NASA ASTROBIOLOGY INSTITUTE
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EPO: Pennsylvania State University

These are the Education and Public Outreach activities for the Pennsylvania State University.

Space Day 2003 at Penn State

During Space Day 2003 at Penn State, scientists, engineers, and students shared presentations and hands−on activities with over 1200 adults and children as they explored Earth, air, and space research at Penn State, including research on the origin, evolution, distribution, and destiny of life in the universe. Five graduate students associated with the Penn State Astrobiology Research Center participated in the event. The PSARC students collaborated with students from the science education program at Penn State to develop activities and lesson plans that were aligned with the national science education standards and the Pennsylvania Academic Standards for Science and Technology.

Space Day 2003 at Penn State included tours of the Space Shuttle Blake, a 4/10 replica of NASA's Space Shuttle, presentations by former astronaut Dr. Jim Pawelczyk and JPL Solar System Ambassador Ann Schmiedekamp, a How to Access NASA Education booth and Star Lab planetarium tours.

Astrobiology: The Search for Life in the Universe (Magazine)

This color publication provides an overview of the field of Astrobiology written at the high school level. The piece was originally published by Research Penn State magazine in their January 2001 issue and is based on a lecture series that was held at Penn State University in January 2000. The lecture series and the magazine supplement features NASA Astrobiology Institute scientists from Penn State University, The University of Colorado, and Harvard University as well as researchers from the SETI Institute and Rice University. The Penn State Astrobiology Research Center and Pfizer, Inc. provided funding for the publication. The Pennsylvania Space Grant Consortium is distributing the publication to interested educators, students, researchers and others across the country and internationally. PDF and Web versions are also available.

Astrobiology: The Origins and Early Evolution of Life (educator workshop)

This five−day residential workshop for in−service teachers was designed to expose middle and high school science teachers to current thinking about the origin and early evolution of life in a way that they can pass on to their

students. The course combined lectures by several Penn State faculty, hands−on classroom activities, lab tours, and a field trip to a local bog. Classroom activities were drawn from TERC's Educator Resource Guide and draft high school curriculum as well as the SETI Institute's Voyages Through Time curriculum. Classroom activities were facilitated by a graduate student at the Penn State Astrobiology Research Center and by two Pennsylvania teachers who attended the workshop in previous years. Following the workshop, the teachers were added to our existing listserv discussion group to facilitate and track the application of knowledge from the workshop back in the classrooms. The Penn State Astrobiology Research Center and the Pennsylvania Space Grant Consortium provided funding for the workshop. Housing, meals and some travel support were provided. Teachers were charged tuition for two graduate credits from Penn State. The workshop was approved by the Pennsylvania Department of Education for Act 48 Professional Development credits.

Women In Science and Engineering Research (WISER)

Faculty members from the Penn State Astrobiology Research Center participate in this two−semester research internship program, which is sponsored by the Pennsylvania Space Grant Consortium. The program is designed to retain women students in the science and engineering fields by providing first−year students invaluable experience and mentoring at the critical early stages of their undergraduate career. Students begin their research in the spring semester and continue during either the subsequent summer or fall semester. Since the program began in 1994, 393 women students have been hosted by 80 faculty members from all of the science and engineering colleges at Penn State.

Astrobiology Public Lectures and Short Courses − Penn State Astrobiology Research Center

The Penn State Astrobiology Research Center team gave a number of lectures for the general public, civic groups, and for various short courses. This year's presentations were as follows: Dr. Blair Hedges: 1) "A molecular timescale for primate evolution" (University of Michigan National Institutes of Health (NIH) Genetics Lecture Series on Genomics, 5−March−2003); Dr. Chris House: 1) "The Carbon Isotopic Analysis of Individual Modern or Fossil Cells, a Geochemical Approach to Studying Biochemistry." (University of North Carolina at Chapel Hill, Fall 2002); 2"Astrobiology: The search for life in the Universe" (AstroFest at Penn State, 12−13−July−2002); Dr. Lee Kump: 1)"The Rise of Oxygen" (Boston University, September, 2002); Dr. Jim Kasting: 1)"Climate evolution on Venus, Earth, and Mars", "The rise of Oxygen and Ozone", and "Habitable zones around stars and the search for extraterrestrial life" (European Research Course on Atmospheres, Grenoble, France, Feb−2003), 2)"Climate evolution on Venus, Earth, and Mars", "The rise of atmospheric O2", "Habitable zones around stars and the search for extraterrestrial life", "Water on Mars", "Snowball Earth", and "The origin of life" (First International Postgraduate Course on Geobiology, Catalina Island, CA,

20−26−July−2002), 3)"Habitable zones around stars and the search for extraterrestrial life" (invited seminar, University of Delaware, Sept. 2002), 4)"Atmospheric composition and climate on the early Earth" (Northwestern University, Oct. 2002).

Astrobiology Summer Program

The Astrobiology Summer Program (ASP), an undergraduate summer training program in astrobiology, was established at Penn State with the help of a 3−year NSF REU−Site award (S. Blair Hedges, PI). Beginning in summer 2003, it supports 10 students (sophomores, juniors) from colleges and universities other than Penn State to participate in research training under the guidance of Penn State Astrobiology Research Center (PSARC) faculty mentors. Women and minorities are encouraged to apply. The program has a director (Dr. Blair Hedges) and a coordinator (Dr. Carla Hass). Five PSARC faculty hosted students during the 2003 summer: Drs. Michael Arthur, Chris House, Lee Kump, and Hiroshi Ohmoto in the Department of Geosciences and Dr. S. Blair Hedges in the Department of Biology. Besides laboratory research, ASP students also have the opportunity to participate in a research excursion to a modern analog of a Precambrian ocean (Green Lake, New York), attend weekly seminars and laboratory tours, stargaze, and participate in a discussion group and a research symposium.

Astrobiology Undergraduate Minor

Undergraduate students at Penn State can participate in the Astrobiology Undergraduate Minor, which is designed to educate students in the varied scientific disciplines that contribute to our general understanding of life, the origin of life, the past history of life on Earth, possible futures for life on Earth, and the possible existence of life on other planetary environments. The principle goal of the minor is to develop students' literacy in astrobiology so that they can critically evaluate claims related to this field. During the 2002−2003 academic year, eight Penn State students graduated with the Astrobiology minor. One student is currently enrolled in the program.

Astrobiology Graduate Courses

Penn State Astrobiology Research Center (PSARC) scientists teach a variety of graduate courses each year. During Fall 2002, the following courses were offered: 1) Astrobiology Graduate Seminar: Advancements in Astrobiology, which included participation via videoconference by PSARC faculty and graduate students at the University of Pittsburgh and State University of New York Stony Brook, 2) Methane: Its Biochemistry, Biogeochemistry, and Paleoclimatology, which covers topics ranging from biochemistry to seismic stratigraphy, and 3) Microbial Diversity, which covers methods for studying microbial diversity, microbial development, and transcription regulation of gene expression. During Spring 2003, the following course was offered: 1) Evolution of the Biosphere.