

Nuclear Science and Security Consortium

2015 Summer School

at Los Alamos and Sandia National Laboratories



Tomi Akindele is a PhD student in nuclear engineering at the University of California, Berkeley. She previously received her B.S. in nuclear engineering from Texas A&M University. Over the past few years, Tomi has had internship positions at the Defense Intelligence Agency, Sandia National Laboratories, and Lawrence Livermore National Laboratory. She is currently in the BARNS group at UCB led by Dr. Eric Norman. She is currently researching anti-neutrino monitoring of thorium reactors, and surrogate reactions to determine (n,xn) cross sections of radionuclides used in legacy tests.



Nicholas Brickner is a graduate student of the Nuclear Engineering Department at the University of California, Berkeley. His research focuses on neutron beam and x-ray characterization methods for experimental and biological applications. Recent work is oriented towards calibrating neutron sources of all kinds and verifying beam shaping assemblies designed for Boron Neutron Capture Therapy. He has extensive experience with non-destructive assays including x-ray fluorescence, gamma-ray spectroscopy, and neutron activation analysis.



Josh Brown is a second year graduate student in the Nuclear Engineering department. He studied physics in the California Community College system and UC Berkeley. His interests include experimental design, and characterization of detection systems. He is currently working with Sandia National Labs on a project to measure the energy dependent light yield of scintillators through a novel approach.

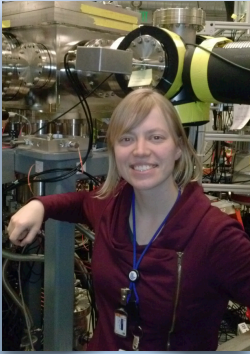


Jacob Cutter is a first-year Physics Ph.D. student at the University of California, Davis, working on the LUX dark matter detector under Professor Mani Tripathi. As a UC Davis undergraduate, he also worked on the LUX experiment, primarily focusing on optimizing data processing capabilities and developing waveform analysis software. He is now focusing on hardware development and detector physics.

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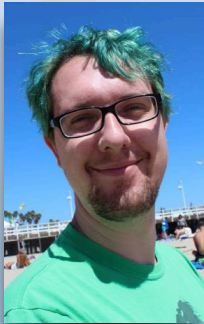
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Agnieszka Czeszumaska is a graduate student at the Nuclear Engineering department at UC Berkeley. As part of the nuclear physics group led by Prof. Eric Norman, she has been involved in various nuclear data measurements. Her master's thesis was a measurement of the neutron-induced fission cross section of Np-239. Currently, she is a Lawrence Graduate Scholar at LLNL, completing her PhD thesis on beta-delayed neutron measurements relevant to nuclear energy and r-process nucleosynthesis. Given her declared minor in nuclear nonproliferation, she has completed relevant coursework and participated in several summer programs related to nuclear security: the PPNT Bootcamp (at UCSD), Radiation Detection for Nuclear Security (at PNNL), and Nuclear Nonproliferation, Safeguards and Security in the 21st Century (at BNL). As she is in her last stages of her PhD, she is looking into various career paths.



Athena Gallardo is a third year student in the Radiochemistry Ph.D. program at the University of Nevada, Las Vegas. She previously received a B.S. as well as a M.S. in Health Physics from UNLV. Her research interests include developing more efficient and rapid separation methods for the analysis of trace quantities of radionuclides present from various matrices as well as examining the behavior and transport of radionuclides in different environments. She is currently investigating the migration of americium and other nuclides from weapons grade plutonium hot particles in soil cores. This research will help to elucidate the effect of weathering on special nuclear materials and potentially provide access to new signatures from the local environment in which the material is present. Athena is advised by Ralf Sudowe.



Joshua Gearhart is a 3rd year physics grad student at UC Davis and is working with the NIFFTE collaboration at Lawrence Livermore National Laboratory. He is studying ternary fission events in neutron-induced fission reactions with plutonium-239. He graduated from Cal Poly, San Luis Obispo with a degree in physics and a minor in mathematics. A SoCal native, he is the oldest of 4 brothers and hopes to one day return to the central coast.



Keegan Harrig is a senior undergraduate physics student at the University of California, Berkeley. Her research focuses on applied nuclear physics for nuclear security applications with Dr. Goldblum and the Bay Area Neutron Group. Harrig has performed work to characterize the light yield of pulse shape discriminating scintillators using a white neutron spectrum and a model-independent approach in collaboration with Lawrence Berkeley and Sandia National Laboratories. More recently, she has performed foil activation analysis to normalize the neutron spectrum produced by a deuteron breakup source and measured using double-time-of-flight.

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Gabriel Kaufman is a nuclear and electrical engineering joint major at UC Berkeley. He has worked on scintillator characterization, namely modeling the temporal response of organic scintillators, and neutron scatter experiments as well as contributing to various other projects at the 88-inch Cyclotron at LBNL. Gabriel is originally from Los Angeles, California, and enjoys swimming, reading, hiking, attending concerts and numerous other activities outside of classwork and research.



Kelly Kmak is an undergraduate student at UC Berkeley studying chemistry. She is interested in actinide and super heavy element chemistry, and she has worked with Dr. Dawn Shaughnessy at LLNL as well as with Dr. David Shuh at LBNL. Her research projects include characterization of actinide samples by spectrometry and a study of the interactions of the homologs of element 114 with macrocyclic extractants.



Anthony Kuchera is a postdoctoral research associate at the National Superconducting Cyclotron Laboratory at Michigan State University. He received his Ph.D. from Florida State University studying the alpha cluster structure of boron and beryllium isotopes. Anthony currently works with the Modular Neutron Array (MoNA) to study neutron-unbound nuclei and knockout reactions under the guidance of Michael Thoennessen.



Michelle Kuchera is a postdoctoral research associate at the National Superconducting Cyclotron Laboratory (NSCL). Her research interest is applying advanced computational methods to experimental nuclear physics applications. Her Ph.D. from Florida State University focused on machine learning algorithms, with a specialization in Bayesian Neural Networks. Michelle currently works under Bradley Sherrill on the LISE++ software. The software simulates in-flight fragment production and separation through a spectrometer for many facilities such as NSCL at Michigan State University, GSI in Germany, and RIKEN in Japan.

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Shaun Loveless is an undergraduate student at Fort Lewis College in Durango, CO, pursuing a Bachelor's degree in Chemistry with a minor in mathematics. He was born in Creve Coeur, Missouri and has spent much of the past decade living in Montana and Colorado. His past research under Dr. Suzanne Lapi at Washington University in St. Louis focused on separation chemistry for radioisotope isolation and purification. His work, mentored by Dr. Tara Mastren (Lapi group), supports isotope harvesting at the future Facility for Rare Isotope Beams at Michigan State University. After graduating in May 2015, Shaun plans to attend Washington University as a PhD candidate, advised by Dr. Suzanne Lapi.



Eric Matthews is currently an undergraduate in Nuclear Engineering and Physics at UC Berkeley. Previously, Eric attended the Missouri Academy of Science, Mathematics, and Computing in place of his Junior and Senior years of high school, where he earned an Associate of Science degree in June of 2013. Eric works with Dr. Brian Quiter in the Applied Nuclear Physics Program at LBNL where he is currently working on optimization and further development of the Fission Induced Electromagnetic Response (FIER) code. Eric has started working on the nuclear forensics analysis using simulations provided by the FIER.



Isaac Meyer is an undergraduate student at the University of California, Berkeley. He is currently doing research under Brian Quiter in the Applied Nuclear Physics Program at Lawrence Berkeley National Laboratory (LBNL) on optimizing a nuclear event prediction code titled "Fission Induced Electromagnetic Response" (FIER).

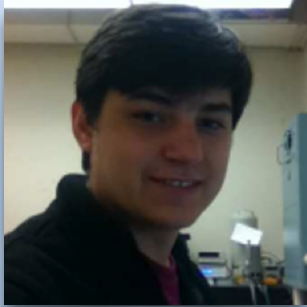


Stephen Scott Parker is a Ph.D student in nuclear engineering at the University of California, Berkeley. His research at Los Alamos National Laboratory centers on materials science with application in nuclear engineering, the scope of which extends from measuring the oxidation kinetics of candidate cladding alloys to the development and characterization of uranium nitride fuels. Other projects include the development of micromechanical techniques in order to characterize discrete oxide layers in multilayered structures, a study of the interfacial strength of grain boundaries under high temperature irradiation, an investigation of the effects of in-vivo high energy proton irradiation on the density and structure of trabeculae in the vertebrae of rats and mice, and a study of the mechanical properties of shale.

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Ryan Pavlovsky is a Nuclear Engineering PhD candidate at the University of California, Berkeley. As the Berkeley RadWatch Lead Developer, Ryan has helped to improve transparency in the RadWatch outreach effort by communicating with the public on issues regarding naturally occurring radioactive materials in the environment. Specifically he has advanced the technical aspects of the RadWatch Realtime Air Monitor and directly mentors several undergraduate students through RadWatch. He has also contributed heavily to the development, design and implementation of prototypes for the future RadWatch dosimeter network, a system that will employ low cost hardware for education and research.



Stacy Queern is a non-traditional student who received BSs in Chemistry and Mathematics, with a minor in Physics from Southern Illinois University – Edwardsville. She did an 18-month internship for a pharmaceutical software development company, Certara Inc., while obtaining her degrees. She is now a PhD candidate at Washington University in St. Louis where her main focus is Nuclear/Radiochemistry. Stacy's research involves gamma spectroscopy and separation of radioisotope produced via fast neutron bombardment of Tb and Gd foils in collaboration with Los Alamos National Lab (LANL). She has written a python script to help analyze the γ spectra obtain from HPGe detector to determine production rates of each isotope. She is currently working on a chemical separation method for rare earth isotopes that were produced during the bombardment of the foils.



Jason Richards is a radiochemistry graduate student at the University of Nevada Las Vegas. He has a B.S. in Chemistry from Utah State University. His research focuses on the separation of americium in high oxidation states from curium utilizing extraction chromatography. The rapid and efficient separation of americium from curium is of great interest in nuclear forensic analysis because it would remove isobaric interferences and provide quantitative isotopic information for both elements in nuclear samples. Jason Richards is advised by Dr. Ralf Sudowe.



Caleb Roecker is a 4th year PhD student in nuclear engineering at the University of California, Berkeley. He is advised by Kai Vetter and works at Sandia National Laboratory California and Lawrence Livermore National Laboratory. His research, which is funded by the Nuclear Science and Security Consortium (NSSC), focuses on high energy neutron spectroscopy. This research is part of larger preliminary program for WATCHMAN to characterize backgrounds underground for large antineutrino detectors, which have the potential to monitor nuclear reactor operation from km scale distances. Due to the policy implications such a detector would have Caleb had the opportunity to present on WATCHMAN and his research at the Union of Concerned Scientists Summer Symposium in 2014. In addition to high energy neutron spectroscopy Caleb is interested in inverse algorithm development and Monte Carlo modeling of detector systems. Upon completing his thesis, Caleb intends to pursue a career at the national labs developing and deploying radiation detection systems.

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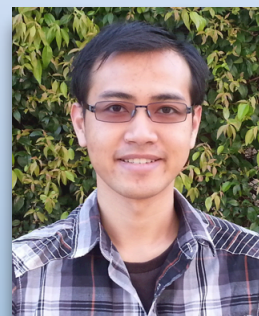
Patricia Schuster is a PhD candidate in Nuclear Engineering at the University of California, Berkeley. She has an M.S. degree in Nuclear Engineering from Berkeley and a B.S.E. degree in Nuclear Engineering and Radiological Sciences from the University of Michigan. Patricia works on radiation detection applications, focusing on methods for neutron detection. She spent two years at Sandia National Laboratories in Livermore, CA working on neutron imaging techniques for large scale search and localization applications. Patricia's thesis work is studying the anisotropic response of organic crystal scintillators to neutrons through measurements and models. Patricia is part of the Nuclear Science and Security Consortium at Berkeley, and has taken courses with Michael Nacht and Stan Prussin on nuclear security policy. Patricia has worked on a policy project with Michael Nacht to study historical case studies of Cross Domain Deterrence as implemented by the United States. Although Patricia has a technical focus, she keeps up with current events and reads historical and political books related to nuclear security. She hopes to find a career that will allow her to work on technical and non-technical problems.



Quinlan Smith is a physics graduate student at the University of Nevada, Las Vegas working at the High Pressure Science and Engineering Center (HiPSEC), under the advisement of Dr. Michael Pravica. He currently is researching the effects of radiation on semiconductor-like materials under high temperatures and pressures. A majority of his work occurs at synchrotron radiation facilities (the Advanced Photon Source at Argonne National Laboratory and the Canadian Light Source) where he probes samples inside diamond anvil cells. The goal of his research is to synthesize and characterize materials to survive longer and produce more accurate measurement abilities in extreme environments.



Daniel Sneed is a first year graduate student in Physics at University of Nevada, Las Vegas. He earned his B.S. in Physics from University of Nevada, Las Vegas in 2014 where he studied spectroscopy and materials science at extreme conditions. He has continued his studies in high pressure science as a graduate student, and is currently working on using x-ray irradiation for photo induced chemistry at extreme pressures to force higher oxidation states of alkali metals by forming novel alkali halide compounds. He is hoping that synthesizing these molecules will help provide a better fundamental understanding of molecular bonding by showing that bonding can occur with inner shell electrons.



Alan Tam is currently a second year PhD student in physics at UC Irvine. Currently he is working with Mikael Nilsson in UCI's nuclear chemistry group. Part of his research involves investigation of new scintillation material composed of nano-composites and applying their quantum mechanical effects. The purpose is to improve on current portability of current gamma and neutron detectors and explore possible novel material. Another part of his research involves fabrication of waveguide using fiber optics matrix and transparent glass composites to accommodate the scintillation material.

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David Weisz is a PhD student in Nuclear Engineering at UC Berkeley. He is currently conducting research at Lawrence Livermore National Laboratory under the supervision of Professor Stanley Prussin. His work involves the study of post-detonation fallout glass from historical nuclear tests through compositional analysis techniques and computational modeling. It is the goal of this research to gain insight into physical and chemical processes that take place in near-surface detonations for possible future applications in nuclear forensic analysis.

