SEDAT GOLUOGLU

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Criticality and Shielding Methods and Applications Group
Nuclear Science and Technology Division
Oak Ridge National Laboratory

EDUCATION

UNIVERSITY OF TENNESSEE, Knoxville, TN
Ph.D., Nuclear Engineering, Nuclear Criticality Safety, August 1997

UNIVERSITY OF TENNESSEE, Knoxville, TN
M.S., Nuclear Engineering, Nuclear Criticality Safety, August 1994

HACETTEPE UNIVERSITY, Ankara, TURKEY
M.S., Nuclear Engineering, Nuclear Criticality Safety, February 1993

HACETTEPE UNIVERSITY, Ankara, TURKEY
B.S., Nuclear Engineering, May 1989

EXPERIENCE

OAK RIDGE NATIONAL LABORATORY, Oak Ridge, TN
6/2000 – present *Research and Development Staff*
Supervisor: Dr. John C. Wagner
Areas of expertise and interest include nuclear criticality safety applications and methods, sensitivity and uncertainty analyses and methods development, methods and code development for static and time-dependent neutron transport, and radiation shielding. Examples of major activities include:

- Added a new capability to the SCALE code system to model doubly-heterogeneous systems such as pebble bed modular reactors.
- Improved and further developed the space-time kinetics code TDKENO to perform moderator intrusion consequence analysis.
- Performed analyses to assess relevance and importance of available and needed integral benchmarks and differential data evaluations impacting potential MOX production throughput determinations relative to low-moderated MOX fuel blending operations.
- Performed calculations to determine potential payload increases in the TRUPACT-II and HALFPACT systems that are used for transporting transuranic nuclear waste from various DOE sites to the WIPP. This study received a citation from DOE NNSA.
- Performed sensitivity and uncertainty analyses of nuclear systems for cross section and code validation. Developed an improved methodology and new related parameters to be used in assessing the area of applicability of benchmarks and the related bias for validation of cross sections and criticality safety code KENO-V.a. Also developed a methodology for determining the penalty that should be added to the safety margin due to insufficient benchmarks.

- Performed shielding calculations for a 21-PWR waste package involving use of cermet and graphite as shielding materials.
- Developed SMORES (SCALE Material Optimization and Replacement Sequence) that is intended to be used to develop bounding curves by determining the optimum material configurations.
- Performed criticality calculations of MOX fuel assemblies for transport and storage.
- Contributed to International Handbook of Evaluated Criticality Safety Benchmark Experiments by evaluating experiments that were performed with arrays of uranyl nitrate cans at ORCEF between 1966 and 1968.
- Additional responsibilities are identification of methods and data deficiencies for novel applications, and subsequently development of the enhancements necessary to rectify the deficiencies.

10/1997 – 6/2000 **FRAMATOME COGEMA FUELS**, Las Vegas, NV
Nuclear Engineer

- Provided criticality safety and shielding expertise in the application of the disposal criticality analysis methodology to designated DOE fuel forms that are slated for disposal at the Yucca Mountain such as FFTF, Shippingport-PWR, Fermi Reactor, N-Reactor, Triga, etc.
- As lead analyst, coordinated or performed the criticality and shielding, analyses and coordinated the structural, thermal and geochemistry analyses for selected DOE EM fuels.
- Performed validation of MCNP for criticality and shielding analyses of waste packages designed for storage at Yucca Mountain.

1/1992 – 10/1997 **UNIVERSITY OF TENNESSEE, NUCLEAR ENGINEERING DEPARTMENT,** Knoxville, TN

6/1997 – 10/1997 *Post-Doctorate*

- Involved in the development of a time-dependent Monte Carlo neutron transport code with thermal-hydraulic feedback (TDKENO).

1/1992 – 6/1997 *Graduate Research Assistant*

- Developed the kinetics computer code TDTORT (available through RSICC) based on time-dependent 3-d transport theory to perform analyses of criticality safety excursions, coolant voiding situations in power reactors, and small high leakage reactors such as space reactors.
- Improved neutronics calculations of the High Flux Isotope Reactor as part of MS thesis by creating more accurate problem-dependent cross section libraries.
- Performed code and cross-section verification and validation studies for criticality and shielding applications.
- As the graduate student in charge of computing codes and resources, installed and maintained computer code collection SCALE, MCNP, TORT, DORT, and DANTSYS on department's workstations.

3/1992 – 12/1993 **OAK RIDGE NATIONAL LABORATORY, HIGH FLUX ISOTOPE REACTOR**, Reactor Technology Section, Research Reactors Division, Oak Ridge, TN
Intern

- Improved earlier methods to analyze the reactor power distributions using the SCALE code system and VENTURE neutronics code.
- Assisted in analyses of foil activation experiments.

9/1989 – 12/1991 **HACETTEPE UNIVERSITY,** Ankara, TURKEY
Research/Teaching Assistant

- MS thesis involved preparation of few group problem dependent cross sections for a Pebble Bed Gas Cooled Heating Reactor (GHR-20) and neutronics analysis of the GHR-20.
- Set up laboratory equipment and helped students understand the theory for "Electronics Lab" and "Nuclear Physics Lab" courses.

ACHIEVEMENTS AND ACTIVITIES

- ORNL Nuclear Science and Technology Division, Operations and Support Award, April 2006, for organizing the ANS Nuclear Criticality Safety Division 2005 Topical Meeting held in Knoxville on September 18-22, 2005.
- PHYSOR 2006 (September 2006), organizer and chair of a session on HTR Numerical Benchmarks and Studies.
- Assistant General Chair, Nuclear Criticality Safety Division 2005 Topical Meeting.
- ORNL Nuclear Science and Technology Division, Scientific and Technical Award, November 2004, for development and application of new sensitivity/uncertainty analysis capability for the DOE Nuclear Criticality Safety Program.
- National Nuclear Security Administration Certificate of Appreciation for demonstrating the opportunity for significant increases in fissile mass limits with corresponding benefit to the transuranic waste disposition program (April 2002).
- American Nuclear Society (ANS) Nuclear Criticality Safety Division Executive Board Member (start June 2006).
- ANS Oak Ridge/Knoxville Local Section Executive Board Member (2003-2006).
- ANS Local Sections Committee Member (2000-2003).
- ANS National Student Design Competition (Graduate Division); Project entitled "Analysis of Shielding Concerns for Spent Fuel in the Advanced Neutron Source Reactor"; selected first place winner at the ANS Meeting in San Francisco (November 1993).
- ANS University of Tennessee student chapter graduate student representative (1994).

- ANS Member. Session organizer and chair for various sessions.
- Attended Nuclear Criticality Safety Short Course at the University of New Mexico (July 1998).
- Worked extensively with SUN, IBM, DEC Alpha and HP UNIX workstations, and PC's. Also have experience with VAX machines and other mainframes.
- Excellent knowledge of FORTRAN, working knowledge of BASIC.
- Involved in first stage calculations of WIMS Library Update Project organized by International Atomic Energy Agency.
- Participated and completed the workshop on Reactor Physics Calculations for Applications in Nuclear Technology held at International Center for Theoretical Physics, Trieste, Italy (1990).

PUBLICATIONS Over 50 publications in journals, conference proceedings or transactions, OCRWM reports, or ORNL reports as primary author or co-author.