

SUNY Oneonta: Workforce Preparation for Majors in Geology, Water Resources, Earth Science and Meteorology

As a multidisciplinary Department of Earth and Atmospheric Sciences, we provide four majors for our students: Geology, Water Resources (hydrogeology), Earth Science and Meteorology. Each of these majors prepares students for distinct career paths. In addition to coursework in the majors, many of our students engage in undergraduate research, which commonly results in presentations at conferences and papers in journals. This is a notable strength of our program.

Geology: Our major in geology is rigorous and rather traditional, though it also includes broad use of technology. The curriculum emphasizes instruction in the field, along with practice in defining geologic problems, gathering data to solve those problems and presentation of findings. Mapping skills and quantitative techniques are focal points within the major. We also require at least one course in hydrogeology (See <http://www.oneonta.edu/academics/earths/geology.html> for a general description of the program and link to required courses.).

The knowledge and skills developed in the geology curriculum have proven to be useful for our graduates in both graduate study and the workforce. Graduates have told us specifically about the advantages they have as a result of their preparation in field techniques, GIS and quantitative methods. Currently, about 40% of our recent graduates are seeking master's degrees at a variety of colleges and universities. The majority of our graduates find employment in environmental consulting. The strong foundation in geology that our curriculum provides, along with coursework in hydrogeology, has served our graduates well; they compete successfully for positions in environmental consulting. A few graduates have sought positions in the petroleum and mining industries. A small number of graduates have pursued law degrees and careers in environmental law.

Water Resources: As one of the first undergraduate hydrogeology programs in the nation (1980), our students have competed successfully with other job candidates that have masters' degrees. Our curriculum is rigorous and requires courses in geochemistry, groundwater modeling, watershed management and applied hydrogeology in addition to foundational courses in geology (See <http://www.oneonta.edu/academics/earths/waterresources.html> for a general description of the program and a link to the required courses.). Field-based projects and an emphasis on quantitative skills are strengths of the program.

Most graduates in Water Resources find employment in environmental consulting. A few have found positions in state regulatory agencies or federal agencies. Approximately 20% of our recent graduates have continued their education through graduate study. Similar to graduates of the geology major, a small number of water resource graduates have pursued law degrees and careers in environmental law.

Because the program in water resources has existed for over three decades, many of our alumni are now in managerial positions. These alumni have provided valuable insights on skills required in the workforce. Faculty regularly solicit the opinions of alumni on curricular matters and alumni commonly return to campus to share their expertise and advice with current students.

Earth Science: Most students that choose our major in Earth Science intend to become high school or middle school teachers of Earth Science. The major is commonly taken as a dual major with Adolescence Education. The curriculum has been designed to meet the content knowledge specified in the New York State Board of Regents Core Curriculum in the Physical Setting: Earth Science. Therefore, the major includes coursework in meteorology, oceanography and astronomy in addition to significant coursework in geology. As such, our graduates are well prepared to execute the Regents curriculum.

A particular strength of the major is a course dedicated to development of pedagogical content knowledge. This course bridges Earth Science content with inquiry-based pedagogy. The course is taught by geoscience faculty and has been praised by graduates of the program as the single most useful course in their undergraduate preparation as teachers. Details of the course may be found at <http://serc.carleton.edu/teacherprep/courses/SUNYO-LabInv.html>. Offshoots of this course have included undergraduate research projects (e.g., see Downey and Ebert 2013) and pre-service teacher candidates (students) conducting professional development workshops for in-service teachers.

Prior to the recession, it was common for our graduates to receive multiple job offers for teaching positions. With the recession, many schools in New York were shedding teaching positions, closing schools and consolidating. Despite this, all recent graduates from our program have secured teaching positions. We view this as a testament to the quality of our program, which enjoys a regional reputation for excellence.

Meteorology: Our major in meteorology follows curricular guidelines from the American Meteorological Society. The curriculum stresses the AMS subject categories of physical, dynamic, synoptic and mesoscale meteorology along with climate dynamics and a capstone experience (See <http://www.oneonta.edu/academics/earths/meteorology.html> for a general description of the program along with a link to the required courses.). The field measurements component of the AMS guidelines is underdeveloped owing to staffing limitations. Despite this, our majors in meteorology excel in their studies and most participate in significant research projects. Many of our students have presented at national and regional conferences and three current students are co-authors with one of our meteorologists on a paper that is in press in a major meteorological journal.

An additional strength of the program is the inclusion of experiences with Linux-based programming for majors and extensive use of Unidata-based data, models and visualizations that are utilized throughout the curriculum from the introductory course through the senior capstone.

The majority of our graduates in meteorology continue their education through graduate school. Some graduates find employment in entry-level positions with governmental and private forecasting agencies, despite the relative scarcity of such positions.

References Cited

Downey, A.C., and Ebert, J.R., 2013, Providing Authentic Research Experiences in Geoscience and Geoscience Education for Pre-Service Teachers: NAGT In the Trenches, v. 3, n. 1, p. 1-3.