ANNUAL REPORT 2013

CAES Center for Advanced Energy Studies

"As CAES moves forward, our goal is to become a resource for private industry and help companies solve critical technical issues."

Dear colleagues,

Over the past eight years, the Center for Advanced Energy Studies has become a model of how universities and national labs can effectively and efficiently collaborate on research while educating a new generation of scientists and engineers.

The CAES partners – Boise State University, Idaho National Laboratory, Idaho State University and University of Idaho – took a significant step in FY 2013 to ensure the collaboration continues to flourish. They signed a new agreement formalizing many aspects of the collaboration, including roles and responsibilities of participants, rules governing intellectual property, and institutional responsibilities.

This agreement will provide a better foundation as we enter the next phase of the CAES partnership and build stronger relationships with industry throughout the state and region.

As CAES moves forward, we will focus on providing research capability to help Idaho businesses be more competitive; we will develop larger, sustainable research programs; and open more opportunities for Idaho students to develop into international research leaders.

These objectives will draw on the real power of CAES – the leverage the collaboration provides. Together, the capabilities of our collaborators are much more competitive than those of any single institution alone. Our goal is to expand and deploy the partners' capabilities to help move Idaho forward.

We are already doing this in bioenergy. CAES researchers continue to work with state and national dairy industry organizations to convert waste into marketable products like bioplastics and electricity, while addressing environmental concerns of our dairymen. It's a great example of the value of the partnership in assisting Idaho business.

In essence, CAES provides a "front door" for Idaho business to gain access to multidisciplinary capabilities and expertise that exist at the partner institutions.

We believe this approach has many benefits. It will enable CAES researchers to win more funding – an economic boon for the state – and our universities to attract more students all while helping grow Idaho's competitive edge.

Sincerely,

Steven Aumeier
Director, Center for Advanced Energy Studies

FY 2013 | By the Numbers

CAES provided the state of Idaho, DOE and Battelle Energy Alliance a strong return on investment in FY 2013.

AMOUNT OF COMPETITIVE RESEARCH FUNDING WON BY CAES RESEARCHERS IN FY 2013.

$4,437,182.00

AMOUNT OF INFRASTRUCTURE GRANTS CAES RESEARCHERS WON IN FY 2013.

475
$ THOUSAND

421

NUMBER OF STUDENTS ENROLLED IN NUCLEAR-RELATED DEGREE AND CERTIFICATE PROGRAMS AT THE CAES PARTNER UNIVERSITIES.

TOTAL RESEARCH AND OTHER FUNDING WON BY CAES RESEARCHERS IN FY 2013.

5.49

TOTAL AMOUNT OF COMPETITIVE RESEARCH AND OTHER FUNDING CAES RESEARCHERS HAVE WON SINCE FY 2008.

56.63

THE STATE OF IDAHO'S INVESTMENT IN CAES IN FY 2013.

TWO

$ MILLION

$578,732.00

AMOUNT OF SCHOLARSHIP, FELLOWSHIP AND OTHER FUNDING AWARDED TO THE CAES PARTNER UNIVERSITIES IN FY 2013.

SIXTY-PLUS

NUMBER OF IDAHO UNIVERSITY STUDENTS WORKING ON CAES-RELATED (NON-NUCLEAR) RESEARCH PROJECTS IN FY 2013.

Research Highlights

Manufacturing crystals for research

A team led by Eric Burgett, an Idaho State University/CAES researcher, successfully created its first batch of pure, single uranium oxide crystals in the Research in Science and Engineering (RISE) facility in Pocatello. Researchers at Idaho National Laboratory and elsewhere are using the crystals to better understand uranium oxide – the primary fuel for the nation's nuclear reactors – and design higher-performing fuels.

ERIC BURGETT, A CAES/IDAHO STATE UNIVERSITY RESEARCHER, AND HIS TEAM MANUFACTURE SINGLE CRYSTALS AT ISU'S RESEARCH IN SCIENCE AND ENGINEERING (RISE) BUILDING IN POCATELLO.

Powering electronics with wind

Boise State University engineering, business and debate students are developing a lightweight, portable wind turbine that can power a cell phone and other electronic devices as part of a national competition. Boise State was one of 10 schools selected by the U.S. Department of Energy to participate in the agency's inaugural Collegiate Wind Competition and was the only college chosen from Idaho, Montana, Wyoming, Utah, Washington and Oregon.

THE COLLEGIATE TEAMS COMPETING ARE:

BOISE STATE UNIVERSITY

CALIFORNIA MARITIME ACADEMY

COLORADO SCHOOL OF MINES

JAMES MADISON UNIVERSITY (VA)

KANSAS STATE UNIVERSITY

NORTHERN ARIZONA UNIVERSITY

PENNSYLVANIA STATE UNIVERSITY

UNIVERSITY OF ALASKA FAIRBANKS

UNIVERSITY OF KANSAS

UNIVERSITY OF MASSACHUSETTS-LOWELL

$2,280,000

AMOUNT OF MONEY WON FROM THE U.S. DEPARTMENT OF ENERGY TO CONDUCT NUCLEAR ENERGY RESEARCH.

CAES HELPS SUPPORT THE UNIVERSITY OF IDAHO'S INTEGRATED DESIGN LAB AND ITS EFFORTS TO IMPROVE ENERGY EFFICIENCY. KEVIN VAN DEN WYMELENBERG, THE LAB'S DIRECTOR, LEADS A TEAM OF STUDENTS AND STAFF.

DID YOU KNOW?

IDAHO NATIONAL LABORATORY FUNDS 12 IDAHO UNIVERSITY RESEARCHERS AS PART OF ITS COMMITMENT TO THE CAES COLLABORATION. INL PAYS FOR UP TO HALF OF THEIR SALARIES THROUGH THE LAB'S JOINT APPOINTMENTS PROGRAM.

Integrating renewable energy through policy

The CAES Energy Policy Institute is leading a three-year, National Science Foundation-funded project to research renewable energy and electricity planning. The team will perform a comparative study of three Regional Transmission Organizations (RTOs) that coordinate delivery of electricity to more than two-thirds of households in the United States. Many states have mandated RTOs to use more wind, solar and other renewable energy sources, but the organizations struggle to integrate them and still provide reliable power.

Researching nuclear energy

University of Idaho/CAES researchers won more than $2.28 million from the U.S. Department of Energy to conduct nuclear energy research. Vivek Utgikar, Chien Wai and Batric Pesic are leading three of the 61 projects funded by the department's Nuclear Energy University Programs (NEUP) in FY 2013. Supathorn Phongikaroon, a UI/CAES researcher, is collaborating on a fourth research project with Ohio State University.

Energy-efficient construction and design

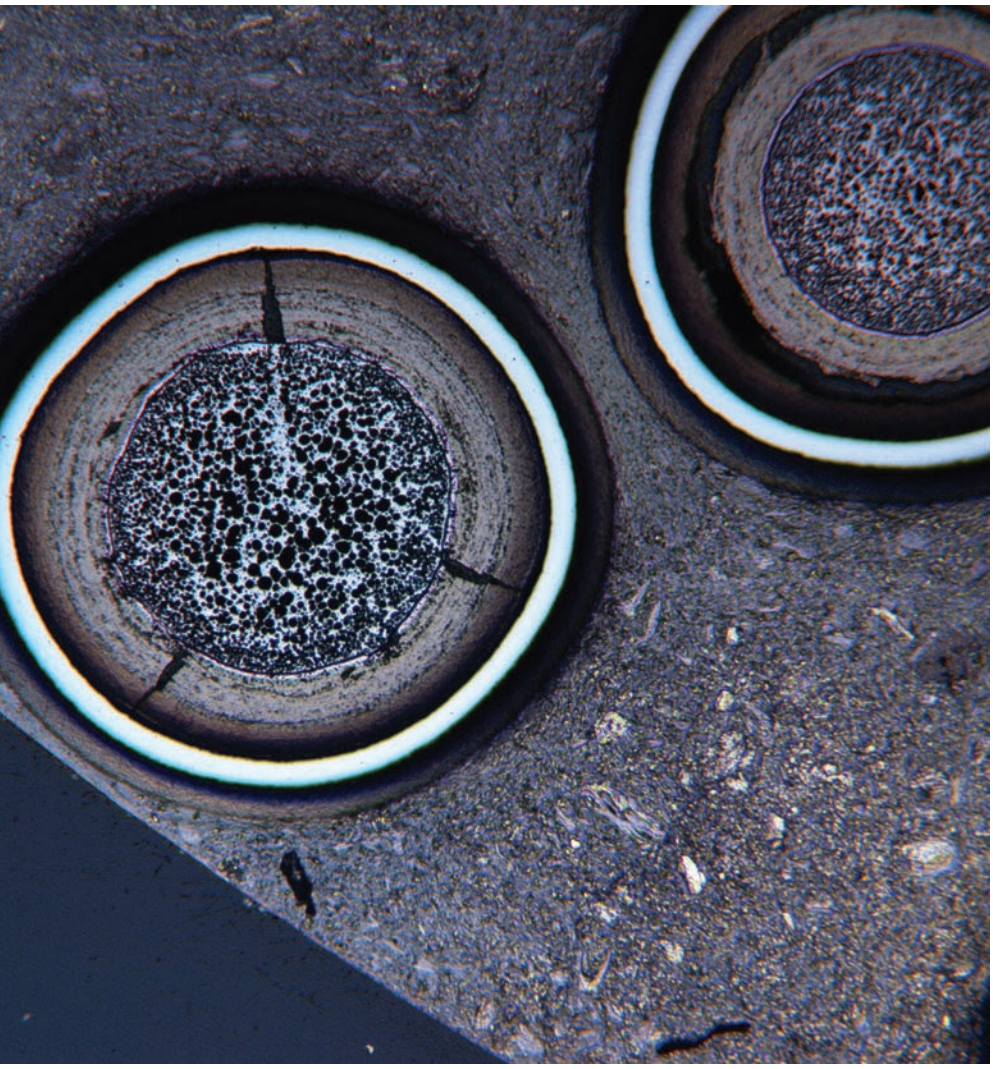
The University of Idaho Integrated Design Lab (IDL) is supporting Idaho Power Company's efforts to improve energy efficiency by providing professional education to the design and construction industry and technical assistance on new construction and renovations. IDL staff also are developing new commercial heat pump sizing calculation methods, researching the most effective commissioning practices to harvest daylight and reduce use of electric lighting, and studying the cost-effectiveness of energy-efficient multifamily residential design.

Finding the silver lining

Idaho National Laboratory scientists studying a new type of nuclear fuel discovered where silver fission products have been hiding with the help of Yaqiao Wu, a Boise State University student and an instrument lead for the CAES Microscopy and Characterization Suite (MaCS). The team used a powerful microscope to identify where silver fission products were amassing in a sample of tristructural isotropic (TRISO) fuel. The fuel could run the next generation of high-temperature gas-cooled reactors, which have built-in safety features. The discovery will help researchers understand how fission products move during irradiation and design better TRISO fuel.

"The (Microscopy and Characterization Suite) at CAES is set up for collaboration and to make discoveries like silver congregating in (tristructural isotropic) fuel."

-Yaqiao Wu, Boise State University researcher and instrument lead for MaCS

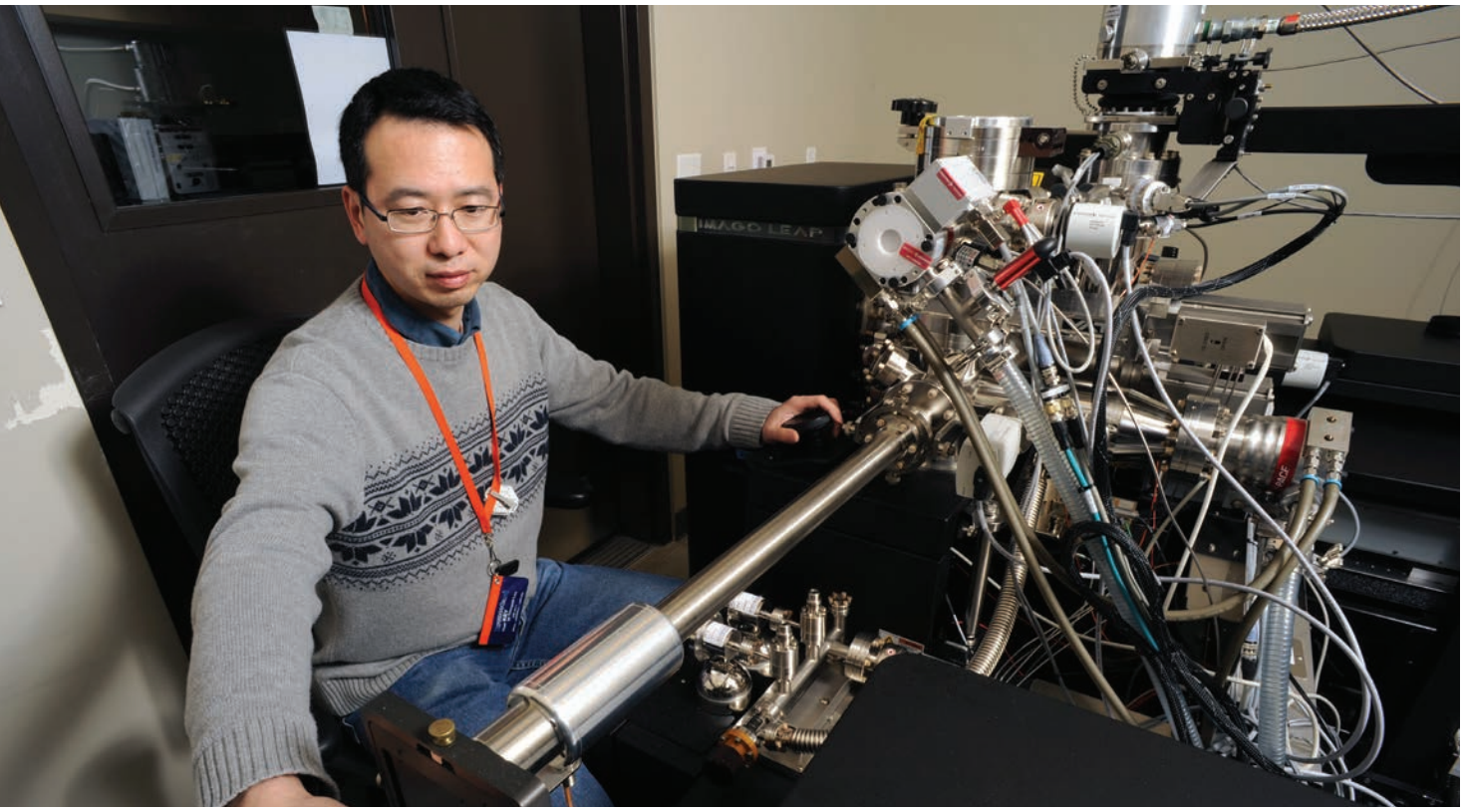


TRISTRUCTURAL ISOTROPIC (TRISO) FUEL COULD RUN THE NEXT GENERATION OF HIGH-TEMPERATURE GAS-COOLED REACTORS, WHICH HAVE BUILT-IN SAFETY FEATURES.

350	NUMBER OF HOURS THE CAES MICROSCOPY AND CHARACTERIZATION SUITE (MaCS) WAS BOOKED FOR USE IN JUNE 2012.
700	NUMBER OF HOURS MaCS WAS BOOKED IN JUNE 2013.
15	AVERAGE NUMBER OF HOURS MaCS IS BOOKED PER DAY.

MaCS-imizing Research

CAES operates its Microscopy and Characterization Suite (MaCS) as a user facility so researchers outside the parternship can gain access to the lab's powerful microscopes and localized electrode atom probe (LEAP).



DID YOU KNOW?

PV MAPPER, A NEW SOLAR-SITING TOOL DEVELOPED BY A CAES RESEARCH TEAM, IS ENTERING THE BETA TESTING PHASE. INDUSTRY PARTNERS ARE EXPECTED TO TEST THE GEOGRAPHIC INFORMATION SYSTEM-BASED SOFTWARE OVER THE NEXT YEAR. THE PROJECT IS LED BY THE CAES ENERGY POLICY INSTITUTE.

UNIVERSITY OF IDAHO RESEARCHERS

HAVE BUILT A PILOT-SCALE SYSTEM TO

TURN COW MANURE INTO PLASTIC.

Converting cow manure to bioplastics

A University of Idaho research team has developed a system to transform cow manure into polyhydroxyalkanoate – or PHA – a biodegradable plastic. A pilot-scale model of the manure-to-plastic system is operating at the UI dairy. The system also works with anaerobic digesters, which convert manure to electricity – a major CAES research initiative. Fermented manure can be split into solids that can be used for electricity and liquids for plastic production.

Presenting energy policy

The third annual Western Energy Policy Research Conference featured 42 presentations from students, university professors, and representatives from government and industry. More than 120 people from six countries attended the event. Sponsored by the CAES Energy Policy Institute, the conference is one of the few that focuses on energy-related policy research.

Helping industry save energy

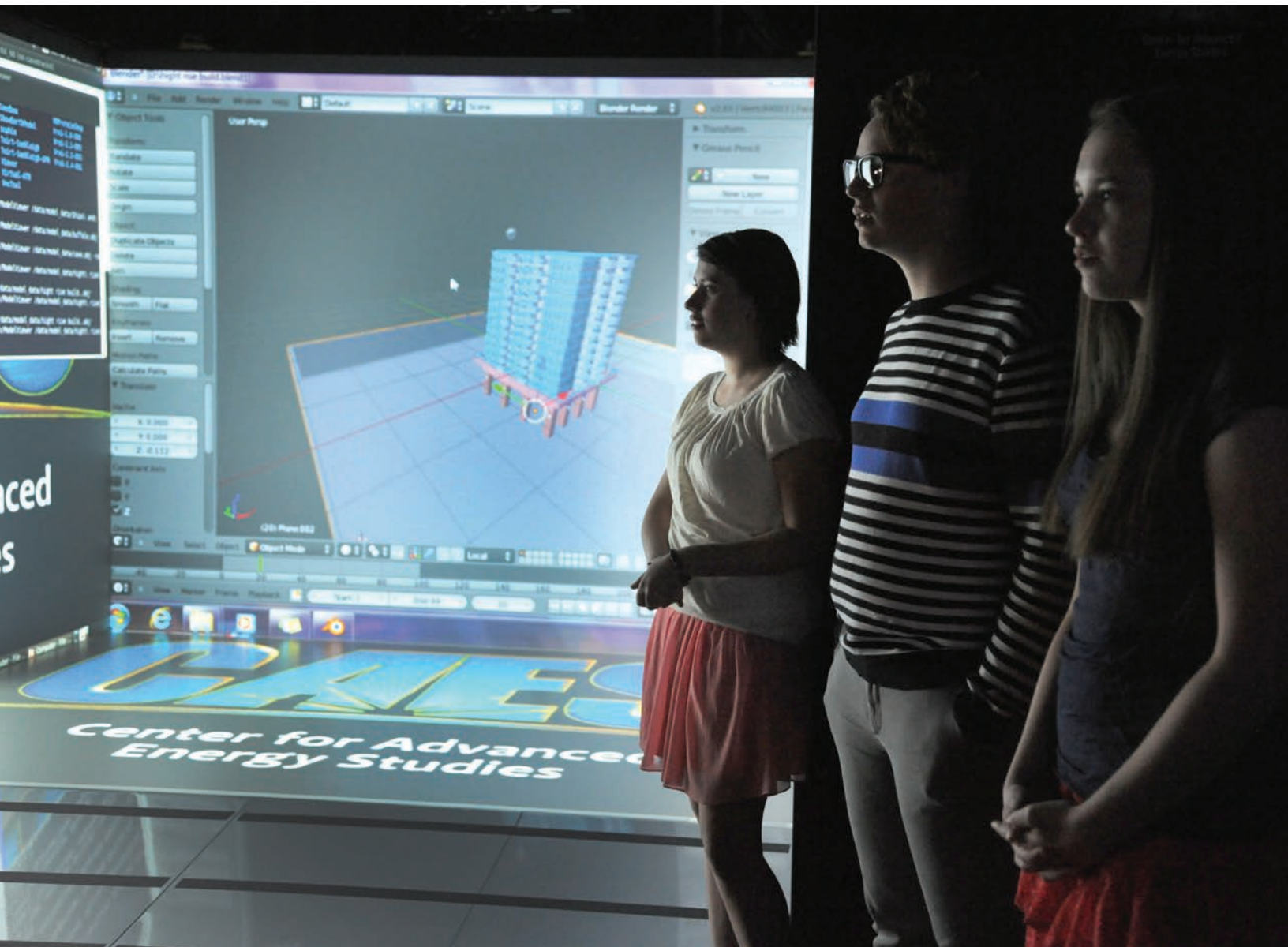
The CAES Energy Efficiency Research Institute (CEERI) launched a statewide industrial assessment center after receiving a DOE grant. Student teams at the CAES partner universities conducted free energy efficiency assessments for regional companies and manufacturing plants. The teams conducted eight visits and submitted four reports during FY 2012. Total projected energy savings identified by the teams is 1,003,464 kilowatt hours, 83,022 therms, 1,255 kilowatts and a potential cost savings of $109, 524.

Education and Outreach

STUDENTS FROM IDAHO FALLS' COMPASS ACADEMY HIGH SCHOOL PRESENTED ON A 3-D MODEL THEY BUILT TO FUNCTION IN THE CAVE.

Doing math in a CAVE

Algebra II students from an Idaho Falls high school used the computer-assisted virtual environment (CAVE) at CAES to learn about the quadratic function. The students created animated computer models that depicted a real-world use of a quadratic equation and displayed their work in the CAVE. They also presented their models and the math behind them to a panel of CAES students and researchers.

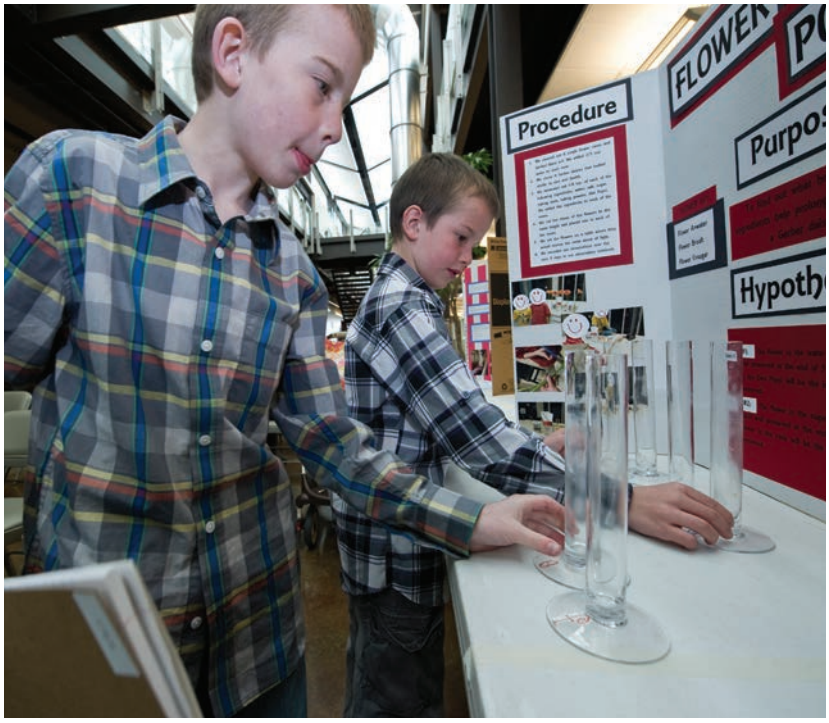


Science Fair

More than 70 students from Twin Falls to Idaho Falls participated in the Eastern Idaho Tournament of Innovation, which was held in March at the Center for Advanced Energy Studies (CAES). The event was sponsored by the Museum of Idaho, the Discovery Center of Idaho, CAES and Idaho National Laboratory.

50

NUMBER OF K-12 EDUCATORS WHO PARTICIPATED IN A WEEKLONG SCIENCE, TECHNOLOGY, ENGINEERING AND MATH TRAINING SESSION AT CAES AND EASTERN IDAHO TECHNICAL COLLEGE.



My Amazing Future

More than 100 female junior high school students defended electronic tablets from cyberattacks, used chemistry and paper chromatography to solve crimes, and detected radiation during the sixth annual My Amazing Future workshop at CAES. Eighth-graders from Idaho Falls, Blackfoot, Fort Hall, Pocatello and Twin Falls participated in the daylong event organized by Idaho National Laboratory employees and members of Idaho Women in Nuclear (IWIN).

CAES Energy Scholars

CAES launched a new scholarship program for Idaho students interested in performing energy-related research. The CAES Energy Scholars program is a mentored internship focused on providing students from the center's partner universities with real-world experience in a variety of areas, including nuclear engineering, bioenergy, material science, modeling and simulation, and cybersecurity.

FEMALE JUNIOR HIGH SCHOOL STUDENTS PARTICIPATED IN HANDS-ON SCIENCE PROJECTS AND INTERACTED WITH PROFESSIONAL WOMEN DURING THE 2013 MY AMAZING FUTURE EVENT AT CAES.

Awards and Accomplishments

Researcher selected for Fulbright scholarship

University of Idaho/CAES researcher Robert Hiromoto was named a Fulbright Scholar and is spending the 2013-2014 academic year teaching and conducting research at the American-Ukrainian School of Computer Science at Ternopil National Economic University. Hiromoto is the first UI-Idaho Falls professor to be named a Fulbright Scholar and the first CAES-based researcher to be selected for the prestigious program.

DID YOU KNOW?

JASON STOCK, A PHYSICS MAJOR AT IDAHO STATE UNIVERSITY, WAS ONE OF 37 UNDERGRADUATE STUDENTS IN THE COUNTRY TO RECEIVE A $5,000 SCHOLARSHIP THROUGH THE U.S. DEPARTMENT OF ENERGY'S NUCLEAR ENERGY UNIVERSITY PROGRAMS (NEUP).

ROBERT HIROMOTO, A UNIVERSITY OF IDAHO/CAES RESEARCHER, IS SPENDING THE 2013-2014 ACADEMIC YEAR IN THE UKRAINE AS A FULBRIGHT SCHOLAR.

Student awarded fellowship from national organization

University of Idaho/CAES student Leslie Kerby received a $32,000 M.H. Blewett Fellowship for Women from the American Physical Society. Kerby, who is earning her master's degree in nuclear engineering, also won a $5,000 Post Foundation Award for her research.

CAES associate director named distinguished professor

Boise State University designated CAES Associate Director Darryl Butt as a distinguished professor for his teaching, research and public service achievements. Butt has mentored more than 34 graduate students, published 180 peer-reviewed journal articles and maintained an active research program since joining BSU in 2005. Butt also served as chair of BSU's Department of Materials Science and Engineering and leads the CAES materials research initiative.

CAES student/advisor win best paper

Dumidu Wijayasekara, a University of Idaho/CAES student, and his advisor, Milos Manic, won the best paper award at the 2013 IEEE Symposium Series on Computational Intelligence (SCCI 2013) in Singapore. Their paper is titled "Shadowed Type-2 Fuzzy Logic Systems." More than 1,000 articles were submitted to the conference.

Researcher recognized for energy efficiency work

The NW Energy Coalition honored the director of the CAES Energy Efficiency Research Institute with its highest award. CEERI director John Gardner, who also teaches mechanical engineering at Boise State University, received the coalition's Bob Olsen Memorial Conservation Eagle Award.

Researcher honored for energy education

The Idaho Falls-based Partnership for Science and Technology organization recognized Akira Tokuhiro, a University of Idaho/CAES researcher, for his contributions to energy education. Tokuhiro teaches and conducts nuclear energy research and also has served on the American Nuclear Society Special Committee on Fukushima.

Publications, Presentations, and Proceedings

1. Ailavajhala, M., M. Mitkova, and D. P. Butt, 2012 "Simulation and Process Flow of Radiation Sensors Based on Chalcogenide Glasses for In Situ Measurement Capability," Phys. Status Solidi C, Vol. 9, No. 12, 2012, pp. 2415–2419.
2. Allahar, K. N., J. Burns, B. Jaques, Y. Q. Wu, I. Charit, J. Cole, and D. P. Butt, 2013, "Ferritic Oxide Dispersion Strengthen Alloys by Spark Plasma Sintering," J. Nucl. Mater., Vol. 443, No. 1 3, 2013, pp. 256–286.
3. Allahar, K. N., J. Burns, B. Jaques, Y. Q. Yu, and D. P. Butt, 2013, "Annealing of Oxide Dispersion Strengthened Alloys Consolidated by Spark Plasma Sintering," 142nd Annual TMS Meeting & Exhibition (TMS 2013), San Antonio, Texas, USA, March 3–7, 2013.
4. Allahar, K., M. Shaltry, M. Orazem, D. Butt, S. Phongikaroon, M. Simpson, "Electrochemical Impedance Spectroscopy of LaCl3, ZrCl4, and UCL3 in Molten LiCl KCl Eutectic," 2013 TMS Conference, San Antonio, Texas, March 2013.
5. Allensworth, J. R., M. F. Simpson, M. S. Yim, and S. Phongikaroon, "Investigation of fission product transport into zeolite A for pyroprocessing waste minimization," Nuclear Technology, 2013, 81, 337–348.
6. Baker, B., and G. Imel, 2011, "Open Loop Oscillator Technique," Transactions of the American Nuclear Society, Hollywood, Florida, USA, June 26–30, 2011.
7. Baker, B., and G. R. Imel, 2013, "Propagation of Uncertainty in the Inverse Kinetics Equation," Transactions of the American Nuclear Society, Atlanta, Georgia, USA, June 16–20, 2013.
8. Beard, D. V., 2012, "A Computer Human Interaction Approach for Evolving Complex Tools," Advances in Nuclear Science and Engineering Working Conference, 2012.
9. Beard, D. V., K. R. Parker, T. A. Ottaway, W. F. Davey, and C. D. Schou, 2013 "Requiring a Systems Analysis and Design Course for a Computer Science Major," The 2013 International Conference on Frontiers in Education: Computer Science and Computer Engineering (FECS '13), Las Vegas, Nevada, USA, July 22–25, 2013.
10. Beausoleil, G. L., P. Price, D. Thomsen, A. Punnoose, R. Ubic, S. Misture, and D. P. Butt, 2013, "Thermal Expansion of Alkaline Doped Lanthanum Ferrites Near the Néel Temperature," submitted to J. Am. Ceram. Soc., 2013.
11. Becker, B., N. Thompson, J. Thompson, D. Beller, S. Bowyer, V. Garvon, G. Imel, and Y. Danon, "Towards Benchmark Measurements For Used Nuclear Fuel Assay Using A Lead Slowing Down Spectrometer," Proceedings of the Tenth International Topical Meeting on Nuclear Applications of Accelerators (AccApp 2011), Knoxville, Tennessee, USA, April 3–7, 2011.
12. Becker, S., D. M. McEligot, E. J. Walsh, and E. Laurien, 2012, "Entropy Generation in a Flow Transitioning Downstream of a Rib," Turbulence, Heat and Mass Transfer 7, (Ed: K. Hanjalic, Y. Nagano, D. Borello, and S. Jakirlic), New York: Begell House.
13. Black, G., 2013, "A Decision Framework for Deploying Small Modular Reactors," Presentations for the Fourth Annual Platts Small Modular Reactor Conference, Washington D.C., USA, May 29–30, 2013.
14. Black, G., 2013, "A Decision Framework for Economic Impacts Deployment of Small Modular Reactors in Developing Countries," Presentation for the 75th Annual International Atlantic Economic Conference, Vienna, Austria, April 3–6, 2013.
15. Black, G., 2013, "Wind Energy Development in the West: The Role of State Incentives," Presentation for the 2013 Western Energy Policy Research Conference, Portland, Oregon, USA, September 5–6, 2013.
16. Boggs, K. G., R. Van Kirk, G. S. Johnson, J. P. Fairley, and J. Bartolino, 2013, "Forecasting Natural Aquifer Discharge Using a Numerical Model and Convolution," Ground Water, August 5, 2013, doi:10.1111. gwat.12096.
17. Bowman, M., J. Carlisle, and S. Kane, 2013, "Public Attitudes Towards Large Scale Solar Energy Development in the U.S.," Presentation, International Symposium on Society and Resource Management, Estes Park, Colorado, USA, June 4–8, 2013.
18. Carlisle, J., and M. Bowman, 2013, "Green on Green: Public Perceptions of Solar Energy Siting in the U.S. Southwest," Presentation, Western Political Science Association Annual Meeting, Hollywood, California, USA, March 28–30, 2013.
19. Carlisle, J., M. Bowman, and S. Kane, 2013, "Public Attitudes Towards Large Scale Solar Energy Development in the U.S.," Presentation, Workshop on Energy, Transportation, and Water Infrastructure: Policy and Social Perspectives, Ames, Iowa, USA, July 17–19, 2013.
20. Cassel, A., S. Kobs Nawotniak, and H. C. Bottenberg, 2013, "Remote Sensing Techniques to Map Reforestation in the Los Tuxtlas Biosphere Preserve," 55th Idaho Academy of Science Annual Meeting and Symposium/15th Intermountain Conference on the Environment Joint Meeting, Pocatello, Idaho, USA, March 21–23, 2013.
21. Choi, K., R. Reavis, D. Osterberg, B. Jaques, D. P. Butt, R. Mariani, D. Burkes, and Z. Munir, 2012, "Effect of Dysprosia Additive on the Consolidation of CeO2 by Spark Plasma Sintering," J. Am. Ceram. Soc., Vol. 95, No. 5, May 2012, pp. 1524–1529.
22. Cleaver, J., D. LaBrier, S. McCrory, K. Nelson, T. Smith, and M. L. Dunzik Gougar, 2013, "Characterization and Treatment of 14C on Irradiated Graphite Surfaces," Poster presented at DOE's VHTR 6th Annual Review meeting, Idaho Falls, Idaho, USA, May 2013, Poster presentation.
23. Cobos, C., M. Mendoza, E. León, M. Manic, and E. Herrera Viedma, 2013, "TopicSearch Personalized Web Clustering Engine Using Semantic Query Expansion, Memetic Algorithms and Intelligent Agents," Polibits, Vol. 47, January 2013, pp. 33–46.
24. Colpetzer, J., A. Tokuhiro, et al., 2013, "Modeling the Reduction in Carbon Dioxide Emissions Due to Replacement of Fossil Fuel Power Plants with Nuclear Power Plants," Western Energy Policy Research Conference, Portland, Oregon, USA, September 5–6, 2013.
25. Cooper, D. C., C. D. Palmer, R. W. Smith, and T. L. McLing, 2013, "Multicomponent Equilibrium Models for Testing Geothermometry Approaches," Proceedings, Thirty Eighth Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, USA, February 11 13, 2013, SGP TR 198.
26. Corradini, M., M. Anderson, D. Lisowski, T. Haskin, M. Muci, O. Omotowa, and A. Tokuhiro, 2013, "Influences of boil off on the behavior of a two phase natural circulation loop," Int. J. Multiphase Flow, submitted, pending final review.
27. Corradini, M., M. Anderson, Y. Hassan, D. Lisowski, O. Omotowa, and A. Tokuhiro, 2012, Experimental Studies of NGNP Reactor Cavity Cooling System with Water, NEUP 09 202, December 22, 2012.
28. Daoud, L., D. Zydek, and H. Selvaraj, 2014, "A Survey of High Level Synthesis Languages, Tools, and Compilers for Reconfigurable High Performance Computing," Proceedings of the 18th International Conference on Systems Science (ICSS 2013), Advances in Intelligent Systems and Computing, Vol. 240, Berlin: Springer Verlag, pp. 483 492.
29. Derr, K., and M. Manic, 2012, "Adaptive Control Parameters for Dispersal of Multi Agent Mobile Ad Hoc Network (MANET) Swarms," Industrial Informatics, IEEE Transactions on, Vol. PP, No. 99, November 21, 2012, doi:10.1109/TII.2012.2228870 (available through IEEE early access articles).
30. Derr, K., and M. Manic, 2013, "Wireless Sensor Network Configuration, Part I: Mesh Simplification for Centralized Algorithms," IEEE T. Ind. Inform., Vol. 9, No. 3, August 2013, pp. 1717–1227.
31. Derr, K., and M. Manic, 2013, "Wireless Sensor Network Configuration, Part II: Adaptive Coverage for Decentralized Algorithms," IEEE T. Ind. Inform., Vol. 9, No. 3, August 2013, pp. 1728–1738.
32. Dunzik Gougar, M. L., 2012, "Chemical Characterization and Removal of 14C from Irradiated Graphite," presented as member of the International Atomic Energy Agency's Coordinated Research Project (CRP) entitled "Treatment of Irradiated Graphite to Meet Acceptance Criteria for Waste Disposal," International Atomic Energy Agency, Vienna, Austria, December 3–7, 2012.

33. Dunzik Gougar, M. L., 2013, "Speciation of 14C in Irradiated Graphite," 14th International Nuclear Graphite Specialists' Meeting, Seattle, Washington, USA, September 19–20, 2013.

34. Dunzik Gougar, M. L., 2013, "The Nuclear Fuel Cycle" and "The March 2011 Earthquake and Tsunami in Japan: A Nuclear Perspective," invited presenter for National Teachers' Workshops conducted by American Nuclear Society, November 2012 and June 2013.

35. Dunzik Gougar, M. L., 2013, "Thermal Treatment of Irradiated Graphite to Remove Surface 14C," 14th International Nuclear Graphite Specialists' Meeting, Seattle, Washington, USA, September 19–20, 2013.

36. Dunzik Gougar, M. L., and J. Fachinger, 2012, "Chemical Characterization and Removal of 14C from Irradiated Graphite," 11th EPRI Decommissioning & Rad Waste Workshop, Rome, Italy, October 2012.

37. Dunzik Gougar, M. L., and P. Wilson, 2013, "The Nuclear Fuel Cycle: The Realities of Today and the Promises of the Future," Part 3 of 4 of American Nuclear Society Nuclear Technology Fundamentals Program for Federal Policymakers, a series of briefings for Congressional staffers on Capitol Hill, Washington D.C., USA, June 2013.

38. Dunzik Gougar, M. L., and T. E. Smith, 2013, "Removal of Carbon 14 from Irradiated Graphite," J. Nucl. Mater., accepted for publication September 2013.

39. Dunzik Gougar, M. L., C. Davison, and P. Caracappa, 2013, "The Basics of Radiation and Radioactivity," Part 1 of 4 of American Nuclear Society Nuclear Technology Fundamentals Program for Federal Policymakers, a series of briefings for Congressional staffers on Capitol Hill, Washington, D.C., USA, March 2013.

40. Dunzik Gougar, M. L., J. Cleaver, D. LaBrier, S. McCrory, and T. Smith, 2013, "Chemical Characterization and Removal of Carbon 14 from Irradiated Graphite II," Waste Management Conference (WM2013), Phoenix, Arizona, USA, February 24–28, 2013.

41. Fujita, Y., D. W. Reed, K. R. Nowak, V. S. Thompson, T. L. McLing, R. W. Smith, and D. C. Cooper, 2013, "Microbial Impacts on Geothermometry Temperature Predictions," Proceedings, Thirty Eighth Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, USA, February 11–13, 2013, SGP TR 198.

42. Gao, T. R., Y. Q. Wu, S. Fackler, I. Kierzewski, and Y. Zhang, 2013, "Combinatorial Exploration of Rare Earth Free Permanent Magnets: Magnetic and Microstructural Properties of Fe Co W Thin Films," Appl. Phys. Lett., Vol. 102, No. 2, January 14, 2013, doi:10.1063/1.4775581.

43. Gesell, T., 2013, "Potential Dose to Street Workers from Slag Particles in Fugitive Dust," John Horan Symposium, Salt Lake City, Utah, USA, April 2013.

44. Ghasemi, E., D. M. McEligot, K. P. Nolan, J. C. Crepeau, A. Tokuhiro, and R. S. Budwig, 2013, "Entropy Generation in a Transitional Boundary Layer Region under the Influence of Freestream Turbulence using Transitional RANS Models and DNS," Int. Comm. Heat Mass Transfer, Vol. 41, February 2013, pp. 10–16.

45. Giani, A., O. Linda, M. Manic, and M. McQueen, 2013, "Known Secure Sensor Measurements Concept and Its Application for Critical Infrastructure Systems," Optimization and Security Challenges in Smart Power Grids, (Ed: V. Pappu, M. Carvalho, P. Pardalos), Berlin: Springer Verlag, July 31, 2013, ISBN 978 3 642 38133 1.

46. Glazoff, M. V., R. Hiromoto, and A. Tokuhiro, "Morphological Analysis of Zirconium Nuclear Fuel Retaining Rods Braided with SiC: Quality Assurance and Defect Identification," J. Nucl. Mater., under review.

47. Glazoff, M. V., S. N. Rashkeev, A. Tokuhiro, and P. Sabharwall, 2013, "Oxidation and Hydrogen Uptake in Zirconium, Zircaloy 2, and Zircaloy 4: Computational Thermodynamics and Ab InitioCalculations," J. Nucl. Mater., accepted April 2013.

48. Hamdy, A. S., and D. P. Butt, 2013, "Corrosion Mitigation of Rare Earth Containing Magnesium EV31A T6 Alloy Via Chrome Free Conversion Coating Treatment," Electrochim. Acta, accepted 2013, in print.

49. Hamdy, A. S., and D. P. Butt, 2013, "Novel Smart Stannate Based Coatings of Self Healing Functionality for AZ91D Magnesium Alloys," Electrochim. Acta, accepted 2013, in print.

50. Harris, J., 2012, "International Nuclear Security Framework," Ensuring a Secure Nuclear Infrastructure in South Africa: A Workshop Towards Sustainable Education, Johannesburg, South Africa, December 3–7, 2012.

51. Harris, J., 2012, "Overview of International Nuclear Security Education Network (INSEN)," Ensuring a Secure Nuclear Infrastructure in South Africa: A Workshop Towards Sustainable Education, Johannesburg, South Africa, December 3–7, 2012.

52. Harris, J., 2013, "Information Security of Nuclear Systems," International Conference on Systems Science (ICSS 2013), Wroclaw, Poland, September 10–12, 2013.

53. Harris, J., 2013, "International Nuclear Security Education Network (INSEN): Past Accomplishments and Future Plans," International Conference on Nuclear Security: Enhancing Global Efforts, Vienna, Austria, July 1–5, 2013.

54. Harris, J., 2013, "International Nuclear Security Regime," 2013 International Safeguards Pre Inspector Training, Idaho Falls, Idaho, USA, April 30 – May 9, 2013.

55. Harris, J., 2013, "Introduction to Nuclear Security I," Introduction de la sécurité nucléaire dans les programmes d'enseignement des sciences nucléaires au Maroc, Fez, Morocco, May 28, 2013.

56. Harris, J., 2013, "Introduction to Nuclear Security II," Introduction de la sécurité nucléaire dans les programmes d'enseignement des sciences nucléaires au Maroc, Fez, Morocco, May 28, 2013.

57. Harris, J., 2013, "Nuclear Security at the State Level," Train the Trainers Workshop on Nuclear Security, University of Ibn Tofail Faculty of Sciences, Kenitra, Morocco, May 30–31, 2013.

58. Harris, J., 2013, "Nuclear Security Fundamentals / Nuclear Security Education," Train the Trainers Workshop on Nuclear Security, University of Ibn Tofail Faculty of Sciences, Kenitra, Morocco, May 30–31, 2013.

59. Harris, J., 2013, "Nuclear Threats from Non State Actors," Train the Trainers Workshop on Nuclear Security, University of Ibn Tofail Faculty of Sciences, Kenitra, Morocco, May 30–31, 2013.

60. Harris, J., 2013, "Unauthorized Acts Involving Nuclear and Other Radioactive Material," Train the Trainers Workshop on Nuclear Security, University of Ibn Tofail Faculty of Sciences, Kenitra, Morocco, May 30–31, 2013.

61. Harris, J., 2014, "Information Security of Nuclear Systems, Advances in Systems Science" Proceedings of the 18th International Conference on Systems Science (ICSS 2013), Advances in Intelligent Systems and Computing, Vol. 240, (Ed: J. Swiątek, A. Grzech, P. Swiątek, J. M. Tomczak), Berlin: Springer Verlag, p. 273.

62. Harris, J., C. Hobbs, and J. Sterba, 2013, "Course Material and Curriculum Development Activities of the International Nuclear Security Education Network (INSEN)," Institute of Nuclear Materials Management 54th Annual Meeting, Palm Desert, California, USA, July 14–18, 2013.

63. Harris, J., et al., 2013, "International Nuclear Security Education Network (INSEN): Past Accomplishments and Future Plans," American Nuclear Society Conference on Nuclear Training and Education 2013, Jacksonville, Florida, USA, February 3–6, 2013.

64. Hoover R., S. Phongikaroon, M. F. Simpson, "Zirconium and Uranium Electrochemistry in Molten LiCl KCl Eutectic System," 2012 International Workshop on Nuclear Pyroprocessing, Daejeon, Korea, December 2012.

65. Hoover R., M. Shaltry, S. Phongikaroon, S. Martin, K. Sridharan, M. Simpson, "Electrochemical Studies and Analysis of Uranium Chloride in Molten LiCl KCl Eutectic," 2013 TMS Conference, San Antonio, Texas, March 2013.

66. Hurley, M. F., B. M. Marx, K. N. Allahar, C. P. Smith, H. A. Chin, W. P. Ogden, and D. P. Butt, 2012, "Corrosion Assessment and Characterization of Aerospace Bearing Steels in Seawater and Ester Based Lubricants," Corrosion, Vol. 68, No. 7, July 2012, pp. 645–661.

67. Hurley, M. F., C. Olson, L. J. Ward, B. J. Jaques, K. Johnson, J. Gunnerson, and D. P. Butt, 2013, "Transgranular Stress Corrosion Cracking of 304L Stainless Steel Pipe Clamps in Direct Use Geothermal Water Heating Applications," Eng. Fail. Anal., Vol. 33, October 2013, pp. 336–346.

68. Jaison, S., D. S. Naidu, and D. Zydek, 2013, "Time Scale Analysis and Synthesis of Wind Energy Conversion Systems," 4th International Conference on Circuits, Systems, Control, Signals (CSCS 2013), Recent Advances in Electrical Engineering, World Scientific Engineering Academy and Society Press, pp. 21–26.

69. Jaques, B. J., D. D. Osterberg, M. F. Hurley, C. R. Cole, S. Tamrakar, and D. P. Butt, 2013, "In Situ Characterization of the Kinetics of Nitridation of Dysprosium During High Energy, Reactive Milling," J. Alloy. Compd., submitted 2013.

70. Jerred, N., L. Zirker, I. Charit, J. Burns, Y. Q. Wu, and J. Cole, 2012, "Pressure Resistance Welding of HT 9 End Plugs to Fast Reactor Oxide Dispersion Strengthened Cladding Tubes," The Nuclear Materials Conference 2012, Osaka, Japan, October 21–25, 2012.

71. Juchau, C., and D. Solan, 2013, "Employment Estimates in the Energy Sector: Concepts, Methods, and Results," Center for Advanced Energy Studies' Energy Policy Institute, March 1, 2013.

72. Kane, J., C. Karthik, R. Ubic, W. E. Windes, and D. P. Butt, 2013, "The Oxygen Surface Chemical Reaction with Polycrystalline Graphite," Carbon, Vol. 8, No. 59, 2013, pp. 49–64.

73. Kane, S., J. Carlisle, and M. Bowman, 2013, "Solar Energy Development and Land Use Preferences," Presentation, International Symposium on Society and Resource Management, Estes Park, Colorado, USA, June 4–8, 2013.

74. Karki, S., S. Kobs Nawotniak, and H. C. Bottenberg, 2013, "Estimating Geothermal Heat Flux in Yellowstone National Park using Multivariate Regression," 55th Idaho Academy of Science Annual Meeting and Symposium/15th Intermountain Conference on the Environment Joint Meeting, Pocatello, Idaho, USA, March 21–23, 2013.

75. Karki, S., S. Kobs Nawotniak, and H. C. Bottenberg, 2013, "Estimating Geothermal Heat Flux in Yellowstone National Park using Multivariate Regression," Intermountain GIS Conference, Boise, Idaho, USA, March 11–13, 2013.

76. Karthik, C., J. Kane, D. P. Butt, W. E. Windes, and R. Ubic, 2012, "Microstructural Characterization of Next Generation Nuclear Graphites," Microsc. Microanal., Vol. 18, No. 2, April 2012, pp. 272–278.

77. Kaur, M., Q. Dai, M. Bowden, M. H. Engelhard, Y. Wu, J. Tang, and Y. Qiang, 2013, "Watermelon Like Iron Nanoparticles: Cr Doping Effect on Magnetism and Magnetization Interaction Reversal," Nanoscale, Vol. 5, No. 17, 2013, pp. 7872–7881.

78. Khalaf, M., R. Brey, J. Harris, D. Derryberry, and G. Tabatadze, 2013, "Monte Carlo Simulation of In vivo Measurement of the Most Suitable Knee Position for the Optimal Measurement of Activity," Health Phys., Vol. 104, No. 4, April 2013, pp. 405–412.

79. Khamis, A., D. Zydek, G. Borowik, and D. S. Naidu, "Control System Design Based on Modern Embedded Systems," 14th International Conference on Computer Aided Systems Theory (EUROCAST 2013), Berlin: Springer Verlag, accepted.

80. Kobs Nawotniak, S. E., 2012, "Vucan on Volcanoes," Maptek Users Conference, Denver, Colorado, USA, October 24–26, 2012.

81. Kobs Nawotniak, S. E., and M. I. Bursik, 2013, "Effects of Complex Plume Morphology on Tephra Dispersion Modeling in ATHAM 3D," International Association of Volcanology and Chemistry of the Earth's Interior Meeting, Kagoshima, Japan, July 20–24, 2013.

82. Kobs Nawotniak, S. E., M. Bursik, A. Jayko, J. Deming, J. Pietraszek, P. Valley, and S. Karki, "Geology of the Mono Lake Islands, Mono County, California," USGS Open file report, in revision.

83. Kobs Nawotniak, S. E., M. Bursik, H. Graf, and M. Herzog, "Eulerian Lagrangian Pyroclast Deposition Modeling: Theory and Application in No wind Eruption Scenarios," J. Volcanol. Geoth. Res., in revision.

84. Koster, A., and S. E. Kobs Nawotniak, 2012, "Magmatic Evolution in the Los Tuxtlas Volcanic Field, Veracruz, Mexico," American Geophysical Union Fall Meeting, San Francisco, California, USA, December 3–7, 2012.

85. Krol, D., and D. Zydek, 2013, "Solving PDEs in Modern Multiphysics Simulation Software," Proceedings of 2013 IEEE International Conference on Electro/Information Technology (EIT 2013), Washington D.C.: IEEE Computer Society Press, pp. 1–6.

86. Krol, D., D. Zydek, and H. Selvaraj, 2014, "Matrix Multiplication in Multiphysics Systems Using CUDA," Proceedings of the 18th International Conference on Systems Science (ICSS 2013), Advances in Intelligent Systems and Computing, Vol. 240, (Ed: J. Swiątek, A. Grzech, P. Swiątek, J. M. Tomczak), Berlin: Springer Verlag, pp. 493 502.

87. Krol, D., D. Zydek, and L. Koszalka, 2013, "Problem Independent Approach to Multiprocessor Dependent Task Scheduling," International Journal of Electronics and Telecommunications, Vol. 58, No. 4, 2013, pp. 369–379.

88. Kucharzak, M., D. Zydek, and I. Pozniak Koszalka, 2013, "Overlay Multicast Optimization: IBM ILOG CPLEX," International Journal of Electronics and Telecommunications, Vol. 58, No. 4, 2013, pp. 381–388.

89. Kuiper, J., D. Ames, R. Lee, and T. Quinby, 2013, "Web Based Mapping Applications for Solar Energy Project Planning," Presentation, SOLAR 2013, Baltimore, Maryland, USA, April 16–20, 2013.

90. LaBrier, D., 2013 "Characterization of 14C in Neutron Irradiated Graphite," Idaho State University, August 2013, (Dissertation defense presentation).

91. LaBrier, D., and M. L. Dunzik Gougar, 2013, "Characterization of 14C in Neutron Irradiated Graphite I: NBG 25," J. Nucl. Mater., submitted for publication September 2013.

92. Linda, O., A. Giani, M. Manic, and M. McQueen, 2013, "Multi Criteria Based Staging of Optimal PMU Placement using Fuzzy Weighted Average," Proceedings of IEEE International Symposium on Industrial Electronics, Taiwan, Taipei, May 28–31, 2013.

93. Linda, O., and M. Manic, 2012, "General Type 2 Fuzzy C Means Algorithm for Uncertain Fuzzy Clustering," IEEE T. Fuzzy Syst., Vol. 20, No. 5, October 2012, pp. 883–897.

94. Linda, O., and M. Manic, 2012, "Monotone Centroid Flow Algorithm for Type Reduction of General Type 2 Fuzzy Sets," IEEE T. Fuzzy Syst., Vol. 20, No. 5, pp. 805–819, October 2012.

95. Lisowski, D. D., T. C. Haskin, A. Tokuhiro, M. H. Anderson, and M. L. Corradini, 2013, "A Study on the Behavior of an Asymmetrically Heated Reactor Cavity Cooling System with Water in Single Phase," Nucl. Technol., Vol. 183, No. 1, July 2013, pp. 75–87.

96. Lisowski, D., O. Omotowa, A. Tokuhiro, M. Anderson, and M. Corradini, 2013, "Power Investigations on the Two Phase Behavior and Instability in an Experimental Reactor Cavity Cooling System (RCCS) with Water," 15th International Topical Meeting on Nuclear Reactor Thermalhydraulics (NURETH 15), Pisa, Italy, May 12–15, 2013.

97. Liu, B., D. Zydek, H. Selvaraj, and L. Gewali, 2012, "Accelerating High Performance Computing Applications Using CPUs, GPUs, Hybrid CPU/GPU, and FPGAs," Proceedings of 2012 13th International Conference on Parallel and Distributed Computing, Applications and Technologies (PDCAT 2012), Washington D.C.: IEEE Computer Society Press, pp. 337–342.

98. Macmillan, W., R. Brey, and J. Harris, 2013, "Particle Size Characterization Of Aerosols Generated During Surface Contaminated Concrete Demolition," Health Phys., Vol. 104, No. 5, May 2013, pp. S83–S86.

99. Majkowska, A., D. Zydek, and L. Koszalka, 2013, "Task Allocation in Distributed Mesh Connected Machine Learning System: Simplified Busy List Algorithm with Q Learning Based Queuing," 8th International Conference on Computer Recognition Systems (CORES 2013), Advances in Intelligent Systems and Computing, Vol. 226, Berlin: Springer Verlag, pp. 763–772.

100. Maloy, S. A., R. S. Lillard, W. F. Sommer, D. P. Butt, F. D. Gac, G. J. Willcutt, and M. R. Louthan, 2012, "Material Loss Rate for Tungsten Irradiated with 800 MeV Protons," J. Nucl. Mater., Vol. 431, No. 1 3, 2012, pp. 140–146.

101. Manic, M., 2012, "Putting the Human Back into Building Energy Management Systems," Brew with the Crew Event, sponsored by INL, ICIS, Eastern Idaho IEEE Section, International Society of Automation, October 18, 2012.

102. Manic, M., 2013, "Fleet Fuel Efficiency," 3rd Idaho Research Symposium: Energy Connected, Center for Advanced Energy Studies, Idaho Falls, Idaho, USA, February 5–6, 2013.

103. Manic, M., 2013, "Virtual Emergency Channels," 3rd Idaho Research Symposium: Energy Connected, Center for Advanced Energy Studies, Idaho Falls, Idaho, USA, February 5–6, 2013.

104. McAnulty, M. J., G. P. Potirniche, and A. Tokuhiro, 2012, "The Application of an Internal State Variable Model to the Visco Plastic Behavior of Irradiated ASTM 304L Stainless Steel," Nucl. Eng. Des., Vol. 250, September 2012, pp. 1–7.

105. McCarty, K., and M. Manic, 2013, "A Fuzzy Framework with Modeling Language for Type 1 and Type 2 Application Development," Proceedings of IEEE 6th International Conference on Human System Interaction (IEEE HSI 2013), Gdansk, Poland, June 6–8, 2013.

106. McCreery, G. E., L. J. Tew, B. G. Williams, R. R. Schultz, and D. M. McEligot, 2013, "MHTGR Core Bypass Flow Patterns and Pressure Losses," 15th International Topical Meeting on Nuclear Reactor Thermalhydraulics (NURETH 15 146), Pisa, Italy, May 12–15, 2013.

107. McEligot, D. M., K. P. Nolan, and E. J. Walsh, 2012, "Von Karman Re visited," American Physical Society Fluid Dynamics Meeting, San Diego, California, USA, November 18–20, 2012, Vol. 57, No. 17, pp. 220 221.

108. McIntyre P., S. Assadi, K. Badgley, W. Baker, J. Comeaux, J. Gerity, J. Kellams, A. McInturff, N. Pogue, S. Phongikaroon, A. Sattarov, M. Simpson, E. Sooby, P. Tsvetkov, "Accelerator driven subcritical fission in molten salt core: Closing the nuclear fuel cycle for green nuclear energy," Application of Accelerators in Research and Industry," 1525, 636–642, 2013.

109. Mi, H., S. Mikael, D. P. Butt, T. Allen, K. Sridharan, and Z. Ma, 2013 "Monitoring the Oxidation of Nuclear Fuel Cladding Using Raman Spectroscopy," J. Nucl. Mater., submitted 2013.

110. Mitkova, M., M. Ailavajhala, D. P. Butt, H. Barnaby, Y. Gonzalez Velo, and C. Poweleit, 2013, "Investigation of the Structure and Performance of CMOS Compatible Lateral Radiation Sensors using Thin Film Chalcogenide Glasses," Can. J. Phys., submitted 2013.

111. Mitkova, M., M. S. Ailavajhala, Y. Gonzalez Velo, C. D. Poweleit, H. J. Barnaby, M. N. Kozicki, and D. P. Butt, 2013, "New Functionality of Chalcogenide Glasses for Radiation Sensing of Nuclear Waste," Sci. Total Environ., submitted 2013.

112. Mitkova, M., P. Chen, M. Ailavajhala, D. P. Butt, D. Tenne, H. Barnaby, and I. S. Esqueda, 2013, "Gamma Ray Induced Structural Effects in Ge S Bare and Ag Doped Thin Films for Sensor Applications," J. Non Cryst. Solids, accepted for publication 2013, in print.

113. Munoz, B., S. Raoux, J. Jordan Sweet, and D. P. Butt, 2013, "A Combinatorial Analysis of Several Phase Change Alloys Via Laser Induced Transformations for Non Volatile Memory Applications," J. Appl. Phys., submitted 2013.

114. Munoz, B., S. Raoux, J. Jordan Sweet, and D. P. Butt, 2013, "Crystallization Characteristics of Thermally Induced Phase Transformations of Chalcogenide Alloys for Non Volatile Memory Applications," J. Appl. Phys., submitted 2013.

115. Nielsen, J. W., A. Tokuhiro, and R. Hiromoto, 2013, "LENDIT Metrics for Risk Quantification in Dynamic Probabilistic Risk Assessment," American Nuclear Society Winter Meeting, Washington D.C., USA, November 10–14, 2013.

116. Nielsen, J. W., A. Tokuhiro, and R. Hiromoto, 2013, "LENDIT Metrics for Risk Quantification in Dynamic Probabilistic Risk Assessment," PSAM 2013, Tokyo, Japan, April 15–19, 2013.

117. Nielsen, J., A. Tokuhiro, and R. Hiromoto, 2013, "Branch and Bound Algorithm Applied to Discrete Dynamic Event Trees," Transactions of the American Nuclear Society, 2013 Winter Meeting, Washington D.C., USA, November 10–14, 2013.

118. Nielsen, J., A. Tokuhiro, and R. Hiromoto, 2013, "Method to Branch and Bound Large SBO State Spaces under Dynamic Probabilistic Risk Assessment via Use of LENDIT Scales and S2R2 Sets," Probabilistic Safety Assessment and Management Conference, Tokyo, Japan, April 15–18, 2013.

119. Nielsen, J., R. Hiromoto, A. Tokuhiro, and J. Khatry, 2013, "Method to Branch and Bound Large SBO State Spaces under Dynamic Probabilistic Risk Assessment via use of LENDIT Scales and S2R2 Sets," J. Nucl. Sci. Technol., submitted September 2013.

120. Osterberg, D., J. Youngsman, F. Ubic, I. Reimanis, and D. P. Butt, 2013, "Recrystallization Kinetics of 3C Silicon Carbide Implanted with 400 keV Cesium Ions," J. Am. Ceram. Soc., accepted for publication 2013, in print.

121. Ostrom, L. T., C. A. Wilhelmsen, and R. L. Scott, 2012, "Use of Three Dimensional Imaging to Perform Aircraft Composite Inspection: Proof of Concept," Presented at the IEEE Human System Interaction Conference, Perth, Australia, June 6–8, 2012.

122. Ostrom, L. T., C. A. Wilhelmsen, and R. L. Scott, 2013, "Development of a Risk Assessment Framework," Airlines for America NDT Symposium, Indianapolis, Indiana, USA, September 23 26, 2013.

123. Ostrom, L. T., C. A. Wilhelmsen, L. Scott, E. Whiting, and S. Grover, 2012, "Use of Three Dimensional Imaging Technology to Support Visual Inspection of Composite Materials," Airlines for America NDT Symposium, Seattle, Washington, USA, September 25–28, 2012.

124. Owen, L. D., T. Xing, D. M. McEligot, J. C. Crepeau, and R. S. Budwig, 2013, "Laminar and Transitional Boundary Layer Entropy Generation over a Flat Plate under Favorable and Adverse Pressure Gradients," ASME Fluids Engineering Meeting, Incline Village, Nevada, USA, July 7–11, 2013, Paper No. FEDSN2013 16314.

125. Pasebani, S., I. Charit, D. P. Butt, and J. I. Cole, 2013, "A Preliminary Study on the Development of La2O3 Bearing Nanostructured Ferritic Steels via High Energy Ball Milling," J. Nucl. Mater., Vol. 434, No. 1 3, March 2013, pp. 282–286.

126. Pasebani, S., I. Charit, D. P. Butt, J. I. Cole, Y. Q. Wu, and J. Burns, 2013, "On the Densification Behavior of a Lanthana Bearing Nanostructured Ferritic Steel Processed Via Spark Plasma Sintering," Acta Mater., submitted 2013.

127. Pasebani, S., I. Charit, Y. Q. Wu, D. P. Butt, and J. I. Cole, 2013, "Mechanical Alloying of Lanthana bearing Nanostructured Ferritic Steels," Acta Mater., Vol. 61, No. 15, September 2013, pp. 5605–5617.

128. Pasebani, S., I. Charit, Y. Q. Wu, J. Burns, J. I. Cole, and D. P. Butt, 2013, "C Spark Plasma Sintering of Lanthana Bearing Nanostructured Ferritic Steels," Microstructure and Microanalysis 2013, Indianapolis, Indiana, USA, August 4–8, 2013.

129. Pasebani, S., I. Charit, Y. Q. Wu, J. Burns, K. N. Allahar, D. P. Butt, and J. I. Cole., 2013, "Processing of a Novel Nanostructured Ferritic Steel via Spark Plasma Sintering and Investigation of its Mechanical and Microstructural Characteristics," full paper submitted to International Workshop on Structural Materials for Innovative Nuclear Systems, Idaho Falls, Idaho, USA, October 7–10, 2013.

130. Phongikaroon, S., "Progress in Pyroprocessing Research from Idaho National Laboratory to the Center for Advanced Energy Studies," 2012 International Workshop on Nuclear Pyroprocessing, Daejeon, Korea, December 2012.

131. Phongikaroon S., R. W. Bezzant, M. F. Simpson, "Measurements and analysis of oxygen bubble Distributions in LiCl KCl molten salt," Chemical Engineering Research and Design, 91, 418–425, 2013.

132. Phongikaroon S., "The U.S. Pyrochemical Research—University and National Laboratory Collaboration," Physics Departmental Seminar, Texas A&M University, Texas, March 2013.

133. Phongikaroon S., "Pyrochemical Technology—A Novel Reprocessing Method in Nuclear Fuel Cycle R&D," Invited Seminar—Nuclear Engineering Program, University of Utah, Salt Lake City, Utah, April 2013.

134. Phongikaroon S., "Pyrochemical Technology—A Novel Alternative Separation for the U.S. and International Nuclear Fuel Cycle," Invited Seminar—Department of Mechanical and Nuclear Engineering, Virginia Commonwealth University, Richmond, Virginia, June 2013.

135. Pollyea, R. M., and J. P. Fairley, 2012, "Experimental Evaluation of Terrestrial LiDAR based Surface Roughness Estimates," Geosphere, Vol. 8, No. 1, February 2012, pp. 222–228.

136. Pollyea, R. P., J. P. Fairley, R. K. Podgorney, and T. L. McLing, "Physical Constraints on Geologic CO2 Sequestration in Low volume Basalt Formations," Geol. Soc. Am. Bull., in press.

137. Pollyea, R., and J. P. Fairley, 2012, "Implications of Reservoir Uncertainty for CO2 Sequestration in the East Snake River Plain, Idaho (USA)," Hydrogeology J., Vol. 20, No. 4, June 2012, pp. 689–699.

138. Pollyea, R., J. P. Fairley, R. K. Podgorney, and T. L. McLing, 2013, "A Field Sampling Strategy for Semivariogram Inference in Rock Outcrops," Stoch. Env. Res. Risk A., Vol. 27, No. 7, October 2013, pp. 1735–1740.

139. Prabhakaran, R., J. Burns, J. Cole, Y. Q. Wu, B. Miller, I. Charit, R. Mishra, and K. Murty, 2013, "Irradiation Studies on Friction Stir Welded ODS Alloys," 142nd Annual TMS Meeting & Exhibition (TMS 2013), San Antonio, Texas, USA, March 3–7, 2013.

140. Price, P., E. Rabenberg, S. Misture, and D. P. Butt, 2013, "Phase Transformations in Lanthanum Calcium Orthoferrites," J. Am. Ceram. Soc., submitted 2013.

141. Pushpa, R., B. Ramanujam, T. Bui, and M. Frary, 2013, "Energetics of Cs in Σ3 grain boundary of 3C SiC," J. Nucl. Mater., submitted 2013.

142. Rabenberg, E. M., K. Knori, B. J. Jaques, B. H. Spencer, F. A. Garner, P. D. Freyer, and D. P. Butt, 2013, "Influence of Irradiation Damage and Temperature on the Strength of 304SS," J. Nucl. Mater., submitted 2013.

143. Radhamani, A. V., C. Karthik, R. Ubic, M. S. Ramachandra Rao, and C. Sudakar, 2013, "Suppression of FeLi Antisite Defects in Fluorine Doped LiFePO4," Scripta Mater., Vol. 69, No. 1, July 2013, pp. 96–99.

144. Rashkeev, S. N., M. V. Glazoff, and A. Tokuhiro, 2013, "Ultra High Temperature Steam Corrosion of Complex Silicates for Nuclear Applications: A Computational Study," J. Nucl. Mater., accepted May 2013.

145. Ravishankar, U., and M. Manic, 2012, "Iterative Learning Heuristic Dynamic Programming (ILHDP) design of a Steam Power Plant Controller," Proceedings of the 38th Annual Conference of the IEEE Industrial Electronics Society (IEEE IECON 2012), Montreal, Canada, October 25 28, 2012.

146. Ravishankar, U., M. Manic, and C. Rieger, 2013, "A Micro Grid Simulator Tool (SGridSim) using Effective Node to Node Complex Impedance (EN2NCI) Models," Proceedings of the IEEE Symposium on Resilience Control Systems (ISRCS 2013), San Francisco, California, USA, August 13–15, 2013.

147. Rehill, B., E. J. Walsh, P. Schlatter, L. Brandt, T. Zaki, and D. M. McEligot, 2013, "Identifying Turbulent Spots in Transitional Boundary Layers," J. Turbomach., Vol. 135, No. 1, January 2013, doi:10.1115/1.4006395.

148. Rostamian, M., G. Johnson, M. Hiruta, G. Potirniche, J. J. Cogliati, A. M. Ougouag, and A. Tokuhiro, 2013, "Computational and Experimental Prediction of Dust Production in Pebble Bed Reactors, Part I," Nuclear Engineering & Design, Vol. 263, October 2013, pp. 500–508.

149. Rostamian, M., G. Johnson, M. Hiruta, G. Potirniche, L. Franzel, M. Bertino, and A. Tokuhiro, 2013, "Computational and Experimental Prediction of Dust Production in Pebble Bed Reactors, Part II," Nuclear Engineering & Design, Vol. 263, October 2013, pp. 509–514.

150. Routson, D., J. Ferguson, J. Crepeau, D. McEligot, and R. Budwig, 2013, "Reynolds Averaged Navier Stokes Models Compared to Direct Numerical Simulations in an Adverse Pressure Gradient Boundary Layer over a Flat Plate," ASME Fluids Engineering Meeting, Incline Village, Nevada, USA, July 7–11, 2013, Paper No. FEDSN2013 16554.

151. Shaltry, M., S. Phongikaroon, M. F. Simpson, "Ion exchange kinetics of fission products between molten salt and zeolite A," Microporous and Mesoporous Materials, 2012, 152:185–189.

152. Shawky, A., D. Zydek, Y. Z. Elhalwagy, and A. Ordys, 2013, "Modeling and Nonlinear Control of a Flexible Link Manipulator," Applied Mathematical Modelling, available online May 30, 2013, doi:10.1016/j.apm.2013.05.003.

153. Silver, I., B. G. Williams, R. R. Schultz, D. M. McEligot, and G. E. McCreery, 2012, "Scaling Analysis for the use of Air in place of Helium for a Heated Flow Experiment," ASME Summer Heat Transfer Conference, Puerto Rico, USA, July 8–2012, Paper No. HT2012 58302.

154. Simpson, M. F., T. S. Yoo, D. LaBrier, M. Lineberry, M. Shaltry, S. Phongikaroon, "Selective reduction of active metal chlorides from molten LiCl KCl using lithium drawdown," Nuclear Engineering and Technology, 2012, 44(7):767–772.

155. Simpson M., G. Fredrickson, B. Serrano Rodriguez, N. Gese, S. Phongikaroon, K. Allahar, "Sensor Technology for Real Time Monitoring of Molten Salt Electrolyte During Nuclear Fuel Electrorefining," 2013 TMS Conference, San Antonio, TX, March 2013.

156. Skifton, R., R. S. Budwig, D. M. McEligot, and J. C. Crepeau, 2013, "Measurement of Entropy Generation within Bypass Transitional Flow," To be presented at American Physical Society Fluid Dynamics Meeting, Pittsburgh, Pennsylvania, USA, November 24–26, 2013, Vol. 58, in press.

157. Skifton, R., R. S. Budwig, D. M. McEligot, and J. C. Crepeau, 2012, "Measurement of Entropy Generation within Bypass Transitional Flow," American Physical Society Fluid Dynamics Meeting, San Diego, California, USA, November 18–20, 2012, Vol. 57, No. 17, p. 452.

158. Smith, T. E., 2012, Removal of 14C from Irradiated Graphite for Waste Volume Reduction and Bulk Graphite Recycle: Thermal Treatment, MS thesis in Nuclear Science and Engineering: Idaho State University, December 2012.

159. Smith, T. E., S. McCrory, and M. L. Dunzik Gougar, 2013, "Limited Oxidation of Irradiated Graphite Waste to Remove Surface Carbon 14," Nucl. Eng. Technol., Vol. 45, No. 2, April 2013, pp. 211–218.

160. Solan, D., 2012, "Development of an Open Source GIS Utility Scale Siting Tool," Presentation at the Edison Electric Institute's & National Rural Electric Cooperative Association's Utility Siting Workshop, Madison, Wisconsin, USA, October 2012.

161. Solan, D., 2012, "From Federal Preemption Politics to Regional Transmission Planning and Policy Integration." The Electricity Journal, 25(9), 25 36.

162. Solan, D., 2012, "Input Output Analysis and Economic models for Small Modular Reactors: Model Construction, Development Options and Future Considerations," Center for Advanced Energy Studies' Energy Policy Institute White paper presented at the consultancy meeting on Methods for Economic Impacts Assessment of a Nuclear Power Plant Programme, Vienna, Austria, December 2012.

163. Sooby E., M. Adams, A. Baty, J. Gerity, P. McIntyre, K. Melconian, S. Phongikaroon, N. Pogue, A. Sattarov, M. Simpson, P. Tripathy, P. Tsevkov, 2013, "Molten salt considerations for accelerator driven subcritical fission to close the nuclear fuel cycle.," Application of Accelerators in Research and Industry, 1525, 230–235.

164. Thompson, N., B. Becker, J. Thompson, D. Beller, S. Bowyer, A. Gavron, G. Imel, and Y. Danon, 2011, "Non Destractive Assay of 235U and 239Pu Using a Lead Slowing Down Spectrometer," Transactions of the American Nuclear Society, Washington, D.C., USA, October 30–November 3, 2011, Vol. 105.

165. Tokuhiro, A., "Applied Biometrics R&D and Technology with Applications in Nuclear Security," World Institute of Nuclear Security Workshop, Abuja, Nigeria, September 5–6.

166. Tokuhiro, A., 2012, "The Post Fukushima World – Lessons Learned, Energy Resources and Security," Malcolm M. Renfrew Interdisciplinary Colloquium, Moscow, Idaho, USA, October 9, 2012.

167. Tokuhiro, A., 2013, "Supply Chain Management in the Global Market; Bridging the Divide between Vendor, Utility and Supplier," Nuclear Exchange, Shanghai Suzhou, China, September 11–12, 2013.

168. Tokuhiro, A., M. Bertino, and M. Hackett, 2012, "Technical and Non Technical Lessons Learned from the Fukushima Nuclear Plant Accident," MRS 2012 Fall Meeting and Symposium Scientific Basis for Nuclear Waste Management XXXVI, Boston, Massachusetts, USA, November 26–30, 2012.

169. Tokuhiro, T., J. W. Carey, R. M. Reed, S. S. Akella, and A. Tokuhiro, 2012, "Selective capture and encapsulation of metallic cations by hydrogels consisting of copoly(N isopropylacrylamide/functional monomer) networks," Southern Brazilian J. Chem., to appear December 2012.

170. Unruh, T., J. Rempe, D. Nigg, P. Hart, G. Imel, J. Harris, and E. Bonebrake, 2010, "Flux Sensor Evaluations at the ATR Critical Facility," 7th International Topical Meeting on Nuclear Plant Instrumentation, Control, and Human Machine Interface Technologies (NPIC&HMIT 2010), Las Vegas, Nevada, USA, November 7–11, 2010.

171. van Rooyen, I. J, P. M. van Rooyen, and M. L. Dunzik Gougar, 2013, "The Effect of High Temperature Annealing on the Grain Characteristics of a Thin Chemical Vapor Deposition Silicon Carbide Layer," Microscopy & Microanalysis Conference, Indianapolis, Indiana, USA, August 4 8, 2013.

172. van Rooyen, I. J., M. L. Dunzik Gougar, and P. M. van Rooyen, 2012, "Silver (Ag) Transport Mechanisms in TRISO Coated Particles: A Critical Review," 6th International Topical Meeting on High Temperature Reactor Technology (HTR2012), Tokyo, Japan, October 28 – November 1, 2012.

173. van Rooyen, I. J., M. L. Dunzik Gougar, and P. van Rooyen, 2013, "The Application of EBSD measurements to determine the effect of Grain Characteristics on Mechanical Properties on thin CVD SiC Layers," ATR NSUF User's Week 2013, Idaho Falls, Idaho, USA, June 10–14, 2013.

174. van Rooyen, I. J., M. L. Dunzik Gougar, P. M. van Rooyen, and T. Trowbridge, 2012, "On Techniques to Characterize and Correlate Grain Size, Grain Boundary Orientation and the Strength of the SiC Layer of TRISO Coated Particles: A Preliminary Study," 6th International Topical Meeting on High Temperature Reactor Technology (HTR2012), Tokyo, Japan, October 28 – November 1, 2012.

175. van Rooyen, I. J., T. M. Lillo, and Y. Q. Wu, 2013, "Identification of Silver and Palladium in Irradiated TRISO Coated Particles of the AGR 1 Experiment," J. Nucl. Mater., accepted for publication 2013.

176. van Rooyen, I. J., Y. Q. Wu, T. M. Lillo, T. L. Trowbridge, J. M. Madden, and D. Goran, 2013, "Advanced Electron Microscopic Techniques Applied to The Characterization of Irradiation Effects And Fission Product Identification of Irradiated Triso Coated Particles From The Agr 1 Experiment.," GLOBAL 2013: International Nuclear Fuel Cycle Conference, Salt Lake City, Utah, USA, September 29–October 3, 2013.

177. Veluppillai, T., B. Ortiz, and R. E. Hiromoto, 2013, "A Big Data File Transfer Tool for Tablet Class Machines," IEEE International Workshop on Intelligent Data Acquisition and Advanced Computing Systems: Technology and Applications, Berlin, Germany, September 12–14, 2013.

178. Vollmer, T., and M. Manic, 2013, "Autonomic Intelligent Cyber Sensor to Support Industrial Control Network Awareness," IEEE Transaction on Industry Informatics, accepted for publication May 2013.

179. Vollmer, T., and M. Manic, 2013, "Cyber Physical System Security with Deceptive Virtual Hosts for Industrial Control Networks," IEEE Transaction on Industry Informatics, in the minor revision stage August 2013.

180. Webb, J. A., J. Perkins, I. Charit, M. Frary, M. Carroll, and D. P. Butt, 2013, "Microstructural Evolution and Sintering Kinetics of Tungsten Particles During Pulsed Electric Current Sintering," Acta Metall., submitted 2013.

181. Wijayasekara, D., and M. Manic, 2013, "Human Machine Interaction via Brain Activity Monitoring," Proceedings of IEEE 6th International Conference on Human System Interaction (IEEE HSI 2013), Gdansk, Poland, June 6–8, 2013, Best paper in the area of Fuzzy Systems.

182. Wijayasekara, D., M. Manic, and C. Rieger, 2013, "Fuzzy Linguistic Knowledge Based Behavior Extraction for Building Energy Management Systems," Proceedings of IEEE Symposium on Resilience Control Systems (ISRCS 2013), San Francisco, California, USA, August 13–15, 2013.

183. Wijayasekara, D., M. Manic, and M. McQueen, 2013, "Information Gain Based Dimensionality Selection for Classifying Text Documents," Proceedings of IEEE Congress on Evolutionary Computation (IEEE CEC 2013), Cancun, Mexico, June 20–23, 2013.

184. Wijayasekara, D., O. Linda, and M. Manic, 2013, "Shadowed Type 2 Fuzzy Logic Systems," Proceedings of IEEE Symposium Series on Computational Intelligence (IEEE SSCI 2013), Singapore, April 16–19, 2013, Best paper in the area of Fuzzy Systems.

185. Williams, A., S. Phongikaroon, M. F. Simpson, "Separation of CsCl from a ternary CsCl LiCl KCl salt via a melt crystallization technique for pyroprocessing waste minimization," Chemical Engineering Science, 2013, 89: 258–263.

186. Wu, Y. Q., K. N. Allahar, J. Burns, B. Jaques, I. Charit, D. P. Butt, and J. I. Cole, 2013, "Fe Cr Mo Based ODS Alloys via Spark Plasma Sintering: A Combinational Characterization Study by TEM and APT," Cryst. Res. Technol., August 19, 2013, doi:10.1002/crat.201300173.

187. Wu, Y. Q., K. N. Allahar, J. Burns, B. Jaques, I. Charit, D. P. Butt, and J. Cole, 2013, "Combinational TEM and APT Characterization of ODS Alloys by SPS," 142nd Annual TMS Meeting & Exhibition (TMS 2013), San Antonio, Texas, USA, March 3–7, 2013.

188. Wu, Y. Q., K. N. Allahar, J. Burns, B. Jaques, I. Charit, D. P. Butt, and J. I. Cole, 2013, "Characterization of ODS alloys by SPS A Combinational TEM and APT Study," Advances in Structural and Chemical Imaging (ASCI) 2013, Eugene, Oregon, USA, May 29–30, 2013.

189. Wu, Y. Q., K. N. Allahar, J. Burns, B. Jaques, I. Charit, D. P. Butt, and J. I. Cole, 2013, "Characterization of ODS Alloys by SPS: A Combinatorial TEM and APT Study," Crystal Research Technology, submitted 2013.

190. Yin, Y., 2013, "An Analysis of Empirical Cases of Community Wind in Oregon," Renew. Sust. Energ. Rev., Vol. 17, January 2013, pp. 54–73.

191. Yu, X., O. Kaynak, and M. Manic, 2012, "Special Section on Soft Computing in Industrial Informatics," IEEE T. Ind. Inform., Vol. 8, No. 4, November 2012, pp.731–732.

192. Zydek, D., G. Chmaj, and S. Chiu, 2013, "Modeling Computational Limitations in H Phy and Overlay NoC Architectures," J. Supercomput., 2013, doi:10.1007/s11227 013 0932 9.

188. Wu, Y. Q., K. N. Allahar, J. Burns, B. Jaques, I. Charit, D. P. Butt, and J. I. Cole, 2013, "Characterization of ODS alloys by SPS A Combinational TEM and APT Study," Advances in Structural and Chemical Imaging (ASCI) 2013, Eugene, Oregon, USA, May 29–30, 2013.

189. Wu, Y. Q., K. N. Allahar, J. Burns, B. Jaques, I. Charit, D. P. Butt, and J. I. Cole, 2013, "Characterization of ODS Alloys by SPS: A Combinatorial TEM and APT Study," Crystal Research Technology, submitted 2013.

190. Yin, Y., 2013, "An Analysis of Empirical Cases of Community Wind in Oregon," Renew. Sust. Energ. Rev., Vol. 17, January 2013, pp. 54–73.

191. Yu, X., O. Kaynak, and M. Manic, 2012, "Special Section on Soft Computing in Industrial Informatics," IEEE T. Ind. Inform., Vol. 8, No. 4, November 2012, pp.731–732.

192. Zydek, D., G. Chmaj, and S. Chiu, 2013, "Modeling Computational Limitations in H Phy and Overlay NoC Architectures," J. Supercomput., 2013, doi:10.1007/s11227 013 0932 9.

CENTER FOR ADVANCED ENERGY STUDIES
995 UNIVERSITY BOULEVARD
IDAHO FALLS, ID 83401

WWW.CAESENERGY.ORG

THE CAES FACILITY IS HOME TO A RENEWABLE ENERGY TEST BED, WHICH CONTAINS FIXED AND TRACKING SOLAR PANELS, AN ADVANCED METERING SYSTEM AND TWO SINGLE-AXIS WIND TURBINES.

CAES
Center for Advanced Energy Studies

13-50328