



# ANS

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## *The ANS Globe*

*...e-news from the ANS International Committee*

### **From the editor**

*The ANS Globe* is the Bulletin of the American Nuclear Society's International Committee (IC). *The ANS Globe* has as its mandate the dissemination of news of international interest to International Committee members and to others.

We would like to keep *The ANS Globe* current and relevant. Please send your letters, articles, news and/or comments for consideration towards the next issue.



*Ben Rouben*

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## From the Chair and Vice-Chairs



As the American Nuclear Society (ANS) begins a year with a new President and Vice-President/President Elect, the ANS International Committee also is welcoming new leadership. Westinghouse's Gale Hauck is joining Luc van den Durpel to become a Vice-Chair of the Committee. Gale is an active member of ANS and the IC. She recently worked in Japan. She is currently based in Abu Dhabi, where she is working on the Barakah Nuclear Power Plant. Gale is also adding to our membership by forming an Abu Dhabi chapter of ANS.

We also welcome incoming ANS President Marilyn Kray and incoming Vice-President/President-Elect Mary Lou Dunzik-Gougar. Both have an expansive view of the nuclear energy world. ANS will benefit from their judgment and experience in two very different sectors – the commercial/utility sector and the academic/lab sector. Finally, we are very pleased to continue to have the support and counsel of Immediate Past President John Kelly, whose international experience and commitment is unparalleled.

There are many international activities and events that ANS members should consider participating in in the next year or so. Here are a few that are particularly interesting:

- Join attendees from 27 nations at the **European Nuclear Young Generation Conference** in Ghent, Belgium, June 23-27, 2019, with a theme of Nuclear for Better Health: From Half Lives to Better Lives. [www.enygf.org/](http://www.enygf.org/)
- The renowned **24<sup>th</sup> World Energy Congress** will be held in Abu Dhabi, United Arab Emirates, September 9-12, 2019. Sponsored by the World Energy Council with 250 speakers, this is a platform for global leaders to explore new energy futures, critical innovation areas and new strategies. [www.worldenergy.org](http://www.worldenergy.org)

- The **IAEA General Conference** will take place in its usual Vienna, Austria, location (the IAEA) from September 16 to 20, 2019 [www.iaea.org/about/governance/general-conference](http://www.iaea.org/about/governance/general-conference)
- Seattle, Washington, USA will host the **Global/Top Fuel Conference** from September 22-26, 2019. This international conference is sponsored by ANS with support from the Atomic Energy Society of Japan, Canadian Nuclear Society, European Nuclear Society, Korean Nuclear Society, Korean Radioactive Waste Society, and the Société Française d’Energie Nucléaire. <http://globaltopfuel.ans.org/>
- The **ANS Winter Meeting** will be held in Washington, D.C. November 17-21, 2019, with a theme of Nuclear Technology for the U.S. and the World. This meeting coincides with the meeting of the Pacific Nuclear Council and the ANS International Committee as well as Young Professionals Congress. <http://answinter.org/>
- The **International Youth Nuclear Conference (IYNC2020)** will take place March 7-14, 2020 in Sydney, Australia. [www.iync.org/2020-sydney-australia-2/](http://www.iync.org/2020-sydney-australia-2/)
- The **International Congress on Advances in Nuclear Power Plants (ICAPP2020)** will be held March 15-18, 2020 in Abu Dhabi, United Arab Emirates. [www.icapp2020.org/](http://www.icapp2020.org/)
- The **Pacific Basin Nuclear Conference (PBNC2020)** will be held April 26-30, 2020 in Cancún, Mexico. The Pacific Nuclear Council and the Mexican Nuclear Society are co-sponsors for the conference. <http://www.pbnc-2020.mx/>

We are sharing these meetings with you because as nuclear energy grows around the world, it is important for ANS members to participate in a variety of international events. The opportunity these conferences afford to meet and interact with members of the global nuclear energy community is vital to the growth of our industry.

We look forward to seeing you at these meetings and at the upcoming American Nuclear Society Annual Meeting in Minneapolis, Minnesota, USA, from June 9 to 13.

All the best –

Mimi Holland Limbach  
Chair

Luc van der Durpel  
Vice-Chair

Gale Hauck  
Vice-Chair

## **The ANS International Committee's Web Page**

Visit the enhanced ANS International Committee's Section on the ANS website, located at <http://www.ans.org/const/international>. It includes:

- Background information about the ANS International Committee
- Connections to ANS International Local Sections
- An overview of Society alliances with international organizations (INEA, INSC, and PNC), along with contact information
- Connections to 30 ANS Agreement Societies/Organizations, and
- Current/back issues of *The ANS Globe*, which features ANS International Committee activities and related items.

## **Election of Non-US ANS Board Member**

Congratulations to **Dr. Olga Simbalista**, who was elected to the Non-US Board position in the 2019 ANS election! Dr. Simbalista is the current President of the Brazilian Nuclear Energy Association. She has been a member of the Latin American Section of ANS since 1992, and has served there as Secretary, Vice-President and President, and Chair of several special meetings/sessions. She is a member of the Materials Science and Technology Division and Nuclear Nonproliferation Policy Division.



## **News from Sister Societies and International News**

- **Canada, Canadian Nuclear Society (CNS)**  
<http://www.cns-snc.ca>



The 39<sup>th</sup> Annual Conference of the CNS, together with the 43<sup>rd</sup> CNS/CNA Student Conference, will be held in Ottawa, Ontario, 2019 June 23-26. Everyone is invited! The CNS Executive will be changing at the CNS Annual General Meeting on June 23. The incoming CNS President is **Mr. Keith Stratton**, who is retired from the Point Lepreau Nuclear Generating Station at New Brunswick Power.

One piece of news about the Canadian nuclear industry: The refurbishment of Ontario Power Generation's Darlington Generating Station continues successfully. All four CANDU reactors in the station are scheduled to be refurbished by 2026. The Darlington station has been in operation since the early 1990s and is approaching the mid-point of its operating life. Replacing critical components of the CANDU reactors will extend Darlington's operating life by 30 years or more. Work is almost completed on installing

new pressure tubes into Unit 2, the first reactor to be refurbished, and is expected to be completed this summer. The next major stage is to load fuel back into the reactor; this is expected to begin this summer and take until February 2020, when the reactor is expected to go back online.

CANDU reactors provide >60% of the electricity produced in the province of Ontario.

The CNS now looks forward to the many events it will be holding in the near future:

- 39<sup>th</sup> Annual Conference of the CNS and 43<sup>rd</sup> CNS/CNA Conference, Ottawa, Ontario, Canada, 2019 June 23-26 (<http://www.cns-annual-conference.org>)
- 14<sup>th</sup> International Conference on CANDU Fuel, Mississauga, Ontario, Canada, 2019 July 21-24 (<https://www.cns-snc.ca/events/fuel2019/>)
- 4<sup>th</sup> Canadian Nuclear Waste Management, Decommissioning and Environmental Restoration Conference (NWMDER-2019), Ottawa, Ontario, Canada, 2019 Sept. 8-11 (<https://www.cns-snc.ca/events/nwmder2019/>)
- CNS CANDU Fuel Technology Course, Ajax, Ontario, Canada, 2019 October 3-4 ([https://www.cns-snc.ca/events/2019\\_fuel\\_technology\\_course/](https://www.cns-snc.ca/events/2019_fuel_technology_course/))
- Fire Safety & Emergency Preparedness for the Nuclear Industry 2019 (FSEP-2019), Ottawa, Ontario, Canada, 2019 October 27-30 (<https://cns-snc.ca/media/fsep-2019/>)
- 40<sup>th</sup> Annual Conference of the CNS and 44<sup>th</sup> CNS/CNA Conference, Saint John, New Brunswick, Canada, 2020 May 31-June 3 (<http://www.cns-snc.ca>)
- NUTHOS-13, Vancouver, British Columbia, Canada, 2020 August 23-26 (<http://www.cns-snc.ca>)
- G4SR-2 (2<sup>nd</sup> International Conference on Generation-IV and Small Modular Reactors), Toronto, Ontario, Canada, 2020 November 9-12 (<http://www.cns-snc.ca>)
- 41<sup>st</sup> Annual Conference of the CNS and 45<sup>th</sup> CNS/CNA Conference, Toronto, Ontario, Canada, 2021 June 6-9 (<http://www.cns-snc.ca>)



- **[European Nuclear Society \(ENS\)](#)**

The following contribution was sent jointly by **Luc van den Durpel** (IC Vice-Chair) and **Fernando Naredo** (Secretary General, ENS) and **Kirsten Epskamp** (Director of Operations, ENS):

### **ANS and ENS Renewed their Memorandum of Cooperation Agreement**

John Kelly and Fernando Naredo representing respectively ANS and ENS renewed the cooperation agreement in September 2018 updating earlier agreements that dated back to the early days of both societies.

By this agreement, ANS and ENS seek to

- inform each other of the convocation of appropriate technical and scientific conferences of international significance to be held in each country/region.
- encourage the interchange of technical information, journals, periodicals and webinars which are jointly identified and agreed upon by the executive officers

- or official points of contact of each society;
- promote as much as possible the establishment of contacts between equivalent groups of each society;
- prepare for publication in each other's journals or other periodicals articles with submitted articles to be subject to usual editorial and financial procedures;
- strengthen contacts and exchange experiences through communication or meetings of delegates
- arrange for and collaborate or sponsor initiatives, joint meetings or workshops on topics of mutual interest, particularly, Nuclear4Climate and Young Generation activities
- encourage the interchange of viewpoints as Position Statements by ANS and White Papers by ENS ensuring, where possible, coherent communication on nuclear scientific and technical topics intended for policy information, and
- encouraging the exchange of scientists and engineers between the USA and European Countries.

As a first action, an overview of the latest developments by ENS and other European organisations are hereby reported in ANS Globe. More information in ENS, the activities and outcome of sponsored conferences can be found via [www.euronuclear.org](http://www.euronuclear.org)

### **ENS Member Societies Promote Nuclear Excellence**

ENS Member Societies submitted 12 entries to the 2<sup>nd</sup> edition of the PhD Award organised by the ENS High Scientific Council. All entries were of excellent quality, underlining once more the strength of our network of nuclear professionals and our ability to promote excellence in science and engineering.

The ENS High Scientific Council (HSC) had the difficult task to select four candidates for the final stage of the contest. Those four candidates will be given the opportunity to present and discuss their PhD work in front of the HSC at its October 31, 2018 dedicated meeting in Brussels.

Having examined the material provided for all candidates, the HSC met on April 17 2019 for final discussions. As a result, the HSC unanimously decided to select the following four finalists:

- Dr Marion Losno, nominated by the French Nuclear Society
- Dr Marat Margulis, nominated by the Israeli Nuclear Society
- Dr Anna Michaelidesova, nominated by the Czech Nuclear Society
- Dr Stanislas Pecko, nominated by the Slovak Nuclear Society

Each finalist received an official letter inviting her/him to the HSC meeting on October 31, and to the exclusive HSC workshop that will take place the day before. The Award Ceremony will take place at the prestigious year-end dinner of the Nuclear Institute on 5 December in London.



### **About the HSC PhD award**

The ENS High Scientific Council highly values excellence, innovation, and originality in scientific research in the field of Nuclear Science and Engineering. In order to express this point of view and to encourage these traits among PhD students, the HSC has decided to support the European Nuclear Society in the organization of an annual award for an outstanding PhD student

based on the scientific merit, the degree of innovation, and the extent of originality of his/her dissertation.

For this award, each national society nominates one candidate. Since many national societies already offer PhD Awards (on a nation-wide level), the idea is to add value to these awards by allowing the winner to participate in a European-wide competition.

The candidates are evaluated by the HSC in a two-stage process. In the preliminary stage, candidates are evaluated based on their dissertation, papers, and recommendation letters according to the HSC evaluation criteria. In the final stage, the finalists are invited for a personal audition in front of the HSC, which includes a presentation, followed by a Q&A session. The winner is then selected based on both the preliminary evaluation and the personal audition.

### **More than 40 Nuclear Associations Sign Joint Declaration Calling for Doubling the R&D funds for Clean Energy**

More than 40 nuclear associations representing over 80,000 scientists have called on the Clean Energy Ministerial Conference (CEM), which will be held in Vancouver in May 2019 to commit to doubling public investment in nuclear-related R&D and innovation within the next five years. The associations said there should be a specific focus on innovative applications of advanced nuclear systems which can make possible the clean energy mix of the future.

The European Nuclear Society (ENS) has joined the international call for policymakers convening at the CEM event between 28 and 29 May to take nuclear innovation to a broad multilateral discussion at both the ministerial and working levels with the goal of unlocking nuclear energy's full potential in national clean energy portfolios and its contribution towards global and national decarbonisation goals.



The current global level of public support for nuclear R&D, both fission and fusion, has remained constant at around \$4bn annually (at 2014 values) since the year 2000, while in many countries the private sector has been less eager and struggling to invest in nuclear research because of negative political, market, and financial environments.

However, the nuclear industry is currently undertaking a new wave of innovation related to digitalization, the development of new reactor designs (e.g. Small Modular Reactors, Generation IV reactors), and the introduction of new alternative applications like desalination, district heating, and process heat for industry.

These projects are expected to open new market opportunities for the use of nuclear power together with other clean energy sources, but they require significant R&D investment and new innovative approaches.

At the same time, a large proportion of the R&D infrastructure is becoming obsolete and needs to be renewed not only to support the development of this new wave of innovative reactors, but also to produce the radioisotopes needed for the development of nuclear medicine.

“A major increase of EU funding for future Euratom research programs is needed because the current budget of €50m a year for nuclear fission R&D is plainly inadequate to simply maintain expertise and keep options open for the development of next generation reactor systems and their associated fuel cycles”, said Eric Proust, ENS High Scientific Council Chairman. “By comparison, 12 times more funding is allocated to Horizon 2020’s “Secure, Clean and Efficient Energy” program, which excludes nuclear energy”, he underlined.

These factors have led the ENS to sign a joint declaration calling for increased policy support in the field of nuclear R&D and innovation in partnership with many national, regional and international scientific societies, as well as numerous technical organisations dedicated to the development and peaceful use of nuclear technologies.

Fernando Naredo, Secretary-General of ENS, said: “It is a very significant development that this initiative of the ENS High Scientific Council and the French Nuclear Society (SFEN) has been adopted by so many professional nuclear societies around the world and the International Nuclear Societies Council, because they together represent more than 80,000 scientists and engineers in the nuclear field”. The declaration can be found at the link below, and is also given in full further below (sent by **Valérie Faudon**):



## **ENS Sponsored RRFM 2019 Conference A New Research Reactor – an Occasion to Meet at RRFM/IGORR**



In December 2016, the Jordan Research and Training Reactor (JRTR) which will be used for research and development, education and training and to produce medical and industrial radioisotopes, was inaugurated. The RRFM/IGORR research reactor communities used the occasion to organise their common meeting in Jordan and to learn about this successful project.

Visits of the reactor during the technical tours organized in the framework of the RRFM/IGORR 2019 conference and several good papers from Jordanian and Korean partners during the technical sessions of the conference gave an insight into the project.

RRFM/IGORR 2019, which took place from 24 – 28 March 2019, was also a moment of exchange on other new projects. C. Gonnier from CEA, France, for example, used the occasion to provide an update of the JHR experimental capacity and first orientations for the experimental programs, M. McGrath from the Dutch Pallas Consortium presented the role of Pallas in supporting nuclear technology research and development and J.-C. Lewitz from LTZ-Consulting GmbH in Germany talked about ‘The Dual Fluid Research Reactor – a novel reactor design for long time and proliferation safe high energy neutron generation. Other presentations on new projects included updates on MYRRHA and MBIR.

133 oral and 35 poster presentations furthermore looked at all aspects of research reactor operation and maintenance, innovative methods in reactor physics and thermo-hydraulics and the fuel cycle. Within this strong track on all aspects of the nuclear fuel cycle, the initiative to consider silicide fuels for conversion of high-performance reactors such as BR2 and HFIR attracted a lot of attention as they could advance these conversion cases significantly with respect to the alternatives based on the U-Mo fuel type. A status update on the OPAL Spent Fuel Management gave an interesting insight on aspects of the back-end of the fuel cycle.

And, finally, a gathering of 227 research reactor experts from over 40 countries worldwide, was also an occasion to talk about international co-operation. D. Iracane, NEA

Deputy-Director and Chief Nuclear Officer presented the Multinational NEA Joint Project on Nuclear Fuel and Material Qualification Testing, which outlined a framework for collaboration after the shut-down of the Halden reactor.

Examples of international collaboration in capacity building, like the CEA scientific and technical offer as a designated International Center based on Research Reactor (ICERR) by the IAEA, which focused on the example of support to BATAN-Indonesia for establishing an Internet Reactor Lab, closed the conference.

### **The European Nuclear Energy Forum (ENEF) Looks into the EU 2050 Long-Term Strategy**

ENEF was created in 2007 by the European Commission, and is sponsored by the Czech and Slovak Republics, which alternate in hosting the annual debates in their respective capitals, Prague and Bratislava.

ENS attended the 14th European Nuclear Energy Forum in Prague, organized by the European Commission [on April 30](#). The forum serves as a platform for a discussion on the opportunities and challenges concerning the issue of nuclear energy in Europe. The forum takes place annually and includes high-level participants and stakeholders. The 2019 conference focused on the topics “Ageing and long term operation of nuclear power plants in Europe - challenges and opportunities” and “2050 Long term strategy”, as outlined in November 2018 in the [strategic long-term vision](#) for a prosperous, modern, competitive and climate-neutral economy by 2050 – A Clean Planet for All. The discussions evolved around decarbonisation, flexibility in the energy grid, the need to absorb the growing share of renewables, the growing electricity demand and the role of nuclear energy towards 2050.

In the political session, both Slovak Prime Minister Peter Pellegrini and Czech Prime Minister Andrej Babis underlined the importance of nuclear energy for both countries. In the same session International Energy Agency Executive Director Fatih Birol stressed that nuclear energy’s share in Europe could decrease significantly without policy changes at EU level. The IEA sees many countries relying on coal, with nuclear capacities declining.

The European Nuclear Industry Association, FORATOM, insisted on the importance of investing more in nuclear Long Term Operation and new build projects (60-100GW), in order to achieve the Commission’s target presented in its 2050 vision. This will require a new framework of incentives, raising awareness among decision makers, convincing the public and increasing R&D.

**Valérie Faudon** of the French Nuclear Society and IC member and **Emilia Jannings** of the European Nuclear Society have sent in the Joint Declaration on Nuclear Energy.

*More than 40 nuclear associations sign joint declaration calling for doubling the R&D funds for clean energy*

More than 40 nuclear associations representing over 80,000 scientists have today called on the Clean Energy Ministerial Conference (CEM) which will be held in Vancouver later this month to commit to doubling public investment in nuclear-related R&D and innovation within the next five years. The associations said there should be a specific focus on innovative applications of advanced nuclear systems which can make possible the clean energy mix of the future.

The European Nuclear Society (ENS) has joined the international call for policymakers convening at the CEM event between 28 and 29 May to take nuclear innovation to a broad multilateral discussion at both the ministerial and working levels with the goal of unlocking nuclear energy's full potential in national clean energy portfolios and its contribution towards global and national decarbonisation goals.

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However, the nuclear industry is currently undertaking a new wave of innovation related to digitalization, the development of new reactor designs (e.g. Small Modular Reactors, Generation IV reactors), and the introduction of new alternative applications like desalination, district heating, and process heat for industry.

These projects are expected to open new market opportunities for the use of nuclear power together with other clean energy sources, but they require significant R&D investment and new innovative approaches.

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“A major increase of EU funding for future Euratom research programs is needed because the current budget of €50m a year for nuclear fission R&D is plainly inadequate to simply maintain expertise and keep options open for the development of next generation reactor systems and their associated fuel cycles”, said Eric Proust, ENS High Scientific Council Chairman.

“By comparison, 12 times more funding is allocated to Horizon 2020's "Secure, Clean and Efficient Energy" program, which excludes nuclear energy”, he underlined.

These factors have led the ENS to sign a joint declaration calling for increased policy support in the field of nuclear R&D and innovation in partnership with many national, regional and international scientific societies, as well as numerous technical organisations dedicated to the development and peaceful use of nuclear technologies.

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### **ABOUT THE FUTURE ROLE OF NUCLEAR ENERGY:**

The ENS is of the opinion that climate change is the most significant threat to our planet today, and embraces the objectives of the 2014 Paris Agreement to limit global warming to 1.5°C in the second half of the century.

Nuclear energy can help address these challenges because it is among the sources of electricity with the lowest carbon footprint. According to the Intergovernmental Panel on Climate Change (IPCC), the median lifecycle greenhouse gas emissions from nuclear energy are 12g/kWh, similar to wind energy.

However, the world is not progressing quickly enough in meeting its climate goals in view of recent developments:

- The latest IPCC report has sent clearly warned that the 1.5°C temperature increase may be exceeded already by 2030.
- According to the International Energy Agency (IEA), in 2018 global energy-related CO<sub>2</sub> emissions rose 1.7% to an historic high of 33.1 gigatonnes of CO<sub>2</sub>.

The ENS stresses the existence of a global consensus that accelerating clean energy innovation is essential for limiting the rise in global temperature but warns that in order to achieve this a significant increase of R&D funds is required.

International institutions including the United Nations, the Organization for Economic Cooperation and Development, and the European Union believe that all low-carbon technologies (renewable, nuclear and carbon capture & storage) will need to be implemented in order to achieve deep decarbonization by the middle of this century.

- [International Youth Nuclear Congress \(IYNC\)](#)

**Luca Capriotti**, IYNC President and IC Member, submitted this report.

The International Youth Nuclear Congress (IYNC) recently held its regular annual Board of Directors meeting. From 8 to 10 March 2019, exactly one year after the IYNCWIN18 Bariloche conference and one year before the Sydney congress, the Board of Directors came together in Abu Dhabi, UAE. Hosted by the Emirates Nuclear Energy Corporation (ENEC) and the nuclear young professionals’ organization – the Barakah Youth Council (BYC) – the Board held a number of meetings and took several important decisions.

## **IYNC2020 in Sydney Coming Up!**

Luca Capriotti, IYNC President, held an open and candid discussion with the IYNC Officers and several observers on issues of importance and the way forward for the organization. This Officers' meeting generated a number of ideas, suggestions and items of feedback to take to the different Board Committees.

Furthermore, the [IYNC2020](#) Executive Committee (ExCom) held a regular meeting in preparation for the up-coming IYNC 2020 in Sydney, Australia. With registration set to open soon, and the ongoing selection of workshop and panel session chairs, the ExCom is progressing steadily towards the March 2020 Congress.

**“With the discussions and decisions we made in Abu Dhabi, we are well on our way to hosting a fantastic Congress in Sydney in March 2020,”** said Luca Capriotti after the meeting.

In preparation for the IYNC2020 Congress in Sydney, the *Call for Papers* was opened immediately after the meeting in Abu Dhabi. You can now submit your papers for review and acceptance, and you can join your colleagues from around the world to present your research! More information on how to submit is [available online](#).



## **IYNC, NICE Future, and Climate Change**

As a side-event to these IYNC meeting, the Nuclear Innovation, Clean Energy (NICE) Future Initiative organized a workshop for the IYNC participants and the Barakah Youth Council.

Envisioning a world in which clean energy, including renewables, nuclear and carbon capture technology, can work collaboratively to minimize our global greenhouse gas footprint, the workshop focused on how young professionals in the nuclear industry are involved in spreading the message about nuclear energy as a clean source of electricity. The IYNC would like to thank Mr. Jeremy Gordon as the independent consultant who conducted the workshop.

## **Young Nuclear Professionals in the UAE**

Finally, the IYNC Board of Directors visited the Barakah Nuclear Energy Plant for a full-day tour. The Board members witnessed first-hand one of the largest nuclear new-build

projects in the world, with four Korean APR-1400 reactors being built at the same site. Once fully operational, the Barakah plant will produce 5,600 megawatts of clean electricity, contributing significantly to the UAE's clean energy targets.

The IYNC would like to thank ENEC and the BYC for hosting the Board of Directors meeting and we hope to see many participants from the UAE join colleagues from around the world in Sydney in March 2020.



- [Japan](#)

**Tomofumi Yamamoto**, of the ANS Japan Local Section and the AESJ International Activities Committee, contributed the following report, which I have edited.

## 1. Energy Policy and Activities of the Government

The Government of Japan formulates the Strategic Energy Plan in order to show to the public the basic direction of Japan's energy policy under the Basic Act on Energy Policy. On July 3, 2018, the Cabinet approved the new Strategic Energy Plan as the basis for the orientation of Japan's new energy policy towards 2030 and further towards 2050, considering the changes in energy environments inside and outside Japan.

This Strategic Energy Plan shows a direction similar to the previous one and emphasizes the following:

- Renewable energy is to be the major electric power source for decarbonization
- The share of nuclear energy remains at 20-22% of total electricity in 2030
- The pursuit of reactors with superior safety, economics and mobility, and the development of technology aimed at the resolution of backend problems.

According to the Strategic Energy Plan, Ministry of Economy, Trade and Industry (METI) launched new project for nuclear innovation in April 2019.

## 2. Status of Nuclear Power Plants

As of April 2009, only 9 PWRs back to online and 6 plants passed safety review of Nuclear Regulation Authority. Utilities have decided to close 24 NPPs.

Applicant	NPP	Type	Commercial Operation	Status (NRA Review)
Hokkaido	Tomari 1	PWR	1989	Application, Jul. 2013
	Tomari 2	PWR	1991	Application, Jul. 2013
	Tomari 3	PWR	2009	Application, Jul. 2013
Kansai	Ohi 3	PWR	1991	Restart, Mar. 2018
	Ohi 4	PWR	1993	Restart, Apr. 2018
	Mihama 3	PWR	1976	Approved, Oct. 2016 Life time extension Approved, Nov. 2016
	Takahama1	PWR	1974	Approval, June 2016
	Takahama2	PWR	1975	Life time Extension Approved, Jun. 2016
	Takahama 3	PWR	1985	Restart, Jul. 2017
	Takahama 4	PWR	1985	Restart, Jun. 2017
Shikoku	Ikata 3	PWR	1994	Restart, Sep. 2016

Kyushu	Sendai 1	PWR	1984	Restart, Sep. 2015
	Sendai 2	PWR	1985	Restart, Nov. 2015
	Genkai 3	PWR	1994	Restart, Mar. 2018
	Genkai 4	PWR	1997	Restart, Aug. 2018
Tokyo	Kashiwazaki-Kariwa 6	ABWR	1996	Approved, Dec. 2017
	Kashiwazaki-Kariwa 7	ABWR	1997	Approved, Dec. 2017
Chugoku	Shimane 2	BWR	1989	Application, Dec. 2013
Tohoku	Onagawa 2	BWR	1995	Application, Dec. 2013
	Higashidori 1	BWR	2005	Application, Jun. 2014
Chubu	Hamaoka 3	BWR	1987	Application, Jun. 2015
	Hamaoka 4	BWR	1993	Application, Feb. 2014
Hokuriku	Shika 2	ABWR	2006	Application, Aug. 2014
JAPC	Tokai 2	BWR	1978	Approved, Sep. 2018
	Tsuruga 2	PWR	1987	Application, Nov 2015
EPDC	Ohma (Full Mox)	ABWR	Not yet	Application, Dec.2014

### 3. Activities of Atomic Energy Society of Japan (AESJ) (<http://www.aesj.or.jp/en/>)

#### (1) Preparation for 60th Anniversary Symposium

AESJ was established in 1959 and celebrate its 60th anniversary in 2019. AESJ held the 60th anniversary symposium on April 25th 2019 in Tokyo. For the symposium, six cooperate societies including ANS gave congratulatory messages. AESJ deeply appreciates ANS's cooperation.

#### (2) Annual Conference

The 2019 Spring Annual Meeting was held at Ibaraki University Mito Campus on March 20 - 22. Many special plenaries and sessions, such as decommissioning, nuclear power plant safety, and so on were organized and implemented successfully under cooperation with the Local Section of AESJ and a local organizing committee. More than 1,300 people attended including students.

During the meeting, presentation ceremonies for AESJ Awards, Excellent Student Awards, and recognition of long-term members were conducted as well.





This photo shows the plenary session “Current Situation and Issues on Nuclear Emergency Preparedness”, organized by the AESJ Board.

The role of national and local government, planning and execution of evacuation, etc. were discussed with specialists and local community residents.

### **(3) Fukushima Daiichi Accident Related Activity**

Fukushima Decommissioning Committee of AESJ has a scientific advice activity for the decommissioning of the Fukushima Daiichi plants and a follow-up activity suggested in the AESJ Fukushima Daiichi Nuclear Accident Report. The committee held a symposium on Fukushima Daiichi Decommissioning in Tokyo on 2019 March 9, on current subjects or problems being faced, and on how AESJ could cope with them.

The topics presented at the symposium are as below:

- Whole process of decommissioning and its hold point
- Management goal and security of damaged reactors
- Waste management for decommissioning and restoration of sites
- Safety evaluation for damaged reactors against natural phenomena
- Challenge for new technologies
- Proposal for international cooperation

## **4. Activities of ANS Japan Section FY2018 (April 2018 – March 2019)**

ANS Japan Section is managed by the International Nuclear Information Network (ININ) of AESJ. Major activities in FY2018 are as follows:

- 1) Semi-annual Members General Meetings are held twice a year, in autumn and spring. The autumn meeting was held in September 2018 in Okayama, the spring meeting was held in March 2019 in Ibaraki.
- 2) Executive Committee Meetings are held about five times a year. Five meetings were held in FY2018: April, June, August, December, and February.
- 3) Workshops by the invited speakers are held four times a year. Four workshops were successfully held in this FY as follows:
  - “Activities of IAEA on Nuclear Power”, by Mr. Kastumi Yamada, former staff of

Division of Nuclear Power, Department of Nuclear Energy, IAEA, on June 27, 2018.

- “Nuclear Energy in Poland”, by Dr. Kazuhiko Kunitomi, Deputy Director General, Sector of Fast Reactor and Advanced Reactor Research and Development, IAEA, on September 6, 2018.
- “Progress in UAE Nuclear Program”, by Dr. Takehiko Saito, former Sr. Design Review Specialist, Nuclear Safety Department, Federal Authority for Nuclear Regulation, UAE, on December 4, 2018.
- “Nuclear Energy & Small Modular Reactor”, by Mr. Jean-Philippe Davignon (First Secretary, Energy and Environment, Embassy of Canada to Japan), and “Slurry Fracture Injection(SFI), Zero Discharge Deep Well Disposal” by Mr. Roman Bilak (President, Terralog Technologies Inc.) on March 21, 2019.

Also, the ANS Japan Section has other ways to communicate with section members: through e-mail, the Web and the annual Newsletter.

- [OECD Nuclear Energy Agency \(http://www.nea.fr\)](http://www.nea.fr)

**The following articles are gleaned from OECD NEA monthly reports.**

### **2018 Year-in-Review**

2018 was a very active and impactful year at the NEA. It marked the 60<sup>th</sup> anniversary of the Agency and brought other milestones, including the establishment of the new NEA Committee on Decommissioning of Nuclear Installations and Legacy Management. During this year, the NEA released flagship reports on emergency management, electricity costs, nuclear law and advanced nuclear fuels. It also organised events, conferences and workshops corresponding to the needs of member countries in the application and exploration of nuclear science and technology for peaceful purposes.

### **Decarbonising the electricity system: The time to act is now**



Many nations have committed to ambitious goals to limit emissions. Yet the world is not on track to achieve these environmental goals, nor are countries pursuing these policies in a cost effective way, concludes the NEA in its new report *The Costs of Decarbonisation: System Costs with High Shares of Nuclear and Renewables*. “We have at our disposal technically mature, low-carbon alternatives to help countries reach their environmental and energy security goals - including: solar and wind technology, hydroelectricity and nuclear power. Reaching these goals will require us to use all of these low-carbon resources in an economically sound manner,” said NEA Director-General William D. Magwood, IV, at the

report's launch in Budapest, Hungary in the presence of János Süli, Minister without portfolio responsible for the Paks II., a nuclear new-build project in Hungary.

### **The NEA Nuclear Education, Skills and Technology Framework (NEST)**

Nuclear skills and education is an increasingly important challenge for NEA member countries, all of whom need to have a new generation of highly-qualified scientists and engineers to ensure the continued safe and efficient use of nuclear technologies for a wide range of industrial, scientific and medical purposes. The NEA has therefore developed the **NEA Nuclear Education, Skills and Technology (NEST) Framework**, which aims to nurture the next generation of nuclear experts who can provide the knowledge and leadership needed by the NEA membership in the years to come. The first NEST Management Board meeting was held on 28 March with 29 participants from the 10 countries and 15 organisations that are signatories of the NEST Framework Agreement. During this meeting, the NEST Management Board elected Dr. Andreas Pautz of Switzerland as its Chair and discussed and established guidelines for the implementation of the Framework and the first steps towards the development of four NEST projects and activities. These projects cover a wide range of nuclear technologies, from robotics in decommissioning proposed by Japan, SMRs proposed by Canada and the United States, hydrogen risk in safety assessment proposed by Switzerland and radioactive waste management with a focus on graphite proposed by Russia. The NEST Management Board wishes to enlarge the NEST Framework by welcoming additional project proposals, countries and organisations.

### **Multinational NEA Framework for In-pile Fuel and Material Testing**

The NEA is launching a multilateral initiative to strengthen fuel- and material-related experimental capabilities for the benefit of a broad community of users. The closure of the widely-used Halden Reactor in Norway after decades of service to the international community reinforced the interest of NEA member countries in establishing a new Multinational NEA Framework for In-pile Fuels and Material Testing. The NEA organised an introductory workshop for this joint undertaking on 4-5 March with representatives from research organisations, regulatory bodies and their support organisations, and the industry. The participants discussed six proposals for joint experimental programmes to be launched under the new Framework as NEA joint undertakings. They highlighted that the Framework must address continuous needs, complement domestic research, and connect data users with facilities. It was generally agreed that the community should avoid discontinuities in fuel and materials testing and maintain momentum with the prompt conclusion of a framework agreement, developed in parallel with Joint Experimental Programmes based on the most mature proposals presented at the workshop. The NEA will engage on both fronts, developing agreements to connect the interested parties to the current experimental programme proposals, while maturing the new Framework concept. The NEA will also promote the outcomes of the resulting activities at the Steering Committee level to keep member governments informed on the solutions being developed

to sustain fuel and material testing capabilities, which is a mandatory requirement for the safe and efficient use of nuclear technology.

### **Building the future of Fukushima**

As part of the recently-launched **OECD-Japan Policy Dialogues on Developing Decommissioning Industry Clusters in Fukushima**, the NEA and the OECD held a joint event in Tokyo, Japan, on 16 April to discuss the future of Fukushima, how the NEA and the OECD provide support to Japan and what the international community can learn from the experience. The OECD Secretary-General Angel Gurría **opened the event**, stressing his commitment to support the Tohoku region and Fukushima in the aftermath of the Great East Japan Earthquake. He also highlighted the NEA's continuing support to the decommissioning of the Fukushima Daiichi Nuclear Power Plant, recovery efforts and food safety concerns in the region. Keynote remarks were also delivered by Akimasa Ishikawa, Parliamentary Vice-Minister of Economy, Trade and Industry (also serves as Parliamentary Vice-Minister for Reconstruction), Masao Uchibori, Governor of Fukushima Prefecture, and Satoshi Endo, Mayor of Hirono Town, Fukushima Prefecture, to present the progress of reconstruction efforts and remaining challenges.

- **Slovenia**

**Tomaž Žagar**, President of the Nuclear Society of Slovenia, sent the following contribution:



In the year 2019, the Nuclear Society of Slovenia will organize the **28<sup>th</sup> International Conference Nuclear Energy for New Europe**. The conference will be held in the beautiful seaside resort **Portorož, Slovenia, September 9<sup>th</sup> – 12<sup>th</sup>, 2019**.

The conference is a traditional annual meeting of professionals from nuclear research and educational institutions, nuclear vendors, nuclear operators, utilities and regulatory bodies. It attracts around 200 participants from more than 20 countries. The topics discussed are general and include reactor physics, thermal hydraulics, probabilistic safety analysis, severe accidents, nuclear fusion, nuclear power plant operation, nuclear materials, waste management and new reactor designs.



For more information please visit the conference website: [www.nss.si/nene2019/](http://www.nss.si/nene2019/), or contact us by email: [nene2019@ijs.si](mailto:nene2019@ijs.si).



- [Spain](#)



IC Member [Santiago San Antonio](#) contributed the following article on the activities of the Spanish Nuclear Society.

### “Spanish Nuclear Power Plants in 2018; Experiences and Prospects”

A new edition of the Conference “*Nuclear Power Plant in 2018. Experiences and Perspectives*” was held at the School of Industrial Engineers of the Polytechnic University of Madrid. More than 200 delegates from the Spanish nuclear industry dealt with relevant issues of the operation of nuclear power plants in the last year and the future of the nuclear sector. The conference was also attended by teachers and students of the masters of nuclear energy programmed in the country.



The “Nuclear España 2018” awards were given out. The prize for the best article of the magazine published by Nuclear Spanish Society was awarded to Luis López Álvarez, Susana Gutiérrez Martínez y Rubén Mascarell Gil for their article “Corte y acondicionamiento de barras de control y canales en C.N. Cofrentes”. The best Nuclear España 2018 issue was awarded to “50 años. Energía nuclear en España”.

The SNE award for the best doctoral thesis in 2018 was given out to Joaquín Galdón Quiroga, student of Sevilla University and Max Planck Institute for Plasma Physics, for her work “Velocity-space resolved measurements of fast-ion losses due to magnetohydrodynamic instabilities in the ASDEX Upgrade tokamak”. Thirteen papers from nine different universities were submitted to the call.

The SNE award to the best nuclear master project 2018 was given out to Pilar Lorente, student of Autonomous University of Madrid and Ciemat, for her work “Estimación de daño al núcleo durante la gestión de emergencias”.



### **45th SNE ANNUAL MEETING**

The 45th Annual Meeting of the Spanish Nuclear Society will take place on September 25, 26 and 27, 2019 in the city of Vigo, in the Community of Galicia, with the motto “Essentials against climate change”. Naturgy will be the host company of the meeting. Two plenary sessions have been scheduled, as well as several workshops and monographic, oral and poster sessions. More than 600 delegates are expected to attend the Meeting. All the information about SNE Annual Meeting can be found on the website ([www.reunionanualsne.es/en](http://www.reunionanualsne.es/en)).

### **ONE-DAY TECHNICAL MEETING ON “THE DIGITAL TRANSFORMATION IN NUCLEAR POWER PLANTS”**

The “SNE One-Day Technical Meeting” was held on April 4th in Tarragona with the participation of 100 professionals from the nuclear sector. The session addressed the issue “The digital transformation in nuclear power plants”, stating that innovation in digitalization is one more key to the process of continuous improvement that governs the activity of the nuclear sector.



### **NEW BOARD OF DIRECTORS OF THE SNE**

The General Assembly of the SNE has elected the new Board of Directors, chaired by Javier Guerra. Héctor Dominguis is the new Vice President, Rafael Vargas the General Secretary, Francisco García Acosta the Treasurer, and Lourdes Borondo, José García and Emilio Mínguez are new members.



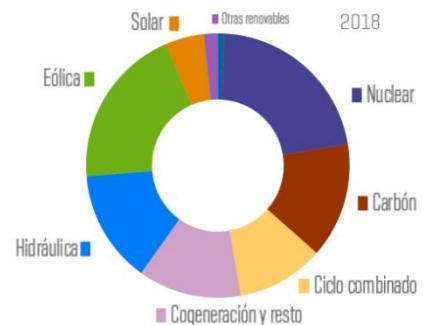
## HISTORIOGRAPHIC PUBLICATIONS PLAN OF SNE



The Spanish Nuclear Society continues with its Historiographic Publications Plan on the Spanish nuclear development and its protagonist. The new book of the series “The first nuclear power plants. Actors, policies and technologies”, by Ana Romero de Pablos, was recently presented in Madrid.

### SPANISH NUCLEAR SECTOR NEWS SPANISH NUCLEAR GENERATION IN 2018

The contribution of Spanish nuclear power plants in 2018 to the production of electric energy was equivalent to 20.4 % of the country’s total consumption. Nuclear generation was in fact the top-ranking energy source in Spain, followed by wind 19 %; coal 14.3 %; hydraulic 13.8 %; gas combined cycle 11.6 % and cogeneration 11.1 %.



## Societies with Collaboration Agreements with ANS

The following is a list of nuclear societies with collaboration agreements with the ANS, along with the corresponding website addresses. The Table contains also a few other entries of interest to ANS International Committee members.

Society	Website or E-Mail Address
Asociación Argentina de Tecnología Nuclear	<a href="http://www.aatn.org.ar">www.aatn.org.ar</a>
Associação Brasileira de Energia Nuclear	<a href="http://www.aben.com.br">www.aben.com.br</a>
Association des Ingénieurs en génie atomique du Maroc	-
Atomic Energy Society of Japan	<a href="http://wwwsoc.nii.ac.jp/aesj/index-e.html">wwwsoc.nii.ac.jp/aesj/index-e.html</a>
Australian Nuclear Association	<a href="http://www.nuclearaustralia.org.au">www.nuclearaustralia.org.au</a>
Bangladesh Nuclear Society	-
Bulgarian Nuclear Society	<a href="http://www.bgns.bg">www.bgns.bg</a>
Canadian Nuclear Society	<a href="http://www.cns-snc.ca">www.cns-snc.ca</a>
Chinese Nuclear Society	<a href="http://www.ns.org.cn">www.ns.org.cn</a>
Croatian Nuclear Society	<a href="http://www.nuklearno-drustvo.hr/en/home.html">www.nuklearno-drustvo.hr/en/home.html</a>
Czech Nuclear Society	<a href="http://www.csvts.cz/cns">www.csvts.cz/cns</a>

European Nuclear Society	<a href="http://www.euronuclear.org">www.euronuclear.org</a>
Hungarian Nuclear Society	<a href="http://www.kfki.hu/~hnucsoc/hns.htm">www.kfki.hu/~hnucsoc/hns.htm</a>
Indian Nuclear Society	<a href="http://www.indian-nuclear-society.org.in">www.indian-nuclear-society.org.in</a>
Israel Nuclear Society	<a href="mailto:meins@tx.technion.ac.il">meins@tx.technion.ac.il</a>
Korean Nuclear Society	<a href="http://www.nuclear.or.kr/e_introduce.php">www.nuclear.or.kr/e_introduce.php</a>
Lithuanian Energy Institute	<a href="http://www.lei.lt">www.lei.lt</a>
Malaysian Nuclear Society	<a href="http://www.nuklearmalaysia.org/index.php?id=18mnu=1">www.nuklearmalaysia.org/index.php?id=18mnu=1</a>
Nuclear Energy Society of Kazakhstan	<a href="http://www.nuclear.kz">www.nuclear.kz</a>
Nuclear Energy Society of Russia	<a href="mailto:ns@kiaer.ru">ns@kiaer.ru</a>
Nuclear Energy Society of Slovenia	<a href="http://www.djs.si">www.djs.si</a>
Nuclear Energy Society of Thailand	<a href="http://www.nst.or.th">www.nst.or.th</a>
OECD/Nuclear Energy Agency	<a href="http://www.nea.fr">www.nea.fr</a>
Polish Nuclear Society	<a href="http://www.ptn.nuclear.pl">www.ptn.nuclear.pl</a>
Romanian Nuclear Energy Association	<a href="http://www.aren.ro">www.aren.ro</a>
Romanian Society for Radiological Protection	<a href="http://www.srrp.ro">www.srrp.ro</a>
Slovak Nuclear Society	<a href="http://www.snus.sk">www.snus.sk</a>
Sociedad Nuclear Española (SNE)	<a href="http://www.sne.es">www.sne.es</a>
Sociedad Nuclear Mexicana	<a href="http://www.sociedadnuclear.org.mx">www.sociedadnuclear.org.mx</a>
Ukrainian Nuclear Society	<a href="http://www.ukrns.odessa.net">www.ukrns.odessa.net</a>
United Kingdom Nuclear Institute	<a href="http://www.nuclearinst.com/ibis/Nuclear%20Institute/Home">www.nuclearinst.com/ibis/Nuclear%20Institute/Home</a>
Women in Nuclear – Global	<a href="http://www.win-global.org">www.win-global.org</a>
<b>Affiliated National Societies</b>	<b>Website or E-Mail Address</b>
Belgian Nuclear Society	<a href="http://www.bns-org.be">www.bns-org.be</a>
<b>Associated Nuclear Organizations</b>	<b>Website or E-Mail Address</b>
International Nuclear Societies Council	<a href="http://insc.ans.org">http://insc.ans.org</a>
Pacific Nuclear Council	<a href="http://www.pacificnuclearcouncil.org">http://www.pacificnuclearcouncil.org</a>
<b>Non-U.S. Local Sections</b>	<b>Website or E-Mail Address</b>
Austrian Section	
French Section	<a href="http://local.ans.org/france/">http://local.ans.org/france/</a>
India Section	<a href="http://local.ans.org/india/">http://local.ans.org/india/</a>
Italian Section	
Japanese Section	
Latin American Section	<a href="http://www.las-ans.org.br">www.las-ans.org.br</a>
Korean Section	
Swiss Section	
Taiwan Section	<a href="mailto:u805301@taipower.com.tw">u805301@taipower.com.tw</a>



# Calendar of Events

Some Upcoming International Conferences on Nuclear and Related Topics  
(Please send us information about your upcoming conferences, for inclusion in this space.)

## Legend:



☀ ANS Event

☐ Non-ANS event co-sponsored by ANS

○ For all other conferences, ANS is NOT a sponsor, nor are these conferences endorsed by ANS.

## 2019

- 9-13 June: ANS Annual Meeting, Minneapolis, MN, USA – <http://www.ans.org/meetings> ☀
- 23-26 June: 39<sup>th</sup> Annual Conference of the Canadian Nuclear Society and 43<sup>rd</sup> CNS/CNA Conference, Ottawa, Ontario, Canada (<http://www.cns-annual-conference.org>)
- 23-27 June: European Nuclear Young Generation Conference, Ghent, Belgium (<https://www.enygf.org/>)
- 21-24 July: 14<sup>th</sup> International Conference on CANDU Fuel, Mississauga, Ontario, Canada, 2019 July 21-24 ([www.cns-snc.ca](http://www.cns-snc.ca))
- 18-22 August: 18<sup>th</sup> International Topical Meeting on Reactor Thermal Hydraulics, Portland, OR, USA ([www.ans.org](http://www.ans.org)) ☀
- 18-22 August: 19<sup>th</sup> International Conference on Environmental Degradation of Materials in Nuclear Power Systems - Water Reactors, Boston, MA, USA (<http://envdeg.ans.org/>) ☀
- 25-29 August: Topical Meeting on Mathematics and Computation, Portland, OR, USA ([www.ans.org](http://www.ans.org)) ☀
- 8-11 September: 4<sup>th</sup> Canadian Nuclear Waste Management, Decommissioning and Environmental Restoration Conference (NWMDER-2019), Ottawa, Ontario, Canada (<http://www.cns-snc.ca/events/nwmder2019/>)
- 9-12 September: Nuclear Energy for New Europe 2019 (NENE2019), Portorož, Slovenia ([www.djs.si/nene2019/](http://www.djs.si/nene2019/))



- 9-12 September: 24<sup>th</sup> World Energy Congress, Abu Dhabi (<https://www.worldenergy.org/>)
- 16-20 September: IAEA General Conference, Vienna, Austria (<https://www.iaea.org/about/governance/general-conference>)
- 22-26 September: Global/TopFuel 2019, Seattle, WA, USA (<http://globaltopfuel.ans.org/>) 
- 6-9 October: 19th International Conference on Emerging Nuclear Energy Systems (ICENES2019), Bali, Indonesia
- 6-11 October: Materials in Nuclear Energy Systems (MiNES), Baltimore, MD, USA (<http://mines.ans.org/>) 
- 27-30 October: Fire Safety & Emergency Preparedness for the Nuclear Industry 2019 (FSEP-2019), Ottawa, Ontario, Canada ([www.cns-snc.ca](http://www.cns-snc.ca))
- 17-21 November: ANS Winter Meeting, Washington, DC, USA ([www.ans.org](http://www.ans.org)) 

## 2020



- 3-7 February: 10<sup>th</sup> International Conference on Isotopes, Kuala Lumpur, Malaysia ([www.10ici.org](http://www.10ici.org))
- 8-13 March: International Youth Nuclear Congress 2020 (IYNC2020), Sydney, Australia (<https://www.iync.org/2020-sydney-australia-2/>)
- 15-19 March: International Congress on Advances in Nuclear Power Plants (ICAPP2020), Abu Dhabi, UAE (<https://www.icapp2020.org/>)
- 19-24 April: Technology of Fusion Energy, Charleston, SC 
- 26-30 April: Pacific Basin Nuclear Conference (PBNC2020), Cancún, México (<http://www.pbnc-2020.mx/>)
- 31 May-3 June: 40<sup>th</sup> Annual Conference of the Canadian Nuclear Society and 44<sup>th</sup> CNS/CNA Conference, Saint John, New Brunswick, Canada ([www.cns-snc.ca](http://www.cns-snc.ca))
- 7-11 June: ANS Annual Meeting, Phoenix, AZ, USA ([www.ans.org](http://www.ans.org)) 

- 23-26 August, NUTHOS-13, Vancouver, British Columbia, Canada (<http://www.cns-snc.ca>)
- 9-12 November, G4SR-2 (2<sup>nd</sup> International Conference on Generation-IV and Small Modular Reactors), Toronto, Ontario, Canada (<http://www.cns-snc.ca>)
- 15-19 November: ANS Annual Meeting, Chicago, IL, USA ([www.ans.org](http://www.ans.org)) 



## 2021

- 6-9 June: 41<sup>st</sup> Annual Conference of the CNS and 45<sup>th</sup> CNS/CNA Conference, Toronto, Ontario, Canada (<http://www.cns-snc.ca>)
- 13-17 June: ANS Annual Meeting, Providence, RI, USA ([www.ans.org](http://www.ans.org)) 
- 31 October- 4 November: ANS Winter Meeting, Washington, DC, USA ([www.ans.org](http://www.ans.org)) 

## 2022

- 12-16 June: ANS Annual Meeting, Anaheim, CA, USA ([www.ans.org](http://www.ans.org)) 
- 13-17 November: ANS Winter Meeting, Albuquerque, NM, USA ([www.ans.org](http://www.ans.org)) 

## 2023

- 11-15 June: ANS Annual Meeting, Indianapolis, IN, USA ([www.ans.org](http://www.ans.org)) 
- 5-9 November: ANS Winter Meeting, Washington, DC, USA ([www.ans.org](http://www.ans.org)) 

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