

## National Socio-Environmental Synthesis Center at UMD Receives \$28.5M Renewal from the National Science Foundation

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*Center focuses on finding solutions to complex environmental problems*

**ANNAPOLIS, MD** -- The National Science Foundation (NSF) renewed its support for the [National Socio-Environmental Synthesis Center](#) [2] (SESYNC) at the University of Maryland with a new five-year, \$28.5 million grant.

SESYNC supports cutting-edge research that accelerates scientific discovery at the interface of human and ecological systems. Located in Annapolis, Maryland, SESYNC serves as a unique resource for the academic, management and policy communities.

“Creating sustainable environments for future generations, while meeting the needs of diverse populations today, is an urgent issue that requires innovative, interdisciplinary research,” said UMD Provost Mary Ann Rankin. “The University of Maryland and SESYNC researchers have made real progress in addressing these challenges and will continue to do so for years to come with the NSF’s renewed support.”

Established in 2011 with a five-year, \$27.5 million grant—the largest NSF award ever received by UMD—the center brings together diverse groups in interdisciplinary collaborations to provide data-driven solutions to society’s most challenging and complex environmental problems.

“SESYNC was founded on the premise that progress toward a sustainable future requires new knowledge that arises from close collaborations across many disciplines and sectors, including the natural and social sciences, nongovernmental organizations, and government agencies,” said SESYNC Director [Margaret Palmer](#) [3], who is a Distinguished University Professor of [Entomology](#) [4] at UMD. “Such collaborations and the involvement of knowledge users create a research portfolio with the potential to identify solutions and inform decisions.”

Since its inception, SESYNC has funded 131 research projects and its researchers have authored over 200 peer-reviewed publications. Each year, over a thousand participants take part in research meetings at the center, with nearly one-quarter hailing from outside the United States and one-fourth coming from non-academic organizations.

At UMD, 97 faculty members have participated in SESYNC programs, 45 graduate students received research assistantships through SESYNC and 67 undergraduate students conducted summer interdisciplinary research projects with UMD mentors through SESYNC.

“SESYNC’s programs and ability to facilitate productive teamwork have had a positive impact on the University of Maryland and beyond,” said [Jayanth Banavar](#) [5], dean of the [College of Computer, Mathematical, and Natural Sciences at UMD](#) [6]. “SESYNC is viewed across campus as a successful model for building bridges across disciplines and involving researchers at the undergraduate, graduate, postdoctoral and senior scientist levels to solve challenging problems that are important to decision makers.”

Researchers at SESYNC frame their projects to inform discourse and results beyond academia. In the past six months, two research teams published influential commentary articles in the journal *Nature* to help inform decisions and improve the design of public policies. Peter Jørgensen, Didier Wernli, Scott Carroll and colleagues [provided a socio-environmental perspective](#) [7] for a call to action on antimicrobial resistance ahead of a high-level United Nations (UN) meeting at which the UN General Assembly’s committed to addressing the root causes of antimicrobial resistance in a coordinated manner. Another team, led by Christopher Golden of Harvard University, utilized new databases on global fish catch and human dietary nutrition to [show that fish resources are under the most intense pressure in low-latitude developing nations.](#) [8]

The center embraces a diversity of perspectives, methods and cultures among disciplines to explore solutions to pressing societal problems. For example, J. Baird Callicott, who recently retired from the University of North Texas, led a diverse team of legal scholars, economists, ecologists, conservation scientists and political ecologists. The researchers synthesized data to understand the implications of shifting ecological restoration goals. The team published its results in the journal *Science* [9] less than a year after its first meeting.

Susan Clayton of the College of Wooster in Ohio led a project that explored the intersection of environmental science and psychology. This work led to a publication in the journal *Nature Climate Change* [10] that highlighted the links between individual behaviors and perceptions of climate change and how this influences responses to climate change response and mitigation.

Ecological economists Klaus Hubacek and Kuishaung Feng of UMD guided a project linking local consumption to global environmental impacts. A publication about this work in the *Journal of Industrial Ecology* [11] addressed the understanding of lifestyles and local consumption activities in

global supply and value chain analysis.

Wei-Ning Xiang from East China Normal University in Shanghai and Joan Nassauer from the University of Michigan synthesized knowledge of ecological functions and patterns, land use, and human population distributions in urban mega-regions of China, where urban populations rose from 18 percent of the total population in 1978 to about 50 percent in 2010. The team published [14 articles](#) [12] in a special issue of the journal *Landscape and Urban Planning* that have implications for urban ecology, landscape planning, governance, public health, environmental justice and most broadly the sustainability of cities.

David Gill, a SESYNC postdoctoral fellow, published a study in the journal *Ecological Economics* [13] that quantified how the loss of reef fish communities could impact the Caribbean's tourism economy. The study demonstrated why conserving coral reefs should be both an economic and ecological priority and provided policymakers with a possible road map for sustainably financing that conservation. Neil Carter, another SESYNC postdoctoral fellow, developed a [novel, spatially explicit agent-based model of tiger population dynamics](#) [14] and applied it to a global biodiversity hot spot with a large tiger population. The model explores human-tiger conflict interactions and population dynamics to inform policies and assess threats to tiger populations.

"Many of society's biggest challenges, from ensuring supplies of fresh water to striving toward environmental justice, can best be met when scientists in the social and natural sciences work together," says Tim Kratz, NSF program director for SESYNC. "SESYNC is very successful at facilitating these collaborations."

Over the next five years, the center will:

- Form new communities of scholars who will work with decisionmakers on transdisciplinary research;
- Expand its program to immerse scientists in foundational concepts, theories and methods outside of their own training;
- Build capacity for young scholars;
- Diversify the socio-environmental synthesis community through joint programming with historically black colleges and universities, including Coppin State University in Baltimore;
- Develop freely available synthesis education videos;
- Increase opportunities for graduate scholars through training and team-based research opportunities; and
- Grow the center's communications capacity to publicize research results more broadly.

With this renewal, the center will continue its pursuit of actionable science at the intersection of social and environmental systems.

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"[Use antimicrobials wisely](#) [7]," Peter S. Jørgensen, Didier Wernli, Scott P. Carroll, Robert R. Dunn, Stephan Harbarth, Simon A. Levin, Anthony D. So, Maja Schlüter and Ramanan Laxminarayan, was published September 7, 2016, in the journal *Nature*.

"[Nutrition: Fall in fish catch threatens human health](#) [8]," Christopher D. Golden, Edward H. Allison, William W. L. Cheung, Madan M. Dey, Benjamin S. Halpern, Douglas J. McCauley, Matthew Smith, Bapu Vaitla, Dirk Zeller and Samuel S. Myers, was published June 15, 2016, in the journal *Nature*.

"[Committing to Ecological Restoration](#) [9]," Katherine Suding, Eric Higgs, Margaret Palmer, Christopher

B. Anderson, Matthew Baker, John J. Gutrich, Kelly L. Hondula, Matthew C. Lafevor, Brendon M. H. Larson, Alan Randall, J. B. Ruhl and Katrina Z. S. Schwartz, was published in May 2015 in the journal *Science*.

“[Psychological research and global climate change](#) [10],” Susan Clayton, Patrick Devine-Wright, Paul C. Stern, Lorraine Whitmarsh, Amanda Carrico, Linda Steg, Janet Swim and Mirilia Bonnes, was published June 24, 2015, in the journal *Nature Climate Change*.

“[Teleconnecting consumption to environmental impacts at multiple spatial scales](#) [11],” Klaus Hubacek, Kuishuang Feng, Jan C. Minx, Stephan Pfister and Naijun Zhou, was published January 24, 2014, in the *Journal of Industrial Ecology*.

Special issue on “[Working with wicked problems in socio-ecological systems: More awareness, greater acceptance, and better adaptation](#) [15],” edited by Brian Head and Wei-Ning Xiang, was published in the October 2016 issue of the journal *Landscape and Urban Planning*.

“[Recreational diver preferences for reef fish attributes: Economic implications of future change](#) [13],” David A. Gill, Peter W. Schuhmann and Hazel A. Oxenford, was published January 28, 2015, in the journal *Ecological Economics*.

“[Co-Adaptation is Key to Coexisting with Large Carnivores](#) [14],” Neil H. Carter and John D.C. Linnell, was published July 5, 2016, in the journal *Trends in Ecology and Evolution*.

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## About SESYNC

SESYNC's mission is to support synthetic, actionable team science on the structure, functioning and sustainability of socio-environmental systems. The center's five core objectives are to: enhance the effectiveness of interdisciplinary collaborations among natural and social science research teams focused on environmental problems; build capacity and new communities of socio-environmental researchers; provide education programs to enhance interdisciplinarity and understanding of socio-environmental synthesis; enhance computational capacity to promote socio-environmental synthesis; and enhance relevance of socio-environmental research to decisions and behaviors via actionable scholarship. For more information on SESYNC and its activities, please visit [www.sesync.org](http://www.sesync.org) [17].

## Audience:

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