AIP|Matters

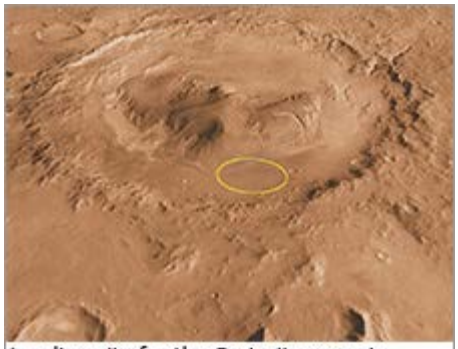
August 3, 2012

Director's Matters

By H. Frederick Dylla, Executive Director & CEO

Curiosity on Mars

By the time we gather for work on Monday morning, we will know if NASA's latest visitor to the Martian surface has made a safe landing. It may take several days to know for certain if the landing was without incident, but early telemetry will mean that scientists and engineers at NASA's Jet Propulsion Laboratory in Pasadena, CA, will be able to breathe a collective sigh of relief. If all goes according to plan, the most sophisticated planetary rover ever built, *Curiosity*, will begin its preparations to explore the geography, chemistry, and geology of a large crater and mountainside on the Martian surface. The landing site is in the Gale crater, one of the deepest features on Mars and home to Mount Sharp, a peak rising mysteriously out of the center of the crater, higher than any mountain in the continental United States. Of special interest is the possible presence of clays and sulfate minerals in the crater, hallmarks of a windy, watery past. This unique combination will offer insights into the early history of Mars, and perhaps provide tantalizing evidence that, at one time, Mars was hospitable to life.



Landing site for the Curiosity rover in Mars's Gale crater.
Image credit: NASA/JPL-Caltech/ASU/UA

We have wondered about that question since Percival Lowell pointed his telescope to Mars in the late 1800s, sketched what he called canals, and started our fascination with the possibility of life on the planet that, to us, has the most Earth-like conditions. When NASA successfully sent the two Viking landers to Mars in 1976, we were treated with our first, up-close views of another planet's surface. I remember thinking at the time that, having just read Ray Bradbury's *The Martian Chronicles*, this vast red desert was exactly what I thought it would look like—eerie, strangely beautiful, and definitely not very inhabitable.

The Viking landers returned beautiful, panoramic pictures from Mars, but their onboard instruments provided no conclusive signs that life had ever taken hold on this alien world. Turn the clock ahead more than 30 years, and we witnessed NASA's wonderful Mars rovers, *Opportunity* and *Spirit*. Bearing a resemblance to Tonka trucks, these explorers were designed to crawl around and analyze the Martian geology for 90 days. *Spirit* lasted six years, and *Opportunity* is still on duty. For all of the data that these two mini-crawlers returned to Earth, the question of the detection of life-related hydrocarbons is still open.

The plan for landing the *Curiosity* rover involved a perilous deceleration in the thin Martian atmosphere, careful manipulation, braking rockets, parachutes, and an unprecedented cabled drop to the surface. If the landing proves to be successful, a package of 10 different scientific instruments will probe the Martian soils and rock. The mission has international contributions, with Spain providing an environmental monitoring system that will report on weather conditions as well as ultraviolet radiation levels. Russia has included an instrument to measure subsurface hydrogen up to three feet below the surface. In the months that follow, we may indeed have more definitive answers to our centuries-old question of life on Mars.

The Curiosity was assembled at NASA's Jet Propulsion Laboratory.
Image credit: NASA/JPL-Caltech.

Alternatively, if *Curiosity* doesn't survive its daredevil landing, there will certainly be cries that NASA "wasted" $2.5 billion of taxpayer funding on this venture. In such a case, I will be disappointed that the mission was cut short, but I will not conclude that we have wasted the investment. By designing, building, testing, and getting this craft to within landing range of the Martian surface, we will have already acquired exceptional knowledge and skills for robotic exploration beyond the Earth and for use in precarious environments on our own planet. The success and potential failure of these extensions of senses provide us essential knowledge for the next mission. We lost Mr. Bradbury just eight weeks ago, but I would bet that his soul is smiling over *Curiosity*.

Update, Monday, August 6: Congratulations to the NASA-JPL team on the successful landing of the Curiosity rover this morning! We look forward to the start of the exploration phase of the mission.

Publishing Matters

PAM librarians celebrate 40th anniversary at SLA meeting

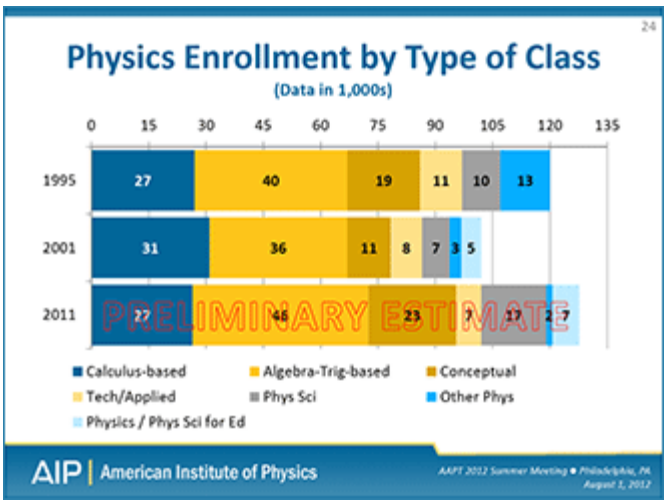
One of AIP's most important librarian networking opportunities in the US is the annual meeting of the Special Libraries Association (SLA), held this year in Chicago, July 15–18. AIP sponsored the roundtable session of the PAM division, a subgroup of SLA comprised of physics, astronomy, and math librarians. Here, librarians and publishers participated in lively discussions on topics such as "Marketing Your Library," "Challenges Facing Librarians in Today's Economy," and "Embedded Librarianship." Vice President of Publishing John Haynes spoke on AIP's behalf at the PAM Vendor Showcase, where AIP's own librarian, Kim Hukill, also a PAM member, served as session moderator. Haynes spoke about the emerging models and trends in scientific content delivery and publishing, and about AIP Publishing's vision and strategic focus; its response to new demands for access (including *AIP Advances*); its new open-access journals (*APL Materials* and *JAP Materials*); and the ways in which AIP Publishing is looking to enhance the next generation of its Scitation platform. Finally, AIP was delighted to sponsor the PAM Open House on July 16. Over 100 PAM librarians attended and enjoyed complimentary food and drinks, as well as a cake

John Haynes at the PAM Open House with Stella Ota, physics librarian at the Stanford University Terman Engineering Library.

congratulating PAM on its 40th anniversary. Here's one attendee's Twitter post: "AIP knocks it outta the park with a beautiful anniversary cake at the PAM Open House - thank you! #SLAChicago."

Physics Resources Matters

Physics in two-year colleges: A closer look



Just last month, the Statistical Research Center (SRC) closed data collection on the 2012 Survey of Physics in Two-Year Colleges (TYCs). Funded, in part, by a subcontract from AAPT members Thomas O'Kuma of Lee College and Dwain Desbien of Estrella Mountain Community College, this survey will update data from the 1995 and 2001 surveys. Preliminary findings were presented at AAPT's Summer Meeting in Philadelphia. The talk, by SRC's Susan White, also included results from the 2007 Survey of Physics & Astronomy Seniors. Among the highlights:

One out of eleven (9%) physics bachelor's degree recipients in 2007 started their college education at a two-year college. This group was more racially diverse and had less exposure to physics in high school than their colleagues who matriculated directly to a four-year institution.

Preliminary analyses of the 2012 TYC Survey suggest that physics enrollments in TYCs are up from 2001. The average class size appears to have grown from 20 students in 2001 to over 25 in 2011. About 40,000 students were enrolled in astronomy classes.

A copy of White's presentation is available on the SRC website. For questions, feel free to contact Susan at swhite@aip.org.

Member Society Spotlight

OSA announcement: Lights! Camera! Action!

Participate in The Optical Society's Optics in a Minute Facebook Video Contest! OSA's first-ever Facebook video contest solicits 60-second videos that describe an application of optics in our everyday world. Maybe it's a description of how laser surgery works. Or how photovoltaic cells convert light into energy. Or maybe you can tell the world just how, exactly, light in a fiber optic cable brings us content on YouTube and Facebook. Whatever it is, if it describes optics in everyday life in less than a minute, it's eligible! So gather your friends or shoot your video solo and you could win $500! The video submission period is now through October 1. For more details, visit OSA on Facebook.

Off the Press

Physics Today, August 2012

Cover: In this artist's representation of a recent experiment on laboratory mice, lipid nanoparticles (white) bombard a cancerous tumor with a cocktail of two drugs (blue and green), one that rallies the body's immune system against the tumor and one that blocks the tumor's own defenses against the attack. (J. Park et al., *Nature Materials*, in press, doi:10.1038/nmat3355.) As discussed in the article by Jennifer Grossman and Scott McNeil on page 38, cancer-fighting nanomaterials have also shown potential in treating human patients. (Image courtesy of Nicolle Rager Fuller, National Science Foundation.)

Coming Up

August 1 – 29

- ACP Annual School Supplies Drive

Sunday, August 5

- *Journal of Mathematical Physics* editors meeting, at the International Congress on Mathematical Physics (Aalborg, Denmark)

Tuesday, August 7

- SPS Interns' closing presentations, 9 am – 1 pm, conference room A (College Park, MD)

Wednesday, August 8

- Staff birthday breakfasts (Melville, NY and College Park, MD)

Monday, August 20

- *Journal of Chemical Physics* reception at the American Chemical Society meeting (Philadelphia, PA)