

Chapter 6. Task Force Reports

ETTF: Education & Training Task Force

Background/term of reference

The GIF Education and Training Task Force (ETTF) was launched in 2015 to serve as a platform to enhance open Education and Training (E&T), as well as communication and networking of people and organizations in support of Gen-IV International Forum. The principal objective of the task force is focused on promoting E&T by:

- 1) identifying and advertising current training courses;
- 2) identifying and engaging collaboration with other international E&T organizations;
- 3) developing webinar series dedicated to Gen-IV systems and related cross-cutting topics and advertising these at the national and international level;
- 4) creating and maintaining a modern social medium platform (LinkedIn www.linkedin.com/groups/8416234) to exchange information and ideas on GIF Research and Development (R&D) topics, as well as related GIF E&T activities.

Main achievements in 2019

The development of webinars is a one of the main activities of this task force. It is intended to inform and stimulate not only young scientists' interest, but also managers, key decision makers and the general public; about advanced reactors introducing foreseen advantages but also key R&D to be developed, knowledge management and preservation with lessons learnt, current research and existing projects.

The ETTF has established collaborative associations with universities and nuclear organizations (**Table ETTF 1**) actively involved in Gen-IV systems to foster the exchange of scientific and technical information for the development of webinars.

Table ETTF 1. **Organizations involved with the development of GIF webinars**

US Department of Energy – Office of Nuclear Energy, United States	Université de Lille 1, France
Institute of Energy and Environment, Youngsan University, Korea	Paul Scherrer Institute, Switzerland
Commissariat à l’Energie Atomique et aux Energies Alternatives, France	Euratom, EU
Argonne National Laboratory, United States	Institute of Physics and Power Engineering, Russia
Canadian Nuclear Laboratories, Canada	Ansaldo Nucleare, Italy
University of California, Berkeley, United States	Kurchatov Institute, Russia
US Naval Postgraduate School, United States	Brookhaven National Laboratory, United States
Nuclear Energy Agency	SCK.CEN, Belgium
Idaho National Laboratory, United States	Los Alamos National Laboratory, United States
Nuclear National Laboratory, United Kingdom	INET, Tsinghua University, China
Research Center Řež, Czech Republic	Japan Atomic Energy Agency, Japan
National Research Nuclear University “MEPhI”, Russia	Idaho State University, United States
Colorado School of Mines, United States	Oak Ridge National Laboratory, United States

Because of its easy access, and free of charge, the ETTF has decided to present webinars and exploits this modern internet technology to reach interest of a broader audience. Therefore, to promote training in Gen-IV systems and to ensure a knowledgeable workforce exists, were created and made them available to the public since 2016 a series of webinars on topics specific to advanced reactor systems and cross-cutting subjects. These webinars are intended to be of interest to those already in the workforce who may need a refresher course or a better understanding of a specific topic, to a more general public. World-class webinars presented by Gen-IV Experts (usually GIF members) will be useful to a wide scope of people (like quality assurance officers, data validators, technicians, managers, regulators, and others who require an enhanced understanding of Gen-IV reactor concepts in their work). Thirty-six webinars have been developed, recorded and archived on the GIF Open Website. It is worth to note that during the GIF Symposium (October 2018 in Paris), an elevator pitch challenge (EPiC) contest was organized and the three best students winning this contest were offered to give a webinar presentation (**Table ETTF 2**). During the American Nuclear Society winter meeting (Washington DC, November 2019), a similar event, called “Pitch your PhD” was organized. The winner Dr Cuddy Wiggins will present a webinar titled “*Development of Multiple-Particle Positron Emission Particle Tracking for Flow Measurement*”, in Dec. 2020.

Table ETTF 2. **GIF Webinar Series (September 2016 to December 2019)**

INTRODUCTION
Atoms for Peace - John Kelly, USA
Introduction to Nuclear Reactor Design - Claude Renault, France
European Sodium Fast Reactor, An Introduction - Konstantin Mikityuk, Switzerland
GEN IV SYSTEMS
Sodium cooled Fast Reactor - Bob Hill, USA
Lead Fast Reactor - Craig Smith, USA
Gas cooled Fast Reactor, Alfredo Vassile, France
MYRRHA, An Accelerator driven System Based on LFR Technology - Hamid Ait Abderrahim, Belgium
Lead Containing mainly isotope Pb-208: New Reflector for Improving Safety of Fast Neutron Reactors - Evgeny Kulikov, Russia
Very High Temperature Reactors - Carl Sink, USA
Supercritical Water Reactors - Lawrence Leung, Canada
Fluoride cooled-High Temperature Reactors - Per Peterson, USA
Molten Salt Reactors - Elsa Merle, USA
Gen IV Coolants Quality Control - Christian Latge, France
Czech Experimental Program on MSR Technology Development, Jan Uhlir, Czech Republic
OPERATIONAL EXPERIENCE
Desig, Safety Features and Progress of HTR-PM - Yujie Dong, China
Feedback Phenix and Superphenix - Joel Guidez, France
Molten Salt Actinide Recycler & Transforming System with and without Th-U Support: MOSART - Victor Ignatiev, Russia
Astrid Lessons Learned - Gilles Rodriguez, France
Safety Of Gen IV Reactors - Luca Ammirabile, EC
Advanced Lead Fast Reactor European Demonstrator, ALFRED Project - Alessandro Alemberti, EC
Russia BN 600 & BN 800 - Ilya Pakhomov, Russia
The ALLEGRO Experimental Gas Cooled Fast Reactor Project - Ladislav Belovsky, Czech Republic
GEN IV CROSS CUTTING TOPICS
Energy Conversion, Richard Stainsby, United Kingdom
Estimating Costs of Gen IV Systems - Geoffrey Rothwell, NEA/OECD
Materials Challenges for Gen IV Reactors - Stu Maloy, USA
FUEL TYPES
General Consideration on Thorium as a Nuclear Fuel - Franco Michel-Sendis, NEA/OECD
Metallic Fuels for SFRs - Steven Hayes, USA
Advanced Gas Reactor TRISO Particle Fuel - Madeline Feltus, USA
SUSTAINABILITY AND FUEL CYCLE
Closing the Fuel Cycle, Myeong Seung, Republic of Korea
Sustainability, A Relevant Approach for Defining Future Nuclear Fuel Cycles - Christophe Poinssot, France
Scientific and Technical Problems of Closed Nuclear Fuel in Two-Components Nuclear Energetics - Alexander Orlov, Russia
Winners of the Elevator Pitch Challenge (EPiC) contest at the GIF Symposium, Paris, October 2018
Formulation of Alternative Cement Matrix For Solidification/Stabilization of Nuclear Waste - Matthieu de Campos, France
Interactions between Sodium and Fission Products in case of a severe Accident in a Sodium-cooled Fast Reactor - Guilhem Kauric, France
Security Study of Sodium Gas Heat Exchangers in Frame of Sodium-Cooled Fast Reactors - Fang Chen, France

The webinars are already planned from January 2020 to June 2020, as shown in **Table ETTF 3**.

Table ETTF 3. **GIF Webinar Planned until June 2020**

Webinars Planned from January 2020 to December 2020
<i>Thermal-hydraulics in Liquid Metal Fast Reactors, Antoine Gerschenfeld, CEA, France – January 2020</i>
<i>SFR Safety Design Criteria (SDC) and Safety Design Guidelines (SDGs), Shigenobu Kubo, JAEA, Japan, February 2020</i>
<i>MicroReactors: A Technology Option for Accelerated Innovation, Jee Gehin (INL and DV Rao LANL), United States, March 2020</i>
<i>GIF VHTR Hydrogen Production Project Management Board, Sam Suppiah, CNL, Canada, April 2020</i>
<i>Performance Assessments for Fuels and Materials for Advanced Nuclear Reactors, Daniel LaBrier, ISU, United States</i>
<i>Comparison of 16 Reactors Neutronic Performance in Closed Th-U and U-Pu cycles, Jiri Krepel, PSI, Switzerland, June 2020</i>

As of August 2019, attendance during the live webcasts totals 1906 and the number of viewings of recorded webinars in the online archive is 3 332 for a total of webinar viewing of 5 238 in 3 years.

The participants in the GIF webinars include representatives from multiple organizations such as federal agencies, national laboratories, various state agencies, universities, international organizations, contractors, and commercial organizations. **Figure ETTF 1** represents the GIF webinar attendance distribution for 35 webinars presented. It is important to note that 35% of webinar attendees are from international organizations. Representatives from state agencies comprise the largest single organization type.

Figure ETTF 1. **Organization type for 35 webinars as of December 2019**

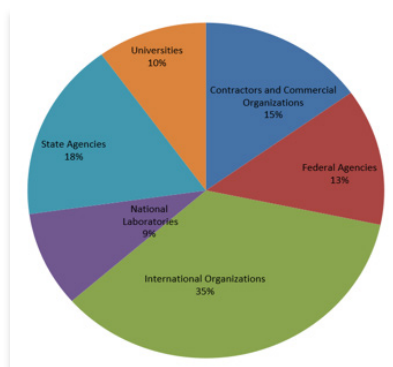


Figure ETTF.2. **Molten Salt Bootcamp, 1-3 July 2019**



The GIF ETTF was represented by Prof. M. Fratoni, from UC Berkeley who participated in the “Molten Salt Summer Boot Camp”, 1-3 July 2019, TU Delft, Netherlands.

A paper summarizing the ETTF's activities and titled: "The GIF Webinars, Past, Present and Future" was presented at the international conference Global 2019, September 2019, Seattle. During this conference, Prof. Il Soon Hwang and Dr Patricia Paviet were representing the GIF ETTF at a panel session "Building Next Generation Nuclear: Enabling Succession Planning to Create and Maintain a Well Educated Workforce in the Nuclear Energy Sector". This panel addressed some of the key challenges for the nuclear energy sector with respect to maintaining and growing a healthy and diverse talent pipeline of higher-level skills and subject matter experts to drive future thought leadership in fuel cycle.

Due to these excellent results proving the viability and dynamism of this Task Force (see **Figure ETTF 3**), it was decided during the GIF Policy Group meeting in Oct. 2019 to transform this Task Force to a Working Group. The E&T Task Force (ETTF) will therefore move to the E&T Working Group (ETWG). Thanks to this it will start to think deeper – in addition with the webinars series – to some medium-term/long-term actions. Therefore the 1st Face to Face ETWG will occur in 2020 to discuss and propose a common GIF Education & Training vision.

Figure ETTF 3. The 1st ETTF Selfie event during the Webinar Presentation of Fang Chen who was one of the three "best students winning contest" of the GIF Symposium



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