

PATHFINDERS MONTHLY

Newsletter of the Office of Grants and Program Review
August 2006

UTC Professor to Analyze Martian Meteorite

Among modern discoveries about Mars, one stands out as particularly compelling: the possible presence of liquid water on Mars, either in its ancient past or preserved in the subsurface today. Water is key because almost everywhere we find water on Earth, we find life. If Mars once had liquid water, or still does today, it's compelling to ask whether any microscopic life forms could have developed on its surface. Is there any evidence of life in the planet's past? If so, could it still exist today?

In an effort to try to understand the climatic history of Mars, NASA's Mars Program has developed an exploration strategy known as "Follow the Water." Following the water means delving into the planet's geological and climatological history to find out how, when and why Mars may have transitioned from a more watery environment to the dry and dusty climate it has today. A UTC faculty member has been selected to conduct research as part of the "Follow the Water" initiative: Dr. **Steven Symes**, Associate Professor of Chemistry, has received a grant of \$21,597 from NASA to

conduct chronological and mineralogical studies of alteration products in Martian meteorites over a period of three years.

Dr. Symes will examine one of the best sources of information about the geologic history of Mars, a group of 31 Martian meteorites discovered on Earth. Many of these meteorites show some evidence of interaction with liquid water. Some include igneous minerals with a little water, but most show evidence of aqueous alteration products (especially hydrated salts and clay minerals) that prove liquid water must have existed at some point in Mars' past. Dr. Symes will collaborate with Dr. Lars Borg, a Senior Research Scientist at Lawrence Livermore National Laboratory, to precisely determine the formation age of aqueous alteration assemblages in the nakhlite class of Martian meteorites.

Building on previously successful analytical techniques, Drs. Symes and Borg will develop a sequential acid-leaching procedure and use state-of-the-art mass spectrometry techniques to measure isotopic

compositions to define the age of alteration products in the nakhlite meteorite known as Lafayette. Lafayette, which was discovered at Purdue University in 1931 and is now held by the Smithsonian Institution, contains the most extra-terrestrial water and the most alteration materials of any Martian meteorite. This abundance of secondary materials is expected to yield coherent results that will provide Dr. Symes, Dr. Borg, and NASA scientists with valuable information regarding the time-history of water on Mars and insight into dating secondary mineralization that will be important in the context of future sample collection missions to Mars.

In the absence of samples taken directly from Mars, dating the formation of alteration products in the Martian meteorites is the only mechanism available for elucidating the history of water in the Martian geologic record. Using cutting-edge analytical techniques, Drs. Symes and Borg may be able to provide NASA with a definitive determination regarding the origins of water – and perhaps of life – on Mars.

FUNDED GRANTS AND RESEARCH

AUGUST 1, 2006 –AUGUST 31, 2006

COLLEGE OF ARTS & SCIENCES

MR. KIM WHEETLEY

Tennessee Arts Commission	Arts Integration and Arts Exploration Summer Workshops	\$6,200
Tennessee Arts Commission	Commission Initiative for SCEA	\$5,000

COLLEGE OF ENGINEERING & COMPUTER SCIENCE

SIM CENTER

Science and Technology Applications	Analytical Modeling of Liquid Rocket Instability	\$10,000
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COLLEGE OF HEALTH, EDUCATION & PROFESSIONAL STUDIES

MS. SANDY COLE

U.S. Department of Education	Hamilton County Talent Search	\$219,999
Opening Doors Community Development Corporation	Evaluation of Weed and Seed and Operation of WesTech Lab	\$4,000
Opening Doors Community Development Corporation	Computer Instruction and Operation of WesTech Lab	\$3,000
U.S. Department of Education	GEAR UP in Bradley and Walker Counties	\$419,940

DR. LUCIEN ELLINGTON

Association for Asian Studies	<i>Education About Asia</i> Journal	\$65,250
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DR. LARRY GARRISON

Public Education Foundation	Osborne Fellows Program	\$294,786
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DR. DEBORAH MCALLISTER

Tennessee Space Grant Consortium	Tennessee Space Grant Consortium College and Fellowship Program Award	\$14,678
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MS. CYNTHIA WALLACE

U.S. Department of Education	Southern Appalachian Educational Opportunity Center	\$255,385
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