



# FISA-EURADWASTE-2019

## PROGRAMME

(draft)

FISA 2019			
EURADWASTE '19			
Monday 3 June	09:00 - 17:00	NUCLEAR 2019 Annual Conference organised by RATEN ICN Pitesti (Mioveni)	
	14:00 - 17:00	Guided Tour of Pitesti	
	17:00 - 19:00	Pre-registration	
	18:00 - 19:30	Welcome reception	
Tuesday 4 June		Joint Opening FISA 2019 and EURADWASTE '19	
	08:00 - 09:00	Registration	
		Opening Plenary Session	
	09:00 - 12:00	Coffee Break	
		Opening Plenary Session (Cont'd)	
	12:00 - 13:30	Lunch and Poster session (Nuclear 2019, FISA 2019 and EURADWASTE '19)	
		EU/EURATOM Directives, Basic Safety Standards, Safety and Waste	FISA 2019
		EU/Euratom Directives	Session I - Safety of nuclear installations
			Technical workshops (in parallel)
			1. Infrastructures and International Cooperation
	13:30 - 18:00	Coffee Break	Coffee Break
		EU/Euratom Directives (Cont'd)	Session I (Cont'd)
			2. Innovations beyond technology
			3. E&T networking event
	18:30 - 20:00	Poster Session, Conference cocktail and Nuclear Awards	
Wednesday 5 June		EURADWASTE '19	FISA 2019
		Session I - Predisposal and disposal technology developments	Session II - Safety of nuclear installations
	09:00 - 12:30	Coffee Break	Coffee Break
		Session I (Cont'd)	Session II (Cont'd)
	12:30 - 14:00	Lunch and Poster session	Lunch and Poster session
		Session II - radioactive waste source term and science for disposal safety	Session III - Advanced nuclear systems and fuel cycles
	14:00 - 18:00	Coffee Break	Coffee Break
		Session II (Cont'd)	Session III (Cont'd)
	19:00 - 22:30	Conference dinner and ENEN PhD Prize	
		EURADWASTE '19	FISA 2019
		Session III - Networking of research communities, Joint Programming of national programmes and integration of Radioactive waste producers	Session IV - Education and Training, infrastructures and International Cooperation
	09:00 - 12:30	Coffee Break	Coffee Break
Thursday 6 June		Session III (Cont'd)	Session IV (Cont'd)
	12:30 - 14:00	Lunch	
		Joint conclusions FISA 2019 and EURADWASTE '19	
	14:00 - 16:30	FISA 2019 and EURADWASTE '19 key messages and future perspectives Joint conclusions from the European Commission and Romanian Presidency FISA 2019 and EURADWASTE '19 Poster and PhD Awards	
Friday 7 June		Technical visits	
	08:00 - 16:00	TRIGA research reactor and Hot Cells facilities (at the Institute for Nuclear Research) and Nuclear Fuel Plant (in Pitesti-Mioveni)	
	08:00 - 16:00	ELI - Extreme Light Infrastructure (in Bucharest-Magurele)	
	07:00 - 18:30	Cernavoda NPP and Waste management facilities (in Cernavoda-Constanta)	

## FOREWORD

Welcome to the 9th European Commission Conferences on EURATOM Research and Training in Safety of Reactor Systems and Radioactive Waste Management. FISA and EURADWASTE conferences have always been a major milestone on the EU/Euratom agenda, gathering on a regular basis research and training organisations, academia, industry, technology platforms, European fora and European civil society, and International Organisations, participating in Euratom Framework Programmes'. Their success lies in coherently summarising most activities and highlighting major achievements of the main pillars of the EU/Euratom Fission Programmes, on safety of reactor systems and radioactive waste management. Following the successful edition in 2013, in Lithuania, these two major events are organised jointly with the Romanian Presidency of the Council of the EU in 2019.

All balanced energy mix scenarios elaborated in Europe on strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050 include nuclear energy in one way or another. While it is for each EU country to choose whether to make use of nuclear power, it remains the role of the European Union, together with its Member States and in the interest of all its citizens, to establish a framework to further develop and support EU/Euratom research and training. The European Union has since long recognised its importance and benefits also through international cooperation.

FISA 2019 EURADWASTE '19 plenary introduction and closure provide an opportunity for both communities to come together, to exchange their views on shared challenges and opportunities in EU/Euratom research and training. Stakeholders' and policy makers' participation contributes to setting the scene at EU/ national/ international levels and illustrating high benefits from cooperation by supporting, among others, today's Energy/Climate/Industrial policies and to tackle today's societal challenges. It also proves EU/Euratom constant success in pursuing excellence in R&D, whilst facilitating pan-European collaborative efforts across a broad range of nuclear science and technologies, nuclear fission and radiation protection.

FISA 2019 EURADWASTE '19 parallel sessions facilitate detailed presentations and panel discussions on the latest achievements, main results and success stories, as well as key recommendations in the respective areas. They are aimed at demonstrating that the knowledge base has advanced significantly, and continuity between actions co-funded over time through the Euratom Framework Programmes guarantees a high impact and is of great added value to the scientific community. It also shows a capacity is maintained to suitably respond to any unexpected event or new EU/Euratom legislative Directives requirements such as the implementation of dedicated research and innovation (or coordinated and support) actions in response to the 2011 Fukushima Daichi accident.

With the incentive of Horizon 2020, Framework Programmes enhance further integration towards a European Research Area together with better prioritisation at European level, with the capitalisation of European Technology platforms and in close collaboration with International Organisations or Fora. Evolutions towards European Joint Programmes, together with Member States research and innovation programmes, are successfully illustrating the added value of a concerted European approach in nuclear safety research and training advocated by the European Commission and Member States.

FISA and EURADWASTE are also a unique opportunity for students, PhD, MSc or young professionals to take part in the ENEN PhD Event & Prize, FISA 2019 and EURADWASTE '19 Poster and PhD awards, and FISA 2019 thematic workshops addressing cross-cutting research and innovation areas of common interest and providing recommendations for the future. The finalists will be selected and invited by a jury (Programme Committee) and awards will be presented at the joint closing plenary session. The awarded paper will be published in the European Physical Journal (EPJ N, EPJ Nuclear Sciences & Technologies), alongside a special edition of EPJ-N and then within the conference proceedings.

Participants will also be able to participate in a technical tour of the nuclear facilities at Institute for Nuclear Research Pitesti (RATEN-ICN), the Nuclear Fuel Plant (FCN Pitesti), the Cernavoda Nuclear Power Plant and waste management facilities, or the Extreme Light Infrastructure – Nuclear Physics (ELI-NP) in Bucharest, one of the most advanced research facilities in the world focusing on the study of photonuclear physics and its applications.

**Joint introduction FISA 2019 / EURADWASTE '19***Chair: Serban-Constantin VALECA (RATEN-ICN, RO)**Vice-chair: Elena RIGHI-STEEL (EC, DG RTD),**Rapporteur : Stefano MONTI (IAEA) Expert*

AM

**Charlina VICHEVA** (EC, DG JRC), Deputy Director-General of the Joint Research Centre, European Commission**Keynote: EU policy developments and achievements in Euratom nuclear research and innovation****Nicolae HURDUC** (Minister, RO), Ministry of Research and Innovation of the Republic of Romania**Keynote****Stefano MONTI** (IAEA), Section Head, Nuclear Power Technology Development section, Division of Nuclear Power, Department of Nuclear Energy**Keynote: Research and Innovation for a safe, secure and safeguarded nuclear power in support of the UN Sustainable Development Goals****Sama BILBAO Y LEON** (OECD/NEA, FR) Head of Division of Nuclear Technology Development and Economics, OECD Nuclear Energy Agency (tbc)**Keynote: Nuclear Research and Innovation successes and accomplishments looking to the future****Teodor CHIRICA** (FORATOM, BE), President of the European Nuclear Industry Association**Keynote: Research and Innovation benefits for a low-carbon economy, Industrial Competitiveness and sustainable development****Pierre Jean COULON** (EESC, EU), President of the Transport Energy and Networks section, European Economic and Social Committee**Keynote: Research and Innovation missions and benefits to Civil Society to tackle today's Societal Challenges****Nathan PATERSON and Petros PAPANDOPOULOS** (ENS YGN, BE), co-Chairs European Nuclear Society Young Nuclear Generation**Keynote: The European Nuclear Society's Young Generation Network, Smart People with Drive and Innovative Ideas**

PM

**International / EU / EURATOM Status in Radiation Protection, Safety of Reactor Systems and Radioactive Waste Management***Chair: Horia GRAMA (ANDR, RO)**Vice-chair, Massimo GARRIBBA (EC, DG ENER)**Rapporteur : Hans FORSSTROM (SE), Expert*

The Euratom Treaty provides the legal Framework to ensure a safe and sustainable use of peaceful nuclear energy across Europe and helps non-EU countries meet equally high standards of safety and radiation protection, safeguards and security. With legally binding Nuclear Safety Directive (2009/71/Euratom) and its latest amendment (2014/87/Euratom), EU nuclear stress tests, including revised common safety approaches of the Western European Nuclear Regulators Association (WENRA) and the International Atomic Energy Agency (IAEA), the EU became the first major regional nuclear actor with a legally binding regulatory framework as regards to nuclear safety. Furthermore, this legal framework has been recently complemented by the Directive (2011/70/Euratom) that establishes a Community framework for the responsible and safe management of spent fuel and radioactive waste (both from fission and fusion

systems), and the Directive (2013/59/Euratom) laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation. Directives on Nuclear Installations' Safety (Art.7), Nuclear Waste Management (Art.8), Basic Safety Standards (Ch.4) and IAEA Convention on Nuclear Safety, all emphasize that each MS shall take the appropriate steps to ensure that sufficient numbers of qualified staff with appropriate education, training and re-training are available for all safety-related activities in - or for each - nuclear installation throughout its life. 'Conclusions' were issued at: a) 'EU Competitiveness Council in November 2008 encouraging Member States and the EC to establish a 'review of EU professional qualifications and skills' in the nuclear field; and b) a 'Second Situation Report on EU E&T in the Nuclear Energy Field' was published in 2014 by the European Human Resources Observatory in the Nuclear Energy Sector (EHRO-N, the latest created in 2009 by the European Nuclear Energy Forum (ENEF)).

International / EU/ Euratom latest state of implementation of the main directives in radiation protection, safety of reactor systems and radioactive waste management, and role of the projects co-funded in the framework of EU/Euratom research and training programmes, challenges and research expectations will be presented during this FISA2019 EURADWASTE'19 plenary session.

PM

## STATUS OF EU/EURATOM DIRECTIVES

Michael HUEBEL (EC, DG ENER), Head of Unit, Radiation Protection and Nuclear Safety  
[EU/Euratom Directives, 2013/59/Euratom on Basic Safety Standards, 2009/71/Euratom and 2014/87/Euratom update on nuclear safety of nuclear installations: status, challenges and future perspectives](#)

[Massimo GARRIBBA](#) (EC, DG ENER), Director Nuclear Energy, Safety and ITER  
[EU/EURATOM R&D supporting Directive 2011/70/Euratom on the responsible and safe management of spent fuel and radioactive waste: status, challenges and future perspectives](#)

## RADIOACTIVE WASTE MANAGEMENT

[Pierre-Marie ABADIE](#) (ANDRA, FR), CEO

[Keynote: European & International status on the management and disposal of radioactive waste, developments and challenges ahead](#)

[Christophe DAVIES](#) (EC, DG RTD), Euratom Fission, Project & Policy officer  
[Euratom research and training programme in radioactive waste management: Overview status, vision and future perspectives](#)

PM

General Discussion: Role of the Euratom Research and Training programme, challenges and research expectations

## SAFETY OF REACTOR SYSTEMS

[Martin MURRAY](#) (Environment Agency, UK)

[EURATOM STC Opinion \(Scientific and Technical Advisory Committee\): Key recommendations from the Opinion published early 2017 and future perspectives](#)

[Panagiotis MANOLATOS](#) (EC, DG RTD), Euratom Fission, Project & Policy Officer  
[Euratom research and training programme in safety of the reactor systems: Overview status, vision and future perspectives](#)

General Discussion: Role of the Euratom Research and Training programme, challenges and research expectations



<b>Day 1/2/3</b>	<b>4-6 June</b>
<b>AM / PM</b>	<p style="text-align: center;"><b>PARALLEL SESSIONS</b></p> <p style="text-align: center;"><b>FISA 2019 (see detailed programme)</b></p> <p style="text-align: center;"><b>EURADWASTE'19 (see detailed programme)</b></p> <p style="text-align: center;"><b>ENEN PhD Event 2019 (see detailed programme)</b></p>
<b>Day 3</b>	<b>Thursday, 6 June</b>
<b>PM</b>	<p><b>Joint conclusions FISA 2019 / EURADWASTE '19</b>  <i>Chair: Serban-Constantin VALECA (RATEN-ICN, RO)</i>  <i>Vice-chair: Said ABOUSAHL (EC, DG JRC)</i>  <i>Rapporteur: Stefano MONTI (IAEA), Expert</i></p> <hr/> <p><b>Poster and PhD Awards</b>  FISA 2019 and EURADWASTE '19 Poster and PhD Awards  <b>Hans FORSSTROM</b> (SE) Expert rapporteur  EURADWASTE '19 - Key messages and future perspectives  <b>Stefano MONTI</b> (IAEA), Expert rapporteur  FISA 2019 - Key messages and future perspectives (tbc)  <b>Patrick CHILD</b> (EC, DG RTD), Deputy Director General, Research and Innovation, European Commission  Keynote: Horizon Europe and Euratom Research and Training framework programmes  <b>Serban-Constantin VALECA</b> (ICN-RATEN, RO)  Joint conclusions: European Commission and Romanian Presidency</p>
<b>Day 4</b>	<b>Fryday, 7 June</b>
<b>AM / PM</b>	<p><b>Technical visits</b></p> <p>Participants will also be able to participate in a technical tour of the nuclear facilities at Institute for Nuclear Research Pitesti (RATEN-ICN), the Nuclear Fuel Plant (FCN Pitesti), the Cernavoda Nuclear Power Plant and waste management facilities, or the Extreme Light Infrastructure – Nuclear Physics (ELI-NP) in Bucharest, one of the most advanced research facilities in the world focusing on the study of photonuclear physics and its applications.</p>

# FISA 2019

9<sup>th</sup> European Commission Conference  
on EURATOM Research and Training  
in Safety of Reactor Systems

4-7 June 2019  
Pitești, Romania



## Day 1

Tuesday, 4 June

### SESSION ONE - Safety of nuclear installations

*Chair: Teodor CHIRICA (FORATOM, BE), President*

*Vice-chair: Maria BETTI (DG JRC, EC), Director of Directorate for Nuclear Safety and Security*

*Rapporteur: Abderrahim AL MAZOUZI (EDF, FR), Expert*

The first session of two on safety of nuclear installations is devoted to reactor performance, system reliability, advanced numerical simulation and modelling for reactor safety, and long-term operation of current Generation II-III reactors. As identified within SNETP-NUGENIA Generation II-III water cooled reactor technology and technical research areas, this is an important challenge since most countries are now considering prolonging the lifetime of their reactors from an originally foreseen 40 years' of operation to 60 years. In order to safely extend the lifetime of these reactors, both nuclear operators and regulators need to have, in addition to a skilled and well-trained workforce, reliable tools to assess the ageing and degradation processes of components and structures, as well as methods and guidelines for their validation and safe management.

PM

**Michel MASCHI** (EDF, FR)

Keynote: SNETP-NUGENIA Research and Innovation in Nuclear

**Kevin MOTTERSHEAD** (WOOD Plc, UK)

Reactor Performance, system reliability: Long-Term Operation (INCEFA-PLUS, SOTERIA, ATLAS-PLUS, MEACTOS, FP7-NUGENIA-PLUS)

**Andreas SCHUMM** (EDF, FR)

Reactor Performance, system reliability: Instrumentation and control (ADVISE, NOMAD, TEAMCABLES, FP7-HARMONICS)

**Christophe DEMAZIERE** (CHALMERS, SE)

Advanced numerical simulation and modelling for reactor safety (CORTEX, McSAFE, FP7-NURESAFE, FP7-HPMC)

**Name SURNAME** (Organisation, Country) (tbc)

Research expectations for Long-Term Operation LTO

General discussion and research perspectives

MSc/PhD Poster introduction and Conference cocktail

**SESSION TWO - Safety of nuclear installations***Chair: Guido BRACKE (GRS, DE), Waste Management Safety**Vice-chair: Massimo GARRIBBA (DG ENER, EC), Director Nuclear Energy, Safety and ITER**Rapporteur: Giovanni BRUNA (FR), Expert*

The second session on safety of nuclear installations is devoted to lessons learned from the Fukushima Daiichi accident, strategic initiatives supported within Europe and internationally as a response to the accident, as well as reviews of technical and scientific improvements in the area of severe accident management and emergency preparedness and response. Nuclear safety is further improved through innovative Generation II-III fuel and materials, and the development of accident-tolerant fuels. High performance research reactors have also to overcome the challenging conversion from highly enriched to low enriched uranium fuels, to fulfil a worldwide non-proliferation effort. Safety assessments and severe accidents analysis, impact of external events on nuclear power plants, studies on mitigation of strategies, and probabilistic safety assessments are further supported. As a result, nuclear and radiological emergency management and preparedness within Europe and across the whole continent highly benefit from a unified, shared and coordinated approach. As such, joint experimental research activities improve and strengthen any optimal use of shared resources, methodologies, tools, and collaboration at pan-European and international level.

**AM****Stefano MONTI** (IAEA)

Keynote: Global trends in nuclear power: advanced reactors including SMR integrated in hybrid energy systems

**Konstantina LAMBRINO** (SCK-CEN, BE)

Innovative Gen-II -III Reactors' Fuels and Materials (IL TROVATORE, FP7-MULTIMETAL, FP7-MATTER, FP7-SCWR-FQT)

**Stéphane VALANCE** (CEA, FR)

Innovative and safe supply of Fuels for Reactors (LEU-FOREVER, HERACLES-CP, ESSANUF)

**Ahmed BENTAIB** (IRSN, FR)

Safety assessments and severe accidents, impact of external events on nuclear power plants and on mitigation strategies (IVMR, SCO2-HeRo, FP7-SAFEST, FP7-PASSAM, FP7-CESAM, FP7-ALISA)

**Evelyne FOERSTER** (CEA, FR)

Probabilistic Safety Assessment for internal and external events (NARSIS, FP7-ASAMPSA-E)

**Federico ROCCHI** (ENEA, IT)

Nuclear and radiological emergency management and preparedness (FASTNET, FP7-PREPARE)

General discussion and research perspectives



### SESSION THREE – Advanced nuclear systems and fuel cycles

*Chair: Franck CARRE (CEA, FR), Scientific Director at Nuclear Energy Division*

*Vice-chair, Roger GARBIL (DG RTD, EC), Project and Policy Officer,*

*Rapporteur: Teodora RETEGAN (CHALMERS, SE), Expert*

This third session on safety of advanced nuclear systems and fuel cycles is devoted to R&D of a new generation of more sustainable reactor technologies, the safety design and licensing of technologies also identified by the European Sustainable Nuclear Industrial Initiative (SNETP-ESNII Generation IV fast reactors and closing the fuel cycle). An important feature of advanced nuclear systems is related to the development of innovative fuels and materials; this development benefits of the support from EERA JPNM (Joint Programme on Nuclear Materials for fission and fusion). Additionally, the entire nuclear fuel cycle is studied, from fuel fabrication to recycling strategies, partitioning and transmutation, to waste streams and high-level waste management, in order to meet, among others, the sustainable goals of minimisation of waste and better use of natural resources. Development of new applications for nuclear such as the Nuclear Cogeneration Industrial Initiative with high temperature reactors (SNETP-NC2I, cogeneration of electricity and heat) is also presented. Cross-cutting nuclear data activities to the level needed by simulation codes to fulfil present requirements, for the safe and sustainable operation, development of existing and future fission and fusion reactors and nuclear fuel cycle facilities, will be also discussed.

PM

**Noël CAMARCAT** (EDF, FR)

Keynote: SNETP-ESNII and EERA-JPNM Research and Innovation

**Konstantin MIKITIUK** (PSI, CH)

R&D in support to safety assessment, design and licensing of ESNII/Gen-IV (ESFR-SMART, ESNII+, SESAME, SAMOFAR, VINCO, FP7-ALLIANCE, FP7-SILER, FP7-SARGEN-IV, FP7-JASMIN)

**Stéphane BOURG** (CEA, FR)

From fuel to fuel: Dissolution, Partitioning and fuel manufacturing (GENIORS, FP7-SACSESS, FP7-ASGARD)

**Hamid AIT ABDERRAHIM** (SCK-CEN, BE)

Partitioning and Transmutation, contribution of MYRRHA to an EU strategy for HLW management (MYRTE, FP7-MARISA, FP7-MAXSIMA, FP7-SEARCH, FP7-MAX, FP7-FREYA, FP7-ARCAS)

**Lorenzo MALERBA** (CIEMAT, ES)

Innovative Gen-IV Fuels and Materials, EERA-JPNM, Fission and Fusion (GEMMA, INSPYRE, M4F, TRANSAT, FP7-MATISSE, FP7-PELGRIMM)

**Grzegorz WROCHNA** (NCBJ, PL)

Nuclear Cogeneration with High Temperature Reactors (GEMINI-PLUS, FP7-NC2I-R)

**Enrique GONZALEZ** (CIEMAT, ES)

Nuclear data activities (FP7-CHANDA, FP7-ERINDA, FP7-EUFRAT)

General discussion and research perspectives

ENEN PhD Prize and Conference dinner

**SESSION FOUR - Education and training, research infrastructures and international cooperation**

*Chair: Sama Bilbao y León (OECD/NEA, FR), Head of Division of Nuclear Technology Development and Economics (tbc)*

*Vice-chair: Foivos MARIAS (DG RTD, EC), Project and Policy Officer, Rapporteur Gérard COGNET (FR), Expert*

Nuclear safety remains, as always, the top priority and the European Union has an outstanding nuclear safety record. However, research must continue in order to maintain the highest level of nuclear safety, security and safeguards. The European nuclear sector is characterised by cutting edge technology and provides highly skilled employment for several hundred thousand people. To ensure our safety both now and in the future skilled people and well-equipped nuclear research facilities are of paramount importance. The availability of these resources is a crucial prerequisite for maintaining safety no matter what the future holds for the nuclear power sector. Europe can retain its technological leadership only if Member States maintain a diverse and well-funded nuclear R&D capability, a fit-for-purpose system for the education and training of scientists and engineers, availability of state-of-the-art research infrastructures, and reinforced international cooperation in key strategic areas with leading third countries, bilaterally or multilaterally. EU/Euratom helps to stimulate joint funding from Member States and/or enterprises, joint programming and dialogue at EU level, cross-cutting fission/fusion/non-nuclear innovative initiatives and benefits are being capitalised from the increasing interaction between European technology platforms, EU stakeholder fora, as well as International Organisations such as OECD/NEA and IAEA.

AM

**Franck CARRE** (CEA, FR)

Growing Synergies between Fission and Fusion Research towards demonstration plants

**Walter AMBROSINI** (University of PISA, IT)

Education, Training and mobility: towards a common effort to assure a future workforce in Europe and abroad (ANNETTE, ENEN-PLUS, BRILLIANT, CORONA-II, FP7-ENEN-RU-II, FP7-ARCADIA, FP7-NEWLANCER, FP7-ECNET, FP7-NUSHARE, FP7-GENTLE)

**Michèle COECK** (SCK-CEN, BE)

Improved expertise in radiation protection, nuclear chemistry and geological disposal (CONCERT, MEET-CINCH, FP7-ENETRAP-III, FP7-EAGLE, FP7-CINCH-II, FP7-PETRUS-III)

**Concetta FAZIO** (DG JRC, EC)

Supporting Access to key infrastructures and pan-European research (FP7-GENTLE, FP7-TALISMAN, others)

**Jean-Yves BLANC** (CEA, FR)

Supporting Infrastructures and Research Reactors: Status, needs and International Cooperation (FP7 and H2020 JHR ACCESS RIGHTS)

General discussion and research perspectives



## FISA 2019 - Technical workshops

Day 1	Tuesday 4 June
PM	<ol style="list-style-type: none"> <li>1. Infrastructures and International Cooperation, co-funding instruments, and partnerships in research and innovation</li> <li>2. Innovations beyond technology</li> <li>3. E&amp;T networking event</li> </ol>
Day 3	Thursday 6 June
AM	<ol style="list-style-type: none"> <li>4. Cross-cutting fission, fusion and non-nuclear energy synergies, challenges and opportunities</li> <li>5. Decommissioning challenges and opportunities</li> </ol>

### Workshops' objectives:

Lessons learned and latest initiatives, challenges and opportunities, to further promote EU/Euratom collaborative research and training activities, to strengthen international cooperation, and practical **key recommendations for the FISA2019 and EURADWASTE'19 conferences' conclusions** will be the key objectives of these workshops.

*Chair: Helena ZATLKAJOVA (DG RTD, EC),*

*Moderator: Margaret McGRATH (PALLAS, NL)*

*Rapporteur : Gérard COGNET (Expert, FR)*

### **Objective**

Large research infrastructures are at the centre of the knowledge triangle of research, education and innovation, producing knowledge through research, disseminating it through education, and applying it through innovation. They offer unique research services to users from different countries, attract young people to science, and help to shape scientific communities through top-level research in their respective fields, and nuclear safety research and training.

To fulfil the key objectives EU/Euratom R&D programmes of maintaining high levels of nuclear safety, knowledge and building a more dynamic and competitive European industry, promoting Pan-European mobility of researchers are implemented by co-financing transnational access to research infrastructures and joint research activities through Research and Innovation and Coordination and Support Actions' funding schemes. Establishment by the research community of European technology platforms is being capitalised. Mapping of research infrastructures, financial mechanisms and funding instruments, and E&T capabilities are stimulating closer cooperations within the European Union and beyond, with the benefit from multilateral international agreements and synergies of initiatives between Euratom, OECD/NEA, IAEA and international fora.

Lessons learned and latest initiatives towards large research infrastructures and E&T, challenges and opportunities to promote further utilisation of experimental facilities for collaborative research and training purposes, and practical key recommendations to strengthen international cooperation will be the objectives of this workshop.

### **Roundtable**

**Jules Horowitz Reactor, Annabelle LOPEZ** (CEA, FR)

**Extreme Light Infrastructure, Ionel ANDREI**, (ELI-NP, RO)

**MYRRHA, Hamid AIT ABDERRAHIM** (SCK-CEN, BE)

**HALDEN, Markus BEILMANN** (OECD / NEA, FR)

*Chair: Roberto PASSALACQUA (DG RTD, EC)*

*Moderator: Guillaume GILLET (EIT-KIC-InnoEnergy, FR)*

*Rapporteur: Stefano MONTI (IAEA)*

### **Objective**

One of the strategic initiatives launched in 2015 by the European Commission is ‘Open innovation’ aiming to involve far more actors in the innovation process, from research and academic communities, to industry, to entrepreneurs, to users, to governments and civil society. All need Open innovation to capitalise on the results of European research and innovation, by creating the right ecosystems, by bringing together multi-disciplinary teams to generate ideas and solutions in an open innovation environment, and by increasing investment, by bringing more companies and regions into the knowledge economy.

Innovation beyond technology is about a technology developed for one sector e.g. aerospace, aircrafts, telecoms, automotive or nuclear industries used in a totally different area. And technology transfer results from the process of using a technology, expertise, know-how or facilities for a purpose for which they were not originally intended.

It opens the minds and the way for strengthening relationships and for transferring new technologies to spin-offs, to industry and the marketplace, to transform European’s capability for innovation in specific areas and to help capture and drive future economic growth. Exploiting the innovation potential in European and/or International industrial and academic communities will only be achieved by being a focal point where small and medium enterprises, large industry and end users can work together with researchers to challenge barriers, explore and develop new ideas, and bring these to commercial reality. Practical key recommendations to strengthen cross-sectorial cooperation in key areas will be the main objective of this workshop.

### **Roundtable**

**Space Industry**, **Zsuzsanna TANDI** (WIGNER Research Institute, HU), ESA technology transfer

**Airbus Industry**, **Name SURNAME** (AIRBUS, ??)

**Automotive industry**, **Name SURNAME** (SIEMENS, BE)

**Big Science industry**, **Marcello LOSSASSO** (CERN, CH)

**Nuclear industry**, **Bernard CARLUEC** (FRAMATOME, FR)

*Chair, Katerina PTACKOVA (DG RTD, EC)*

*Moderator: Walter AMBROSINI (University of Pisa, IIT),*

*Rapporteur: Teodora RETEGAN (CHALMERS, SE)*

### **Objective**

The dwindling education, training and knowledge management in many nuclear disciplines was interpreted as “A cause for concern?” in 2000 by the OECD/NEA report entitled “Nuclear Education and Training: A Cause for Concern?” Many bottom-up initiatives have been started since then, resulting among others in preserving and further development of nuclear education and training. Nonetheless, the long-term sustainability of nuclear education and training seems to be exposed to larger risks than two decades ago.

The challenges to be discussed: How did this happen? What are possible bottom-up and top down strategies to preserve and further develop the nuclear education and training for the future generations of nuclear workforce and reactors in Europe? How can we engage all nuclear stakeholders (including general public) to jointly promote the necessity of and support for nuclear education and training?

Practical key recommendations on the paramount importance of guaranteeing an adequate supply of experts and trained cross-sectorial workers will be the main objective of this workshop.

### **Roundtable**

Prof Dr **Javier DIES LLOVERA** (Commissioner, Consejo de Seguridad Nuclear, ES)

Prof Dr **Joerg STARFLINGER** (Vice-President of ENEN, Uni Stuttgart Germany, DE)

Mr **Petros PAPANDOPOULOS**, Vice-President and **Nathan PATERSON**, President (ENS YGN, BE)

Dr **Pavel ZHURAVLEV** (ROSATOMTECH, RU)



*Chair: Mykola DZUBINSKY (DG RTD, EC)*

*Moderator: Lorenzo MALERBA (CIEMAT, ES)*

*Rapporteur: Giovanni BRUNA (Expert, FR)*

### **Objective**

Common technological constraints and methodological approaches, combined with similarities between their safety concepts, have stimulated synergies between nuclear fission and fusion energy research. For example, at the moment two cross-cutting Research and Innovation Actions show the benefit of cross-fertilization and working in a transversal way (M4F and TRANSAT). In addition, several commonalities emerge between nuclear (fission and fusion) and other energy technologies. Cooperation opportunities have been established between national, European and international Energy research programmes for a low carbon economy within the European Energy Research Alliance (EERA, the research pillar of the EU Strategic Energy Technology Plan, SET-Plan), involving cross-fertilization through joint research programmes e.g. related to nuclear materials (JPNM) and solar thermal energy (CSP), as well as geothermal energy (JP-GEO), bioenergy (JP-BIO) and hydrogen and fuel cells (JP-FCH).

Thus, it is clear that the development of state-of-the-art and innovative materials and materials manufacturing processes, the elaboration of design codes for advanced nuclear systems and the related safety approaches and culture, as well as specific issues such as remote maintenance, benefit from a successful close cooperation between EU/Euratom R&D programmes to maintain the highest levels of nuclear safety. Further cross-cutting developments, innovation and exchange of knowledge with non-nuclear research would also be highly beneficial, to tackle today's societal challenges and the world's Sustainable Development Goals, and to build a more dynamic and competitive European industry.

Mission-oriented recommendations to strengthen nuclear fission, fusion and non-nuclear energy collaboration opportunities will be the main objective of this workshop.

### **Round table**

**Cross-cutting fission / fusion / solar thermal energy challenges, [Lorenzo MALERBA](#) (CIEMAT, ES)**

**Synergies between fission and fusion: an industrial perspective, [Alessandro ALEMBERTI](#) (Ansaldo Nucleare, IT)**

**Synergies between nuclear and solar thermal energy, [Florian SUTTER](#) (DLR, EERA JP-CSP, DE)**

**Opportunities and benefits from fusion / fission energy collaboration, [Christian GRISOLIA](#) (CEA, FR)**

**Common challenges concerning design codes for fusion and fission components [Jarir AKTA](#) (KIT, DE)**

*Chair : Athanasios PETRIDIS (DG RTD, EC),*

*Moderator:*

*Rapporteur :*

### **Objective**

Nuclear decommissioning is an industrial activity that is growing strongly worldwide and creating opportunities for high-skilled workers. The European Union has acquired a large know-how in the field and can position itself today as a leader in the world. The European scientific community has a key role to play to support the European industry in this endeavor through a contribution to innovation, standardization and harmonization of the highest safety standards, development and/or capitalizing the best technologies available. Research challenges and opportunities in technical and non-technical fields identified should enable all relevant stakeholders to jointly improve safety, to support its value chain, to reduce costs and minimize environmental impact in the decommissioning of nuclear facilities.

Building confidence through the steps needed for the generation and management of knowledge on decommissioning, identifying key research areas, creating synergies between European partners, and supporting international collaborative platforms whenever applicable are all key enablers. Universities, research laboratories and industry should engage in innovative approaches, benefit from a vibrant education and training culture, basic academic MSc / PhD / Engineering / Managerial education as well as continuous professional development of competences. The use of advanced technologies across all nuclear and engineering fields should guarantee a new generation of skilled experts will be available whenever needed, having high levels of safety implemented throughout the sector for decades.

Having key challenges and opportunities of decommissioning Identified, recommendations on how to support the application highest safety standards, a global positioning of the EU technologies, organisations and industries in this area will be the main objectives of this workshop.

### **Round table**

**Short Title, Name SURNAME** (Organisation, Country)

**Short Title, Name SURNAME** (Organisation, Country)

**Short Title, Name SURNAME** (Organisation, Country)

**Short Title, Name SURNAME** (Organisation, Country)



## INTRODUCTION

The structure of the conference programme and the objective of the sessions aim at taking stock of what kind of research the Commission has funded during Horizon 2020, why and how the topics of successive calls for proposals were shaped, and open-up exchange and discussions on future collaborative research of EU added-value.

The reference document for the Commission's action is the Framework Programme (FP) Horizon 2020 (2014-2018/2020). It defines the activities necessary to achieve the programme objectives, which are: "Contributing to the development of safe, longer-term solutions for the management of ultimate nuclear waste, including final geological disposal as well as partitioning and transmutation", including Joint and/or coordinated research activities on remaining key aspects of geological disposal (GD) of spent fuel (SF) and long-lived radioactive waste with, as appropriate, demonstration of technologies and safety. Those activities are to promote the development of a common Union view on the main issues related to waste management from discharge of fuel to disposal.

Research activities related to management of other radioactive waste streams for which industrially mature processes currently do not exist.

To attain FP objectives the regulation enables the activities to be implemented through: public-public partnerships based on the Joint Programming 'Programme co-fund actions' funding scheme.

In 2014, at the beginning of the FP, the main aim of the EC was to prepare for integration of Waste Management Organisations (WMOs), Technical Support Organisations (TSOs) and other Research Organisations (Entities) in Joint Programming at European level. The purpose was for these communities to develop and implement a joint Strategic Research Agenda (SRA), which would integrate the needs from all communities and from all MSs, in particular those either with small programmes or with less-developed knowledge or less-advanced in geological disposal.

Another aim was to enable the TSOs to continue to structure between themselves and exchange knowledge and competence for their reviews of license applications for repositories. The third aim was the core of the Euratom Research and Training programme for many years in support implementation-oriented research and science underpinning the safety case (SC) of GD for SF and long-lived radioactive waste. This aim was in line with the SRA of IGD-TP and the activities of the FP.

In the first call, Work Programme (WP) 2014-2015, three topics were proposed, with the selected projects :

- #4, EU concerted development of Member State research on radioactive waste management (JOPRAD)
- #5, EU regulatory requirements for licensing geological repositories (SITEX II)
- #6, Supporting the implementation of the first-of-the-kind geological repositories (CEBAMA, MIND and Modern 2020)

The five projects selected address: JOPRAD (to prepare for a Joint Programme co-fund), SITEX II (to Network/coordinate the TSOs), CEBAMA (Cements barrier interactions), MIND (Microbiology in repositories) and Modern 2020 (repository monitoring strategies & technologies).

In 2016, WP 2016-2017 took stock of the outcome of the last Euratom projects of FP7 (2007-2013), of the evolution of the research programmes in the MSs and of disposal programmes and the analysis and perception of the needs for R&D on pre-disposal for other categories of waste than HL&LL W and SF. The context at the time was that knowledge on science supporting the SC for GD was advanced in many countries and license applications were about to be submitted or authorisations were expected shortly, giving perception that the Euratom scope of activities was focussing more and more on 'remaining key aspects of geological disposal'. The question was and still is, is such a concentrated scope of research activities sufficient to justify the long-term role and sustainability of the Euratom programme to support the wider needs of MSs.

Other factors become more and more important to define the long-term role of a public institutional programme such as the Euratom research and training programme are management of knowledge and the need for each national programme to perform its own research. This later point was one of the key messages delivered at the previous EURADWASTE conference in 2013, stating that each underground repository is the first of the kind. The key question for those less-advanced programmes is to know what research is needed while trying to avoid duplication of state-of-the-art knowledge. On knowledge management, generations of scientists are retiring and given also the long lead time (several decades) needed to reach readiness to start operating an underground repository, there is a critical role for institutional programmes to help maintaining, developing and exchanging knowledge and competence between generations and national programmes.

This was emphasised by the Euratom coordination project to IGD-TP, SecIGD 2 (FP7) completed at the end of 2015, which produced the first guidance document called PLANDIS on research needed by less-advanced programmes.

At the same time, SecIGD 2 also issued a report on the IGD-TP SRA acknowledging that it was of limited use for small and less-advanced national programmes. The focus of the Euratom projects on very specific scientific/technical issues could not be of interest to these less-advanced programmes and their participation in projects was marginal.

These factual situations and observations triggered some kind of turning point for the Euratom programme in considering the kind of topics it would open for proposals in WPs from then on. In order to cover other needs of national programmes, in particular those with longer time schedules for GD implementation (beyond 2050) and also attract gradually larger participation from these countries, WP 2016-2017 opened new topics in addition to GD and HL&LL W and SF, on:

- . Characterisation, quality control / checking and treatment of unconventional or legacy waste, operational wastes, waste arising from repair or maintenance and decommissioning/ dismantling waste, and
- . Knowledge management (KM) in the transition period until KM activities would be taken care of in the expected Joint Programme on radioactive waste management.

In the second call, WP 2016-2017, three topics were proposed, with the selected projects:

- #6, Addressing key priority R&Innovation (R&I) issues for the first-of-the-kind geological repositories (DISCO and Beacon)
- #7, R&I on the overall management of radioactive waste other than geological disposal (CHANCE, THERAMIN and INSIDER)
- #8, Pan-European knowledge sharing and development of competence in radioactive waste management (no project selected)

The five projects selected address: DISCO (Modern/doped SF disso. & characterisation), Beacon (Bentonite engineered barrier mechanical evolution), CHANCE (Characterisation of conditioned waste), THERAMIN (Thermal treatment for waste minimisation) and INSIDER (Characterisation for waste minimization in decommissioning and dismantling).

In 2017, during progress of work of the JOPRAD project, the Commission expressed its vision of the needs to develop extensive knowledge management activities. Among others, the concept advocated is to further develop/deepen the PLANDIS guide of SecIGD 2 and make KM a priority core activity of the future Joint Programme (JP). Also, in order to establish its central role in helping all MSs and defining future R&D

needs in common the JP was prompted to include specific activities aimed at producing strategic studies. In 2018, the Commission issued the third Euratom call, WP2018, corresponding to the last year of the five year FP before extension of two years (2019-2020) to align to the EC Horizon 2020 FP of seven years and to the EU budgetary timeframe (2014-2020). A single topic was published calling for a 'European Joint Research Programme (EJP) in the management and disposal of radioactive waste'.

The concept of the EJP is to integrate the needs across EU MSs and all mandated research organisations by their official National programme for R&D i.e. WMOs whose mission covers the management and disposal of radioactive waste, (ii) TSOs carrying out activities aimed at providing the technical and scientific basis for notably supporting the decisions made by a national regulatory body and (iii) nationally funded Research Entities (REs) which are involved in the R&D of radioactive waste management, under the responsibility of Member States, as well as radioactive waste producers/owners.

The EJP based on the SRA is expected to cover joint research activities on the domains of management (pre-disposal) and disposal of radioactive waste (RW) defined in Directive 2011/70/Euratom.

The proposal submitted in response to the call includes participation from 21 MSs and the two associated countries to the Euratom programme: Switzerland and Ukraine, for a total of 53 mandated organisations (Beneficiaries) and 59 organisations linked to a mandated organisation.

The proposal includes seven technical, two strategic and three horizontal KM work packages. They result from joint decision of the governing committee representing the three mandated communities. The budget put forward by the Commission is €32.5m at a co-fund rate of 55%, allowing a total budget of €59.09m. The plan is to launch the EJP called 'EURAD' at the EURADWASTE conference.

Providing that the EURAD performs adequately, the EJP instrument is expected to be continued in the next Euratom FP and would be the main instrument for Euratom support to research and training on RWM. In the meantime, in order to reinforce the R&D on pre-disposal and to gradually include the waste producers in the EJP concept, the Commission has opened a topic on pre-disposal as part of WP2019-2020 on:

#10, Developing pre-disposal activities identified in the scope of the European Joint Programme in Radioactive Waste Management.

The aim is to develop methods, processes, technologies and demonstrators for the treatment and conditioning of wastes for which no or inadequate solutions are currently available (except spent nuclear fuel and high-level radioactive waste to which means have been allocated as part of previous Euratom Work Programmes).

This action is defined as complementary to the EJP co-fund action mentioned above, and consequently the reference founding documents of the EJP (vision, SRA, roadmap and governance and implementation mechanisms) are expected to be updated and adapted jointly with the programme executive body of the EJP to align and share the approaches between the different communities.

The successive Euratom calls and the resulting and up-coming new projects are the results of EC strategy for its Euratom programme and future developments. The three proposed sessions reflect the evolution of this strategy during the Horizon 2020 FP and will be open for discussion for future Euratom activities.

These three sessions summarise the approach described above.

**SESSION ONE – Predisposal and disposal technology developments***Chair: Jon MARTIN (RWM, UK)**Vice-chair:**Rapporteur : Wilhelm BOLLINGERFEHR (BGE, DE), Expert*

Pre-disposal is becoming a pillar domain of Euratom. It will require involvement of waste producers, technology developers and Research Entities in general. The RE also play a role in the development of technologies for GD. The keynote should illustrate the role and contribution of REs in developing treatment processes and solutions for legacy and problematic waste, in particular from the perspective of smaller nuclear countries. The idea with the panel is seek a wider view from the different categories of organisations from different countries on the issues they have to solve or contribute to in term of pre-disposal and disposal technologies.

AM

**Radek TRILEK** (ÚJV Řež, CZ)

Keynote: Role, contributions, challenges and perspectives from Research Entities in advancing knowledge, solutions and technologies for the management and disposal of radioactive waste

**Danièle ROUDIL** (CEA, FR)Nuclear site characterisation for radioactive waste minimisation, **INSIDER****Denise RICARD** (ANDRA, FR)Characterization of conditioned nuclear waste, **CHANCE****Matti NIEMINEN** (VTT, FI)Thermal treatment for radioactive waste minimisation, **THERAMIN****Johanna HANSEN** (POSIVA, FI)Tunnel plugs and shaft seals demonstrations, **DOPAS****Johan BERTRAND** (ANDRA, FR)Monitoring strategies & technologies for geological disposal, **Modern2020**

General discussion and research perspectives

**SESSION TWO – Radioactive waste source term and science for disposal safety***Chair : Antonio Gens (UPC, ES)**Vice-chair : Jean-Paul GLATZ (DG JRC, EC),**Rapporteur: Piet Zuidema (Zuidema Consult GmbH, CH), Expert*

PM

'Science for safety of geological disposal' remains the key challenge facing national programmes for HLW and SF disposal. But it is acknowledged that science and knowledge is very mature. So what role and support can Euratom provide in the future. The keynote should highlight the forward-looking view from a country with an advanced GD programme, compared to many other EU MSs. The panel should discuss the challenges in science for the SC and how to handle them for the benefit and synergies between different national programmes and categories of organisations

**Johan ANDERSSON** (SKB, SE)

Keynote: From past to future science underpinning the Safety Case of deep geological repositories – Challenges until licensing and how maintain knowledge and competence on cutting edge science afterwards during operation



**Lena ZETTERSTROM EVINS** (SKB, SE)

"Doped" and MOX fuel dissolution behaviour and process in a repository environment and in a failed waste container, **DISCO**

**Simon NORRIS** (RWM, UK)

Carbon-14 Source Term generation and release from irradiated metals, ion-exchange resin and graphite, **FP7-CAST**

**Marcus ALTMAIER** (KIT/INE, DE)

Cement properties and barrier functions in repository environments, **CEBAMA**

**Patrick SELLIN** (SKB, SE)

Bentonite engineered barrier erosion and mechanical evolution effects on the long-term performance of the barrier, **FP7-BELBAR** and **BEACON**

**Birgitta KALINOWSKI** (SKB, SE)

Influence of microbial processes on waste forms and safety of geological disposal, **MIND**

General discussion and research perspectives

## Day 3

Thursday, 5 June

AM

### **SESSION THREE – Networking of research communities, Joint Programming of national programmes and integration of Radioactive waste producers**

*Chair: Piet Zuidema (Zuidema Consult GmbH, CH)*

*Vice-chair, Ian Gordon (IAEA, AT)*

*Rapporteur: Jacques Delay (ANDRA, FR), Expert*

Networking and support to collaborative research across different countries can be considered as the 'raison d'être' of the Euratom programme. The first part of the session is dedicated to seeking the views of the three communities in the EJP (WMOs, TSOs and REs) and from Central and Eastern Country smaller and less-advanced programmes on the benefits they see both for their own community or countries but between them in working together in the EJP in a structured way and their forward looking. The result of this integration process is the EURAD EJP, which will be launched during the session. KM in the form of 'State of knowledge, Guidance on R&D and Training and mobility' activities within the Joint Programme is considered as the domain where the Euratom role and support can bring most European added-value. Coordination with IAEA and NEA, who also carry out KM activities, should be ensured. So, a clear, structured and coordinated interaction of the EJP in this field with both IAEA and OECD NEA is expected. Intervention from these two international organisations should highlight ways and means to implement this interaction. Finally, the panel and its introductory keynote aim at discussing/preparing both communities, Waste management and Waste producers and technology developers to develop a joint proposal responding to the Euratom call for the topic on pre-disposal. The proposal submission deadline is end of September 2019. Invited panellists should represent both communities and from a wide spectrum of countries, including associated countries expressing their needs and views on the requested coordination.

**Christophe DAVIES** (DG RTD, EC) **Session Introduction**

Networking of the research communities with a national mandate for RD&D in RW disposal – view from WMOs, TSOs, REs and less developed or advanced programmes on their R&D needs, contribution to the European Joint Programme development, expected impacts and future perspectives

**Robert WINSLEY** (RWM, UK)

**WMOs (Waste Management Organisations), IGD-TP** (Implementing Geological Disposal – Technology Platform)

**Delphine Pellegrini** (IRSN, FR)

**TSOs (Technical Support Organisations), SITEX II and SITEX Network**

**Christophe BRUGGEMAN** (SCK-CEN, BE)

**RE (Research Entities), EURADScience**

**Balint NOS** (PURAM, HU)

**The necessity of cooperation for central and eastern European countries**

.....  
Joint Programming of national research and development programmes in the management and disposal of radioactive waste – The European Joint Programme in Radioactive waste management (EJP)

**Frédéric PLAS and Marie GARCIA** (ANDRA, FR)

**European Joint Research Programme in the management and disposal of radioactive waste (EURAD)**

.....  
Synergies between the Euratom European Joint Programme on radioactive waste management and the IAEA and OECD NEA programmes on the State of knowledge, Guidance on R&D and Training and mobility – Way forward

**Stefan MAYER** (IAEA, AT)

**Perspective from the IAEA radioactive waste management programme**

**Rebecca TADESSE** (OECD/NEA, FR)

**Perspective from the OECD Nuclear Energy Agency radioactive waste management programme**

.....  
Panel discussion – Ways and means for enlarging the EJP by including and integrating R&D on pre-disposal of radioactive waste under the responsibility of radioactive waste producers for joint implementation of activities from cradle to grave

**Michel PIERACCINI** (EDF, FR)

**Keynote: RD&D programmes and activities of waste producers on pre-disposal (treatment and conditioning) of radioactive waste in Europe, and Vision, Strategy and suggestion for enlarging the EJP on waste disposal for joint implementation of joint programming**

Panel discussion on perspectives for research and community integrations



## Day 2

Wednesday, 5 June

### 13th ENEN PhD Event & Prize 2019

<http://www.enen.eu/en/phd/phdevent2019.html>

13th ENEN PhD Prize 2019 will be organized in the framework of the FISA 2019 and EURADWASTE'19 Conferences in Pitesti, Romania, 4 – 7 June 2019 (<http://fisa-euradwaste2019.nuclear.ro/>) by the European Nuclear Education Network (ENEN) Association, in cooperation with the Joint Research Centre of the European Commission.

The objectives of the ENEN PhD Event are:

- to provide a forum for PhD students to present their research work to their fellows and colleagues in a friendly but competitive spirit,
- to promote the research work of PhD students in the nuclear fields, in particular experimental work,
- to set up a bridge between PhD students and professionals in the nuclear field.

Students will be admitted to the FISA 2019 and EURADWASTE'19 Conferences for all four days, June 4 – 7, 2019.

All PhD students will participate in the poster session on June 4th and conference welcome cocktail.

## AM / PM

Competition presentations will take place on Wednesday, June 5th, 2019. Award ceremony of the ENEN prize will be held on the same day.

All participants are requested to attend the poster session, the competition event and the award ceremony of the ENEN Prize.

The event will consist of up to 12 PhD presentations nominated by ENEN Members and selected by the ENEN PhD Prize Jury. The event will be divided into several sessions according to the subjects. The participants will make a presentation of their research work for 25 minutes followed by 5 minutes questions and discussion.

All presentations will be judged by the Jury members on the submitted paper as well as on the quality of their presentation and on the clarity in the discussion while answering the questions and discussions. Three best presentations will be awarded the ENEN Prize. Please see the "Criteria and Procedure for the ENEN Prize" in Annex I.

The Award Ceremony of the ENEN Prizes will be held during the FISA 2019 and EURADWASTE'19 Conferences, on Wednesday, June 5th, 2019.



## FISA 2019 EURADWASTE'19 - Technical visits

Day 4	Friday, 7 June
AM / PM	<p><b>TRIGA research reactor and Hot Cells facilities (at the Institute for Nuclear Research) and Nuclear Fuel Factory (in Pitesti-Mioveni)</b></p> <p>Technical visits of the RATEN ICN experimental facilities (TRIGA research reactor HEU to LEU converted, Hot Cells, Material Testing Laboratories and Radioactive Waste Treatment Plant) will be organized. Pitesti Nuclear Fuel Plant, FCN Pitesti ensures the production of about 10.080 CANDU nuclear fuel bundles nuclear fuel annually for the operation of the two units at Cernavoda NPP.</p>
	<p><b>ELI – Extreme Light Infrastructure (in Bucharest-Magurele)</b></p> <p>Extreme Light Infrastructure (ELI) will be the only European and International Centre for high-level research on ultra-high intensity laser, laser-matter interaction and secondary sources with unparalleled possibilities. This infrastructure will create a new open access European laboratory with a broad range of science covering frontier fundamental physics, new nuclear physics and astrophysics as well as applications in nuclear materials, radioactive waste management, material science and life sciences.</p>
	<p><b>Cernavoda NPP and Waste management facilities (in Cernavoda-Constanta)</b></p> <p>Cernavoda Nuclear Power Plant ensures the safe operation of Units 1 and 2, each with an installed power of 700 MW. The two nuclear reactors from Cernavoda NPP ensures about 20% of Romania's energy demand. Cernavoda NPP uses Canadian CANDU 6 technology (Canadian Deuterium Uranium) with natural uranium as fuel and heavy water as moderator and cooling agent. Cernavoda NPP Unit 1 was commissioned on 2 December 1996 and Unit 2 on 28 September 2007.</p>