Spectroscopy Society of Pittsburgh September Meeting

Duquesne University – Mellon Hall of Science (Laura Falk Hall)

Wednesday – October 15, 2008

Technology Forum Speaker's Presentation **5:30PM**
Social Hour **6:00PM**
Dinner in the City View Café (6th Floor) **6:30PM**
Business Meeting **8:00PM**
Technical Program Speaker's Presentation **8:15PM**

Deadline for Dinner Reservations 10**/10/08**
Carolyn Benga crbssp@yahoo.com or (412) 487-0915

TECHNOLOGY FORUM - 5:30 PM
Jennifer Loveland-Curtze

"The Real Survivors: Microbes in Frozen Environments"

Eighty percent of the Earth's biosphere is cold. Humans may consider polar and non-polar ice, ocean water (below 5°C), and permafrost as harsh environments but life persists even under these seemingly inhospitable conditions. Among the survivors in frozen habitats are microorganisms, which are too small to be seen individually but together constitute a significant portion of the earth's biomass. Although microbes have been isolated from frozen environments including glacier and permafrost samples hundreds of thousands to millions of years old (permafrost), the vast majority of this microbial world remains unknown and uncultivated. Glacier ice is unique because it contains a chronological record of microbial life and climatic data and provides an excellent analog for frozen extraterrestrial habitats. The microbes in the glacial ice are exposed to stresses such as sub-freezing temperatures, high pressure, limited nutrients, and low oxygen. Cells probably survive in narrow liquid veins within glacier ice and may be metabolically active. Our research has focused on the microbiology of the Greenland ice sheet and initial observations indicated that ultra-small cells dominated the ice samples studied. Innovative cultivation strategies allowed us to grow in the laboratory many bacterial isolates that had been trapped in the ice for at least 120,000 years. Many of these isolates are ultra-small microbes with volumes 10 to 100 times smaller than that of a typical *Escherichia coli* cell. Although novel bacteria and other microbes have been isolated from frozen environments, only about 10 bacterial species from polar ice and glaciers have been described and validated. We recently characterized two of our Greenland glacier isolates that represent new species and for which we proposed the names, *Chryseobacterium greenlandensis* and *Herminiimonas glaciei*. Further study of the microorganisms from the glaciers will help us to better understand how these cells can persist in the harsh glacial conditions and how we can cultivate and discover more about these fascinating glacier survivors.

Bio

Jennifer Loveland-Curtze received her A.B. magna cum laude from the University of Pennsylvania in 1979. She received her M.S. from the Pennsylvania State University in Animal Nutrition in 1981 and was a Pratt fellow at Virginia Tech, graduating with a Ph.D. in Animal Science in 1986. After obtaining her degree, she returned to Pennsylvania and worked in a poultry vaccine company as a research scientist where she co-directed two Ben Franklin research projects. She currently is a senior research associate in Dr. Jean Brenchley's laboratory in the Department of Biochemistry and Molecular Biology at the Pennsylvania State University. The focus of the research is the study of cold-loving (psychrophilic) bacteria and their cold active enzymes. She has characterized psychrophilic bacteria including a novel bacterial species isolated from Pennsylvania farmland and a new bacterial genus isolated from an Antarctic lake. Recently, she presented a poster at the 108th General Meeting of the American Society for Microbiology about novel ultramicrobacterial isolates from a deep Greenland ice core that was chosen for a press release. Several news items subsequently featured this research concerning the ultra-small microbes.

TECHNICAL PROGRAM - 8:15PM
Dr. Michael E. Zolensky.

"Hydrocarbon Nanoglobules: Finding One of Life's Building Blocks in Meteorites and Implications for the Mars Phoenix Mission"

We have recently discovered that hollow, micron-sized hydrocarbon globules are important components of primitive astromaterials. Found in meteorites, interplanetary dust, micrometeorites and comet particles, these globules have also been synthesized in lab experiments simulating giant molecular clouds and wet protoplanetary bodies. They are of critical interest to scientists seeking to repeat the processes that led to early life in the Solar System, since these globules would have served to protect organic precursors to life, while still permitting some interaction with their environment. We now know that these globules would have been delivered to every solar system body, including Earth, Mars, and the Jovian and Saturnian moons. Implications for the Phoenix Mission on Mars will be discussed.

Bio
Dr. Michael Zolensky received his B.S. degree in Geology in 1977 from the New Mexico Institute of Mining and Technology, and his Ph.D. in Geochemistry in 1983 from Pennsylvania State University. From 1975 to 1977 he was a Student Assistant for the New Mexico Bureau of Mines, and from 1977 to 1983 he worked as a Research Assistant for the Department of Geosciences at Penn State. From 1983 to 1985 he served as a National Research Council Postdoctoral Fellow at the NASA Johnson Space Center. Since then he has worked as a Space Scientist at the NASA Johnson Space Center. His primary area of expertise is in crystallography, mineralogy, geochemistry, and planetary science.

Dr. Zolensky is currently involved with the Cosmic Dust Working Group, the Stardust Working Group, and the Council of the Meteoritical Society. His current duties involve research on solar system materials and processes, and he is the NASA Associate Curator for Stardust, interplanetary dust, and hardware returned from space. He is also co-investigator of the STARDUST Discovery Mission, and the Sample Analysis lead for the Hayabusa Mission Space Team.

Mike has lead or participated in successful meteorite recovery expeditions on four continents, and in the development of techniques for characterization of meteoroid and space debris impact features on spacecraft. He led the effort to characterize the impact record of the LDEF satellite, and developed new techniques for the analysis of microparticles, and the characterization of the chemical weathering record of asteroids, and primitive mineralogy of comets. He is also leading efforts to locate and characterize aqueous fluid inclusions in meteorites. He has led preliminary mineralogical characterization efforts for returning Wild 2 samples.

Mike is a Fellow of the Meteoritical Society, and of the Mineralogical Society of America, and has received NASA Group Achievement Awards for leading the LDEF Meteoroid and Debris Investigation Team and Science Team of the STARDUST Mission. He has also received the National Science Foundation Antarctic Service Medal, and has the honor of having a minor planet named after him – Minor Planet 6030-Zolensky. He also has over 600 publications.

Dinner Reservations:
Please email Carolyn Benga at crbssp@yahoo.comor call (412) 487-0915 to make dinner reservations NO LATER THAN FRIDAY, October 10, 2008. This month's entrée will be Lemon Chicken with Mushrooms, Rosemary Garlic Red Skin Potatoes, and Grilled Seasonal Vegetables. Cream of Asparagus soup will start the meal and Carrot Cake will be served for dessert. Dinner will cost $8 and checks can be made out to the SSP. If you have dietary restrictions, please let Carolyn know when you RSVP.

Parking Instructions:
The Duquesne University Parking Garage is located on Forbes Avenue. Upon entering the garage, receive parking ticket and drive to upper floors. Pick up a parking chit at the dinner or meeting. If any difficulties arise, contact Dr. Mitch Johnson at Duquesne University.