Astronomy Open Night, Friday, October 2, 2015

ESS 001; 7:30 P.M.

For more information: http://www.astro.sunysb.edu/openight/opennite.html

Alan Calder

"What did New Horizons teach us about the system formerly known as Planet Pluto?"

On July 14, 2015 NASA's New Horizons probe, launched in 2006, flew by dwarf planet Pluto giving us our first detailed observations of Pluto and its moons. I will give an overview of our solar system and its formation to set the context of this mission. While the process of receiving data from New Horizons will continue for months, we have received high-resolution images of the surface and atmosphere that indicate and unexpected amount of activity. I will present early results and what we have learned, and also new questions that have arisen.

Prof. Calder joined the Stony Brook Physics and Astronomy department in 2007 after research appointments at the University of Illinois and the University of Chicago. His research is in computational astrophysics and he has studied a variety of problems including core collapse and thermonuclear supernovae, coalescing neutron stars, and classical novae.

World of Physics Open Night, Friday, October 9, 2015

ESS 001; 7:30 P.M.

Abhay Deshpande

'"Spin Crisis": What do we know now?'

Physicists have known since 1968 that protons and neutrons (collectively called the Nucleons) are made up of quarks, and that gluons bind them together. The nucleons are the building blocks of the visible universe. Theoretical ideas that prevailed in the '70s and '80s could explain most of the known properties of the nucleons successfully. And then there was a crisis! In 1988 an experiment at CERN revealed, astonishingly, that the simple idea that quark-spins would add up to make the proton's spin, was simply wrong! The surprise was so unexpected, that the result became known as the "Spin Crisis". Several major experimental efforts were launched around the world to understand the Crisis, the polarized Relativistic Heavy Ion Collider (RHIC) physics program at BNL, being one of the biggest ones. I will present what we have learnt in the last 10 years at RHIC, and ideas of a future facility, the Electron Ion Collider (EIC), needed to solve the crisis finally.

Prof. Abhay Deshpande works in experimental high energy nuclear physics. His current research focuses on understanding the contributions of quarks, antiquarks and gluons to the proton's spin using the PHENIX detector and high energy polarized proton beams at the Relativistic Heavy Ion Collider (RHIC)

Living World Open Night, Friday, October 16, 2015

ESS 001; 7:30 P.M.

For more information: http://life.bio.sunysb.edu/marinebio/livingworld/

Christopher Gobler

"Coastal Ocean Acidification"

Increased nutrient loading into estuaries causes the accumulation of algal biomass and microbial degradation of this organic matter decreases oxygen levels and contributes towards hypoxia. A second, often overlooked consequence of microbial degradation of organic matter is the production of carbon dioxide (CO2) and a lowering of seawater pH. To assess the potential for acidification in eutrophic estuaries, my group has been assessing levels of dissolved oxygen (DO), pH, the partial pressure of carbon dioxide (pCO2), and the saturation state for aragonite (Ωaragonite) during the onset, peak, and demise of low oxygen conditions in systems across the northeast US. Low pH conditions (< 7.4) were detected in all systems during summer and fall months concurrent with the decline in DO concentrations. While hypoxic waters and/or regions in close proximity to sewage discharge had extremely high levels of pCO2, (>3,000 µatm), acidic pH (<7.0), and were undersaturated with regard to aragonite (Ωaragonite <1), even near-normoxic but eutrophic regions of these estuaries were often relatively acidified (pH <7.7) during late summer and/or early fall. The close spatial and temporal correspondence between DO and pH and the occurrence of extremes in these conditions in regions with the most intense nutrient loading indicated that they were primarily driven by microbial respiration.

A second effort by my group has undertaken has been to exploring the individual and combined effects of low pH and low dissolved oxygen and low pH and harmful algal blooms (HABs) on early life stage (larval, juvenile) bivalves and early life stage fish. We have further contrasted the effects of chronic and diurnal exposure to these conditions. All marine animals studied have negatively affected by hypoxia whereas some were resistant to acidification. Resistance to acidification did not separate between broad taxonomic classifications, as individual fish and bivalves species were both negatively impacted. The combination of hypoxia and acidification or acidification and HABs had additive or synergistic, negative effects on different species of fish and bivalve. Diurnal rather than chronic exposure to acidification provided a refuge for some bivalves but not all meaning that nearshore animals are vulnerable to these

conditions. The broad sensitivity of fish and bivalves to low pH and dissolved oxygen suggests that current and future ocean hypoxia and acidification will alter the productivity of marine food webs.

Collectively, this body of work demonstrates that acidification is an additional symptom of eutrophication that must be considered in tandem with co-stressors such as hypoxia and HABs. Because these co-stressors have very rarely been consider in tandem by scientists, more work is needed to document their co-occurrence in an ecosystem setting and the co-effects on coastal marine life. On the policy front, given that coastal acidification, HABs, and hypoxia are promoted by excessive nutrient loading and reach levels that negatively impact key species that comprise or support coastal marine fisheries, they must be considered as co-symptoms of eutrophication and warrant focused and accelerated managerial attention.

Christopher Gobler is a professor within the School of Marine and Atmospheric Sciences (SoMAS) at Stony Brook University. He received his M.S. and Ph.D. from Stony Brook University in the 1990s. He began his academic career at Long Island University (LIU) in 1999. In 2005, he joined Stony Brook University as the Director of Programs for SoMAS on the Stony Brook – Southampton campus. In 2014, he was appointed as the Associate Dean of Research at SoMAS. His research examines the functioning of aquatic ecosystems and how that functioning can be effected by man or can affect man. He investigates harmful algal blooms (HABs) caused by multiple classes of phytoplankton in diverse ecosystems. Another research focus within his group is the effects of climate change effects on coastal ecosystems. A final area of interest is investigating how anthropogenic activities such as eutrophication and the over-harvesting of fisheries alters the natural biogeochemical and/or ecological functioning of coastal ecosystems.

Geology Open Night, Friday, October 23, 2015

ESS 001; 7:30 P.M.

For more information: http://www.geo.sunysb.edu/openight/index.html

Deanne Rogers

"Deciphering the climate history of Mars through the mineralogic record"

Clear evidence for fluids moving across the Martian surface suggest a warm and wet climate may have persisted on Mars over 3.5 billion years ago. Yet climate models are unable to produce such an environment. Examination of the mineral types found on the Martian surface, and their geologic context, provides clues about the aqueous history and environmental conditions that may have persisted on ancient Mars. Prof. Rogers

will discuss some of these findings and how they have advanced current understanding of Martian aqueous environments.

Dr. Deanne Rogers is an Assistant Professor of Geosciences at Stony Brook University in Stony Brook, New York. Her work focuses on the use of remote sensing techniques, statistical methods and laboratory spectroscopy to investig ate planetary surface processes. Dr. Rogers obtained her Ph.D. at Arizona State University and worked as a Postdoctoral Scholar at the California Institute of Technology. She was a member of the Mars Exploration Rover science team and is actively involved in the Mars Odyssey mission. She is also a Co-Investigator within the NASA Solar System Exploration Research Virtual Institute (SSERVI) sub-node at Stony Brook University. She was named a NASA Planetary Science Division Early Career Fellow in 2008.

Astronomy Open Night, Friday, October 30, 2015

ESS 001; 7:30 P.M.

For more information: http://www.astro.sunysb.edu/openight/opennite.html

Fred Walter

"Are we descendants of Martians? Will we someday be Martians?"

Mars is a small planet, cold, arid, airless, rusted and largely dead, with half the radius and one-tenth the mass of Earth. Yet it was once warm and wet, with a substantial atmosphere. The Mars rovers have found evidence of substantial liquid surface water – which evaporated over three billion years ago. Even today, brine occasionally runs across the Martian surface. Back when life was struggling to get a toehold on Earth, Mars may have been an oasis.

I will start with an overview of Mars, its place in the Solar System, and how it evolved into what it is today. Then I will turn to humanity's interest in Mars as a potential colony of Earth. From the Mars One organization's plan to establish a permanent human presence on Mars in 2027 to NASA's plans to send astronauts in the 2030s, Mars is in our crosshairs. What is involved in getting there? Can humans live on Mars? What is involved in terraforming a planet? Is there a red planet in our future?

Dr. Walter, a resident of East Setauket, studies star birth, stellar weather, and star death using the CHANDRA and XMM-NEWTON X-ray Observatories, the Hubble Space Telescope, and telescopes in Arizona, Hawaii and Chile. He has been a professor of Astronomy at Stony Brook since 1989.

Directions to SUNY Stony Brook and ESS Building

⇨ From exit 62 of the Long Island Expressway (LIE, I-495) follow Nicolls Road (Route 97) north for nine miles. Pass the South and Main entrances to the University.

⇨ Enter the North entrance which will be on your left.

⇨ At the top of the small hill, turn right on Circle Road.

⇨ Proceed about 1 mile.

⇨ Turn left onto Campus Drive and then immediately turn left again onto John S. Toll Drive.

⇨ Proceed about 50 yards then turn right into the large paved parking lot.

⇨ The Earth and Space Sciences building is the large concrete building at the northeast end of the parking lot.

Map of campus is on the web at: http://www.stonybrook.edu/sb/map/

TEACHER IN SERVICE CREDITS

If your school requires you to have a sequence of educational opportunities in order to receive in-service credit, please advise them that during the Fall 2014 semester we will provide attendance certification for each of the lectures attended.

Please contact the respective department for more information.