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-unsustainable demands on natural resources and environmental systems. Increased levels of greenhouse gases are potentially warming Earth’s climate and ecosystems are badly stressed and degraded. Rather than continue on this path, we must better understand the scientific processes of 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 WILL PRODUCE 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:
• 7-8 credits of required courses providing a foundation in current environmental issues and research methods;
• up to 10 credits of hands-on research experience; and
• 12-21 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 includes a one- or two-semester capstone project designed to complement the student’s career goals and interests.

We offer specialty tracks in the following areas or students can choose to take any of the offered elective courses to meet their academic interests:

• **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, Land Use and Environmental Impact Planning, Ecosystem Services, Public Policy and Managing Public Networks

**RESEARCH**

Research projects are underway and available for student participation:

• River inputs to nearshore coral reefs in Puerto Rico—Dry- and wet-season analyses of river pollutants to support watershed management and healthy coral reef ecosystems.
• Long-term, investigations of boreal peatlands in northern Alberta, Canada, including:
  • Field manipulations to determine the impact of fire on carbon sequestration.
  • The role of biological nitrogen fixation in moderating methane fluxes.
  • Historical rates of heavy metal deposition in peat cores spanning 60 years.
• Marsh vulnerability to sea-level rise along the east coast of the United States—Human and natural influences to sediment delivery reaching marshes to assess their resilience to sea-level rise.
• Stream and shallow groundwater quality after horizontal drilling and hydraulic fracturing associated with natural gas extraction in the Marcellus Shale region of Pennsylvania.
• Source and fate of contaminants in suburban streams—Collaborations with local municipalities and watershed conservation organizations to investigate real-world problems that have environmental significance.

**Graduate Program Director**
**DR. LISA J. RODRIGUES**
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**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. Our faculty engages in research, publishing in the top academic journals of their fields, presenting at national and international conferences, and collaborating with local environmental organizations.

**FOR MORE INFORMATION OR TO APPLY:**
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