

SUMMER 2020 Undergraduate Research Opportunities For Environmental Majors

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. Some of these research opportunities are paid positions. Read each posting carefully to see what compensation is available.

Basic Instructions:

- 1) Student should review list of available projects below, and then contact faculty members directly to learn more about project expectations and qualifications (if any) that are needed. **Students must provide the following information with their inquiry:**

***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/availability required for the project based on the advertisement listed here. Indicate "SUMMER RESEARCH INTERN" in the subject line of your email.**

- 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/wp-content/uploads/2011/11/ENVSCI_IndepStudyForm_fields.pdf

Instructions for completing the form are provided on-line within the same document link. 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.

- 3) **To enroll for SUMMER Credits, the completed Independent Study Contract must be delivered to the ENVSCI Program Office at 310 Holdsworth Hall before the end of the Spring semester. Additional paperwork is required to enroll through University Without Walls for Summer credits.** You will be guided through this process. Please note that there is an additional tuition cost for enrolling in summer credits. (Note: It may be possible to roll-over some academic credit into the Fall term, depending on what follow-up written report might be required and when this work is conducted.)

SEE LIST OF FACULTY RESEARCH INTERESTS ON NEXT PAGE.

~ Environmental Research Opportunities ~ Summer 2020~

Amanda Bayer, Extension Asst. Professor
Stockbridge School of Agriculture
210 Bowditch Hall (413)-545-1059

Sustainable Landscape Horticulture
abayer10@umass.edu

Description: There is a growing public demand for more sustainable landscapes that support the environment. The first steps to a sustainable landscape is appropriate plant selection, proper planting techniques, and plant care during establishment. Native plants are touted to require less water, but even native plants are classified by water-use. A common theory is that native plants and drought tolerant plants require less water and care during establishment. This study will assess landscape establishment of three drought tolerant and three drought intolerant native plant species under two irrigation strategies.

Duties: The student will be helping with experiment setup, maintenance of plant material, and data collection. Experiment setup will involve planting shrubs and helping assemble the irrigation system. Maintenance of plants will involve monitoring plants for signs of stress and reporting any issues to me. Measurements will include plant growth parameters (plant height and width and root growth). The student will learn about and use various pieces of equipment including a leaf porometer, SPAD meter, leaf spectrometer, and soil moisture sensors. The student will be responsible for compiling data in excel.

Location of activities: UMass Research Farm in South Deerfield and some work at CNS greenhouse on campus

Qualifications: The student must have the ability to work independently and be responsible. Attention to detail is needed for using equipment properly and taking accurate measurements. The student should have experience and interest in plant material and horticulture. The student will need to be able to transport themselves to the various research areas.

Time Commitment/Schedule: Starting May 10, 2020. 12-15 hours/week for 14 weeks. Schedule is somewhat flexible but availability in May is necessary.

Compensation: Hourly student employee – funding pending for paid research positions. A paid position will be dependent on funding from the CAFÉ summer scholar program, otherwise it would be an independent study.

To Apply: Contact Dr. Mandy Bayer, abayer10@umass.edu with your resume/CV and letter/email indicating interest, relevant experience, and availability.

David Boutt, Professor
Department of Geosciences
248S Morrill IV, 413-545-2724

Hydrogeology
dboutt@geo.umass.edu

Title: Groundwater sampling in Lawrence Swamp, Amherst, MA

Description: This project will primarily be focused on sampling groundwater wells in Lawrence Swamp, Amherst, MA. Additional support sampling groundwater in the western MA area may be needed. These samples will be used in a master's project looking at mechanisms for manganese

dissolution and transport in Massachusetts aquifers. Lab work filtering samples, preparing samples, etc. may be included in project if student is interested.

Supervisor: LeAnn Zuñiga (grad student, email: lzuniga@umass.edu). Faculty supervisors may include Dave Boutt and Justin Richardson

Qualifications: Prior experience collecting water samples is preferred, but not required. Ability to hike in tall grasses/carry equipment up to 20 lbs.

Time Commitment/Duration: ~7hrs/week, 10 weeks (going out generally every other week)

Compensation: Paid Hourly or practicum credits

To Apply: Email lzuniga@umass.edu with your interest and availability. Deadline: April 30th

Dwayne Breger, Extension Professor
Department of Environmental Conservation
209 Agricultural Engineering Building, 413-545-8512

Clean Energy Extension
dbreger@umass.edu

Description: UMass Clean Energy Extension (CEE) is looking for a student to work with us on a project recently funded through the National Renewable Energy Laboratory, Solar Energy Innovation Network, Solar in Rural Communities program. The project be a collaborative effort with regional planning agencies, local solar developers, UMass Five Federal Credit Union, state agencies, and 3 Massachusetts towns, to develop replicable models for rural communities to proactively plan for solar PV development in their jurisdictions. The project will engage with the communities with mapping tools to identify available development options, identify electric grid infrastructure, and survey stakeholders and constituents regarding preferred solar siting and financing methods. The student's main role will be to review and analyze federal and state policy opportunities regarding solar development, including federal and state solar incentives, MA solar program regulations, local siting and zoning by-laws, and solar siting and by-laws in other states.

Project supervisors: the student will be jointly supervised by CEE staff – Director Dwayne Breger, Associate Director River Strong, and Research Fellow Zara Dowling

Qualifications: strong research, writing, and communication skills a must; experience in policy helpful

Time Commitment: 20-40 hours per week, for 10-12 weeks over the summer

Compensation: hourly student employee, or independent study/practicum credits available

To Apply: Priority will be given to applications received by March 27, but we will also consider applications received after that date.

Isla Castañeda, Associate Professor
Department of Geosciences
233 Morrill Science Center II, (413) 577-1124

Biogeochemistry/Climate science
isla@geo.umass.edu

Project Summary/Description: The Antarctic Circumpolar Current (ACC) is a primary driver of global thermohaline circulation as it redistributes water and heat between the Pacific, Atlantic and Indian Oceans. However, variability in the latitudinal positions of ACC frontal systems such as the Subantarctic Front remains poorly constrained over geologic time due to a lack of continuous marine sedimentary records. In order to better constrain the effect of the ACC on global climate and improve future climate models, it is important to reconstruct ACC dynamics over an extended time interval. Sea surface temperature (SST) reconstructions provide an efficient method with which to reconstruct ACC frontal changes, however, until recently no South Pacific SST records existed older than ~0.5 Ma. One South Atlantic SST record, from ODP Site 1090, offers the only existing constraint on Pliocene ACC dynamics to date. In this study, we will reconstruct past SST in the time interval from 3.5 to 1.5 million years ago using three different organic geochemical methods. One is based on lipids of alkenones (haptophyte algae, coccolithophorids), one is based on lipids of long-chain diols (produced by diatoms), and one is based on membrane lipids of thaumarchaeota (mesophyllic archaea that are abundant in the oceans). Together, these three methods will generate a robust SST record that will be examined to determine past shifts in the ACC and resulting impacts on global climate.

Location: Morrill Science Center UMass (Biogeochemistry Lab)

Supervisors: PhD student Rebecca Smith and Professor Isla Castañeda

Duties/Qualifications: This project is a laboratory-based research project. We have obtained ocean sediment (mud) samples from Site U1450 in the South Pacific Ocean. Required student skills include interest in studying past climate/ocean variability; ability to pay close attention to detail (it is important that laboratory procedures are followed carefully; we will provide training), good organizational skills, ability to communicate verbally and via email to other project members, and familiarity with making spreadsheets in Microsoft Excel. The student must be able to work in a fume hood (although no prior experience is required), which requires standing for several hours a day. The student will use organic solvents to extract and isolate ancient molecules preserved in ocean sediments. These samples will then be analyzed by the student by gas and liquid chromatography and mass spectrometry to isolate temperature-sensitive compounds. The student will integrate compound peaks using ChemStation software, export the data to Microsoft Excel, and apply equations to calculate past sea surface temperature. We will provide detailed training for all steps.

Time Commitment/Duration: The project will continue throughout the entire summer; we would like to have someone involved who can be here for at least 2 months (although we are flexible; e.g. taking a week or two off in the middle of the summer is fine). 15 hours/week minimum up to 30 hours/week. There are also opportunities to turn this project into a senior thesis or an Honors Thesis project.

Compensation: Independent study or practicum credits

To Apply: Deadline - April 10th

Interested students should email isla@geo.umass.edu and rasmith@geo.umass.edu and provide a brief statement addressing the following question: Why are you interested in this position and what do you hope to gain from this experience?

Brian Cheng, Assistant Professor
Environmental Conservation
115 Holdsworth Hall, 413-545-2454

Marine Global Change Ecology
bscheng@eco.umass.edu

Marine Ecology Research Technician Position



Location: Gloucester, MA

Employment Period: May through August 2020 (some flexibility in dates)

Supervisors: Jordanna Barley and Alysha Putnam (PhD students) and Brian Cheng (PI)

Salary: \$12.75/hour (\$6,120 for summer, 30-40 hours per week for 12-15 weeks)

Project Description: The Marine Global Change Ecology Lab at UMass Amherst (<https://bscheng.com>) is seeking a highly motivated and enthusiastic technician for the summer of 2020 to assist with marine field and lab research. We are broadly interested in the effects of climate change on ecological and evolutionary processes in the marine environment. The technician will assist with several projects, including but not limited to: 1) understanding the mechanisms of range limits in an ecologically important salt marsh crab, 2) understanding how increasing ocean temperature affects marine species physiology and evolutionary processes, and 3) understanding how climate change will affect American lobsters. The research will be conducted at the Gloucester Marine Station, operated by UMass Amherst with occasional field work in coastal Massachusetts waters (e.g. Cape Cod).

Duties: We are seeking a self-motivated, hard-working, and team-oriented individual. The technician will assist in the collection of marine organisms from marine environments in potentially hot, humid, windy, wet, or cold conditions. Ability to work closely with others in these conditions is a must. The position is considered full time for the summer and will be paid a regular weekly stipend, although hours may vary week to week. On the job training will be provided and will require participation in May for safety training. The technician will also be spending time in the lab culturing and acclimating marine organisms for experiments. The successful candidate will be able to work in a team and conduct precise data collection for these research projects. Candidates with housing in the north shore Massachusetts are encouraged to apply.

Specific tasks:

- Assist with collection of marine organisms in marine environment (e.g. salt marsh, rocky intertidal, nearshore coastal waters)
- Assist in daily care and maintenance of marine fish and invertebrates, including feeding, cleaning of tanks, and maintenance of aquarium equipment and water quality
- Aid in set-up of experimental design and general maintenance of laboratory cultures (plankton)
- Collection of field ecological data (abundance and community composition)
- Data collection and entry, quality control and assurance of data

Qualifications/Specific requirements:

- Prior field and laboratory experience
- Ability to work independently and within a team
- Proficiency MS Office suite and computing, proficiency in R computing language is ideal but not required

- Small organism culture experience, although not required- training will be provided
- Must hold a valid driver's license

To Apply: All interested applicants should email Jordanna Barley at jbarley@umass.edu with the following as one PDF file:

- cover letter briefly describing your interest and fit for the position, preferred start and end dates, need for housing (not required)
- CV with contact information, pertinent experience, relevant coursework, contact information for two references (at least one academic)
- Unofficial transcript

Please submit applications by **March 20th 2020**, however the position will remain open until filled. Questions can be emailed to Jordanna Barley at the above address.

Michelle DaCosta, Associate Professor
Stockbridge School of Agriculture
310 Paige Laboratory, 413-545-2547

Plant Stress Physiology
mdacosta@umass.edu

Project description: Our lab investigates physiological strategies that plants use to survive environmental stresses, including drought and temperatures extremes. Most of our research involves the study of grasses that are commonly used for turf, forage, and bioenergy. We are looking for a motivated student to assist in ongoing research projects consisting of both field, laboratory, and greenhouse experiments.

Location of work: Student will be working on the UMASS Amherst campus (Paige Lab, CNS Greenhouses) as well as the Joseph Troll Turf Research Facility in South Deerfield.

Supervising Individuals: In addition to the lab PI, the student will also be supervised by graduate students in the lab, Rachael Bernstein and Jefferson Lu.

Qualifications: The student must have willingness to work under potentially adverse environmental conditions in the field. Students with prior research experience working in a greenhouse or laboratory is desirable, but not required. We need someone that is highly organized, responsible, and pays attention to detail!

Valid driver's license is required along with ability for transportation from campus to research facility in South Deerfield.

Time Commitment/Duration: We are looking for one full time person, preferably up to 40 hours per week, but we will also consider individuals with a minimum time commitment of 20 hours per week. Project will run May through the end of August.

Compensation: Student can earn \$13-15/hour, depending on experience. Academic credit is also an option if desired by the student.

To Apply: Please send inquiries to Rachael Bernstein (rpbernst@umass.edu) and copy Dr. Michelle DaCosta (mdacosta@umass.edu) by Friday March 27.

Joseph Elkinton, Professor
Environmental Conservation
309 Agricultural Engineering Bldg, 413-545-4816

Entomology & Forest Pests
elkinton@ent.umass.edu

Title: Invasive Insect and Weed Biological Control

Description: The rate of introductions of invasive nonnative insects and plants is increasingly yearly, resulting in widespread disruptions to many ecosystems. In the Elkinton lab, we study the population dynamics and evolution of nonnative pestiferous insects and weedy plants. In particular, we focus on the invasive forest pests including Hemlock woolly adelgid (*Adelges tsugae*; HWA), Gypsy Moth (*Lymantria dispar*), Winter Moth (*Operophtera brumata*), and Emerald Ash Borer (*Agrilus planipennis*), as well as invasive plants such as Japanese knotweed (*Reynoutria japonica*). We are looking for highly motivated work study students interested in gaining laboratory experience to aid in the study and control of these (and other) invasive insects and weeds. Work in the lab is highly dynamic, and may include a mixture of field work, insect or plant colony maintenance, and/or molecular analyses, and can be tailored to suit individual student's interests. Selected students will work with a team of researchers from the Elkinton Lab, USDA APHIS, as well as state and local agencies.

Supervisors: Dr. Joseph S. Elkinton and Dr. Jeremy C. Andersen (postdoc)

Qualifications: Experience with basic lab techniques; experience working with insects is desirable but not necessary.

Time Commitment/Duration: Up to 40 hours/week throughout the summer. Ideal candidate will be able to continue working on projects through the Fall 2020 semester as either a work study student or as an independent study.

Compensation: Paid hourly position if student has Federal Work Study available.

To Apply: Interested students should send a brief statement (1-2 paragraphs) that includes a summary of your research/career interests, and a copy of your C.V. (resume) to Dr. Andersen - jcandersen@umass.edu

Evan Grant, Adjunct Faculty
Environmental Conservation (Adjunct)
U.S. Geological Survey, Research Scientist
USGS Patuxent Wildlife Research Center, Turners Falls, Massachusetts

Wildlife Biology & Ecology
ehgrant@usgs.gov

Multiple, full-time, paid research positions available this Summer working with USGS scientists at the Patuxent Wildlife Research Center/Conte Anadromous Fish Lab in Turners Falls Massachusetts.

Students must have their own transportation to/from the Conte Lab in Turners Falls.

To Apply for any of these positions: Email Evan Grant (ehgrant@usgs.gov) with a copy of your resume, indicate which project you are most interested in, and include a statement about why you are interested in this project. Applications should be submitted by 27 March 2020. Interviews will be conducted shortly thereafter.

Project 1) Population disease connectivity

Description: A central debate in conservation biology are the tradeoffs in host population connectivity for dampening or exacerbating disease risk. Disease risk can increase for well-connected host populations if it facilitates disease spread; alternatively, well-connected population can decrease disease risk if population connectivity increases host genetic diversity or introduces an alternative host that dampens the effects of disease.

This project will involve investigating the role of population connectivity in facilitating or dampening disease risk. The student will be in charge of cultivating bacteria, setting up the experiment, and collecting data. The student will vary the degree of population connectivity among bacterial populations, and measure how rapidly a pathogen spreads through the population and bacterial genetic diversity over time. The student will gain experience in data collection, lab techniques, and experimental design. The student will also be in charge of writing a manuscript and analyzing data to be submitted to a peer-reviewed journal with our guidance.

Qualifications - Strong interest in disease ecology; Strong interest in pursuing graduate school (ideally in ecology); Easy to work with; Follows instructions; Responsible and considerate; Independent worker/thinker; Mindful and careful; Motivated and ambitious

Time Commitment: 40 hrs/week for 8 weeks.

Duration: Start date: 15 June 2020. End date: 07 Aug 2020

Compensation: \$15.25/hour student employee

Project 2) Turtle repatriation

Description: Illegal export of turtles is a significant factor in the conservation of native US turtle species. Multiple agencies are responsible for intercepting illegal trade, housing confiscated turtles, and returning individuals to the wild or to captive centers. Each agency must make decisions about what actions they can take. Some of these decisions may depend on test results such as whether or not a turtle is diseased, or the genetics of an individual. Agencies, including the US Fish and Wildlife Service, need a tool to help make these decisions.

The project will involve summarizing information from case studies for the wood turtle and spotted turtle, using this information to build a 'decision tree,' which is a predictive model for a decision analysis that helps identify the best decision to make for a range of scenarios. The results will be summarized in a report and an excel spreadsheet tool for the US Fish and Wildlife Service and State agencies.

The student will gain experience in turtle ecology, decision-making and decision analysis, quantitative decision analysis models, and report writing.

Qualifications / skills:

- Strong interest in conservation biology & quantitative modeling
- Strong interest in turtle ecology
- Easy to work with
- Follows instructions
- Responsible and considerate
- Independent worker/thinker
- Mindful and careful
- Motivated and ambitious

Time Commitment 40 hrs/week for 8 weeks.

Duration: Start date: 15 June 2020. End date: 07 Aug 2020

Compensation: \$15.25/ hour student employee

Project 3) Salamander-ticks

Description: Tick-borne illnesses are an increasing threat to public health, but few methods exist for controlling tick populations. The abundance of ticks in a forest is related to the broader wildlife community and increases with the availability of hosts such as deer and small mammals. However, it is less clear which species in a forest act as a negative control on tick populations. The red-backed salamander preys on forest floor invertebrates and has documented effects on detrital invertebrate abundance and composition. There are reports that red-backed salamanders do consume ticks in a lab setting and may prefer ticks over other prey.

This project involves the quantification of the effects of red-backed salamanders on tick populations by designing experimental mesocosms in both lab and field settings. The student will be responsible for collecting data, caring for animals in the mesocosms, and analyzing and reporting results.

The student will gain experience in animal care, data collection, and experimental design. The student will also be in charge of writing a manuscript and analyzing data to be submitted to a peer-reviewed journal with our guidance.

Qualifications / skills:

- Strong interest in experimental design
- Strong interest in ecology and food webs
- Understanding of proper animal care
- Easy to work with
- Follows instructions
- Responsible and considerate
- Independent worker/thinker
- Mindful and careful
- Motivated and ambitious

Time Commitment: 40 hrs/week for 8 weeks.

Duration: Start date: 15 June 2020. End date: 07 Aug 2020

Compensation: \$15.25/hour student employee

Project 4) Salamander-subsurface

Description: Woodland salamanders (*Genus Plethodon*) are a diverse and diminutive vertebrate taxon, for which challenges exist for studying their movement ecology because most species are fossorial (spending time belowground) and thus unavailable for capture for much of their life. Yet, a more complete understanding of movement is needed to improve their management and conservation. *Plethodon* natural history is highly moisture- and temperature-dependent in forested ecosystems.

This project involves using a novel vertical antenna system and tagging method for detection and vertical tracking of terrestrial salamanders in soil mesocosms. The student will be responsible for collecting data, caring for animals in the mesocosms, and analyzing and reporting results. The student will gain experience in animal care, data collection, and experimental design. The student will also be in charge of writing a manuscript and analyzing data to be submitted to a peer-reviewed journal with our guidance.

Qualifications / skills:

- Strong interest in experimental design
- Strong interest in ecology and food webs
- Understanding of proper animal care
- Easy to work with
- Follows instructions
- Responsible and considerate
- Independent worker/thinker
- Mindful and careful
- Motivated and ambitious

Time Commitment 40 hrs/week for 8 weeks.

Duration: Start date: 15 June 2020. End date: 07 Aug 2020

Compensation: \$15.25/ hour student employee

Masoud Hashemi, Extension Professor

Sustainable Farming Systems

Stockbridge School of Agriculture

Masoud@umass.edu

207 Bowditch Hall, 413-545-1843

Description: Improper fertilization can affect yield and often have detrimental impacts on the environment. The objective of this study is to more closely pinpoint the exact N requirement of kohlrabi and to introduce an innovative method for a quick N sufficiency test. We will use the petiole sap nitrate-N test for guaranteeing that kohlrabi plants receive timely and enough nitrogen during the growing season while preventing over-fertilization.

Qualifications: The candidate must be graduating in May 2021, must present the research project as a poster in September 2020, and must show very high motivation for the field and lab works.

Time Commitment/Compensation: If the research receives funding, the student will be involved in every step of the research and will receive a stipend of up to \$4,000 for a period of May 15-August 29." Additionally, the student can also register for academic credit in the form of independent study.

To Apply: Contact Dr. Masoud Hashemi at masoud@umass.edu to arrange for a 15 minutes in-person interview.

Christine Hatch, Extension Assoc. Professor

Water Resources & Climate Change

Department of Geosciences

chatch@geo.umass.edu

233 Morrill Science Center, 413-577-2245

Project Title: Making and Monitoring Microclimates in the Wetland

Project Description: The Hydrologic Understory is an integrated research and extension project that explores groundwater flowpaths, surface water mixing, underground thermal regimes and soil moisture monitoring to map out the interconnected web of hydrology and ecology beneath the surface ultimately helping guide management of the forests, including desirable native species, cold water fish habitat and optimal water quality. It takes place in a cranberry-bog-turned-restored-freshwater-wetland, the largest in Massachusetts. Now part of the MassDER program dedicated to cranberry bog to wetland restorations in Massachusetts, measurable metrics and tools to assess the success of such efforts are especially critical and timely. Foothills Preserve was in cranberry cultivation until October 2015, was acquired by the town of Plymouth for restoration (which was recently funded and is out-to-bid), as it presents valuable headwater habitat.

The undergraduate student scholar will work with graduate student(s), PI, and restoration designers to create a "hand-restored" test section of microtopography on site. The summer scholar's work will contribute a vital piece to the restoration puzzle by helping quantify how effective is using microtopography to create microclimates and diverse moisture regimes amenable to wetland plants, and whether this technique is worth the expense of implementing it. In addition, these in-situ interpretations can help guide interpretation of broader, less detailed sensing data. In addition, the scholar will likely assist with reference plot soil sampling and analysis, installation of two additional monitoring stations on site, and preparing on-site equipment for restoration construction.

Duties: The student will engage in a detailed field and laboratory investigation of restoration practice designed to turn a formerly agricultural ground surface through the use of excavators to generate microtopography and bring freshwater wetland soils and seeds back to the surface. The Scholar will help create a "hand-restored" test section of microtopography on site. This step is highly experimental, and will require some on-site problem solving: real fieldwork in action! Soil moisture, a primary indicator of wetland condition, will be documented in detail. In addition (s)he will conduct detailed soil moisture data using a field probe will be collected along several transects at the restoration site as well as previously-restored, and retired (control) sites. Much of the fieldwork will be completed over several weeks, separate or consecutive, at the site (lodging is provided, stipend will supplement travel and per diem costs). Throughout the planning, design, implementation and analysis of this summer scholar's project and data, the scholar will receive individual mentoring, training and supervision from the PI and graduate student(s) for field and laboratory work. The research team will be available over the summer for guidance and group mentoring.

Qualifications/Skills: The student must have the ability to work independently and be responsible, field work requires acute attention to detail for successful notes and measurements. Enthusiasm, willingness to get into the muck and patience are also a plus! Priority given to students who have worked on this project during the Fall or Spring Semester.

Time Commitment: This will require an average of 20 hours per week but may be irregularly distributed throughout the summer, and will be flexible by arrangement. **Duration:** This project runs from 5/10/20 to 8/29/20. Student will be encouraged to continue with an independent study for the Fall 2020 semester.

Compensation: If this project receives funding, the student will receive a stipend of \$4,000; otherwise, independent study are available. 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 summer.

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

Scott Jackson, Extension Associate Professor

Environmental Conservation

328 Holdsworth Hall, 413-545-4743

Extension/Outreach

sjackson@umext.umass.edu

Project 1) Climate Change Adaptation Peer Learning and Network Building

Description: We are seeking a student to contribute to UMass Extension efforts to build community and capacity for climate change adaptation across the Commonwealth. The student will investigate and compile best practices in peer learning and knowledge exchange for our collaborative initiatives, and shared with other leaders of climate change social-impact networks. They will also assist with: helping plan the Mass ECAN (the Massachusetts Ecosystem Climate Adaptation Network Conference, developing monthly newsletters and other outreach materials, and supporting expert work groups. These activities will expose the student to a variety of real-world experiences in Extension work, facilitating collaborations with professionals from many different organizations.

Location of Duties: Preference for UMass Amherst, but could work remotely as long as able to meet in-person once/week in Amherst.

Faculty Summer Research Projects. Updated March 11, 2020.

Supervisor: Melissa Ocana, Climate Adaptation Coordinator

Qualifications: the student must have excellent communication skills and be organized and detail oriented. Familiarity with climate change topics and past experience with literature reviews and event planning a plus.

Time Commitment/Duration: Estimated at 20 hours/wk for 16 weeks, but schedule is very flexible to accommodate vacations and shift hours/week.

Compensation: hourly student employee (funding is pending for paid research position); option of independent study credits (graded project only) or practicum credits (Pass/Fail)

To Apply: Contact Melissa Ocana, mocana@umass.edu, with a resume and a few sentences explaining your interest in this position.

Project 2) Salt Marsh Research Internship

Description: Seeking a fulltime summer field technician to assist with assessing the health of Massachusetts salt marshes. The work involves field data collection via ground transect sampling, as well as assisting in the collection of remotely sensed data using unmanned aerial systems (drones). This is part of an EPA funded project to better understand stressors affecting salt marshes and develop climate adaptation strategies to ensure their persistence in the face of rising sea levels. The intern will be involved in field data collection, use of drones for data collection, GIS work, and the processing of images collected via UAS (a combination of field and computer work).

Location: Fieldwork will be along the coast of Massachusetts, including the North Shore, South Shore, Buzzards Bay, and Cape Cod.

Housing: Housing (dorm-style) is likely to be available near the coast on the North Shore and Cape Cod for periods of field data collection. Travel and housing expenses will be paid from the EPA grant.

Supervisors: The student will be supervised by Professors Scott Jackson and Charlie Schweik, with field supervision provided by field crew leaders Amanda Davis and Ryan Wicks.

Qualifications/Requirements: 1) UMass undergraduate student now and in the fall (not a graduating senior), 2) ability and willingness to negotiate difficult terrain and work in uncomfortable weather conditions, and 3) have your own car, or access to a car, for travel to field sites. Experience doing fieldwork and/or familiarity with salt marsh systems, preferred. Time

Commitment/Duration: The position is 35-40 hours per week, from mid-May through August.

Compensation: \$15/hour plus reimbursement for travel and other expenses. Funding is available from U.S. EPA and the UMass Center for Agriculture, Food and the Environment's Summer Scholars Program to support a fulltime summer field technician on this project

To Apply: To apply, send a resume and brief explanation of your interest to Amanda Davis at amandad@umass.edu . Deadline for applications is April 3.

Dave King, USDA Forest Service Research Wildlife Biologist
Environmental Conservation (Adjunct Faculty)
Holdsworth Hall (413) 545-6795

Forest Wildlife
daveking@eco.umass.edu

Project description: The King Lab is seeking a summer field technician to study the interface between wildlife populations and agricultural insect pest control. The candidate will be able to gain experience in ornithological and entomological fieldwork and genetics lab work. Our research focuses on the role of New England songbirds in agricultural insect pest control.

Duties: The technician would assist in (and could choose to take on as an independent project) determining experimentally how songbird pest suppression varies within a field and the preferential predation of songbirds between several insect pests. The technician would also aid in other aspects of our project, including helping with mist netting of songbirds (and optional genetic analysis of fecal samples) and insect pest abundance and damage surveys in a row crop experiment.

Qualifications: Strong work ethic. Willingness to work full days outside in high heat and humidity. Willingness to wake up before sunrise for early morning fieldwork. Ability to carry out field data collection in a standardized manner. Access to a personal car or ability to meet on UMass campus to carpool early in the morning. Preference will be given to candidates who demonstrate experience in bird and insect identification, mist netting, data collection for research, and excitement about taking on an independent project.

Project Location: UMass Amherst with local travel (~30 mi) – transportation to field sites from UMass will be provided or compensated for.

Supervisor: Sam Mayne (smayne@umass.edu), 2nd year master's student

Time Commitment/Duration: 40 hours/week from June 1 into August – dates and hours somewhat flexible

Compensation: Compensation will vary depending on experience. Up to \$560 per week for highly qualified candidates. Practicum and Independent Study credits are also an option.

To Apply: Interested candidates should email a brief cover letter (1 page), resume, contact information for three references, and dates of availability as a single Word or PDF document to Sam Mayne (smayne@umass.edu). Applications will be reviewed on a rolling basis until the position is filled.

Anita Milman, Associate Professor
Environmental Conservation
210 Holdsworth Hall, 413-545-3749

Environmental Policy & Governance
amilman@eco.umass.edu

Project Title: Groundwater, policy coordination, and politics

Project Description: Environmental policy is characterized by interactions across government agencies operating at multiple scales. Where agencies share jurisdictional authority over natural resources, coordination of knowledge, of goals, of policies, and of implementation is necessary. Yet many factors inhibit such coordination. This project examines inter-agency coordination and collaboration over shared water resources. Tasks will include review and comparison of legal, regulatory, and science documents; quality assurance of interview transcriptions, assistance in preparing outreach documents.

Location: Amherst or remote. If remote: student will be expected to report regularly, participate in conference calls, and demonstrate hours have been completed.

Supervising Individual: Prof Anita Milman and 2 graduate students

Qualifications: Ability to work independently, set and meet deadlines, communicate clearly, attention to detail, an ability to organize data and information. Coursework in environmental policy, legal studies, public policy, geography or political science field required. Coursework in water resources or geology preferred.

Duration of project: Up to 20 hrs per week

Compensation available: Paid, hourly.

To Apply: Send an email to amilman@eco.umass.edu that includes a statement of interest, an explanation of your qualifications, your GPA and resume, and a copy of a paper written for a course assignment.

Deadline for application: April 1, 2020.

Allison Roy, Unit Leader

Massachusetts Cooperative Fish and Wildlife Research Unit

Environmental Conservation, Adjunct Professor

Adrian Jordaan, Associate Professor, Environmental Conservation

Aquatic & Fisheries Ecology

aroy@eco.umass.edu

THESE POSITIONS WERE ADVERTISED PREVIOUSLY AND APPLICATIONS WILL BE REVIEWED STARTING ON 3/17/20, with interviews taking place the week of 3/23/20

**Summer 2020 Technician Positions in Aquatic & Fisheries Ecology
Massachusetts Cooperative Fish and Wildlife Research Unit
Department of Environmental Conservation, University of Massachusetts Amherst**

Multiple student technician positions for aquatic and fisheries ecology research projects (described below) are available in the in the Massachusetts Cooperative Fish and Wildlife Research Unit. All positions include on-the-job training and require participation in May for various safety trainings (e.g., CPR/AED & First Aid, Over the Water, Field Research Safety, Animal Use & Care). Positions are considered full time for the summer and students will be paid a regular weekly stipend, although hours may vary week to week and will allow for vacation time off (as agreed upon with supervisors). Preference for most positions will be given to rising juniors and rising seniors from UMass Amherst.

To Apply: email cover letter (with name, email address, and phone number for two references, including at least one academic reference), resume (with your local contact information, pertinent experiences, relevant coursework, etc.), and unofficial transcript to Dr. Allison Roy, Unit Leader, at aroy@eco.umass.edu. If you are interested in more than one project, please indicate your preferred order of consideration in your cover letter. Also indicate if you may be eligible for work study or have any restrictions on summer availability (students only available 10-12 weeks may be considered).

Review of applications will begin on Tuesday, March 17th and interviews will take place the week of March 23rd.

Project 1) River Herring Productivity (1-2 positions)

The technician(s) will assist on a project investigating river herring productivity in estuaries, large rivers, and coastal freshwater lakes and ponds in New England. The position is split between field work and lab work. For field work (15–20 days/month), juvenile fishes will be sampled at night in lakes from a boat using purse seines and during both day and night in estuaries using a combination of purse and beach seines. Additional sampling will take place for water quality, habitat quality, zooplankton, etc. When not in the field, technicians will be aging fish otoliths, identifying zooplankton, entering data, and organizing samples. The position is based at UMass Amherst but will require extensive extended overnight travel (> 2 weeks at a time) to field sites throughout New England. Lodging accommodations while in the field (paid by the Coop Unit) will vary and include hotels, university dorms, field stations, and camping.

Qualifications: Applicants with a strong background and interest in fishes and aquatic systems and have experience in field and laboratory settings are preferred. Must be able to swim, experienced on boats, and willing to work at night over the water. Teamwork and communication skills are essential. MOCC boat safety training will be provided.

Supervisors: Matt Devine (PhD student), Adrian Jordaan (PI), and Allison Roy (PI)

Employment Period: May through August 2020 (15 weeks) for 32 hours/week (on average)

Compensation/Salary: \$12.75/hour (\$6120 for summer)

Project 2) River Herring Emigration (1 position)

The technician will assist in evaluating what environmental and biological factors are associated with juvenile river herring productivity, growth rates, and departure from freshwater to the ocean. The position is split between field work (in CT and Eastern MA) and lab work. In the field, the technician will support video camera maintenance and installation, zooplankton sampling, and nighttime river herring sampling. In the lab, the technician will identify zooplankton, mount and age fish otoliths, and process emigration videos.

Qualifications: Preferred candidates will have attention to detail, ability to use a microscope, field work experience preferred (preferably aquatic), and flexibility in schedule. Must be able to swim, be comfortable on boats, be willing to work at night over the water, and have a valid driver's license. Lodging accommodations for overnight travel with night field work will be provided.

Supervisors: Meghna Marjadi (PhD student) and Allison Roy (PI)

Employment Period: May through August 2020 (15 weeks) for 32 hours/week (on average)

Compensation/Salary: \$12.75/hour (\$6120 for summer)

Project 3) Dam Removal (2 positions)

The technicians will assist a graduate student in a project examining the response of stream ecosystems to small dam removals across Massachusetts. This work involves downloading and deploying temperature loggers, deploying dissolved oxygen loggers, sampling stream macroinvertebrates, and potentially assisting with stream electrofishing in collaboration with biologists from MassWildlife. Additional lab work will include calibrating and maintaining equipment, sorting

macroinvertebrate specimens from debris using a dissecting scope and identifying to order, and data entry and quality control. This position is based in Amherst but will require driving to field sites throughout Massachusetts with USGS vehicles.

Qualifications: Applicants must have a driver's license and insurance, as well as the ability to swim and lift/portage a canoe. Preferred applicants will have a strong background and interest in water quality and stream monitoring, as well as dependability, attention to detail, and independence.

Supervisors: Kate Abbott (PhD Student) and Allison Roy (PI)

Employment Period: May through August 2020 (15 weeks) for 32 hours/week (on average)

Compensation/Salary: \$12.75/hour (\$6120 for summer)

Project 4) Drawdown Hydrology (1 position)

The technician will assist a graduate student studying winter lake drawdowns and their effects on downstream hydrology and ecosystems. Tasks will include installation and maintenance of hydrologic monitoring stations using pressure transducers, measuring stream flow and channel morphology, biological sampling of aquatic macro-invertebrates and algae, and sorting macro-invertebrates. Work will be conducted in the field, in and around streams and lakes, as well as in the lab sorting macroinvertebrates. This position is based in Amherst but will require driving to field sites throughout Massachusetts with USGS vehicles.

Qualifications: Technicians must be able to carry heavy objects such as buckets of water and steel piping, work long hours outside in inclement conditions, and have a valid driver's license and insurance. Preferred applicants will have an interest in stream ecology and have a flexible schedule.

Supervisors: Alec Baker (MS Student) and Allison Roy (PI)

Employment Period: May through August 2020 (15 weeks) for 32 hours/week (on average)

Salary: \$12.75/hour (\$6120 for summer)

Project 5) Freshwater Mussel Conservation and Propagation (1 position)

The aquatic technician will work with collaborators at the US Fish & Wildlife Service's Richard Cronin Aquatic Resource Center in Sunderland, MA (5 min from UMass-Amherst and on the bus line). Tasks include culturing freshwater mussels, running experiments, counting and measuring mussels using a microscope, recording data, cleaning and sterilizing equipment, and manual labor around the facility and outside in the raceways. The position also involves collecting water quality samples for eDNA within wadable streams in Massachusetts. The technician may also assist with freshwater mussel sampling with a UMass graduate student or staff with the MassWildlife Natural Heritage & Endangered Species Program.

Qualifications: Applicants must be able to travel to and from Cronin, comfortable in the water, willing to snorkel, have a driver's license and insurance to drive federal vehicles. Candidates who have high attention to detail and are excited about freshwater mussels are preferred.

Supervisors: Dave Perkins, Timothy Warren, and Virginia Martell (USFWS)

Employment Period: May through August 2020 (15 weeks) for 32 hours/week (on average)

Compensation / Salary: \$12.75/hour (\$6120 for summer)

Faculty Summer Research Projects. Updated March 11, 2020.

Matthew Winnick, Assistant Professor
Department of Geosciences
Morrill Science Center

Biogeochemistry
mwinnick@umass.edu

Project Title: Carbon fluxes from headwater stream systems

Description: This project seeks to characterize the role of headwater stream systems as sources of CO₂ to the atmosphere. The student involved will collect environmental chemical data that will be used by our lab to constrain and validate predictive models of stream carbon budgets. Duties will include sampling local streams and groundwater wells, conducting laboratory analytical measurements of stream chemistry, and organizing and plotting collected data. Additionally, depending on availability and student interest, this project may include a 2-week field trip to the Rocky Mountains in late June for additional stream sampling work.

Location of Activities: Fieldwork will take place 1-3 days per week within 1 hour of campus, and laboratory work will be based at UMass. There is the possibility of accompanying our research group on a field trip to Crested Butte, CO, working and lodging at the Rocky Mountain Biological Laboratory (www.rmbl.org). If included as part of the project, airfare and housing will be covered for this trip.

Supervisors: Prof. Matthew Winnick and PhD Candidate Brian Saccardi

Qualifications/Restrictions: The student should be comfortable with off-trail hiking in steep terrain. Experience with field and lab geochemical characterization techniques (e.g. water filtering, alkalinity titrations) and GIS are preferred. Experience with excel is required.

Time Commitment: Local field and lab work hours are relatively flexible, and may involve 5-20 hours per week depending on student interest and availability. If the student is involved in Colorado fieldwork, field sampling will involve 3-9 hours per day for roughly two weeks.

Compensation: We are flexible in supporting an hourly paid employee or independent study/practicum credits. (Housing and travel during the Colorado field trip will be supported if the student is involved.)

To Apply: Please contact Matthew Winnick (mwinnick@umass.edu) with a CV and 1-page cover letter describing your interest and experience. Deadline for applications will be April 3rd, though applications submitted by the priority deadline of March 27 will receive first consideration.

Jon Woodruff, Associate Professor
Department of Geosciences
Morrill Science Center

Sedimentology
woodruff@geo.umass.edu

Project Summary/Description: The project is assessing regional controls on salt marsh health through a synthesis of existing GIS, oceanographic, and remotely sensed data and the ongoing collection of observational and sedimentological data in the field. We are examining the supply and distribution of inorganic sediment (a key ingredient for marsh growth and sustainability) to a number of marshes around New England. Site specific methods involve mapping sediment availability and distribution via moored instrumentation, water sampling, and observations from boats, combined with a network of sediment traps.

The student will aid in field work and assist with all laboratory activities including determination of bulk density, grain size, and loss on ignition to assess organic content of marsh sediments. Applicants should expect to tromp around in muddy environments, spend a few days at a time in the field, and do physically demanding work. We also encourage applicants who cannot do field work to apply, but please state in which non-field responsibilities you are interested.

Project Location: Laboratory work in the Sedimentology Lab in the Geosciences Department and field work in saltmarshes along the Massachusetts and New Hampshire coasts.

Supervisor name and contact info: Jon Woodruff (woodruff@geo.umass.edu), Brian Yellen (byellen@geo.umass.edu), and Tim Cook (tcook@geo.umass.edu)

Qualifications: Some experience with data analysis via excel (or matlab) and GIS is preferred, as well as an interest in outdoor field work that requires the participant sometimes to get wet and muddy.

Time Commitment: Time commitment is flexible; students could work part-time or full time for all or part of the summer.

Compensation available: Students can be hourly employees, receive independent study credits (graded project), or practicum credits as desired by the student

To Apply: Students should submit a resume and cover letter describing their interest in the project to Jon Woodruff (woodruff@geo.umass.edu), Brian Yellen (byellen@geo.umass.edu), and Tim Cook (tcook@geo.umass.edu) by Friday, March 27. Please describe your availability/preference for the schedule (begin/end dates and hours per week).

Baoshan Xing, Professor
Stockbridge School of Agriculture
Paige Laboratory, 413-545-5212

Environmental & Soil Chemistry
bx@umass.edu

Project Description: Application of nanotechnology (nanomaterials) in agriculture

Research Location: Paige Lab and CNS greenhouse (both on UMASS Amherst campus)

Supervisors: Ph.D. student, Ms. Heping Shang and Dr. Baoshan Xing

Qualifications: the student must have previous lab experience with plants and wet chemistry

Time Commitment/Duration: 3 months; about 30 to 35 hour/week.

Compensation: hourly student employee, pending funding from CAFÉ Scholar Program

To Apply: Email your resume to Professor Xing (bx@umass.edu), along with a statement outlining your experience and why you are interested in researching the use of nanomaterials in agriculture.