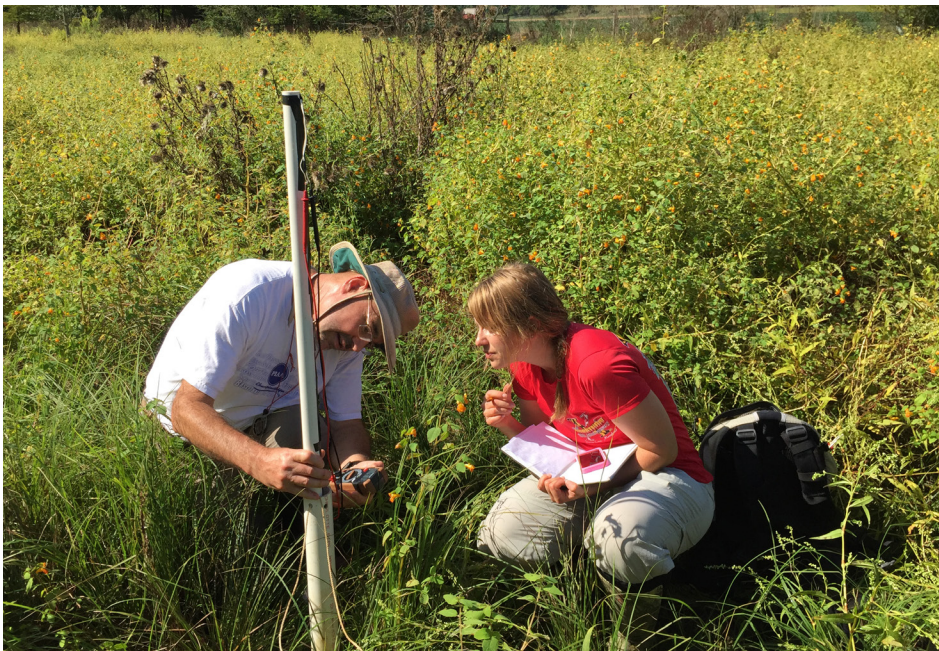
University of Maryland Center for Environmental Science

STRATEGIC INITIATIVES

2019

Environmental intelligence for resilient environments and communities



SCIENCE FOR SOLUTIONS

VISION: UMCES RECOGNIZED AS A GLOBAL LEADER IN UNDERSTANDING AND SOLVING MAJOR ENVIRONMENTAL CHALLENGES FACING MARYLAND AND THE WORLD

The University of Maryland Center for Environmental Science (UMCES) strategic initiatives build on our ***rich tradition of scientific innovation and discovery***, supporting citizens and agencies of Maryland for nearly 100 years. Our scientists conducted the cutting-edge research that supported ***large-scale restoration efforts for Chesapeake Bay*** with measurable improvements in its water quality, fisheries, and ecosystem health. We also export our environmental expertise around the world and train the next generation of environmental leaders.

Since our founding, UMCES' highly collaborative, interdisciplinary scientists have tackled important societal challenges. Their diversity of expertise, willingness to work in teams, and use of cutting-edge methods and approaches provide a powerful scientific force for generating ***actionable science*** and tackling major environmental issues. ***New environmental challenges are emerging***, and UMCES scientists will continue to pioneer innovations to address these challenges.

UMCES remains dedicated to continuing our core research capabilities across the spectrum of environmental sciences. We also look to invest in four strategic initiatives to create knowledge to a) maintain sustainable landscapes and seascapes, b) build coastal resilience, c) create healthy urban waterfronts, and d) accelerate the science of changing oceans and climate.

Addressing these strategic initiatives demands we change the way we conduct science and education. First, we envision ***forming strategic partnerships*** with academic partners, agencies, NGOs, and private industries to achieve this vision. Second, we need to develop a ***more diverse and inclusive workplace*** so that our faculty, students, and staff better reflect society. Third, we aim to become a ***leader in environmental sustainability*** by exporting our expertise, experience, and educational programs around the nation and across the globe.

UMCES scientists support large-scale restoration efforts for Chesapeake Bay health.

CORE RESEARCH AREAS

- Biodiversity & invasive species
- Climate & energy
- Coastal & estuarine science
- Environmental chemistry & toxicology
- Fisheries & aquaculture
- Genes & microbes
- Ocean science
- Restoring & sustaining ecosystems
- Terrestrial ecology & land management
- Water resources & watersheds

PRESSING RESEARCH CHALLENGES

Maintain sustainable landscapes and seascapes

UMCES has developed internationally recognized expertise in terrestrial and aquatic ecology, fish and wildlife management, agriculture, and environmental economies. Building from our Chesapeake Bay focus, we have studied landscapes and associated seascapes with urban and rural communities around the world as living laboratories. The challenges presented by climate variability, land-use change, and emerging contaminants are placing demands on these ecosystems that will require innovative science to inform adaptation and resilience strategies.

To help maintain and promote sustainable landscapes and seascapes, we aim to enhance our understanding of the structure, function, and dynamics of these ecosystems.

To help maintain and promote sustainable and desirable landscapes and seascapes, we will enhance our understanding of the structure, function, and dynamics of these ecosystems. We will also undertake research to elucidate the ways to maintain biological diversity, improve climate resilience, and yield economic returns. In addition, we will employ new sensor systems, apply molecular assessments of biodiversity, and use innovative analytics and modeling of increasingly large data sets ("big data") produced by these technologies. UMCES will actively engage and collaborate with diverse stakeholders to apply our science to promote sustainable policies and communities.

Build coastal resilience

Coastal resilience is the ability of communities and ecosystems to adapt to changing conditions. Effective management of our coastal resources requires improvements in understanding vulnerability and risk. UMCES scientists have been improving our understanding of coastal resilience in terms of predictive ecology, fisheries, biodiversity, and ecosystem health. However, the increasing severity of storms and flooding due to changing land use and climate change are testing the resilience of coastal communities and ecosystems.

To help build coastal resilience, UMCES scientists will assess the relative merits of built (gray) infrastructure and natural (green) infrastructure. A holistic approach to understanding how marshes, wetlands, living shorelines, aquatic grasses, and beach vegetation can help stabilize coasts will be employed. We will also develop scientific expertise and partnerships to span and integrate natural sciences, engineering, urban planning, and social sciences needed for innovative solutions. UMCES will also build on its record of translating scientific discoveries and innovations into effective management actions.

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Create healthy urban waterfronts

Urban waterfronts, including harbors and ports, are a defining feature of coastal cities and serve as gateways to the rest of the world. These urban waterfronts, like Baltimore, Maryland, are particularly vulnerable to intensified coastal development and to storms and flooding, leading to increased risk to people and coastal resources.

Urban waterfronts like Baltimore's Inner Harbor are particularly vulnerable to intensified coastal development and to storms and flooding.

UMCES will partner with academic, governmental, NGOs, and corporate partners to advance the science underpinning the revitalization of urban waterfronts. UMCES will apply our expertise in green ports, ship innovations, aquatic sensor technology, environmental genetic analysis (e.g., eDNA), chemical analyses, toxicology, environmental scorecards, and environmental socioeconomics to promote the future human and ecosystem health of urban waterfronts.

UMCES WAS ESTABLISHED IN 1925 TO "CONDUCT A COMPREHENSIVE PROGRAM TO DEVELOP AND APPLY PREDICTIVE ECOLOGY FOR MARYLAND TO THE IMPROVEMENT AND PRESERVATION OF THE PHYSICAL ENVIRONMENT, THROUGH A PROGRAM OF RESEARCH, PUBLIC SERVICE, AND EDUCATION."

Accelerate the science of changing oceans and climate

The global ocean is inextricably linked to climate. The oceans are an important driver of climate, and understanding atmospheric and oceanic processes is important for assessing vulnerability to climate change. Already the impacts of sea level rise, ocean acidification, extreme weather events, and declining oxygen levels are evident. Nonetheless, we are increasingly relying on the ocean for energy development, recreation, fisheries, and aquaculture, which will be vulnerable to climate change impacts.

UMCES oceanographers and fisheries scientists are at the forefront of what is one of the most globally integrated and interdisciplinary scientific fields. UMCES will increase engagement with diverse stakeholders and partners to develop new and innovative research programs that focus on the many impacts of climate change on our oceans. UMCES will use its capacity, networks, and innovation for a global effort to resolve and ultimately safeguard the impacts of a changing climate on our global ocean.

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STRATEGIC DIRECTIONS

UMCES transforms lives through education

UMCES will build on its outstanding educational programs of research-based graduate programs, internship programs for undergraduates, outreach programs to K-12 students and teachers, and informal learning programs for the public. UMCES will ***expand professional training*** for our current students and working environmental professionals. We will ***cultivate new collaborations*** with University System of Maryland partners. We will ***develop innovative programs*** to enhance diversity and inclusion, grow our student body, expand our educational reach, and offer greater service to the citizens of Maryland.

UMCES cultivates inclusivity, equity, and diversity in a supportive environment

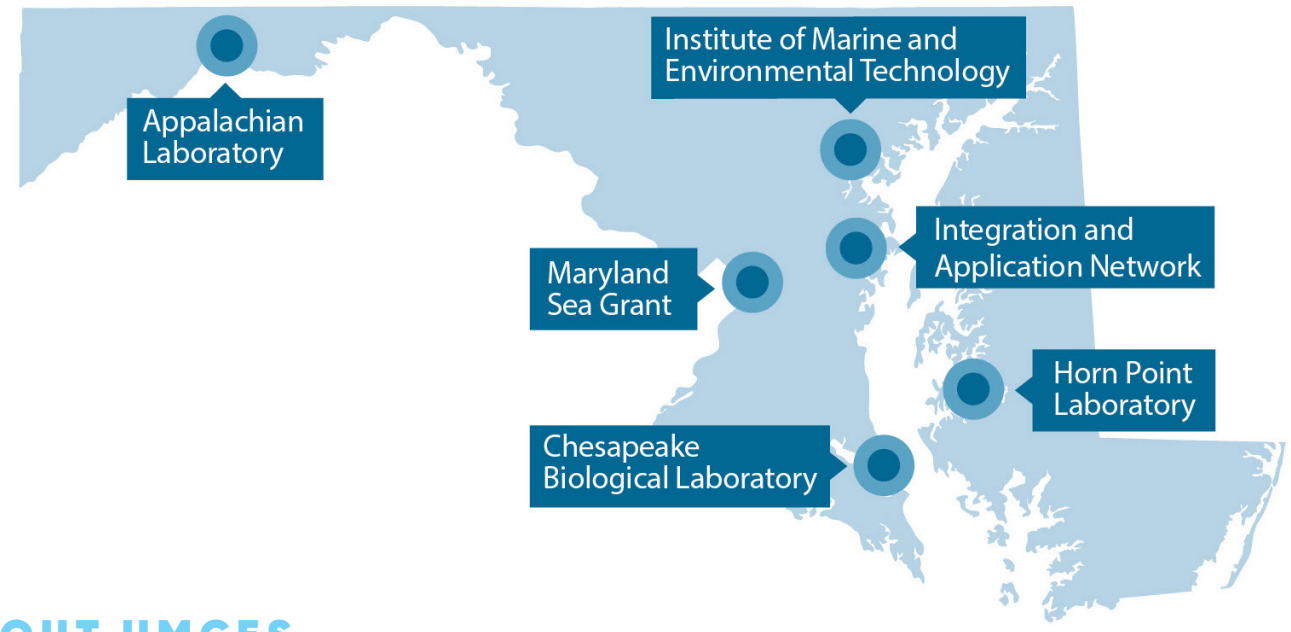
UMCES will be an exemplar of environmental science professionals reflecting the face of the communities served by its work. Knowledge discovery accelerates and the societal relevance of scientific research improves when supported by a diverse workforce. Building this culture requires new commitments. We will ***enhance diversity*** of interns, graduate students, faculty, and staff. We will ***cultivate inclusivity*** through professional development and innovative mentoring. We will incentivize change via individual and institutional performance metrics.

UMCES engages policy makers and communities

Achievements in restoring Chesapeake Bay have relied upon an informed citizenry and science-based decisions that have become a global example. UMCES will offer communication and media training for students and faculty, expand our informal learning networks and citizen science programs, and establish a fellows program to export Maryland's successes to other coastal systems across the nation and globe. UMCES will create an ***Environmental Challenges Collaborative*** to help identify and address emerging environmental threats facing Maryland.

UMCES promotes environmental entrepreneurship

UMCES will foster entrepreneurship in faculty and students through programs that encourage them to develop scientific partnerships with emerging and established businesses and to start their own companies. We will facilitate the development of new technologies and ***support the transition of new innovations*** into operations for solving environmental problems nationally and internationally. We will also promote innovative approaches to science that directly improve the Maryland economy.



ABOUT UMCES

The University of Maryland Center for Environmental Science (UMCES) is a world-class, independent graduate public university. UMCES provides ***environmental intelligence*** so that communities and governments can respond to a changing world. Since our founding in 1925, UMCES has conducted basic and applied environmental research from the ***mountains to the sea*** and from ***genes to ecosystems***. We use cutting-edge approaches at our facilities throughout the state of Maryland to generate data and provide understanding to advance stewardship and sound management of the environment at the state, national, and international levels. We provide unbiased assessments of the effectiveness of restoration efforts and produce environmental report cards.

Since our founding in 1925 by biologist Reginald Truitt, UMCES has conducted basic and applied environmental research from the mountains to the sea and from genes to ecosystems.

We are proud of UMCES' s reputation as a ***globally eminent*** and ***locally relevant*** source of objective and unbiased environmental science. UMCES researchers have more than 100 active international collaborations, from the ***poles to the tropics*** and from ***headwaters to oceans***. UMCES researchers actively serve on various advisory groups and committees to advance stewardship of Maryland and Chesapeake Bay.

As Maryland's graduate university for the environment, we train students to be ***environmental leaders of the future***. We employ an interdisciplinary, research-based curriculum to provide M.S. and Ph.D. students with the tools to develop impactful future careers. Graduates include senior officials in state and national agencies, academics at universities around the world, and leaders in corporations and environmental NGOs.

We will further fortify these strengths through diverse, collaborative, interdisciplinary teams to address and solve complex environmental problems. We will continue to value ***personal and scientific integrity*** while pursuing ***independent and creative thinking***. We will foster a diverse community of researchers to promote an inclusive, equitable, and sustainable future.

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