

International Youth Nuclear Congress IYNC2022



Sunday 27 November 2022 - Friday 02 December 2022

Scientific Programme

Track 1: Reactor Design, Operation, Maintenance and Digitalization

This track covers design, operation and maintenance of conventional reactors, and digitalization in nuclear systems. It includes cost optimization; life cycle management; risk-based or risk-informed operation and maintenance; operational experiences; performance and reliability improvements; outage optimization; power uprating; asset management; human factors; plant staffing; outage reduction features; major component reliability; repair and replacement; in-service inspection; codes and standards. It also includes digitization and digitalization in nuclear systems; application of information and communication technology to nuclear systems; application of artificial intelligence or internet-of-things to nuclear systems.

Track 2: Advanced Reactors, SMRs and Fusion Technologies

This track focuses on the design of advanced reactors. It includes reactor designs for near term deployment (including but not limited to: AP1000, ABWR, ESBWR, System 80+, EPR, US APWR, Hualong One, VVER, APR1400, CAP, I2S, ACR Series, GT-HMR), small modular reactors (SMRs); small and medium sized reactors (SMRs); design and construction; certification process; early site permits. It also includes generation IV reactors; accelerator-driven subcritical system; research and demonstration reactors; advanced construction and project management techniques. The track also involves fusion energy physics; burning plasma experiments; target fabrication and technology; tritium science and technology; magnetic and inertial fusion energy reactor studies; heating and current drive physics and technology; plasma control; plasma diagnostics; fusion-driven subcritical systems.

Track 3: Nuclear Physics, Neutronics and Reactor Physics

This track covers physics related to nuclear applications. It includes nuclear data libraries; core design methods; core optimization; multi-physics coupling; nuclear criticality safety analysis and associated experiments; burnup credit; spent fuel disposition; transport theory numerical methods; deterministic and Monte Carlo methods, model, computational code and their verification, validation and uncertainty quantification in reactor physics. It also includes radiation measurement, detection, and shielding; neutron spectroscopy; neutron and photon correlation and multiplicity.

Track 4: Thermal Hydraulics

This track covers thermal hydraulic experiments, modelling and simulation. It includes separate and integral effect tests; thermal hydraulic experimental techniques and measurement; heat transfer under single, two-phase and multiphase flow; development, validation, and application of thermal hydraulic computer codes at the system, component, meso and micro-scales; containment thermal-hydraulics and aerosol transport; thermal-hydraulics of molten core; neutronics/thermal hydraulics coupling calculation; thermal hydraulics/structural coupling calculation.

Track 5: Nuclear and Structural Materials

This track covers studies related to materials and structure in nuclear power systems. It includes fuel, core, reactor pressure vessel and internals structures; environmental effects and fracture mechanics; design and monitoring for seismic; advanced materials issues; irradiation issues, materials and structural mechanics issues; aging material issues; concrete and steel containments design and analysis; structural codes and standards for new generation plants.

Track 6: Nuclear Safety, Security, Safeguards and Radiation Protection

This track covers 3Ss in nuclear applications: safety, security and safeguards, and radiation protection. It includes design basis accidents; BEPU analysis; severe accidents; natural disaster-initiated accidents; probabilistic safety assessment (PSA); probabilistic risk assessment (PRA); accident management; risk management; reliability engineering; emergency preparedness and response; fire protection; radiological safety; radiation monitoring; advanced dosimetry; nuclear plant security; nuclear material safeguards; non-proliferation of nuclear weapons; ALARA and ALARP; reactor licensing; regulatory issues.

Track 7: Nuclear Fuel Cycle, Waste Management and Decommissioning

This track covers issues related to nuclear fuel itself and nuclear fuel cycle. It includes fuel reliability issues and experience; advanced fuel cycles and associated fuel forms; fuel cycle economics and burn-up optimization; reload analysis and optimization techniques; future for nuclear fuel resources; uranium mining, enrichment and processing; fuel fabrication and manufacturing; MOX fuel; fuel blending from HEU; thorium and alternative fuel cycles; reprocessing; onsite storage; repositories; transportation of spent fuel; fuel cask design; waste transmutation; waste minimization, transport, processing and disposal; decontamination and decommissioning of facilities.

Track 8: Policy, Economic and Social Aspects of Nuclear Applications

This track covers non-technical aspects of nuclear applications. It includes government programs supporting deployment; economics of nuclear power and other nuclear applications; construction and project management techniques; international cooperation; public acceptance; environmental impacts of nuclear systems; contribution of nuclear power to carbon emission reduction; nuclear and climate change; nuclear and sustainability.

Track 9: Communication, Knowledge Management and YGN Best Practices

This track covers communication campaigns, knowledge management, strategies and approaches for promotion of nuclear energy, and best practice sharing of YGNs. It includes training and education; teaching approaches; design of nuclear professional degree; curriculum development; roles of laboratories and experimental facilities; educational simulator development; collaborative

efforts of industry and research in education; evaluation of training and education; nuclear power plant personnel training; human factors and workforce aging; health physics and occupational exposure; National Young Generation projects; Regional Young Generation projects; new initiatives; experience sharing; IYNC and YGN forecasting.

Track 10: Non-Power Nuclear Applications

This track covers all non-power nuclear applications. It includes applications of nuclear technology in various fields, including but not limited to agriculture, mining, medicine, biology, industry, radiation measurement, and oil logging. It also includes non-classical nuclear system concepts and non-conventional energy conversion systems (excluding technologies mentioned in Track 2); non-destructive examination technologies; radioisotope thermoelectric generator; nuclear power for space exploration.