January 2015
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MPA Materials Matter

INSIDE

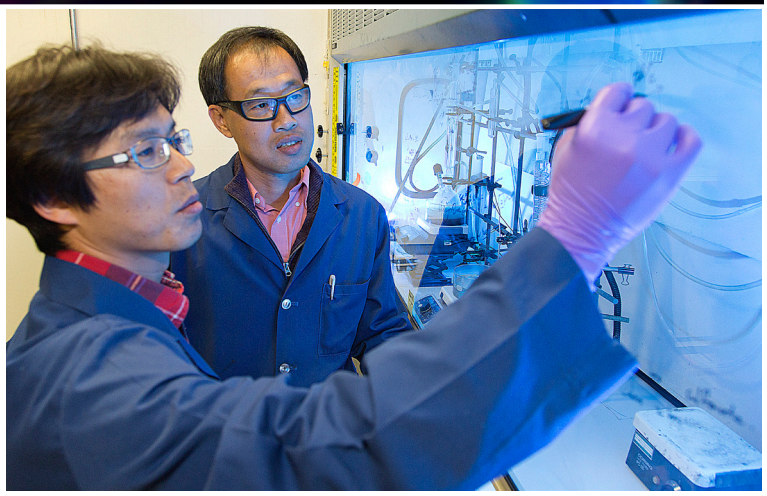

Photo by Sandra Valdez, NIE-CS

In 2008, Kwan-Soo Lee (near right) observed that conventional Nafion membranes dissolved in glycerol. He and mentor Yu Seung Kim (far right) were experimenting with this solvent to improve adhesion between the fuel cell membrane and electrode, a promising means to enhance fuel cell power density, fuel efficiency, and durability in hydrogen vehicles. "Through his finding, we had a new invention," Kim said.

Yu Seung Kim

Breaking through the status quo in fuel cell technology

By Diana Del Mauro, ADEPS Communications

Above, Kwan-Soo Lee and Yu Seung Kim discuss the chemistry behind fuel cell membranes at a Los Alamos National Laboratory fuel cell lab.

One October morning, chemical engineer Yu Seung Kim and postdoctoral researcher Kwan-Soo Lee arrived for what they thought would be a routine visit with their sponsor. To their astonishment, Assistant Secretary David Danielson of DOE's Energy Efficiency and Renewable Energy (EERE) program pulled up a slide featuring the co-inventors' novel fabrication technique for improving critical fuel cell components. "This is a great example," said Danielson, of how EERE-funded projects have made an impact in industry. For the emerging hydrogen-powered vehicle market, Giner Inc. is preparing to manufacture fuel cell and electrolyzer components based on Kim and Lee's patented methods.

Danielson later called Kim to the front of the conference room for special recognition. Receiving public accolades from his sponsor was a career high point for Kim (Materials Synthesis & Integrated Devices, MPA-11), who has amassed patents, publications, and awards during a decade in the Los Alamos fuel cell program. Kim's work at LANL has been funded by EERE's Fuel Cell Technologies Office. "I didn't expect to be recognized because this (project) just started," he said, noting other inventions Danielson praised that day were mature collaborations with larger companies.

Tied into that moment is Kim's appreciation of new financial incentives the U.S. Department of Energy is offering to fast track the transfer of inventions from national labs to the private sector through licensing agreements. In May, Giner and Kim's research team received EERE's first-ever technology-to-market Small Technology Transfer Research (STTR) award. The funding cemented a nine-month research and development

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From Rick's desk . . .

First off, Happy New Year and let's hope it is even better than the last!

This month's article focuses on continuous improvement and the line-of-sight from our scientific research to applied technologies. Our scientific research addresses multiple objectives—including discovery science, physics insight, and data for code calibration and validation; all of which are critically important to our mission. For each of these, continuous improvement in our understanding of materials is an important element, and one that becomes ideal when joined with discovery and an appreciation for the line-of-sight of how our scientific research is relevant to applied technologies.

Continuous improvement is a theme that we understand well and encourage at all levels. For example, we recently completed the CINT Co-Director interviews with town hall seminars from four outstanding finalists. The process and presentations reminded me of *The Goal* by Eliyahu Goldratt, which outlines the need for continuous improvement achieved from a deep understanding of our environment, expectations, and the constraints around us. While continuous improvement will always be important, it has become imperative, particularly as we look for programmatic opportunities in FY15, that we do not forget the application–or line of sight–that benefits from the innovative science across the Division.

"While continuous improvement will always be important, it has become imperative, particularly as we look for programmatic opportunities in FY15, that we do not forget the application–or line of sight–that benefits from the innovative science across the Division."

We continue to work with programs across the Laboratory to develop multidisciplinary applications for functional material science. Recall last year's Big Ideas Summit for Energy Programs, which focused on the power grid and subsurface production for a safe and effective future. In FY15, LANL will likely continue this approach with a summit this spring on sustainable transportation and advanced manufacturing. Sustainable transportation crosscuts many areas in MPA, including sensors and fuel cells. MPA may also play a significant role in advanced or additive manufacturing with feedstock qualification, health monitoring, and in-situ diagnostics to produce "born qualified" hardware.

Connections between global security and nanotechnologies remain strong following our Laboratory-wide Nanoscience/Global Security Deep Dive in November. We have now started monthly tech talks to discuss the current state of discovery and foundational science with potential applications for graphine, nanocomposites, quantum dots, and sensors technologies. Stockpile programs also continue to support MPA for safety and surety applications. Recently, we initiated a seminar series on hydriding and surface chemistry, which are areas that are starting to get more attention from directed stockpile work. MPA may have a key role in advancing our fundamental understanding of hydriding and surface chemistry, particularly in the areas of thermodynamic properties and related kinetics. Our ability to articulate a line-of-sight from discovery science, spectroscopy, heat capacity, and diffusion-based experiments in support of new physics, code calibration, and validation of our predictive models may be key in our ability to obtain broader programmatic support.

Our contributions to the advancement of functional materials science are strong, and there are a number of opportunities for programmatic growth in areas such as Directed Stockpile Work, Global Security, Energy, and the Office of Science. Our success in the future will largely be dependent on how we continuously improve our science while considering the line-of-site to the relevant programmatic application.

Acting MPA Deputy Division Leader Rick Martineau

Incubate - Innovate - Integrate - IMS.lanl.gov

Institute for Materials Science is up and running!

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IMS is excited to share with you its mission to foster incubation of new ideas and innovation of new materials science concepts. Integration of scientists and ideas across the diverse LANL materials community is a cornerstone of our program.

Outreach and communication are integral to our "*Incubation, Innovation, and Integration*" mission, which aims at bringing together the international science community. IMS seminars, workshops, colloquia, meetings, and other events support and encourage cross-sector collaboration, inspiring new ways of approaching materials science. A few of our upcoming, present, and past projects are:

IMS's *Quantum and Dirac Materials for Energy Applications* conference, March 8-11 at La Fonda in Santa Fe, will be a platform for discussion of the past progress and future research opportunities in quantum and Dirac materials. Recent materials discoveries highlight the importance of combining theory and modeling with advanced spectroscopies of materials. This workshop is in collaboration with KTH Royal Institute of Technology, the Nordic Institute of Theoretical Physics (NORDITA) and the New Mexico Consortium. Please visit our website for detailed information at ims.lanl.gov.

Targeted for July, IMS is facilitating a workshop on additive manufacturing together with MPA, MST, T, and C divisions. This workshop features key external lecturers from academia and industry who will discuss state-of-the-art and critical technical development opportunities. External program managers will also participate. The involvement of those active in the additive manufacturing community, as well as those in the materials synthesis, spectroscopy, and characterization fields, will provide insight on how their techniques may impact this growing field.

The *IMS Distinguished Lecture Series* has hosted or co-hosted eight visiting experts to date, with more to come. On January 28 our next lecturer, John Rogers, will give the lecture "*Soft, Stretchy Circuits That Can Dissolve in Your Body.*" Please consult our calendar at ims.lanl.gov for upcoming events.

IMS has revived the bi-weekly *MS Cookies and Tea,* with Alexander Balatsky kicking off the first talk on January 7. *MS Cookies and Tea* connects postdocs and early-career staff members with senior Laboratory staff, program managers, and management through informal presentations and discussions. Organized by MPA and MST divisions, IMS is pleased to support its revival. For more information, please see the story on page 7.

The November *Deep Dive on Nanoscience/Global Security Programs* hosted by IMS, MPA and MST divisions and PADGS accomplished its goal of connecting materials research to Global Security program needs. The Deep Dive fostered collaboration between researchers, program managers, and others and furthered ties between nanotechnology and Laboratory programmatic missions. Two-person teams representing materials capabilities and GS programs facilitated discussions throughout the day in unclassified morning sessions and classified afternoon sessions. There were more than 100 participants!

We trust you share our enthusiasm and will join us in one or more of our conferences, seminars, workshops, colloquia, or meetings.

Kim cont.

partnership to propel the Los Alamos technology into the marketplace.

"The benefits are for both the national lab and for Giner," said Hui Xu, a program manager at the Boston-based company and former MPA-11 postdoctoral researcher. "There are many brilliant people at national laboratories. They have the great ideas and technologies, and Giner knows how to commercialize these technologies." By collaborating with industry, Los Alamos researchers facilitate their inventions going from prototype to mass market: in this case, fuel cells destined for use in low-emission vehicles for everyday people. As part of its national security mission, Los Alamos leads materials advances in sustainable energy generation, including methods that reduce greenhouse gasses and air pollution.

These days, Giner and Los Alamos are working through the kinks of scaling up Kim's new approach to building the membrane-electrode assembly (MEA). The chemical reaction that generates electricity in a polymer electrolyte membrane (PEM) fuel cell originates in the MEA, which transmits protons between two electrodes.

For decades, water-based Nafion dispersion has been the industry standard for electrode processing; now competition to develop new materials is fierce as automakers launch the first commercially available fuel cell electric vehicles.

Kim's waterless Nafion dispersion technique for building MEAs with state-of-the-art catalyst materials has produced fuel cell devices outperforming and outlasting anything commercially available, according to independently verified LANL studies. The ionomer materials are more compatible with the catalyst materials, and thereby provide superior electrode performance, stability, and durability for PEM fuel cells during harsh operating conditions.

"The major advantages of this MEA are durability and lifetime. This is important for its commercialization," Xu said. "There's a good chance to use these MEAs for fuel cell cars, but it's too early to say that for sure."

Kim is leading another ambitious project that has caught DOE's eye (please read Kim's favorite experiment). "I want to see an alkaline fuel cell car in five years. People are doubting if it will work," he said. The chief problem: "People cannot make stable anion exchange membranes," he said, because the thin material disintegrates under high pH conditions.

Alkaline fuel cells have been used only in power plants on NASA-crewed space flights where liquid electrolytes were used. If Kim can achieve stable alkaline membranes, which offer higher catalytic reaction efficiency than PEM fuel cells, automakers could replace expensive platinum catalysts with non-precious-metal catalysts, leading to more palatable sticker prices on the car lot. Such fuel cells also could revolutionize other energy applications like air-metal batteries, desalinations, and membrane-based water electrolysis, he said.

Yu Seung Kim's favorite experiment

What: Overcoming the degradation problem in anion exchange membranes (AEMs)

Why: To develop alkaline membrane-based electrochemical devices

When: 2010-2013

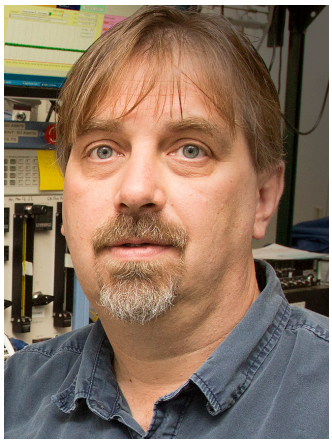
Where: Los Alamos National Laboratory, Sandia National Laboratories (SNL), Japan's National Institute of Advanced Industrial Science and Technology (AIST), and Connecticut-based Proton OnSite

Who: Dae-Sik Kim, Kwan-Soo Lee, Yu Seung Kim (MPA-11); Neil Henson (Physics & Chemistry of Materials, T-1); Cy Fujimoto (SNL); Yoong-Kee Choe (AIST); Luke Dalton, Kathy Ayers (Proton OnSite)

How: We found a clue that chemical degradation of anion exchange membranes (AEMs) could happen in the polymer backbone of the AEMs. We confirmed this was true by proton nuclear magnetic resonance experiments and density functional theory calculations.

The "a-ha moment:" We designed new anion exchange polymers, tested them in alkaline membrane water electrolysis, and demonstrated their record-high durability. The good results in 2014 led the sponsor of this work, DOE's Fuel Cell Technologies Office, to recognize Los Alamos National Laboratory as having a core competency in alkaline membranes.

Borup garners Electrochemical Society's Research Award



Rod Borup (Materials Synthesis and Integrated Devices, MPA-11) has won the 2015 Research Award presented annually by the Energy Technology Division of the Electrochemical Society (ECS). He is recognized for "his seminal contributions to the fundamental understanding of the durability of polymer electrolyte fuel cells."

Borup and his team are focused on improving the polymer electrolyte membrane (PEM) fuel cell, which converts hydrogen to electricity for power, but emits only water. Their work is important for hydrogen-powered fuel cell electric vehicles. "Over the past decade Rod has led a team of researchers at national labs, industry, and universities that has made significant contributions to several aspects of PEM fuel cell durability, including platinum electrocatalyst degradation and carbon corrosion in the electrode and gas diffusion layers," said ECS Energy Technology Division chairman Adam Weber. "Through his current leadership of the Los Alamos National Laboratory fuel cell program, Rod continues to guide research efforts to increase the durability and decrease the cost of PEM fuel cells to enable commercialization."

Borup received a PhD in chemical engineering from the University of Washington. He joined Los Alamos in 1994 as a postdoctoral researcher in the Laboratory's former Engineering Sciences and Applications Division, which at that time had one of the nation's first research groups studying fuel cell components. Through his involvement with the Los Alamos/GM Joint Development Center, Borup collaborated with industry, developing the electrochemical engine—a PEM fuel cell system powered by methanol converted on demand to a hydrogen-rich gas. In 1996 he joined General Motors as a senior project engineer at its new fuel cell R&D center in New York. Since returning to Los Alamos in 1999, he has been a scientist in MPA-11's fuel cell team, collaborating with automakers to reduce the cost and increase the performance of PEM fuel cell stack components. He also serves as the LANL program manager for DOE's Fuel Cell Technologies Office.

Borup garnered a 2005 DOE Hydrogen Program R&D Award in recognition of outstanding achievements in PEM fuel cell durability and the U.S. Drive 2012 Tech Team Award for the Fuel Cell Technical Team. He holds 13 U.S. patents, and has authored more than 100 papers related to fuel cell technology. Borup is a member of the DOE/U.S. Drive Fuel Cell Technical Team and cochair of the DOE Fuel Cell Technologies Office Durability Working Group.

The Electrochemical Society is a U.S.-based professional association with more than 9,000 members in more than 75 countries. Its mission is to advance theory and practice at the forefront of electrochemical and solid-state science and technology, and allied subjects. The Research Award includes a monetary prize and membership in the Society's Energy Technology Division. It will be presented at the ECS spring 2015 meeting in Chicago.

Technical contact: Rod Borup

Omberg leads American Chemical Society's fiscal committee

Kristin Omberg (Acting Group Leader of the Center for Integrated Nanotechnologies, MPA-CINT) has been named chair of the American Chemical Society's Committee on Budget and Finance, the fiscal advisory committee of the world's largest scientific society. She has served as a member on the committee for three years and as Chair will assist the ACS Treasurer's Office in implementing financial policies, reviewing and making recommendations on new program funding, and reviewing and preparing ACS's $450 million annual operating budget.

She is an American Chemical Society (ACS) Fellow; a former ACS Congressional Fellow, which included working on the staff of the US Senate Committee on the Budget; and a past Chair of the ACS Committee on Chemistry and Public Affairs.

Omberg earned a PhD in chemistry and a doctoral certificate in public policy analysis from the University of North Carolina at Chapel Hill. She joined LANL in 1995 as a graduate student in the Chemical Science and Technology Division, before becoming a Director's Postdoctoral Fellow in Materials Science and Technology Division in 1999. She moved to the Decision Applications Division in 2001, where she served as deputy group leader, group leader, and deputy division leader as well as the Laboratory's project leader for the Department of Homeland Security's BioWatch Program. BioWatch is a detection system that monitors for potential airborne bioterror attacks. Her BioWatch team advised cities on the placement of detection equipment to optimize population protection, and on post-detection decision-making. Omberg received a LANL Women's Career

continued on next page

Omberg cont.

Development Outstanding Mentor Award and an R&D 100 Award for the Biological Aerosol Sentry and Information System (BASIS).

In 2013, Omberg became deputy group leader of CINT, a group of researchers working in nanotechnology and staffing a Department of Energy national user facility. She continues to be program manager for several homeland security and defense projects.

ACS, with more than 161,000 members, is a congressionally chartered nonprofit organization with a mission "to advance the broader chemistry enterprise and its practitioners for the benefit of Earth and its people." Its staff of nearly 2,000 publishes 44 scientific journals, runs databases, convenes research conferences, and provides educational, science policy, and career programs in chemistry. ACS gives more than $22 million every year in grants for basic research in petroleum and related fields.

Technical contact: Kristin Omberg

Taylor joins APS Panel on Public Affairs

Antoinette "Toni" Taylor (Division Leader for Materials Physics and Applications, MPA) has been elected to a three-year term to the American Physical Society (APS) Panel on Public Affairs (POPA). The panel offers recommendations on the society's public affairs activities to the APS president, the executive board, and the APS council.

POPA secures funding for and leads in-depth studies on such topics as energy, environment, and national security; initiates new public affairs activities for APS; and recommends new programs to the APS council.

Taylor is an APS Fellow and served as the 2014 chair of the APS Division of Laser Science executive committee. She is former director-at-large of the Optical Society of America and former topical editor of *Journal of the Optical Society B: Optical Physics*. For the National Academies, she was a member of the Solid State Science Committee (now the Condensed Matter and Materials Research Committee) that advised the Board of Physics and Astronomy, and she chaired the National Academies' Committee on Nanophotonics Applicability and Accessibility.

She is a Fellow of Los Alamos National Laboratory, the Optical Society of America, and the American Association for the Advancement of Science. In 2003, she won the inaugural Los Alamos Fellows' Prize for Outstanding Leadership in Science and Engineering.

Taylor received a PhD from Stanford University, where she studied novel molecular spectroscopy. She joined Los Alamos in 1986. Her research interests include the investigation of ultrafast dynamical nanoscale processes in materials, the development of novel optical functionality using metamaterials, and the development of novel optics-based measurement techniques for the understanding of new phenomena. She has co-authored more than 300 papers in these areas, written 3 book chapters, and edited 5 books.

Founded in 1899, APS is an organization dedicated to advancing and disseminating knowledge of physics through its research journals, scientific meetings, and education, outreach, advocacy, and international activities. APS represents over 50,000 members, including physicists in academia, national laboratories, and industry in the United States and throughout the world.

Technical contact: Toni Taylor

Neutron spectroscopy reveals strength of microscopic magnetic interactions in model system for emergent phenomena

Microscopic magnetic interactions are at the origin of various emergent phenomena such as superconductivity, magnetic frustration, ferromagnetism, and magneto-electric coupling that are important for current and future applications ranging from computing over alternative energies to transportation. To make progress on understanding such emergent phenomena, scientists work on quantifying and ultimately being able to tune magnetic interactions.

A family of cerium-based materials that can be tuned to exhibit superconductivity and complex magnetism has served as "test bed" to study such emergent phenomena since their discovery at Los Alamos in 2000. By combining neutron spectroscopy and theory, researchers from Los Alamos National Laboratory and Oak Ridge National Laboratory's Spallation Neutron Source have uncovered the strength of the magnetic interactions in these materials for the first time.

Microscopic magnetic interactions are the forces between neighboring magnetic moments—that is, microscopic "compass needles" that sit on every atom in a magnetic material. Here, the researchers have shown for the first time that the magnetic interactions in the material $CeRhIn_5$ that is part of this family are "frustrated," because the constraints resulting from magnetic forces on the nearest and next-nearest magnetic moments cannot be fulfilled at the same time.

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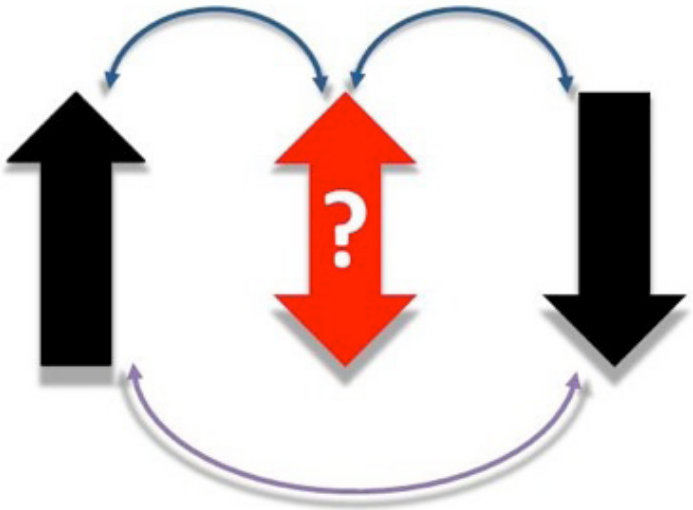

When the magnetic interactions between nearest (blue arrows) and next-nearest (purple arrow) neighbors both require antiparallel alignment of the respective magnetic moments, the resulting magnetic order is frustrated as is observed in the cerium-based materials $CeRhIn_5$.

Neutron cont.

Because magnetic interactions in this family of cerium materials are also believed to play an important role for the emergence of superconductivity, this result allows new insight in the complex interplay between frustrated magnetism and superconductivity.

This effort in understanding emergent phenomena in functional materials is aligned with grand challenges outlined by the Department of Energy Basic Energy Sciences and the Lab's Materials Strategy.

Work at Los Alamos was performed under the auspices of the U.S. DOE, OBES, Division of Materials Sciences and Engineering and funded in part by the LANL Laboratory Directed Research and Development program. The research supports the Lab's Energy Security mission area and Materials for the Future science pillar.

Reference: "Magnitude of the Magnetic Exchange Interaction in the Heavy-Fermion Antiferromagnet $CeRhIn_5$," by Pinaki Das, Nirmal J. Ghimire, Filip Ronning, Eric D. Bauer, Joe D. Thompson, and Marc Janoschek (Condensed Matter & Magnet Science, MPA-CMMS); Shizeng Lin and Cristian D. Batista, (Physics of Condensed Matter & Complex Systems, T-4); Kevin Huang (University of California, San Diego & MPA-CMMS), and Georg Ehlers (Oak Ridge National Laboratory); *Phys. Rev. Lett.* **113**, 246403 (2014).

Technical contact: Marc Janoschek

Materials science series offer early-career researchers chance to broaden horizons

For early-career researchers looking to broaden their knowledge of the Laboratory, for ways to spark new collaborations across organizations, or to receive expert coaching from a Laboratory Fellow before presenting their latest technical results, the New Year offers two outstanding series.

MS Cookies & Tea, which aims to connect postdoctoral researchers and early-career staff with Laboratory senior staff, program managers, and management through informal presentations and discussions on a range of Laboratory issues, has returned with events held on the first and third Wednesdays of the month. Technical and non-technical talks are followed by a half-hour of refreshments, informal discussion, and networking. Meetings are open to all employees. Materials Physics and Applications and Materials Science and Technology divisions organize the gatherings with support from the Institute for Materials Science. Send ideas for speakers or topics to hosts Ming Tang (Materials Science in Radiation and Dynamics Extremes, MST-8, mtang@lanl.gov) or Blake Sturtevant (Materials Synthesis and Integrated Devices, MPA-11, bsturtev@lanl.gov).

On Feb. 4 at 4 p.m. George Guthrie, program manager of the Laboratory's Applied Energy Office, will discuss the fossil fuels and geothermal energy programs he oversees. The talk will be held in the Building 32 conference room (TA-3, SM-32, 134).

The James L. Smith Materials Postdoc/Early Career Seminar is a new showcase for materials-related research from Laboratory postdoctoral researchers and early-career staff. Seminars will be held every two weeks. Prior to their presentation, speakers will discuss their work and career goals with Smith (Metallurgy, MST-6), giving them an opportunity to receive feedback from an enthusiastic retired Laboratory Fellow. Throughout his 40-year career at Los Alamos, Smith, who has a PhD in physics from Brown University, has been and continues to be an active mentor and champion of early-career LANL scientists. The seminar series is organized by the Materials Science and Technology and Materials Physics and Applications divisions. To suggest presenters, contact hosts Seth Imhoff (Metallurgy, MST-6, sdi@lanl.gov) or Jinkyoung Yoo (Center for Integrated Nanotechnologies, CINT, jyoo@lanl.gov).

On Feb. 9 at 11 a.m. Hisato Yamaguchi (MPA-11) will speak on "Solution Processable Two-Dimensional Materials: Synthesis, Properties, and Applications," at the Materials Science Laboratory (TA-3, SM-1698, A103).

HeadsUP!

ADEPS Environmental Action Plan for FY15

Environmental management will always be an ongoing effort. Our 2015 Environmental Action Plan addresses our impact on the environment and outlines steps we can take to reduce our impact and decrease the potential for, and severity of, any environmental damage.

We again focus upon three objectives: Clean the Past; Control the Present; and Create a Sustainable Future. These objectives parallel the LANL institutional objectives, with the targets fine-tuned to fit our Directorate's needs.

Clean the Past: ***Reduce Environmental Risks from Historical Operations, Legacy and Excess Materials, and Other Conditions Associated with Activities No Longer a Part of Current Operations.***

Target 1: Ensure testing is continuing on our peroxide-forming chemicals; update the current inventory of all peroxide-formers.
Target 2: Reduce ADEPS surplus equipment, salvaging or recycling wherever appropriate; inventory and work to minimize use of transportainer storage units; reduce total volume of chemical containers; properly disposition unwanted/unneeded office and lab items; properly disposition legacy records and documents.

Action 1: Reduce, Salvage and Recycle
Action 2: Transportainer Inventory, Clean-out, and Removal
Action 3: Combined Effort: MPA/MST Clean Up of Rad-Contaminated Vacuum Pumps and other Legacy Items from 03-34. (Contingent on available funding)
Action 4: Transfer hazardous chemicals from LANSCE to ORNL-SNS
Action 5: Establish a common staging area for MST/MPA for salvaging/recycling.

Control the Present: ***Control and Reduce Environmental Risks from Current, Ongoing Operations, Missions, and Work Scope.***

Target 1: Managers will conduct at least one environmentally-focused MOV in each quarter.
Target 2: Perform annual chemical inventories (90% of ChemLog entries inventoried).
Target 3: Communicate environmental objectives to the Directorate
Note: *all three targets are assessed on an annual basis.*
Create a Sustainable Future: ***Reduce or Eliminate the Use of***

SF6 Green House Gas (GHG) by Recycle/Reuse or Replacement Activities.

Target 1: Support institutional efforts towards SF6 reduction, elimination, and/or reclamation of this egregious GHG (greenhouse gas).
Target 2: If funded, advance the design and prep phases of the SF6 P2 project in the P23 Turbulence Lab.

Additionally:
We need you to turn off lights in offices, conference rooms, hallways, and labs when not in use. Get that leaking faucet/toilet/urinal fixed (contact your facilities coordinator). Turn off computer peripherals when not in use. Alter your purchasing habits – Purchase GREEN. Use the blue and green recycling bins. Share chemicals, minimize chemical inventories, purchase safer alternatives, recycle and dispose properly. Salvage all unnecessary or unused (and not needed) equipment. Nominate a deserving colleague for a P2 Award!!

Document, Record & Report all significant environmental actions that you take that positively affect the environment. Remember, if it's not recorded, it didn't happen. Please send your environmental action updates to your Division's EAP contact (MPA: Susie Duran at susiew@lanl.gov; MST: Dan Thoma at thoma@lanl.gov; P: Steve Glick at sglick@lanl.gov). This will ensure that our Directorate continues to get the recognition it deserves for our environmental efforts.

The plan in greater detail can be found at the LANL EMS web page at int.lanl.gov/environment/ems/index.shtml; then click on Tools - "EMS Action Plans."

Celebrating service

Congratulations to the following MPA Division employees celebrating a service anniversary recently:

Joe Thompson, MPA-CMMS ..... 40 years
Jennifer Hollingsworth, MPA-CINT ..... 15 years
Quinn Mcculloch, MPA-CINT ..... 15 years
Aditya Mohite, MPA-11 ..... 5 years
Blake Sturtevant, MPA-11 ..... 5 years

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To submit news items or for more information, contact Karen Kippen, ADEPS Communications, at 505-606-1822 or kkippen@lanl.gov.
To read past issues see www.lanl.gov/orgs/mpa/materialsmatter.shtml.

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