SUMMER 2019
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 Continuing & Professional Education 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 2019~

Anne Averill, Professor **Pollinator Ecology**
Department of Environmental Conservation **averill@eco.umass.edu**
301A Holdsworth Hall, 413-545-1054

CRANBERRY INSECT ECOLOGY/BEHAVIOR/MANAGEMENT;
CRANBERRY POLLINATION & BEE HEALTH ON FARMS.

Description: Several paid summer research assistant positions located off-campus (Southeastern Massachusetts). We are 1) studying host-plant utilization by cranberry weevil and cranberry scale 2) surveying field populations/phenology/natural enemies at cranberry scale outbreak sites and assisting with cranberry scale identification (in collaboration with UMASS molecular lab) 3) assessing trap captures of cranberry fruitworm moths, 4) surveying native bee communities, 5) assessing bumble bee colony growth and parasite loads on commercial cranberry beds.

Location of activities: Research activity is all centered at the Cranberry Station Labs in East Wareham, MA. We will work as teams on projects at a UMass satellite unit with ca. 6 scientists and a staff of 20 located 5 miles from Cape Cod.

Qualifications: Students equally comfortable conducting field observations under hot, exposed conditions and lab work (dissections, microscope inspections, insect curation, and data entry/tally/chart) are sought. Note for CHC students: Dr. Averill will provide funding for supply costs to carry out an Honors Thesis Project loosely related to the above lines of applied research if you wish to continue this research after the summer and use as a thesis project.

Time Commitment/compensation: 40 hours/week. $12/hour. May 15-August 15. Flexible on hire months: but must be available June 1-July 15. One CAFÉ Summer Scholar Internship is available-- for the successful applicant, research stipend can be supplemented to defray housing costs. Housing is not available.

To Apply: Contact Professor Anne Averill (who will be supervisor) (Dept. Environmental Conservation, averill@eco.umass.edu)

Amanda Bayer, Extension Asst. Professor **Landscape Horticulture**
Stockbridge School of Agriculture **abayer10@umass.edu**
210 Bowditch Hall (413)-545-1059

Position 1:
Project Description. Plant establishment is key to landscape success and sustainability. There is anecdotal evidence that native plants are better adapted and quicker to establish in the landscape; however, this has not been proven with research. I am looking for a student to help with experiment setup and data collection on plant growth and establishment of native and exotic landscape plants. The student will also help with a salt tolerance study on ornamental shrubs. The student will also help with plot maintenance of a plant cold hardiness trial and other research and extension related activities.

Location of Activities: Research will be the Crop and Animal Research and Education Farm in South Deerfield, the CNS Greenhouses on campus, and the Cold Spring Orchard in Belchertown.

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/Compensation: 10-20 hours per week. Duration will be from May through August, ideally continuing into the fall semester. Paid hourly student employee or independent study credits available.

To Apply: Contact Dr. Mandy Bayer, abayer10@umass.edu with your resume/CV and letter/email indicating interest, relevant experience, and availability. Applications will be accepted until the end of the Spring semester.

Position 2:

Project Description. An increasing number of laws and regulations regarding water and nutrient runoff from plant production areas and growing consumer pressure for more sustainable production practices are necessitating that growers reduce irrigation and fertilizer applications. Reduced or deficit irrigation is becoming more common to reduce production inputs, to lessen the environmental impact, but also to control plant growth. Another growing trend is that consumers are interested in plants that support pollinators. The research question to be addressed is what impact reduced irrigation and fertilization practices have on plant pollen and nectar production. The student will also help with other research activities and will be given the opportunity to develop an experiment based on their interests. The student will need to participate in the fall poster session as part of the CAFÉ summer scholars program.

Location of activities: Research will be at the CNS Greenhouses on the UMASS Amherst 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.

Time Commitment/Compensation: 10-20 hours per week. Duration will be from May through August, with the potential to continue working in the fall semester. Hourly stipend available.

To Apply: Contact Dr. Mandy Bayer, abayer10@umass.edu with your resume/CV and letter/email indicating interest, relevant experience, and availability. Applications will be accepted until the end of the Spring semester.

Forrest Bowlick, Lecturer **Geographic Information Science**
Geosciences & Environmental Conservation fbowlick@umass.edu
Morrill Science Center IV Room #260, (413)-577-3816

Project Description: This project concerns understanding the knowledge, skills, and practice in geographic information science and technology (GIS) in specific contexts in higher education. It will review the curriculum requirements of GIS and related degrees at institutions which are ESRI Development Centers. These centers, positioned as high impact partnerships between industry and education, have an unknown impact on student learning at hosting institutions. Students in this project will analyze course curriculum at these institutions, discover integrations with ESRI DCs, and research how these institutions function differently, if at all, from other GIS programs.

Location: Anywhere with Internet.

Qualifications: GIS Experience; strong internet search skills; survey development skills; strong organization capacities

Time Commitment: Variable. Five hours a week on average.
Compensation: Academic Credit (40 hours of effort per 1 credit)

To Apply: Send email to Forrest Bowlick (fbowlick@umass.edu) by April 30th.

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

Project 1: Municipal Planning for Carbon Neutrality

Description: UMass Clean Energy Extension (CEE) is seeking an undergraduate student to help develop planning materials for municipalities seeking to achieve 100% renewable energy use. CEE provides support to Massachusetts municipalities working to improve energy efficiency and integrate renewable energy technologies into their communities. A growing number of Massachusetts cities and towns have passed resolutions committing to the goal of 100% renewable energy or zero carbon emissions. Introductory checklists and toolkits are available to aid communities in developing plans to move towards this goal, but the tools require further development and expansion to provide meaningful support for municipal planning.

Responsibilities: The successful applicant will work with CEE staff to conduct a literature review of existing tools, and reach out to environmental organizations and planning agencies within the state to identify necessary components of planning support tools. The student will help develop a series of fact sheets, spreadsheet tools, and planning guides, including a user-friendly greenhouse gas inventory tool for municipal use, and documentation of how to integrate CEE's GIS-based renewable energy resource assessment into carbon neutral planning. The student will be hired as a Summer Scholar through the Center for Agriculture, Food, and the Environment (CAFE) program, which provides networking, professional development, and field trip opportunities.

Project supervisors: Zara Dowling, CEE Postdoctoral Research Fellow will be the primary supervisor; student will also work with Dwayne Breger, CEE Director and River Strong, CEE Associate Director

Qualifications: Competency in Excel, basic data analysis, and basic GIS; literature review research abilities; good writing and interpersonal skills; comfortable initiating phone and e-mail contact with municipal officials

Time Commitment: 20-40 hours a week; at least 300 hours over the course of the summer (May 12-August 31), which equates to 20 hours a week for 15 weeks

Compensation: The student will be paid as an hourly student employee ($15/hour), through the CAFE Summer Scholar Program or through Clean Energy Extension.

To Apply: Priority deadline of March 31, if position is not filled immediately, applications will be considered after this date. Initial contact should be to Zara Dowling (zdowling@umass.edu).

Project 2: Energy Efficiency Programming – Researching Barriers & Opportunities

Description: UMass Clean Energy Extension (CEE) is seeking a student to help research and design innovative approaches to increase the success of residential energy efficiency campaigns. The successful applicant will conduct a review of existing energy efficiency programs, research studies, and barriers to implementation (e.g. workforce availability, customer attitudes), and prepare a report identifying recommendations and next steps. Throughout the project, the student will work closely with CEE staff and with members of the non-profit Ener-G-Save. Ever-G-Save is a philanthropically funded energy efficiency pilot project in the Pioneer Valley which facilities the MassSAVE energy assessment process, aids in finding contractors to do energy efficiency updates, and advises on additional energy savings options (e.g. heat pumps, solar installations). As timing allows, the student may also conduct outreach to municipal officials, volunteers, and local town residents regarding new energy efficiency initiatives.

Supervisors: River Strong, CEE Associate Director, will be the primary supervisor; student will also work with Dwayne Breger, CEE Director and Zara Dowling, CEE Research Fellow

Qualifications: Literature review research abilities; good writing and interpersonal skills; comfortable initiating phone and e-mail contact with municipal officials

Time Commitment: 20-40 hours a week, approximately 15 weeks (summer break)

Compensation: The student can be paid as an hourly student employee ($15/hour) or receive academic credit for this project.

To Apply: Priority deadline of March 31, if position is not filled immediately, applications will be considered after this date. Initial contact should be to Zara Dowling (zdowling@umass.edu).

Theodore Eisenman, Assistant Professor **Urban Greening**
Landscape Architecture & Regional Planning teisenman@umass.edu
333 Olver Design Building, 413-577-0858

Description: We are studying neighborhood residents' preferences for new tree plantings in cities across Massachusetts, using the Greening the Gateway Cities Program as a model (mass.gov/service-details/greening-the-gateway-cities-program).

Responsibilities: Alongside partners at Clark University, we are seeking multiple undergraduate students to conduct in-person interviews with 2 types of residents: those that have received new trees under the GGCP and those that have declined to receive new trees. Students will need to complete CITI human subjects research training before beginning the interviews. Data entry and initial data analysis work may follow the survey sessions.

Location of Activities: The interview locations will be local (i.e. Chicopee, Holyoke) and outside of the Amherst-area (i.e. Chelsea, Pittsfield). Transportation can be provided, although you may prefer the flexibility of using your own vehicle or traveling from your MA hometown.

Qualifications: The interview teams will always travel together, but the applicant must be comfortable approaching and speaking to neighborhood residents one-on-one. Bilingual students (esp. English + Spanish) are strongly encouraged to participate. Interest in urban greening, social-environmental research, and local community development 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:

- 1-credit (Pass/Fail) practicum at undergraduate and graduate levels.
- Independent study option may be available if the student would like to assume more responsibility for the qualitative analysis, including data entry (i.e. transcription) and analysis (i.e. open coding)
- Acknowledgement in any publication that emerges from this work.
- Opportunity to participate in future research on this topic.

To Apply: Please indicate your interest by e-mail no later than March 22, 2019 to graduate student Alicia Coleman (afcoleman@umass.edu)

Masoud Hashemi, Extension Professor **Sustainable Farming Systems**
Stockbridge School of Agriculture **Masoud@umass.edu**
207 Bowditch Hall , 413-545-1843

Description: One summer paid internship is available to assist with a field study to evaluate a new biofertilizer that may help improving soil health and reduce the use of commercial nitrogen fertilizer. In this trial the influence of various rates of biofertilizer application on yield and quality of sweet corn and lettuce as compared with commercial nitrogen fertilizers will be evaluated.

Summary of duties:

1- Participation in a poster session at the start of the fall 2019 semester is required.

2- Some field work experience is preferred.

3- the selected student must be willing to work outdoors in a variety of weather conditions.

4- The duties included but not limited to collecting soil and plant data and processing the samples in the lab.

5- progressive weekly report.

Time Commitment/Compensation: 20-24 hours a week, $12-14 per hour (based on experience and qualification), 12-15 weeks beginning late May-early June.

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

Scott Jackson, Extension Assistant Professor **Extension/Outreach**
Environmental Conservation **sjackson@umext.umass.edu**
328 Holdsworth Hall, 413-545-4743

Three projects available.

Project 1: Climate Change Adaptation Network Building and Communications

Project Description: We are seeking a student to assist with climate adaptation initiatives coordinated by UMass Extension, including: a community of practice for adaptation practitioners and researchers working on ecosystem resilience and natural resources conservation in our state called Mass ECAN (Ecosystem Climate Adaptation Network), and expert work groups on specific topics.

Responsibilities:

- Help plan the annual Mass ECAN Conference, including the program, advertising, and logistics. The student will also be invited to participate at the Fall conference, a unique opportunity to meet professionals and learn about an emerging field.

- Assist in preparing a workshop for land trusts, in partnership with several conservation organizations

- Assist with other climate professionals network-building activities and explore best practices in network science that can advance and strengthen our community of practice

- Assist with other related activities, such as monthly newsletter development, recruitment of new members, development of outputs or meetings on specific adaptation actions such as culvert replacement, or other needs that might arise from the expert work groups.

Location of the activity: Can work remotely as long as able to meet in-person once/week at UMass Amherst.

Supervisor: Melissa Ocana, Climate Adaptation Coordinator

Qualifications: Must have excellent communication skills and be organized and detail oriented. Familiarity with climate change topics and past event planning experience a plus.

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

Compensation: $15/hr.

To Apply: Contact Melissa Ocana, mocana@umass.edu, Climate Adaptation Coordinator and Extension Project Manager.

Project 2: Data and tools for forest climate adaptation

Project Description: We are seeking a student to assist with a project on evaluation of tools and products for climate change adaptation in forests, such as:

- Creating a user-friendly comparison of tools and products

- Supporting development of a survey of forest conservation and management stakeholders

Location of the activity: Can work remotely as long as able to meet in-person once/week at UMass Amherst

Supervisor: Melissa Ocana, Climate Adaptation Coordinator

Qualifications: Must be organized and detail oriented. Some familiarity with GIS/mapping tools preferred. Experience with survey development a plus.

Time Commitment/Compensation: Estimated 12-15 hours/wk for 16 weeks, but schedule is very flexible to accommodate vacations and shift starting/end dates and/or hours/week. $15/hr

To Apply: Contact Melissa Ocana, mocana@umass.edu, Climate Adaptation Coordinator and Extension Project Manager.

Project 3: Salt Marsh Research Internship

Description: 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 a project to assess 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 of Activities: Fieldwork will be along the coast of Massachusetts, including the North Shore, South Shore, Buzzards Bay, and Cape Cod. 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.

Project Supervisors: The student will be supervised by 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/Compensation: The position calls for 35-40 hours per week, from mid-May through August. $15/hour plus reimbursement for travel and other expenses.

To Apply: Send a resume and brief explanation of your interest to Amanda Davis at amandad@umass.edu Deadline for applications is April 5.

Dave King, USDA Forest Service Research Wildlife Biologist **Forest Wildlife**
Environmental Conservation (Adjunct Faculty)
Holdsworth Hall (413) 545-6795 **daveking@eco.umass.edu**

Project description: American Turtle Observatory (ATO; americanturtles.org) is seeking seasonal Turtle Technicians to study the spatial ecology and long-term habitat use of three threatened turtle species in Massachusetts: Eastern Box Turtles (*Terrapene carolina*), Spotted Turtles (*Clemmys guttata*), and Wood Turtles (*Glyptemys insculpta*). This position will primarily involve fieldwork, with some office responsibilities and will run from May–September (exact start and end dates are negotiable). Field work locations throughout Massachusetts (but primarily Connecticut River Valley, MA)

Field responsibilities: may involve visual surveys, trapping, hand-capturing, and radio-telemetry of Spotted Turtles, Eastern Box Turtles, and Wood Turtles. The technician should regularly expect to conduct fieldwork in very difficult habitats (e.g., including, but not limited to swamps, rocky streams, and very dense shrubland habitat) and inclement weather. Additional field responsibilities may include standardized habitat assessments, providing assistance to project collaborators, communicating with landowners, and following standard decontamination procedures. Office responsibilities will include entering and proofing all field data on a weekly basis, data management in Microsoft Excel, ArcGIS, and/or Google Earth, conducting habitat assessments using aerial imagery, and managing photographs.

Project Supervisor: Patrick Roberts (h.patrick.roberts@gmail.com), Ph.D. student

Time Commitment: May–September (exact start and end dates are negotiable). The technician will have two days off per week that, depending on the schedule, may or may not be on weekends. The technician must adhere to all state and federal environmental laws during the course of their employment.

Compensation: hourly student employee ($400-450/week), academic credit also available

Qualifications: Applicants should be hard-working, enthusiastic, enjoy travel, and expect to work long hours in the field in difficult conditions (rough terrain, heat, cold, rain, insects). Applicants should enjoy working independently in relative solitude in areas with limited or no cellphone service, and excel at independently prioritizing research-related decisions based upon a strong grasp of project objectives. Applicants should also be able to interact in a professional manner with landowners and project collaborators by email and phone. Applicants must have a valid driver's license and access to a personal vehicle. Ideal candidates will be proficient in GPS and compass navigation, have experience with radio- telemetry, and be able to interpret topographic maps and aerial photographs. Desired qualifications also include field experience with freshwater turtles in the wild, ArcGIS, and Google Earth. Ideal applicants will be able to start work by early May.

To Apply: Please provide (via email) a brief (<1 page) cover letter, resume, and contact information (email and phone number) for three references as a single Word or PDF document to Patrick Roberts (h.patrick.roberts@gmail.com) and Liz Willey (lisabeth.willey@gmail.com) by April 15, 2018. Please include "Turtle Technician Application 2019" in the subject of the email. Applications will be reviewed upon submission. Feel free to email Patrick Roberts with questions.

Olga Kostromytska, Extension Asst. Professor **Integrated Pest Management**
Stockbridge School of Agriculture **okostromytsk@umass.edu**
104 Agricultural Engineering Bldg , 413-577-3997

Project description: Integrated pest management of turf insect pests. Project will include mostly field studies of different management strategies for turfgrass insects (mostly annual bluegrass weevil and white grubs) on golf courses and lawns. Student will be involved in every aspect of field entomological experimentation in turf: preparation, setting up and evaluation. Turf and soil samples processing, data collection and analysis.

Qualifications: Basic understanding of the experimental design and procedures, conducting assays with living organisms. Be able and willing to work in the field, to handle insects.

Time Commitment: Flexible with the time, (20 h per week) but time period most critical for the project : Late April, May, June and August
Compensation: Hourly payment or practicum credits (Pass/fail only**)**

To Apply: Send email by Mid-April to Dr. Olga Kostromytska (okostromytsk@umass.edu)

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

Field and Lab Technician Job in Pollination Ecology

Description: I am seeking a research technician 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. Technicians will gain some bee identification skills. Fieldwork will involve deploying and collecting bee bowl transects, active netting of bees on flowers, and recording site characteristics. Work will be primarily in the lab with an approximately 70% lab to 30% fieldwork split. Lab work will take place in Room 207A, Holdsworth Hall, at the University of Massachusetts Amherst. Field sites are located within 15 minutes of the University.

Qualifications: Experience with field entomology and/or botany and Excel preferred. Attention to detail and ability to follow exact instructions to prepare museum quality bee specimens in the lab. Willingness to work outside in hot, humid, buggy conditions; ability to carry up to 40 lbs.; drivers' license; no known bee sting allergy; maturity and ability to work independently.

Time Commitment: Positions run for ~12 weeks 3 June through 30 August, 2018 (exact dates negotiable), at 40 hours per week.

Compensation: Pay is $13 per hour. Occasional use of personal vehicle, mileage will be reimbursed.

To Apply: As a single PDF, please send a cover letter explaining why you are interested in this position, a resume, and the names and contact information of three references to - jmilam@eco.umass.edu. Please put “Pollination Tech” in the subject line of your email. Review of applications will begin March 20 and continue until the position is filled.

UMass-Amherst is an Equal Opportunity/Affirmative Action Employer and Winfree and encourages applications from underrepresented groups.

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: New crops for a changing climate: Effect of thinning on wine grape cultivars juice quality

Project description: Facing unpredictable climate changes, maintaining a resilient 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?

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). The student could be involved in the statistical analysis aspect of the multiyear study, participate to Extension related activities, and publication of the work in a Newsletter format or peer review format.

Each student would meet once a week or biweekly for 30 min with the supervisor Elsa Petit to talk about publications on the subject, report on lab work, and optionally work on statistical analysis. For the remaining time, the student would work in Dr. Petit's lab carrying juice analysis or in the field on grape practices.

Location of the activity: Lab work will take place at UMass Amherst campus. If the student is interested in field work, this would take place at the vineyard at Cold Spring Orchard in Belchertown.

Qualifications: GPA at or above 3.0
The student should have an interest in either food sciences, enology, plant sciences, viticulture (grape growing), sustainable agriculture, and/or environmental sciences.

Time Commitment/Compensation: 1 to 3 academic credits (40 to 120 hours total) according to student's availability. Depending on the student's time and interest (lab versus field) work, we could discuss during which time period the student would work (Summer session I, Summer Session II or both). If a student wishes to obtain academic credit for the research experience, we can either enroll them for summer credits (which cost the student ~ $200/credit) or we can discuss the requirement for a practicum "reflection assignment" or "final research report" to be prepared in the Fall term which will allow us to enroll the student for up to three credits during that semester.

We welcome the possibility for the student to extend the work through the Fall 2019/Spring 2020 in this lab even on a different project and/or an honors thesis.

To Apply: Please contact Elsa Petit at epetit@umass.edu, include in the subject line "Summer 2019 Independent Study on New crops for a changing climate:
Effect of thinning on wine grape cultivars juice quality" along with resume, cover letter and transcripts.

Project 2: Umass student-run organic vineyard on campus

Project description: There is a growing awareness of the possibilities of viticulture in cool climates thanks to newly bred varieties adapted to the New England local conditions. These new varieties are much more resilient to the sudden climate variations that we are now experimenting due to global climate changes. Because of this new opportunity, an increasing number of small, family-run vineyards has been opening in New England. New courses of viticulture that we have developed emphasize in particular the challenges and opportunities of the growing local cold climate industry and small-scale vineyards. The two courses teach the principles and practices governing the establishment and management of a sustainable vineyard. Hands-on activities include the involvement of the students in the student-run organic vineyard project at the Agricultural Learning Center at UMass. Half of the vineyard was planted last fall (https://www.umass.edu/newsoffice/article/umass-amherst's-stockbridge-school-2).

Responsibilities: If the student is more interested in a research based project then this project will specifically focus on comparing the effect of mycorrhizae (infection from diseases) on propagating and grafting different grapes variety. If the student is more interested in gaining practical experience on grape growing then the student could be involved in learning more about organic cultural practices (seeding cover crops, application of organic produce) and setting up (planting, trellising system) of a vineyard. The student could be involved in the statistical analysis aspect of the multiyear study, participate to Extension related activities with the grape Industry, and publication of the work in a Newsletter format and/or peer review format.

Each student would meet once a week or biweekly for 30 min with the supervisor Elsa Petit to talk about publications on the subject, report on lab work, and optionally work on statistical analysis. For the remaining time, the student would work in the field or the greenhouse or on reading about the subject and writing up reports, Newsletters and/or publications on the subject.

Location of the activity: Work will take place at UMass Amherst campus at the Agricultural Learning Center and at the CNS greenhouse.

Qualifications: GPA at or above 3.0 - The student should have an interest in either sustainable and organic agriculture, IPM (Integrated Pest Management),plant sciences, viticulture (grape growing) and/or environmental sciences.

Time Commitment/Compensation: 1 to 3 academic credits (40 to 120 hours total) according to student's availability. Depending on the student's time and interest (lab versus

field) work, we could discuss during which time period the student would work (Summer session I, Summer Session II or both). If a student wishes to obtain academic credit for the research experience, we can either enroll them for summer credits (which cost the student ~ $200/credit) or we can discuss the requirement for a practicum "reflection assignment" or "final research report" to be prepared in the Fall term which will allow us to enroll the student for up to three credits during that semester.

We welcome the possibility for the student to extend the work through the Fall 2019/Spring 2020 in this lab even on a different project and/or an honors thesis.

To Apply: Please contact Elsa Petit at epetit@umass.edu, include in the subject line "Summer 2019 Independent Study on Umass student-run organic vineyard on campus" along with resume, cover letter and transcripts.

Project 3: 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.

Duties: The student will specifically work on developing a DNA extraction for microbes present on the surface of the grape berries. Depending on the time the student can spend on the project, the student could be involved in the bioinformatics aspects of the study, publication of the work. 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 in the Dr. Petit's lab.

Qualifications: GPA at or above 3.5, Sophomore, 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: 1 to 3 academic credits (40 to 120 hours total) according to student's availability. Depending on the student's time and interest (lab versus field) work, we could discuss during which time period the student would work (Summer session I, Summer Session II or both). If a student wishes to obtain academic credit for the research experience, we can either enroll them for summer credits (which cost the student ~ $200/credit) or we can discuss the requirement for a practicum "reflection assignment" or "final research report" to be prepared in the Fall term which will allow us to enroll the student for up to three credits during that semester.

We welcome the possibility for the student to extend the work through the Fall 2019/Spring 2020 in this lab even on a different project and/or an honors thesis.

To Apply: Please contact Elsa Petit at epetit@umass.edu, include in the subject line "Summer 2019 Independent Study on The native grape microbiome"
along with resume, cover letter and transcripts.

Allison Roy, Assistant Unit Leader **Aquatic Ecology**
Massachusetts Cooperative Fish and Wildlife Research Unit
Environmental Conservation, 317 Holdsworth Hall **aroy@eco.umass.edu**
Adrian Jordaan, Department of Environmental Conservation, UMass Amherst
Steve McCormick, U.S. Geological Survey, Conte Anadromous Fish Research Laboratory

THESE POSITIONS WERE ADVERTISED PREVIOUSLY AND APPLICATIONS WILL BE REVIEWED STARTING ON 3/19/18.

Summer 2019 Technician Positions in Aquatic & Fisheries Ecology

Overview: Multiple student technician positions for aquatic and fisheries ecology research projects (described below) are available in the Roy, Jordaan, and McCormick labs in the Department of Environmental Conservation at the University of Massachusetts Amherst. 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 for any of these positions, 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 Allison Roy 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 have had work study during the school year or have any restrictions on summer availability.
Review of applications will begin on **Tuesday, March 19th** and interviews will take place the week of March 25th.

1) River Herring Productivity (2 positions)

The technicians will assist on a project investigating river herring productivity in estuaries and coastal freshwater lakes and ponds in New England. The positions are 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 the day in estuaries using beach seines. Additional sampling will take place for water quality, habitat quality, zooplankton, etc. When not in the field, technicians will be ageing fish otoliths, identifying zooplankton, entering data, and organizing samples. Additional opportunities with this position include developing a database and performing

statistical and/or spatial analyses. The position is based at UMass Amherst but will require extensive overnight travel (> 2 weeks at a time) to field sites throughout New England. Lodging accommodations (paid separately by the grant) will vary and include hotels, university dorms, field stations, and camping. 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, comfortable 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 2019 (16 weeks) for 32 hours/week (on average)
Salary: $12/hour ($6144 for summer)

2) River Herring Ecophysiology (1 position)

The technician will assist on a project investigating the effects of temperature on juvenile river herring physiology in laboratory and field experiments, as well as perform field collections. Beginning in late-May to June, we will collect juvenile river herring to run ecophysiology experiments in the laboratory and maintain mesocosms in the field. Daily tasks include caring for fish tanks, checking experimental systems, and measuring physiological traits/sampling fish. Students may also be asked to assist in juvenile river herring sampling (project 12 above) and collecting a subsample for later analyses. This position is primarily in the wet lab, although there are several field work opportunities. The position is based at the US Fish & Wildlife Service's (USFWS) Richard Cronin Aquatic Resource Center in Sunderland, MA, where the technician will have opportunities to interact with other UMass students and USFWS biologists. Candidates who have attention to detail, can perform mundane tasks with accuracy, and are interested in learning about fish ecophysiology or fisheries/aquaculture are preferred. Student must have a driver's license; access to a personal vehicle is preferred but not necessary.

Supervisors: Lian Guo (PhD Student), Adrian Jordaan (PI), and Steve McCormick (PI)
Employment Period: May through August 2019 (14 weeks) for 32 hours/week (on average)
Salary: $12/hour ($5280 for summer)

3) Freshwater Mussel Conservation and Propagation (2 positions)

The aquatic technicians will work with a team of graduate students at the USFWS Richard Cronin Aquatic Resource Center in Sunderland, MA (5 min from UMass-Amherst and on the bus line). Tasks include culturing freshwater mussels, 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 and taking measurements of mussels in experimental chambers within wadable streams in Massachusetts. Technicians must be able to lift heavy objects (experimental chambers are concrete) and be able to work longer hours on field days. Three days per month the technicians will conduct mussel surveys with the MassWildlife Natural Heritage and Endangered Species Program's Chief of Conservation, Dr. Peter Hazelton. Technicians are also likely to assist with fish electroshocking at mussel sites in conjunction with state biologists from the northeast. Students must have a driver's license and insurance to drive federal vehicles to field sites. Applicants must be able to travel to and from Cronin, comfortable in the water, and willing to snorkel. Candidates who have high attention to detail, can perform mundane tasks with accuracy, and are excited about working with freshwater mussels are preferred.

Supervisors: Ayla Skorupa (PhD student), Jennifer Ryan (MS student), Timothy Warren (USFWS), Dave Perkins (USFWS), Pete Hazelton (MDFW), and Allison Roy (UMass)
Employment Period: May through August 2019 (16 weeks) for 32 hours/week (on average)
Salary: $12/hour ($6144 for summer)

4) Dam Removal (1–2 positions)

The technician(s) 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. This position is based in Amherst but will require driving to field sites throughout Massachusetts with USGS vehicles. Applicants must have a driver's license and insurance to drive USGS vehicles, 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 2019 (16 weeks) for 32 hours/week (on average)
Salary: $12/hour ($6144 for summer)

Michelle Staudinger, Adjunct Assistant Professor **Wildlife Ecology**
Environmental Conservation **mstaudinger@usgs.gov**
Science Coordinator, DOI Northeast Climate Adaptation Science Center
126B Morrill Science Building, 413-577-1318

Project title: Seabird Foraging Ecology in a Changing Climate

Project description: This project is investigating how the pre-breeding adult foraging ecology of seabird species varies across regional and local scales using stable-isotopes as ecological tracers and is part of a larger effort to understand how climate change is influencing shifts in phenology (also known as the timing of recurring life history events) in marine systems along the U.S. Atlantic coast. Stable-isotope analysis complements direct observations of what seabirds are consuming by providing integrated information on the habitats and trophic levels seabirds are feeding. Assistance on this project will include organizing and creating inventories of eggshell samples, preparing samples for stable isotope analyses in the laboratory, and data entry. Students may also conduct species-specific literature searches, and help draft reports.

More information on this project can be found at:
http://necsc.umass.edu/projects/ecological-and-management-implications-climate-change-induced-shifts-phenology-coastal-fish

Location of Activities: Northeast Climate Science Center, Morrill Science Center, Campus

Supervisors: PhD student Henry Legett (hlegett@purdue.edu) and NE CASC Science Coordinator Michelle Staudinger (mstaudinger@usgs.gov)

Qualifications: Students with a strong background and interest marine and coastal ecosystems, use of spreadsheets and data entry are especially encouraged to apply. Dependability, attention to detail, initiative, and independence will also be considered.

Time Commitment: Flexible 10 hours / week from approximately June 1 – August 1.

Compensation: Independent study credits or practicum credit. Paid hourly position may be available to exceptional students.

To Apply: Deadline for accepting application is April 1st. Please send email inquiries to Henry Legett (hlegett@purdue.edu).

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

Project 1: Stream carbon exports in Crested Butte, CO

Description: This project will be based around a ~3-4-week field trip to assist with water sample collection in Crested Butte, CO. The project will be focused on characterizing stream carbon fluxes across a high elevation watershed in the Rocky Mountains.

Location: Fieldwork will take place at the Rocky Mountain Biological Laboratory (rmbl.org) in Crested Butte, CO

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

Time Commitment/Compensation: Fieldwork will involve ~30 hours/week for 3-4 weeks. Field dates will likely occur early-late June and will be finalized over the coming month. Timing is also flexible if the student is interested in staying on longer for additional credit. Independent study / practicum credits preferred, though may be able to support an hourly employee if necessary. Housing at RMBL and airfare will be provided.

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 1st, though applications submitted by the priority deadline of March 22 will receive first consideration.

Project 2: Stream carbon exports in the Connecticut River Watershed

Description: This project will involve sampling local streams along with laboratory analyses and data management around the Connecticut River Watershed. Specifically, we will be working to characterize CO2 levels in streams, how they vary as a result of stream characteristics, and how large fluxes of CO2 from streams to the atmosphere are.

Location of work: Fieldwork will take place 1-3 days per week within 1 hour of campus, and laboratory work will be based at UMass

Qualifications: 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 manipulating data in excel is required.

Time Commitment/Compensation: Field and lab work hours are relatively flexible, though will involve ~20-40 hours per week for 4-5 weeks. Timing is flexible as well for work to occur in June, July, and August. Independent study / practicum credits preferred, though may be able to support an hourly employee if necessary.

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 1st, though applications submitted by the priority deadline of March 22 will receive first consideration.