

The background of the entire page is a photograph of the Eiffel Tower in Paris, France, under a blue sky with white clouds. The tower is on the left side, and the city of Paris is visible at its base.

GEN **IV** International
Forum™

GIF SYMPOSIUM



ATOMS FOR THE FUTURE

16-18 October 2018

Conference Programme





Greetings

It is my pleasure to welcome you to the fourth GIF Symposium embedded in the Atoms for the Future Conference (AFF). This event is designed to inform and educate audiences outside the GIF community with two main objectives: firstly, to present the major results and outcomes achieved by the GIF in pursuing the collaborative R&D objectives as specified in the 2014 GIF Technology Roadmap Update, and, secondly, to identify remaining or new challenges and the R&D efforts for the next 10 years needed to overcome them on the path to viability or performance demonstration, or, in some cases, towards the demonstration of the respective six GIF systems.

We decided with our AFF colleagues to share with you a prospective and comprehensive vision of the development of innovative reactor designs. In particular, we have organised the programme to promote cross-cutting visions and discussions on technical, market and regulatory issues facing the development of Gen IV systems. Such crosscutting approaches are indeed very important to support synergies and foster deployment.

This event is also a unique opportunity for students, PhDs or young professionals to take part in the Elevator Pitch Challenge (EPiC) and to present in a didactic way their work in 3 minutes. The 3 best EPiC presentations will be selected by a jury and presented in the Closing Plenary Session. Prizes will be awarded to the best presenters!

I would also like to warmly thank the GIF and AFF Staff for their help in organising this event and the many experts that have accepted to review the papers and chair the technical tracks.

I wish you a pleasant and productive symposium with many fruitful side-discussions and new ideas for future cooperation in developing your own project dedicated to Gen-IV systems!

François GAUCHE
GIF Chairman



Photo

Summary

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About...

ATOMS FOR THE FUTURE



Atoms for the Future is the annual event organised in Paris by the French Nuclear Society Young Generation Network.

This group gathers about 400 students and young professionals that are passionate about nuclear energy.

Several actions to improve our general knowledge on nuclear and develop our network are carried out such as top management interviews, presentation of the nuclear industry in schools, casual meetings, exchanges with international networks, etc. These actions are key for our organisation. Since 2010, Atoms For the Future has gathered students and young professionals in the nuclear industry from all over the world.

www.atomsforthefuture.org

The Generation IV International Forum (GIF) is a co-operative international endeavour which was set up to carry out the research and development needed to establish the feasibility and performance capabilities of the next generation nuclear energy systems.

The Generation IV International Forum has fourteen Members which are signatories of its founding document, the GIF Charter.

The goals adopted by GIF provided the basis for identifying and selecting six nuclear energy systems for further development. The selected systems are based on a variety of reactor, energy conversion and fuel cycle technologies. Their designs include thermal and fast neutron spectra cores, closed and open fuel cycles. The reactors range in size from very small to very large. Depending on their respective degree of technical maturity, the first Generation IV systems are expected to be deployed commercially around 2030-2040.

www.gen-4.org

Overall Program



Tuesday,
16 October

9:30 - 10:30

PLENARY 1

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coffee break

11:00 - 12:30

PLENARY 1

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12:30 - Lunch break

14:00 - 15:50

TECHNICAL
SESSION

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WORKSHOP

coffee break

16:10 - 18:00

TECHNICAL
SESSION

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WORKSHOP

From 19:00

SOCIAL EVENT

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Wednesday,
17 October

8:30 - 10:20
TECHNICAL
SESSION
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10:20 - 12:30
EPIC &
WORKSHOP
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coffee break

10:40 - 12:30
TECHNICAL
SESSION
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12:30 - 14:00
EPIC &
WORKSHOP
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12:30 - Lunch break

14:00 - 15:30
PLENARY 2
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coffee break

16:00 - 17:30
PLENARY 2
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Thursday,
18 October

NUCLEAR

JOB

FAIR

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TECHNICAL
VISITS

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Plenaries

Louis Armand Room

9:30	Opening Remarks	F. Gauché (CEA) & V. Faudon (SFEN)
Introduction	Welcome speech	W. Magwood (NEA)
	NICE Future Initiative	S. Golub (US-DOE)
10:00	Clean Energy Futures	K. Gogan (EfH, UK)
Cycle 1 Drivers for the development of GEN IV systems	Heat market opportunities and the road-map in Poland for HTR deployment	G. Wrochna (NCNR, Pol)
	Q&A	
10:30	Break	
11:00	Introduction	J. Kelly (ANS)
Cycle 2 Innovation and R&D in support of the demonstration and deployment of GEN-4 systems	Preparing for regulating Advanced Nuclear Technologies in the UK	D. Lisboa (ONR)
	Advanced reactors A paradigm shift	A. Cubbage (WG-SAR, US-NRC)
	Development of GEN IV systems: utility perspective	A. Sowder (EPRI, USA)
	The licensing of a GEN IV reactor: small company perspective	D. LeBlanc (Terrestrial Energy, Canada)
	Innovation in nuclear technology: an academic perspective	C. Forsberg (MIT, USA)
	Panel discussion and Q&A	

Opening Remarks



Valérie Faudon

*Executive Managing Director of
Société Française d'Énergie
Nucléaire (SFEN)*

François Gauché

*Nuclear Energy Division,
Deputy Managing Director at CEA
(France)*



Mr. François Gauché graduated from the Ecole Polytechnique (1997) and from the Ecole Nationale Supérieure des Mines de Paris (2000). He started his career in the industry (BMW, ALSTOM). He then joined the French Nuclear Safety Authority (ASN) as head of the regional division in Strasbourg, and the CNRS as head of the Cyclotron Aronax project in Nantes, until 2006.

In 2006, he joined the Agency ITER FRANCE as Director, CEA Cadarache, until 2009, for the ITER construction site and was in charge of site preparation activities.

In 2010, he took the position of Head of the 4th generation reactors programme at CEA and was responsible for the management of the ASTRID project, with a 600 researchers and engineers.

In 2015, he served as Director of the safety department of the ITER Organization in Cadarache.

In February 2016, he became the Head of the nuclear energy division of the CEA (4.000 staff), he is responsible of management of a large set of CEA nuclear energy R&D and D&D programmes and infrastructures, in support of CEA nuclear energy development policy and strategy.

Valérie FAUDON is *Executive Managing Director* of Société Française d'Énergie Nucléaire (SFEN) and Vice-President of the European Nuclear Society (ENS). She is also teacher at Sciences-Po in the frame of the Public School of International Affairs.

She served as Marketing Director at AREVA from 2009 to 2012, right after serving in different directing positions at HP then at Alcatel-Lucent, in the United States of America and in France. She graduated from Ecole Polytechnique and de l'Ecole Nationale des Ponts et Chaussées and also from Institut d'Études Politiques of Paris. He also has a Master of Science from Stanford University, California.

Introduction



William D. Magwood, IV

Director-General at OECD/NEA

S. Golub

Deputy Assistant Secretary for
Nuclear Technology Research and
Development

*U.S. Department of Energy, Office of
Nuclear Energy*



Mr. William D. Magwood, IV is the Director-General of the OECD Nuclear Energy Agency (NEA) since September 2014. Prior to this position, he served from 2010 to 2014 as one of the five Commissioners appointed by the US President and confirmed by the US Senate to the US Nuclear Regulatory Commission (NRC).

From 2005 to 2010, he provided independent strategic and policy advice on energy, environmental and technology policy issues. From 1998 to 2005, Mr. Magwood was Director of Nuclear Energy at the US Department of Energy (DOE). During his tenure, he launched several important initiatives including the Generation IV International Forum (GIF).

He began his career working as a scientist for Westinghouse and managing electric utility research and nuclear policy programmes at the Edison Electric Institute in Washington, DC. Mr. Magwood, a US national, holds Bachelor's degrees in Physics and English from Carnegie Mellon University and a Master of Fine Arts from the University of Pittsburgh.

As Associate Deputy Assistant Secretary for Nuclear Technology Research and Development, Mr. Golub leads the U.S. Department of Energy's research and technology development portfolio associated with advanced reactors, advanced nuclear fuels, separations technologies and materials development.

He serves as the interim Vice Chair of the GIF Policy Group on regulatory issues.

While in the private sector, he completed a variety of challenging projects in the commercial nuclear industry, including supervisory and management positions at 4 nuclear power stations in the areas of design, construction engineering, plant startup, licensing, operations and maintenance.

Mr. Golub received his degree in Civil and Environmental Engineering from Clarkson University and is a graduate of the Federal Executive Institute



Cycle 1

Drivers for the development of GEN IV systems



Kristy Gogan

*Co-founder and executive director
of Energy for Humanity*

Grzegorz Wrochna

*National Centre for Nuclear
Research, Poland*



Kirsty Gogan, MSc. is co-founder and executive director of Energy for Humanity (EFH), an environmental NGO focused on large scale deep decarbonisation and energy access. EFH led a delegation of the world's most highly regarded climate scientists to Paris COP21. EFH was subsequently shortlisted for the Business Green Leaders "Green NGO of the Year» Award in 2016.

At COP23, EFH published a new report on European Climate Leadership 2017 and presented a new study on Decarbonizing Cities with Advanced Nuclear. She is also founding director of Clean-Tech Catalyst (a consultancy specialising in climate and energy), recently commissioned by the Energy Technologies Institute to lead the Nuclear Cost Drivers Study in partnership with Lucid Strategy (based in Cambridge, MA).

Kirsty Gogan is regularly invited as an expert speaker on science communication, nuclear competitiveness and innovation to high profile events around the world, with experience as a senior advisor to industry, non-profits and Government.

Professor Grzegorz Wrochna graduated from the Warsaw University Physics Faculty, and was an assistant from 1986 to 1991. Between 1991 and 1998 he worked at the CERN Geneva on Large Hadron Collider experiments. Then from 1999 at Andrzej Sołtan Institute for Nuclear Studies at Świerk, Poland, in 2006 he served as Director.

He served as the Director at the National Centre for Nuclear Research (NCBJ), Poland until 2015. He is now International Cooperation Manager.

He is also a member of the Governing Board of European Sustainable Nuclear Energy Technology Platform (SNETP), Chairman of Nuclear Cogeneration Industrial Initiative (NC2I), a member of the Board of Governors of Joint Research Centre (JRC), and a Member of Council of European-XFEL GmbH.

He represents Poland in several international bodies, including the Euratom Program Committee, the Euratom Scientific and Technical Committee, and also, at the OECD/NEA, Nuclear Innovations 2050 Advisory Panel and at the OECD/NEA, High Level Group on Medical Radioisotopes.

Cycle 2

Innovation and R&D in support to the demonstration and deployment of GEN IV systems



John E. Kelly

President of the American Nuclear Society (ANS)

Dr. John E. Kelly is the President of the American Nuclear Society. Previously, he had been the Chief Technology Officer in the Office of Nuclear Energy, U.S. Department of Energy. He was responsible for establishing the strategic technical direction for the R&D portfolios. Prior to being the Chief Technology Officer, he was the Deputy Assistant Secretary for Nuclear Reactor Technologies, responsible for the U.S. civilian nuclear reactor research and development portfolio, which included Small Modular Reactors, Light Water Reactors, and Generation IV reactors.

In the international arena, he chaired the Generation IV International Forum and the International Atomic Energy Agency's Standing Advisory Group on Nuclear Energy. Before joining the Department of Energy in 2010, Dr. Kelly spent 30 years at Sandia National Laboratories where he was engaged in a broad spectrum of nuclear energy research. Dr. Kelly received his B.S. from the University of Michigan in 1976 and his Ph.D. in nuclear engineering from the Massachusetts Institute of Technology in 1980.



Diego Lisbona

*Nuclear Safety Inspector
Office for Nuclear Regulation*

Dr Diego Lisbona is a Nuclear Safety Inspector at the United Kingdom's Office for Nuclear Regulation. Diego holds a BEng and MEng in Chemical Engineering by the University of Oviedo (Spain) and a PhD, also in Chemical Engineering, by the University of Nottingham (UK). Following roles as HAZOP facilitator and safety case author in the UK nuclear consultancy sector, Diego joined ONR in 2016 as Internal Hazards assessor for the Generic Design Assessment of the UK ABWR. Diego currently acts as ONR's Deputy Delivery Lead in the Advanced Nuclear Technologies project sponsored by the UK Department of Business, Energy and Industrial Strategy (BEIS). As part of this project, Diego has led the development of the regulatory criteria that will be applied in the evaluation of design submissions to the UK Advanced Modular Reactors (AMR) feasibility and development project. Diego has also been responsible for the development and implementation of ONR's training and knowledge management strategies to ensure that ONR has the capability and capacity to regulate Advanced Nuclear Technologies in the future.



Andrew Sowder

Electric Power Research
Institute (EPRI)

Amy Cubbage

*Senior Project Manager, Office of
New Reactor, U.S. Nuclear
Regulatory Commission*



Ms. Cubbage joined the NRC in 1989 and she has held increasingly responsible positions in the Office of Nuclear Reactor Regulation (NRR) and the Office of New Reactors (NRO) including Lead Project Manager for the ESBWR Design Certification and Team Leader for BWR projects in the Division of New Reactor Licensing. In 2011, Ms. Cubbage was selected to serve as a Senior Staff Member in the NRC's Fukushima Near-Term Task Force. She was also selected as the Chief of the Policy and Rulemaking Branch, Division of Advanced Reactors and Rulemaking, NRO. In 2013, she served as the Reactor Policy Advisor for Commissioner Ostendorff. In 2016, she returned to NRO as a Senior Project Manager for advanced reactors. In this role she leads the NRC's activities to prepare for advanced reactor licensing. She currently serves as the chair of the NEA/CNRA Working Group on the Safety of Advanced Reactors. She received a Bachelor's Degree in Mechanical Engineering from the University of Virginia.

Dr. Andrew Sowder is a Technical Executive in the Advanced Nuclear Technology program at the Electric Power Research Institute (EPRI). He currently leads EPRI's strategic program on advanced reactors. His previous responsibilities at EPRI included R&D on accident tolerant fuel for LWRs and used nuclear fuel management and disposal.

Prior to joining EPRI, Andrew served as a physical scientist and foreign affairs officer at the U.S. Department of State addressing international nuclear safety and radiological security issues.

He received a B.S. in Optics from the University of Rochester and a Ph.D. in environmental nuclear engineering from Clemson University. He holds an adjunct faculty appointment in the Environmental Engineering and Earth Sciences Department at Clemson University and serves on the Advisory Board for the University of South Carolina's Nuclear Engineering program.

He is a Certified Health Physicist, serves on the American Nuclear Society's Standards Board, and is the past Chair of the ANS Fuel Cycle and Waste Management Division. He is a member of the Generation IV International Forum (GIF) Senior Industry Advisory Panel.



IYNC2020

DIVERSITY IN NUCLEAR

The International Youth Nuclear Congress (IYNC) and the Australian Young Generation in Nuclear (AusYGN) will hold the IYNC2020 conference in Sydney, Australia, in March 2020. Under the theme “Diversity in Nuclear,” the mission of the conference is to promote and enable the diversity of people engaged in the many peaceful uses of nuclear science and technology.

The IYNC2020 aims to promote and encourage diversity of people. Diversity comes in many forms, including gender, culture, educational background, professional experience and geographical location. IYNC2020 will also showcase the diversity in the peaceful uses and applications of nuclear science and technology. We will encourage interaction between participants, particularly in the sharing of knowledge and ideas between professionals of different personal and professional backgrounds and different generations of nuclear experts.

IYNC and AusYGN are developed and diverse organisations that are committed to ensuring that the youth are engaged and supported within the nuclear industry, and able to capitalise on the numerous professional opportunities for careers, networking and development. The theme of ‘Diversity in Nuclear’ reflects a commitment to promoting gender equity and addressing diversity issues within the nuclear industry.



Image: Destination NSW

MENTORSHIP PROGRAMS

INTERACTIVE WORKSHOPS

PANELS ON KEY TOPICS

CONTACT INFORMATION:

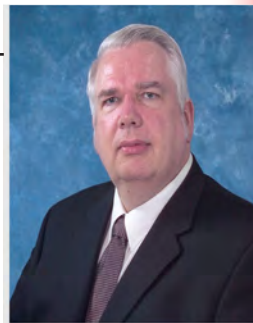
Please contact info@iync2020.org for further information on how you can get involved.





Charles Forsberg

Principal Research Scientist MIT



David LeBlanc

CTO and President
Terrestrial Energy

Dr. LeBlanc is a globally recognized authority on MSR technologies and has dedicated his career to the improvement and realization of advanced nuclear power systems, in particular Molten Salt Reactor technologies. His work has focused on the simplification of design and reduction of R&D requirements to realize this goal. He obtained his Ph.D. in Physics from University of Ottawa in 1998.

He has published numerous times in academic journals in conference proceedings and is extensively cited. He is a frequent speaker at international nuclear industry conferences on Molten Salt Reactor design concepts.

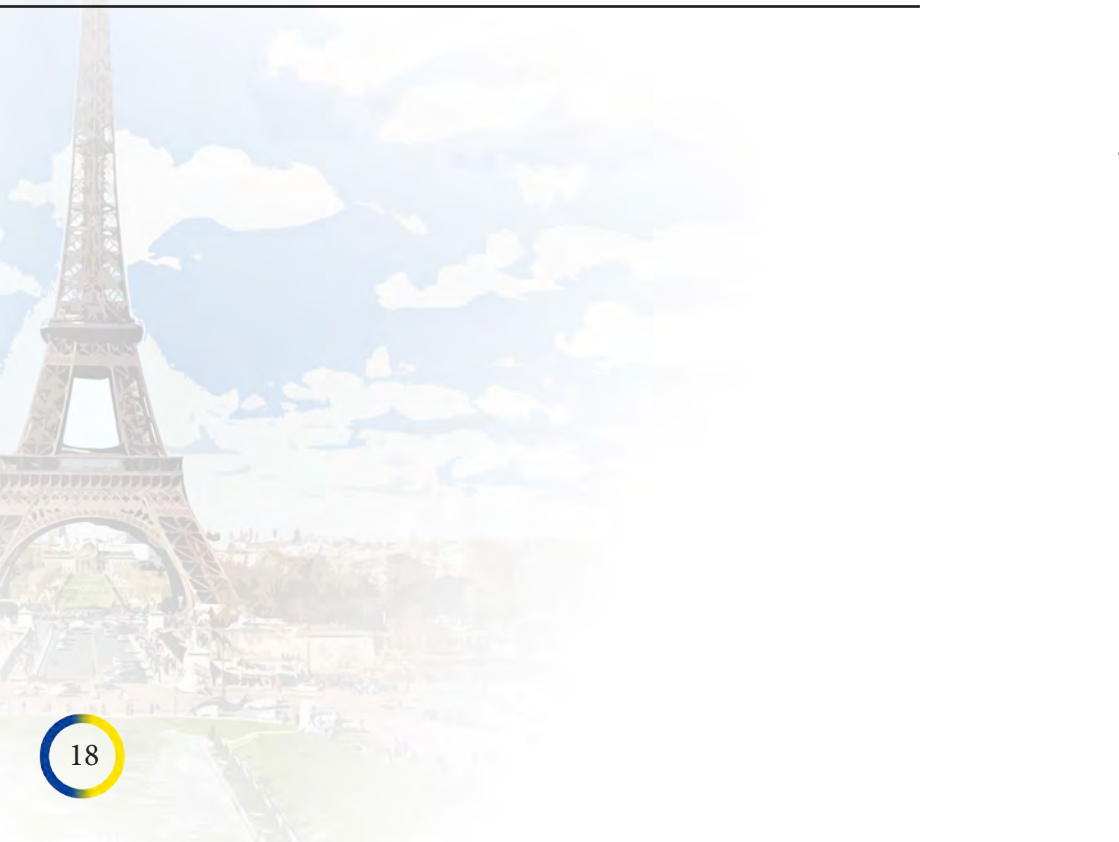
In early 2013 Dr. LeBlanc helped found Terrestrial Energy Inc. whose mission is to bring its Integral Molten Salt Reactor (IMSR) to commercialization.

Dr. Charles Forsberg is the Director and a Principle Investigator of the DOE Integrated Research Project on Fluoride-salt-cooled High-Temperature Reactors (FHRs). His research also includes large-scale heat storage including Firebrick Resistance-Heated Energy Storage (FIRES) and utility-scale heat storage for nuclear reactors. He teaches at MIT the fuel cycle and nuclear chemical engineering classes. Before joining MIT, he was a Corporate Fellow at Oak Ridge National Laboratory.

He is a Fellow of the American Nuclear Society, a Fellow of the American Association for the Advancement of Science, and recipient of the 2005 Robert E. Wilson Award from the American Institute of Chemical Engineers for outstanding chemical engineering contributions to nuclear energy, including his work in waste management, hydrogen production and nuclear-renewable energy futures.

He received the American Nuclear Society special award for innovative nuclear reactor design. Dr. Forsberg earned his bachelor's degree in chemical engineering from the University of Minnesota and his doctorate in Nuclear Engineering from MIT. He has been awarded 12 patents and has published over 300 paper

Technical Sessions



Louis Armand Room

14:00 - 15:50**Track 1**Chair: Jean-Paul Glatz (EC)
& Eric Loewen (GE)

Progress on GEN IV systems



- Lyndon Edwards *Recent Advances in the GIF Very High Temperature Reactor System*
- Alessandro Alemberti *The Generation IV Lead Fast Reactor Activities*
- Laurence Leung *An Update on the development status of the super-critical water cooled reactor*
- Andrea Bucalossi
& Roger Garbil *Ten years' overview of a successful R&D contribution of Euratom to GIF*
- Frederic Varaine *Astrid Project, general overview and status progress*

16:10 - 18:00**Track 8**Chair: Ramesh Sadhankar (CNL)
& Charles Forsberg (MIT)Integration of GEN IV reactors
in low carbon energy system

- Okaeng Rakereng
& Meli Fipaza & Bheka Khumalo *Optimal Energy Storage System for the AHTR Technology*
- Charles Forsberg *Base-Load Nuclear Reactors with Heat Storage to Buy and Sell Electricity: Integrating Nuclear and Renewables*
- Kamil Tucek
& Craig F. Smith *Small Modular LFR: construction cost features and comparison with PWR*
- Ramesh Sadhankar *EMWG Position Paper on the Impact of Increasing Share of Renewables on the Deployment of Generation IV Nuclear Systems*
- Celestin Piette *Economic and financial analysis of lead-cooled small modular reactor (SMR)*

Friedrich List Room

14:00 - 15:50

Track 4

Chair: Christian Latgé (CEA)
& Roger Garbil (EC)

Research Infrastructures

- Laurence Leung *R&D experimental capabilities for advancing GIF SCWR System in the next decade*
- Yanhua Zheng *Introduction on some experimental facilities for VHTR system*
- Kamil Tucek *The development of Liquid Lead Laboratory (LILLA) for mechanical testing in liquid lead*
- Pascal Tarrasson *PLINIUS 2 Facility : a severe accident facility for GEN23 and GEN4 reactors, open to international partnership*
- Roger Garbil *Generation IV systems experimental infrastructure needs*

16:10 - 18:00

Track 3

Chair: Konstantin Mikityuk (PSI)
& John Kelly (ANS)

Human capital development

- Konstantin Mikityuk *GIF Webinars: An Online Educational Resource*
- Sara Bortot *GEN IV Fast Spectrum Reactors - Pilot MOOC development at EPFL*
- Sara Bortot *GEN IV Fast Spectrum Reactors - Course development and e-learning at KTH*
- Christian Latgé *Teaching Sodium Fast Reactors in CEA*
- Valérie Faudon *The SFEN/INSTN MOOC on "nuclear energy in France": objectives and results*

Room 302

14:00 - 15:50

Track 10

Operation, Maintenance, Simulation &
Training (all reactor technologies)



François Baque

In Service Inspection and Repair developments for SFRs

Theo Chenu

*Improvement of industrial performance of complex
decentralised organisations*

16:10 - 18:00

Track 9

Chair :

Elsa Xavier-Lemaître (andra)

Decommissioning & Waste Management
(all reactor technologies)

Mathieu De Campos

*Formulation of alternative cement matrix for solidification
/stabilization of nuclear waste*

Tanguy Ronan

*Building a new facility to help decommissioning: the Box
Encapsulation Plant project*

Laurence-Emmanuelle
Dernoncourt

*A challenging way to dismantle large
nuclear component*

Sophie Missirian

Reducing waste by recycling nuclear fuel

SOCIAL EVENT

This year, Atoms for The Future and I2EN offer the young generation (**registered AFF participants only, < 35 years old**) a convivial moment at

The Bureau

28 cours Albert Ier, 75008 Paris

7.30pm

The I2EN will award the best French nuclear training with the I2EN Labels.

This part of the event will be in French.

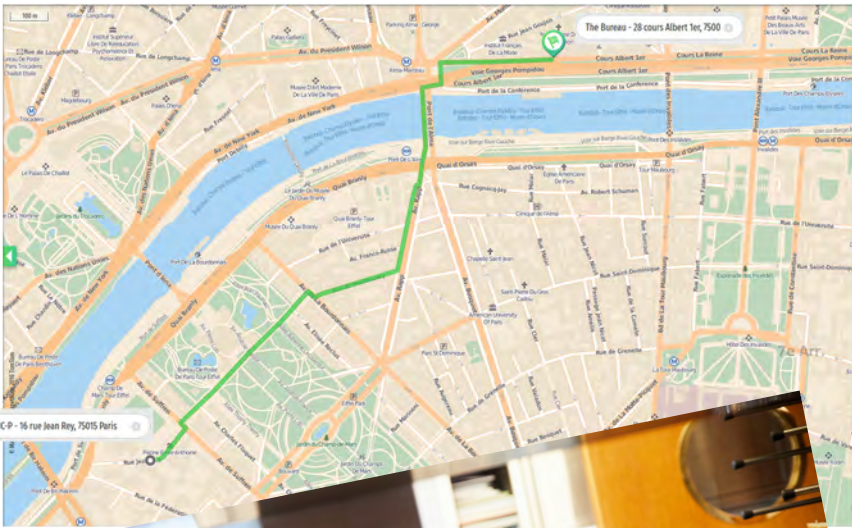
“

This label guarantees the excellency of the french nuclear training programs and education. This is also a signal of the quality and employability of our students in the nuclear industry, and for those, who wish to benefit from french expertise.

”

8.00pm

The Label ceremony will be followed by a cocktail to encourage information exchange and experience sharing. This event will be the perfect occasion for informal discussions.



Technical Sessions

Louis Armand Room

08h30 - 10h20

Track 5

Chair : Amy Cabbage (NRC) &
Bernard Carlucci (Framatome)

Safety and Security

Joel Guidez

New safety measures propositions for European Sodium Fast Reactor in Horizon-2020 ESFR-SMART project

Ben Cipiti

Developing a Molten Salt Reactor Safeguards Model

Shigenobu Kubo

Development of safety design guidelines on structures, systems and components for Generation IV sodium - cooled fast reactor systems

Chao Fang

The R&D of the HTR-STAP Program package : source term analysis codes for pebble-bed High-temperature gas-cooled reactor

Giacomo Cojazzi

The GIF Proliferation Resistance and Physical Protection working group (PRPPWG): achievement and perspectives

Yasushi Okano

GIF Risk and Safety Working Group: Application of the ISAM methodology to Gen IV nuclear systems

10h40 - 12h30

Track 7

Chair : David Planq (CEA) &
Konstantin Kornienko (Rosenergoatom)

**Advanced components &
systems for GEN IV reactors**

Cecile Petesch

CEN Workshop 64: an innovative way to work on a harmonized set of rules for Gen IV reactors

Janos Bodi

Use of CAD models in ESFR-SMART EU project

David Planq

Progress in ASTRID Gas Power Conversion System development

Tai Asayama

Codes and standards development for next generation sodium-cooled fast reactors in Japan

Hui Guo

Innovative Designs of Control Rods in Sodium Fast Reactors

Friedrich List Room

08h30 - 10h20

Track 6

Chair : Lyndon Edwards (ANSTO) &
Tatiana Ivanova (NEA)Fuels and materials
for GEN IV systems

Bin Gong

Corrosion behavior of austenitic steel in supercritical water

Will Windes

The USA's Advanced Reactor Technologies (ART) Graphite R&D Program

Ondrej Benes

The Chemistry of the Molten Salt Reactor Fuel

Satoshi Ohtsuka

Development ODS tempered martensitic steel for high burn-up fuel cladding tube of SFR

Domink Legut

Thermal expansion and thermal conductivity of actinides from first-principles calculations

Ondrej Muransky

Development and assessment of materials for the Generation IV; Nuclear reactors : Abrief overview of research in Australia

10h40 - 12h30

Track 2

Chair : Joel Guidez (CEA) and Shoji
Kotake (JAPC)

Progress on GEN IV systems

Victor Ignatiev

Molten-salt reactor as a necessary element of the nuclear fuel cycle closure for all actinides

Branislav Hatala

Progress of GFR technology

Daniel Bradi

Past, Present and Future of SCWR development in Canada

&Laurence Leung

Jan Uhler

Current Progress in Experimental Development of MSR and FHR Technologies

Pablo Rubiolo

Numerical and experimental thermal hydraulic studies of high temperature molten salts for Generation IV reactors

La communication dans le nucléaire



En tant que professionnel du nucléaire, vous avez aussi votre voix à faire entendre.

Prenez la parole, soyez acteur de votre avenir!



Workshop

La Fresque du Climat *The Climate Frescoe*



17 October

Workshops

Participants : (Max) 30 pers.
Duration : 3 hours, Wednesday 17
Language: English



The Climate Fresco is a fun and interactive workshop on climate change. This workshop sheds light on the complexity of climate change and provides a key to understanding it.

The introduction to this educational workshop will take 3 hours and is based on collective intelligence. It is designed for both novices and experts and will focus on how climate functions and the consequences of its disruption. Participants will learn a good deal, in a short period of time, about the climate and link causes and effects between the different components of climate change.

What's the objective? Raise awareness to climate change through play!



Plenaries

Louis Armand Room

14:00	GIF R&D Outlook	A. Stanculescu (GIF Technical Director)
Cycle 3 From R&D to demo projects	GIF R&D Infrastructures Task Force, Challenges and Opportunities	R. Garbil (EURATOM)
	Overview of Gen IV Demonstration projects in China	J. Tian (CNNC, China)
	Q&A	
	15:30 <i>Break</i>	
16:00	Market perspectives and challenges of Gen IV	H. Kamide (JAEA, Japan)
Cycle 4 From demo to market opportunities	Nuclear energy in the UK and the role of Advanced Nuclear Technology	F. Rayment (NNL, UK)
	Q&A	
16:45	Top 3 EPIC presentations and prize ceremony	J. Kelly (ANS) & Y. Morvan (SFEN-YG)
Closing session	Closing remarks	F. Carré (CEA) & M. Boissavit (SFEN-YG)



Alexander Stanlescu

GOF Technical Director

Trained as a reactor physicist and engineer, he has a PhD in Physics from La Sapienza in 1973. Over his career, he has gained a broad set of skills in almost all areas related to nuclear energy, viz. reactor design and engineering, methods development, fuel cycle analysis, safety analysis, strategy and economics studies, and non-electric applications of nuclear energy.

He has worked in R&D and core design of fast reactor and hybrid nuclear systems. He possesses a broad professional experience basis having worked for industrial organizations, research organizations and national laboratories, and IAEA.

Till December 2016 he was the Director of the Nuclear Systems Design and Analysis Division at the Idaho National Laboratory (INL).

Currently he serves as GIF Technical Director.



Roger Garbil

Scientific & Project Officer - Euratom Fission

Trained as a Nuclear Physicist at the University of Saint-Etienne, France, Roger Garbil gained extensive knowledge while responsible for the JET Joint Undertaking (UK) and later at the CEA Tore Supra (FR). Since 2009 he has been working within the EU/Euratom Nuclear Fission (BE).

He is a promoter, among others, of successful European Technology Platforms such as the Sustainable Nuclear Energy Technology Platform, the ESNII, the European Energy Research Alliance Joint Programme in Nuclear Materials, and the ENEN. He is also involved with EU International Fora, OECD/NEA, IAEA, and GIF initiatives. Promoting international multi-disciplinary science diplomacy to tackle today's global Energy and Climate challenges is also his daily motto.



Tian Jiashu

Deputy director of CNNC

Deputy-Chief-Engineer of China National Nuclear Corporation (CNNC), Mr. Tian Jiashu also holds the position of GINET Chairman, a Sino-US JV of CNNC and TerraPower for TWR development.

Prior to this he was head of R&D Department, Head of Nuclear Power Department in CNNC, Head of the Nuclear Safety Center of Ministry of Environmental Protection of China. He also served as President of China Nuclear Power Research Institute-CNPRI, President of China Nuclear Power Design Company-CNPDC, Vice President and Chief – Engineer of Beijing Institute of Nuclear Engineering-BINE.

He is specialized in nuclear power engineering and nuclear safety.



Cycle 4

From demo to market opportunities



Fiona Rayment Obe

Executive Director of NIRO

Hideki Kamide

Deputy Director General, Sector of
Fast Reactor and Advanced Reactor
Research and Development, JAEA



Duties:

Deputy Director General
Sector of Fast Reactor and Advanced Reactor
Research and Development
Japan Atomic Energy Agency (JAEA)

Academic Career:

1985 Master Degree, Graduate School of
Osaka University, Nuclear Engineering
2010 Doctor of Engineering, Tokyo Institute of
Technology, Nuclear Engineering

Professional history:

1985 Joining to Power Reactor and Nuclear Fuel
Development Corporation
2014 Director General, Advanced Fast Reactor
Cycle System Research and Development Center,
Sector of Fast Reactor Research and Development,
JAEA
2015 Chair of Thermal Hydraulic Division, Atomic
Energy Society of Japan (April 2015 ~ March
2016)
2015 Vice chair of GIF (Generation IV International
Forum) Policy Group
2018 Deputy Director General, Sector of Fast
Reactor and Advanced Reactor Research and
Development

Fiona Rayment is the Executive Director of NIRO, that is charged with providing strategic nuclear advice to Her Majesty's Government. She has more than 25 years of nuclear industry experience working within operations and strategic planning roles across nuclear sites internationally. Rayment is a chartered chemist and engineer with a PhD in chemistry from University of Strathclyde, Glasgow and is a fellow of the Royal Society of Chemistry and of the UK Nuclear Institute. She has an MBA from Manchester Business School. Rayment recently received an OBE in the 2017 Queen's birthday honours for her services to Nuclear innovation and research.

Rayment's other roles across the sector include being on the board of the UK Nuclear Institute, and the American Nuclear Society. She is a member of the UK Research Councils Fusion Advisory Panel, Office of Nuclear Regulation Independent Advisory Panel and Idaho National Laboratory's Nuclear Science and Technology Advisory Committee. Rayment is the chair of the UK's Nuclear Skills Strategy Group, the strategic body that oversees UK nuclear sector skills requirements, and chairs the Nuclear Energy Agency's NI 2050 advisory panel.



Frank Carré

Executive Director of NIRO



Dr. Frank Carré is the Scientific Director of the Nuclear Energy Division at the French Commission for Atomic and Alternative Energies (CEA). Since joining the CEA in 1976, he has contributed to studies on advanced nuclear systems such as light water reactors, fusion reactor blankets and space power reactors. After 1990 he successively managed Services in charge of Innovative Systems for power reactors, and Reactor and Fuel Cycle Physics within the Department of Reactor Studies. From 1997 to 2000 he served as the Assistant Director, CEA, of the Strategy and Evaluation Division, he was in charge of the strategic planning for CEA's civilian activities. From 2001 to 2006, he acted as the Program Director for Future Nuclear Energy Systems within the Nuclear Energy Division. In this position, he contributed to shaping and managing national R&D programs on fast neutron reactors with advanced fuel cycles and high temperature reactors for the cogeneration of process heat and hydrogen.

From 2007 to mid-2009, he acted as the Deputy CEA Director for Nuclear Development and Innovation within the Nuclear Energy Division. In this position he co-managed national programs on future nuclear systems and remained actively involved in collaborative programs on future nuclear energy systems both in Europe and the Generation IV International Forum.

In August 2009, he became Scientific Director at the CEA of the Nuclear Energy Division and a member of the International Nuclear Energy Academy. Frank Carré also holds a lecturing and research chair on "Sustainable Energies" at the Ecole Polytechnique. In 2012 he assumed the additional responsibility of Scientific Counsellor to the High Commissioner for Atomic Energy.

He received the Jan Runermark Award from the European Nuclear Society in 2012 for outstanding services to the benefit of the young generation.

Nuclear Job Fair

Louis Armand Room

In 2017, Atoms for the Future merged with the young SFEN members' seminar. An event organised for students and young graduates similar to student job fairs is organised with two objectives. First, enable companies to meet potential future employees and offer internships and other professional opportunities. Secondly, discuss the type of jobs that the nuclear sector, the 3rd largest industrial sector in France, offers.







Technical Visits

Technical visits are open to registered AFF participants only.

ORANO : La Hague

on the cutting edge of used fuel recycling



The La Hague site is a nuclear fuel reprocessing plant at La Hague on the Cotentin Peninsula in northern France. Operated by Areva NC, formerly COGEMA (Compagnie générale des matières atomiques), La Hague has nearly half of the world's light water reactor spent nuclear fuel reprocessing capacity. It has been in operation since 1976, and has a capacity of about 1700 tonnes per year. It extracts plutonium which is then recycled into MOX fuel at the Marcoule site.

Ever since its beginnings in the 1950s and 1960s, the nuclear industry has had to ponder the question of used fuel management. With the creation of la Hague treatment plant in 1966, the French nuclear industry acquired a sustainable solution for meeting this need. The la Hague site has evolved over the years and is now – as it has always been – the global benchmark in the field of treatment, a vital step in recycling.

25% NATURAL URANIUM SAVING

300 HECTARES

32000 METRIC TONS OF USED FUEL TREATED SINCE SITE CREATION

Today, the la Hague treatment site is the world leader in the field of used fuel recycling and has strong international business. In addition to the volumes treated, it is a model of technology for a number of countries as well as a place of constant innovation

INDICATIVE PROGRAM OF THE VISIT

11:00	Arrival at the site	13:30	Site tour
11:15	Presentation of La Hague	17:30	Back in the cloakroom
12:30	Lunch	17:45	Exit formalities
13:15	Changeover in the cloakroom	18:00	End of the visit

EDF : Superphénix

a fast breeder in the 80's



Superphénix is a 1200 MW fast breeder reactor currently being dismantled.

Superphénix had a twin goal of reprocessing nuclear fuel from France's line of conventional nuclear reactors, while also being an economical generator of power on its own.

This design has three major advantages over conventional military designs; the entire reaction cycle occurs much faster, therefore, it breeds new fuel at a faster rate, it can use a wider variety of breeding materials because it is not used as the fuel as well, and it also generates ample amounts of heat, which can be used to efficiently produce power.

The breeder reactor was designed to replace the graphite with liquid sodium metal. The graphite is used as a moderator, slowing the neutrons released in the nuclear reactions to a speed that makes other uranium atoms sensitive to them. However, natural uranium fuel is replaced with sensitive to fast neutrons, typically highly enriched uranium or plutonium, the reaction can run without the use of a moderator.

Construction began in 1974 and was completed in 1981. Power production was halted in December 1996 for maintenance. Superphénix closed permanently in December 1998.



INDICATIVE PROGRAM OF THE VISIT

09:45	Arrival at Superphénix
10:00	Presentation of EDF and Superphénix
12:00	Lunch
13:45	Site tour
16:30	Back to Public Information Center
16:45	End of the visit

ITER Project

Energy for the future



china eu india japan korea russia usa

The ITER Project is currently under construction on a 180-hectare site in southern France. Thirty-nine buildings and technical areas will house the ITER Tokamak and its plant systems.

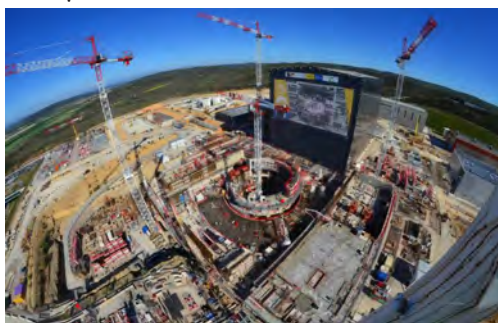


The heart of the facility – the Tokamak Building – is a seven-storey structure in reinforced concrete that will sit 13 meters below the platform level and 60 meters above.

Pre-assembly of Tokamak components will take place in the adjacent Assembly Hall. Other auxiliary buildings in the vicinity of the Tokamak Building will include cooling towers, electrical installations, a control room, facilities for the management of waste, and the cryogenics plant that will provide liquid helium to cool the ITER magnets.

Europe, as part of its commitments to the project, is building nearly all of the platform buildings and site infrastructure. An estimated 2,300 workers will participate in the construction of the ITER scientific facility. Over the next years each building, as it becomes ready for occupation, will be handed over to the ITER Organization for the start of assembly works.

The successful integration and assembly of over one million components (ten million parts), built in the ITER Members' factories around the world and delivered to the ITER site constitutes a tremendous logistics and engineering challenge.



INDICATIVE PROGRAM OF THE VISIT

- 10:00 Arrival at ITER Visitor Centre
- 10:30 Presentation of the ITER project / Q&A
- 12:00 Virtual Reality Room
- 13:00 Lunch
- 14:15 Worksite tour
- 16:30 End of the visit





ORGANISING TEAM

ATOMS FOR THE FUTURE



Eric Abonneau
International Scientific Program
Committee Chairman



Martin Boissavit
President of SFEN Young Generation



Pascal Terrasson
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NOTE

