

Eleodor Nichita, PhD

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Developing advanced computational models for nuclear reactor safety analysis and radiation dosimetry

Nuclear fission is the world's main source of electricity with near-zero greenhouse-effect-inducing carbon dioxide emissions. The more than 440 commercial nuclear power plants operating in 31 countries provide over 11 per cent of the world's electricity as continuous and reliable base-load power. Another 60 reactors are under construction. Durham Region is home to two nuclear power plants, both within a 30 km radius of the University of Ontario Institute of Technology (UOIT).

To remain an important contributor to Ontario's energy supply, CANDU reactors must satisfy ever-increasing economic and safety demands. In particular, increasingly detailed and accurate simulation models are required for the safety analysis of existing and future CANDU reactors. To that end, Eleodor Nichita, PhD, Associate Professor in the Faculty of Energy Systems and Nuclear Science, is primarily focused on computational reactor and radiation physics to ensure the long-term safety of these and other nuclear power plants. In collaboration with the University Network of Excellence in Nuclear Engineering and Ontario Power Generation, Dr. Nichita's latest research focuses on modelling the static and dynamic behaviour of CANDU reactors and on developing CANDU computational benchmarks to be used to evaluate existing and emerging reactor-physics computational tools.

His other research investigates the dynamic characteristics of Pressure-Tube Supercritical-Water-Cooled Reactors (which contribute to the design of the control and safety systems of the Canadian Generation IV advanced reactor concept); computational radiation dosimetry studies for the protection of radiation workers; and medical radionuclide production methods.

Dr. Nichita's motivation to confront two of the world's most critical issues – energy and health, spurred his educational path. He earned a Bachelor of Science in Engineering Physics from the University of Bucharest in Romania, a Master of Science in Medical Physics from McMaster University in Hamilton, Ontario, and both a Master of Health Physics and a Doctorate in Nuclear Engineering from the Georgia Institute of Technology in Atlanta, Georgia. He then moved back to Canada and spent his first six years in industry as a reactor core physicist for Atomic Energy of Canada Limited, before joining UOIT in 2004 as an assistant professor. A former President of the Canadian Nuclear Society, Dr. Nichita has earned several awards for his work.

Advanced Medical Equipment, Education/Learning, Energy, Information Technology and Services, Nuclear, Program Development, Professional Training and Coaching, Renewables and Environmental, Research, Safety, Utilities

Software Development, Modelling and Simulation, Nuclear Medicine and Radionuclides, Reactor Safety Analysis, Reactor Design, Standards Development, Educational Curriculum Development, Reactor and Radiation Physics, Neutron and Radiation Transport, Nuclear Reactor Kinetics and Control

Professional Engineers Ontario, Canadian Nuclear Society, American Nuclear Society, Canadian Organization of Medical Physicists, American Association of Physicists in Medicine, Alpha Nu Sigma, Nuclear Science and Engineering Honour Society

Designing a Computer Code to Calculate the Committed Dose Equivalent to Internal Organs Following the Injection of a Radiopharmaceutical
35th Annual Conference of the Canadian Nuclear Society

Temperature Distribution Inside Fresh-Fuel Pins of Pressure-Tube SCWR
7th International Symposium on Supercritical Water-Cooled Reactors

Axial Power and Coolant-Temperature Profiles for a Non-Re-entrant PT-SCWR Fuel Channel
7th International Symposium on Supercritical Water-Cooled Reactors

Progress Towards an Accurate Lattice-Homogenization Technique for Pressure Tube Supercritical Water-Cooled Reactor Neutronic Calculations
PHYSOR 2014 International Conference the Role of Reactor Physics Toward a Sustainable Future

Preliminary Evaluation of Coolant Void Reactivity of a Re-entrant Channel Pressure Tube Supercritical Water-Cooled Reactor
PHYSOR 2014 International Conference on the Role of Reactor Physics Toward a Sustainable Future

Preliminary Space-Time Kinetics Simulation of a Coolant Voiding-Induced Transient for a Supercritical Water-Cooled Reactor with Re-entrant Fuel Channels
19th Pacific Basin Nuclear Conference

Preliminary Comparison of Transport Codes Applied to a Second-Generation PT-SCWR Lattice
Canada-China Conference on Advanced Reactor Development 2014

Preliminary Serpent Calculations for a PT-SCWR Lattice
SERPENT User Group Meeting

Preliminary Study of Dynamic Properties of a Th-Pu Pressure-Tube Supercritical Water-Cooled Reactor
The 6th International Symposium on Supercritical Water-Cooled Reactors

Uncertainties in Kinetics Parameters of Natural-Uranium-Fuelled CANDU Cores Introduced by Lattice Homogenization and Group Condensation
24th Nuclear Simulation Symposium

Georgia Institute of Technology
PhD Nuclear Engineering

Georgia Institute of Technology
MS Health Physics

McMaster University
MS Medical Physics

University of Bucharest
BS Engineering Physics

Fellow, Canadian Nuclear Society

Appointed to this role, the Canadian Nuclear Society promotes the exchange of information on all aspects of nuclear science and technology and its applications.

Best Paper Award, American Nuclear Society

Awarded at the American Nuclear Society Winter Conference in Washington DC.

Member Alpha Nu Sigma National Honor Society,

Affiliated with the American Nuclear Society, Alpha Nu Sigma National Honor Society recognizes high scholarship, integrity, and potential achievement among outstanding degree-seeking nuclear engineering students at institutions of higher learning.

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