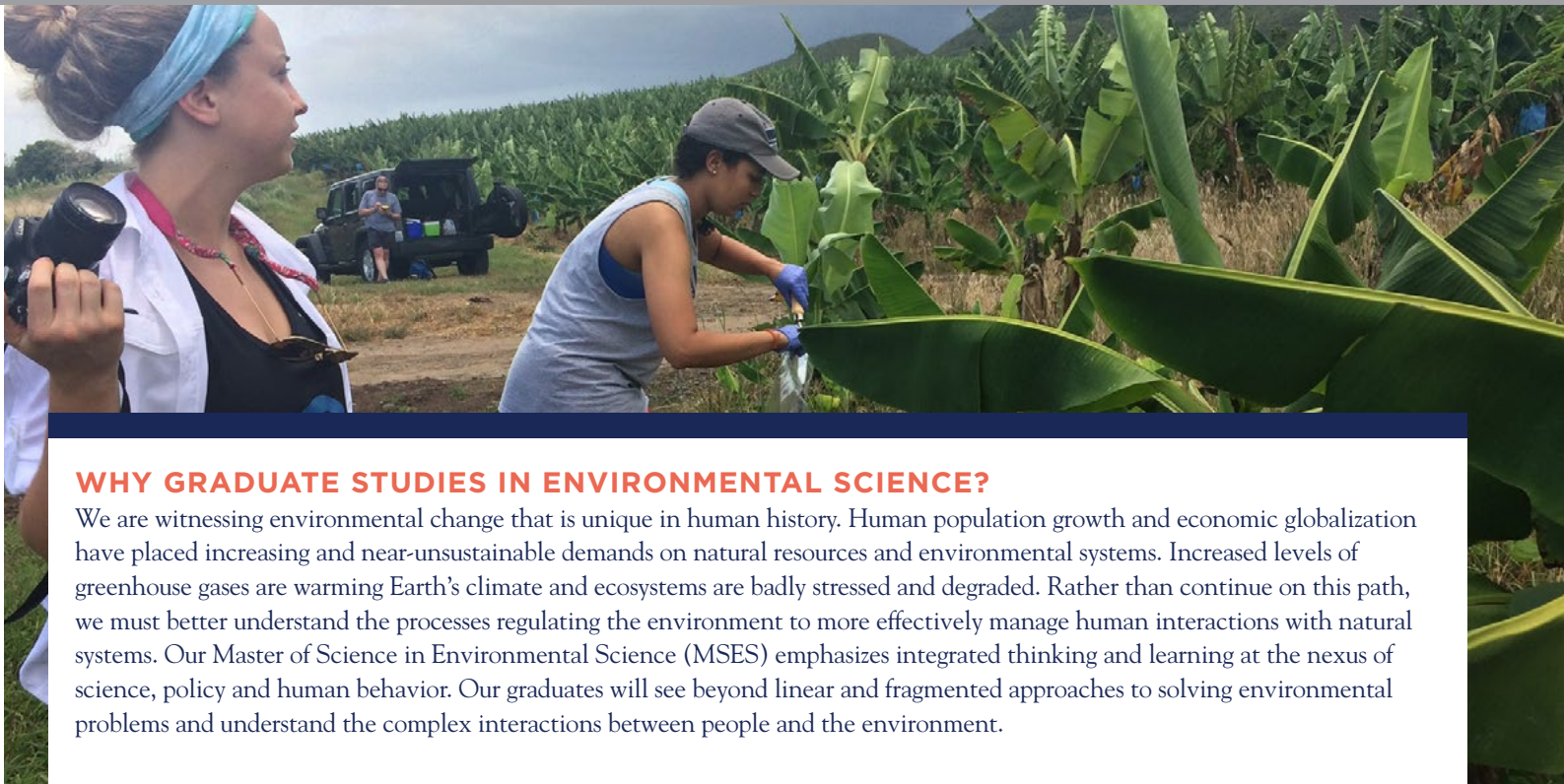




MASTER OF SCIENCE

Environmental Science



WHY GRADUATE STUDIES IN ENVIRONMENTAL SCIENCE?

We are witnessing environmental change that is unique in human history. Human population growth and economic globalization have placed increasing and near-unustainable demands on natural resources and environmental systems. Increased levels of greenhouse gases are warming Earth's climate and ecosystems are badly stressed and degraded. Rather than continue on this path, we must better understand the processes regulating the environment to more effectively manage human interactions with natural systems. Our Master of Science in Environmental Science (MSES) emphasizes integrated thinking and learning at the nexus of science, policy and human behavior. Our graduates will see beyond linear and fragmented approaches to solving environmental problems and understand the complex interactions between people and the environment.

THE MSES PROGRAM PRODUCES GRADUATES WHO CAN:

- Understand fundamental and advanced scientific principles related to the environment;
- Connect contemporary environmental issues with a variety of non-science disciplines, including the fields of social science, policy, ethics, humanities and religion;
- Construct models to facilitate the understanding and solution of environmental problems;
- Select and apply appropriate research methods and techniques to solve complex environmental problems.

WHY VILLANOVA UNIVERSITY?

- Students will gain highly marketable skills in relevant technologies such as Geographic Information Systems, Global Positioning Systems, computer-aided cartographic techniques and satellite imagery.
- Students will use technology to solve problems and enhance their ability to make cogent, informed decisions.
- Villanova's geographic location in the Mid-Atlantic coastal plain is advantageous in offering a variety of research environments, including estuarine, coastal zone, forest and upland, urban and suburban and agricultural environments.

- Graduates of the MSES program will successfully compete in and be prepared for the scientific, academic, governmental or commercial field of their choosing.

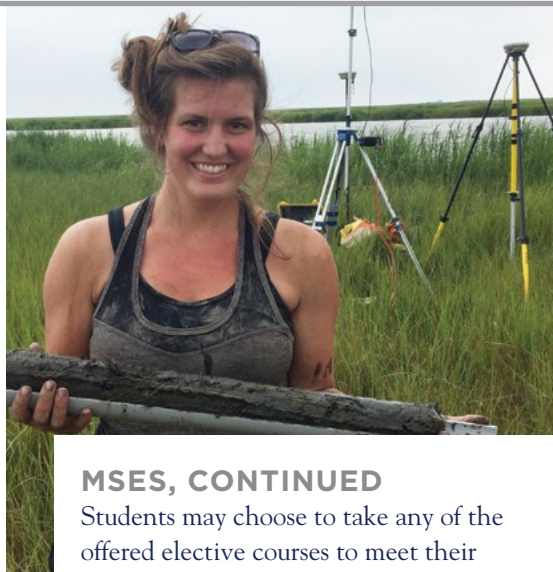
MASTER OF SCIENCE IN ENVIRONMENTAL SCIENCE

The MSES is a 30-credit degree program consisting of:

- 7-10 credits of required courses providing a foundation in current environmental issues and research methods;
- Up to 12 credits of hands-on research experience;
- 8-23 credits of elective courses that can be combined to develop a concentration or specialty track within environmental science.

Students may elect either a **thesis** or **non-thesis** option for the research component:

- A thesis will involve research conducted by the student under the direction of a mentor, culminating in the writing of a publishable thesis and public defense of the research.
- A non-thesis option culminates in a portfolio or a capstone project designed to complement the student's career goals and interests.



MSES, CONTINUED

Students may choose to take any of the offered elective courses to meet their academic interests, and we offer **specialty tracks** in the following areas:

- **Ecosystem Sciences** – Focus in ecosystems ecology and biogeochemistry to include coursework in Ecosystem Services, Environmental Ecology, Watershed Biogeochemistry, Wetland Science, Ocean Environments and Field Methods in Environmental Science.
- **Resource Management** – Focus in the management of natural resources to include coursework in Natural Resources and Conservation, Environmental Chemistry, Land Use and Environmental Impact Planning, Ecosystem Services, Public Policy and Managing Public Networks.
- **Geospatial Sciences** – Focus on geospatial techniques and technologies to include coursework in GIS for Environmental Systems, Geospatial Field Methods and Remote Sensing for Environmental Analysis.

RESEARCH

Faculty in the MSES program have multiple projects underway that are available for student participation:

- Geospatial assessment of climate change driven alterations in wildland fire and drought risk in the western U.S.
- Mapping and modelling the distribution of urban ecosystem services in large metropolitan areas.
- Analysis of river pollutants in Puerto Rico to support watershed management and healthy nearshore coral reef ecosystems.
- Assessment of tidal marsh vulnerability to sea-level rise along the east coast of the United States.
- Fine scale, spatially explicit data collection and analysis of urban air pollution in Philadelphia.
- Stream and shallow groundwater quality after horizontal drilling and hydraulic fracturing associated with natural gas extraction in the Marcellus Shale region of Pennsylvania.
- Influence of sea-level rise and land use change on carbon and nitrogen cycling in coastal ecosystems.
- Analysis of climate change, severe weather risk, and societal vulnerability.

- Measurement and characterization of outdoor and indoor air pollution.
- Collaborations with local municipalities and watershed conservation organizations to investigate sources and fates of contaminants in suburban streams.
- Spatial analysis of the relationship between urban structure and surface temperature in various cities in the U.S.
- Determination of chemical contaminants in food and water.

FACULTY

The MSES faculty includes professors with expertise in several academic disciplines and a range of scholarly interests that span geography, biology, chemistry, and geology and intersect at the nexus of environmental issues. The MSES faculty engage in high-impact research, publish in the top academic journals of their fields, present at national and international conferences, and collaborate with local and regional environmental organizations to motivate tangible environmental progress.

FOR MORE INFORMATION OR TO APPLY:

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