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HEADS UP!

## AOT student wins award for engineering research



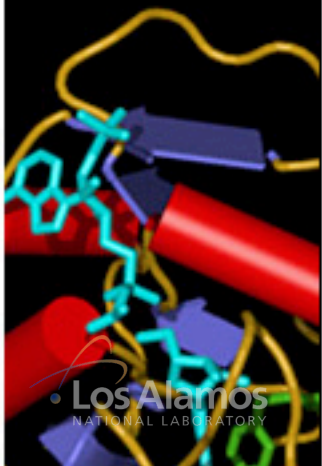
Nicholas Brennan (Radio Frequency Engineering, AOT-RFE) is the recipient of a 2012 Student Symposium outstanding presentation award for work that could lead to improved performance and reliability of the linac accelerator at the Los Alamos Neutron Science Center. His mentor is John Lyles (AOT-RFE).

In his technical talk, "Optimizing the performance of a 3-megawatt VHF amplifier," Brennan described a method for validating a replacement 201-MHz amplifier system for the drift tube linac, an essential part of the LANSCE accelerator restoration project.

A 3-megawatt prototype of the Diacrode amplifier system is undergoing testing at LANSCE currently.

A visiting graduate research assistant, Brennan built upon a three-dimensional electromagnetic model that he developed last summer. He extended the model to include the entire amplifier. The amplifier now has higher efficiency and power gain, because he refined design features of the input cavity using simulation software. In the past, design features were adjusted solely by empirical testing.

Brennan studies electrical engineering at Texas A & M University. ❖



Colleagues,

Since my last note, we have accomplished a lot at LANSCCE facilities—from making major contributions to NNSA's mission related to experiments at WNR and pRad, to increased neutron production at UCN, and to continuing production of isotopes at IPF. Additionally (see the front page), Nicholas Brennan (AOT-RFE) was the recipient of a recent Student Award for outstanding presentation. We recently hosted a very successful DOE Office of Science–National Science Foundation (NSF)-sponsored 2012 Neutron School on Soft Matter, hosting 37 students representing 22 institutions in the United States. This year the NSF program manager also attended the school. Additionally, the Advanced Simulation Techniques for Total Scattering Data workshop, organized in collaboration with CNLS, took place the first week of October and the International Workshop on Scattering Techniques for Structural Materials, co-organized with UC Berkeley, was held the second week of October. From my view point, I'm still amazed and delighted that even during intriguing, complicated—and to say the least—interesting times, we all pull together as a cohesive and strong team, delivering on all fronts here at TA-53. So, once again congratulations to all!

Let me also bring to your attention the successful 2012 Accelerator Safety Workshop co-organized with Sandia National Laboratories, which drew approximately 90 participants from DOE labs (including headquarters), NNSA site offices, and the accelerator community, representing national laboratories around the country. This year, the workshop focused on soliciting input from the community regarding the Accelerator Safety Guide (DOE Order 420.2c). DOE's Office of Science is to publish the order sometime during 2013. It is important to note that the order seeks to implement standardization across the complex and the



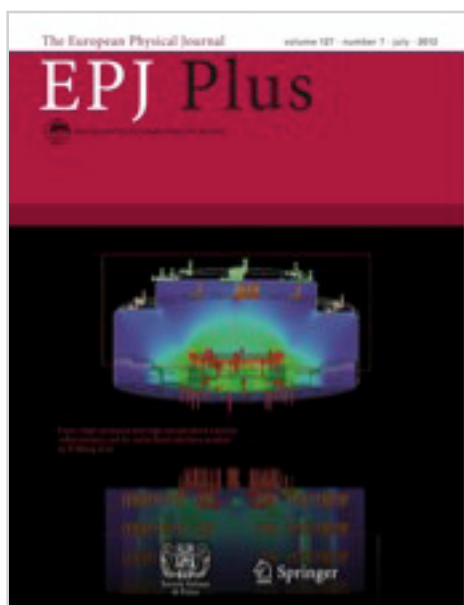
**'... how sure are we (as mentors) that our message is well understood and our mentorees feel they have the appropriate environment in which to ask when they don't know how to proceed next?'**

workshop assisted on how to better utilize USI processes. The TA-53 staff also contributed on several other workshop sessions, such as cyber security, control systems, and human performance improvements. Another good job and example of team work by many at TA-53. So, great job here as well!

Last but not least, let me bring to your attention another topic that I find to be very important, in particular related to TA-53 as a complex experimental facility. The topic is mentoring—in particular mentoring of our students and postdocs. From my prospective I find this topic of great interest not only from the scientific and technical aspects of mentoring, but also related to what levels of communication we have and what we believe is the place to educate the next generations of leaders. The point is, how sure are we (as mentors) that our message is well understood and our mentorees feel they have the appropriate environment in which to ask when they don't know how to proceed next? What kind and types of venues have we established and we understand to be in place for any of our less senior staff to just stop and ask the question, "I don't understand what to do next: can you help me?" Or, "I made a mistake: can you help me?" This may sound too philosophical, but it is not, in fact, it may happen every day all around us, from our students to our postdocs, to our early-career staff. The interesting side of this is that we may not even notice if folks are seeking help or advice when mistakes have been made. In the same way we do so well on all of our technical endeavors at TA-53, are we paying the same level of attention to mentoring? Even if we are all doing great (at least we believe we are), we can always improve. So, please pay particular attention to new hires, students, and postdocs. Walk the labs, be visible, and ask the question, "How are you doing and what can I do to help?" Just a thought folks, just a thought!

*LANSCE Deputy Division Leader Alex Lacerda*

## European journal highlights Lujan Center research on cover



A new high pressure-temperature neutron reflectometry cell developed at the Lujan Neutron Scattering Center is featured on the cover of the July issue of *European Physical Journal Plus*.

The image is taken from “High Pressure and High Temperature Neutron Reflectometry Cell for Solid-Fluid Interface Studies,” which described new experimental capabilities in neutron scattering. To study interactions between solids and liquids relevant to earth and energy sciences, researchers at Los Alamos and Sandia laboratories designed a high-pressure and high-temperature neutron reflectometry cell. The new setup can be applied to a range of mission areas, including deep-gas extraction, high pressure-temperature corrosion of nuclear fuels and cladding, and waste performance in repositories. The approach also can lead to a better understanding and control of engineered geosystems in extreme pressure-temperature environments.

Scientists used the Lujan Center’s surface profile analysis reflectometer (SPEAR) for their study.

This work is a collaboration of P. Wang, M. Taylor, and J. Majewski (Lujan Center, LANSCE-LC), A. H. Lerner and D.D. Hickmott (Earth and Environmental Science Division, EES-DO), J.K. Baldwin (Center for Integrated Nanotechnologies, MPA-CINT), and R.K. Grubbs (Sandia National Laboratories).

The work benefited from funding by the LDRD-ER proposal “Determination of Fluid Properties at Carbonate Interfaces—An Integrated Experimental and Theoretical Approach,” and the use of

the SPEAR neutron time-of-flight spectrometer at the Lujan Center, which is funded by the U.S. Department of Energy’s Office of Basic Energy Sciences and Los Alamos National Laboratory. Reference: “High Pressure and High Temperature Neutron Reflectometry Cell for Solid-Fluid Interface Studies,” *European Physics Journal Plus*, **127**, (7) (2012). ❖

Technical contact: J. Majewski

## Los Alamos science recognized at the International Materials Research Congress



At a two-day symposium on “Novel Characterization Methods for Biological Systems,” Los Alamos researchers and collaborators created considerable interest with an impressive showing of high impact scientific findings. Organized by Jarek Majewski (LANSCE-LC) and Alan Hurd (Science Program Office and Department of State) with partners from Universidad Nacional Autónoma de Mexico and University of South Florida, the symposium featured eight speakers citing Los Alamos key results. A key result, accepted for publication in the *Proceedings of the National Academy of Sciences (PNAS)* on the day of presentation, represents the first neutron diffraction protein structure with better than 1 Angstrom resolution, taken on LANSCE’s Protein Crystallography Station instrument. Another key result discussed high resolution x-ray and neutron scattering data leading to understanding of interactions of bio-toxins with cell membranes. The findings, published in *PNAS*, were the result of collaboration with LANSCE scientists using the SPEAR instrument.

The novel characterization symposium was one of 27 symposia in a large international meeting. More than 1,400 scientists from 46 countries converged on Cancun, Mexico, in August for the 21st annual International Materials Research Congress (IMRC). The presidents of the sponsoring societies, Sociedad Mexicana de Materiales (SMM) and the Materials Research Society (MRS), joined in congratulating the symposium organizers for convening a world-class conference. SMM President Sergio Mejía of the Universidad Autónoma de Nuevo León and MRS President Bruce Clemens of Stanford University cited the high quality of speakers

*continued on page 4*

## Science ...

and the willingness of 26 organizations to fund the event. That high quality was epitomized by the novel characterization symposium, one of 17 symposia selected for joint sponsorship by both SMM and MRS; it was funded generously by the Office of Naval Research-Global, National Science Foundation, and the University of South Florida. Three of the 12 invited speakers were U.S. National Academy members and 3 traveled from Europe. A delightful highlight was the presentation by Steen Rasmussen, a former Los Alamos employee now with the University of Southern Denmark and the Santa Fe Institute, who showed the surprising progress in bottom-up synthetic biology, which seeks to create a "protocell" that metabolizes energy and reproduces via the propagation of information. The Danish protocell is based on an oil drop in water that becomes unstable toward division with light-induced creation of lipid surfactants. ❖

Contact: J. Majewski



**MRS**  
**Call for Papers**  
**International Materials**  
**Research Congress**  
<http://www.mrs-mexico.org.mx/imrc2012>

- Biomembranes, cells, proteins, lipid rafts
- Adhesion, hydration, hydrophobicity
- Artificial life, self-assembly, proto-cells
- Scattering, optics, surface forces, theory

**Invited speakers**

Piotr Marzalek	Duke
Zoe Fisher	Los Alamos
Lise Arleth	Copenhagen
Paul Langan	Oak Ridge
Joyce Wong	Boston
Matt Tirrell	Chicago
Tonya Kuhl	Davis
Jeffrey Brinker	New Mexico
Steen Rasmussen	Denmark
M. Olvera de la Cruz	Northwestern
Ka Yee C. Lee	Chicago
Hans Arwin	Linköping

**Cancun, Mexico**  
**August 12-18, 2012**

**Novel Characterization**  
**Methods for Biological Systems**

**Organizers** Jarek Majewski (Los Alamos), Norma Alcantar (South Florida), Phaedra Silva (UNAM), Alan Hurd (Santa Fe Institute)

## HeadsUP!

### Processing unneeded property

In support of housekeeping activities, employees are reminded to follow all safety, security, environmental, and property management regulations. Organizational waste coordinators, property specialists, computer support technicians, and/or deployed security officers are available to assist employees in properly disposing of items.

To place a service request or obtain additional assistance, employees can e-mail

- [lanlproperty@lanl.gov](mailto:lanlproperty@lanl.gov),
- [salvage@lanl.gov](mailto:salvage@lanl.gov),
- [wastenot@lanl.gov](mailto:wastenot@lanl.gov), and/or
- [burn-it@lanl.gov](mailto:burn-it@lanl.gov).

If possible, stage items for disposal in a safe/secure manner and attach a copy of your e-mail or other documentation to show that the disposal process has been initiated, i.e.: "In Process." Be patient, as this is a very large effort and may extend response times associated with property and material disposal operations.

### Avoid common collisions

Being rear-ended and rear-ending another vehicle are two of the most frequent types of crashes for both GOV drivers and the general population. To avoid these common collisions, we need to focus on a few fundamentals. Some we learned in driver's education, but like many skills, they can get rusty without an occasional refresher. Please take a moment to review the information on the Vehicle and Pedestrian Safety website, [int.lanl.gov/safety/industrial\\_hygiene\\_and\\_safety/ihs\\_programs/vehicle-pedestrian-safety.shtml](http://int.lanl.gov/safety/industrial_hygiene_and_safety/ihs_programs/vehicle-pedestrian-safety.shtml), and take extra care to drive safely.

### Reminders about parking overnight on LANL property

Please note the following reminders about parking on LANL property:

- Private vehicles left parked on Laboratory property for more than 10 days are considered abandoned and will be towed at owner's expense.
- Overnight parking is only allowed under three circumstances—for details, refer to Parking Procedure 908.
- Drivers must have a commuter overnight parking permit to leave their vehicles overnight in the Park and Ride parking lot.

Visit the Special Parking Situations webpage, [int.lanl.gov/security/special-parking-situations.shtml](http://int.lanl.gov/security/special-parking-situations.shtml), for more information. For questions about parking enforcement, write to [parking@lanl.gov](mailto:parking@lanl.gov). To request parking permits, write to [parkingpermits@lanl.gov](mailto:parkingpermits@lanl.gov).

## AOT & The Pulse

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To read past issues, see [lansce.lanl.gov/pulse.shtml](http://lansce.lanl.gov/pulse.shtml)

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