Kevin Dugan

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Contact Information

Oak Ridge National Laboratory
P.O. Box 2008
Oak Ridge, TN 37831

dugankj@ornl.gov

Education

Université de Paris Sud XI, Orsay, FRANCE — October 2013 – October 2016
Commissariat à l'Énergie Atomique, Saclay, FRANCE
Ph.D. in Nuclear Energy

Texas A&M University, College Station, TX, USA — August 2011 – August 2013
M.S. Nuclear Engineering
GPR: 3.900/4.0

Texas A&M University, College Station, TX, USA — August 2007 – May 2011
B.S. Nuclear Engineering
GPR: 3.547/4.0

Selected Publications

K. Dugan, R. Sanchez, I. Zmijarevic, "Cross section homogenization for transient calculations in a spatially heterogeneous geometry," *Annals of Nuclear Energy*, 116:439–447, 2018
https://doi.org/10.1016/j.anucene.2018.02.041

K. Dugan, I. Zmijarevic, R. Sanchez, "Cross Section Homogenization for Reactivity Induced Transient Calculations," *Journal of Computational and Theoretical Transport*, 45(6):425–441, 2016
http://dx.doi.org/10.1080/23324309.2016.1188116

Conference Proceedings

K. Dugan, S. Hart, "Warthog: At the Intersection of MOOSE and SHARP," *ANS Summer (2018)*, June 2018, Philadelphia, PA

K. Dugan, I. Zmijarevic, R. Sanchez, "Cross Section Homogenization Technique for Transient Calculations," *PHYSOR (2016)*, May 2016, Sun Valley, ID

K. Dugan, I. Zmijarevic, R. Sanchez, "Cross Section Homogenization for Transient Calculations," *International Conference on Transport Theory*, September 2015, Taormina (Italy)

B. T. Rearden, K. Dugan, F. Havluj, "Quantification of Uncertainties and Correlations in Criticality Experiments with SCALE," *Nuclear Criticality and Safety Division, ANS*, September 2013

K. Dugan, J. Ragusa, D. Lebrun-Grandie, "Hp-FEM Automatic-Mesh Adaptivity Applied to Two Dimensional Neutron Diffusion", *ANS Winter Conference*, November 2011, Washington D.C.

L. Vasudevan, K. Dugan, A. Tijerina, "A Standardized Approach for Low Level Waste Quantification at the Texas A&M Nuclear Science Center using Gamma Spectroscopy and ISOCS Mathematical Calibration Software", *National Health Physics Meeting*, June 2010.

Theses

K. Dugan, "Developing a Multiphysics Solver in APOLLO3 and Applications to Cross Section Homogenization," *Université Paris-Saclay*, 2016
https://tel.archives-ouvertes.fr/tel-01531828

K. Dugan, "Dynamic Adaptive Multimesh Refinement for Coupled Physics Equations Applicable to Nuclear Engineering," *Texas A&M University*, 2013
http://hdl.handle.net/1969.1/151073

Work History

Postdoctoral Fellow June 2017 – Present
Oak Ridge National Laboratory
Reactor Physics Group
Description: Working on the NEAMS Workbench to facilitate coupled physics simulations.

Ph.D. Student October 2013 – October 2016
Commissariat à l'Énergie Atomique (CEA), Saclay, FRANCE
DEN/DM2S/SERMA/LTSD
Description: To build a multiphysics framework within the APOLLO3 software package. The framework will use matrix-free methods and will support coupling between neutron transport and thermal hydraulics. Special attention was devoted to the treatment of homogenized cross sections in transient simulations.

Graduate Research Assistant August 2011 – August 2013
Texas A&M University, College Station, TX, USA
Department of Nuclear Engineering
Description: To build a high fidelity model of coupled physics important to reactor analysis. The proposed method uses the mesh adaptive finite element method which can utilize the Deal.II FEM library written in C++. The physics modeled are two-group transient neutron diffusion and non-linear heat conduction.

Summer Internship May 2012 – August 2012
Oak Ridge National Lab, Oak Ridge, TN, USA
Reactor and Nuclear Systems Division
Description: Built a tool for the SCALE suite that evaluates how manufacturing tolerances impact the behavior of k-eff. This tool also handles the situation where parameters within a model are correlated and when possible correlations exist between different models. The tool was later incorporated in the SCALE 6.2 release.

Reactor Operator/ Health Physicist May 2009 – May 2011
Nuclear Science Center, College Station, TX, USA
Description: A reactor operator ensures the safe operation of the reactor facility, and also performs necessary maintenance on the reactor (1MW TRIGA). A health physicist performs environmental surveys on the facility and conducts analysis experiments using the available reactor.

Certifications

Senior Reactor Operator License November 2010 – December 2012
Reactor Operator License March 2010 – November 2010

References

Dr. Igor Zmijarevic
Ph.D. Research Advisor
CEA - Saclay
FRANCE

Dr. Richard Sanchez
Ph.D. Research Advisor
CEA - Saclay
FRANCE

Dr. Jean Ragusa
Master's Research Advisor
Texas A&M University
College Station, TX, USA

Dr. Brad Rearden
SCALE Project Leader
Oak Ridge National Lab
Oak Ridge, TN, USA

Jerry Newhouse
Reactor Supervisor
TAMU Nuclear Science Center
College Station, TX, USA

Dr. Latha Vasudevan
Radiation Safety Officer
Texas A&M University
College Station, TX, USA

*Contact Information for References is Available on Request.

Technical Skills

- Programming Languages: C++, MATLAB, FORTRAN, PERL, PYTHON
- Modeling: Nuclear Reactor Transients, 2D Fluid Flows, Uncertainty Analysis
- Document Processing: LaTeX, Microsoft Word & Excel
- Nuclear Codes: APOLLO3, SCALE, MCNP
- Nuclear Experimentation: Neutron Activation Analysis, Gamma Spectroscopy, Instrument Calibration, Reactor Operation, Radioactive Material Packaging, Robotic Arm Manipulation, Environmental Surveying

Miscellaneous

- Studied French in Paris, France at the Sorbonne University for one month (JUN2010)
- Eagle Scout rank earned (APR2006)
- **Languages:** English (Native), French (Proficient)
- **Countries Visited:** Australia, Austria, Belgium, Czech Republic, France, Germany, Greece, Italy, Monaco, U.A.E.