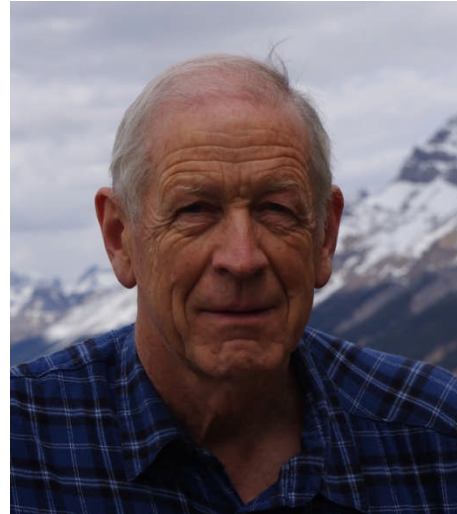

Author Biographies

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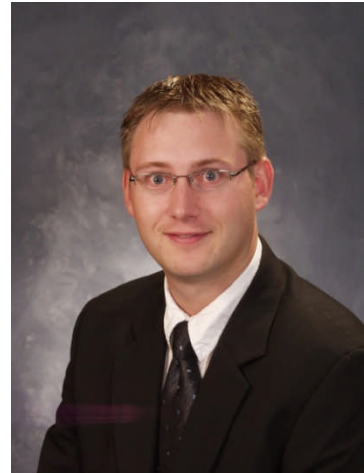
1 Dr. Robin A. Chaplin (chapters 1, 2, 8, 9, appendix Basic Electrical Theory)

Robin Chaplin obtained a B.Sc. and M.Sc. in Mechanical Engineering from University of Cape Town in 1965 and 1968 respectively. Between these two periods of study he spent two years gaining experience in the operation and maintenance of coal fired power plants in South Africa. He subsequently spent a further year gaining experience on research and prototype nuclear reactors in South Africa and the United Kingdom and obtained an M.Sc. in Nuclear Engineering from Imperial College of London University in 1971. On returning to South Africa and taking up a position in the head office of Eskom he spent some twelve years initially in project management and then as Head of Steam Turbine Specialists. During this period he was involved with the construction of the 3 x 80 MW Ruacana Hydro Power Station in Namibia and the 2 x 900 MW Koeberg Nuclear Power Station in South Africa being responsible for the underground mechanical equipment and civil structures and for the mechanical balance-of-plant equipment at the respective plants. Continuing his interests in power plant modeling and simulation he obtained a Ph.D. in Mechanical Engineering from Queen's University in Canada in 1986 and was subsequently appointed as Chair in Power Plant Engineering at the University of New Brunswick. Here he has taught thermodynamics and fluid mechanics and specialized graduate level courses in nuclear and power plant engineering in the Departments of Chemical Engineering and Mechanical Engineering. An important function was involvement in the plant operator and shift supervisor training programs at Point Lepreau Nuclear Generating Station. This included the development of material and the teaching of courses in both nuclear and non-nuclear aspects of the program. He has also been involved with the UNESCO sponsored Encyclopedia of Life Support Systems (EOLSS) as Honorary Theme Editor and primary author of the theme on Thermal Power Plants and has also assisted with the theme on Nuclear Energy and Reactors. Altogether he has contributed some three dozen chapters to this major source of international knowledge. As an adjunct professor at Waterloo University he has established and taught a graduate course in power plant thermodynamics to engineers in the nuclear industry as part of the UNENE masters program in nuclear engineering. He has served as Acting Chair and Chair in the Department of Chemical Engineering at University of New Brunswick and has been a consultant for Canadian Power Utility Services.



2 Dr. Willy Cook (chapters 14, 15)

Willy Cook is an Associate Professor in the Department of Chemical Engineering at the University of New Brunswick (UNB). He is a professional engineer with consulting and research interests in power plant chemistry and corrosion control and teaches courses related to these topics and global energy issues. Willy earned his BSc and MSc degrees in Chemical Engineering at UNB in 1997 and 1999 where he completed option programs in Power Plant and Nuclear Engineering. He worked as the research engineer and laboratory manager for the Chair in Nuclear Engineering at UNB until 2004 where he supervised the academic research and industrial contracts undertaken by the Chair. He completed his PhD in 2005 (UNB) and has since been actively involved in the Generation IV International Forum (GIF) evaluating materials and chemistry control regimes for a supercritical water-cooled reactor. The restart of the CANDU-6 plant at Point Lepreau following its refurbishment outage in 2012 coincided with a sabbatical leave from UNB and Willy spent nine months during this time as a technical consultant for the chemistry department at the station during the restart activities. In the Fall of 2014, he was appointed as the Scientific Director of the Centre for Nuclear Energy Research, an Institute on UNB's campus that undertakes research and provides consulting to the power generating industry and develops commercial products for corrosion measurement and control.



3 Ms. Diane Damario (chapter 20)

Diane is a registered professional engineer in the province of Ontario. She earned a B.A.Sc. in Mechanical Engineering at the University of Toronto in 1990. After completing her studies, she joined AECL at Sheridan Park. She has been involved in fuel handling at Sheridan Park ever since, transitioning to Candu Energy Inc., a member of the SNC-Lavalin Group, when the commercial division of AECL was privatized in 2011. Diane's fuel handling experience has mainly been based on the CANDU 6 station design, particularly for the Qinshan and Wolsong 2, 3 and 4 stations. Over the years, she has delivered training on fuel handling at Sheridan Park and Chalk River.



4 Mr. Milan Gacesa (chapters 17, 18, 19)

Independent consultant - nuclear fuel and project management. Milan earned his BSc and MSc in Mechanical Engineering at the University of Windsor and is a registered professional engineer in the province of Ontario. He worked at Westinghouse Canada Ltd. for 7 years, initially performing tests and developing design/analysis tools used for CHF and thermal-hydraulic stability analysis, and later leading the nuclear fuel design section where the design of C6 fuel was produced. At AECL he continued to work on C6 fuel design,



testing, and verification until its successful launch in the first generation C6 reactors. As manager of the fuel branch Milan broadened the branch's participation in all aspects of the CANDU fuel industry, in particular fuel design, testing, development of analytical tools, assessment of plant performance feedback (especially as related to defective fuel), and assistance to operators. As Engineering and Project Manager of CIRENE Technical Assessment (Italian BWR similar to Gentilly 1) he led a group of selected AECL specialists to a successful completion of an independent evaluation of CIRENE design and, in particular, safety. Following CIRENE, Milan completed a number of other projects, including an extensive multi-disciplinary study of alternative fuel cycles in CANDU for a Japanese client, before his overseas assignment as Manager of Engineering at KAERI (Republic of Korea) where he led an expat group of AECL senior technical specialists and Korean engineers in completing the design packages for a number of C6 NSSS systems. For the past 14 years Milan has provided consulting services to a number of clients, including AECL where he worked for a number of years as the senior fuel specialist on the ACR project. In addition to producing the fuel bundle configuration for ACR, the fuel team spearheaded a number of methodology changes, including the adoption of fuel acceptance criteria, development of design verification strategy and plan, and standardization of verification assessments, which can be used on any future CANDU project.

5 Dr. William J. Garland (editor in chief, prologue, chapter 7)



Bill Garland is Professor Emeritus of Nuclear Engineering in the Department of Engineering Physics at McMaster University (Ontario, Canada). He specialized in reactor physics and thermalhydraulics. Since 2000, he has been Academic Director of CANTEACH, the public on-line library for technical information on CANDU reactors. On partial and full secondment from McMaster from 2004 to 2008 he served in various capacities within the University Network of Excellence in Nuclear Engineering (UNENE), namely Secretary / Treasurer, Program Director, and Executive Director. Since retiring from McMaster he served as UNENE President until September

2009. From October 2009 to September 2011 he was Academic Consultant to UNENE with Knowledge Management as the primary duty.

He served as Department Chair in the Department of Engineering Physics at McMaster from 1988 to 1994 and was Director of MNR (McMaster Nuclear Reactor) for 1994 to 1995 leading up to the decision to revitalize reactor operations. Subsequent to that he is took a lead role in MNR safety analysis and operational support analysis.

From 1975 to 1983, he worked in the Canadian Nuclear Industry specializing in CANDU heat transport system analysis and design (Darlington and CANDU 6). The major effort from early 1980 to mid 1983 was in heat transport system stability investigations leading up to the now standard header to header interconnection. This included pre- and post-test analysis, coordination of AECL's process team, test planning, and liaison.

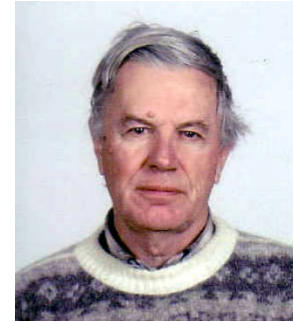
While on research leave at Harwell Nuclear Labs in England, Bill conducted knowledge engineering for heat exchanger selection and developed a heat exchanger selection computer code which became a commercial product distributed through the international company HTFS. In addition, computerized water property functions developed at McMaster are in use in about 13 countries by over 120 users in 51 institutions and major engineering firms worldwide.

Bill received the CNS Education and Communication Award in 2001 and became a CNS fellow in 2006.

William J. Garland, P. Eng., FCNS (B. Eng. Phy. 1970, M. Eng. Phy., 1971, Ph.D. Chem. Eng. 1975, McMaster University, Canada)

6 Dr. George Alan Hepburn (chapter 10)

Alan Hepburn earned his B.Sc. in Electrical Engineering at the University of Glasgow in 1966. After a further four years study in the field of automatic control, he obtained a Ph.D. in Electrical Engineering in 1970. During his postgraduate work, he had the use of an early prototype computer which had been developed to demonstrate that semiconductors were a practical replacement for vacuum tubes in digital computers.



Despite the assurance of the Canadian embassy that there were “no jobs for Ph.D.s in Canada”, Alan emigrated to Canada in the fall of 1970, where he obtained a position in a small company applying minicomputers to data acquisition.

Alan joined the Plant Computer Systems Branch at AECL in Mississauga in 1972. He was the first employee of the branch to have had experience with computers prior to joining the company. His first task at AECL was to write the Reactor Regulating System program for Bruce A. In 1974, he was posted to Bruce “A” NGS, where he was AECL’s representative on the Digital Control Computer (DCC) commissioning team.

Following his return to Sheridan Park in 1976, Alan continued his work in real time computer systems development for Bruce B, the early CANDU 6’s, and Darlington, including involvement in the development of the world’s first fully computerized shutdown systems for Darlington GS. He became a section head, followed by branch manager of the Plant Computer Systems Branch, then Department Manager of the Instrument and control systems Department at Sheridan Park.

In 1987, Alan left the nuclear industry and moved to the aerospace, where he managed the Engineering Sciences group at Garrett Canada, primarily responsible for the development of software for the environmental control systems on many of the western world’s larger civil and military aircraft. After four years at Garrett, he transferred to TRW who were subcontracted to the Systems Engineering group of CDC in Nepean to develop a major communications system for the Canadian Army. Just two years later, the project was transferred to Calgary, and after a further two years, TRW’s contract was cancelled.

Rather than move to Washington with TRW, Alan decided to see if there was still a position for him back at AECL, and as a result, found himself working as a contractor on the development of a modern distributed control system for the CANDU 3, and subsequently CANDU 9 reactors in Saskatoon. This was followed by four years at Bruce A as AECL’s on-site representative on replacement project.

In 2000, Alan moved to Chalk River to head the Control and Operations Technology Branch, whose responsibilities included the early development work on a distributed control system for the Advanced CANDU Reactor. He retired from this position in 2006.

Alan’s only teaching exposure has been as a flight instructor, in which capacity he is still active.

7 Dr. Jin Jiang (chapter 11)

Professor, Western University

An NSERC/UNENE Senior Industrial Research Chair Professor, in the Department of Electrical and Computer Engineering, Western University in Canada. His research interests are in the areas of fault-tolerant control of safety-critical systems, instrumentation and control of nuclear power plants, and control of electrical power plants and power systems.

He is a fellow of Canadian Academy of Engineering, a fellow of IET (formally IEE), and a fellow of ISA. He is also a member of International Electrotechnical Commission (IEC) 45A subcommittee to develop industry standards on instrumentation and control for nuclear facilities. He also works closely with International Atomic Energy Agency (IAEA) on modern control and instrumentation for nuclear power plants.



8 Dr. Derek Lister (chapters 14, 15)

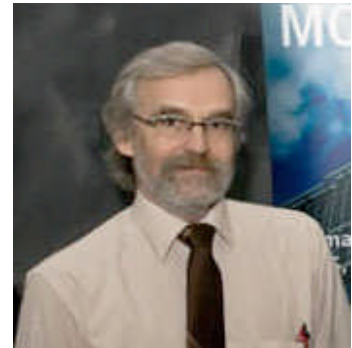
Derek Lister is Professor Emeritus in the Department of Chemical Engineering at the University of New Brunswick in Fredericton, where he continues to hold the Research Chair in Nuclear Engineering. He has a BSc and an MSc in chemical engineering from the University of Manchester and a PhD in physical chemistry from the University of Leicester. He entered the nuclear industry after graduation as an R&D Engineer with the English Electric Co. in the UK, where he worked on Magnox fuel systems and was on the commissioning team for the Hinkley Point A reactor. He joined AECL at Chalk River to develop CANDU fuel but soon moved to the Chemical Engineering Branch to work on coolant chemistry and corrosion, specialising first of all in activity transport. His research broadened over the years to cover many aspects of primary and secondary coolant chemistry and corrosion and in 1992, when Manager of the System Chemistry and Corrosion Branch, he accepted the appointment of Industrial Research Chair in Nuclear Engineering at UNB. His research still involves coolant chemistry and corrosion and besides his Chair research he manages a number of research contracts dealing specifically with power-plant corrosion. He serves on a number of national and international advisory committees. He is a Fellow of the Chemical Institute of Canada and as a Member of the Institution of Chemical Engineers in the UK he is a Chartered Engineer. He is a member of the Nuclear Institute and of the Canadian Nuclear Society, which presented him with an Outstanding Contribution Award in 2011.



9 Dr. Guy Marleau (chapter 3)

Professor, Department of Engineering Physics, École Polytechnique de Montréal.

Guy earned his BSc (1977) in physics from the University of Ottawa and his MSc (1979) and PhD (1983) in physics from McGill University. In 1983, he joined École Polytechnique de Montréal as a research scientist where he became a professor of nuclear engineering and engineering physics in 2006. From 2007 to 2013 he served as the director on the Institut de Génie Nucléaire at École Polytechnique de Montréal. For the last 30 years, he has been involved in the development of reactor physics simulation codes being one of the co-developers of the well known lattice code DRAGON that is used to solve the neutron transport equation for general 2D and 3D geometry. Over the years, he taught several courses in nuclear engineering including reactor statics, reactor simulation, radiation and radioprotection as well as nuclear technology. He received in 2010 the WB Lewis medal from the Canadian Nuclear Association and the Canadian Nuclear Society for his contribution to the development of advanced computational methods in reactor physics.



courriel/email: guy.marleau@polymtl.ca, Tel: (514)-340-4711 x 4204

adresse: Institut de genie nucleaire, Ecole Polytechnique de Montreal, C.P. 6079, succ. Centre-ville, Montreal, QC, H3C 3A7, Canada

10 Dr. Eleodor Nichita (chapters 4,5)

Dr. Eleodor Nichita, Associate Professor, Faculty of Energy Systems and Nuclear Science, University of Ontario Institute of Technology.

Eleodor holds a B.Sc. in Engineering Physics from the University of Bucharest, a M.Sc. in Health Physics from Georgia Institute of Technology, a M.Sc. in Medical Physics from McMaster University, and a Ph.D. in Nuclear Engineering from Georgia Institute of Technology. He is a Licensed Professional Engineer in the Province of Ontario. He has extensive nuclear-industry experience, beginning at the Institute for Nuclear Research in Pitesti, Romania, and continuing at Atomic Energy of Canada Ltd., where he worked on analysis and code development for the neutronic core-simulator, RFSP. In 2004 Eleodor joined the University of Ontario Institute of Technology where he is currently an Associate Professor and Director of the undergraduate Nuclear Engineering Program. He teaches courses in Reactor Physics, Transport Theory and Medical Imaging, and performs research in Nuclear Reactor Modelling and Simulation, Computational Particle Transport and Computational Medical Physics. Eleodor held the presidency of the Canadian Nuclear Society between 2009 and 2010.



11 Dr. Nik Popov (chapters 6, 7, 16)

Dr. Popov has over 35 years of experience in the nuclear industry in Canada and internationally in various disciplines including thermal-hydraulics, safety analysis, licensing, computer codes development and validation, and severe accident analysis. He worked at the University Cyril & Methodius at Skopje, Macedonia as lecturer and assistant professor (1978-88). Then he worked 23 years at the Atomic Energy of Canada (1988-2011), the last 3 years as the Director for Safety and Licensing. He also worked at SNC-Lavalin-Nuclear as Director of Safety and Licensing (2011-2014). He is the owner of DENIPO Consulting Ltd., which provides nuclear engineering consulting and educational services.



Dr. Popov was involved and managed various projects at AECL, such as the licensing of advanced CANDU reactor in Canada, USA, UK, and other countries. He was involved in international projects at AECL, such as serving as the Canadian representative in the G-8 safety review of the Kursk 1 RBMK nuclear power station in Russia (2001-2002); and leading the AECL team that interfaced with the European Commission Panel safety review to obtain approval to proceed with the Cernavoda 3-4 CANDU project in Romania (2009-2010). At COG he was the lead of the Severe Accident Working Group of the joint project JP-4426 working on the update of the Severe Accident Management Guidance documentation (2012-2014).

Dr. Popov is an Adjunct Professor at McMaster University, Engineering Physics (since 2000), where he teaches graduate courses at McMaster and the UNENE program (reactor thermal-hydraulics design and reactor thermal-hydraulics analysis). He is also an Adjunct Professor at the University Cyril and Methodius, Electrical Engineering, in Macedonia, where he teaches graduate courses (reactor engineering, nuclear energy industrial applications, and environmental aspects of power engineering). Dr. Popov is a lecturer of an international team organized by the University of Pisa, Italy (since 2006), delivering 3D-SUNCOP courses at annual international seminars. He teaches best-estimate and uncertainty assessment, safety culture in safety analysis, and development and validation of computer programs.

Dr. Popov participated in the preparation of over 200 publications and industrial reports.

Nikola K. Popov (B. Mech. Eng., 1976, M. Sci. Nucl. Eng., 1983, Ph.D. Mech. Eng. 1988, University of Zagreb, Croatia).

12 Dr. Benjamin Rouben (chapters 4, 5, 21)

Ben Rouben holds an Hons. B.Sc. from McGill University in Physics and Mathematics, and a Ph.D. in Nuclear Physics from the Massachusetts Institute of Technology. After pursuing research at the Université de Montréal for several years, he joined Atomic Energy of Canada Limited (AECL) in 1975, where he worked in many areas of reactor physics. From 1993 to 2006, Ben served as Manager of the Reactor Core Physics Branch at AECL.

Ben was President of the Canadian Nuclear Society (CNS) in 1997-98, and is currently its Executive Director. He was elected CNS Fellow in 1999. He is also a member of the American Nuclear Society (ANS), where he is active on the Reactor Physics Standards Committee and on the ANS International Committee.

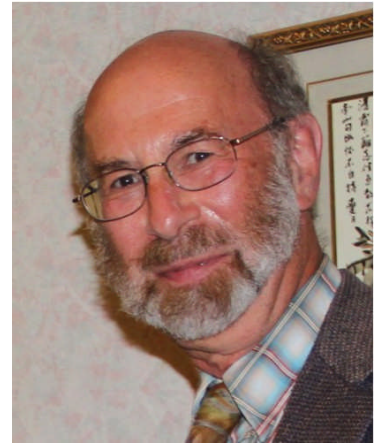
Ben retired from AECL in 2007 February. He is currently a consultant, and an Adjunct Professor at McMaster University and at the University of Ontario Institute of Technology. He teaches courses on Reactor Physics, Reactor Dynamics, Nuclear Fuel Management, Power Plant Operation, and Nuclear Concepts for Scientists and Engineers. He teaches also in the M. Eng. Program offered by UNENE, the University Network of Excellence in Nuclear Engineering, where he also serves as Secretary/Treasurer.

roubenb@alum.mit.edu



13 Dr. Victor G. Snell (chapter 13, 16)

Dr. Snell is the owner of VGSSolutions, a nuclear safety consulting and education firm. He has 38 years of nuclear experience, largely in the area of safety and licensing. As a member of the Senior Global Assessment Team in 2010-11, he helped review the Global Assessment of the NRU reactor. As Enhanced CANDU 6 Licensing Manager for AECL in 2008-9, he was responsible for obtaining a positive conclusion by the Canadian Nuclear Safety Commission for the Phase 1 pre-project design review. For ten years, as Director of Safety and Licensing at AECL, he had overall responsibility for interaction with regulatory agencies on AECL's product line of reactors. This included obtaining a favourable AECB report on licensability of CANDU 9; initial licensing of Wolsong 2 with KINS in Korea; negotiating licensing requirements for an unattended urban heating reactor (SES-I 0); and managing licensing for CANDU 3U with the USNRC, to the point of submittal of an application for Standard Design Certification. Other major projects included responsibility for pre-project licensing, safety design and Probabilistic Safety Analysis of AECL's Advanced CANDU Reactor (ACR) design; responsibility (for two years) for the safety analysis and licensing of the MMIR Project; participation in an IAEA-sponsored design review of a district heating nuclear plant in Gorky (the first mission of its kind in the Soviet Union); and team leader of a design review of CANDU & Chernobyl. In the nuclear education area, he is currently Programme Director, University Network of Excellence in Nuclear Engineering (UNENE), responsible for course development and deployment and administration of the nuclear M.Eng. programme. He has over fifty publications on Reactor Safety and Licensing.



Contact: Email: vgssolutions@rogers.com, Phone: (905) 824-6236

14 Mr. Mukesh Tayal (chapters 17, 18, 19)

Mukesh is an independent consultant in nuclear fuel. He has 37 years of nuclear experience in areas of nuclear fuel, safety analysis, stress analysis, and heat transfer. He has developed a criterion-based approach to qualify fuel designs which significantly increases the robustness of design verification while reducing its cost and schedule. He has performed, and provided technical leadership to, design, testing and analytical verification of fuels such as 37-element fuel for C6, Bruce, and Darlington stations; 43-element fuel for ACR (Advanced CANDU Reactor); and 61-element fuel for HAC (Highly Advanced Core) CANDU reactor. He has played key roles in developing several computer codes used by Atomic Energy of Canada Limited (AECL) for design assessments of nuclear fuels. These include: ELESTRES code for thermo-microstructural-mechanical performance of fuel under normal operating conditions; ELOCA-A code for accident analysis of fuel; FEAT code for non-linear thermal analysis; FEAST code for non-linear stress analysis; BOW code for non-linear lateral deflection; LONGER code for ridging and collapse; BEAM code for rigidity and vibration; FEED code for diffusion; and GASOUT code for transient release of fission gas. He has also developed science and models for several phenomena such as environmentally-assisted cracking (stress corrosion cracking), bowing, longitudinal ridging, and endplate fatigue. Mukesh has also worked on advanced fuel cycles such as thorium fuel and enriched high-burnup fuel. Mukesh received the CNA/CNS award for Innovative Achievement in 2007 and has authored/co-authored well over 200 technical documents in the area of nuclear fuel.



Mukesh Tayal, P. Eng., (B. Tech., Mech. Engg., 1970; M. Sc., Mech. Engg., 1973, Univ. of Sask., Canada).

15 Dr. Edward J. Waller (chapter 12)

Faculty of Energy Systems and Nuclear Science, University of Ontario Institute of Technology

Ed earned his BSc in Physics and MScE in Chemical Engineering at the University of New Brunswick (UNB) and his PhD in Nuclear Engineering at Rensselaer Polytechnic Institute, New York (RPI). He worked for over 15 years in industry for Science Applications International Corporation, primarily in threat assessment, health physics and applications of radiation. In 2003 he joined the University of Ontario Institute of Technology. He is currently an NSERC Industrial Research Chair in Health Physics and Environmental Safety. Ed is a Professional Engineer (PEng), Certified Associate Industrial Hygienist (CAIH) and Certified Health Physicist (CHP). He teaches radiation protection, health physics, environmental effects of radiation, Monte Carlo methods and nuclear forensics at UOIT, and performs research in areas of emergency response, radiation dosimetry, applied health physics, radiation safety, and threat assessment.



