

PROGRAMME

Workshop on Digital Innovation in Nuclear Unleashing the Power of AI

1 October 2024
Ottawa, Canada

Programme

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The Westin Hotel Ottawa

11 Colonel By Dr, Ottawa, ON K1N 9H4, Canada

Opening remarks

8:30 Diane Cameron, Head of Division, Nuclear Energy Agency

Keynote 1: What is AI? What are its best uses?

8:35 Dr Nelli Babayan, AI Director, U.S. Federal Civilian, Microsoft

Session 1: Using AI to accelerate the deployment of nuclear power

9:00 Sonia Iqbal, Program Manager – SMR Program, CANDU Owners Group
Mohammad Movassat, Senior Manager – Data Analytics, Ontario Power Generation
Matt Hall, Senior Director of Strategic Projects, Evergy
Ben Cameron, Staff – Level II, EPRI

10:00 Break

Session 2: Rethinking nuclear applications around AI

10:30 Dr Hogeon Seo, Senior Researcher, Applied Artificial Intelligence Section, KAERI
Bharath Nangia, CEO, NPX
Craig Stover, Senior Program Manager – Advanced Nuclear Technology, EPRI
Professor Nawal K Prinja, Technology Director, Jacobs
Brian Mori, Ontario Power Generation

Hands on experience: Unlocking AI for engineering excellence

11:30 Professor Nawal K Prinja, Technology Director, Jacobs

12:30 Lunch

Keynote 2: How can AI profoundly transform industries

13:30 Elbert Van Der Bijl, Director of Marketing & Solutions Consulting, Yokogawa Corporation of America

Session 3: Changing organisations with AI: From data management to cultural shift

14:00 Professor Nawal K Prinja, Technology Director, Jacobs

Dr Andreas Korinek, Director, Science & Technology Strategy & Collaborations, Canadian Nuclear Laboratories

Vivek Agarwal, PhD, Distinguished Staff Scientist and Senior Manager Advanced Reactor Technology & Design Department, Idaho National Laboratory

Dr Nelli Babayan, AI Director, U.S. Federal Civilian, Microsoft

15:00 Break

Session 4: Regulating AI: Opportunities and challenges

15:30 Assistant Professor Majdi Radaideh (RAD), University of Michigan

Barry Hogan, Nuclear Safety Principal Inspector, Office for Nuclear Regulation

Matt Dennis, Data Scientist, U.S. Nuclear Regulatory Commission

Kevin Lee, Canadian Nuclear Safety Commission

Ku Young Chung, Korean Institute of Nuclear Safety

Closing remarks: Unleashing the power of AI and what's next?

16:45 Rumina Velshi, Former Chief Executive Officer, Canadian Nuclear Safety Commission

17:30 End of day

Biographies – In order of appearance



Diane Cameron, Head of the Nuclear Technology Development and Economics Division, Nuclear Energy Agency

Diane Cameron is Head of the Nuclear Technology Development and Economics Division at the OECD Nuclear Energy Agency (NEA). In her role at the NEA, she leads an expert team of economists and scientists that supports energy policy and nuclear energy policy development among NEA Member Countries by advancing evidence-based, authoritative assessments and analyses in the areas of nuclear economics, financing, and cost reduction, as well as nuclear technology, innovation, and the fuel cycle. From 2014 to 2021, Ms Cameron was Director of the Nuclear Energy Division with the Government of Canada. As Director, she headed up the division responsible for leading and co-ordinating Canadian public policy on nuclear energy and served as Chair of Canada's Small Modular Reactor (SMR) Roadmap and Action Plan. She joined the Government of Canada in 2007 to work on energy, environment, and economic policy – including international relations and negotiations. Prior to her tenure with the Government of Canada, she worked in management consulting and engineering in the private sector specialising in global value chains and international logistics. A Canadian national, Diane holds a Master's degree in Technology Policy from Massachusetts Institute of Technology (MIT) where she was named Alfred Keil Fellow for Wiser Uses of Science and Technology. Diane also holds a Bachelor's degree of Applied Science in Systems Design Engineering from the University of Waterloo.



Dr Nelli Babayan, AI Director, U.S. Federal Civilian, Microsoft

Dr Nelli Babayan is the AI Director at Microsoft, overseeing AI initiatives with all U.S. Federal Civilian agencies. She leads virtual cross-solution teams to advance mission outcomes, directing strategy and secure implementation of AI by fostering collaboration and developing mission-specific use-cases. Nelli supports government efforts with her extensive and diverse background, having managed research and policy projects at DC-based think-tanks, lectured at universities, published in peer-reviewed journals, and led international projects for USAID and the European Union.



Sonia Iqbal, Program Manager – SMR Program, CANDU Owners Group

Sonia Iqbal is the Program Manager for the Small Modular Reactor (SMR) Program at CANDU Owners Group (COG). Prior to joining COG, she held various positions at CSA Group, CANDU Energy and Atomic Energy of Canada Ltd. (AECL).

Sonia has over 20 years of experience in the Canadian nuclear industry, with expertise in project management, licensing, nuclear safety and design. She has extensive experience with nuclear new build and refurbishment projects. She is a member of the IAEA Technical Working Group on SMRs and the IAEA Nuclear Harmonization and Standardization Initiative Working Group on Common Approaches to Codes and Standards for SMRs.



Mohammad (Mo) Movassat, Senior Manager – Data Analytics, Ontario Power Generation

Mo Movassat is a Senior Manager at the Data Analytics Department at Ontario Power Generation (OPG). Reporting to Enterprise Operations, the team provides various analytics and AI services to the business to support equipment reliability, work management, human performance, etc.

Mo holds a PhD in Mechanical Engineering and before entering data analytics world, he was a Computational Fluid Dynamics engineer at OPG and before that at AECL (CNL).



Matt Hall, Senior Director of Strategic Projects, Evergy

Matt is the Senior Director of Strategic Projects at Evergy's Wolf Creek Generating Station and leads their innovation strategy. He has over 25 years of nuclear experience at three utilities and has had a wide range of leadership responsibilities to include Innovation, IT, Operations, Engineering, Cyber Security, Strategic Planning and Risk Oversight. Matt has an M.S. in Electrical Engineering and an M.S. in Operations Management from the University of Arkansas.



Ben Cameron, Staff – Level II, EPRI

Ben Cameron graduated from the University of Texas in May 2024 with a master's degree in computer science. He has been working full time as a data scientist at EPRI since then, after coming in as an intern in June of 2023. While at EPRI Ben Cameron has worked with data science, technology, and AI in the nuclear field.



Dr Hogeon Seo, Senior Researcher, Applied Artificial Intelligence Section, KAERI

Hogeon Seo obtained his Bachelor of Science in Mechanical Engineering in 2013 and his Ph.D. in Convergence Mechanical Engineering from Hanyang University in 2018. He is an Associate Professor of Artificial Intelligence at the Korea National University of Science and Technology (UST), a Senior Researcher at the Korea Atomic Energy Research Institute, and the Director of International Affairs at the Korean Society of Non-destructive Testing. His research applies artificial intelligence to simulation acceleration, multi-modal data fusion, non-destructive evaluation, and prognosis.

Since 2019, Dr Seo has been engaged in a National Technology Centre project to develop a supercomputing-based virtual nuclear reactor platform. He is the principal investigator of a project on flaw detection in ultrasonic non-destructive evaluation using meta-learning. In this project, he also investigates multi-channel signal analysis and multi-modal data for AI-driven anomaly detection, fault classification, and object segmentation. His recent research activities have focused on the acceleration of AI-powered simulations for nuclear reactors and the utilization of robotic process automation to enhance operational efficiency by applying large language models.



Bharath Nangia, CEO, NPX

Bharath Nangia leads Nuclear Promise X (NPX) as its CEO, a company focused on applying innovation to create a sustainable nuclear sector. With extensive experience in leadership and Canadian nuclear projects, Bharath cherishes entrepreneurship and contributing to climate solutions through nuclear efficiency.



Craig Stover, Senior Program Manager – Advanced Nuclear Technology, EPRI

Craig Stover leads the Advanced Nuclear Technology (ANT) program which is focused on developing technology and solutions to support the deployment of the next generation of new nuclear power plants. Craig is also responsible for the Nuclear Beyond Electricity (NBE) Initiative which is enabling nuclear plants to participate in new energy markets.

Over his 10+ years at EPRI, Craig has worked in several different roles. Craig has managed the Balance of Plant NDE Innovation program. He led the advanced manufacturing and materials area in the Advanced Nuclear Technology (ANT) program. Craig also led the heat exchanger and thermal performance research portfolio for the Balance of Plant Corrosion (BOPC) program.

Craig joined EPRI after spending 6 years with South Carolina Electric & Gas (SCE&G). During his time at SCE&G, Craig worked on the VC Summer Project where he supported licensing and constructing two new AP1000 nuclear power plants.

Craig holds a BS degree in Mechanical Engineering from the University of South Carolina and an MBA from Ohio University.



Professor Nawal K Prinja, Technology Director, Jacobs

Professor Nawal Prinja has 43 years of academic and industrial experience in the nuclear civil and defence sectors. He is the Technology Director of Jacobs (Clean Energy) and held a position of Honorary Professor at four British universities (Aberdeen, Brunel, Bangor and Bolton). He is an expert on codes and standards and has been working on Harmonisation of Nuclear Codes for over 10 years. He has been on IAEA missions to China, South Africa, UAE, Spain and Poland and is a member of their AI Working Group. He was appointed as an advisor to the UK Government to help formulate their long-term R&D strategy for nuclear industry and was a member of the Fusion Advisory Board of UKRI. He chaired a Technology Focus Group on Artificial Intelligence in Science and Technology Advisory Group of the Ministry of Defence, participates in a number of international committees and represents the UK at the Senior Industry Advisory Panel of the Generation IV International Forum for the next generation of nuclear reactors. He was awarded the IMechE Donald Julius Groen 2022 prize for an outstanding contribution to the advancement of pressure systems technology. He has delivered workshops on practical use of AI for engineers and has applied AI to accelerate and derisk engineering projects.



Elbert Van Der Bijl, Director of Marketing & Solutions Consulting, Yokogawa Corporation of America

Elbert van der Bijl joined Yokogawa in 2008 and has held various roles in Marketing and Sales throughout his tenure. He holds a master's degree in chemical engineering from Delft University of Technology and has been working in the industrial automation industry for 25 years. In addition to his passion for Co-innovating with end-users in the process industry, Elbert has worked closely with the headquarter organization in Japan as well as several R&D centres within Yokogawa globally on new technology developments including AI.



Andreas Korinek, Director, Science & Technology, Strategy & Collaborations, Canadian Nuclear Laboratories

Andreas Korinek holds a PhD in Science from the Max-Planck Institute for Biochemistry and has developed high-throughput image processing and machine learning tools for electron microscopy and spectroscopy. He has co-authored a number of publications on material science in nuclear applications. His current portfolio includes governance of conduct of research, artificial intelligence applications, scientific high-performance computing and data management for CNL's Science & Technology mission.



Vivek Agarwal, PhD, Distinguished Staff Scientist and Senior Manager Advanced Reactor Technology & Design Department, Idaho National Laboratory

Vivek Agarwal is a distinguished staff scientist and senior manager of the advanced reactor technology & design department, as well as the technical lead of the Fission Battery Initiative at INL. He received a Bachelor of Engineering in Electrical Engineering from University of Madras, India in 2001, an M.S. in Electrical Engineering from University of Tennessee, Knoxville in 2005, and a Ph.D. in Nuclear Engineering from Purdue University in 2011. He joined INL as a researcher in 2011 and since then has led projects under multiple DOE programs such as Light Water Research Sustainability, Nuclear Energy Enabling Technologies – Advanced Sensors and Instrumentation Program, Technology Transition Office, and others. Through these programs, he has worked with nuclear industry developing solutions that enable automation in plant operation and maintenance. For advanced reactor technologies, he is researching autonomous controls and operation to enable flexible operation for expanded applications and markets. He was awarded 2019 Presidential Early Career Awards for Scientists and Engineers. In 2016 and 2023, he was awarded the Laboratory Director Early Career and Research Excellence Awards, respectively. In 2023, he was also honoured as the Asian-American Most Promising Engineer of the Year. In 2024, the International Atomic Energy Agency's Innovation to Support Operating Nuclear Power Plants Network selected the technology "Three-dimensional Printed Valve Position Indicator Sensor System," invented by Vivek Agarwal, for the Innovation Award in the Advanced Manufacturing category.



Majdi Radaideh (Rad), Assistant Professor University of Michigan

Prof. Majdi I. Radaideh (Rad) is an Assistant Professor at the University of Michigan, where he leads the AIMS lab (Artificial Intelligence and Multiphysics Simulations). The lab focuses on the intersection of nuclear reactor design, Multiphysics modelling and simulation, advanced computational methods, and machine learning algorithms to advance reactor research and enhance the sustainability of the current reactor fleet. AIMS currently has 18 members, including 2 postdocs, 9 Ph.D. students, 3 master's students, and 4 undergraduate students, all from nuclear engineering and computer science backgrounds. Prof. Rad earned his B.Sc. in Nuclear Engineering from the Jordan University of Science and Technology and his M.S. and Ph.D. in Nuclear Engineering from the University of Illinois at Urbana-Champaign, with minors in Computational Science & Engineering and Applied Statistics. Following his Ph.D., he held various R&D positions at MIT and Oak Ridge National Laboratory (ORNL), where he completed his postdoctoral studies and collaborated with several national labs and industry partners. He is the 2023 Distinguished Early Career Award recipient from the U.S. Department of Energy's Office of Nuclear Energy. Currently, he leads multiple projects for the U.S. Department of Energy and the U.S. Nuclear Regulatory Commission, focusing on AI applications and regulation in areas such as reactor design optimization, autonomous control, natural language processing, generative AI, and explainable and licensable AI.



Matt Dennis, Data Scientist, U.S. Nuclear Regulatory Commission

Matt Dennis is a Data Scientist at the U.S. Nuclear Regulatory Commission (NRC) in the Office of Nuclear Regulatory Research and leads the agency's efforts in developing and implementing the NRC AI Strategic Plan. Additionally, Matt supports the development and maintenance of the MACCS consequence analysis suite of codes and conducts severe accident consequence analyses. Prior to joining the NRC, Matt held positions at Northrop Grumman and Sandia National Laboratories. As a Senior Reliability Engineer with the Reliability Analysis Laboratory at Northrop Grumman's Mission Systems Baltimore, he supported sustainment efforts for Global Hawk, Triton and Phoenix unmanned aircraft systems. As a Senior Member of the Technical Staff in the Risk and Reliability Analysis department at Sandia National Laboratories, Matt led research and development projects supporting risk assessment and consequence analysis for new and operating nuclear reactors, as well as nuclear waste transportation. He has a B.S. and M.S. in Nuclear Engineering from the Missouri University of Science and Technology.



Kevin Lee, Lead, Innovation and Research Hub, Canadian Nuclear Safety Commission

Kevin Lee currently leads the Canadian Nuclear Safety Commission's (CNSC) team analysing Disruptive, Innovative and Emerging Technology (DIET). This team aims to ready the CNSC to evaluate and regulate nuclear activities that will implement DIET. Kevin is also engaged in work readying the CNSC's regulatory framework for the regulation of Advanced Reactor Technology (ART) and Small Modular Reactors (SMRs). He is also active on numerous other policy and regulatory files at the CNSC across the broad spectrum of the Canadian nuclear sector, including fusion technologies. Kevin serves on the following International Atomic Energy Agency (IAEA) groups:

- Steering committee for the Network for Innovation to Support Operating Plants (ISOP)
- Working group on Explainable AI for the Nuclear Power Industry
- Working group on Approaches to Fusion regulation

Kevin is also active with the Canadian Nuclear Society, serving in the following capacities:

- Co-Chair of the CNS Annual DIET Conference and DIET Division Chair
- Plenary Committees for the 2024 Generation Four Small Reactors (G4SR) Conference and the 2025 Annual Conference.
- Organizing Committee of the 2024 CNS Annual Conference

His over 30 years of providing regulatory, policy and operational expertise, and extensive experience in government includes nearly a decade spent as Special Assistant to the Right Hon. Jean Chretien, former Prime Minister of Canada.



Dr Ku Young Chung, AI technologies in Nuclear Facilities: Expectations and Regulatory Challenges

Dr Chung obtained his Ph.D. in Nuclear Engineering from Seoul National University in 2003. Upon completing his studies, he joined the Korea Institute of Nuclear Safety (KINS) the same year. KINS is a technical expert organization specializing in regulatory activities for nuclear installations, including inspections and reviews.

Throughout his tenure at KINS, Dr Chung has held various key positions. In 2016, he was appointed Head of the Severe Accident and Risk Assessment Department, followed by Director of the Safety Policy Division in 2018. In 2020, he assumed the role of Executive Director for the Management and Planning Office, and in 2023, he served as Executive Director of the Nuclear Safety Office.

Currently, Dr Chung is working as a Principal Researcher in the Regulatory Policy Department at KINS.



Rumina Velshi, Strategic Advisor, Torys LLP. Former President and CEO, Canadian Nuclear Safety Commission

With over four decades of experience in the nuclear energy industry, Rumina is a senior leader and strategic advisor to investors, project proponents, and technology developers worldwide, as well as governments, international organizations, and regulatory agencies.

Rumina is sought after by organizations around the world for her strategic and operating advice on matters ranging from safety, compliance, and regulatory issues, leadership, to investment due diligence, strategic transactions, and innovative nuclear projects, including small modular reactor projects.

Over the course of her career, Rumina worked in various capacities as a senior executive at Ontario Hydro and Ontario Power Generation. She most recently served as President and CEO of the Canadian Nuclear Safety Commission, a role she held for five years after previously serving as a Commission member for seven years. Rumina is currently on the Board of Directors of SaskPower and Hydro Ottawa. She is also a cofounder and principal of a startup nuclear energy company, ZettaJoule, in Japan and Strategic Advisor at Torys LLP.

Rumina also holds numerous positions with international nuclear organizations, including:

- Member, International Nuclear Safety Advisory Group to the Director General of the International Atomic Energy Agency.
- Chair, OECD Nuclear Energy Agency High Level Group on Stakeholder Engagement and Trust; and
- International Expert Advisor to Japan's Nuclear Regulation Authority.

Recognition and Awards:

- In November 2023, Rumina was presented the "Icon of Nuclear" award by the International Framework for Nuclear Energy Cooperation in recognition for her global leadership as a nuclear regulator, the vision she has demonstrated as an agent of change and the mentoring she has provided to people around the world, especially women in the nuclear sector.
- Non-resident Senior Fellow at the Atlantic Council's Nuclear Energy Policy initiative, May 2024
- Distinguished Fellow at Munk School of Global Affairs and Public Policy

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