

Standing Committee on Major Neutron Research Facilities (SC-MNRF)

Terms of Reference

Large neutron facilities such as research reactors and accelerator-based spallation neutron sources play a critical role in the global scientific community. Their primary mission is to supply high-flux neutron beams that allow scientists to probe the structure and dynamics of matter at atomic and molecular scales. Because neutrons are electrically neutral, highly penetrating, and uniquely sensitive to magnetic properties and light elements like hydrogen, they reveal critical information that X-rays or electron microscopes cannot capture.

To achieve this mission, these facilities target four key objectives

- Atomic and molecular-level visualization: Providing high-flux neutron beams to map the positions and movements of atoms and molecules.
- An open user ecosystem: Offering free, merit-based access to specialized instrumentation for peer-reviewed academic and corporate researchers.
- Isotope production: Generating critical isotopes for cancer therapies, industrial radiography, and deep-space exploration.
- Energy research support: Testing materials under extreme radiation to design next-generation power technologies and clean-energy facilities.

Large neutron facilities drive breakthroughs in everyday consumer technology, medicine, and the economy:

- Clean Energy & Transportation: Scientists use neutron scattering to track lithium ions moving in real-time inside next-generation batteries. It is also used to detect microscopic structural stresses in aircraft wings and train rails before cracks form.
- Biomedicine & Pharmaceuticals: Neutrons map the intricate hydrogen bonds inside proteins, accelerating the development of targeted drugs, vaccines, and advanced medical treatments.
- Quantum Materials: Experiments illuminate subatomic magnetic behaviors, directly paving the way for high-density data storage and future quantum computers.
- Economic Return: Every dollar invested in these facilities returns an estimated \$2.67 to the economy by accelerating commercial technology timelines. The research generates thousands of active patents and scientific publications annually.

Mandate and Mission:

Recognizing the increasing importance of large neutron facilities, the US Liaison Committee submitted a proposal to the 33rd IUPAP General Assembly to create a Working

Group dedicated to Major Neutron Research Facilities. Because the proposed working group aligns with the characteristics of a Standing Committee under a Commission, and that condensed matter researchers are frequent users of these facilities, the 34th IUPAP General Assembly in 2025 resolved to establish the **Standing Committee on Major Neutron Research Facilities (SC-MNRF)** under Commission C10 (Structure and Dynamics of Condensed Matter).

The mission of the Standing Committee on Major Neutron Research Facilities include:

- **Mapping the Infrastructure Landscape:** Providing a comprehensive description and outlook of the global neutron research infrastructure for the next 10 to 20 years.
- **Expanding Scientific Opportunities:** Generating new research pathways and opportunities for the global scientific community.
- **Fostering Global Collaboration:** Promoting communication, cooperation, and coordination among stakeholders at existing and planned neutron facilities worldwide.
- **Centralizing Access Documentation:** Gathering and updating documentation regarding accessible neutron facilities and their specific entry and utilization requirements.
- **Training Future Experts:** Enhancing the coordinated training of the next generation of neutron source users and operators.
- **Community Outreach:** Supporting outreach initiatives to improve public and scientific understanding and acceptance of neutron sources and related technologies.

Modus Operandi:

The Standing Committee on Major Neutron Research Facilities (SC-MNRF) will meet twice a year: once in person and once remotely.

The in-person meeting should leverage independently funded attendance of Committee Members at one of the major international or regional neutron science conferences:

- International Conference on Neutron Scattering (ICNS)
- European Conference on Neutron Scattering (ECNS)
- American Conference on Neutron Scattering (ACNS)
- Asia-Oceania Conference on Neutron Scattering (AOCNS)

The SC-MNRF will also establish dedicated Working Groups to investigate and resolve specific issues pertinent to the SC-MNRF core mission.

Composition:

The Committee comprises lead facility directors, stakeholders from existing and emerging facilities worldwide, selected liaisons to neutron societies and designated IUPAP Commission liaisons.

Reflecting the international nature of IUPAP, the Committee's composition aims for geographic balance with representation across all continents. The Committee will also appoint a Scientific Secretary to support meeting logistics and program execution.

The proposed initial membership is the following:

Ex officio

IUPAP, Chair SC-MNRF	Fulvia Pilat
IUPAP, Chair Commission 10	Shobhana Narashiman
IUPAP, Advisor (Meeting 1)	Sekazi Mtingwa

AMERICAS

SNS, HFIR	John Taylor	Director, Neutron Science
NIST/NCNR	James Adams	Director, NCNR
LANSCE	Thomas Mattsson	Director, LANSCE User Facility
Missouri U. Research Reactor	John Brockman	Director, Research & Education
McMaster Nuclear Reactor	Karin Stephenson	Director, Research & Education
Centro Atomico Bariloche	Javier Santisteban	Director
Brazilian Multipurpose Reactor	Federico Genzini	Director, Research Reactor Center

EUROPE/AFRICA

ILL	Regine Willumeit-Romer	Director, ILL
ESS	Jane Volbaek-Nielsen	Director, ESS
ISIS	Sarah Rogers	Director, ISIS
SINQ CNM, PSI	Marc Janoschek	Director, CNM
Juelich Center for NS (JCNS)	Stephan Foerster	Managing Director, JCNS
FRM-II Reactor Garching	Andreas Meyer	Scientific Director
SAFARI Res. Reactor S. Africa	Andrew Venter	Director Neutron Science

ASIA/AUSTRALIA

J-Parc SNS	Toshiya Otomo	Director, JSNS
JRR-3 JAEA Tokai	Taku Sato	Director, Neutron Science
CSNS Dongguan	Wang Shen	Director, CSNS
China Myanyang Res. Reactor	Guang-ai Sun	Director, Neutron Scattering
HANARO NRF Daejeon Korea	Young-Soo Han	Director, Neutron Science
ANSTO/OPAL Australia	Jamie Shulz	Director

FLNP, JINR, Dubna	Egor V. Lychagin	Director, Neutron Science
PIK Nuclear Reactor	Vladimir V. Voronin	Deputy Director
Nat Fac N Beam Research BARC	V.K. Aswal	Director, NFNBR

Commissions and Organizations Liaisons

ELENA (Europe Low Energy NF)	Thomas Brueckel	Chair, ELENA
Commission Liaison 1	TBD	
Commission Liaison 2	TBD	