The Nuclear Education, Skills and Technology (NEST) Framework

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NEA
NUCLEAR ENERGY AGENCY

NEST Framework in numbers

13 participating countries

18 participating organisations

What is NEST?

The NEA Nuclear Education, Skills and Technology (NEST) Framework is a multinational framework to maintain and build both technical and non-technical skills and competences through multinational research and training projects for promising students and young professionals from around the world.

Aims and benefits

NEST seeks to nurture the next generation of nuclear subject matter experts and leaders through the transfer of practical experience and knowledge.

NEST will achieve its aims by:

- fostering multidisciplinary skills and competences through hands-on training;
- providing access to state-of-the-art facilities;
- participating in challenging and innovative activities;
- mentoring experts to transfer knowledge to the next generation of professionals.

Developing capacity-building networks through multinational co-operation will facilitate the transfer of knowledge, which in turn generates new knowledge, leading to new technologies and the innovation necessary to address global challenges.

How NEST works

NEST runs projects that target specific areas of the nuclear sector where skills need to be developed.

NEST Projects are multi-disciplinary and must involve at least three NEST countries.

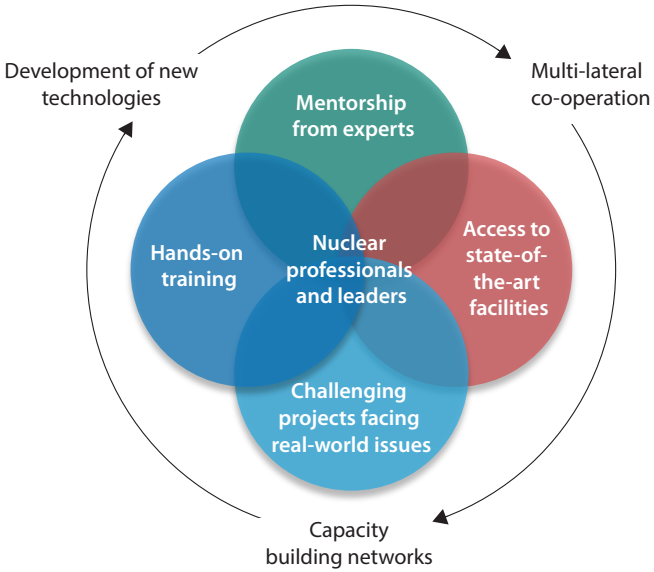
Each project brings together a variety of organisations (from universities to industry) wishing to co-operate to develop the skills of their workforce.

The NEST Framework is governed by a Management Board made up of representatives from the countries participating in NEST.

Fellows from **50+** organisations

± 200 Fellowships

8 Projects: 7 ongoing, 1 concluded



Components of the NEST Framework and its interconnections

NEST Fellows and Fellowships

NEST Fellows are students and young professionals belonging to one of the organisations participating in the NEST Projects.

Fellows will:

- gain intrinsic knowledge and non-technical skills through workshops and summer schools;
- acquire technical skills and knowledge through hands-on training activities carried out as part of the specific project;
- apply the knowledge acquired to address real-world issues and global challenges.

Fellowships are generally carried out for a period of one to six months in an organisation and country other than that of the Fellow.

Upon completion of a Fellowship, the NEST Awards ceremonies are held to recognise the achievements of the Fellows and provide them with a networking opportunity.

Current NEST Projects

There are seven ongoing NEST Projects, with one recently concluded:

- **Hydrogen Mitigation Experiments for Reactor Safety (HYMERES)**;

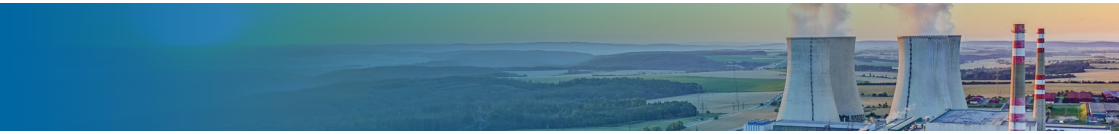
  The NEST HYMERES (Hydrogen Containment Experiments for Reactor Safety) project, spearheaded by the Paul Scherrer Institute (PSI) in Switzerland, focuses on studying safety-critical phenomena within containment structures during accidents. It provides hands-on training opportunities during experimental test campaigns conducted at the PSI PANDA facility, renowned as one of the most advanced containment test facilities globally. Simultaneously, the project aims to foster exploratory research initiatives under the mentorship of experts from participating organisations, with a particular emphasis on collaboration with universities.

- **Small Modular Reactors (SMRs)**;

  Led by McMaster University in Canada, this NEST project aims to consolidate existing research on small modular reactors (SMRs) from various participating organisations into a comprehensive programme. It addresses challenges and opportunities related to SMR development and deployment, covering areas such as technology assessment, regulatory frameworks, societal issues, spent fuel management, and economics. It also offers interdisciplinary and international training opportunities for NEST Fellows.

Hands-on Training on Remote Spectroscopic Analysis at Collaborative Laboratories for Advanced Decommissioning Science (CLADS)

JAEA



- **Advanced Remote Technology and Robotics for Decommissioning (ARTERD)**;

  The NEST ARTERD Project, led by Japan Atomic Energy Agency Collaborative Laboratories for Advanced Decommissioning Science (JAEA/CLADS) and the University of Tokyo, focuses on developing advanced remote technology for decommissioning activities in highly radioactive environments, such as robotics and virtual reality. Additionally, the project explores radiation-hardened and smart technologies, radiation imaging, advanced measurement, and remote spectroscopic analysis. It offers opportunities for foreign young researchers to work as NEST Fellows in Japanese organisations, gaining exposure to cutting-edge science and technology. Similarly, it invites young Japanese researchers to become NEST Fellows and conduct research in overseas partner organisations.

- **Radioactive Waste Management of I-graphite (i-Graphite)**;

  Led by National Research Tomsk Polytechnic University (TPU) in the Russian Federation, this NEST project addresses the main issues of i-graphite management, including characterisation, decontamination, and disposal. Hands-on training consists of several activities which makes use of the fully-fledged infrastructure, pilot and experimental facilities present at the ROSATOM site. This includes specially-manufactured equipment for i-graphite remote sampling, graphite incineration facilities and radioactive waste repository mock-up models for investigation of geological barriers.

- **Building Competence, Expert Knowledge, Applied Techniques, Safe Decommissioning, Train Fellows (BEAST)**;

  Led by Aachen Institute for Nuclear Training (AiNT), the programme targets postgraduate students, postdoctoral researchers, and young professionals interested in nuclear decommissioning and waste management. It focuses on addressing key issues such as radiological characterisation of nuclear facilities, decontamination technologies, clearance of buildings and radioactive waste, and characterisation of radioactive waste, particularly legacy waste. The fellows will acquire theoretical and hands-on training through webinars, a special workshop focused on ongoing research and development projects, and by working on current projects at the facilities of partner organisations through internships.

- **Training Radiological and International Nuclear Security (TRAINS)**;

  Led by the University of Siena in Italy, the TRAINS initiative aims to enhance training and knowledge dissemination in radiological and nuclear security. Its primary focus is

on providing training to fellows with diverse backgrounds – ranging from technical and scientific to law, international relations, and economics – in the security of radiological sources and nuclear materials. For young professionals, it represents an opportunity to leverage the current resurgence and rejuvenation in the nuclear sector, nurturing the development of skills among the next generation of professionals. In addition to its immediate objectives, this project will also raise awareness within the scientific community about the interconnectedness of security with safety and safeguards.

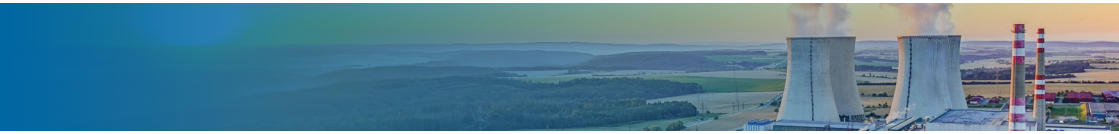
- **Improving Cross-disciplinary and Transversal Skills for the Severe Accidents Community (TCOFF-II)**;

  Led by the French Alternative Energies and Atomic Energy Commission (CEA), the TCOFF-II initiative aims to enhance expertise and knowledge dissemination in thermodynamics modelling applied to materials science. Its objectives include improving the management of thermodynamic data impact, including validation, uncertainty propagation, and sensitivity analysis, within severe accident codes. This project will offer training opportunities for current engineers and researchers in data manipulation and the application of thermodynamic calculations specific to accident scenarios. Furthermore, it seeks to facilitate knowledge exchange and raise awareness within the scientific community regarding the dearth of fundamental data concerning severe accidents and their repercussions.

- ***Concluded*** **Medical Applications, Nuclear Technologies, Radioprotection and Safety (MANTRAS)**.

  Led by the National Institute of Nuclear Physics (INFN), the MANTRAS project encompassed educational and training initiatives, events targeting medical sector applications, and access to available research infrastructures. Its primary focus was in advancing technologies for future nuclear applications in medicine and dosimetry, including experimental production of radioisotopes and refining radiotherapy techniques. Additional focal points included science and basic technology, safety assessments, security considerations, fostering safety culture and radiological protection, addressing ethical and societal aspects in decision-making processes, practical implementation of safety and radiological protection measures, as well as exploring multidisciplinary cross-cutting issues and international collaboration. This project was concluded in December 2023 but there is the opportunity to relaunch a project on this topic if NEST members wish.

And there is the opportunity to launch more projects!



Current and upcoming activities

- 3rd SMR Project Workshop, McMaster University, Canada, June 2024
- NEST Fellows participation in Summer School on Artificial Intelligence (AI) for Nuclear, Halden, September 2024
- NEST Awards and 5th Anniversary event, November 2024
- NEST Small Modular Reactor Workshop to be held in Belgium in collaboration with the Belgian Nuclear Research Centre (SCK-CEN)
- NEST Summer School to take place in Summer 2025
- NEST Awards Ceremony in conjunction with World Nuclear Exhibition in November 2025

How to join NEST

The NEA supports participation in the NEST Framework and is keen to engage further with member and non-member countries that wish to train the next generation of professionals and value long-term and sustainable international co-operation in nuclear education, skills and technology.

Countries and organisations that wish to join the NEST Framework can do so by contacting the NEA Secretariat.

Further information

For further information, please contact the NEST Framework by e-mail: nest@oecd-nea.org, or visit www.oecd-nea.org/nest.

Watch the "NEST Fellows Speak" video for more insights on our NEST website: www.youtube.com/watch?v=7W6LNGzfxiw.

The Nuclear Energy Agency (NEA) is an intergovernmental agency under the framework of the Organisation for Economic Co-operation and Development (OECD) headquartered in Paris, France. Its main objective is to promote international co-operation assisting member countries in maintaining and further developing the scientific, technological and legal bases required for a safe, environmentally friendly and economical use of nuclear energy for peaceful purposes.

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