ONTARIO TECH UNIVERSITY
IAEA COLLABORATING CENTRE

INTEGRATED ENERGY SYSTEMS WITH ADVANCED NUCLEAR POWER REACTORS

OntarioTech UNIVERSITY

IAEA International Atomic Energy Agency

2021 – 2022

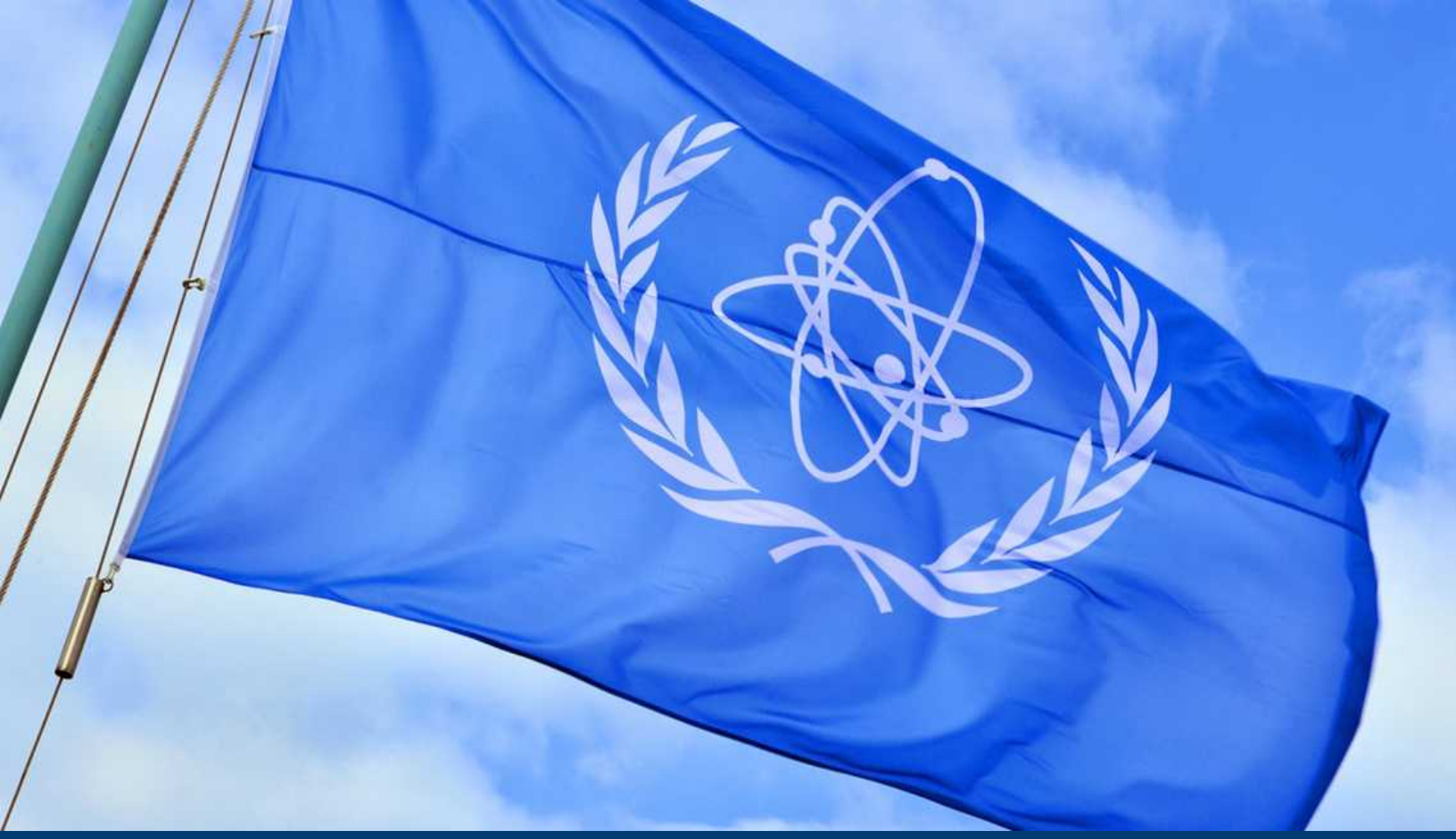
Message from the Collaborating Centre Liaison Officer at Ontario Tech

"Since the inception of engineering at Ontario Tech University, clean energy is on the top of our research priorities. We offer the only accredited undergraduate nuclear engineering degree in Canada, and our clean energy research laboratory hosts state-of-the-art hydrogen research. The IAEA Collaborating Centre is a testament to Ontario Tech's strength in nuclear energy and integrated energy systems. The Centre brings tremendous opportunities to build on this strength, not only in terms of research collaborations but also in education and training."

Dr. Hossam Kishawy

Dean, Faculty of Engineering and Applied Science
Ontario Tech University

OntarioTech UNIVERSITY



Message from the Collaborating Centre Liaison Officer at the IAEA

"As an IAEA Collaborating Centre, Ontario Tech University has the capability to assist the IAEA in implementing its programmatic activities on deploying the integrated energy systems using advanced nuclear power reactor technologies, including Small Modular Reactors (SMRs). The university has top-notch faculty members to conduct efficient cooperative frameworks that encourage highly experienced institutions in Canada to share resources, knowledge, and expertise to accelerate the deployment of SMRs and microreactors in IAEA Member States, including Canada."

Dr. Hadid Subki

Technical Lead
SMR Technology Development
Department of Nuclear Energy, IAEA

IAEA
International Atomic Energy Agency
Atoms for Peace and Development

Ontario Tech University delivers a leading-edge learning environment that combines the pursuit of academic excellence, research opportunities, hands-on skills and vibrant student life.

Office of Vice-President, Research and Innovation (VPRI), Faculty of Engineering and Applied Science (FEAS), Clean Energy Research Laboratory (CERL), Energy Systems and Nuclear Science Research Centre (ERC), Centre for Small Modular Reactors (CfSMR), Brilliant Energy Institute (BEI), and the Brilliant Catalyst (BC) are some of Ontario Tech's talent pillars that work together to ensure successful implementation of the IAEA Collaborating Centre Workplan.

ONTARIO TECH UNIVERSITY DESIGNATED AS IAEA COLLABORATING CENTRE

APRIL 2021

On 22 April 2021, the International Atomic Energy Agency (IAEA) designated Ontario Tech University as a Collaborating Centre to support IAEA activities. Ontario Tech is the first institution in Canada to receive such a designation.

This partnership involves researching advanced nuclear power technology, such as small modular reactors (SMRs), as well as the non-electric applications of nuclear energy, such as desalination for producing potable water, and hydrogen production or providing heat for industrial processes.

Ontario Tech University plays a prominent role in researching energy issues, with leadership roles in several fields, from hydrogen to nuclear energy and nuclear science, small modular reactors, advanced data analytics and software development.

SIGNATORIES CEREMONY

Mikhail Chudakov, IAEA Deputy Director General and Head of the Department of Nuclear Energy presents the IAEA Collaborating Centre plaque to HE Heidi Hulan, Ambassador of Canada to Austria (2018–2021) and Chairperson of the IAEA's Board of Governors (2020–2021).

The agreement was signed by Deputy Director General, Head of the IAEA Department of Nuclear Energy, Dr. Mikhail Chudakov in the presence of HE Heidi Hulan, Ambassador of Canada to Austria and its Permanent Representative to the United Nations organizations located in Vienna (2018–2021).

The agreement includes developing of Education & Training (E&T) resources toward achieving effective capacity-building on topics related to SMRs and integrated nuclear-renewable energy systems, as well as nuclear cogeneration.

In addition, Ontario Tech plans to support IAEA activities to attract more women to nuclear science and engineering and encouraging outstanding graduate students to apply for IAEA Marie Sklodowska Curie Fellowship Programme (MSCFP).

This agreement embodies the spirit of innovation and collaboration that we are going to need in the years ahead to build back better.

H.E. Heidi Hulan

Ambassador of Canada to Austria (2018–2021) and Chairperson of the IAEA's Board of Governors (2020–2021)

Ontario Tech IAEA Collaborating Centre's topics are very timely as we face the great challenge of producing enough energy to power global development, while ensuring we do no harm to our planet. Nuclear power, as a clean, reliable and sustainable source of energy can help us meet that challenge. And innovation, of course, is key to that success.

Dr. Mikhail Chudakov

IAEA Deputy Director General
Head of the Department of Nuclear Energy

This IAEA designation validates Ontario Tech University's expertise and leadership in numerous clean energy fields. To be recognized by the IAEA as a collaborating centre firmly establishes our research as impactful on the international stage. The Collaborative Centre designation is a timely initiative given the momentum the university has in all aspects of energy.

Dr. Steven Murphy

President and Vice-Chancellor
Ontario Tech University

LAUNCH EVENT

NOVEMBER 2021

In light of its designation as an IAEA Collaborating Centre, Ontario Tech hosted an online event from 2 to 3 November 2021 with the participation of senior management and experts from the IAEA and Canada's key energy stakeholders.

Dr. Les Jacobs, Vice-President of Research and Innovation at Ontario Tech University, moderated the two-day event. Dr. Steven Murphy, President and Vice-Chancellor at Ontario Tech University, alongside Dr. Mikhail Chudakov, Deputy Director General and Head of the Department of Nuclear Energy at the IAEA, delivered the welcoming remarks to the event participants.

Speakers addressed commitments to renewable energy and diversifying the energy sector. The event highlighted the Ontario Tech's long-lasting collaboration with the participating institutes and organizations, and over 400 individuals attended. Together, these leaders will support the implementation of the Collaborating Centre Workplan and its commitment to the IAEA and its Member States.

LAUNCH EVENT

SPEAKER REMARKS

Dr. Gina Strati

The Special Science Policy Advisor at the Office of the Chief Science Advisor of Canada underscored the value and pathways for strengthening the link between scientific researchers and policymakers. She also highlighted the importance of raising public awareness of science, including all aspects of nuclear energy and its uses.

Mr. Mike Rencheck

The President and CEO of Bruce Power presented the company's commitment to leading Canada on the path to a zero-emissions future with the strategy of unlocking the potential of other technologies complementary to nuclear power, such as isotope storage, renewables, hydrogen, and electrified vehicles.

Mr. Steve Gregoris

The Chief Nuclear Officer at Ontario Power Generation (OPG) delivered a talk highlighting OPG's partnership with Ontario Tech to invest in recruiting and retaining students from underrepresented groups, such as Indigenous and female-identifying students, within the engineering profession. The goal is to build a diverse population of potential employees for the energy sector in skilled trades, science, engineering and technology.

Mr. Jerry Hopwood

The President of the University Network of Excellence in Nuclear Engineering (UNENE), delivered high-level remarks highlighting the opportunities encouraged by the Centre. UNENE is a mechanism for industry and universities to work collaboratively to identify, fund and advance the most relevant nuclear research and education.

Ms. Christina Van Drunen

The Director of Science and Technology Strategy and Collaboration at the Canadian Nuclear Laboratories (CNL) stressed the long-term partnership with Ontario Tech and the work being conducted collaboratively on hydrogen production technologies using nuclear energy, as well as CNL work on establishing a new clean energy research park.

SEMINAR ON OPPORTUNITIES AND CHALLENGES FOR DEPLOYMENT OF ADVANCED REACTORS

DECEMBER 2021

As part of its knowledge transfer and Education and Training (E&T) activities, Ontario Tech held a special edition of the University Speaker Spotlight on 7 December 2021, featuring Dr. Ramesh Sadhankar, Senior Advisor at Natural Resources Canada. The seminar's title was “Opportunities and Challenges for Deployment of Advanced Reactors.” Dr. Stefano Monti from the IAEA moderated the event.

The seminar discussed the innovative approaches for the successful deployment of advanced reactors, including renewable-nuclear hybrid energy systems, cogeneration of alternative products and large-scale energy storage, the challenges for deployment of advanced nuclear reactors in the future energy market with an increasing share of variable renewable sources, the economic considerations for new nuclear projects, the requirements for flexible operation, and policies conducive to the deployment of advanced reactors.

"As we transition to a carbon emissions-free future, the IAEA Collaborating Centre at Ontario Tech University brings together our researchers and industry partners to make valuable contributions to the energy sector around the world. As a key component of Ontario Tech’s Brilliant Energy Institute, the IAEA Collaborating Centre will be a vital national and international resource that drives new research and discovery on small modular reactors and integrated energy systems."

Dr. Les Jacobs

Vice President, Research and Innovation, Ontario Tech University

WORKSHOP ON INTEGRATED NUCLEAR-RENEWABLE ENERGY SYSTEMS

MARCH 2022

In support of engineering and technology (E&T) activities within the scope of the Collaborating Centre Workplan, Ontario Tech held a two-day online workshop on nuclear and renewable integrated energy systems on 24–25 March 2022 with the participation of 730 registrants from 78 Member States. Ms. Aline Des Cloizeaux, Director of the Nuclear Power Division at IAEA, joined Dr. Steven Murphy, President, and Dr. Les Jacobs, Vice-President of Research and Innovation at Ontario Tech, in delivering the opening remarks at the workshop.

The first day of the event hosted distinguished speakers from Idaho National Laboratory and IAEA, along with experts from Ontario Tech who delivered talks on nuclear reactor technologies and hybridization with renewables. The scope of the second day focused on the role of integrated nuclear-renewable energy systems in the hydrogen economy, with several speakers from Canadian Nuclear Laboratories (CNL), Idaho National Laboratory (INL), the International Association of Hydrogen Energy (IAHE) and IAEA.

"The IAEA acknowledges Canada's important international role in R&D and deployment of advanced nuclear power reactors, including the coming newbuilds in Ontario using small modular reactors and microreactors in integrated energy systems. These topics are timely as we face the challenge of meeting energy demand to power global development. Through Ontario Tech University as an IAEA Collaborating Centre, we will continue to explore how nuclear energy can be used in a more sustainable and versatile way, beyond solely electricity production. Innovation is key to that success."

Ms. Aline des Cloizeaux

Director, Division of Nuclear Power
Department of Nuclear Energy, IAEA

FIRST CANADA-IAEA NUCLEAR ENERGY MANAGEMENT SCHOOL

MAY 2022

On 9–10 May 2022, Ontario Tech University hosted the first Canada-IAEA Nuclear Energy Management School, organized in collaboration with the CANDU Owners Group (COG) and the University Network of Excellence in Nuclear Engineering (UNENE).

The school was in line with the goal of the IAEA Collaborating Centre to support young professionals in the nuclear sector by enhancing managerial & technical competencies essential for maintaining national nuclear energy . Several experts delivered lectures and training sessions from the IAEA, the Collaborating Centre, and other organizations and stakeholders from the nuclear sector in Canada.

Twenty-one young professionals from ten IAEA Member States participated in the school. The school had over sixty-five percent female representation among the international participation and fifty-seven percent in total.

THE NUCLEAR TRAINING AND SIMULATION FORUM

JUNE 2022

Ontario Tech University hosted the first Canadian Nuclear Training and Simulation Forum between 22 to 24 June 2022. It was co-organized with the CANDU Owners Group (COG), the Organization of Canadian Nuclear Industries (OCNI), and Imagine4D. The event was supported by Westinghouse and Ontario Power Generation (OPG) and several digital and software companies including L3Harris, Alithya, EXO Insights, & Tecnatom.

The event brought together those who are involved with simulators, training personnel, training managers, operation support managers and anyone with an interest in nuclear power plant simulators or those who develop or use simulation tools for nuclear power plants. This event was an excellent opportunity for networking, benchmarking and business development with industry peers, contractors, vendors, suppliers and regulators.

THE WORLD HYDROGEN ENERGY CONFERENCE

JUNE 2022

Ontario Tech University, in cooperation with the IAEA, supported the International Hydrogen Energy Association and the Turkish National Hydrogen Association in organizing the 23rd World Hydrogen Energy Conference (WHEC). The conference was held on 26 to 30 June 2022 in Istanbul, Turkey, as a hybrid event.

Since its inception in 1976, WHEC continues as a large and prestigious forum on hydrogen energy that brings together leading energy experts, decision-makers, scientists and experts from the academic, industrial and manufacturing sectors. This year, the conference has a separate track on nuclear hydrogen production that discussed the different aspects of the topic, including the state-of-the-art technologies and advances in research and development, as well as the projects considered in different counties for the near-term deployment of large-scale carbon-free hydrogen production using nuclear energy.

THE ROLE OF NUCLEAR ENERGY IN THE HYDROGEN ECONOMY

NOVEMBER 2022

Ontario Tech held this workshop from 19 to 21 November 2022 in collaboration with the CANDU Owners Group (COG), the University Network of Excellence in Nuclear Engineering (UNENE), and the Nuclear Hydrogen Initiative (NHI).

The workshop focused on the status and advances in different hydrogen technologies and their potential for coupling with the current nuclear power plants as well as the advanced nuclear reactors and SMRs, and the ongoing development in nuclear reactor designs with a focus on small and micro reactors and their role in the transition towards a sustainable hydrogen economy.

Speakers from the IAEA and Ontario Tech were joined by presenters and panelists from international institutes as well as Canada's experts from the industrial and academic sectors.

The workshop activities were sponsored and supported by Bruce Power, Ontario Power Generation, Terrestrial Energy, & Tractebel-engie.

NEW PARTNERSHIP TOWARD TALENT DEVELOPMENT AND RESEARCH GROWTH IN THE NUCLEAR SECTOR

NOVEMBER 2022

Ontario Tech signed an agreement with Atomic Energy of Canada Limited (AECL), Canada's nuclear Crown Corporation, and Canadian Nuclear Laboratories (CNL), Canada's premier nuclear science and technology laboratory, to pursue collaborative research opportunities.

This agreement will create opportunities to achieve mutual strategic goals and objectives and position themselves for an exciting new era of nuclear energy in Canada.

As part of the new agreement, the organizations will work together to facilitate joint research programs, foster the professional development of highly qualified personnel, develop academic and non-academic programming, and encourage shared access to specialized infrastructure.

Memorandum of Understanding signing ceremony with Dr. Steven Murphy, President, Ontario Tech (left) with Dr. Jeff Griffin, Vice-President, Science and Technology, CNL (November 28, 2022)