

# G4SR-5

Generation IV and Small Reactors



## SUBMIT A PAPER TO CANADA'S LARGEST SMR CONFERENCE

The G4SR-5 Technical Program Organizing Committee welcomes the submission of full-length technical papers in the G4SR-5 Proceedings.

The Westin Ottawa

**VISIT [G4SR.ORG](http://G4SR.ORG) FOR MORE INFORMATION**

October 1-4, 2024

**G4SR-5 will organize a set of specialized Technical Sessions along the following track themes:**

- Research & Development (R&D) Supporting Advanced Reactor (ARs) & SMRs
- R&D Supporting Micro reactors, Research Reactors & Extraterrestrial Reactors
- Security, Safety Assessment & Regulatory Activities
- Public Policy & Engagement
- Economic, Financing, & Business Models
- Nuclear-Enabled Integrated & Hybrid Energy Systems & Energy Supply Mix
- Skill Development & Nuclear Knowledge & Work Force Management
- Manufacturing & Supply Chain
- Deployment
- Decommissioning, Waste Management, & Fuel Cycles

**\* Please see page 2 of this flyer for submission instructions and deadlines**

All authors will present their papers in English, about 20 minutes will be allotted for each paper. At least one author is required to register for the conference by the early bird registration deadline. Authors should submit a one-page ~200-word abstract (text only) with contact information, and preferred track by April 18th, 2024. Following abstract acceptance, authors

will be asked to submit full papers and a short note (<100 words) biography note.

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# PRELIMINARY TECHNICAL TRACK THEMES

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## RESEARCH & DEVELOPMENT (R&D) SUPPORTING ADVANCED REACTORS (ARS) AND SMRS

- R&D for the verification of innovative passive and inherent safety features.
- Materials and structural issues for advanced reactors.
- R&D into high-level safety, safeguards, and security features (including cyber security), particularly for remote applications.
- Development of instrumentation and controls (I&C) technologies, including monitoring for fitness for service, autonomous control and operation for remote applications (e.g. abnormal incident monitoring, safe operation envelope with power reduction and shutdown criteria).
- Modelling & simulation tool and capability development, e.g., coupled safety analysis codes, dynamic system modelling (simulators); digital twin; AI and machine learning applications.
- Research on innovative reactor core design concepts, reactor core physics, thermal-hydraulics, advanced technology fuel or accident tolerant fuel (ATF).
- Dry cooling technologies to enable deployment with reduced water usage.
- Inspection, testing technologies, smart conditioned based maintenance methodologies.
- Updates on nationally and internationally managed R&D programs.

## R&D SUPPORTING MICROREACTORS, RESEARCH REACTORS, & EXTRATERRESTRIAL REACTORS

- Advances in research reactor design and capability
- Applications of research reactors to support R&D for SMRs and advanced reactors.
- Decommissioning of small research reactors and lessons learned.
- Staff training at research reactors to support new reactor deployment and operation.
- R&D for the verification of innovative passive and inherent safety features.
- Transportability of reactor modules, including sealed reactor cores
- Development of instrumentation and controls (I&C) technologies
- Reliability assessments for passive and inherent heat removal systems
- Rankine steam cycle alternatives (e.g. Brayton cycle, sterling engines) to improve thermal efficiency.

## DECOMMISSIONING, WASTE MANAGEMENT, AND FUEL CYCLE

- Identification and characterization of waste streams.
- Spent fuel management options and strategies.
- Long-term strategy and public policy requirements for dispositioning future waste streams,
- Decommissioning strategies for advanced reactors.
- Policy considerations for nuclear liabilities applicable to very small or micro SMR operation.
- Recent developments and innovations in reactor decommissioning and site remediation, and their applicability to SMRs.
- Advanced technologies for used fuel recycling and applications of advanced fuel cycles.

## SECURITY, SAFETY ASSESSMENT & REGULATORY ACTIVITIES

- Establishing technical and/or safety analysis requirements using graded approach or alt. approaches.
- New safety analysis software and codes and standard activities for proposed advanced reactors and SMRs.
- Application of GIF's Integrated Safety Assessment Methodologies (ISAM) to advanced nuclear systems.
- Relevance of past design/operating data and OPEX.
- Identification of principal design criteria and/or licensing basis events.
- Advancement of Probabilistic Safety Assessment (PSA) methods and their application.
- Security and proliferation resistance
- Methodologies and changes required for emergency preparedness and response (EPR) planning.
- Development and application of codes and standards for advanced reactors and SMRs
- Disruptive, Innovative and Emerging Technology
- Environmental assessments and impact assessments
- Status of ongoing licensing, pre-licensing reviews / Vender Design Review activities and lessons learned.

## PUBLIC POLICY & ENGAGEMENT

- Public perceptions of risk, and how they may differ in remote communities.
- Strategies for effective public engagement, including indigenous engagement, for the successful deployment of SMRs and advanced reactor technologies.
- Security of power supply and definition of an optimal portfolio in energy planning.
- Cultural considerations and how they may vary from community to community.
- Requirements for public infrastructure to support remote SMR deployments, e.g., roads, hospitals, etc.
- Ongoing activities at international organizations, e.g. IAEA, NEA, GIF, etc.
- Net-zero and climate considerations.

## ECONOMICS, FINANCING, & BUSINESS MODELS

- Cost estimates of SMRs, fabrication facilities, and/or centralized operation & maintenance facilities.
- Economic estimates for non-electrical applications of SMRs and advanced reactors.
- Economic impacts on remote communities, including greenhouse gas reductions, jobs, quality of life, etc.
- Assessing "economy of multiples" vs. "economy of scale."
- Public-private partnership business models that enable investment.
- Innovative financing and investment mechanisms that reflect the evolving electricity marketplace.
- Business model enabling a "fleet approach" to SMR deployment and links to novel deployment approaches.
- Business models for hybrid energy systems.
- Operational management models for outages and maintenance planning.

## DEADLINES

**Submissions of abstracts:** May 1, 2024

**Notification of acceptance:** May 17, 2024

**Draft full paper submissions:** June 19, 2024

**Review notifications:** August 6, 2024

**Final full paper submission:** September 3, 2024

## NUCLEAR-ENABLED INTEGRATED & HYBRID ENERGY SYSTEMS AND ENERGY SUPPLY MIX

- Integrating renewables and variable energy sources with SMRs.
- Energy storage solutions and their role in enabling nuclear hybrid systems
- Design and operation of microgrids incorporating SMRs in remote communities, mines, etc.
- Non-electrical applications e.g. Hydrogen production, water desalination, and chemical manufacturing
- Innovation and collaboration with other sectors for decarbonisation, e.g. transportation, mining & resource extraction, petroleum refining, etc.

## SKILL DEVELOPMENT & NUCLEAR KNOWLEDGE & WORK FORCE MANAGEMENT

- Advances in competency development in regulatory bodies and TSOs
- Identifying skills necessary for successful SMR and advanced reactor technology deployment.
- Recommendations for academic/research program enhancements.
- Recommendations for training activities related to advanced reactors and SMRs, including training on SMR operations, use of computer-aided engineering (CAE) tools for design evaluation and optimization, validation of new technologies, and applications beyond grid-connected electricity generation.
- Knowledge management for the large number of advanced reactors and SMR technologies
- Preparing to operate SMRs and advanced reactors with different and novel technologies.

## MANUFACTURING AND SUPPLY CHAIN

- SMR design standardization and licenses for factory manufacturing.
- Applications of additive manufacturing ("3D printing") in a SMR factory or "assembly line";
- Current nuclear supplier capabilities and preparations for advanced manufacturing of SMRs.
- Innovative approaches and challenges to modular manufacturing.

## DEPLOYMENT

- Updates on reactor projects currently under development, assessment, or construction.
- Site assessment and selection for prototype or demonstration reactors.
- Management approach for engaging the regulator, operator, vendor, and supporting R&D organizations in a manner that supports timely deployment.
- Special licensing, safety, and risk assessment considerations for prototypes and demonstration reactors.
- Practical applications for a first-of-a-kind reactor beyond technology demonstration, e.g. electricity generation, district/process heating, neutron source, etc.
- Novel deployment opportunities, e.g. for micro reactors, off-shore or floating SMRs
- Specific user or deployment requirements and criteria.

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Click the link below to create a submission:

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