Fifty-First Annual Briefing

NEW HORIZONS IN SCIENCE

PART OF

SCIENCEWRITERS2013

CASW Council for the Advancement of Science Writing

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UNIVERSITY OF FLORIDA

CASW Council for the Advancement of Science Writing


SCIENCEWRITERS2013

Conference Program

FRIDAY, NOVEMBER 1, 2013

11:00 AM - 4:00 PM – Hilton Board Room
NASW BOARD MEETING (CLOSED MEETING)

1:00 - 4:00 PM – Depart from Hilton lobby; tours leave on the hour at 1 pm, 2 pm & 3 pm
FLORIDA MUSEUM COLLECTIONS TOUR

1:00 - 4:00 PM – Depart from Hilton lobby; tours leave on the hour at 1 pm, 2 pm & 3 pm
UF HEALTH ORTHOPAEDICS AND SPORTS MEDICINE INSTITUTE

1:00 - 4:00 PM – Depart from Hilton lobby; tours leave at 1 pm and 2:30 pm
UF/IFAS ENTOMOLOGY DEPARTMENT TOUR

2:00 - 6:00 PM – Hilton Prefunction Area/Lobby
PROFESSIONAL HEADSHOTS WITH MARK BENNINGTON

3:00 - 7:00 PM – Hilton Lobby
CHECK-IN

4:00 - 5:00 PM – Hilton (Front Lawn)
AERIAL CAMERA DRONE DEMO

6:00 - 9:00 PM – Florida Museum of Natural History (a short walk from the hotel; shuttle available)
WELCOME RECEPTION

9:00 - 11:00 PM – Two Bits Lounge, Hilton Lobby
AFTER PARTY

SATURDAY, NOVEMBER 2, 2013

7:00 AM - 5:00 PM – Prefunction Area, Hilton University of Florida Conference Center
CHECK-IN

7:00 AM - 5:00 PM – Century Ballroom A
NATIONAL ASSOCIATION OF SCIENCE WRITERS WORKSHOPS

7:30 - 8:00 AM – Century Ballroom A, Hilton University of Florida Conference Center
CONTINENTAL BREAKFAST AND NEWCOMER MEET AND GREET

6:30 - 10:00 PM – Samuel P. Harn Museum of Art at the University of Florida
(a short walk from the hotel; shuttle available)
AWARDS RECEPTION

Time change — don't forget to set your clocks back 1 hour!

7:00 - 8:30 AM – Prefunction Area
BREAKFAST

7:00 AM - 12:00 PM – Prefunction Area
CHECK-IN

8:30 - 9:30 AM – Century Ballroom A
THE TREE OF LICE AND THE TREE OF LIFE: TALES OF EVOLUTION AND SYMBIOSIS WRITTEN IN ONE PARASITE'S GUT

How much science can you do with one lousy insect? Tons. As companions riding on humans through their evolution, lice reveal much about our species' migration, evolution and history. But the blood of living and fossil lice doesn't just carry the DNA of their hosts and their hosts' microbiome; lice themselves are hosts to a shifting cast of endosymbiotic bacteria. Those rapidly evolving species provide precise molecular clocks for recreating events in primate evolution and interpreting the fossil record — while offering fascinating insights into bacterial and insect ecology and evolution to boot.

DAVID REED

Curator of Mammals and Chair, Department of Natural History
Florida Museum of Natural History

David Reed grew up in a family of musicians. Thanks to an influential science teacher in high school, he enrolled in a marine biology program and went on to graduate school at Louisiana State University, where he studied coevolution with Mark Hafner, one of its pioneers. Reed is best known for research that explores human evolution through the lens of our species' longtime traveling companion, the lowly louse. Results on human migration have received widespread public attention and even a wag of the finger from Stephen Colbert. As curator of mammals at the Florida Museum of Natural History, Reed oversees more than 30,000 mammal specimens collected around the world. He and his students also study the effects of climate change on mammal populations. He developed a course with Bruce MacFadden that teaches graduate students how to better communicate with public audiences.

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9:00 AM - 6:00 PM – Prefunction Area
PROFESSIONAL HEADSHOTS WITH MARK BENNINGTON

9:30 - 10:30 AM – Century Ballroom B

CRASHING MARKETS, POWER BLACKOUTS AND SUDDEN DEATH: THE PHYSICS OF A NETWORKED WORLD

Massive power outages, global financial crashes and sudden death in the elderly are all startling and befuddling events. To Gene Stanley, they're unavoidable shocks in an interconnected world, where interdependencies between networks create dangerous vulnerabilities. Stanley and his colleagues have uncovered new laws that show why everyday fluctuations in one network can trigger abrupt failures across coupled networks. They've found that the rapid switching typical of financial networks produces features analogous to phase transitions in physics. Furthermore, market moves that economists call "rare events" turn out to have the same statistical properties as everyday fluctuations. Recently, the group has applied these principles to Google query data and found early warning signs of market changes.

H. EUGENE STANLEY

William Fairfield Warren Distinguished Professor
Professor of Physics, Chemistry, Biomedical Engineering and Physiology;
Director, Center for Polymer Studies
Boston University

Gene Stanley's pathbreaking career in physics and complexity studies began when he performed biological physics research with Max Delbrück at Harvard. Today he works in collaboration with students and colleagues on major puzzles in interdisciplinary science. He has worked on a range of topics in complex systems, such as quantifying correlations among the constituents of the Alzheimer brain and quantifying fluctuations in noncoding and coding DNA sequences. Honored by universities and scientific societies around the world, Stanley is a member of the Academies of Sciences in the US and Brazil. He was elected chair of the 2008 NAS/Keck Futures Initiative on Complexity and is an active member of the NAS committee Forefronts of Science at the Interface of Physical and Life Sciences, charged with finding ways to fostering useful collaborations between physicists and life scientists.

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9:30 - 10:30 AM – Century Ballroom A
FROM HAITI TO THE HAJJ: REAL-TIME SCIENCE TO PREVENT PANDEMICS
FOLLOWED BY A DIALOGUE ON COMMUNICATING THE SCIENCE OF EMERGING DISEASES, LED BY MARYN MCKENNA

As the annual Hajj pilgrimage approaches, world health officials are watching with concern a SARS-like coronavirus that has already caused dozens of deaths in Saudi Arabia this year. Glenn Morris and his collaborators at the Emerging Pathogens Institute at the University of Florida scramble to do the basic science necessary to fend off and combat pandemics. Areas of current activity include understanding the transmission of the Saudi Arabian virus from animals to humans. Morris is also studying how Haiti's newly established and highly virulent cholera strain continues to evolve, both in the island's waters and during transmission from one human host to another. The establishment of a single strain in a new environment has turned Haiti, tragically, into a laboratory for puzzling out the dynamics of *Vibrio cholerae*.

GREGORY C. GRAY

Professor and Chair, Department of Environmental and Global Health
Director, Global Pathogens Laboratory
University of Florida

Greg Gray, a board-certified physician with graduate training in public health, has conducted epidemiological infectious disease research in the US and abroad for 25 years and joined the University of Florida faculty in 2010. His current research interests include the transmission of pathogens, especially respiratory viruses, from animals to people as a result of occupational exposure. This work has taken him more than to a dozen countries in Asia, Europe and Africa. A strong proponent of the cross-disciplinary "One Health" approach to animal and human health, he holds a joint appointment in veterinary medicine at UF, directs the world's first One Health PhD program and recently won NIH funding for a postdoctoral zoonoses training program in partnership with scholars in Mongolia.

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J. GLENN MORRIS JR.

Director, Emerging Pathogens Institute
Professor of Medicine (Infectious Diseases) and Public Health
University of Florida

Glenn Morris came to Gainesville to become director of the Emerging Pathogens Institute in 2007. He holds an MD and a master's degree in public health and tropical medicine from Tulane and has served as an Epidemic Intelligence Service officer at the Centers for Disease Control and Prevention, focusing his attention on cholera and other water- and food-borne illnesses. From 2000 to 2007 he chaired the Department of Epidemiology and Preventive Medicine at the University of Maryland, Baltimore. Morris has authored more than 200 articles in peer-reviewed journals and served on

the Institute of Medicine's Food and Nutrition Board, on multiple IOM/National Academy of Sciences committees dealing with food safety and on the Armed Forces Epidemiology Board. Much of his current research is international and focuses on enteric and foodborne pathogens: "New diseases do not respect borders," he notes. He currently has NIH funding for studies of cholera in Haiti and Bangladesh.

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10:30 - 10:45 AM – Prefunction Area
BREAK

10:45 - 11:45 AM –Century Ballroom A
SIMPLICITY, SURPRISE, SCIENCE – (PATRUSKY LECTURE)

Sir William Bragg is said to have said: "The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them." Having worked at the frontier of one of the most complex of the sciences, chemistry, George M. Whitesides has launched an effort Bragg would applaud: peeling back the layers of complexity in modern science to discern the scientific meaning of simplicity and thus to discover new scientific methods and approaches to invention.

GEORGE M. WHITESIDES

Woodford L. and Ann A. Flowers University Professor
Harvard University

George M. Whitesides is the world's most cited living chemist and one of the most imaginative and prolific scientists and inventors of the past century. A pioneer in microfabrication and self-assembly at the nanoscale and the founder of several companies, he served on the faculty of MIT from 1963 to 1982 before moving his laboratory to Harvard, where he chaired the chemistry department from 1986-89. He now holds one of 21 University Professorships at Harvard. Whitesides is a member of the National Academies of Science and Engineering, a major figure in science policy and a winner of the Kyoto Prize, King Faisal International Prize in Chemistry, U.S. National Medal of Science and many other honors. A lively explainer of scientific ideas, he is co-author with Felice Frankel of *On the Surface of Things: Images of the Extraordinary in Science* (2008) and *No Small Matter: Science on the Nanoscale* (2009). His extensive Harvard research group is currently investigating questions ranging from soft robotics to medical diagnosis to the origins of life. Its goal is "to fundamentally change the paradigms of science."

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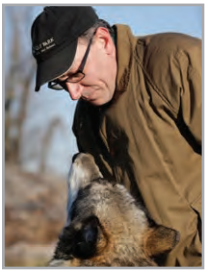
11:45 AM - 1:45 PM – Conference Center meeting rooms
LUNCH WITH A SCIENTIST

1:45 - 3:45 PM – Depart from Hilton lobby
POWELL STRUCTURES LAB TOUR

1:45 - 2:30 PM – Century Ballroom A
RETHINKING THE ORIGINS OF DOGS

However popular, useful and abundant they are, dogs hold many mysteries. For one thing, just how did they come to be? Clive Wynne has been traveling the world to re-examine evidence supporting two dominant ideas: the "hunter's helper" and "dumpster diver" hypotheses. Wynne, who conducts behavioral research with both dogs and wolves, focuses on such issues as how the first dogs achieved the reproductive isolation needed to create a canid subspecies. Behavioral and genetic details revealed by recent research on dogs and wolves, he says, call for revising the story of this "obligatory symbiont." It's likely the ancestors of dogs effectively domesticated themselves, jolted along their way by genetic accident.



CLIVE D. L. WYNNE

Professor of Psychology
Arizona State University

Clive Wynne's research interests have focused on dogs and their wild relatives, but over the last 30 years he has studied the behavior of animals ranging from pigeons to dunnarts (a mouse-sized marsupial) and from bats to Galápagos tortoises. He is currently completing a book on the evolution of dogs, a project that has taken him to Africa and other sites of early domestication to elucidate the interplay of genetics and behavior. Professor of psychology at the University of Florida from 2002 to 2013 and director of UF's Canine Cognition & Behavior Lab, Wynne recently joined the Arizona State faculty. He is also Director of Research at Wolf Park, a wildlife education and research facility in Battle Ground, IN. Always fascinated by the things animals do, in recent years he has developed an additional interest in how people relate to animals. When not working, he talks to his dog — even though research from his own lab suggests she is quite indifferent to what he says to her.

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1:45 - 2:30 PM – Century Ballroom B
WHEN YOU GO TO MARS, TAKE A TOWEL – AND A HANDFUL OF SEEDS

For Anna-Lisa Paul, taking plants into a space is a way of understanding just what they're made of. Challenged to survive outside their ancestral environment, plants leverage a unique genetic toolkit to adapt to new challenges; in the process, they reveal how they work. Using zero-g experiments, for example, Paul and her colleagues achieved a new understanding of how plants' roots grow, upending a long-held theory that gravity holds the key. She is currently combining parabolic flight and orbital experiments with imaging and gene expression studies. Fully understanding how plants survive and grow under extreme conditions, she says, will advance the biology needed to understand how all higher organisms survive in space. Not to mention the practical importance of having a packet of hardy seeds along on your journey. "You don't go anywhere without your plants," says Paul. "Plants will find a way. They'll survive, and they'll give us what we need."

ANNA-LISA PAUL

Research Associate Professor of Horticultural Sciences
University of Florida

Anna-Lisa Paul is a plant molecular biologist with an interest in how plants respond to abiotic stress, particularly at the gene expression level. Venues associated with spaceflight provide an opportunity to explore plant genomic responses to a novel environment that is outside the evolutionary experience of terrestrial organisms. Paul and her colleague Robert Ferl have launched and analyzed five spaceflight experiments: a sortie on the Space Shuttle Columbia in 1999 plus three telemetric and gene expression experiments and a BRIC-16 gene expression experiment (BRIC stands for Biological Research in Canisters) on later shuttle flights. An additional spaceflight experiment launched and returned with SpaceX-2. Current research is evaluating the effects of the spaceflight environment on the patterns of signal transduction and gene expression in the model plant *Arabidopsis thaliana* using state-of-the-art molecular biology and genetic techniques along with telemetric image collection.

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12:30 - 3:15 PM – Century Ballroom A
PROBING NANOPARTICLES FOR ANSWERS TO BIG CLIMATE QUESTIONS

For years, tiny organic particles in the air we breath have bedeviled climate modelers. Some of these particles are byproducts of human activity; others can be traced to oxidized gas molecules emitted by trees. These particles play a significant role in climate and have the remarkable habit of trapping toxic pollutants and transporting them from industrial regions to the pristine arctic. So far, models have been able to explain at best one-tenth of the organics actually measured in the atmosphere. Such large inaccuracies throw wrenches into attempts to accurately represent cloud formation and other processes in climate models. Alla Zelenyuk has tackled this discrepancy by building a system, called SPLAT, that measures many of the key properties of a single nanoparticle all at once. Most recently, she's been able to combine laboratory and field findings to remove the troubling discrepancy between data and models in a major data set from Mexico City.

ALLA ZELENYUK

Senior Research Scientist
Pacific Northwest National Laboratory

Alla Zelenyuk uses laboratory and field studies to probe two questions important to understanding clouds and climate: the complex processes that govern the atmospheric lifecycle of aerosols and the characterization of combustion particles. She has conducted this research at PNNL since 2003. Zelenyuk earned her PhD in chemical physics at the Moscow Institute of Physics and Technology in Russia and served as a research scientist at Semenov Institute of Chemical Physics in Moscow. In the U.S., she conducted research at the University of North Carolina at Chapel Hill

and Brookhaven National Laboratory before joining PNNL. The dual-use tools she has developed aim to bridge the gap between fundamental and applied sciences, advancing the understanding of chemical and physical transformations of nanoparticles while also shedding light on the role of aerosols in cloud condensation and the nucleation of atmospheric ice.

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3:15 - 3:45 PM – Prefunction Area
BREAK

3:30 - 4:30 PM – Depart from Hilton lobby
U.F. POINSETTIA AND COLEUS BREEDING PROGRAM TOUR

3:45 - 4:30 PM – Century Ballroom A
ONE MEDICINE: HOW DOGS ARE ACCELERATING HUMAN CANCER RESEARCH

Matthew Breen knows the source of the cancers common in purebred dogs: people. As we bred dogs for behavioral and appearance traits, humans unwittingly selected for susceptibility to maladies including retinal atrophy, hip dysplasia and certain cancers. But genomic studies have revealed a silver lining: Research on these inbred populations can radically accelerate progress on cancers shared by humans and their loyal companions. By looking at 150 dogs with lymphoma, Breen and colleagues identified a genetic signature that predicts how long a dog will respond to chemotherapy. The same signature, found in corresponding regions of the human genome, might also help doctors refine the prognosis for human lymphoma patients. There is so much genetic diversity in humans that locating it otherwise would have taken many years. Breen is working with breeders to reduce defective genes from kennel populations in a controlled and effective way, while collaborating with labs seeking clues to human cancer. "Within [the canine] genome," he says, "we're starting to find the answers we've been looking for in our own genome for 50 years."

MATTHEW BREEN

Professor of Genomics, Department of Molecular Biomedical Sciences, College of Veterinary Medicine
North Carolina State University

Trained in the UK at the University of Liverpool and Medical Research Council, Matthew Breen launched a career in molecular cytogenetics in the UK and Australia, where he helped develop techniques to analyze the genomes of horses and humans. After extending his comparative genomic studies to dogs, he relocated his lab to NC State University's College of Veterinary Medicine as part of a campuswide genomics initiative in 2002. He is a member of the NCSU Center for Comparative Medicine and Translational Research and the UNC Lineberger Comprehensive Cancer Center. He was a founder and now serves on the board of the Canine Comparative Oncology and Genomics Consortium. He spends much of his time working with dog breeders who, he reports, are broadly committed to reducing the burden of genetic disease in purebred dogs by careful controlled breeding.

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3:45 - 4:30 PM – Century Ballroom B
PLANCK COSMOLOGY: ZOOMING IN ON BIG-BANG INFLATION

What would the universe look like to an electron some 370,000 years after the big bang? This spring the Planck cosmology probe released a fine-scale map of the subtle thermal variations imprinted on the cosmos around that time, revealing that the universe was slightly older than previously thought. But the Planck instruments also measured the polarized intensities of the ancient light. Mission scientists are now working to zoom in using the polarization data, getting that electron's-eye insider view of the early universe. Cosmologists are eagerly waiting to see whether Planck has detected the gravitational waves that would provide direct confirmation that there was an inflationary period in the instant after the big bang. Meanwhile other experiments are searching for gravitational-wave signatures, in an effort Charles Lawrence calls "the most rapid expansion of our understanding of the universe that's ever happened."

CHARLES LAWRENCE

Principal Scientist, Astrophysics, Jet Propulsion Laboratory
US Project Scientist for The Planck Collaboration

Charles Lawrence works in relativistic astrophysics, the effort to understand the nature and history of the universe by analyzing the cosmic microwave background, extra-galactic radio sources, strong gravitational lensing and other evidence of the primordial universe. He is thrilled to have participated in the field during a time when many long-puzzling questions about the universe have been answered. He currently leads US participation in Planck, the third-generation space mission to measure the anisotropy of the cosmic microwave background, which launched in May 2009. Lawrence went to MIT for graduate school after working as a physics teacher in the Baltimore public schools for seven years. He earned a PhD in physics and headed to Caltech as a research fellow. He joined the Jet Propulsion Lab in 1993. He has received NASA's Outstanding Leadership Medal twice, for his leadership on both the Spitzer and Planck projects.

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4:30 - 5:30 PM – Century Ballroom A
THE FUTURE OF SPACEFLIGHT: AN UPDATE FROM VIRGIN GALACTIC
FOLLOWED BY A GOOGLE HANGOUT MODERATED BY FRASER CAIN OF UNIVERSETODAY.COM

On April 29 this year, a new space vehicle–Virgin Galactic's SpaceShipTwo–reached supersonic speeds in its first rocket-powered flight over the Mojave Desert. By the time ScienceWriters convenes in November, Virgin Galactic will have flown again, and more than 600 passengers are now lined up for commercial flights into space that could start next year. CEO George T. Whitesides will bring a report on the countdown to space operations at Spaceport America, where Richard Branson hopes to ride his ship 50 miles up–officially reaching space to open the age of commercial flight. And yes, your science experiment will also get a chance to ride, possibly funded by NASA. What's next in private space travel and exploration? Could this lead someday to hyper-fast supersonic transport? And whither NASA?

GEORGE T. WHITESIDES

Chief Executive Officer and President
Virgin Galactic

George T. Whitesides was chosen in 2010 to lead Virgin Galactic, the spaceflight company founded by Sir Richard Branson. After winning the X Prize with SpaceShipOne, a rocket plane that is lifted initially by a carrier vehicle, Branson unveiled SpaceShipTwo in 2009. Whitesides is responsible for guiding all aspects of the company to commercial operation in the US and a proposed spaceport in Abu Dhabi. Before joining Virgin Galactic, Whitesides served as chief of staff for NASA and earlier as executive director of the National Space Society. Whitesides holds a master's degree in geographic information systems and remote sensing from the University of Cambridge. He is a licensed private pilot and certified parabolic flight coach and cofounder of Yuri's Night, an annual global celebration of space.

George.Whitesides@virgingalactic.com | 347-820-0709

6:30 - 7:30 PM – Depart from Hilton lobby
FLORIDA INNOVATION HUB RECEPTION

7:30 - 11:00 PM – Walk from Innovation Hub, shuttles back to hotel. Pay on your own.
GAINESVILLE DOWNTOWN DINE-AROUND

MONDAY, NOVEMBER 4, 2013

7:00 - 8:30 AM – Prefunction Area
BREAKFAST

8:30 - 9:30 AM – Century Ballroom A
FROM REDUCTIONISM TO SUSTAINABLE SCIENCE

Paul Anastas acknowledges that science has made huge progress through reductionism and tinkering, learning what happens when you change just one parameter. But the resulting products and processes have given us a 21st-century world that is awash in unintended consequences and expends enormous agency on flawed and ineffective risk analysis. Reductionism, he says, is "a wonderful tool, a terrible master, an even worse religion." He will propose ways for scientists and engineers to embrace systems thinking, systems design and "transformative innovation."

PAUL T. ANASTAS

Director, Center for Green Chemistry and Green Engineering
Teresa and H. John Heinz III Professor in the Practice of Chemistry for the Environment
Yale University

Paul Anastas trained as a synthetic organic chemist, earning his PhD at Brandeis. Focusing on sustainability science and moving among academia, industry and government,

he established the field of green chemistry, articulating its principles in books that include *Benign by Design and Green Chemistry: Theory and Practice* (John Warner, co-author). A Yale faculty member since 2007, he served in the White House Office of Science and Technology Policy from 1999-2004. He also served as the Assistant Administrator for the Environmental Protection Agency's Office of Research and Development and Science Advisor to the EPA.

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9:30 - 10:15 AM – Century Ballroom B

TINY MAMMALS, GIANT REPTILES: FOSSIL SNAPSHOTS OF BIOTIC RESPONSE TO CLIMATE

What will happen to life on Earth in a rapidly warming planet? Jon Bloch says we have only to look in the fossil record for abundant data from past global hyperthermal events—the big experiments already run by the planet. Along with Titanoboa, the 48-foot long biggest snake ever, he has found the tiny ungulate ancestors of horses, cows, pigs, camels, rhinos and whales during a big planetary warmup around 60 million years ago. Bloch's recent work in the Americas tells a dynamic story of the biotic response to global climate change. Sharing the stage are early primates, furious battles between invasive and endemic species and, yes, monkeys rafting the open seas.

JONATHAN I. BLOCH

Director of the Program in Vertebrate Paleontology
Florida Museum of Natural History

Jon Bloch received his PhD in geological sciences from the University of Michigan and spent a year there as an NSF-funded postdoctoral fellow, followed by two years as a research fellow at the South Dakota School of Mines and Technology. In 2004 he joined the faculty at the Florida Museum of Natural History. A Research Foundation Professor at the University of Florida, Bloch studies fossil vertebrates from the Cenozoic with an emphasis on addressing questions surrounding the first appearance and early evolution of the modern orders of mammals. Field research has taken him to the Cenozoic of Wyoming and Montana, the Cerrejón and Bogotá formations of northern Colombia, and the exposures along the Panama Canal. Bloch has been an associate editor of the *Journal of Human Evolution*, is on the editorial board of the *Journal of Mammalian Evolution* and is co-editor of the journal *Paleobiology*.

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9:30 - 10:15 AM – Century Ballroom A
VIRAL GENE THERAPY: LEVERAGING STRUCTURAL BIOLOGY FOR SAFER CURES

After decades of effort, gene therapy is happening: In November 2012, the European Commission approved a viral gene therapy for a rare metabolic syndrome causing pancreatitis, while clinical trials are well under way for a treatment for a rare form of blindness. Both therapies use adeno-associated viruses (AAVs) as a vector for delivering genes to the cell nucleus. But the pursuit of viral vectors for gene therapy and the battle against pathogenic viruses are both hampered by the subtle shape-shifting of viruses and the immune system's equally dynamic response to them. Mavis Agbandje-McKenna will describe what structural virologists are doing to understand how AAVs recognize cell-surface receptors, traffic genes into the cell, fend off antibodies and then release and replicate in the nucleus.

MAVIS AGBANDJE-MCKENNA

Director, Center for Structural Biology, McKnight Brain Institute;
Professor of Biochemistry and Molecular Biology
University of Florida

By investigating the role of biological structure in viral infection, Mavis Agbandje-McKenna aims to understand how structure-function relationships drive biological processes. Although she is now focusing on engineering the viral capsid for gene therapy, she began with molecular-level PhD work at the University of London, where she characterized a novel group of anti-tumor agents that can intercalate DNA (fitting between base pairs to inhibit replication). In postdoc fellowships at Purdue and Warwick, she studied structure and function in single-stranded DNA parvoviruses as well as the Geminiviridae and Microviridae. Agbandje-McKenna joined the faculty of the University of Florida in 1999. In Gainesville her work on ssDNA viruses has expanded further to include the newly discovered TT (Torque Teno) virus.

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10:15 - 10:30 AM – Prefunction Area
BREAK

10:30 - 11:15 AM – Century Ballroom A
A PATHOGEN HUNTER FLIES INTO AFRICAN DUST PLUMES

Each summer, huge atmospheric plumes from African dust storms dump some 50 million metric tons of dust on the state of Florida before spreading through the eastern U.S. The plumes bring with them spores and microbes scoured from the agricultural lands of the Sahel. Many plant and animal pathogens have been found in the dust, but only sparse sampling is possible on land. So plant pathologist Andrew Schuerger is taking to the air. This summer, Schuerger and his colleagues made the first high-altitude flights with DART, a detector that can be quickly strapped to the underside of a jet or airplane wing and flown into a dust plume as it approaches across the Atlantic Ocean. Ultimately he envisions an early-warning system to reduce risks to people, animals and crops exposed to the dust.

ANDREW C. SCHUERGER

Research Assistant Professor in Astrobiology and Plant Pathology
University of Florida

After studying microbiology and plant pathology for his PhD, Andrew Schuerger worked for 18 years at The Land, a hydroponic research and education facility at Epcot Center, developing disease management programs for vegetable and agronomic crops. He has published extensively on plant-pathogen interactions in semi-closed plant growing systems, the survival of terrestrial microorganisms under Martian conditions, and the microbial ecology of human missions to Mars. Since joining the UF plant pathology faculty in 2003, he has been studying the effects of the surface environment on the survival, growth, and adaptation of terrestrial microorganisms on Mars. He also has continued research into the use of remote sensing technologies to detect and classify plant pathogens present in hydroponic plant production systems.

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10:30 - 11:15 AM – Century Ballroom B
THE CELL AS A PUMP

What are cells? Among other things, most are pumps, and that's how Tommy Angelini sees them. Animal cells are built to generate contractile forces; they pull on each other and can generally pump an amount of fluid 10 times their internal volume in an hour. This mechanical perspective turns the notion of cell signaling on its head. A biochemist might imagine cell signaling as a diffusion process; Angelini, understanding cells as machines, says cells respond to mechanical signals by pushing signaling molecules through their pores. When crowded, they form "cell hordes" whose behavior is altered by collective experience. Angelini studies both prokaryotic cells—bacterial biofilms—and assemblages of eukaryotic cells such as endothelial layers and developing embryos.

THOMAS E. ANGELINI

Assistant Professor of Mechanical and Aerospace Engineering
University of Florida

Tommy Angelini's Bio and Soft Matter Lab at UF hopes to discover how system-level properties of large groups of cells — epithelial layers, endothelial networks and bacterial biofilms — emerge from microscopic dynamics. This is the latest focus of a research career that has combined molecular biophysics with cell mechanics, including the study of physical interactions between the cornea, the eyelid, and contact lenses mediated by synthetic and biological macromolecules. Angelini received his PhD in physics from the University of Illinois at Urbana-Champaign and moved into cell mechanics and the physics of bacterial biofilm growth during postdoctoral research in the Weitz Lab at Harvard before joining the UF faculty in 2010.

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11:15 AM - 12:00 PM – Century Ballroom A
READING THE DRUG-DOSING INSTRUCTIONS WRITTEN IN YOUR GENOME

How close is medicine to a world in which your treatment for hypertension, coronary artery disease or pain is fine-tuned to your genotype? Weaving a path through the thorny issues surrounding "personalized medicine," Julie Johnson and her colleagues are now showing that a genotype-driven approach to drug dosing can work. An example is the blood thinner warfarin, where the therapeutic daily dose can be anywhere from 1 to 20 milligrams, and patients must have frequent blood tests to prevent dangerous bleeding and strokes. People of different ancestry vary broadly in how they metabolize these drugs, and new research has identified several genetic factors that explain much of the varying dose response. International trials are looking at the practical application of the findings and beginning to examine the big payoff: using genotype to predict the long-term outcome of a given treatment for a particular individual.

JULIE A. JOHNSON

Chandran Professor of Pharmaceutical Sciences and Dean of the College of Pharmacy
University of Florida

Julie Johnson is a leader in the field of personalized medicine, particularly for cardiovascular treatment. She joined the faculty at the University of Florida in 1998 following nine years on the University of Tennessee College of Pharmacy faculty and was named dean of the UF College of Pharmacy in July 2013. Her research into how genes influence individual patients' responses to important cardiovascular drugs, including blood thinners and medications regulating blood pressure, has already found use in the field. In June 2012 UF Health began using a blood test to determine whether cardiac catheterization patients should be administered clopidogrel, a commonly prescribed anti-clotting drug, and found that approximately 28 percent have a genetic variation indicating a different medication should be used. The healthcare system is now storing this information in patient medical records and expanding the research to other medications.

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12:00 - 1:00 PM – Century Ballroom A
LUNCH

12:45 - 2:45 PM – Depart from Hilton lobby
U.F. MCKNIGHT BRAIN INSTITUTE TOUR

1:00 - 1:45 PM – Century Ballroom A
CAN THE CLIMATE-CHANGE LOCOMOTIVE BE STOPPED?

Burning tanker trains, oil sands, fracking, pipeline wars. A quarter-century after the G20 nations agreed on a target for reducing atmospheric carbon dioxide, local and regional ecological crises dominate the debate over energy and environment. Mark Jaccard sees international economic and political systems as paralyzed by a sort of mass delusion about global carbon. Jaccard, a contributor to the early IPCC reports, will offer an economist's perspective on North American energy controversies as well as the IPCC reports released this fall.

MARK JACCARD

Professor of Sustainable Energy
Simon Fraser University

Mark Jaccard is an economist who has advised energy and environmental policy makers around the world. He is known for designing and applying energy-economy models to assess the effectiveness and cost of sustainable energy policies. A Fellow of the Royal Society of Canada, Jaccard contributed to assessment reports of the Intergovernmental Panel on Climate Change in the 1990s and was an author on its 2011 special report on renewable energy sources. In 2007-12, he served as convening lead author for sustainable energy policy with the Global Energy Assessment. He has served on the faculty of Simon Fraser University since 1986, save for a stint as chair and CEO of the British Columbia Utilities Commission 1992-97. He writes the blog Sustainability Suspicions *(http://markjaccard.blogspot.ca)* and made headlines in 2012 as one of 13 protesters arrested for blockading a rail line used to deliver US coal to Canada.

jaccard@sfu.ca | 778-782-4219

1:45 - 2:30 PM – Century Ballroom A
LEDS ARM A GREENHOUSE "LIGHT BRIGADE"

What will the strawberry field, grocery store, florist's greenhouse and space station of the future have in common? In Kevin Folta's vision, they'll all have automatic lighting systems and reflective surfaces that use varying colors of light to fine-tune nutrition, flavor and many other attributes in plants. Since the dawn of photosynthesis, many aspects of the lives of plants have been managed by photoreceptor chemistry. Now that inexpensive LEDs are available in many wavebands, Folta's lab has found ways to manipulate gene expression in growing and harvested plants to dynamically improve nutrition and flavor, control pests, time flowering and ripening and retard spoilage. These techniques have already found their way into fields in the form of colored mulches and reflective films. In the cut-flower industry, light may soon replace the chemicals applied to switch on flowering.

KEVIN M. FOLTA

Associate Professor and Chair, Department of Horticultural Sciences
University of Florida

Kevin Folta's laboratory examines the role of light in plant development and productivity, as well as how genes in small fruits contribute to consumer-desired traits. Folta has edited two seminal texts on genomics and genetics in fruit crops and serves as an editor for leading journals. He has been recognized with several prestigious national awards for research and student/postdoc mentoring. His research program has been recognized for its strong element of student training and service to the community. Folta's goal is to teach evidence-based science at all levels and use research as a mechanism to train scientists and further scientific understanding beyond laboratory walls. He maintains an active web presence with the blog

Illumination *(kfolta@blogspot.com)* and is a frequent guest on science podcasts and radio shows. Ultimately his goal is to extend laboratory knowledge, shaping better products and policy that can benefit communities, farmers and the environment.

kfolta@ufl.edu | 352-273-4812

2:30 - 3:00 PM – Prefunction Area
BREAK

2:45 - 4:15 PM – Depart from Hilton lobby
U.F. HEALTH CANCER & GENETICS INSTITUTE TOUR

3:00 - 3:45 PM – Century Ballroom A
CLIMATE CSI: A GEOLOGIST REPORTS FROM GREENLAND'S MELTING ICE SHEET

Climate scientists have been watching Greenland with alarm in recent years as its massive glaciers melt, crack and break off, losing ice at a rate that has doubled in the past 10 years. Ellen Martin and her collaborator Jon Martin are spending summers capturing a geochemical record of Greenland's change, hoping to use this natural laboratory to inform paleoclimate studies. Ellen Martin studies the global carbon cycle by analyzing isotopic signatures of continental weathering. The presence of radiogenic isotopes in water and sediment provides a record of the intense weathering that happens as glaciers wax and wane. The fieldwork in Greenland will allow her to compare isotopic evidence collected from meltwater, recent snow melt and nearby ocean sediments. The detailed contemporary data will improve scientists' ability to reconstruct the planet's deep climate history from chemical proxies in ocean sediment cores.

ELLEN E. MARTIN

Professor of Paleoceanography and Paleoclimatology
University of Florida

Ellen Martin joined the geological sciences faculty at the University of Florida in 1994 following completion of a PhD at Scripps Institution of Oceanography and an NSF Postdoctoral Fellowship at UC Santa Cruz. Her research in paleoceanography and paleoclimatology reconstructs past ocean chemistry and continental inputs to the ocean in order to define relations between continental weathering, carbon sequestration, ocean circulation and global climate change. She collaborates with the International Ocean Discovery Program, which will take her to the Baltic Sea in the winter. Martin is on the steering committee for the Florida Climate Institute and is a member of the University of Florida Graduate Council. She has also served as a Distinguished Lecturer for the Consortium of Ocean Leadership and was the Colonel Allan R. and Margaret G. Crow Term Professor 2002–10.

eemartin@ufl.edu | 352-392-2141

3:45 - 4:30 PM – Century Ballroom A
BURSTS OF COLOR ON THE TREE OF LIFE: THE TURBULENT EVOLUTION OF FLOWERS

Even if your name is Rose or Daisy, to an evolutionary geneticist you're a pale imitation of a flower. Flowering plants frequently go through whole-genome doubling and other radical events rare in the animal kingdom. The fossil and phylogenetic record of plants is full of bursts of speciation and radiation

and turbulent periods of rapid evolutionary experimentation. As a result, a number of today's crops and flowering species have large and remarkable toolkits allowing surprising adaptations. Doug and Pam Soltis are sequencing the complete genome of the oldest known flowering plant, Amborella, and have created synthetic tetraploids to observe genome dynamics in the lab. Combining phylogenetic information with herbarium records and ecological models, they are also collaborating to predict the adaptation of Florida's flora to climate change.

PAMELA S. SOLTIS

Distinguished Professor
University of Florida
Curator of Molecular Systematics and Evolutionary Genetics
Florida Museum of Natural History

Pam Soltis has played a major role in reconstructing the plant branch of the tree of life and relaying this information to the scientific community and the public. Her research interests are in plant biodiversity, emphasizing angiosperm phylogeny, polyploidy, the evolution of the flower, conservation genetics of rare plant species and phylogeography. She joined the University of Florida faculty in 2001 after teaching at Washington State, where with Doug Soltis she investigated genome doubling. Soltis has served as president of the Society of Systematic Biologists and the Botanical Society of America and as an associate editor for 10 journals, including *Evolution and Systematic Biology*. She participates in public outreach through the Gainesville public schools and the Florida Museum of Natural History, where she is featured in an ongoing exhibit, "Botanical Chords," with artist Terry Ashley.

psoltis@flmnh.ufl.edu | 352-273-1964

DOUG SOLTIS

Distinguished Professor, Department of Biology
University of Florida

Douglas Soltis came to the University of Florida from Washington State in 2001. He is a former president of the Botanical Society of America, winner of their Centennial Award and author with Pam Soltis of *Phylogeny and Evolution of Angiosperms*. His interests include genome doubling (polyploidy), floral evolution, building the tree of life and angiosperm diversification. He has reconstructed relationships among major lineages of flowering plants and, with others, proposed a new classification for angiosperms. These new classifications represent the most dramatic changes in angiosperm relationships in over 100 years. Soltis' framework formed the basis for two projects using genomic tools to address a fundamental problem: the origin of the flower. Soltis is part of a recently funded effort to build a first-draft tree of life for all of the 1.8 million species on Earth.

dsoltis@ufl.edu | 352-273-1963

4:30 - 5:30 PM – Century Ballroom A
I DON'T FEEL YOUR PAIN: SOLVING THE PUZZLE OF SUBJECTIVE MEASUREMENT

Nurses everywhere know the drill: "Tell me how bad your pain is on a scale of 1 to 10, where 10 is the worst pain you've ever experienced." Linda Bartoshuk wouldn't use such a poor question to make decisions about pain medication. Bartoshuk studies the senses, especially taste, and she made her mark with research revealing why the experience of taste varies across individuals. Now she's trying to fix the way scientists measure perception. It turns out that you can achieve much more reliable measures by asking a cross-modality question—say, comparing pain intensity to the intensity of a light or sound. She likes to show, rather than tell, so attend this session expecting to experience the difference between good and bad measurement, and to be surprised by what sweet taste really is.

LINDA BARTOSHUK

Professor of Community Dentistry and Behavioral Science;
Director of Human Research, Center for Smell and Taste
University of Florida

Linda Bartoshuk came to UF in 2005 from the surgery department at the Yale University School of Medicine. She is interested in genetic variation in the sense of taste as well as pathologies of taste. A member of the National Academy of Sciences, Bartoshuk has served as president of the Association for Chemoreception Sciences (AChemS), the Eastern Psychological Association and the Behavioral Neuroscience and Comparative Psychology Division of the American Psychological Association. In 1998, she received the AChemS Award for Outstanding Achievement in the Chemical Senses. This year she was recognized by the Association for Psychological Science with its highest honor, the William James Lifetime Achievement Award for basic research.

lbartoshuk@dental.ufl.edu | 352-273-5119

5:30 - 7:00 PM – UF Cultural Plaza, Pay on your own
FOOD TRUCK RODEO

7:30 - 9:30 PM – Phillips Center for the Performing Arts
BIG BAD VOODOO DADDY CONCERT

MONDAY

TUESDAY NOVEMBER 5, 2013

7:00 - 8:30 AM – Prefunction Area
BREAKFAST

7:30 AM - 12:00 PM – Depart from Hilton lobby (registration required)
THOMAS FARM FOSSIL DIG

7:30 AM - 4:00 PM – Depart from Hilton lobby (registration required)
FLORIDA SPRINGS TOUR

7:30 AM - 4:00 PM – Depart from Hilton lobby (registration required)
HISTORIC ST. AUGUSTINE TOUR

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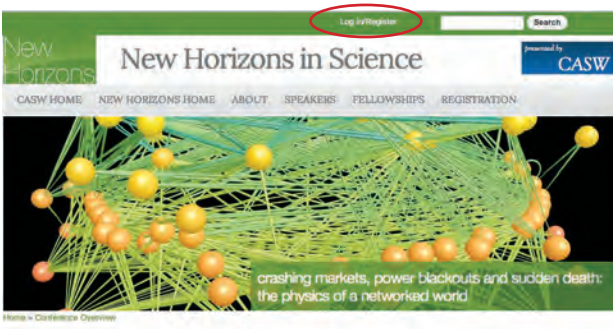

The New Horizons permanent website, **www.casw.org/new-horizons**, offers background papers and speaker slides. Use the **log in/register link** on any page to register for access. The program and speakers buttons take you to session pages and speaker profiles. These will display available information and files when you are logged in as a member. Not all speakers supply background material.

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