



AMERICAN MUSEUM OF NATURAL HISTORY

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**AMERICAN MUSEUM OF NATURAL HISTORY ANNOUNCES EXPLORE21
STRATEGIC INITIATIVE TO DRIVE HIGH-TECH, MULTIDISCIPLINARY
RESEARCH EXPEDITIONS**

**PROGRAM BUILDS ON MUSEUM'S 144-YEAR-OLD EXPLORATORY
LEGACY TO ADDRESS 21ST-CENTURY CHALLENGES**

This fall, the American Museum of Natural History is launching a comprehensive initiative to foster a series of innovative scientific expeditions that meet the challenges and opportunities of the 21st century. The program, called **Explore21**, will support exploratory fieldwork that is multidisciplinary, heavily integrated with emerging technologies, and focused on delivering real-world applications by discovering new species, preserving biodiversity, and uncovering new knowledge about the natural world – even potentially human health. **The Explore21 Solomon Islands Expedition**, the first expedition launched under the Museum's new program, is underway to investigate the mysterious organisms that light up its dark waters, its uncharted microbial life, and its rich diversity of fishes, corals, and other animals.

"Exploration and innovation have been central to the Museum since its founding in 1869," said Museum President Ellen V. Futter. "Explore21 ushers in a new era of expeditions that define what exploration means in 2013 and beyond. Celebrated explorers including Theodore Roosevelt, Roy Chapman Andrews, Margaret Mead, and Franz Boas are indelibly associated with the Museum, and many of the iconic objects in our exhibition halls and scientific collections are here because of exploratory work. Explore21 builds on this long-standing legacy by taking an extremely modern direction that capitalizes on the Museum's expertise in scientific collecting with novel multidisciplinary approaches and modern technology and techniques."

Explore21 will provide the framework and resources to develop modern fieldwork methods and collections stewardship. The program will advance investigations in key research areas of the Museum's scientists, including the discovery of new species in habitats enriched with biological diversity but under threat from major drivers such as deforestation, pollution, invasive species, and climate change. Explore21 will also foster innovative research approaches that employ cutting-edge technologies like advanced imaging and genome sequencing, increase the communication of findings and public outreach, and lead to critical new additions to the Museum's preeminent collection of more than 32 million artifacts and specimens, as well as genomic and astrophysical data and frozen tissue samples stored in the Ambrose Monell Collection for Molecular and Microbial Research.

"The Museum has one of the greatest natural history collections in the world, and it is constantly growing as our researchers bring back specimens from more than 100 expeditions per year," said Michael Novacek, the Museum's senior vice president and provost of science. "Explore21 will bring innovation to the Museum's expedition program by sponsoring both interdisciplinary expeditions across the Museum's five scientific divisions and inter-institutional partnerships for joint fieldwork in key geographic areas of the greatest interest to science. There is urgency to survey many of these sites as human activity and environmental factors continue to put the planet's biodiversity at risk."

Museum ichthyologist John Sparks and others have set out on The Explore21 Solomon Islands Expedition aboard the 56-meter-long research vessel *Alucia*, which supports a range of capabilities including submersibles that can take a crew of three down to 1,000 meters, a state-of-the-art imaging production facility, high-bandwidth connectivity, and a full suite of oceanographic instrumentation and infrastructure. Sparks' team will look for rare examples of bioluminescence and biofluorescence in fishes, coral, and other marine organisms by combining *Alucia's* advanced offerings with custom-built underwater cameras capable of taking extremely high-resolution footage in low light, novel collecting methods, and on-board genomic sequencing tools.

Recent work involving the Museum has shown how bioluminescent signaling systems – those that generate light based on a chemical reaction – evolve and diversify in the ocean. This work also has revealed that biofluorescence – a phenomenon in which

organisms absorb light, transform it, and eject it as a different color – is surprisingly widespread in marine fishes. The three-week Solomon Islands expedition, which includes Chris Filardi, director of Pacific Programs in the Museum’s Center for Biodiversity and Conservation; Eunsoo Kim, an assistant curator in the Museum’s Division of Invertebrate Zoology; David Gruber, a marine biologist at the Museum and the City University of New York; Vincent Pieribone, a molecular biologist at the Museum and Yale University; Robert Schelley, a scientific assistant in the Museum’s Department of Ichthyology; and Dawn Roje, a Ph.D. student in the Museum’s Richard Gilder Graduate School, will investigate these poorly understood yet prominent phenomena within a greater evolutionary framework.

The unique expedition will be the first to broadly examine biofluorescence in fishes. The team will conduct a comprehensive survey of both shallow-water reef fishes and deepwater species, with a particular emphasis on the wavelengths of light they emit, the fluorescent proteins they contain (potentially powerful tools in the medical world), and the organisms’ positions within the tree of life.

In the bioluminescent realm, the researchers will image glow patterns of fish in the effort to better understand the evolution of this characteristic and its impact on biodiversity.

Other Museum scientists on board the *Alucia* will explore different aspects of the Solomon Islands’ diversity.

Kim studies the diversity and evolution of protists – organisms such as algae – that are microscopic and eukaryotic, meaning that their cells contain relatively complex structures like the nucleus. During this expedition, she will survey a variety of eukaryotic microbes as well as small cyanobacteria, which are abundant in the Solomon Islands but not well known. Her main interest lies in the study of the first eukaryote capable of photosynthesis, the process that converts sunlight into energy. As these organisms emerged, spread, and multiplied, they significantly contributed to the buildup of atmospheric oxygen – a byproduct of photosynthesis – making it possible for the rise of animals. Using advanced collecting equipment and sensors, Kim will collect water samples along with data on the environment’s salinity, temperature, depth, oxygen, pH, and other nutrient concentrations. She will also use on-board microscopy, cultivation, and genomics tools to study microbial eukaryotes and their interactions with other microbes including cyanobacteria.

Filardi has a long history of conservation practice across the tropical Pacific and western North America. Over the last eight years, the scientists from the Center for Biodiversity and Conservation, led by director Eleanor Sterling, have traveled to the Solomon Islands to address daunting threats to some of the largest tracts of contiguous rainforest and adjacent lagoon and reef systems remaining in the tropical Pacific. On the current expedition, Filardi will continue to survey the area's unique ecological gradients— from cloudforest to lowland rainforest to reef and on to some of the deepest ocean habitats on Earth— that have vanished from nearly all other large archipelagos on earth.

This groundbreaking expedition will serve as a model for future Explore21 endeavors, drawing together scientists and experts from several disciplines, using the latest technology, and bringing science to bear on a broad set of problems.

The Museum greatly acknowledges the Dalio Foundation for its generous support of the inaugural Explore21 expedition.

The Museum's Explore21 Initiative is generously supported by the leadership contributions of Katheryn P. and Thomas L. Kempner, Jr., and Linda R. and William E. Macaulay.

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The American Museum of Natural History, founded in 1869, is one of the world's preeminent scientific, educational, and cultural institutions. The Museum encompasses 45 permanent exhibition halls, including the Rose Center for Earth and Space and the Hayden Planetarium, as well as galleries for temporary exhibitions. It is home to the Theodore Roosevelt Memorial, New York State's official memorial to its 33rd governor and the nation's 26th president, and a tribute to Roosevelt's enduring legacy of conservation. The Museum's five active research divisions and three cross-disciplinary centers support 200 scientists, whose work draws on a world-class permanent collection of more than 32 million specimens and artifacts, as well as specialized collections for frozen tissue and genomic and astrophysical data, and one of the largest natural history libraries in the world. Through its Richard Gilder Graduate School, it is the only American museum authorized to grant the Ph.D. degree. In 2012, the Museum began offering a pilot Master of Arts in Teaching program with a specialization in Earth science. Approximately 5 million visitors from around the world came to the Museum last year, and its exhibitions and Space Shows can be seen in venues on five continents. The Museum's website

and collection of apps for mobile devices extend its collections, exhibitions, and educational programs to millions more beyond its walls. Visit amnh.org for more information.

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No. 70