UNDERGRADUATE RESEARCH OPPORTUNITY:
Forested Wetland Studies: Atlantic White Cedars and Water Quality

PI: Christine E. Hatch, Extension Professor, Department of Earth, Geographic and Climate Sciences
Supervisors: Christine E. Hatch (PI), and Lyn Watts (graduate student)

PROJECT DESCRIPTION: Massachusetts has invested in restoring and protecting its wetlands, most recently by creating a cranberry bog program prioritize restoration in these places where the hydrology and geology are already optimal for wetlands. The independent study student(s) will assist with ongoing research on several southeastern Massachusetts sites encompassed by the Hydrologic Understory: Groundwater flowpaths, surface water mixing, underground thermal regimes and soil moisture monitoring - the interconnected web of hydrology and ecology beneath the surface. Specifically, students will assist with compiling background project literature on specific topics, performing chemical analyses on water samples in the laboratory, logging and calibrating hydrologic measurements, making ecohydrology plant community habitat measurements in the field (with a focus on Atlantic White Cedars), compiling, organizing and plotting collected data, processing and analyzing weather station and distributed temperature sensing (DTS) data and drafting results report. Background on Living Observatory collaborative projects can be found here (https://projects.livingobservatory.org/projects). The student researcher should expect to take at least one, and possibly two trips to the site during the semester (lodging is provided). Live data from restored wetlands Foothills Preserve is available here (https://tidmarsh.media.mit.edu/data/foothills), as is Tidmarsh Wildlife Sanctuary.

Remote or Face-to-Face: Ideally this experience is a face-to-face experience including both field and lab activities. Meetings will be either in person or remote, by arrangement and the comfort of student and other researchers. This opportunity can be fully remote if desired (or required at some future moment).

Responsibilities/qualifications: The student(s) must have the ability to work independently and be responsible. Students interested in gaining some lab and field experience must be organized, detail-oriented and possess good data management skills. Students must have the ability to work independently and be responsible, and the lab instrumentation requires acute attention to detail for successful measurements. Enthusiasm for a novel project and ability to

work in a diverse team are also a plus! Students will be primarily advised by Christine Hatch and graduate student Lyn Watts.

Time Commitment/ Compensation: Depending on the number of credits desired, this will require an average of 3, 6, or 9 hours per week (corresponding to 1, 2, or 3 credits), but may be irregularly distributed throughout the semester, and are flexible by arrangement.

Duration: This independent study project is scheduled for the Spring semester.

Job Description/ Planned Activities: Assist with Research Project *Hydrologic Understory*: Groundwater flowpaths, surface water mixing, underground thermal regimes and soil moisture monitoring - the interconnected web of hydrology and ecology beneath the surface. Specifically, assist with (one or more of) the following: (1) Cranberry bog restoration site maps: orthomosaic and digital elevation models from drone-derived and/or LiDAR-based elevation models, (2) Hydrologic assessment of past, present and future Cranberry bog restoration sites using in-situ water and piezometer measurements, logging and calibrating hydrologic measurements, and (3) the Ecohydrology of Atlantic White Cedar forests.

CRITERIA FOR EVALUATION (General): 1 or 2 credits (or practicum if desired).

• Attendance in lab or field per arrangement (irregular schedule) for a minimum of 3 or 6 hours per week (for 1 or 2 credits, respectively). The student researcher should expect to take at least one, and possibly two trips to the site during the semester (lodging is provided). When in the field, the student will make measurements and collect data contributing to the larger project, as well as their specific topic of independent study, including GPS data, water level measurements, streamflow measurements, and soil moisture measurements. Excellent note taking is expected.

• Final Data Report. All collected data should be recorded in the laboratory notebooks, and students may copy or photograph these. In addition, the student is expected to enter these data into a neatly organized spreadsheet, where any calculations and/or corrections can be made. This final table will be evaluated for completeness, organization, correctness and clarity. All intermediate data, field notes, and final data table and reports should be uploaded to the correct location on OneDrive.

• Photos of Samples and Procedures. In addition, students are expected to take photographic documentation of all field activities, any samples, numbering, procedures and steps, and share all relevant photos in the OneDrive / Teams folder.

• Field/ Lab Working Notebook. Keep a notebook/ journal of observations and techniques learned while interacting with lab and other hydrogeologic researchers. If something seems new and interesting, write it down. For example: What other experiments are going on in the lab? Why are things measured the way they are? Did you notice any predictable patterns with regards to what the samples looked like, their location, or their experimental treatment? Did the data you measured also follow these patterns, or different ones? Why do you think this is the case? At the end of the semester, this notebook (or electronic journal) will be evaluated for: (a) completeness (regular entries), (b) science (try to note what you learned and how it relates to what you know).

How to Apply: Contact Christine Hatch, cehatch@umass.edu, (413) 577-2245 and graduate student, Lyn Watts, cwatts@umass.edu . Please fill out an application to ***Forested Wetland Studies: Atlantic White Cedars and Water Quality*** on PROPEL, including a brief statement of interest and reference contact information. PROPEL does not allow you to upload a resume, so please email that directly to be considered for this position.