AC 2008-1572: DEVELOPMENT OF A NUCLEAR CERTIFICATE FOR NUCLEAR SAFETY, NUCLEAR SECURITY, AND NUCLEAR ENVIRONMENTAL PROTECTION WITHIN A MECHANICAL ENGINEERING DEPARTMENT

Sheldon Landsberger, University of Texas at Austin

Dr. Landsberger is Coordinator of the Nuclear and Radiation Engineering Program and has primarily involved in the determination of heavy metals in environmental samples using nuclear analytical methods. In particular he has developed improved nuclear techniques to better determine the elements of critical importance in identifying regional sources of airborne particles, and characterizing solid waste leaching dynamics. His current research interests include low-level counting of natural radioactivity, corrosion studies, Compton suppression gamma-ray spectrometry and risk assessment in radioactivity handling. He is also involved in development of distance learning education.

Steven Biegalski, University of Texas at Austin

Dr. Biegalski researches nuclear instrumentation and neutron radiography, analyzes environmental media using nuclear methods and models environmental pathways. In the past he has worked to develop technology in support of the Comprehensive Nuclear Test-Ban Treaty, an agreement started in 1996 that now has 196 member nations. He developed and installed environmental aerosol and xenon monitoring stations, developed software to analyze data from the radionuclide monitoring systems, and investigated the trends, sources, and origins of man-made radioactive atoms in the environment. Biegalski has also investigated air pollution sources in the Arctic, assessed the toxic metal input into the Great Lakes and worked on global change modeling.

Elmira Popova, University of Texas

Dr. Popova specializes in stochastic processes, Bayesian statistics and stochastic optimization. She is interested in reliability analysis and design of optimal maintenance strategies for randomly failing systems. Popova studies quantitative finance such as trading strategies, equity pricing calculations and asset allocation decisions. She has also worked with researchers from Brazil to forecast energy pricing and load. One of her current projects, in collaboration with the McCombs School of Business, concerns risk-informed asset management for electric and nuclear power generation. The project addresses risk assessment, risk management, and reliability problems that arise in electric power generation. The research seeks to help industry officials make the best operational and executive management decisions by more accurately accounting for seemingly unpredictable issues such as outage duration and regulatory safety constraints, as well as uncertainty related to energy prices, mechanism failures, repair costs and other factors.

Kendra Foltz-Biegalski , University of Texas

Dr. Kendra Foltz-Biegalski has sixteen years experience in nuclear engineering, nuclear and chemical analytical techniques, and two years of nuclear reactor operations. She has been involved in areas of nonproliferation, advanced algorithms, analytical modeling, nuclear engineering, nuclear science, project management, test and evaluation, transition planning, and training support.

Michael Krause, University of Texas

Michael Krause is the Reactor Manger and is responsible for supervising reactor operations in compliance with Nuclear Regulatory Commission License. Specific areas of work include: manage operation of TRIGA research reactor; assist in design and fabrication of reactor experiments; routine surveillance and calibration of reactor equipment, repair or upgrade of

reactor equipment, review and update of operating, calibration, surveillance, emergency, and security procedures, and training of licensed reactor operators

Development of a Nuclear Certificate for Nuclear Safety, Nuclear Security, and Nuclear Environmental Protection within a Mechanical Engineering Department

Teaching and research initiatives in nuclear education have dramatically veered away from nuclear power operations over the past three decades. With the advent of a real change in delivering economically competitive electricity base loads in the nuclear industry, global warming, and a transformation in public perception, including politicians, on the requirement for greenhouse gas free electricity production, there is a clear need to have academic programs to support the US NRC and the nuclear power industry. A nuclear technical option at The University of Texas at Austin has been in existence for fifty years. The earliest known course was Nuclear Reactor Operation and Maintenance and was first offered in 1957. Nuclear Engineering became an option in Engineering Science in 1960 and in Mechanical Engineering in 1970, where it is currently administered. In August 1963, the TRIGA nuclear reactor went critical at 10kW using fuel loaned from the U.S. Government. In 1968, the power was upgraded to 250 kW and then upgraded again in 1992 to 1,100 kW at a different site; the Nuclear Engineering Teaching Laboratory (NETL). Throughout its long history, the nuclear program has had a commitment to educating the brightest students in the United States and abroad. This dedication which continually grows stronger now as the program has expanded to encompass health physics, radiation engineering, research reactor beam port experiments, radioactive waste management and reactor and computational nuclear engineering, homeland security and non-proliferation. As a result of the ever broadening educational and research needs, ten years ago the nuclear program changed its name to Nuclear and Radiation Engineering to better reflect its new directions. In spring 2007, we were funded by the Nuclear Regulatory Commission to implement at new undergraduate technical option in the Nuclear and Radiation Engineering Program at The University of Texas at Austin The overall objective is to to provide: (1) a Nuclear Certificate geared towards undergraduate students in engineering and individuals in the nuclear industry consisting of courses in nuclear safety, nuclear security, nuclear environmental protection, and reactor operations including 15 overall credits with 3 credits from a chosen graduate course where such an opportunity will serve as a bridge for undergraduate students to consider graduate education; (2) an opportunity for students to train on The University of Texas TRIGA reactor and achieve NRC Reactor Operator license; and (3) an avenue to encourage internships at the NRC and nuclear power plants. These outcomes will have the benefit of creating a pipeline of well qualified students to the Nuclear Regulatory Commission (NRC) (especially to serve NRC Region 5), and to the nuclear industry for employment including the seven newly planned nuclear reactors in the state of Texas.