

World of Physics Open Night, Friday, November 6, 2015

ESS 001; 7:30 P.M.

For more information: <http://www.physics.sunysb.edu/Physics/WorldsOfPhysics/2015/>

Stephen Shapiro

“Finding Out What’s the Matter with Matter”

Since matter is composed of atoms it is important to understand how atoms are arranged in matter and how they move relative to each other. With this understanding we can explain the properties of materials and, with hard work, create new ones. In this talk I shall describe how various probes are used to measure where atoms are and how they move. I shall discuss two technologically important materials: superconductors and the phenomenal shape memory alloys. I shall demonstrate the latter via a simple experiment.

Stephen Shapiro received his Ph.D from The Johns Hopkins University and joined Brookhaven National Laboratory in 1971. He specialized in using neutrons to study materials using Brookhaven's High Flux Beam Reactor (HFBR) and X-rays using the National Synchrotron Light Source (NSLS).

Geology Open Night, Friday, November 13, 2015

ESS 001; 7:30 P.M.

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

Scott McLennan

“Roving on Mars: Where we have been; Where we are; Where we are going”

In 1997, a two-decade absence from the surface of the red planet ended with the successful landing of the NASA Mars Pathfinder mission. One component of Pathfinder was a microwave-sized rover, Sojourner, that survived for 83 sols (Martian days), more than ten times its life expectancy, and traversed just over the length of a football field. Pathfinder first demonstrated the capability to remotely command a rover on Mars, collected valuable geochemical data and instigated a new phase of laboratory experimentation and general excitement for studying Mars.

The next rovers to land on Mars were the hugely successful Spirit and Opportunity, arriving two weeks apart in January 2004. These rovers shattered all expectations of what could be done with mobile spacecraft on planetary surfaces, surviving massive dust storms, climbing mountains, exploring crater interiors and breaking records for survival and drive distance set by the lunar rovers some 40 years earlier – over 11 years and 42 kilometers for Opportunity.

Within a decade, NASA landed the massive Curiosity rover, using a novel “sky crane” landing system, in Gale crater in August 2012. Curiosity is nearly 5 times larger than the MER rovers, at 900 kilograms, and equipped with highly sophisticated internal laboratories capable of measuring mineralogy, critical species such as methane, water vapor and carbon dioxide, and the isotopes of elements crucial for life including carbon, hydrogen and oxygen. Curiosity has also broken all expectations, having already survived nearly twice its life expectancy and driven over 10 kilometers, a remarkably rapid pace by rover standards. While doing all this, the science return from these rovers has been extraordinary, demonstrating, among other things, that habitable geological environments were not just present on ancient Mars but perhaps even common and determining the first radiometric ages of a planetary surface using a robot.

Both Opportunity and Curiosity are still functioning, with Opportunity examining the margins of the Endeavour meteorite impact crater and Curiosity just beginning a trek up the 5 km high Mount Sharp to document global changes in Martian environmental conditions. Looking forward, a new rover, based on the basic design of Curiosity but with new instrumentation and capabilities, is planned for launch in 2020 and is set to explore a new habitable geological environment on Mars, at a location currently undergoing the rigorous multi-year selection process. The Mars2020 rover is also designed to drill, collect and cache geological samples for future return and study in the most sophisticated laboratories on Earth.

Scott McLennan is a professor of geochemistry in the Department of Geosciences at Stony Brook University. He carries out research into planetary science and the geochemistry of sedimentary rocks, with his work focused on gaining a better understanding of the composition and evolution of planetary crusts. For the past 15 years, Prof. McLennan has employed experimental studies and chemical / mineralogical data returned from Mars to understand the nature of the surficial processes that have operated on that planet during its history. He has served on the science teams of the 2003 Mars Exploration Rover mission (Spirit and Opportunity), 2001 Mars Odyssey orbital mission gamma ray experiment, 2011 Mars Science Laboratory rover mission (Curiosity) and the upcoming Mars 2020 sample caching mission. In 2011 he co-chaired the NASA-ESA-sponsored international science analysis group (E2E-iSAG) that formulated science priorities and mission requirements for a Mars sample return campaign.

Living World Open Night, Friday, November 20, 2015

ESS 001; 7:30 P.M.

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

Catherine Markham

“Evolution of Social Complexity in Chimpanzees and Baboons”

Group living is pervasive in primates, with increasing social complexity characterizing human evolution. In this seminar, I'll discuss how individuals compete within social groups, and how these interactions both influence and are influenced by competition between social groups. Specifically, I'll present research on two highly social primate species - baboons and chimpanzees - and relate empirical findings to existing theories of optimal group size, territoriality, and group stability. Drawing upon analyses of behavioral, ecological, and physiological datasets, I will suggest how the study of non-human primates presents an opportunity to understand the evolutionary origins and ecological basis of social complexity in our own species.

Catherine Markham is a primate behavioral ecologist, and has had experience studying wild savannah baboons in Amboseli, Kenya, and eastern chimpanzees in Gombe, Tanzania. She earned her PhD from Princeton University in 2012 with a dissertation project focused on baboon ecology. Next, from 2012-2014, she studied maternal behavior in chimpanzees as a post-doctoral researcher at George Washington University. In the Fall of 2014, Catherine moved to the Stony Brook area and is now an Assistant Professor of Anthropology at Stony Brook University. More information about her research can be online at: <http://catherinemarkham.com/>

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.