6th ANNUAL SYMPOSIUM OF THE METROPOLITAN SOCIETY OF NATURAL HISTORIANS

Hosted in conjunction with the Science Research Mentoring Program, American Museum of Natural History

Sunday, February 25, 2018
2–4 PM
Linder Theater
American Museum of Natural History

Organizers

Dr. Stephanie Loria, President, The Metropolitan Society of Natural Historians (MSNH)
Dr. Mark Weckel, Assistant Director, Youth Initiatives, American Museum of Natural History (AMNH)
Dr. Rae Wynn-Grant, Postdoctoral Fellow, Science Research Mentoring Program, AMNH
Dr. Harald Parzer, Vice President, MSNH
Glenn Doherty, Treasurer, MSNH

Funding

Funding for conference participation of students in the Science Research Mentoring Program of the American Museum of Natural History is supported by the Doris Duke Charitable Foundation.

About The Metropolitan Society of Natural Historians

The Metropolitan Society of Natural Historians (MSNH), is a 501(c)3 charitable organization based in New York City that is dedicated to science education for the public benefit. Since its founding in 2011, the MSNH has hosted over 60 events attracting more than 1,200 people. Monthly events include free tours of natural history collections, research labs and exhibits led by scientists from renowned institutions across New York City including the American Museum of Natural History, New York Botanical Garden, City University of New York, Rutgers University, Columbia University, and Rockefeller University. Additionally, the MSNH hosts guided nature walks and hikes in Central Park and nearby state forests.

About Science Research Mentoring Program

The Science Research Mentoring Program (SRMP) provides New York City high school students with the opportunity to undertake year-long research projects with scientists from the American Museum of Natural History (AMNH). Students conduct research in the divisions of Astrophysics, Earth and Planetary Sciences, Vertebrate and Invertebrate Zoology, Conservation Biology, and Anthropology. Designed by AMNH educators and scientists, SRMP curriculum connects content, theory, and methodologies to the cutting-edge research of Museum scientists. The program also focuses on building networking and professional development skills, and provides exclusive opportunities to engage with professionals across a range of scientific fields.

SCHEDULE

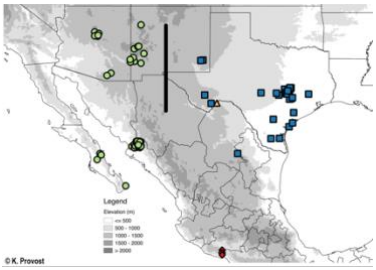
2:00 PM	**Glenn Doherty**	**Welcome**
2:10 PM	**Kaiya Provost**	**Genomic differentiation in Northern Cardinals of the North American Warm Deserts is Maintained by Behavioral Isolation**
2:20 PM	**Alexandra Grote**	**Understanding the Symbiosis Between Parasitic Worms and Bacteria**
2:30 PM	**Pío A. Colmenares**	**A Brief Look at the Diversity and Distribution of Harvestmen in Central Amazon, Brazil**
2:40 PM	**Taylan Morcol**	**Biodiversity of Wild Hops in the American Southwest**
2:50 PM	**REFRESHMENTS**	
3:20 PM	**Kristi Ashley Collom**	**Aquatic Urbanites and Where to find them: Examining the Presence of Bottlenose Dolphins (*Tursiops truncatus*)**
3:30 PM	**Brett Carr**	**Observing the Ongoing Eruption of Sinabung Volcano: A balance Between Science and Safety**
3:40 PM	**Manpreet Kohli**	**The real Dragon(fly)s of the Past and Present**
3:50 PM	**Emanuel Tschopp**	**Opening Old Boxes to Ask New Questions: The Howe Quarry Project, Reassessment of a Dinosaur Graveyard**

PRESENTATION SUMMARIES

Genomic Differentiation in Northern Cardinals of the North American Warm Deserts is Maintained by Behavioral Isolation

Kaiya Provost

Ph.D. Candidate, Richard Gilder Graduate School, American Museum of Natural History, New York, NY



When populations of organisms get separated from each other, they can find themselves on the path to speciation. Some organisms have traits that make successful migration across a barrier difficult. We examined how having different song types affects migration across a barrier between the Sonoran and Chihuahuan deserts. Our focal bird species has been separated for ~600,000 years with little migration across the barrier. We recorded songs from both deserts and played them back to males to assess their aggression. When males are aggressive to a song, they consider the singer to be their own species. However, we found that males ignored songs from across the barrier. Sonoran birds don't consider Chihuahuan birds to be the same species and vice versa. From this, we suggest that differences in song are important in starting speciation especially when populations are physically separated by a barrier.

Kaiya Provost is a Ph.D. Candidate at the Richard Gilder Graduate School, American Museum of Natural History, working with Brian Smith. Kaiya completed her Bachelor's at Cornell University in Ecology and Evolutionary Biology and her Master's at Columbia University in Conservation Biology, also with Brian Smith, where she wrote her thesis on Northern Cardinal behavior and demography. Her Ph.D. work focuses on phylogeography of birds across southwestern North America, particularly in deserts. Her broad research interests include phylogenetic systematics, behavioral ecology, biogeography, computational biology, desert adaptation, and parrots.

Understanding the Symbiosis Between Parasitic Worms and Bacteria

Alexandra Grote

Ph.D. Candidate, Department of Biology, New York University, New York, NY

I study two parasitic worms that cause diseases in humans: *Brugia malayi*, one of the causative agents of lymphatic filariasis; and *Onchocerca volvulus*, the causative agent of river blindness. Together these diseases represent the leading cause of morbidity in the developing world with over 150 million people infected in 73 different countries and an estimated 1.5 billion at risk for infection. These worms, however, have an Achilles' heel: they carry bacteria called *Wolbachia* that live in symbiosis inside the worm cells. The worms require the bacteria for development, reproduction, and survival in their human host. Successful exploitation of this relationship, however, is impeded by our lack of understanding as to the molecular mechanism of symbiosis. I am trying to define these mechanisms in order to manipulate the worm's dependence on *Wolbachia* and develop novel drug therapies against them.

Alexandra Grote is a Ph.D. Candidate at New York University where she studies parasitic worms. Trained as a molecular biologist, she is seeking to incorporate computational biology into the study of host-pathogen interactions for the development of novel drug therapies. She received her B.A. in Integrative Biology from UC Berkeley where she studied fungal biology and ecology. She then moved on to study the biophysics of bacterial cell growth and movement at Stanford University and the Carnegie Institution for Science before pursuing her Ph.D.

A Brief Look at the Diversity and Distribution of Harvestmen in the Central Amazon, Brazil

Pío A. Colmenares, Ph.D.

Museum Specialist, Division of Invertebrate Zoology, American Museum of Natural History, New York, NY

Arthropod diversity is strongly influenced by habitat components related to plant architecture and habitat complexity. In the Amazon, the distribution of different arthropod assemblages has been related to environmental gradients. However, the relationship between arthropod diversity and vegetation structure is poorly understood. It was tested at a regional scale if spatial distribution of harvestmen assemblages is structured by habitat, in addition to which environmental factors affect harvestmen assemblages. At a local scale, we also tested the relationship between harvestmen and vegetation structure and microhabitats. Harvestmen were collected in 107 plots in the Central Amazon and Brazil. Three-thousand and twenty individuals were identified, representing 71 species and 13 families. At regional scale, changes in the habitat structure shaped the patterns of the harvestmen assemblages. Environmental variables associated with harvestmen physiology also affected harvestmen richness. At a local scale, harvestmen composition was related to vegetation structure predictors, and trees were the most diverse microhabitat.

Pío Colmenares is an arachnologist with experience in taxonomy and ecology. His main research interests are the taxonomy, systematics, ecology, conservation and biogeography of Opiliones. He also has experience with other arachnid orders such as Amblypygi, Schizomida and Solifugae. Colmenares joined the AMNH staff in 2016 and is currently in charge of the Arachnid (non-Araneae) and Myriapod Collections. Colmenares received his undergraduate degree in biology in 2008, from the University of Zulia (LUZ) in Maracaibo, Venezuela. Upon graduating, he also worked in the Biodiversity Unit at the Instituto Venezolano de Investigaciones Científicas (IVIC) in Caracas, Venezuela. In 2009, he studied at the National Museum of Natural History of the Smithsonian Institution in Washington, DC, where he received training in curatorial techniques and management of various natural history collections. In 2015, Colmenares defended his doctoral thesis on Amazonian Harvestmen communities at the Instituto Nacional de Pesquisas da Amazônia (INPA) in Manaus, Brazil.

Detection and Development: How Sea Urchins Evolved the Ability to Match Their Environments

Taylan Morcol

Ph.D. Candidate, City University of New York, New York, New York & New York Botanical Garden, Bronx, New York

Hops (*Humulus lupulus* L.) grow wild throughout the temperate northern hemisphere (i.e. Europe/Asia/North America). Over the centuries, people have selected and domesticated hops, mostly for use in beer making. Even today, hop breeders are seeking wild hops with desirable traits such as disease resistance, drought tolerance, and unique aromas to help them develop new and better-adapted hop varieties. In my research, I am characterizing the genetic and chemical diversity of wild hops in the American Southwest. My project is part of a larger, collaborative effort to catalog and preserve the biodiversity of wild hops around the world. In doing so, we hope to help commercial hop agriculture adapt to environmental and economic changes. The findings from my study will also give us clues into the history of wild hop populations in the Sky Islands region of the Southwest, an area rich in biodiversity.

Taylan Morcol is a Ph.D. Candidate in the joint graduate program between the City University of New York (CUNY) and the New York Botanical Garden (NYBG). His curiosity about plants can be traced back to elementary school when he conducted an experiment to investigate how bean plants respond to different light-dark cycles. In 2006, he obtained a B.S. in Chemical Biology from the University of California, Berkeley. For the next seven years, he worked in such diverse fields as forest ecology/environmental chemistry (Smithsonian Environmental Research Center), natural products research, and organic farming. In his current graduate studies, Morcol has been fortunate to collaborate with researchers at CUNY (including primary mentor, Dr. Edward J. Kennelly), NYBG, the Hopsteiner company (project sponsor), and the United States Department of Agriculture. He hopes to apply his experiences towards developing ecologically-oriented agricultural systems.

Aquatic Urbanites and Where to Find Them: Examining the Presence of Bottlenose Dolphins (*Turniops truncatus*) in the Western New York Bight

Kristi Ashley Collom

Master's Student, Animal Behavior and Conservation Biology Program, Hunter College & Lead Facilitator, Discovery Room, American Museum of Natural History, New York, NY

Wildlife tourism facilitates valuable observations of diverse marine mammal species. At present, there has been no systematic study of bottlenose dolphins (*Tursiops truncatus*) in the Western New York Bight although historical and anecdotal data indicate their presence in the area. The aim of this study was to describe the seasonal occurrence and group size of bottlenose dolphins in a coastal survey area of approximately 82 kilometers (41 nautical miles) proximate to the New York and New Jersey metropolitan area. Vessel-based opportunistic observations were conducted annually on board a seasonal whale watching vessel from May–November, 2011–2016. Encounters ranged from 10–36 events per season. The estimated mean group size was 50 animals with an overall mode of 100 individuals per group over the course of the study period. A comparison with historical data suggests an increase in the observed estimated group size of this species in this region. We also conducted spatial and statistical analyses of species' seasonal occurrence in relation to human activity (i.e., shipping lanes, recreational boating). This study provides baseline data for future research on the presence and group size of bottlenose dolphins in an area that faces increasing human-wildlife interaction.

Kristi Ashley Collom is a graduate student in the Animal Behavior and Conservation Biology program at Hunter College and Lead Facilitator for the Discovery Room at the American Museum of Natural History. Her research focuses on evaluating critical habitats of Bottlenose Dolphins in the New York Bight and utilizing passive acoustic monitoring techniques to monitor reclusive channels of the Turneffe Atoll Marine Reserve in Belize.

Observing the Ongoing Eruption of Sinabung Volcano: A balance Between Science and Safety

Brett Carr, Ph.D.

Postdoctoral Research Scientist, Lamont-Doherty Earth Observatory, Columbia University, New York, NY

Volcanic eruptions are powerful reminders that we live on a dynamic planet. Eruptions present many different hazards and can have widespread effects, but studying volcanoes to better understand these hazards can be difficult and dangerous. For non-explosive eruptions, the rate at which lava leaves the vent - the effusion rate - is especially useful for understanding the processes and hazards of that eruption. However, the effusion rate is also especially difficult to measure. I apply thermal and visual remote sensing techniques to measure the effusion rate both directly and indirectly during the ongoing eruption of Sinabung Volcano in Indonesia. Using a technique called photogrammetry, I am able to map the thickness of Sinabung's lava flow and calculate the flow volume and effusion rate. I also use this data to study how the lava flow moves. The results can then be used to manage hazards associated with the eruption.

Dr. Brett Carr grew up in Norman, Oklahoma and became interested in volcanoes during high school after a Latin class project on the destruction of Pompeii. He received a B.A. in Earth Sciences from Dartmouth College in 2007 and an M.S. in Geophysics from the University of Wisconsin-Madison in 2008. In 2009 and 2010, Dr. Carr worked as a geologist for Yellowstone National Park. He received his Ph.D. from Arizona State University in 2016, where his research focused on what causes transitions between different styles of volcanic eruptive activity. In 2017, Dr. Carr started his current position as a postdoctoral research scientist at Columbia University's Lamont-Doherty Earth Observatory where he is investigating the growth and collapse of lava domes.

The Real Dragon(fly)s of the Past and the Present

Manpreet Kohli

Ph.D. Candidate, Department of Biology, Rutgers University, Newark, NJ

One of the most enigmatic and beautiful insects are the dragonflies. With their colorful body and wings, they are usually seen flying around ponds and lakes. They are voracious predators. They are the strongest fliers among all insects, known for flying all around the globe. Modern dragonflies appeared ~250 million years ago while their extinct relatives are ~315 million years old. In my talk, I will focus on a species of dragonfly that lives above the Arctic Circle, being found in one of the coldest habitats. These dragonflies have large Holarctic distribution and their populations are in North America, Europe and Russia. My research has shown that these dragonflies, despite their vast geographic distribution, do not show any genetic differences. This is a unique trend that is not seen in many insect species.

Manpreet Kohli is a Ph.D. Candidate at Rutgers University where she studies macro- and micro- evolutionary patterns in insects. While she enjoys working with all insects, her favorite insects are dragonflies. Through her research she answers questions about ages and relationships between different dragonfly lineages. She conducts her research by using a combination of methods that include the use of molecular data (DNA), fossils and computational models. Out of all the various aspects of her research, she enjoys fieldwork the most, observing and catching dragonflies in their habitats.

Opening Old Boxes to Ask New Questions: The Howe Quarry Project, a Reassessment of a Dinosaur Graveyard

Emanuel Tschopp, Ph.D.

Postdoctoral Research Scientist, Division of Paleontology, American Museum of Natural History, New York, NY

One-hundred and fifty million years ago, in western North America, there was an enormous floodplain with rivers, marshes, and lakes. The climate was sub-tropical. The plain was inhabited by numerous turtles, crocodiles, and small mammals. But, most importantly, it was also inhabited by dinosaurs - so many, in fact, that researchers wonder how they managed to live together, especially the gigantic, long-necked sauropods. But maybe they did not: maybe they lived at different times, or in different places. The American Museum of Natural History houses several boxes with bones from the 1934 excavation at Howe Quarry in northern Wyoming which might help solve the riddle. This area of the West is not well studied; there are indications that the species reported from here are not the ones we thought them to be. Our recent studies of the bones from these old boxes are helping us to understand if and how so many sauropods lived together. In the future, this could even tell us how to best protect today's ecosystems.

Emanuel Tschopp got hooked on dinosaurs early on. His ambitions to become a paleontologist were reinforced by the opening of the Sauriermuseum Aathal in 1992, a dinosaur museum close to where he grew up in Switzerland. During his undergraduate study in Switzerland and Ph.D. in Portugal, Emanuel specialized in sauropods from western North America. He discovered two new species and found that *Brontosaurus*, considered to be the same as *Apatosaurus* by scientists for more than 100 years, was actually distinct and could be used again. He now continues his research at the AMNH studying material from a site they excavated in Wyoming in 1934 –but not completely. In fact, the Sauriermuseum was founded thanks to a book mentioning that the excavations from 1934 were never finished, and thanks to the bones they found in that same site in 1990.

MSNH Contact Info

To learn more about the MSNH or to be added to our email list, please contact us at metropolitannaturalhistory@gmail.com. Or visit us online:

Website: www.metropolitannaturalhistory.org
Facebook: https://www.facebook.com/groups/258831564151843/
Meetup: http://www.meetup.com/The-Metropolitan-Society-of-Natural-Historians/

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