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Nuclear Energy Student & Postdoctoral Opportunities

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Nuclear Engineering Student Outreach

NE Student Outreach

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Activities in 2014

2014 NE Summer Intern Seminar Series

These seminars provide a taste of some of the Division's important work to address global problems such as proliferation of nuclear materials, spent fuel disposition (called "waste" in current public discourse) and developing a sustainable energy system. Students from other divisions are invited to attend.
Target Audience: Summer Students in NE or other Argonne Divisions.

DOWNLOAD: 2014 NE Summer Intern Seminar Series [134.92 KB, last mod.: June 02 2014, 14:50]

Welcome to NE and Intern Orientation

Tom Ewing, Associate Director, Nuclear Engineering Division
May 29, 2014, 02:00pm, location: Bldg. 203 Room D120

Seminar Abstract:

Thomas F. Ewing, Associate Director of the NE Division, will welcome NE summer interns and provide a short overview of activities in the NE Division. Afterwards, the Student Outreach Committee will discuss planned intern activities and introduce pertinent Division employees.

Print abstract
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Sodium-cooled Fast Reactor – Past and Future

Taek K. Kim, Principal Nuclear Engineer and Section Manager, Reactor & Fuel Cycle Analysis Section
June 4, 2014, 10:30am, location: Guest House Restaurant
SOCIALIZE: This seminar will be immediately followed by lunch for NE students, postdocs and supervisors/managers!

Seminar Abstract:

Since the first electricity from nuclear energy was obtained at Experimental Breeder Reactor I (EBR-I) on December 20, 1951, we have dreamed of a sustainable nuclear fuel cycle for the ideal use of nuclear energy resources and the Sodium-cooled Fast Reactor (SFR) technology has been at the center of that dream. The United States has designed, built, and operated fast reactors (mostly SFRs) from EBR-I up until the Fast Flux Test Facility (FFTF) and Experimental Breeder Reactor II (EBR-II) were permanently shut down and the IFR program was canceled in 1994. Worldwide, SFR technologies have logged more than 400 operating-years, and many countries (China, India, Russia, Japan, France, Korea, and even the U.S.) have very active plans for SFR deployment in the near future. In this seminar, the history of SFR development will be discussed, including the critical turning points of nuclear system development in the United States and the reasoning

behind the recent refocus on SFR technology.

Print abstract
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Fast Reactor Physics

Florent Heidet, Nuclear Engineer,Nuclear Systems Analysis Department
June 10, 2014, 10:00am, location: Bldg. 203, Room D120

Seminar Abstract:

How fast reactor physics differs from thermal reactor physics, and how the fast spectrum allows pursuit of various strategic objectives, e.g., resource extension, actinide burnup in lieu of disposal, weapons material disposition.

Print abstract
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Early Career Seminar: Project Management, Risk Management and Policy in the R&D World: Example of the GTRI-Convert Program

Natalia Saraeva, Nuclear Engineer, Technical Integration Section
June 17, 2014, 10:00am, location: Bldg. 203 Auditorium

Seminar Abstract:

The National Nuclear Security Administration (NNSA)'s Global Threat Reduction Initiative Reactor Conversion Program (GTRI-Convert) supports minimization of highly enriched uranium (HEU) use in the world by converting research and test reactors as well as isotope production facilities from HEU to low enriched uranium (LEU). The program is a continuation and expansion of the Reduced Enrichment for Research and Test Reactors (RERTR) program that was established by DOE in 1978. Argonne has successfully led the technology development for conversion of these reactors since the very beginning of the program - 1978. On behalf of DOE's NNSA, Argonne is responsible for both technical details and project support of GTRI-Convert. In those roles, Argonne is required to conduct formal project management and risk management activities and to report to NNSA on conversion progress.

Why are project management and risk management required and what do they entail? This presentation will answer these questions using the example of GRTI-Convert – a complex, multinational and multi-institutional program. The presentation will also demonstrate how R&D, project management and policies are interconnected and interdependent. The increasing importance of this interdependency in today's world will be highlighted.

Print abstract
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Nuclear Weapons Proliferation: How It Happened

Kirsten Laurin-Kovitz, Manager, Technical Nonproliferation Policy Support Section
June 24, 2014, 10:00am, location: Bldg. 203 Auditorium

Seminar Abstract:

Proliferation threat and response: Coevolution of proliferation and nonproliferation.

Print abstract
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News piece on how proliferators want indigenous capabilities to create WMD: "Made in the USA" in Iran from CBS

Used Nuclear Fuel Management in the U.S.

Mark Nutt, Principal Nuclear Engineer, Innovative Systems & Engineering Assessments Section
July 1, 2014, 10:00am, location: Bldg. 203, Room D120

Seminar Abstract:

The seminar will provide a brief history of nuclear waste management in the U.S. since the inception of nuclear power through the present. The impacts of the decision to no longer pursue development of the Yucca Mountain geologic repository will be discussed. The recommendations made by the Blue Ribbon Commission for Americas Nuclear Future will be summarized and the U.S. Department of Energy's (DOE) strategy for managing used nuclear fuel going forward will be presented. On-going activities in the DOE's Used Fuel Disposition Research and Development Campaign and Nuclear Fuel Storage and Transportation Planning Project will be described.

Print abstract

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See also: Waste Management Systems Analysis - NE website

RAP'ping at Fukushima: Argonne's Role in Radiation Monitoring

Frank Moore, RAP Scientist/ Equipment Coordinator

July 8, 2014, 10:00am, location: Bldg. 203 Auditorium

Seminar Abstract:

Following a magnitude 9 earthquake and 14-meter tsunami on March 11, 2011, the Fukushima Dai-ichi nuclear power plant in Japan suffered a major loss-of-coolant accident and large quantities of radioactive materials were released to the environment. Within 3 days of the earthquake, the White House directed the Department of Energy to deploy a team to Japan to provide radiological monitoring support to the Department of Defense, Department of State, and the Government of Japan. This team consisted of personnel and equipment from DOE-NNSA, the Remote Sensing Laboratories in Las Vegas and Washington DC, and several RAP Regions, including four team members from Argonne. This talk will give an overview of the accident and description of the DOE assets and capabilities called upon to respond. Some first-hand experiences of radiological monitoring in Japan will be discussed and some monitoring results will be presented.

Print abstract

Download Seminar Viewgraphs [not available yet]

Light Water Reactor Severe Accident Analysis and Experimentation at Argonne

Mitch Farmer, Manager, Engineering Development Labs

July 15, 2014, 10:00am, location: Bldg. 203, Room D120

Seminar Abstract:

The 2011 earthquake and Tsunami in Japan initiated severe accidents at several of the reactors at the Fukushima Dai-ichi nuclear complex. These accidents have led to a resurgence of interest in Light Water Reactor (LWR) severe accident phenomenology. This presentation will provide an historical overview of this research and discuss some of the basic physics involved with severe accidents, as well as phenomenological models that have been developed to describe the progression. The presentation will also include a general discussion about the application of the LWR severe accident knowledge base to events at Fukushima.

Print abstract

Download Seminar Viewgraphs: [Not available yet]

Early Career Seminar: High Performance Neutronics Simulations at Argonne National Laboratory

Emily Shemon, Nuclear Engineer, Neutronics Methods & Codes Section

July 22, 2014, 10:00am, location: Bldg. 203 Auditorium

Seminar Abstract:

During the past few years, the Neutronics Methods and Codes group in the Nuclear Engineering Division has

researched and developed high performance neutronics tools that take advantage of massively parallel systems such as Argonne's Leadership Computing Facility (ALCF). The resulting toolset includes the second order discrete ordinates code, PROTEUS-SN, which has been used to analyze several problems. In this talk, Emily will introduce the supercomputing resources for which the high performance neutronics codes were tailored, introduce the PROTEUS-SN code, and show an analysis example performed with PROTEUS-SN on the ALCF supercomputer.

Print abstract

Download Seminar Viewgraphs [not available yet]

Mindboggling Science: The Leidenfrost Edition

Craig Gerardi, Nuclear Engineer,
Engineering Development & Applications Department
July 29, 2014, 10:30am, location: Bldg. 203, Room D120
Lunch provided immediately following seminar.

Seminar Abstract:

Water flows uphill? Liquid nitrogen skitters across a table? A hand immersed in hot molten lead emerges unscathed? Are these cinematic tricks? Are the laws of physics being broken? Alas, science saves the day with a very simple explanation of these phenomena: the Leidenfrost effect.

One of the most common examples of the Leidenfrost effect in action involves a pancake griddle. Water droplets will hover over a very hot pancake griddle and take a long time to evaporate. The griddle is much hotter than the boiling point which causes the water near the griddle surface to rapidly turn to steam so that the drop hovers on its own vapor cushion. This vapor cushion insulates the water droplet from the hot griddle which slows overall droplet evaporation. Oddly, if the temperature were reduced below the Leidenfrost point, the droplet could touch the surface directly and rapidly boil away. This phenomenon is counterintuitive of course: total evaporation is slower on the hotter surface. It also causes difficulties as engineered cooling systems are expected to transfer more heat, rather than less, as surface temperatures rise.

Various aspects of the Leidenfrost effect have been studied since it was first reported by Johann Leidenfrost in 1756. Measurements typically have been performed with zero or small incident velocity. However, in many real-world situations droplets crash into heated surfaces which influences the Leidenfrost temperature and local heat transfer. Models need to be developed to help us understand and control processes such as rewetting of fuel rods in a nuclear power plant during reflooding after the postulated loss-of-coolant-accident where droplets in the dispersed flow regime impact hot cladding.

High-speed x-ray full field phase-contrast imaging, a relatively new technique, makes it possible to track dynamic changes in gas-liquid interfaces in real time. The partially coherent x-rays produced by a synchrotron such as the APS can reveal the interface between phases even when the interface is inside a thick liquid medium. This makes it possible to clearly visualize internal vapor generation within a falling droplet at unprecedented speeds and spatial resolutions. These visualizations will be presented and scrutinized during this talk.

Print abstract

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Other Activities

Information about current and or upcoming activities can be found in the NE Student Outreach home page.

Contact the Student Outreach Committee

If you would like to contact the NE Student Outreach Committee for further information or to request a student activity, please email neoutreach@anl.gov .

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