajordaan@eco.umass.edu**
309 Holdsworth Hall, 413-545-2758

Title: Fish husbandry & ecophysiology

Project Description: Laboratory assistance for a graduate project rearing juvenile river herring, running laboratory experiments, and using otoliths (earbones) to measure fish growth rates. The overarching project examines how temperature and food availability affect juvenile river herring physiology (e.g. growth, energetics, etc). Husbandry and experimental work includes general fish care, like feeding, siphoning, tank maintenance. Otolith work requires multiple steps including extractions, mounting, imaging, and measurements. Depending on interest, students may be able to specialize in one, or work in both of these areas.

Qualifications: This research requires communication, patience, and a detail-oriented work ethic. Preferred (but not required!) skills include microscopy, dissection, and animal husbandry. The live fish are kept at the US Fish and Wildlife Service Richard Cronin Aquatic Resource Center on Plumtree Road in Sunderland, MA. For this work, students must be able to either ride the bus or drive to the facility. However, otolith-related work is done on UMass campus.

Time Commitment and Compensation: This position is for 1-3 practicum credits (3-9 hours/week), and it is preferred if the student can dedicate large blocks of time (3-4 hours) for research. Students will be mentored directly by the supervising graduate student and may have opportunities to get involved in related research experiences, as well as potentially extend research into the spring.

To Apply: email Lian Guo (lguo@umass.edu) with your resume/CV and letter/email indicating why you are interested in the position, relevant experience, preferred number of credits, and general availability.

Lisa Komoroske, Assistant Professor **Conservation Genetics**
Environmental Conservation **lkomoroske@umass.edu**
127 Holdsworth Hall, 413-545-2491

Project Description: ***Cownose Ray Population Genetic Connectivity***
Our primary goal is to determine geographic connectivity of the Western Atlantic cownose ray population, with hopes to extend the research to evaluate the size of the (sub)population that visits Chesapeake Bay annually to reproduce. Cownose rays (*Rhinoptera bonasus*) are migratory stingrays that are close relatives of manta and devil rays. They visit estuaries spanning the Eastern coast of the US to give birth and mate each summer; during this time, they are often caught in commercial fishery nets and hunted for sport by bowfishermen with little to no regulations. The first ever fisheries management plan for cownose rays is currently being drafted in Maryland, which is a promising development, as cownose rays are some of the slowest vertebrates to reproduce. However, we do not know the extent to which the subpopulations that utilize the various estuaries are interconnected (i.e. are they all interbreeding or is gene flow reduced among estuaries?), nor do we know how many rays there are. By addressing these data gaps, we aim to help inform the development, refinement and, if necessary, expansion of the much-needed cownose ray fisheries management plan currently under development.

We have an opportunity for a qualified undergraduate assistant to help DNA isolation and DNA quality control for these cownose ray samples. The student will also be expected to contribute to general lab upkeep and participate in lab meeting/ journal clubs.

Qualifications: self-motivated; industrious; basic knowledge of genetics and molecular approaches, demonstrated through having taken a genetics/molecular biology course (preferably with a lab component). Previous experience in a molecular lab setting is strongly preferred but not required. Full expectations of working in the MEC lab would be discussed fully and agreed upon before award of the position, but would generally include: commitment to clear communication for scheduling, tasks and roles.

Time Commitment: Negotiable based on availability, incoming skill level, and schedule; expected minimum of 3-6 hours/week. The exact schedule has some flexibility, but lab work of the position requires a minimum of 3 consecutive hour time blocks. It is strongly preferable to find a student that would be interested in staying on the project after the semester (and/or working on a different project applying learned ski

Compensation: Practicum credits, with possible potential for independent study and/or work study in subsequent semesters.

To Apply: please send a cover letter, resume if available, transcripts (unofficial is fine, just to see course experience). Please indicate in the cover letter the number of hours and schedule that can be committed and general availability *(e.g., 5 hrs/week, available to complete these during M,W,F afternoons from 1-5pm).* Please email Lisa Komoroske at lkomoroske@umass.edu and cc John Swenson swensonjohnd@gmail.com

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Susannah Lerman, Research Ecologist — Urban Ecology & Sustainability

Environmental Conservation (Adjunct Faculty)
USDA Forest Service, Northern Research Station
201 Holdsworth Hall, 413-545-5447

slerman@umass.edu

Project 1: Urban Arthropod Project

Description: Student interns needed to prepare insect specimens for identification. Research is part of the "Alternative Futures for the American Residential Macrosystem (ARM)" project, a multi-city integrated assessment of local and regional-scale consequences of residential development. We are investigating how varied land management decisions influence the ecological function and communities, and structure of residential yards and other public spaces. The interns will gain experience in a variety of lab techniques including sorting ground arthropods, pinning bees & wasps and creating labels, and will develop insect identification skills.

Qualifications: No previous experience is needed. Enthusiasm, patience and attention to detail required. Training and work stations will be provided.

Time Commitment: 5-10 hours per week

Compensation: Either independent study credits (graded project) or practicum credits (Pass/Fail)

Duration: Initial project duration is Fall 2018, but opportunities for spring may be available for engaged students.

Contact: Interested students should email a resume, and a brief statement on why they are interested in this project to Post-doctoral researcher, Desiree Narango, dnarango@umass.edu.

Project 2: Wildlife ecology of residential yards and urban green space

Description: We are seeking a student intern to assist with a quantitative literature review of urban wildlife papers to determine spatial and temporal trends, the proportion of research that takes place on different types of green space and whether these patterns have changed over time. Duties will include organizing and compiling relevant literature, reviewing research articles to collect information and entering data in excel. There may also be opportunities to assist with occasional field work in the local area (e.g. mist-netting backyard birds).

Qualifications: No previous experience is needed. Good reading comprehension skills and a willingness to work independently. Training will be provided.

Time Commitment: 5-10 hours per week

Compensation: Either independent study credits (graded project) or practicum credits (Pass/Fail)

Duration: Initial project duration is Fall 2018, but opportunities for spring may be available for engaged students.

To Apply: Interested students should email a resume, and a brief statement on why they are interested in this project to Desiree Narango, Postdoctoral Researcher, dnarango@umass.edu.

Joan Milam, Adjunct Research Associate **Pollination Ecology**
Environmental Conservation (Adjunct Faculty) **jmilam@eco.umass.edu**
207A Holdsworth Hall

Project Description: seeking research technicians to conduct lab and fieldwork for a project investigating wild bee diversity and ecology in managed forests and forest gaps. Lab work includes preparing specimens, curation (insect pinning, label making) and data entry. The technician will gain some bee identification skills. Lab work will take place at the University of Massachusetts Amherst in Holdsworth Hall.

Qualifications: Ability to follow the lab protocol for processing bees and experience with Excel.

Time Commitment/Compensation: Positions runs through Dec 12, 2018, for 6 hours per week. Position eligible for 2 practicum credits (Pass/Fail).

To Apply: As a single PDF, please send a cover letter explaining why you are interested in this position, a resume, and the name of a contact person who can give you a recommendation. Send your resume to jmilam@eco.umass.edu. Please put "Pollination Tech" in the subject line of your email. Review of applications will begin September 6.

Anita Milman, Assistant Professor **Environmental Policy**
Environmental Conservation **amilman@eco.umass.edu**
210 Holdsworth Hall, 413-545-3749

Project Description: Assist with development of a website and outreach materials related to several projects on water governance. One project addresses the use of science to influence policy in internationally shared river basins. The other projects address policies related to groundwater management.

Qualifications:

- Prior experience developing webpages using Wordpress or Drupel.
- Prior experience designing layouts and putting together posters, pamphlets or other handouts that include visuals, tables, figures and text (could be for class projects)
- Good written communication skills and ability to communicate across a variety of audiences
- Attention to detail
- Timeliness of completing tasks
- Willingness to communicate, revise and edit work
- Some basic knowledge of water resources preferred

Time Commitment: Anticipated number of weekly hours will vary; no more than 5 per week. Potential to extend the work through the spring.

Compensation:

- website work - paid hourly
- assistance with research projects - for academic credit. (if interested in helping with the research, email to ask for additional details),

To Apply: Send an email to Prof Milman (amilman@eco.umass.edu). Include in your email a description of your background as well as any project experiences in relation to the qualifications listed above. Also send a link to or copies of examples of your work (websites, reports or other projects you have worked on)

Elsa Petit, Lecturer **Plant Pathology & Viticulture**
Stockbridge School of Agriculture **epetit@umass.edu**
206 Bowditch Hall, 413-545-5217
https://stockbridge.cns.umass.edu/elsa-petit
https://sustgrapes.wordpress.com/

Project 1 - Taming emerging wine grape varieties: juice quality

Project Description: Facing unpredictable climate changes, maintaining a sustainable agriculture depends on the availability of genetically diverse cultivars. The traditional European grapes (e.g. Pinot Noir) are cultivars of a single species. In contrast, emerging grape cultivars (European-American hybrids) take advantage of the tremendous genetic diversity of the native American grape species (about 30 species). In the traditional European grape varieties, shoot and fruit thinning is known to influence fruit juice quality (ripening time, sugar, acidity) and help reduce pesticide usage. Little is known regarding these effects on emerging European-American grape hybrids. Our multiyear project, started in 2015, quantifies the effect of thinning practices and their cost on these emerging hybrids. Here we ask: Would the resulting increase in wine and grape quality and decrease in disease pressure be worth the added labor cost?

Student Responsibilities: The student will quantify the juice quality (sugar content, acidity, nitrogen) of different grape varieties that have been subjected to different cultural practices (thinning fruits and/or shoots). If staying during the following Spring, the student could be involved in the statistical analysis aspect of the multiyear study, publication of the work and presentation of a poster at the Undergraduate Student Conference.

The student would meet once a week for 30 min with the supervisor Elsa Petit to talk about viticulture and enology, publications on the subject, report on lab work, and work on statistical analysis and work under the supervision of another student with experience in juice analysis in Dr. Petit's lab.

Qualifications: GPA at or above 3.5, starting Junior or Senior year, Lab experience, Interested in working in a group. The student should have an interest in either grape growing, enology, food sciences and/or plant sciences.

Time Commitment: 3 to 9 hours a week including meeting time and lab work. Preferable if student can extend through the Spring 2019

Compensation available: Independent study credits (graded project) only1 to 3 academic credits, depending on weekly time commitment.

To Apply: Please contact Elsa Petit at epetit@umass.edu, include in the subject line "Independent Study on Taming emerging wine grape varieties: juice quality" along with resume, cover letter and transcript.

Project 2: The native grape microbiome:

Project Description: The cold climate wine industry has recently boomed in the Northeastern America after the successful breeding of cold-tolerant grape varieties. Vineyards harbor a wide variety of microorganisms that play a pivotal role in grape quality and will contribute significantly to the final aromatic properties of wine. If essential beneficial microorganisms have been identified in traditional wine cultivars, in contrast little is known about cold-climate cultivars.

This project investigates how microbial communities vary between wild native grapes and agrosystems such as vineyards of Northeastern America. This will help in the discovery of yeast and bacterial species essential to wine quality and guide future sustainable farming practices.

Student Responsibilities: During the fall, the student will specifically work along with another experienced student on developing a DNA extraction for microbes present on the surface of the grape berries. If staying during the following Spring, the student could be involved in the bioinformatics aspects of the study, publication of the work and presentation of a poster at the Undergraduate Student Conference.

The student would meet once a week for 30 min with the supervisor Elsa Petit to talk about microbiomes of plants, publications on the subject and report on lab work and work under the supervision of another student with experience in DNA extraction in the Dr. Petit's lab.

Qualifications: GPA at or above 3.5, starting Junior or Senior year, Lab experience with molecular biology or DNA extraction. The student should have an interest in either ecology, evolution, enology, molecular biology, or bioinformatics.

Time Commitment/ Compensation: 3 to 9 hours a week including meeting time and lab work. Preferable if student can extend through the Spring 2019. Independent study credits (graded project) only, 1-3 credits depending on weekly time commitment.

To Apply: Please contact Elsa Petit at epetit@umass.edu, include in the subject line "Independent Study on The native grape microbiome" along with resume, cover letter and transcript**.**

Justin Richardson, Assistant Professor — Soil Biogeochemistry

Department of Geoscience
jbrichardson@umass.edu
Morrill Science Center, 413-545-4840

Project Description: Investigating mineral weathering release of nutrients and toxic metals. We will be conducting laboratory experiments to quantify the release of nutrient metals (Ca, Mg, and K) and toxic metals (Cr, Hg, Pb) from rocks and soils collected throughout Massachusetts and Connecticut. The primary tasks for the position will range from physical processing of rocks and soils, making artificial soil solutions, and preparing samples for quantitative chemical analysis via inductively coupled plasma mass spectrometry.

Qualifications: Student must have completed General Chemistry. Additional but not required pre-requisites: Soil Science, Mineralogy, Geochemistry, Microbiology.

Time commitment: At least 6 hours of work per week, up to 20 hours per week maximum. This project will take place beginning Fall 2018 and extend through the Spring 2019 semester and beyond. Sophomores and Juniors are highly encouraged to apply.

Compensation: Three types of compensation are available: independent study credits; practicum credits; or paid hourly wage. Please state desired compensation when inquiring

To Apply: contact Dr. Justin Richardson (jbrichardson@umass.edu) with a resume, latest transcript (unofficial is fine), and brief cover letter of interests in science and why you are applying for the position.

Allison Roy, Research Assistant Professor — Freshwater & Fish Ecology

Environmental Conservation/US Geological Survey
aroy@eco.umass.edu
317 Holdsworth Hall, 413-545-4895

Multiple positions are available in freshwater and fish ecology working with graduate students:

Project 1) Rearing freshwater mussels. Laboratory assistance for graduate project rearing freshwater mussels in a propagation laboratory (with Virginia Martell, MS student and Ayla Skorupa, PhD student). Work involves siphoning fish tanks to collect juvenile mussels and observing mussel development and enumerating mussels under a microscope. Students will also assist with maintaining juvenile mussel rearing systems, including: feeding, cleaning, and sampling mussels for growth and survival during experimental trials.

Qualifications: Experience with Microsoft Excel, Image Pro/Image J, sampling procedures, and statistical software, and a strong interest in aquatic ecology and laboratory-based research are preferred. The position requires dependability, attention to detail, initiative, problem-solving, and independence. The position is based at the US Fish and Wildlife Service Richard Cronin Aquatic Resource Center on Plumtree Road in Sunderland, MA, and students must have reliable transportation to the laboratory (5 minutes from UMass-Amherst and on the bus-line).

Time Commitment/Compensation: This position is for 2-3 practicum credits (6-9 hours/week), and preferred schedule availability will be blocks of 3-4 hours in the lab.

Project 2) Examining growth of River Herring. Laboratory assistance for graduate project examining age and growth of juvenile river herring (with Matt Devine, PhD student). Work involves extracting and mounting otoliths (fish ear bones) from small fish (< 100 mm) and counting growth lines from otoliths under a dissecting microscope. **Qualifications:** Students comfortable using microscopes and willing to work alongside others are encouraged to apply. Also looking for a student with database experience to help create an MS Access database for the river herring project.

Project 3) Emigrating River Herring & Identifying Zooplankton. Laboratory assistance for graduate project examining juvenile river herring emigration rates and environmental factors associated with migration to the ocean (with Meghna Marjadi, PhD student). We need assistance processing zooplankton samples and videos of emigrating river herring. The zooplankton work involves learning to identify zooplankton under the microscope. The emigration work requires watching and interpreting video footage and helping to manage a citizen science monitoring platform. The position is for 1-2 credits (3-6 hours per week) and students may work on one or both aspects of the project. Multiple positions are available, and ideally students will continue into the spring 2019 semester.

Time Commitment/Compensation: All positions are available for academic credit (1-3 credits, 3-9 hours/week), with possible extension into spring 2019 for selected projects. Compensation for work study students is possible.

Supervisors: Students will work directly with graduate student mentors and have the opportunity to participate in weekly lab meetings with the entire Roy lab group.

To Apply: Email Dr. Allison Roy (aroy@eco.umass.edu) with a resume/CV and letter/email indicating why you are interested in the position, experience, which positions you would like to be considered for, preferred number of credits, and general availability.

Honor's students interested in conducting aquatic research in 2019 are encouraged to apply.

When applying, please indicate which project(s) you would like to be considered for and your general availability. More information about Dr. Roy's research can be found at: http://www.coopunits.org/Massachusetts/People/Allison_Roy/index.html

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John Stoffolano, Professor — **Insect Physiology**
Stockbridge School of Agriculture — **stoff@umass.edu**
204A Fernald Hall, 413-545-1046

Project Description: Multiple Project Available- see list below (continued on next page)

1. Using hormone therapy on flies injected with the house fly virus to see if it is possible to reverse the viral effect on both mating and egg development.

2. Do field data collecting within the state of Mass. to provide important information about the occurrence of sore mouth (ORF) of sheep and goats and also its presence in slaughter houses.
3. Determine if the labellar glands of flies are innervated or what stimulates their secretion.
4. Determine if the queen blow fly when bubbling shares it with females
5. Determine the effect of chitosan (an antimicrobial organic) on survivorship in flies.
6. Determine the effect of the house fly virus on intake of carbohydrates and/or proteins
7. Determine the quantity of food ingested when fed chitosan and sugar alcohols
8. Determine the effect of chitosan on longevity of the queen blowfly, *Phormia regina*

Qualifications: Serious, hard-working, and dependable student interested in working with insects

Time Commitment: 3- 6 hours per week. Project can be extended to the spring semester and also possibly paid during intersession

Compensation: Graded independent study credits (1-2 credits). Paid, hourly position also available (with Federal work-study funding only)

To Apply: Contact Dr. Stoffolano via email stoff@umass.edu

Chris Sutherland, Assistant Professor **Wildlife Population Ecology**
Environmental Conservation **csutherland@umass.edu**
118 Holdsworth Hall, 413-545-1770

Project description: Seeking 1-2 undergraduate assistants to become involved in a project involving the American marten (*Martes americana*) in New Hampshire. Students will assist with data management for the first part of the semester in order to become familiar with the data, then be able to design their own independent research project to work on for the rest of the semester.

Over the past two winters, camera traps were set across the northern parts of New Hampshire. All of the photos collected have been identified to species. The next step is to identify individual marten by their chest markings for use in capture-recapture modeling. Analysis of these photos will enable us to evaluate how marten are distributed across the greater New Hampshire area.

The assistant will have the following duties:

- Enter data into Excel
- Assist with any necessary photo database cleanup and organization
- Identify individual marten in the photos
- Design and implement an independent research project

Time commitment: Student will be required to contribute 5-10 hrs to assigned projects per week. As this position is student-driven, applicants should be motivated, able to work independently, and have good organizational skills. Students involved in this project will have the opportunity to participate in other projects based on performance during the semester.

Compensation: These positions are unpaid. Academic credits are available, and we can offer 'independent study credits' for a graded project only, or 'practicum credits' as pass fail.

To Apply: Please contact graduate student Donovan Drummey (ddrummey@umass.edu) with a short paragraph describing your interest in the position, as well as any relevant experience or skills.

Paige Warren, Associate Professor **Wildlife & Urban Ecology**
Environmental Conservation **pswarren@eco.umass.edu**
216 Holdsworth Hall, 413-545-0061

Research Overview: Research in the Warren lab focuses on the impacts of urbanization on wildlife. Suburban development changes habitat structure, influences resource availability, and affects wildlife behavior. We are seeking laboratory technicians in Fall 2018 for two avian urban ecology studies, working with Aaron Grade and Kit Straley, PhD students in Dr. Paige Warren's lab.

Aaron's study is focused on the effects of perceived predation risk on House Wren nesting biology on an urban gradient. During summer field seasons, Aaron's crew monitors House Wren nests in nest boxes on private homeowner lands. They work in collaboration with Neighborhood Nestwatch Springfield, administered by the Smithsonian and U.S. Forest Service. They conduct avian, small mammal, and habitat surveys, monitor nests, and measure House Wren eggs and nestlings.

Kit's study is focused on the effects of suburban forests on Wood Thrush nesting ecology compared to larger, more intact forests. During summer field seasons, Kit's crew monitors Wood Thrush nests in forest patches around suburban Amherst and the forest of the Quabbin Reservoir. They find and monitor nests, place nest cameras to record parents, measure nestlings, perform habitat surveys, and collect nests for a nesting material and ectoparasite study.

******For any of the following positions, we require students to be able to fit their research hours into the work days Monday-Friday between 9 AM-5 PM, and to be able to work for 2-3 hour windows at a time. Successful candidates must be able to work 1-2 days per week for ~3 consecutive hours. ******

Position Descriptions/Qualifications/Instructions to Apply:

1) Mammal Camera Technician – Mammal camera technicians will be responsible for entering data by sorting through mammal camera trap photos. In addition, technicians will do miscellaneous data-related tasks. Undergraduates applying for this position must be responsible, careful and detail oriented, and hard-working. No prior research experience is required, but preference will be given to undergraduates who have an advanced understanding of small mammal and bird identification skills. Technicians will have the opportunity to learn small mammal identification, bird identification, and basic principles of scientific data collection and processing.

Time Commitment/Compensation: This is a **6 hour per week (i.e., 2 credit) position.** Students ***must*** have at least 6 hours of availability per week, preferably in blocks of at least 2 hours. Undergraduates that can work responsibly independently will succeed in this position.

To apply: Please e-mail a cover-letter outlining interests and previous experience, along with a CV/Resume with relevant experience, and a copy of unofficial transcripts to agrade@umass.edu.

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2) Data Management Technician – Data management technicians will be responsible for sorting and managing data on a Microsoft Access database and Microsoft Excel, along with entering and scanning data from datasheets. In addition, technicians will do miscellaneous data-related tasks such as backing up, validating, and sorting data, or other related tasks as needed. Undergraduates applying for this position must be responsible, careful and detail oriented, and hard-working. No prior research experience is required, but preference will be given to undergraduates who have an advanced understanding of database management and/or Microsoft Access. Technicians will have the opportunity to learn the basics of managing a Microsoft Access database and basic principles of scientific data organization.

Time Commitment/Compensation: This is a **3 hour per week (i.e., 1 credit) position.** Students ***must*** have 3 hours of availability between Tuesday – Friday and between 9 AM and 5 PM to work in the lab.

To apply: Please e-mail a cover-letter outlining interests and previous experience, along with a CV/Resume with relevant experience, and a copy of unofficial transcripts to agrade@umass.edu.

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3) Bird TV Technician – Videography technicians will be responsible for watching behavioral videos of bird adults feeding nestlings, and will be "scoring" (entering) behaviors using the program JWatcher. In addition, students may aid in miscellaneous data management tasks. Undergraduates applying for this position must be responsible, careful, observant, detail oriented, and hard-working. No prior research experience is required, but preference will be given to undergraduates who have had experience in bird research, and/or animal behavior (e.g., taken an ornithology or animal behavior course). Technicians will have the opportunity to learn the basis of behavioral observation and videography methods, bird behavior, and basic principles of scientific data organization.

Time Commitment/Compensation: This is a **3 - 6 hour per week (i.e., 1-2 credit) position.**

To apply: Please e-mail a cover-letter outlining interests and previous experience, along with a CV/Resume with relevant experience, and a copy of unofficial transcripts to agrade@umass.edu AND kstraley@cns.umass.edu. We are both looking for students to watch nest videos, so emailing us both is best!

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4) Nest Ectoparasite Technician – Nest ectoparasite technicians will be responsible for finding, sorting, identifying, and preserving invertebrate ectoparasites that occupy bird nests for a nest parasite study. Students may also aid in miscellaneous data management tasks. Undergraduates applying for this position must be responsible, careful, observant, detail oriented, and hard-working. This is a laboratory environment, and technicians are expected to observe proper lab safety rules. No prior research experience is required, but preference will be given to undergraduates who have had experience in invertebrate identification, and/or have worked in a laboratory environment. Technicians will have the opportunity to learn the basis of invertebrate sampling and sorting methods, and basic principles of laboratory work and scientific data organization.

Time Commitment/Compensation: This is a **6 hour per week (i.e., 2 credit) position.** Students ***must*** have at least 6 hours of availability (preferably in at least 2 hour blocks) between Monday– Friday and between 9 AM and 5 PM.

To apply: Please e-mail a cover-letter outlining interests and previous experience, along with a CV/Resume with relevant experience, and a copy of unofficial transcripts to agrade@umass.edu.

5) Nest Dissection Technician – Nest dissection technicians will be responsible for dissecting bird nests and identifying and weighing their component materials. Students will gain skills on nest dissection and become proficient in classifying and categorizing plant and other materials based on their appearance and other characteristics. Students may also aid in miscellaneous data management tasks. Undergraduates applying for this position must be responsible, careful, observant, detail oriented, and hard-working. This is a laboratory environment, and technicians are expected to observe proper lab safety rules once trained. No prior research experience is required. Technicians will have the opportunity to learn about the structure and materials of bird nests, and basic principles of laboratory work and scientific data organization.

Time Commitment/Compensation: This is a **6 hour per week (i.e., 2 credit) position.** Students ***must*** have at least 6 hours of availability (preferably in 3 hour blocks) between Monday– Friday and between 9 AM and 5 PM.

To apply: Please e-mail a cover-letter outlining interests and previous experience, along with a CV/Resume with relevant experience, and a copy of unofficial transcripts to kstraley@cns.umass.edu.

Matthew Winnick, Assistant Professor **Biogeochemistry**
Department of Geosciences **mwinnick@umass.edu**
Morrill Science Center

Project Description: The release of CO2 and N2O greenhouse gases from streams to the atmosphere has recently been recognized as a major flux within the global carbon cycle. However, little work has addressed the processes that control these fluxes and how they may respond to climate change. This project will seek to characterize the role of upland soil environments in controlling stream geochemistry and fluxes of greenhouse gases to the atmosphere in headwaters streams throughout the Connecticut River watershed. Specifically, we seek an enthusiastic undergraduate researcher interested in helping us address this question through a combination of field characterizations of stream and soil environments as well as laboratory analyses of stream- and soil-water geochemistry and greenhouse gas concentrations and fluxes.

Qualifications: GEOG 110 or equivalent introduction to Environmental/Earth Sciences required. Field geochemical methods experience (measuring pH, temperature, alkalinity, conductivity, etc.), laboratory experience, and/or GIS skills preferred.

Time commitment: Flexible, 3-10 hrs/week. Students interested in extending this work past Fall 2018 are preferred.
Compensation available: Flexible – able to support independent study, practicum, or paid hourly position (work study preferred)

To Apply: please send a brief cover letter describing your interests in this project and relevant experience along with a transcript to Prof. Matthew Winnick (mwinnick@umass.edu)

Jonathan Woodruff, Associate Professor **Sedimentology**
Brian Yellen, Research Assistant Professor
Department of Geosciences **woodruff@geo.umass.edu**
249 Morrill Science Center, 413-577-3831 **byellen@geo.umass.edu**

Project Description: Dams and Sediment in the Hudson

Hundreds of old, defunct dams were built on tributaries of the Hudson River to run mills. Today, many dams are being removed to allow for migratory fish passage and/or reduce liability from failing dams. This project will address needs identified by estuarine managers and regulators to assess the immediate impacts of sediment that is released when a dam is removed, as well as the longer term implications. The approach combines field observations with analysis of sediment movement using a proven hydrodynamic model. The project will develop watershed assessment tools for permitting dam removals and establish an improved scientific basis for considering the potential downstream benefits in regulatory decision-making.

Currently, the research team needs help with collecting and processing sediment cores. If possible, an undergraduate would join us in the field during mid-September to collect sediment cores from tidal marshes and mill ponds. Following the field work, s/he would help to open the cores and perform laboratory measurements on the sediments collected.

Qualifications: The ideal student would have demonstrated interest in geology, environmental, or wetland science.

Time Commitment: We are looking for a student who can work 8-10 hours per week this fall. If the student enjoys working in the lab, we would likely employ the student through the spring and possibly summer of 2019, possibly on other projects

Compensation: We are flexible with respect to compensation. If the student prefers salary, the pay is $11/hr (work study ok). The student can also complete a 3 credit independent study or practicum.

To Apply: Please email a resume (include GPA and relevant course work) and cover letter indicating your interest in geology/environmental science to Prof. Brian Yellen at byellen@geo.umass.edu .

Baoshan Xing, Professor **Environmental & Soil Chemistry**
Stockbridge School of Agriculture **bx@umass.edu**
410 Paige Lab, 413-545-5212

Project areas:

- Environmental behavior and application of engineered nanoparticles;
- Fate of engineered nanomaterials from nano-enabled products in simulated gastrointestinal systems;
- Interaction between engineered nanomaterials and plants;
- Biochar characterization and use

Qualifications: Students must have basic knowledge of chemistry and willing to work diligently. Honors students or others seeking long-term research experience are encouraged to apply.

Commitment: Nine to twelve (9 to 12) hours/week anticipated.

Compensation available: Graded Independent Study credits only.

Duration: It is preferred that students can extend their research to Spring 2019 (maybe summer 2019 too) for completion of the project and producing meaningful/publishable data.

For the summer of 2019, paid internship is potentially available, depending on the performance of the students during the semesters.

To apply: Contact Professor Xing (bx@umass.edu) with a resume and a statement of interest

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Other campus research opportunities can be found on the Biology Research Site:

BURA (https://www.bio.umass.edu/bura/content/welcome)

Off-Campus Internship Opportunities

Town of Palmer, Conservation & Planning Department

Angela Panaccione, Conservation Agent conservation@townofpalmer.com
Town of Palmer, 4417 Main Street, Palmer, MA. 413-283-2687 (cell: 413-222-4934)

Description/Duties: Looking for two interns for this year. The focus would be split between administration and enforcement of the Wetlands Protection Act and Conservation Land Maintenance. This would consist of attending Conservation Commission meetings, recording and typing minutes, attending site visits, reviewing site plans and helping draft permits under the Wetlands Protection Act and the Town Wetlands Ordinance. The Conservation Land Management would include boundary marking and GPS locating survey points in the field from deed descriptions as working with SCA AmeriCorps and local scout troops to administer a recreational trails grant for a universally accessible river walk.

There is also an additional internship opportunity working on stormwater mapping and monitoring in coordination with town's Department of Public Works (DPW).

Qualifications/Eligibility: I'm normally looking for Juniors or Seniors, with a focus in either Environmental Policy/Land Use or Environmental Planning/Natural Resources Conservation. Stormwater intern will need valid driver's license and must provide own transportation (but will be reimbursed for mileage).

Time Commitment: Flexible. Time commitment will determine academic credit awarded.

Compensation: Academic credit can be awarded (with campus faculty sponsor). It could either be a graded independent study course, or a pass/fail practicum, or a project could be tailored to meet senior thesis requirements. Three hours per week equates to one academic credit.

Contact: Angela Panaccione about internship position. Successful candidates can coordinate academic credit through Deb Henson (dhenson@eco.umass.edu)