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# PNS Newsletter

A Quarterly Newsletter of the Pakistan Nuclear Society

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The Council Members (see Page-12) with the Chief Guest Mr. Muhammad Naeem, Chairman PAEC, after oath-taking ceremony on 24th December 2020.

## From the desk of Editor-in-Chief

The newly elected Council is grateful to all PNS members for reposing confidence in their guardianship and extending kind support during the election process. The new team is fully committed to its election manifesto and determined to come up to the expectations of the PNS members.

Previously, the PNS Newsletter had been published in hard-copy form on regular basis. But this practice was discontinued a few years ago. Even the on-line version could not be published after 2016 for various reasons. The new Council intends to publish it again on quarterly basis with an improved look. It is intended that, in a limited quantity, hard copies will be printed, however, the major distribution mode will be the on-line posting on PNS website.

The purpose of this publication will be three-fold:

1. creating awareness about the benefits of the peaceful applications of nuclear technology, and publicizing the contributions being made by Pakistani professionals working in this field;
2. dissemination of information about the developments taking place in the nuclear field world-wide; and,
3. to provide a forum for PNS members to share their views and learn about the ongoing activities and future programmes of their Society.

Meeting all these objectives would require active participation of PNS members. It is my pleasure to invite contributions in the form of short articles from readers on any matter relevant to the peaceful applications of nuclear science and technology as well as allied disciplines. Any interesting and informative material that members wish their colleagues to know about will also be welcome. Of course, your valuable suggestions to improve the quality of the newsletter or any other venture of PNS will be highly appreciated.

## Vision

The vision of Pakistan Nuclear Society (PNS) is to become a resource centre for disseminating news and information about peaceful applications of nuclear science and technology in Pakistan and a hub of promoting this cause world-wide along with international partners for global environmental and economic stability. The principal tools to be used for this purpose would be PNS Website and PNS Newsletter.

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## Oath taking of the new Council

The election of PNS Council for the term 2020-22 was held at the Pakistan Atomic Energy Commission (PAEC) Rest House, Sector G-8/3, Islamabad on 26th November 2020. The Oath Taking Ceremony of the elected Council took place at the same venue on 24th December 2020. Chairman PAEC Mr. Muhammad Naeem, HI, SI, took oath in a simple and elegant ceremony. Due to Corona restrictions, only office bearers of the present and the previous Council and three officials from PAEC HQ, Mr. Qamar Mahboob (Member Materials), Mr. Muhammad Munir (Secretary PAEC) and Dr. Imtiaz Ahmed (DG International Affairs) were invited.

The former President of the PNS Council, Dr. Muhammad Ashraf Chaudhry presented a brief summary of the PNS activities during his tenure. He especially mentioned about the two-day conference on "Water Problems in Pakistan and their Solutions" at Holiday Inn, Islamabad. He also mentioned the

with respect to educating general public about nuclear science and applications of nuclear technology in the areas of health, agriculture, industry, water resource management, environmental and climate change, etc. He stated that since its inception in 1991, several hundred elite scientists, engineers and medical doctors joined PNS as its member, yet the Society has not been able to realize its full potentials as a representative body of highly qualified professionals associated with nuclear science and technology in Pakistan. He showed his determination to project Pakistan's nuclear contributions from the platform of Pakistan Nuclear Society. He further added that PNS will also conduct programmes for attracting young students towards nuclear science, provide policy inputs on strategic issues, engage decision makers and approach international audiences through participation in Science Diplomacy Programmes, including those of the Ministry of Foreign Affairs (MoFA). He also appreciated the efforts of Convener Election Committee, Mr. Azhar Inayat, DG (Nuclear Power Engineering), PAEC and his team, especially



*Chairman PAEC Mr. Muhammad Naeem talking oath from the elected members of the PNS Council*

other main programmes arranged by PNS including Memorial Reference on the 1st Anniversary of Dr. Ishfaq Ahmad, former Chairman PAEC at Pakistan Academy of Sciences (PAS), Islamabad, Seminar on Cyber Security and Effects of Radiation on Human Health at Allama Iqbal Open University (AIU), Islamabad, Symposium on Nano-Medicine at INMOL, Lahore and Seminar on Energy Storage and Nuclear Energy at COMSATS, Islamabad. He lauded the efforts of the Council members for making all the programmes successful and thanked the organizations/ institutions especially PAEC, PSF, PAS and COMSATS for their support. He wished that the new Council may take up some of the planned programmes which could not be carried out due to the pandemic (COVID-19).

The new President of PNS Council, Dr. Imtiaz Elahi Qureshi, presented a vision of the future activities of the Society

Mr. Shaoib Akhter, for executing the election process in an efficient and transparent manner.

The Chief Guest, Mr. Muhammad Naeem, HI, SI, congratulated the newly elected Council of 'Like-Minded Persons' and also acknowledged and appreciated the efforts and activities conducted by the previous Council of PNS. He emphasized that PAEC has always supported the activities of PNS since its inception. The objectives chalked out in its constitution are useful for creating awareness about the applications of nuclear science and technology among the scientific communities as well as amongst the people of Pakistan. The Chairman PAEC highlighted that since PNS has a large number of in-service and retired professionals who possess in-depth knowledge and skills, therefore, their expertise

should be utilized for national causes. He suggested that the PNS should engage such senior scientists and engineers to give advice on emerging fields of scientific developments in their respective areas of expertise.

The Chairman PAEC also recounted the enormous services rendered by nuclear scientists for socio-economic development of Pakistan. He mentioned that PAEC has made a strong headway in power generation by running four nuclear power plants at CHASHMA near Mianwali and two recently built plants K-2 and K-3 near Karachi. These power plants will be supplying over 3500MWe of electricity to the national grid by the next year. He informed that installation of a third research reactor (PARR-3) through indigenous efforts is in progress at Nilore where the first research reactor (PARR-1) is operating with our own fuel. Moreover, PAEC has made great achievements in the field of agriculture by utilizing nuclear techniques. PAEC is running 18 nuclear medical hospitals in all provinces of Pakistan and the 19th hospital is near completion in Gilgit. He suggested that PNS should arrange programmes and launch social media campaigns to make the people realize about the benefit of Nuclear Science & Technology. Finally, he reiterated his commitment to provide all possible logistic support to PNS to meet its aims and objectives.

## Activities during the 1st quarter

### The first meeting of the newly elected Council

After taking oath, the first formal meeting of PNS Council Members presided by PNS President, Dr. Imtinan Elahi Qureshi was held in the Board Room of PAEC Rest House on Tuesday, 29th December 2020. The meeting was attended by all the Council members. Salient decisions of the meeting are as follows:

1. The following Sub-Committees were constituted to carry out various assignments:
  - a. Website restructuring (Dr. M. Tahir Khaleeq/ Dr. Shazia Fatima)



The first Meeting of PNS Council was held on Tuesday, December 29th 2020 at Board room of PAEC Rest House, G/8, Islamabad.

- b. Newsletter (Mr. Waqar Ahmad Butt/ Mr. Ghulam Sarwar)
  - c. PNS records including List of Members/Fellows (Mr. Waqar Ahmad Butt/ Mr. Ghulam Sarwar/ Syed Zahid Hussain)
  - d. Membership drive and M/Cards (Dr. Mohammad Mohsin/ Mr. Waqar Ahmad Butt)
  - e. Lectures/Webinars (Dr. Imtinan Elahi Qureshi/ Dr. M. Tahir Khaleeq/ Dr. Shazia Fatima/ Ms. Shazia Fayyaz)
  - f. Coordination with strategic organizations (Dr. Mohammad Mohsin/ Dr. Niaz Ahmad)
  - g. Partnership with other societies/think-tanks (Dr. Imtinan Elahi Qureshi/ Dr. Shazia Fatima/Ms. Shazia Fayyaz/ Mr. Waqar Ahmad Butt)
  - h. Purchases/entertainment/office up-keep (Mr. Ghulam Sarwar / Syed Zahid Hussain)
2. The design of new logo, membership card and letterhead pad were approved and adopted.
  3. A calendar of activities will be prepared after contacting relevant speakers.

### Webinar on Artificial Intelligence in Medical Imaging, Feb. 21, 2021

In the wake of Covid-19 restrictions on public gatherings, PNS has shifted its focus to webinars in order to continue its educational programmes. This is in line with international trends and the well established usefulness of the practice. The first of the series of webinars, proved the efficacy of this format and attracted attention not only from Pakistan but from abroad also.



#### Speakers and topics:

1. Dr. Imtinan Elahi Qureshi, President PNS, "AI Overview".
2. Dr. Khan M. Siddiqui, MD, Hyperfine, USA, "Fear, Hype, and Reality of AI in Radiology".
3. Dr. Riccardo Laudicella, MD, Univ. Messina, Italy, "AI in Nuclear Medicine".
4. Dr. Yaser Ayaz, Head Robotic & AI, SMME, NUST, "AI Status in Pakistan".

#### Coordinator:

1. Dr. Shazia Fatima, Head Nuclear Medicine NORI, EM PNS (Recordings of the Webinar available on request)



*The PNS delegation with Malik Qasim Mustafa, Director ACDC, and his team members at the Institute of Strategic Studies Islamabad (ISSI).*

## Outreach

### Meeting with ACDC-ISSI officials

Dr. Imtinan Elahi Qureshi, Mr. Waqar Ahmad Butt and Dr. Shazia Fatima visited the “Arms Control and Disarmament Centre (ACDC)” on Monday, December 21, 2020, at the Institute of Strategic Studies Islamabad (ISSI), Islamabad. Malik Qasim Mustafa, Director ACDC gave a presentation on the working of the ISSI and highlighted the achievements of ACDC since its establishment on October 30, 2019. He also elaborated the ACDC-ISSI Vision 2023.

Dr. Imtinan Elahi Qureshi appreciated the working of the ACDC at ISSI. He then highlighted the contribution of PNS in the areas of peaceful uses of nuclear energy and the welfare of the community of nuclear scientists in Pakistan.

Both sides agreed to exchange information, building linkages with the scientific community of Pakistan, organizing joint-events on various themes related to peaceful applications of nuclear technology, nuclear safety and security and its integration with other emerging technologies. The visit concluded with a tour of ACDC and the ISSI library.

### Meeting with the Chairperson SASSI University

The sub-committee of PNS comprising Dr. Imtinan Elahi Qureshi, Mr. Waqar Ahmad Butt, Dr. Shazia Fatima and Ms. Shazia Fayyaz met the President/Chairperson of SASSI University, Dr. Maria Sultan, in her office on 24th December 2020. She was accompanied by Mr. Anwar Habib (former Chairman PNRA) who is currently serving as Director Power in the Centre for Nuclear Policy and Technology at SASSI.

The meeting was held in a very cordial and friendly atmosphere. Dr. Maria recounted the wide spectrum of academic activities of SASSI involving formal educational programmes, training courses, public policy engagement and international outreach. She suggested a number of



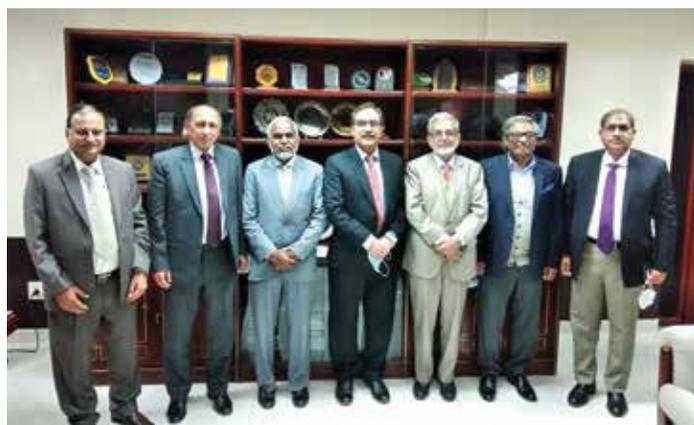
*The PNS delegation with President SASSI University, Dr. Maria Sultan, and her colleagues.*

possibilities for bilateral cooperation between PNS and SASSI including, inter alia, joint webinars, training courses, media events, revenue generating programmes, publication of a journal, writing books etc. She candidly admitted that NGOs/Think-tanks relevant to strategic studies need intellectual resources of professionals who are members of PNS.

Dr. Imtinan emphasised that PNS should be recognised as a resource base for nuclear knowledge. Mr. Anwar Habib was kind enough to agree that while introducing guest speakers in their webinars, who are members of PNS, their affiliation with PNS will be specifically mentioned. Both sides agreed to sign an MoU, after discussing specific areas and modalities of joint events, training programmes and publications.

### Meeting with Chairman PSF

A delegation comprising of PNS Council members (Dr. Imtinan Elehi Qureshi, Dr. M. Tahir Khaleeq, Dr. Niaz Ahmed and Mr. Waqar A. Butt) and a lifetime member of PNS, Dr. Yusuf Zafar, former Chairman Pakistan Agriculture Research Council (PARC) held a meeting with the newly appointed Chairman, Dr. Shahid Mahmood Baig, SI, Pakistan Science Foundation (PSF), on January 07, 2021 in his office. On behalf of PNS Council, Dr. Qureshi congratulated Dr. Baig for



*The members of PNS delegation with Dr. Shahid Mahmood Baig, Chairman Pakistan Science Foundation (PSF), and Dr. Mirza Habib, Director Research PSF.*

his well deserved appointment and conveyed good wishes for his success in the new role. He said that every body in our Council is happy that a former PAEC colleague has been honored for his abilities, knowledge and experience.

Dr. Shahid Baig reciprocated good wishes for the future work of PNS. He said that PNS comprises of highly experienced scientists and engineers and this forum should propose new initiatives for the development of Science & Technology in the country and assured his full support for the Society.

Dr. Mirza Habib, Director Research PSF/ Acting Member Finance who also joined the meeting conveyed a good news that the Government has substantially enhanced budget of PSF for supporting learned societies, holding of scientific seminars, travel grants to speakers from abroad, publications of books and proceedings. PNS qualifies for these grants/ financial assistance to pursue its programmes.

Dr. Qureshi briefed the Chairman PSE about new initiatives and future plans of PNS. He offered him cooperation of the society in terms of academic support as PNS has a large number of highly qualified and experienced scientists and engineers at its pool as Lifetime Members. He made the following cooperative initiatives with PSF.

1. Participation in technical committees of PSF for evaluation of projects.
2. Advisory role in Science Museum project.
3. Volunteering for science popularization programmes.
4. Submission of research projects through S&T organizations or universities by the willing retired experts of PNS.

It was agreed that PNS office will act as a resource centre for any academic support required by PSF. The meeting ended with a commitment from both sides to keep close liaison and conduct joint activities falling under common objectives of the two organizations



Dr. Muhammad Faheem, Director Nuclear Oncology and Radiotherapy Institute (NORI) in conversation with the Council members of PNS in his office in NORI.

## Meeting with Director NORI

President PNS, Dr. Imtihan Elehi Qureshi alongwith Dr. M. Tahir Khaleeq and Mr. Waqar A. Butt held a meeting with Dr. Muhammad Faheem, Director Nuclear Oncology and Radiotherapy Institute (NORI) on Wednesday, 13th January 2021. Dr. Shazia Fatima, Executive Member of PNS who is the Head of Nuclear Medicine Department at NORI also joined the meeting.

Dr. Qureshi briefed about the initiatives of PNS regarding the dissemination of information on peaceful uses of nuclear technology, including the role of nuclear medical centers of PAEC in the treatment of cancer all over Pakistan.

Dr. Faheem appreciated the programmes of PNS and assured the delegation of his personal and institutional support for the following activities:

1. Briefings about developments in nuclear medicine and oncology;
2. Informational videos about the facilities available at NORI;
3. Educational articles/videos about the use of radiations in therapy and imaging in clinical oncology;
4. Participation in webinars organized by PNS on topics relevant to Nuclear Medicine.

## Reports by PNS Members

### *Report on Fall Armyworm (FAW): A New Emerging Threat to Cereal Food Crops in Pakistan*

*Dr. Saima Arain*

*Nuclear Institute of Agriculture (NIA), Tando Jam*

*PNS M.No. 2191*

Wheat is the main staple food crop in Pakistan followed by rice. These food crops are grown in various regions of the country to feed the fast growing population. Negative impacts are being faced to these crops due to environmental swings resulting in more pests and diseases. Fall Armyworm (*Spodoptera frugiperda*) is one of the emerging threats to various crops including wheat, rice and corn. Occurrence of FAW has been reported in various maize growing areas of Sind (Tando Allahyar and Mirpur Khas) and Punjab (Khanewal, Okara, Sahiwal). Some types of armyworms have also been observed on wheat in Tando Jam. These worms damage wheat leaves which are the food factories to support the developing grains. The Government of Pakistan has mobilized teams to monitor these pests through rigorous surveys in the affected areas. Maize growers can face great losses due to this pest, as reported in African countries.

NIA has been conducting studies for the identification and control using the Integrated Pest Management approach.



## From the International Media

### **Nuclear–Renewable Synergies for Clean Energy Solutions** **JISEA News, December 17, 2020**

The definition of clean energy doesn't always include nuclear energy, but it's one of the world's largest sources of low-carbon electricity after hydropower. When considering greenhouse gas emissions, nuclear has the potential to be a key part of clean energy. Since 2011, the Joint Institute for Strategic Energy Analysis (JISEA) has explored the potential for increased integration of nuclear and renewables in the evolving power grid. Nuclear-renewable hybrid energy systems are physically coupled facilities that include both nuclear and renewable energy sources to produce electricity and another commodity product such as fuel, thermal energy, hydrogen, or desalinated water. They can provide electricity when the grid needs it and produce the commodity during other hours, increasing the economic benefit of the nuclear reactor.

In 2017, building upon the early reports, JISEA studied the economic potential of tightly coupled nuclear-renewable hybrid energy systems that produce hydrogen and generate electricity. The systems were profitable in scenarios with higher electricity and natural gas prices, low hydrogen prices, and increased electricity price volatility. It explores widescale hydrogen production and utilization in the United States to support the electric grid and play a larger role across industry and transportation. Researchers look at an electrolyzer at the National Renewable Energy Laboratory. Using electricity produced by renewable or nuclear energy, an electrolyzer splits water into hydrogen and oxygen with virtually zero atmospheric emissions.

New technologies like advanced inverters are paving the way for innovative nuclear solutions to industrial decarbonization, grid integration, and solving other challenges related to the clean energy transition. A recent study on novel multi-input, multi-output hybrid energy systems that synergistically incorporate diverse energy sources, including renewable, nuclear, and fossil with carbon capture, to provide sustainable, cost-effective, and reliable power, heat, mobility, and other energy services. Scientists have identified a viable path forward for these energy systems—a major step toward understanding today's most complex energy challenges.

Full article is available at: <https://www.jisea.org/20201217.html>

### **Cotton in Pakistan: How Nuclear Techniques are Helping the Textile Industry** **IAEA Weekly News – January 22, 2021**

Cotton, linen and silk are textiles associated with fashion

capitals of the world. Some of those textiles popular with designers are produced in Pakistan, where the textile industry contributes 8.5 per cent to the gross domestic product and accounts for 60 per cent of the country's exports. But climate extremes such as heat waves and increasing temperatures have been impacting the cotton industry, which has seen an unprecedented fall in yields. IAEA, in partnership with FAO, is working with local experts to develop and introduce new varieties of cotton that are more resilient and better adapted to the new climate reality in the country. The new varieties developed now account for 40 percent of all cotton produced, up from just 25 per cent two years ago. These new varieties have higher yield and improved fibre quality as well as good agronomic performance and adaptability to climate change variation. The collaboration between the NIAB, IAEA and FAO includes a long-term technology transfer and capacity-building programme. Through this long-standing collaboration, Pakistani scientists have reached a level of expertise that they can share with neighbouring countries that are in the early stages of mutation breeding.

How can plant mutation breeding combat climate change? Seeds are first exposed to irradiation with gamma rays and then planted in growth chambers or greenhouses. Plants arising from the irradiated seeds are planted and advanced over three to four generations during which they are examined and selected for the traits targeted for improvement in the programme. Once suitable plant lines have been identified, they are planted in different locations (agroecological zones) of the country – representing various climatic and soil conditions. Once an advanced line/s has proven its performance in such multi-locational trials, it is released as a variety for cultivation by farmers. The seed of the variety is then multiplied so that farmers have access to sufficient amounts to plant.

Through implementing plant mutation breeding techniques, scientists can access novel genetic diversity that is not accessible through conventional breeding, and thus ensure the identification of new and improved lines in a shorter time, enabling the development of improved plant varieties adaptable to climate change and tolerant to abiotic stresses, such as heat and drought.

Complete article is available in PNS Educational Resources at [www.pns.org.pk](http://www.pns.org.pk).

### **SMRs a clean, reliable complement for renewable energy** **ANS Nuclear SmartBrief – February 12, 2021**

Small modular reactors are touted as having a multitude of advantages -- safer, smaller, less oversight needed, more electricity generated, no emissions -- but they still must overcome negative public perceptions of the industry. Nonetheless, many governments, countries and companies

are racing to develop SMRs that could ultimately complement renewable energy sources, such as wind and solar, and help replace coal- and gas-fired plants.

### **Fuel for world's largest fusion reactor ITER is set for test run** **NATURE, NEWS, February 22, 2021**

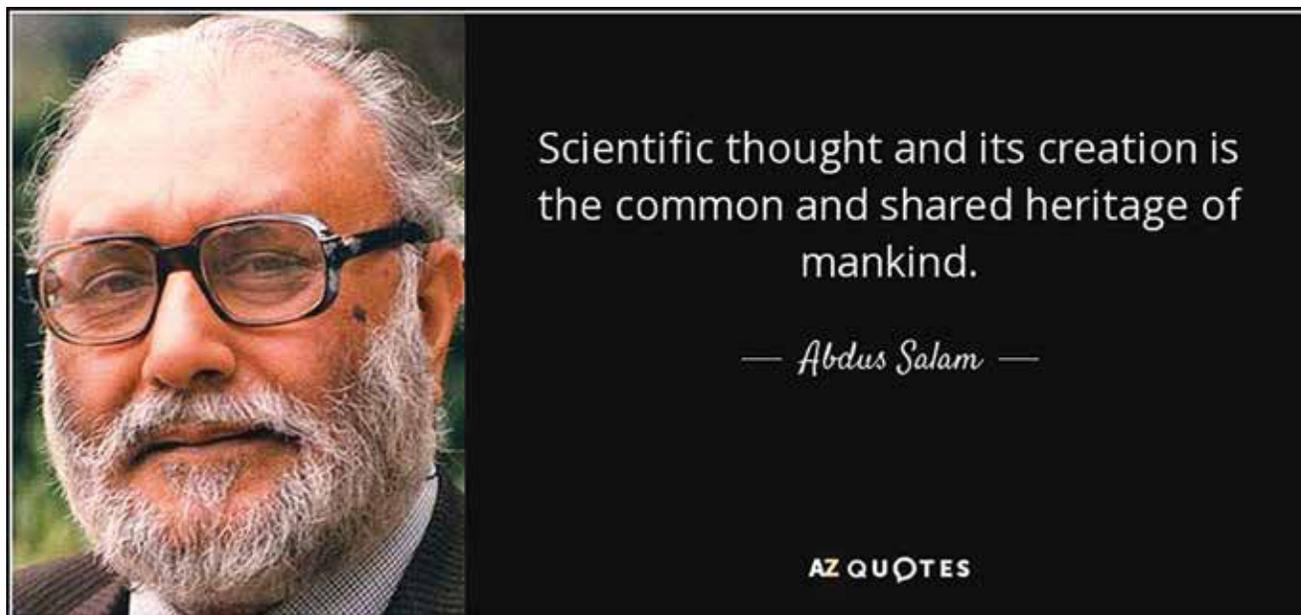
Nuclear fusion is the phenomenon that powers the Sun and, if physicists can harness it on Earth, it would be a source of almost limitless energy. The experiments with deuterium and tritium at the Joint European Torus (JET) are at a crucial dress rehearsal for the mega-experiment. A pioneering reactor in Britain is gearing up to start pivotal tests of a fuel mix that will eventually power ITER – the world's biggest nuclear-fusion experiment.

In December, researchers at the Joint European Torus (JET) started conducting fusion experiments with tritium. It is the first time since 1997 that researchers have done experiments in a tokamak with any significant amount of tritium. The reactor should heat and confine a plasma of deuterium and tritium such that the fusion of the isotopes into helium produces enough heat to sustain further fusion reactions. JET's experiments will help scientists to predict how the plasma in the ITER tokamak will behave and to craft the mega-experiment's operating settings. ITER will begin operations with low-power hydrogen reactions in 2025. But from 2035, it will run on a 50:50 mix of deuterium and tritium.

doi: <https://doi.org/10.1038/d41586-021-00408-1>

## **Renowned Pakistani Scientists**

The first Pakistani to receive a Nobel Prize



Professor Dr. Abdus Salam was born in 1926 in Jhang. He started his career as a lecturer at Govt. College, Lahore and then went to UK for higher studies. He obtained a PhD in theoretical physics at Cambridge. In 1957 he joined Imperial College, London as Professor of Theoretical Physics. His notable achievements include the Grand Unified Theory, work on supersymmetry and, most importantly, Electroweak Unification Theory, for which he was awarded the Nobel Prize in 1979. He used his share of the Nobel Prize entirely for the benefit of physicists from developing countries. In 1964, Prof. Salam founded the International Centre for Theoretical Physics (ICTP), Trieste, Italy and served as its director until 1993. Furthermore, he spent the whole money he received from the Atoms for Peace Award on setting up a fund for young Pakistani physicists to visit the ICTP. In 1997, the scientists at ICTP commemorated him and renamed ICTP as the "Abdus Salam International Centre for Theoretical Physics".

As scientific advisor to MoST, he played an influential role in the development of the country's science infrastructure. Prof. Salam proposed the idea of establishing an annual college to promote scientific activities in the country that led to the establishment of the International Nathiagali Summer College on Physics and Contemporary Needs (INSC) in 1976. He was the founding director of the Space and Upper Atmosphere Research Commission (SUPARCO), and also established Theoretical Physics Group (TPG) in the Pakistan Atomic Energy Commission (PAEC) which formed the ground breaking work that led the country to become a Nuclear Power. (see Salam's interview on his role in PAEC <https://youtu.be/fBLfxsKmiXE>).



## Hike cum Family Picnic of PNS Members

Lush green Margalla Hills provide a breathtaking backdrop to scenic Islamabad city. They beckoned nature loving PNS members at the onset of Spring and many joined for the hike with families on Sunday the 28th February 2021.

After light showers two days ago, the foliage along trail 5 was glistening in the bright sunshine and merrily swinging in cool breeze. The party spent about 90 minutes in walking to and

fro, along the pristine track with gentle climbs, up to the first spring. After returning to the starting point, light refreshments were served and the participants helped themselves with the tea prepared on-the-spot, while observing Corona SOPs. The icing on the cake was 'gup shup' in open air. This event was in line with the policy of PNS to not only organize academic events, but also provide opportunities of social interactions among the members and their families. In the past the society has been organizing visits to places of tourist attractions, picnics and at least one gala dinner every year.



## A historic photo



Visit of the President of Pakistan, Field Marshal Muhammad Ayub Khan to Atomic Energy Centre, Lahore (AECL) - 1961. He is accompanied to his left by Chairman Pakistan Atomic Energy Commission (PAEC), Dr. I. H. Usmani. Immediately behind the two are Governor of Punjab, Mr Amir Muhammad Khan (in turban), and Minister of Industries, Mr. Zulfikar Ali Bhutto (later to become the Prime Minister of Pakistan). The AECL was the hub of planning activities for the future programmes of PAEC.

## Nuclear News - PNS

### An MoU signed between PNS and SASSI

After mutual consultations and due deliberations, SASSI University and PNS finally agreed to consolidate their bilateral cooperation through an MoU, which was signed between the two parties on 15th March 2021.

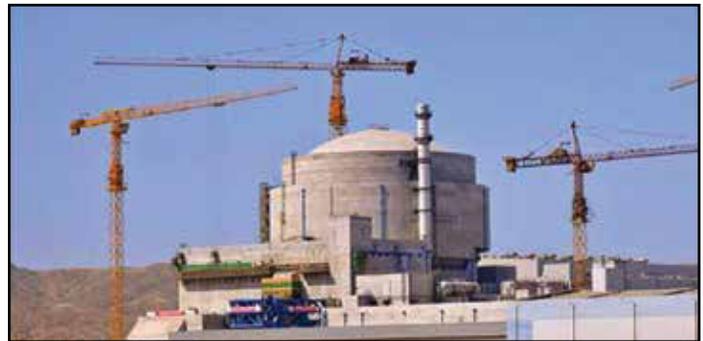
The signing ceremony was held in the committee room of PAEC Rest house in Islamabad. Speaking on the occasion, the PNS President, Dr. Imtihan Elahi Qureshi, reiterated the resolve of PNS Council to enter into partnerships with various NGOs, think-tanks and University departments engaged in strategic studies related to nuclear issues. He pointed out that the strength of the Society lies in the huge amount of nuclear technology experience of its members, many of whom constituted the vanguard of Pakistan's nuclear journey. The knowledge and experience of these elite scientists and engineers has been under-represented in discussions on strategic matters and policy making. The strengths of institutions like SASSI University in terms of education, research, communication experience and media resources offer enormous opportunities of synergy with technical know-how of PNS membership. The representative of the SASSI University, Brig (R) M. Mehboob Qadir, Director Research, emphasized the need to counter anti-Pakistan narratives generated under the guise of 'academic' briefs by fake or genuine international think-tanks. This can best be done through well researched reports prepared jointly by experts of social sciences and natural sciences. He informed the participants about the wide spectrum of strategic themes being pursued by SASSI scholars. He agreed with Dr. Qureshi that the MoU between the two academic bodies will benefit both and serve Pakistan's interests better.

The two sides have agreed to undertake the following joint activities:

- a. To organize joint webinars on topics of common interest, mainly peaceful applications of nuclear technology with due consideration of national and international safety and security framework;
- b. To undertake research and publish policy papers on implications of adopting or avoiding the use of nuclear energy, radiation sources in medical diagnostics and treatments, GMOs, etc.;
- c. To prepare content for on-line educational material pertaining to nuclear and allied disciplines for general public, students and professionals;
- d. To jointly organize short courses aimed at building communication capacities of pure science researchers;
- e. To organize briefing sessions for bureaucrats, diplomats, politicians, and journalists for comprehensive elaborations on topics of national interest having complex scientific underpinnings.

## Nuclear News - Pakistan

### Pakistan's K-2 nuclear power plant connected to grid



ISLAMABAD: The Pakistan Atomic Energy Commission (PAEC) on Thursday announced that it had connected its 1,100MW Karachi Nuclear Power Plant Unit-2 (K-2) to the national grid.

In a statement, the PAEC termed it a 'Pakistan Day' (celebrated on 23rd March) gift to the nation. It said the nuclear power plant (NPP) had achieved criticality at the end of February and was undergoing certain safety tests and procedures before it could finally be connected to the national grid. The loading of nuclear fuel onto the plant was started on December 1, 2020 after getting clearance from the Pakistan Nuclear Regulatory Authority.

The PAEC pointed out that K-2 is the first nuclear power plant in Pakistan with a generation capacity of 1,100MW and its addition to the national grid will "surely help improve the economy of the country".

K-2 is one of the two similar under-construction nuclear power plants located near Karachi and will be inaugurated for commercial operation by the end of May this year. The other one, K-3, is also in completion phase and is expected to be operational by the end of this year.

The PAEC is now running six NPPs in the country – two located in Karachi and four at Chashma in Mianwali district. Earlier, the collective generation capacity of all PAEC-operated nuclear power plants was around 1,400MW. The coming online of the Karachi Nuclear Power Plant Unit-2 will nearly double the generation capacity of nuclear power plants in the country, substantially improving the overall share of nuclear power in the energy mix.

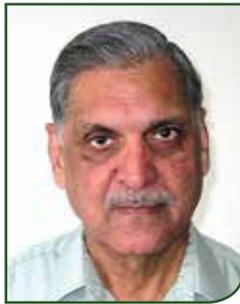
Pakistan Atomic Energy Commission Chairman Muhammad Naem congratulated Member Power Saeedur Rehman and his team on this great achievement.

*Published in Dawn, March 19th, 2021*

## Some personal reflections on the early stages of establishing Pakistan Nuclear Society

by  
Dr. Shamim Ahmad Chaudhri

It took over 30 years after the establishment of the Pakistan Atomic Energy Commission (PAEC) to the formation of Pakistan Nuclear Society (PNS) in 1990! Several factors might have contributed to this situation.



In earlier years, there was a very limited pool of scientists and engineers to even think about the need for such a forum.

In 1960s, the PAEC went through an active phase of expanding its manpower through fresh recruitments and training at foreign universities and nuclear facilities.

The 1970s witnessed an expansion in infrastructure, and new Centres and Institutes were established at various cities. It also brought a change in leadership at the top at a time when new political and security considerations were thrust to the forefront after the Indian test of a nuclear device at Pokhran.

One significant side effect of these changes and developments was the prevalence of a very cautious and conservative approach in the PAEC towards allowing group activities of any sort. The already existing Association of Scientists and Engineers at PINSTECH was left to fade out without much notice. In the following many years there was not much discussion, interest or intent, among the PAEC scientists and engineers to consider establishing a professional body.

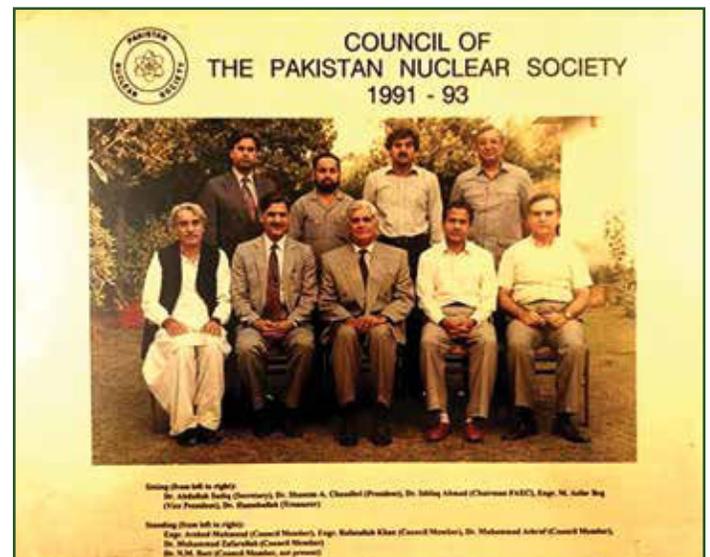
During my posting at the Embassy of Pakistan at Vienna from 1983-1987, I noticed the formal representation of some national nuclear societies in the Annual General Conferences and other technical meetings of the International Atomic Energy Agency. Although these Societies had only an observer status and were not part of any decision-making process, the representatives had no doubt an opportunity of peddling soft diplomacy for promoting their interests. I was encouraged by the PAEC Chairman, Mr. Munir Ahmad Khan, to interact with some of them, particularly Mr. Octave J. Du Temple, the Executive Director of the American Nuclear Society for a very long time. I was impressed by the wide membership of the Society both in the academic and professional circles while maintaining an independence from the commercial interests of the nuclear industry.

After returning to Pakistan, I gained an impression over a

period that the top PAEC management would not be averse to the idea of having such a body in Pakistan. It took a couple of years before a group of colleagues at PINSTECH started discussions on the drafting of a Constitution for a Nuclear Society and got Pakistan Nuclear Society duly registered in 1990 by fulfilling the requirements. (It was a sheer coincidence that an exercise undertaken by a group of Physicists at the Quaid-e-Azam University resulted in the registration of the Pakistan Physical Society in the same year.) A little later, we got PNS accepted as a member of the International Nuclear Societies Council, which itself was founded as a Non-governmental Organization in November 1990.

On completion of the process leading to the registration of the PNS, a campaign was initiated to offer membership to those who met the criteria set out in the Constitution of the Society. It was understood that an offer would be made to the top PAEC management for membership of the Society. There was a general support for the idea that Chairman of the PAEC would be the Patron of the Society, and that all positions on the Council would be filled through elections for a two-year term.

The elections for the term 1991-1993 were held around the last quarter of 1991 and I had the honour of being elected as the first President of the Pakistan Nuclear Society. I was elected again as President for the next term of 1993-1995 but could not complete the full tenure as I was offered a job at the IAEA and left for Vienna end July 1994. On returning to Pakistan after nearly a decade, I settled at Lahore. I have been generally aware of the good work done over the years by dedicated and competent colleagues to further the objectives of the PNS and hope for the continuation of this process through the newly elected Council with even greater vigour and wisdom. I wish the new Council a glowing success in this regard.



## Message from the President

**Dr. Imtihan Elahi Qureshi, T.I**

PNS is a representative body of Pakistani professionals associated with nuclear and allied disciplines. The new Council of PNS that took office in Dec. 2020 started its work with fresh determination, taking a number of new initiatives in a short span of time. That included; better internet connectivity, new website with dynamic and interactive features, and more office space.

A number of measures were also taken to streamline the PNS office work through subcommittees comprising of Council members as well as volunteers from amongst other lifetime members. The expansion of infrastructure and purchases of additional office equipment are still going on.

One of the compulsions of disseminating information in a pandemic situation is to make a shift from traditional seminars to virtual assemblies dubbed as 'webinars'. This transition is being witnessed throughout the world, taking its hold in meetings of the United Nations bodies, multilateral meetings of States and, of course, in IAEA programmes. The new administration of PNS was quick to join the new wave by acquiring a Zoom license for its webinars. A highly encouraging response and wide recognition was achieved in the very first such event, entitled "Artificial Intelligence and Medical Imaging".



The traditional approach of sharing information through newsletters has also taken a new bend by way of the 'online' publications. Immediate attention has been paid to restore the publication of PNS Newsletter which had been stalled for some years. The present issue is printed in limited numbers but is accessible to national and international readers in the form of soft copy that is available at our website. The pages of this publication reflect the proactive approach of the Society to engage other national academic forums and think-tanks to better achieve our objectives. Very soon we will start interacting with our counterparts in other friendly countries.

As PNS President it is my honour to convey the following messages.

To PNS members: You have shown trust in the new team of PNS office bearers through your votes, which is highly appreciated. Please come forward and fully participate in PNS activities to ensure that PNS objectives are effectively achieved. We hope that your comments and suggestions conveyed through feed-back proforma on the website ([www.pns.org.pk](http://www.pns.org.pk)) or through email ([council@pns.org.pk](mailto:council@pns.org.pk)) will help us perform our functions more efficiently. I especially appeal to my seniors who played a role in establishing the Society 30 years ago and participated in its development, to kindly guide us in our endeavours. Many of these venerable colleagues are 'Fellows' of the Society. Their close interactivity with the incumbent Council is highly desirable and most welcome.

To non-member nuclear professionals: Due to the special nature of your work, it is very important to have a group identity and avenues of networking through academic and social interactions outside the realm of official work. You are welcome to join us by filling out the membership form available on PNS website. The advantages of joining the Society are also elaborated on the website.

To senior officials of strategic organizations: As per international practice, the independent academic bodies of highly qualified people attached to a certain type of profession are patronized by their peers in positions of authority. The PNS has a dual role to play; namely, to serve the nation through sharing of knowledge and information in a specialized field of critical importance to national economy, and to further the interests of the practitioners of this field. We look forward to your support for the success of our mission.

And finally,

To my fellow Council members: The fact that you offered your services to run the affairs of the Society, which requires onerous duties to be performed on honorary basis, already is a testimony of your selfless dedication to the national interest and community welfare. I highly appreciate the close-knit cooperative working of the Council and the results achieved so far. We have a long way to go to fully capitalize on the human resources available to us for ensuring national interests. With your strong determination and hard work it will be possible for the Society to achieve new heights. I thank you for your commitment and sense of responsibility in performing your designated functions.



## Significant News

Pakistan Nuclear Regulatory Authority (PNRA) has awarded licenses to two design organizations of PAEC:

- To HMC-3, for Design of Nuclear Safety Class-3 equipment
- To WASO, for Design of Nuclear Safety Related Structures (for installation of PARR-3 at PINSTECH)

The ceremony was held at PNRA Head Quarters on January 20, 2021. Chairman PNRA awarded the licenses which was received by Chairman PAEC. The event was attended by Members, DGs, Directors and other senior officers from the two organizations. PNRA has issued Fuel Load Permit to K-2 after fulfillment of all regulatory requirements. Fuel loading at K-2 has also been completed and commissioning tests are being performed.

## Benefits to become PNS Lifetime Member

1. Growing professional circle by strengthening connections with peers in relevant fields
2. Free access to nuclear related webinars, online courses and discussions to share views and enhance knowledge of current issues, challenges and opportunities in nuclear science and technology
3. Group visits at various S&T organizations/ universities
4. Free e-copy of quarterly PNS Newsletter
5. Login facility at PNS website with a secure password
6. Lifetime Membership Card with a photo
7. 50% reduction in PNS conferences fee
8. 20-30% fee reduction in conferences arranged by other organizations
9. 25% discount in fee on courses offered by Pakistan Institute of Management (PIM) in Islamabad, Lahore, Karachi
10. 50% reduction in Annual Gala Dinner at Islamabad Club
11. 15-20% discount at various outlets, branded shops and restaurants
12. Social programmes like family picnic/hikes, trip to Northern areas, etc.
13. Registration/ Lifetime Membership Fee is only Rs. 2,100/-.

Membership Form is available at [www.pns.org.pk](http://www.pns.org.pk)  
(Form and Fee can be deposited online in PNS Bank Account at NBP, Margalla Br. Islamabad, IBAN: PK18NBPA1725004018982691)

## Conference announcements - 2021

1. 28th IAEA Fusion Energy Conference, Nice, France, 10 – 15 May.
2. ICTP-IAEA Nuclear Knowledge Management School, Trieste, Italy, 24 – 28 May.
3. World Congress on Medical Physics and Biomedical Engineering, Singapore, 30 May – 4 June.
4. 10th International Conference on High Temperature Reactor Technology, Yogyakarta, Indonesia, 2 – 4 June.
5. International Conference on Operational Safety of Nuclear Power Plants, Beijing, China, 30 Aug – 3 Sep.
6. International Conference on the Development of Preparedness for National and International Emergency Response (EPR2021), Vienna, Austria, 11 – 15 Oct.
7. International Conference on Radioactive Waste Management: Solutions for a Sustainable Future, IAEA HQ, Vienna, Austria, 1 – 5 Nov.

## PNS Council 2020-22



Dr. Imtihan Elahi Qureshi  
President



Dr. M. Tahir Khaleeq  
Vice President



Dr. Muhammad Mohsin  
General Secretary



Ghulam Sarwar  
Finance Secretary



Waqar A. Butt  
Executive Member



Dr. Shazia Fatima  
Executive Member



Shazia Fayyaz  
Executive Member



Dr. Niaz Ahmad  
Executive Member



Syed Zahid Hussain  
Executive Member



Issue 2/2021

April-June, 2021

# PNS Newsletter

A Quarterly Newsletter of the Pakistan Nuclear Society

## Patron:

Dr. Imtihan Elahi Qureshi, T.I.

## Editor-in-Chief:

Waqar Ahmad Butt

## Editors

Dr. Riffat M. Qureshi

Dr. Muhammad Sadiq

Mr. Waheed Akram

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## Vision

The vision of Pakistan Nuclear Society (PNS) is to become a resource centre for disseminating news and information about peaceful applications of nuclear science and technology in Pakistan and a hub of promoting this cause worldwide along with international partners for global environmental and economic stability. The principal tools to be used for this purpose would be PNS Website and PNS Newsletter.

## Contact Us

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One-day Seminar on the Applications of Nuclear Techniques in Industry held on 26th May 2021 at NIFA, Peshawar (page-2).

## From the desk of Editor-in-Chief

The first issue of the PNS Newsletter in 2021 has generated much interest not only among PNS Members but also in other academic circles. The Editors are grateful to all those who have appreciated the Newsletter and shared valuable suggestions for its further improvement. One of the reasons for appreciation was its timely publication. The Society intends to keep it up at the same pace. However, it may only be possible with the valuable support and cooperation of PNS Members. In the last issue, there was only one S & T contribution from the Members. The Society expects more input from Members as there are more than 900 Lifetime Members of PNS, and about one-third of these are retired experienced scientists and engineers. Many of them are renowned experts in their fields and they can write short articles for the motivation and guidance of the young professionals. Similarly, the young Members can also write about their innovative ideas, initiatives being taken or achievements made during the course of their higher studies. The only submission is that all such material should be in line with the mandate of PNS i.e. the promotion of peaceful applications of nuclear science and technology and allied disciplines.

The calendar of PNS programmes and activities during July-Dec. 2021 has been finalized (Page-16). InshAllah, it will be followed to the maximum extent possible.

In this issue, a new section on 'Obituary (PNS Members)' has been added. In the forthcoming issues, we intend to include 'Letters to the Editors' and 'Opinion' section to open up a dialogue on matters pertaining to PNS and national interest at large.



## Activities during the 2nd quarter

### Webinar on the Future of Nuclear Power in Pakistan

In view of the usefulness of holding webinars in current scenario of pandemic situation, the second webinar of the series was arranged on 3rd April 2021. Two highly experienced professionals, Syed Yusuf Raza, Chief Engineer (R)/ former Member Power PAEC and Engr. Hamid Akbar, Chief Engineer(R) / former Director General, Chashma Nuclear Power Generating Station (CNPGS) were the resource persons. These professionals remained associated with Pakistan's nuclear power programme for more than 30 years and delivered illuminating presentations. However, the third presentation could not be delivered due to certain technical problems.



After the introductory remarks by President PNS Dr. Imtihan Qureshi, Syed Yusuf Raza elaborated the overall status of operational as well as the under-construction nuclear power plants in the country. He mentioned that during last five years, PAEC has increased its generating capacity by adding its third and fourth units at Chashma. Recently, K-2 has started commercial operation in April 2021 whereas K-3 is expected to come into operation in 2022. This will take the share of Nuclear power in Pakistan to 3530 MWe, representing around 10% of the total installed capacity. Moreover, contract for installation of C-5 plant at Chashma will be finalized in near future which will add another 1100 MW to the national grid.

Mr. Hamid Akbar presented a detailed overview of the factors that must be taken into consideration for the nuclear new-built plants. He covered all aspects with respect to quality challenges, nuclear supply chain, suspect items, contractor's and suppliers' issues, regulatory requirements, procurement and contracting strategies, production of sound forgings, skilled workforce and the lessons learned.

This webinar was moderated by Dr. Shazia Fatima, Executive Member, PNS.

### One-day Seminar on the Applications of Nuclear Techniques in Industry

A seminar titled, "Applications of Nuclear Techniques in Industry" was organized by Pakistan Nuclear Society (PNS) with financial support from Pakistan Science Foundation (PSF) at the Nuclear Institute for Food and Agriculture (NIFA), Peshawar on 26th May 2021. The objective of the seminar was to disseminate information about huge financial benefits of using nuclear techniques in agriculture and industries, taking into account the related issues of radiation safety, their viable solutions and recommendations.

The seminar started with recitation from the Holy Quran. Dr. Muhammad Mohsin, General Secretary PNS and Mr. Ghulam Sarwar, Finance Secretary PNS acted as Stage Secretaries in the morning and afternoon sessions respectively. The welcome address was delivered by Director NIFA, Dr. Gul Sanat Shah. He lauded the efforts of PNS for arranging this seminar at NIFA even in the presence of logistical limitations posed by COVID-19 restrictions. The introductory remarks were made by President PNS, Dr. Imtihan Elahi Qureshi. He appreciated the research work being done in NIFA and



Participants of the Seminar observing SoPs

*Dr. Yusuf Zafar**Dr. Javaid Khurshid**Dr. Shamshad Ahmad**Mr. Waqar A. Butt**Dr. Tariq Yasin*

other three agricultural Centers of Pakistan Atomic Energy Commission (PAEC). Recalling the achievements of these Centers over the last five decades in producing beneficial crop varieties, he noted that the food security is as important for national survival as the security of country's borders. He applauded the work carried out by the scientists and engineers of PAEC in the service of the nation and declared them unsung heroes. He elaborated the role of PNS in highlighting the achievements of nuclear scientists, engineers, agriculturist and medical doctors. He said that PNS was a symbol of professional identity for the nuclear community in Pakistan and it would continue to project their R&D work at national and international level along with providing support and guidance in matters related to their own welfare.

Five talks were delivered encompassing areas of Food and Agriculture, Power Generation, Polymers/ Rubbers Industry, Ornamental Gemstones and Material Processing.

In Food and Agriculture, Dr. Yusuf Zafar, former Chairman Pakistan Agricultural Research Council (PARC), emphasized the importance of food security, which encompasses production, nutritious value, storage and distribution and sustainability. He noted that mutation breeding of crops requires appropriate adaptation in accordance with soil and climatic conditions in different geographical regions. He stressed the role of

water resources in enhancing crop productivity, which can be best monitored using stable isotope ratio analysis methods. Public and private sector comparisons in agriculture and food industry were highlighted mentioning that the applications of nuclear technologies in Private Sector are very limited.

Dr. Syed Javaid Khurshid, Sr. Research Fellow, Center for International Strategic Studies (CISS), talked about the peaceful uses of Nuclear Technology in the sector of Power Generation. He presented detailed analysis of nuclear energy production and provided an insightful comparison of economic viability among different energy sources such as hydro power, nuclear and fossil fuels. Highlighting the advantages of nuclear power production over coal, gas and oil generated power; he showed that nuclear power is more cost effective and environment friendly as compared to fossil fuels. He also described nuclear power plants of different capacities and their country-wide installation in chronological order.

Dr. Shamshad Ahmad, IAEA Consultant, presented a review of across-the-board uses of radiation technology covering its applications in the field of medicine, agriculture and crosslinking of polymers that served humanity by uplifting standards of health and environment. He elaborated his personal experiences as radiation chemist and as an entrepreneur in

*Visit to NIFA Lobby (Exhibition Area)*



*Seminar participants with Director NIFA*

the commercial utilizing of polymer chemistry. Some salient features showing the superiority of radiation processing over competing technologies were also presented.

Mr. Waqar Ahmad Butt, Former Minister (Technical), in his power-point presentation emphasized that enormous value addition in gemstones is possible by using different treatments like thermal heating, electron beam exposure, gamma rays or neutron irradiations. It enhances ornamental qualities of gemstones by adding different colors and in certain stones like topaz, 30-40 times value can be added by neutron irradiations. The research reactor at the Pakistan Institute of Nuclear Science & Technology (PINSTECH) has the capability for neutron exposures that are necessary to produce long-lasting desirable colors. He emphasized that handsome amount of revenue can be generated and even foreign exchange can be earned by utilizing this technology.

The presentation of Dr. Tariq Yasin, Registrar, Pakistan Institute of Engineering Applied Sciences (PIEAS) was related to radiation uses in different processing industries. He noted that fire-resistant materials made from polymers and rubbers can be produced by radiation cross-linking. Applications of radiation technology for production of materials including sterilized food, cross-linked materials (wire, cables and tire rubber), superabsorbent hydrogel, polymer grafted products, wound dressing and plant growth promoters were described in detail.

All the speakers highlighted the contributions of scientists from PAEC in different areas of peaceful uses of nuclear technology. The seminar was conducted with full observance of safety protocols for COVID-19 and relevant SOPs. The participants of the seminar visited NIFA Lobby in which the products and achievements of the institute were displayed. In the concluding session, Dr. Niaz Ahmad, Executive Member

PNS presented the seminar summary. At the end, vote of thanks was given by Dr. Maazullah Khan, Head Food and Nutrition, NIFA. He appreciated all those who put their efforts to make the seminar a success. Certificates of participation were distributed to all the participants of the seminar.

### Webinar on Science Diplomacy

The nomenclature of 'Science Diplomacy' (SD) has entered the lexicon of foreign relations discourse during the last decade or so, but the practices it entails has been in vogue since 1940s. The need for devising a taxonomy of 'Science Diplomacy' arose because of the increasing relevance of scientific knowledge in addressing global challenges. It necessarily meant that scientists are required to be closely associated with diplomatic community to inform and to educate on matter with strong scientific underpinnings, such as climate change, infectious diseases, genetically modified foods, cyber security etc. There are a variety of ways in which nations have embedded scientific inputs in their diplomatic endeavors, notably through training of diplomats to appreciate and absorb scientific ethos, on the one hand, and enabling scientists to provide data-based advice in relevant global or cross-boundary issues.



A webinar on the topic was organized by Pakistan Nuclear Society with the support of the Virtual University of Pakistan on 25th June 2021, in order to publicize Pakistan's achievements in Science Diplomacy and to highlight the developments taking place elsewhere in the world. Considering the wide variety of audience, including the students, which were

expected to join the webinar, it was considered appropriate to start off with an introductory talk on SD. The first speaker, Dr. Arshad Saleem Bhatti, Rector Virtual University of Pakistan, elaborated the basic concepts of Science in Diplomacy, Science for Diplomacy, and Diplomacy for Science. With specific examples derived from success stories such as CERN project of European countries, he emphasized that scientific cooperation can lead to political reconciliations. The second talk, entitled "Building Gaps through Science Diplomacy: Pakistan's Perspective" was delivered by the former Secretary General of Pakistan Academy of Sciences, Prof. Dr. Muhammad Aslam Baig, who elucidated the role played by 'Abdus Salam International Centre for Theoretical Physics (ASICTP)', in providing the interactivity between scientists from developed and developing countries. He also cited the project "Synchrotron light for Experimental Science and Applications in the Middle East (SESAME)" as a fine example whereby even the scientists from bitterly rival countries can work together. An illuminating talk by Prof. Dr. Raheel Qamar, Head of Science and Technology Sector, ICESCO, dilated upon how Science Diplomacy played out in the world during the outbreak of Covid-19 pandemic. It involved cooperation of multiple countries for preparing vaccines, but also highlighted the limitations of cooperation in the presence of national priorities. Recalling that diseases that did not affect Western hemisphere such as Ebola and Malaria were not given due attention by multinational pharmaceutical companies on profitability grounds, he stressed the role of scientific communities in developing countries to promote South-South collaboration. He gave several examples of how ICESCO has been helping OIC countries in scientific capacity building.

The Director General of 'Science Diplomacy Division' (SDD) in the Ministry of Foreign Affairs of Pakistan, Mr. Muhammad Kamran Akhtar, spoke at length about the initiatives of Pakistan's Foreign Ministry in projecting Pakistan's scientific achievements at international fora and helping local industry in addressing their import-related issues. He lauded the services of Pakistan Atomic Energy Commission for deploying nuclear technology in support of 9 out of 17 Sustainable Development Goals. Mr. Kamran was of the view that SDD is well-placed to use its resources for projecting soft power of Pakistan. The efforts to improve Pakistan's image abroad will be continued through dissemination of information about achievements of our scientists, such as the recent IAEA award won by Pakistani scientists of Nuclear Institute of Agriculture and Biology (NIAB). He informed the audience that Science Diplomacy 'Focal Points' have been nominated in Pakistan Embassies in most capitals, who are responsible for reporting on the measures taken by the relevant embassies to find opportunities of S&T cooperation.

Dr. Imtinan Elahi Qureshi, President Pakistan Nuclear Society,



*A shield presented to Mr. Kamran Akhtar by the President PNS*

recalled that during his tenure as Executive Director of COMSATS, the first ever round table on 'Science Diplomacy' was held in Islamabad in 2015, under the umbrella of this international organization based in Pakistan. The Special Additional Secretary of the Ministry of Foreign Affairs, Mr. A. B. Sial, had conferred on that occasion the titles of 'Science Ambassadors' to selected renowned scientists. The Ministry itself established its Science Diplomacy Division in 2018 and later on Pakistan Academy of Sciences also came on board. Meanwhile two other international organizations with Headquarters in Islamabad, namely the Ministerial Committee of Organization of Islamic Cooperation on Science and Technology (COMSTECH) and Economic Cooperation Organization Science Foundation (ECOSF) also stepped up their efforts to promote Science Diplomacy in their respective member countries, including Pakistan. Dr. Qureshi dwelled upon the current scenario in the world recounting the measures taken by advanced countries as well as developing countries. He noted that there is a major difference in the two sets of countries with respect to their approach towards involving scientists in decision making processes undertaken by politicians and bureaucrats. An extreme example is that of USA where a high-profile scientist is appointed as the Director of the Office of Science and Technology Policy. With his own team of specialists, he directly advises the US



president on matters of international affairs that require deep understanding of scientific knowledge. On top of that the US Department of State also has its own scientific advisory team. The European Union countries individually give high importance to the advice of scientists who do so in individual capacity or as part of scientific academies. There is also a “European Union Science Diplomacy Alliance” which works for the promotion of joint interests of the group. Other SD initiatives exist in the Middle East, Latin American Countries, and South Asia, which have varying degrees of impact, so far. Big countries like China and India are also taking measures to use S&T to gain influence and political advantage. Even small countries, like New Zealand, Netherlands, Arab Emirates, Cuba and Nepal are making a mark on the world scene because of their S&T contributions propagated through SD mechanisms. Dr. Qureshi also touched upon the issues of ‘competition’ versus ‘cooperation’ in the face of possible conflicts in national interests and global benefits. He wondered if the upcoming new technologies will help create an egalitarian world in which the benefits of science and technology would be shared equally by all countries.

## Outreach

### Meeting with the Chairman PNRA

A delegation of Pakistan Nuclear Society (PNS) visited the Headquarters of Pakistan Nuclear Regulatory Authority (PNRA) on 20th April 2020, and held a meeting with the newly appointed Chairman and other senior officials of the organization. Members of the delegation included Dr. Imtihan Elahi Qureshi (President PNS), Dr. Mohammad Mohsin (General Secretary PNS), Syed Yusuf Raza (former Member Power, PAEC) and Ms. Shazia Fayyaz (Executive Member PNS).

Welcoming the delegation, the Chairman PNRA, Mr. Faizan Mansoor appreciated the PNS initiative to hold discussions with PNRA authorities to explore avenues of mutual cooperation. He pointed out that the role of PNRA as an independent regulatory body for nuclear and radiation related activities across the country requires the highest degree of competence and vigilance on the part of its personnel. The organization has lived up to the expectations of all stakeholders within Pakistan and earned appreciation in international circles. He noted that there are a large number of PNRA professionals, including his predecessor Chairmen, who are associated with PNS as lifetime members.

Dr. Qureshi presented a brief overview of the scope of PNS activities as envisaged in its charter. Being an independent, non-governmental, not-for-profit, academic body comprising of highly qualified professional of nuclear and allied disciplines, the Society has a mandate to promote education and research in various sectors of nuclear technology. He emphasized that the Society is well placed to play a role in the dissemination of information and public awareness about safety and security of radioactive materials and other radiation sources. In this respect the educational programmes of PNS in the form of lectures, infographs, round-tables and seminars/webinars are helpful for supporting public outreach efforts. Further, he requested PNRA authorities to extend in-kind support to PNS for enabling it to perform its functions more effectively.

Ms. Shazia Fayyaz pointed out that the newly elected Council of PNS for the term 2020-2022 has restarted the publication of a quarterly Newsletter, in which Dr. M. Sadiq, Advisor PNRA is contributing as a member of the editorial board. This publication, as well as the website of PNS is a good resource for PNRA to highlight its contributions in safeguarding vital national interests. The Chairman directed Mr. Saleem Zafar (Member Corporate) to coordinate any assistance that PNS



Meeting with Chairman PNRA and his team



*PNS delegation with high officials of PNRA*

may request and nominated Dr. M. Sadiq to plan educational events that can be organized by PNS with resource persons from PNRA.

### **Signing of an MoU between PNS and PPS**

The Pakistan Nuclear Society (PNS and Pakistan Physical Society (PPS) ) has signed an agreement of Reciprocal Membership Privileges and Cooperation on 26th May, 2021, after getting approvals from the Executive Councils of respective Societies. In a simple ceremony held in Nuclear Institute of Food and Agriculture (NIFA), Peshawar, PNS President Dr. Imtihan Elahi Qureshi and PPS President, Prof. Dr. Anisa Qamar, signed the Agreement on the sidelines of one-day seminar organized by PNS at NIFA on 'Applications on Nuclear Techniques in Industry'. Director NIFA, Dr. Gul Sanat Shah and Members of the PNS Council, Mr. Waqar Ahmad Butt, Dr. Niaz Ahmad, Mr. Ghulam Sarwar and Syed Zahid Hussain were present on the occasion. The objective of the Agreement is that PNS will provide same privileges to PPS Members as its own members such as reduced conference fee, publications of scientific articles and etc. Reciprocally, the PPS will also treat PNS members as its own members with respect to such privileges. Additionally, the two Societies will help each other in their individual programmes as well as conduct joint activities where appropriate.

The two Societies have been functioning for the last 30 years in Pakistan and organizing academic events in accordance with their respective mandates and by-laws. The collective membership of two Societies runs into thousands and includes the top-most experienced scientists in the disciplines of Physics, Computer Sciences, Engineering and Nuclear Science and Technology. In view of the overlapping interests and memberships of two Societies it was considered advisable to create synergy and pool resources for maximizing the benefits to members of both Societies. Speaking on the occasion, the Presidents of both Societies reiterated their commitment to follow-up on the provisions of the Agreement with the help of their distinguished colleagues in respective



*MoU signing ceremony*

Executive Councils.

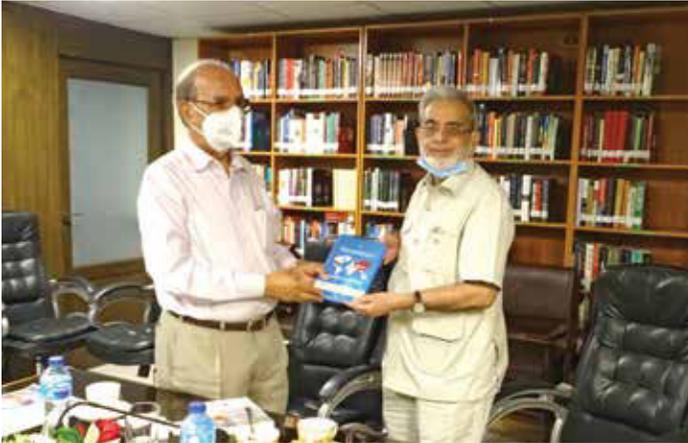
### **Visit of PNS Delegation to SVI**

To explore the possibilities of academic collaboration with the Strategic Vision Institute (SVI), an Islamabad-based think-tanks engaged in nuclear studies, a delegation of PNS Council members visited SVI offices on 23rd June 2021. The delegation headed by the President PNS, Dr. Imtihan Elahi Qureshi, included Vice President, Dr. M. Tahir Khaleeq; General Secretary, Mohsin; and Executive Member, Ms. Shazia Fayyaz. Detailed discussions were held with the President/ Executive Director of SVI, Dr. M. Dr. Zafar Iqbal Cheema, who is a renowned educationist and meritorious Professor of Quaid-e-Azam University. His team, comprising of Ms. S. Sadia Khan, Director Academic, policy, and Program; and Mr. Munir Ahmad Goraya, Assistant Director Administration and HR.

After mutual introduction, the President PNS outlined his view of the comparative strengths of the two bodies and identified complementarity of expertise available at each forum. He mentioned that PNS has over 1000 life-time members, who are currently working or retired from strategic organizations. Many of the veteran scientists of PNS are the ones who pioneered the nuclear programme of Pakistan and steered



*Meeting of PNS delegation with SVI team*



Dr. Zafar Iqbal Cheema presenting his book to the President PNS

the country towards successful nuclear deterrence apart from laying the foundation of a robust nuclear infrastructure for peaceful applications of nuclear energy and technology. However it was felt the contributions of nuclear scientists in the sectors of health, agriculture and industry are under-appreciated and inadequately projected in the media, leading to a lop-sided public image at home and negative perception abroad. It is in this concern that think-tanks with public outreach and media access can play a strong role.

Dr. Cheema recognized the immense intellectual potential of Pakistan's nuclear community which is untapped in so far as the national discourse on security affairs and international relations are concerned. He presented a brief summary of the wide spectrum of issues including strategic affairs that fall under the interest profile of SVI. The Institute has been playing an important role in highlighting Pakistan's narrative through its seminars/webinars, lectures, public appearances, policy papers and other publications. In particular the books and journals of SVI have been popular among intelligentsia for their high quality scholarly content. He generously offered that PNS members may freely interact with SVI for giving technical input or gaining experience of public communication. It was agreed that in future some of the events of mutual interest will be organized jointly under terms to be decided later.

## From the International Media

### Concept for a compact tokamak design

*Engineering360 -April 02, 2021*

A tokamak is a device which uses a powerful magnetic field to confine and control 150 – million-degree-Celcius plasma to produce controlled thermonuclear, to combine two atoms to become one and release much more clean and inexhaustible energy without harming the environment. A new design is proposed for a compact fusion reactor that can generate electricity and help define the technology necessary for commercial fusion power. General Atomics, which operates

the DIII-D National Fusion Facility in San Diego, California, for the U.S. Department of Energy, developed the design in collaboration with U.S. Oak Ridge National Laboratory and U.S. Lawrence Livermore National Laboratory. The Compact Advanced Tokamak (CAT) technology is expected to enable a higher-performance, self-sustaining configuration allowing the facility to be built at a reduced scale and cost.

### Diamond battery powered by nuclear waste runs for 28,000 years

ZME Science

Ref: <https://www.zmescience.com/science/diamond-battery-powered-by-nuclear-waste-runs-for-28000-years/amp/>

Nano Diamond Battery (NDB) made of a combined radioactive isotopes from nuclear waste with ultra-slim layers of nanodiamonds has been reported to assemble a battery that allegedly can last 28,000 years. The energy comes from waste graphite that was previously used in graphite-cooled nuclear reactors. The radioactive graphite is encased in layers of nano-thin, single crystalline diamond, which act both as a semiconductor and heat sink. Diamond has the highest energy-conductivity, meaning it quickly transfers heat from the radioactive graphite. So the diamond layers not only collect charge, but also prevent radiation leakage. Since the carbon-14 isotopes have half-life times in the range of thousands of years and diamonds are virtually indestructible, NDB felt confident making this bombastic marketing claim.

“This battery has two different merits,” NDB CEO and co-founder Nima Golsharifi said in an interview with Future Net Zero. “One is that it uses nuclear waste and converts it into something good. And the second is that it runs for a much longer time than the current batteries.”

The product is supposed to come in two versions. The “forever” version that is supposed to last 28,000 years before it runs out of charge. This hard-core version is meant for niche applications, such as deep space where it could power instruments onboard spacecraft and satellites. These spacecraft, for instance, could be sent to other star systems on centuries-long voyages and they would still have enough power to beam back messages.

There is also a consumer version, meant for powering electric vehicles, smartphones, and other small devices. Since the graphite would be wrapped in multiple coatings of synthetic diamond, there would be no radiation leaking out of your phone. NDB even claims that the radiation levels emitted by the cells will be less than those emitted by the human body.

For now, NDB has only completed a proof of concept. The company was about to release a commercial prototype, but then came COVID. Nevertheless, the company expects to

release a low-power commercial version of its radioactive diamond battery in less than two years, while the high-power version is slated for five years' time.

### Physicists have created a new and extremely rare kind of uranium

*Physical Review Letters* -DOI: 10.1103/PhysRevLett.126.152502  
16 April 2021

Researchers have produced the lightest version of a uranium atom ever. It has only 122 neutrons compared with the 146 neutrons found in more than 99 per cent of the world's naturally occurring uranium, which is known as uranium-238. Zhiyuan Zhang at the Chinese Academy of Sciences and his colleagues produced the new isotope through a process of blasting samples of tungsten with powerful beams of argon and calcium until the atoms fused together. They then picked the uranium-214 atoms out of the sample using a magnetic device called a separator.

"The production of these atoms is very difficult, because

not every collision can produce what we want," says Zhang. "About 1018 beam particles were delivered to collide with the target, but only two nuclei of uranium-214 were produced successfully and separated."

The researchers watched those nuclei decay and determined that the half-life of uranium-214 is about 0.52 milliseconds. They performed similar experiments on two previously discovered isotopes, uranium-216 and uranium-218, and found that their half-lives are about 2.25 milliseconds and 0.65 milliseconds respectively.

They also measured how these isotopes decay and found that uranium-214 and uranium-216 undergo alpha decay, in which an atom loses two protons and two neutrons, unexpectedly easily compared with other uranium isotopes.

<https://www.newscientist.com/article/2274847-physicists-have-created-a-new-and-extremely-rare-kind-of-uranium/#ixzz6sikkKHwW>

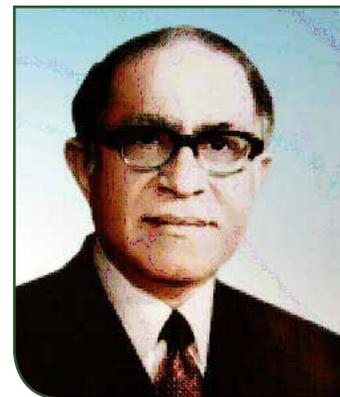
## Renowned Pakistani Scientists

### Dr. I. H. Usmani

The pioneer of Pakistan's Nuclear Programme

Dr. Ishrat Hussain Usmani served as Chairman PAEC during 1960-1971, which was a critical period between the creation of PAEC and consolidation of its primary agenda. He was a visionary leader, a hard task master and perfectionist administrator. With a doctorate in Physics and management experience as senior member of Pakistan's elite group of civil service, he was able to build a solid foundation of nuclear energy and technology in Pakistan. As a strong proponent of peaceful uses of nuclear technology, he launched multi-dimensional programmes to produce nuclear energy, create facilities for research and development and employ radioisotopes in health, agriculture and industry to address national development needs.

Dr. Usmani was born on 15th April 1917 in Delhi, India. He graduated in science from the Aligarh Muslim University and did his Masters in Physics with honors from Bombay University in 1936. Then he went to Imperial College, London, for a doctorate and wrote his thesis entitled "A study of the growth of compound crystals by electron diffraction" under the supervision of Nobel Laureate Prof. P. M. S. Blackett. He was also taught by another Nobel Laureate, G. P. Thomson, the son of famous Prof. J. J. Thomson. Interestingly, he completed his PhD in two years when he was only 23 years old. He also worked in Oak Ridge National Laboratory, United States as a Director.



In 1942, he passed the Indian Civil Services (ICS) examination with distinction and served as District Officer at Madras Presidency from 1942-47. After partition, Dr. Usmani moved to Pakistan where he served in different high-level posts such as Chief Controller of imports and exports. In 1959, Dr. Usmani was appointed as a member of the Pakistan Atomic Energy Council, which later became Pakistan Atomic Energy Commission (PAEC) and then took charge as its Chairman in 1960. There he did meticulous planning to build nuclear infrastructure and to train the manpower for running future nuclear programmes. He used various practical and innovative strategies to develop high-class manpower, acquire up-to-date scientific equipment and establish state-of-the-art research facilities. He groomed at least 400 bright scientists and engineers in various disciplines of nuclear sciences and technology in a very short span of time by providing them opportunities of higher studies in well-reputed universities of Europe and America.

PAEC nuclear centres were established in Karachi, Lahore, Faisalabad, Tando Jam, Dhaka, Chittagong and Memon Singh



under his able leadership. Even today, the country-wide cluster of nuclear medical centers, agricultural centres and precision engineering facilities are fruits of his vision and efforts. He also played a pivotal role in establishing the Pakistan Institute of Nuclear Science and Technology (PINSTECH); a leading establishment for research, training and capacity building. He started wide ranging consultations with international nuclear power suppliers, both in public and private sector, for a nuclear power plant for Pakistan. After years of hard work, he finally succeeded to acquire the Karachi Nuclear Power Plant (KANUPP); the first ever commercial nuclear reactor of the Muslim world. He also served as vice-chairman of the Pakistan Space and Upper Atmosphere Research Commission (SUPARCO) and set the foundation of the country's national space agency.

Dr. Usmani always wanted to use atomic energy for peaceful purposes. He played a prominent role in the series of conferences held by International Atomic Energy Agency entitled "International Conference on the Peaceful Uses of Atomic Energy" which truly depicted his vision and intention. In January 1972, Mr. Munir Ahmad Khan, a reactor physicist working in IAEA, was appointed as the new Chairman of PAEC and Dr. Usmani was transferred to the Ministry of Science and Technology as Secretary and then in Ministry of Education as Education Secretary. He resigned from this post in 1974 on getting the position of UN's Senior Energy Advisor in New York, USA. He remained there until 1978 and then moved to Vienna to join the International Atomic Energy Agency (IAEA). He was a strong advocate of the non-conventional ways of producing energy and dedicated the last days of his life for the same cause. He is credited for the establishment of two regional centers of alternative energy in Senegal and Sri Lanka.

Dr. Usmani returned to Pakistan in 1991 and settled in Karachi where he breathed his last on 17th June 1992. For his meritorious services to the nation, the Government of Pakistan conferred upon him the highest civil award, Nishan-i-Imtiaz, post-humously.

### A historic photo



**Dr. I.H. Usmani**  
Chairman  
PAEC

**Dr. S. Eklund**  
Director General  
IAEA

**Dr. H. D. Symth**  
Governor from USA  
to IAEA BoG

Agreements signed between Pakistan, IAEA and the United States for  
the supply of nuclear fuel and a research reactor,  
March 5, 1962, Vienna, Austria

## Nuclear News - International

### Karachi Unit 3 Completes Cold Pressure Tests Nuclear Street News – April 22, 2021

The China National Nuclear Corporation (CNNC) said that cold pressure testing had been successfully conducted at the Karachi Unit 3 reactor in Pakistan, a milestone that was witnessed by the Pakistan Nuclear Regulatory Authority and the Pakistan Atomic Energy Commission (PAEC).

CNNC called the Hualong 1000 reactor as the country's



“national business card,” calling attention to the high hopes the model will become a fully realized export commodity. The Karachi NPP Units 2 and 3 are the first HPR1000 exports, constructed under a \$9 billion contract signed with PAEC in 2013.

Unit 2 reached first criticality in February 2021, followed by its connection to the grid on March 18, according to Nuclear Engineering International.

“Hualong One is China's third-generation nuclear power technology with full intellectual property rights,” said CNNC. It is designed with an operational lifespan of 60 years. The reactor “adopts a 177 fuel assemblies - core design with 18 months refuelling outage span and has a utilization rate of over 90 percent.” Safety features for the reactor use both passive and active technologies along with double containment.

Cold pressure testing puts the plant through operation conditions without rising temperatures. The aim of the cold pressure testing is ensuring integrity of the reactor's primary loop that it will sustain the design pressure and determining of leakages.

The K-3 unit is expected to become commercially viable in 2022.

### IAEA discusses opportunities and challenges of microreactors

#### Nuclear Engineering International – May 04, 2021

The International Atomic Energy Agency (IAEA) hosted a Technical Meeting on the Status, Design Features, Technology Challenges and Deployment Models of Microreactors. The meeting united experts from 13 countries, the European Commission and the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development. The event included a panel discussion on the opportunities and challenges of microreactors led by Grossi and former US Energy Secretary Ernest Moniz. They agreed that international collaboration is vital in developing and deploying new nuclear power technologies, such as small modular reactors (SMRs) including microreactors (MRs), and that the IAEA is the most appropriate place for this collaboration to take place.

MRs, which have smaller footprints than other SMRs, will be well suited for regions inaccessible to clean, reliable, resilient and affordable energy, including remote areas where large electricity grids are not in place or delivery of fossil fuels is cumbersome. Furthermore, MRs could serve as a backup power supply in emergency situations or replace power generators that are often fuelled by diesel. More than a dozen MRs – from heat-pipe cooled reactors to high temperature gas cooled reactors and liquid metal cooled fast reactors – are under development in several countries, including Canada, the Czech Republic, Japan, the United Kingdom and the United States.

The IAEA has recently launched a project to investigate the coordinated use of nuclear power and renewables in hybrid energy systems. In response to requests from countries and international organisations, the IAEA is developing an Agency-wide platform on SMRs, inclusive of MRs, to coordinate support related to all aspects of SMR development, deployment, oversight and their electric and non-electric applications, such as use in district heating and desalination systems. The Agency is also conducting a review of the applicability of IAEA Safety Standards to new advanced reactors, including MRs.

### Food Safety Labs in Seven Countries Attain Accreditation with IAEA and FAO Support IAEA News – May 21, 2021

In between distant farms and the local grocer, from meat and milk products to cereals and condiments, food safety laboratories are at the frontline of protecting public health, ensuring the safety and quality of products before they reach consumers. The integrity of these labs is accreditation which is regarded as a measure of competence that boosts consumer confidence. With the support of the IAEA, in partnership



with FAO, food safety laboratories in seven countries – Botswana, Mongolia, Namibia, Nigeria, Pakistan, South Africa and Uganda – recently received international accreditation or re-accreditation. Laboratories undergo external independent evaluation to assess, for instance, how equipment performs, the level of training and competence of staff, quality control and assurance systems, and participation in interlaboratory and proficiency testing schemes.

Accreditation is granted for a limited period, followed by reassessment to determine if the accredited status should be extended. “It is not unusual for an accredited laboratory to be denied re-accreditation. To keep these standards, we need to improve, have relevant inputs and participate in training and in proficiency tests. The IAEA and FAO have continued to support us in all these, without which accreditation would be impossible,” said Uzma Maqbool, Deputy Chief Scientist at Pakistan’s Nuclear Institute for Agriculture and Biology (NIAB). The Joint FAO/IAEA Centre supports the safe and appropriate use of nuclear and related technologies in food and agriculture through adaptive research and development at its own laboratories in Seibersdorf, Austria, and through the coordination of more than 25 research projects involving about 400 research institutions. The Centre also facilitates capacity-building and technology transfer to over 200 national and regional technical cooperation projects and provides technical and policy advice to decision makers.

NIAB, which was first accredited in 2017 following support from the Joint FAO/IAEA Centre, has been re-accredited through 2023 to test drug and chemical residues in animal production. “This achievement continues to ensure confidence among the users of the laboratories’ services, including EU-registered exporters of sheep casings from Pakistan, enhancing international trade,” Uzma Maqbool said.

## Nuclear News - National

### **Drap approves country’s ‘first ICU ventilator’ developed by Pakistan Atomic Energy Commission Dawn – April 28, 2021**

PAEC’s scientists and engineers have developed ventilator while keeping in view all essential quality standards and regulatory requirements, the body said in a statement, adding that doctors at the PAEC hospital in Islamabad also provided input during the development process. “Besides passing through all internal reviews and testing, the ‘i-Live’ ventilator also successfully passed the independent reviews and testing conducted throughout the development lifecycle by the evaluation team from Pakistan Innovation and Technology Centre and the Pakistan Engineering Council (PEC),” PAEC said. Clinical trials of the ventilator were also conducted at Jinnah Hospital in Lahore under the supervision of senior

doctors, biomedical engineers, and medical researchers, the statement said, “The ventilator successfully passed all stages of engineering evaluation and medical validation.”

PAEC spokesperson Shahid Riaz Khan said the ventilator was approved by the Drug Regulatory Authority of Pakistan (Drap) today, following which “i-Live” would now be manufactured and supplied to hospitals in the country. “This is a giant leap towards self-reliance in designing and manufacturing of life-saving equipment,” he added. PAEC Chairman Mohammad Naeem congratulated the scientists, engineers and doctors involved in the ventilator’s development, saying that “massive production of i-Live would be commenced immediately to meet the growing demand of hospitals for this crucial equipment in the context of ongoing corona pandemic.”

### **Inauguration of Karachi Nuclear Power Plant Unit-2 (K-2) Dawn – May 21, 2021**

The largest Nuclear Power Plant of Pakistan in Karachi has been virtually inaugurated by the Prime Minister Imran Khan on 21st May 2021. Speaking during the ceremony, he said that the unit – established due to cooperation between Pakistan and China – will generate 1,100MW of clean energy. “This is important for us because Pakistan is among the top 10 countries at risk due to climate change.” He said that glaciers that supply 80 per cent of our water needs are melting at a rapid speed, and our coming generations will face an acute water shortage as well as food security issues if the effects of climate change are not reversed. Therefore, clean energy is important for us. The project will help to train manpower and facilitate technology transfer from China as 40,000 experts visited the country over an extended period of time.

Speaking on the occasion, the chairman of the China Atomic Energy Authority said that the power plant was being inaugurated on the 70th anniversary of the establishment of diplomatic relations between Pakistan and China. He said China and Pakistan have been extending support to each other and cooperating in various fields. The two countries have also been cooperating in the peaceful use of nuclear energy. He expressed the hope that bilateral cooperation will further expand in the future.

The construction of K-2 commenced in November 2013, whereas its fuel loading started on Dec 1, 2020 after approval from the Pakistan Nuclear Regulatory Authority. A series of cold and hot functional commissioning tests related to plant operation and safety were conducted, before achieving criticality at the end of February this year. After further reactor physics tests, the plant was connected to national grid on March 18, 2021 for trial operation and power escalation tests. The K-2 plant has 60-year life expectancy, extendable to 20 more years. It is designed with higher plant availability and

capacity factors, and extended refuelling cycle.

### **PAEC Developed new variety of Soybean The News - June 10, 2021**

ISLAMABAD: The Pakistan Atomic Energy Commission (PAEC) developed soybean lines for spring and autumn cultivation and its intercropping with sugarcane and maize. On this great achievement, Chairman PAEC, Mr. Muhammad Naeem has congratulated the agricultural scientists, technologists and technicians at NIBGE and NIAB for this commendable work. The PAEC Spokesperson, Shahid Riaz Khan, said that PAEC scientists have successfully identified, high-yielding soybean lines suitable for autumn cultivation (July/August) in different agroecological regions (Narowal, Faisalabad, Islamabad, Mingora, Tando Jam) of Pakistan, high-yielding soybean lines suitable for spring cultivation (February/March) in different

regions of Pakistan. These varieties are highly virus resistant soybean genotypes against multiple viruses. After palm oil, soybean is the second major source of edible oil. It fulfills 25% of world's requirements. Therefore, promoting soybean crop and its production could help in improving local production of edible oil.

Soybean is a source of quality vegetable oil, proteins, essential amino acids, and essential fatty acids. Different products such as soya milk, tofu, fortified wheat flour by mixing soybean seed flour to add protein in wheat flour etc., are being used in the world. Therefore, inclusion of soybean food products in eating habits of our common public could improve their nutritional status. Furthermore, presence of quality proteins, fats and minerals in soybean meal may improve the nutrient level of feed for poultry and livestock.

## **Recalling the old memories**

PNS Council-1994



From left to right (sitting): Mr. Sultan Skandar Khan, Dr. N. M. Butt, Dr. Shamim Ch.(President), Dr. S. M.H. Zaidi(late)  
(Standing): Dr. M. Ashraf Ch, Dr. M. A. Bangash, Dr. Inam-ur-Rahman, Dr. Ishrat Rehana, Mr. S. D. Orfi and Mr. Saleem Ansari  
(Photo with the courtesy of Dr. N. M. Butt)

## News about PNS Members

### Dr. M. Ishaq Sajjad



A lifetime member of PNS, Dr. Muhammad Ishaq Sajjad, Chief Scientist (R) became victim of COVID-19 and breathed his last on 29th May, 2021. He was a very hardworking, simple, honest and dedicated professional. Dr Ishaq joined PINSTECH as Scientific Officer in 1968. He was among the pioneers of Isotope Hydrology in Pakistan and helped build the Isotope hydrology laboratory of this institute as one of the leading laboratories of international repute, which has been taking part in IAEA's programme of inter-calibration of standards in hydrology, biology and agriculture since 1989. He indigenously developed two mass spectrometers and various sample preparation systems. He established one of the most efficient and state of the art analytical facility for isotope analyses in the region that achieved international acclaim. He had more than 100 national/ international publications, 60 reports and 46 international expert missions to his credit. For his meritorious services in the field of science & technology, he was awarded Pride of Performance. He retired as Chief Scientist/ Head Isotope Applications Division in January 2003. *Inna lillah hay wa inna elai hay raajeon.*

### Dr. Waheed Arshed



A lifetime member of PNS, Dr. Waheed Arshed, Chief Scientist (R) became victim of the pandemic and lost his life on 12th April, 2021. His colleagues and friends remember him as a learned, honest, humble, friendly and sincere person. He was born in a small town, Alipur, located in between Islamabad and Nilore. After graduating with distinction from the Physics Department of Quaid-e-Azam University, he was selected for one-year Health Physics Course at the Center for Nuclear Studies (now PIEAS). After successful completion of the course, he joined PINSTECH and spent all his professional life there. In pursuit of higher studies, he went to UK and obtained PhD degree from the University of Surrey. Due to his knowledge and experience in the field of health physics as well as his administrative qualities, he became Head Health Physics Division and then Director Technology in PINSTECH. Apart from his technical life, he was a qualified Islamic scholar and had obtained degree in Dars-e-Nizami. He used to give sermons before Jumma prayers in a Jamia Masjid of his town. For this virtue, he was appointed as the Convenor PINSTECH Religious Committee. He has also been taking part in social activities and was an active member of PINSTECH Hiking Club. May ALLAH Kareem rest the departed soul in eternal peace and place him at a high position in Jannah. Ameen!

## Message from the President

**Dr. Imtinan Elahi Qureshi, T.I**

This Newsletter was restarted with effect from January 2021 after a dormancy of several years. The first quarterly issue was an opportune occasion to introduce the new Executive Council of PNS and highlight the rejuvenated activities of the Society. The ambitious plan of work is now underway as posted on PNS website and reported in this issue. It is a good time to reflect upon broader issues of the role of science in society and contributions of PNS members in this respect. A monologue on the subject is relatively easy but will mostly constitute aphorismic statements. What could be perhaps more meaningful is an open-ended multi-stakeholder interactive discussion. The avenues of such an inclusive and insightful exchange of view are, of course, available through social media. However, a well-considered, carefully paraphrased, opinion piece is more effective when it is disseminated through an archivable edited publication such as this Newsletter. We are glad to extend open invitation to all readers, especially those who are or have been involved in scientific R&D, to please come forward and share their views and experiences in the form of short articles of less than 750 words. These will be published after in-house review by the editorial committee under the title "Opinion".



In this quarter, the most conspicuous academic activity of the Society was a seminar held at Nuclear Institute for Food and Agriculture (NIFA), Peshawar, on 26th May 2021. Some of the worth-noting features of the event were: (1) involvement of a research Centre outside Islamabad, (2) feasibility of holding a limited-gathering function with due observance of Covid-19 precautionary SOPs, (3) participation of experienced professionals as well as students, (4) focus on a topic involving revenue generating projects with the help of local industry, and (5) creation of awareness about the uses of nuclear radiations to achieve food security. The occasion was also utilized to impress upon participants about the role of PNS as a forum to publicize contributions of nuclear professionals in the peaceful uses of nuclear technology and a platform for providing them group identity. I would like to take this opportunity to convey my sincere gratitude to Pakistan Science Foundation for providing financial support for the event; to NIFA administration for making excellent logistical arrangements and to Pakistan Atomic Energy Commission for granting necessary permissions and clearances to use NIFA facilities.

On another note, PNS members may be aware that the Society has no regular staff and no sources of grants or any other means of income. The occasional financial help, such as the one provided by PSF is our sole means of funding. The 9-member Council works on purely honorary basis. The ambitious plans that we have envisaged to pursue under the aegis of PNS are not possible without additional manpower and financial resources. I am, therefore, launching an appeal to all members, especially the Fellows, to please offer their services on voluntary basis for undertaking or supervising selected activities. We are looking for two types of support: (1) physical presence in PNS offices on routine basis for a certain number of hours every week, (2) undertaking some assignments by working from home. Offers from Islamabad-based volunteers are much needed, but from any where in Pakistan there are a number of tasks related to welfare of PNS members that can be catered to by active volunteers. It is hoped that a positive response will be received from both in-service and retired nuclear professionals.

Lastly, I would like to make a few comments on the rationale of holding a webinar on 'Science Diplomacy', which was organized by PNS with the support of Virtual University, Pakistan, in the last week of June. It is well-known that the source of economic disparities as well as differences in political influence and military strength among the nations of the world lies in their widely different S&T capacities. Various approaches to bridge the gaps have largely failed in most developing countries because of lack of communication between scientists on the one hand, and policy-makers, enterprises and diplomats, on the other. 'Science Diplomacy' is a new codified mechanism that promises to rectify the situation through creating synergies among all stake-holders. The importance of this approach warrants that PNS should play its due role in relevant initiatives. The lead has been already taken by The Ministry of Foreign Affairs, in the form of establishing 'Science Diplomacy Division' in 2018, while the major counterpart on the side of scientific community has been designated as Pakistan Academy of Sciences. The PNS webinar of 25th June 2021 has taken on board the views of both forums, and furthermore added a dimension of international Science Diplomacy landscape, providing a good comparison of what has been done in Pakistan and what are the possibilities for the future. It is hoped that PNS will continue to provide valuable support to this venture of extreme national importance.



## Proposed Activities during July-Dec. 2021

Month	Activity Type	Title of Activity	Coordinator
July	Seminar	Lifetime Ageing Management of Nuclear Plant- Challenges and Lessons Learnt at AEMC, Karachi	Mr. Waqar Murtaza Butt
Aug.	Students Debate	Advantages and Disadvantages of Nuclear Energy at PSF, Islamabad	Syed Yusuf Raza Mr. M. Latif
Sept.	Seminar	Advances in Nuclear Medicine at NORI, Islamabad	Dr. Shazia Fatima
Sept.	Seminar	Development of cancer treatment facilities in Pakistan at CINAR, Quetta	Dr. M. Tahir Khaleeq
Oct.	Seminar	Nuclear Power trends in Pakistan and the world at large at Karachi	Dr. Muhammad Jamil
Oct.	Social Event	A short hike of 4 km on Trail-4 for PNS Members/ families, Islamabad	Syed Zahid Hussain
Nov.	Seminar	Security of nuclear and radioactive material- Pakistan's efforts at PNRA, Islamabad	Dr. M. Sadiq
Nov.	Seminar	Nuclear Technology and Environment at PAS, Islamabad	Dr. Niaz Ahmad
Dec.	Seminar	Role of nuclear techniques in the development of agriculture sector in Pakistan at NIAB, Faisalabad	Dr. Uzma Maqbool Dr. Niaz Ahmad
Dec.	Lecture/ Annual Dinner	Advances in Nuclear Sciences (online of Dr. Ishfaq Ahmad from abroad)/ Dinner for PNS families, Islamabad Club	Dr. Imtihan Qureshi Dr. Muhammad Mohsin

## Announcements

1. International Conference on Operational Safety of Nuclear Power Plants, Beijing, China, 30 Aug – 3 Sep.
2. International Conference on the Development of Preparedness for National and International Emergency Response (EPR2021), Vienna, Austria, 11 – 15 Oct.
3. International Conference on Radioactive Waste Management: Solutions for a Sustainable Future, IAEA HQ, Vienna, Austria, 1 – 5 Nov.
4. Career Development Workshop for Women in Physics, Online, 17-19 Nov.
5. Joint ICTP-IAEA Workshop on Medical Physics Aspects of Stereotactic Radiotherapy Techniques, Seibersdorf, Wien - Austria, 6-10 Dec.

## Membership Drive

1. Growing professional circle by strengthening connections with peers in relevant fields
2. Free access to nuclear related webinars, online courses and discussions to share views and enhance knowledge of current issues, challenges and opportunities in nuclear science and technology
3. Group visits at various S&T organizations/ universities
4. Free e-copy of quarterly PNS Newsletter
5. Login facility at PNS website with a secure password
6. Lifetime Membership Card with a photo
7. 50% reduction in PNS conferences fee
8. 20-30% fee reduction in conferences arranged by other organizations
9. 25% discount in fee on courses offered by Pakistan Institute of Management (PIM)
10. 50% reduction in Annual Gala Dinner at Islamabad Club
11. Social programmes like family picnic/ hikes, trip to Northern areas, etc.
12. Registration/ Lifetime Membership Fee is only Rs. 2,100/-.
13. Membership Form is available at [www.pns.org.pk](http://www.pns.org.pk) (Form and Fee can be deposited online in PNS Bank Account at NBP, Margalla Br. Islamabad, IBAN: PK18NBPA1725004018982691).



Issue 3/2021

July-September, 2021

# PNS Newsletter

A Quarterly Newsletter of the Pakistan Nuclear Society

## Patron:

Dr. Imtihan Elahi Qureshi, T.I.

## Editor-in-Chief:

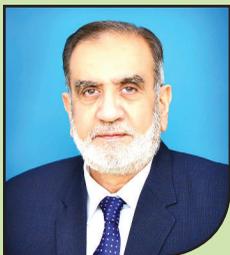
Mr. Waqar Ahmad Butt

## Editors

Dr. Riffat M. Qureshi

Dr. Muhammad Sadiq

Mr. Waheed Akram



## Congratulations

*A lifetime member of PNS, Mr. Muhammad Naeem, Chairman PAEC has been awarded the highest Civil Award of Pakistan 'Nishan-i-Imtiaz', on the occasion of Pakistan's 74th Independence anniversary. A matter of pride for the prestigious Society!*

*Eleven other PNS Members have also been decorated (Page -13). The PNS Council is honoured to congratulate all its esteemed members, who have been conferred Civil Awards 2021.*

## From the desk of Editor-in-Chief

The pandemic situation in the country has badly affected many sectors of life in the country. Consequently, PNS had to postpone its seminar on 'Lifetime Ageing Management of a Nuclear Power Plant' and 'Development of Cancer Treatment Facilities in Pakistan', which were scheduled to be held at Karachi and Quetta respectively. These would have been major activities of the Society after the successful seminar that took place at NIFA, Peshawar in May 2021. Similarly, the Students Debate which was planned to be held at PIEAS also became victim of COVID-19 and the same has been postponed till the situation is improved.

To reactivate and strengthen the Scientific Advisory Board (SAB), President PNS contacted a few prominent senior members of PNS requesting them to spare some of their valuable time and provide guidance and extend help. Ten members have agreed to be on the Board with a commitment to help in making the Society a vibrant and effective forum for protecting the interests of nuclear community in Pakistan (Page-8).

Upon the advice from PNS Council and with the approval of PNS President, the General Secretary sent emails to the proposed PNS Contact Persons (PCP) in various centres/ establishments. These volunteers have been requested to strengthen the Society by organizing/ coordinating PNS activities at the respective Centres. The PCPs will keep close liaison with the General Secretary for the flow of information to and from the concerned centres on matters related to PNS programme and also to encourage colleagues to become PNS members.

Apart from its S&T ventures, PNS is quite conscious about the welfare of in-service as well as retired officials. One such step is the writing of a letter by President PNS on behalf of the Society to the Pay and Pensions Commission (PPC) of Pakistan in which he mentioned that enhancements in the amount of pension over the years has not been kept in pace with inflationary trends, resulting in serious downgrading of the pensioners' living conditions, especially the older ones. He also touched other issues like the cash payment of entitled 20% of their medical allowance as well as the Group Insurance of employees for which an employee contributes during his service out of his salary. He proposed that the pensions should be indexed according to average Sensitive Price Index (SPI), which is produced 52 times in each year by Pakistan Bureau of Statistics.

As mentioned in the previous Newsletter, it was intended to include a section on 'Letters to the Editor' in this issue but sorry to say that not a single person has sent any such letter, so far. PNS Members are again encouraged to give workable suggestions, fruitful comments, healthy criticism etc.

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## Vision

The vision of Pakistan Nuclear Society (PNS) is to become a resource centre for disseminating news and information about peaceful applications of nuclear science and technology in Pakistan and a hub of promoting this cause world-wide along with international partners for global environmental and economic stability. The principal tools to be used for this purpose would be PNS Website and PNS Newsletter.

## Contact Us

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## Activities during the 3rd quarter

### Book Launch Ceremony at SVI

PNS Council Members were invited to a book launching ceremony at the Strategic Vision Institute (SVI), Islamabad. Seven Council Members attended the half day session. The book titled 'Problems and Prospects of the Non-Proliferation Regime' has been edited by Prof. Zafar Iqbal Cheema, the Founder and present Executive Director of the Institute. Comprehensive articles on all essential aspects of NPT have been covered in the book including peaceful uses of nuclear technology and NPT, nuclear disarmaments, CTBT, FMCT, nuclear terrorism, politics of NSG, technology transfer, nuclear energy security and safeguards. Lt. Gen. (R) Mazhar Jamil, Advisor NCA/ former DG (SPD) was the Chief Guest on this occasion. Other prominent speakers were Ambassador(R) Zamir Akram, Dr. Ghulam Mujaddid from Air University, Dr. Zafar Nawaz Jaspal from SPIR/QAU and Dr. Rabia Akhtar from the University of Lahore. One of the main conclusions was that Pakistan's stance on NPT is in line with the country's strategic interests and this position should be continued.

## Outreach

### Visit to PINSTECH

One of the regular activities of PNS Council is to visit nuclear Centres under strategic organizations with the aim to increase memberships of the Society and also to learn about welfare-related issues of the members. In this connection, a two-member delegation of PNS comprising of Dr. Imtihan Elahi Qureshi, President PNS, and Mr. Waqar Ahmad Butt, Executive Member PNS, visited PINSTECH on 1st July 2021, and held discussions with Dr. Qamar-ul-Haque, Director-

General PINSTECH in the presence of Director Science, Director Technology, Director Systems and Services, and Director Coordination.

Dr. Qureshi briefed the PINSTECH team about several new initiatives taken by the new Council of PNS, since taking charge from January 2021. While conveying the strong commitment of PNS Council to make the Society a stronger body, he emphasized that the active participation and support of PNS members is crucial for achieving desired objectives. Dr. Qureshi requested DG PINSTECH to facilitate the expansion of PNS membership in the Institute, where PNS took birth through the efforts of its distinguished former scientists. Furthermore, PINSTECH scientists may be encouraged to get involved with PNS activities, especially through the creation of scientific educational material in the form of articles, podcasts and infographics.

Dr. Qamar-ul-Haque, who is himself a lifetime member of PNS, assured the delegation that he and his colleagues realize the importance of PNS as a body that is meant for projecting the achievements of scientists working in nuclear and allied disciplines, as well as looking after their broader interests. Underscoring the role of PINSTECH as a hub of R&D in multifarious aspects of nuclear technology, he mentioned the on-going work of building a new research reactor, PARR-3, with indigenous technical expertise.

It was further added that PINSTECH has previously established its nuclear engineering capability by upgrading PARR-1 from 5 to 10 MW and manufacturing its fuel elements. A linear accelerator being developed and installed through in-house resources is also an example of outstanding engineering skills of PINSTECH scientists and engineers. Director Technology mentioned the major advances made



Meeting with the DG and Directors of PINSTECH

in the production capacity of Mo-99/Tc-99m generator which at present produces more than the requirements of all 18 PAEC and 20 other Govt./private cancer hospitals. The Reactor remains operational for at least 18 hours per week for isotope production and conducting basic research experiments. Additionally, a number of new types of freeze dried radiopharmaceutical kits are being developed in PINSTECH for the diagnostics and therapy of cancer patients. The possibility of using fast neutrons for irradiation of gemstones, which enhances the value of precious stones by 20 to 30 times, was also taken up during the exchange of views with Head of Reactor Operations Group. Besides scores of fascinating research projects being undertaken in PINSTECH, it was exciting to note that two of the research groups in Physics Division have established collaboration with the world's most renowned experimental facilities; the ALICE detector at CERN (the European Nuclear Research Centre) and Jiangmen Underground Neutrino Observatory in China.

The PNS delegation was escorted to visit PINSTECH library and Auditorium, which were found to be well-maintained. Apart from the pleasure of seeing the expanding role of PINSTECH as 'mother institute' of PAEC establishments, both members of PNS team were gripped with nostalgia as former PINSTECH employees who had spent more than a quarter century of their careers in that premises. A key element of a vibrant research environment in any establishment is the interaction with former colleagues; hopefully PINSTECH will arrange such meetings in future.

### Visit to PIEAS

Seven PNS Council Members visited Pakistan Institute of Engineering and Applied Sciences (PIEAS) on 3rd August 2021. Wide-ranging discussions were held with the Pro-

Rector, Registrar, Deans of Faculties and Director ORIC. Mr. Kamran Safdar presented an overview of PIEAS infrastructure, administrative and financial set-up, and educational programmes. The presentation also covered the undergraduate, graduate and Ph.D. programmes being conducted at PIEAS campus at Nilore as well as at four affiliated colleges located in Islamabad, Faisalabad, and Karachi. He recalled that PIEAS was granted degree awarding status in 2000, although it existed as an educational Institution under different names since 1967. The PIEAS university has acquired top position among the highest-ranking engineering universities of Pakistan. Recently, the International Atomic Energy Agency (IAEA) has designated PIEAS as its Coordinating Centre in the region for high quality education in nuclear engineering and allied disciplines.

Dr. Imtihan Elahi Qureshi briefed PIEAS team about the progress of PNS activities during the last half-year, since the taking over of new Executive Council. He informed PIEAS leadership about the new dynamic website of PNS and requested them to be in touch with the society's activities. Calling the Society a 'precious asset' of nuclear community in Pakistan, he emphasized that a greater number of PIEAS faculty members should join the Society as lifetime members and contribute towards its academic programmes. In particular, the faculty members were requested to prepare educational videos on the basics of various teaching and research programmes of PIEAS so that these can be uploaded on the PNS website for disseminating knowledge and creating awareness about the peaceful uses of nuclear technology.

The PNS delegation also visited the Computer Centre and Library of the institute, both were found to be highly impressive with respect to available facilities for students and faculty members.



Meeting of PNS Council Members with the high ranking officials of PIEAS

PNS Focal Persons in various Organizations/Centres	
1.	Dr. Humayun Faiz Rasul
2.	Dr. Anjum Iqbal
3.	Mr. Hazrat Bilal
4.	Mr. Zeeshan Siddiqui
5.	Dr. Mubbashir Ahmad
6.	Dr. Uzma Maqbool
7.	Dr. Saima Mir Arain
8.	Mr. Zubair Shah
9.	Mr. Muhammad Tariq
10.	Dr. Shahid Amin
11.	Mr. Muhammad Nasir
12.	Mr. Awais Farooq
13.	Dr. Shazia Fatima
14.	Mr. Saeed ur Rahman
15.	Mr. Abid Khan
16.	Dr. Mohammad Mohsin
17.	Syed Zahid Hussain
18.	Dr. Tariq Yasin
19.	Mr. Moazzam Shahzad
20.	Dr. M. Arif Kamal

### Meeting with MD PAEC Foundation

A four members delegation of PNS comprising of Dr. Muhammad Tahir Khaleeq (Vice President), Dr. Mohammad Mohsin (General Secretary), Mr. Ghulam Sarwar (Finance Secretary) and Mr. Waqar Ahmad Butt (Executive Member) visited PAEC Foundation on Wednesday, 25th August 2021 and met Mr. Munir Ahmad, the newly appointed Managing Director (MD). Dr. Tahir initiated the dialogue and explained the purpose of holding the meeting to exploring avenues of mutual cooperation and possibilities of utilizing services of PNS lifetime members. He elaborated the activities and initiatives of PNS in uplifting the image of the society and the ongoing efforts to make it more vibrant and member driven forum. Initiatives like regular functioning of PNS office, establishing a dynamic and updated website, appointment of PNS Contact Persons (PCP) in various centres, formation of a Scientific Advisory Board (SAB), holding of regular webinars, seminars and visits to relevant centres were highlighted.

Mr. Waqar recalled the earlier meeting of PNS Council with the predecessor MD of PAEC Foundation in which the functions and ongoing projects of the Foundation were elaborated and ideas of some new proposals/ projects were discussed. He shared the significant areas of PNS like having a large professional membership base, most of which have rich and wide range of experience available to be exploited



*Mutual discussions with MD PAEC Foundation for mutual benefits of PNS and Foundation.*

The following items/ideas were exchanged in the meeting:

1. Starting a joint setup for sterilizing syringes and other medical items requiring sterilization.
2. Joint working on gemstone irradiation project from commercial perspective. In this regard, a proposal has already been submitted by PNS to Pakistan Science Foundation (PSF).
3. Feasibility of setting up of a medical clinic in PWD area for welfare and extending health services to PAEC employees.
4. Setting up of medical diagnostic/ testing laboratories in the town as a business venture.
5. Setting up of educational institutions such as Foundation Schools.
6. Feasibility of agro based farming projects like dairy farming etc.
7. Technical consultation utilizing the expertise of retired professionals.
8. Collaboration with industry and offering of technical advisory services for industries located in Gujranwala and Sialkot zone.
9. Construction of a PAEC Club/ Community Centre in Islamabad.
10. Completion of remaining work in PAEC Housing Foundation project at Lahore especially to deliver possession of pledged area plots.

MD Foundation was of the view that PNS may work on proposals in which it has core competency and monopoly like situation as competing with other players in the market may be difficult. He encouraged entry in educational venture by starting schools similar to the concept of 'The Science School'. The idea of offering Technical consultation services to local industries was also concurred. MD shared that Foundation has started to develop about 300 acres of land in Nilore for plantation, dairy farming and other agro based initiatives. Mr. Ghulam Sarwar was requested to assist Foundation in provision

of supervisory staff for a dairy farm. MD Foundation briefed about the status of PAEC Housing project and informed that it's almost complete and allottees have started construction of houses. However, possession of plots to allottees has not been handed over in the area pledged as per requirement of LDA. Moreover, the Foundation has reserved a big plot for a school in the society. The idea of construction of PAEC Club is still in infancy and purchase of land for its construction is being explored.

The meeting concluded on a positive note to develop proposals and feasibilities on the shared ideas mainly for schools, collaboration with industries, offering consultation/technical advisory services and dairy farm project.

### Visit to CSCR

The Centre for Strategic and Contemporary Research (CSCR) is a policy research institute that is actively pursuing research and analysis on security and governance-related issues since 2014. One of its research portfolio themes includes nuclear security with particular reference to South Asia. To learn more about their academic activities and operational model, a delegation of PNS comprising Dr. Imtihan Elahi Qureshi, Dr. M. Tahir Khaleeq, Mr. Waqar Ahmad Butt and Ms. Shazia Fayyaz visited the offices of CSCR on 16th Sept. 2021. The discussions were held with the CSCR's team, which included: Mr. Anas Abdullah, Executive Director; Mr. Talha Ibrahim, Director Academics; and Ms. Syeda Ailiya Naqvi, Managing Editor.

After the mutual introduction, Mr. Talha Ibrahim made a presentation about the achievements of the centre, especially its role in working with the disenfranchised youth for capacity building and enhancing national cohesion. The



Meeting with CSCR authorities

Centre is currently doing research on artificial intelligence and cyber security, environmental sustainability and climate change, China-Pakistan Economic Corridor (CPEC) projects, and South Asian regional security dynamics. With a young and dynamic team, the Centre has been producing thought provoking articles on Pakistan's national interests in defence, environment, economy, and social justice. The President PNS elaborated the role of PNS as a representative body of professionals associated with nuclear science and technology and allied disciplines. Emphasizing the importance of a huge intellectual reservoir in the form of about 1000 lifetime members of PNS, he advised the Centre to seek technical inputs where deemed necessary in matters falling within the expertise of PNS members. After a detailed exchange of views, it was agreed to maintain close contacts between two forums in connection with areas of common interest, seek each other's support where needed, and complement the strengths of both sides through mutual cooperation.

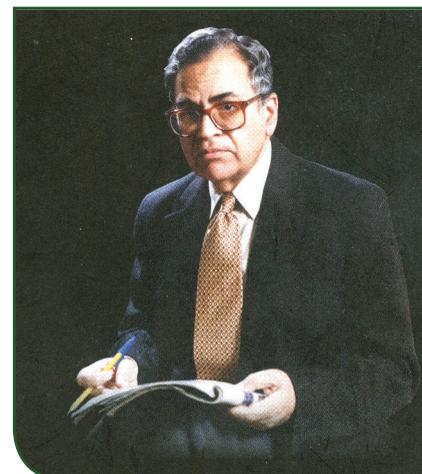
## Renowned Pakistani Scientists

### Professor Dr. Riazuddin (H.I., S.I., T.I.)

(1930-2013)

Professor Dr. Riazuddin was a world recognized highly prominent Pakistani theoretical physicist, who holds the honor of being the only Pakistani Ph.D student of Nobel Laureate Professor Abdus Salam. He is considered as second only to Professor Salam in reputation among Pakistani physicists. His specific research area included theoretical particle physics with emphasis on gauge theories, heavy quark spin symmetry, neutrino physics and phenomenology of particle interactions.

Prof. Riazuddin was born on 10th November 1930 at Ludhiana, India. After the Partition of India, his family migrated to Pakistan in 1947 and settled in Lahore. He took his BSc(Hons) degree in Mathematics from Punjab University and also studied under the supervision of Prof. Salam at Cambridge University, UK. He was the founding Director of the Institute of Physics at the University of Islamabad, which was established in 1967 and later renamed as Quaid-i-Azam University (QAU), Islamabad. He played a pioneering role in the establishment of many research institutes in Pakistan, including the National Centre for Physics (NCP) at QAU Campus. Before becoming the founder Director



General of NCP, Prof. Riazuddin held several senior academic positions in Pakistan, Saudi Arabia and visiting positions in USA. He also served as a Full Time Member of Pakistan Atomic Energy Commission from 1973-76 and established a Group which played a pivotal role in making Pakistan a nuclear power.

Prof. Riazuddin published more than 165 scholarly research papers in leading journals of physics, covering all the three main branches of particle physics; weak electromagnetic and strong interactions. He co-authored three books, first on the "Theory of Weak Interaction in Particle Physics" published in 1969 and is regarded as a classic book on the subject. The second is a text book on Quantum Mechanics, while the third book "A Modern Introduction to Particle Physics" is now a standard text in Particle Physics and is used as course text in many prestigious universities. A book on his long life experiences, "Memoirs of Riazuddin: A Physicist's Journey" Edited by Fayyazuddin and M. Jamil Aslam, has been published by University of Oxford Press, posthumously.

He won many international and national awards including UNESCO Albert Einstein Gold Medal for Fundamental Science, International Khwarizmi Award, Distinguished Research Award by King Fahd University, Saudi Arabia, HEC Life Time Achievement Award and Gold Medal of Pakistan Academy of Sciences. He was a fellow of Pakistan Academy of Sciences, Third World Academy of Sciences, Islamic Academy of Sciences and American Physical Society. For his meritorious and dedicated contributions to the nation he was decorated Pakistan's civil awards Tamgha-i-Imtiaz, (1979), Sitara-i-Imtiaz, (1990) and Hilal-i-Imtiaz, (1999).

Prof. Riazuddin was a very quiet, gentle and humble man by nature. His dedication to the development of science in Pakistan, and to QAU continued in his personal capacity. Not widely known, Professor Riazuddin established a family trust that funds scholarships at QAU. It covers all natural science departments at the Master's level and for the Physics Department at the M.Phil. level too. The family has renamed the trust as Riazuddin Trust for Science Education and Research in Pakistan and expanded its domain. All earnings from the memoirs benefit the Riazuddin Trust.

He breathed his last on September 9, 2013 and buried in Islamabad.

*(Dr. Riffat M. Qureshi)*

## From the former PNS Presidents

*Written by*

**Dr. Javed Hanif**

*President (1997 to 1999)*

Since the establishment of Pakistan Nuclear Society in 1990, it has grown considerably with its membership in thousands at various universities and nuclear research centres. PNS website and Newsletter have been the main sources of communication/ information for the nuclear community including its members. Regular seminars and meetings were held for the professional exchange of knowledge and experience. I take this opportunity to inform the members about the modest contribution made as the President PNS during 1997-99; the period in which Pakistan became a Nuclear Power.

Elections for the PNS Executive Council for the tenure 1997-99 were held in the end of year 1997. I had the honor to be elected (unopposed) as President for the two year term. The other Council members included Dr. Ayub Mir as Vice- President, Mr. Khalid Mahmood Ghazali as General Secretary, Mr. S.D. Orfi as Finance Secretary, Dr. S. Jamshaid Hussain Zaidi, Ms. Abida Khtoon, Dr. Syeda Fatima Ghausia and two others were Executive Members. Most of the Council Members were of the opinion to make this NGO independent and improve its infrastructure and membership. Therefore, Focal Persons at various universities and centres were nominated for communication of PNS activities. In order to extend our activities in distant areas, it was decided to establish local setups with a minimum of twenty PNS members each. Thus, special one day seminars were held in Chashma and D.G. Khan for the same purpose. Several professional programmes and social gatherings were held as per routine.



Pakistan's Peaceful Nuclear Explosions - I feel honoured to briefly talk about the proud moment when Pakistan became the world's 7th nuclear power. India carried out its first, so called, Peaceful Nuclear Explosion in May 1974 which went unnoticed

and without any condemnation or sanctions by big powers and world at large. Encouraged by this status and in order to establish itself as a Nuclear Power, India conducted five Nuclear Explosions in Rajasthan desert near Pakistan border on 5th May, 1998. This was not only a violent blow to international peace but also a threatening message to Pakistan. In defense, in spite of international pressure and threats of sanctions by big powers, Pakistan replied with six explosions in Chagai Hills on May 28, 1998 lifting the national morale and confidence. This was a reflection of how well prepared were our scientists and engineers whose hard work and dedicated efforts took just over three weeks to shock the enemy and surprise the world. PNS, in celebration of the occasion held a ceremony at PINSTECH Auditorium on March 20, 1999, awarded medals and certificates to its 122 life members for their contribution in making Pakistan an invincible Nuclear Power. The awards were to be granted by H.E Mr. Muhammad Rafiq Tarar, President of Islamic Republic of Pakistan as the chief guest. However, due to some unavoidable circumstances, President's visit was cancelled. Consequently, Mr. Munir Ahmad Khan, former Chairman PAEC presided the meeting and distributed the medals and certificates. During his closing remarks, Mr. Khan briefly described the journey of how Pakistan commenced its efforts till the conduct of cold tests and the establishment of testing site in early 80's and the situation that led to becoming nuclear power. The function, however, was well projected over the electronic and print media.

### PNS Scientific Advisory Board

To make PNS a vibrant and more effective forum, a Scientific Advisory Board (SAB) comprising of highly experienced professionals has been constituted for guidance and valuable advice. The following PNS Members have consented to take up this responsibility.

- |                           |                        |
|---------------------------|------------------------|
| 1. Engr. Parvez Butt      | 6. Mr. Anwar Habib     |
| 2. Dr. N. M. Butt         | 7. Dr. Yusuf Zafar     |
| 3. Dr. Abdullah Sadiq     | 8. Dr. Muhammad Jamil  |
| 4. Mr. Waqar Murtaza Butt | 9. Dr. Javed Hanif     |
| 5. Syed Yusuf Raza        | 10. Dr. Muhammad Fahim |

### A historic photo



The first rocket of Pakistan to the space, REHBAR-1, was launched by PAEC in 1962.

Dr. I.H. Usmani, Chairman PAEC (4th from the left) with the Rocket launching crew including the Team Leader Dr. Tariq Mustafa (3rd from the left), Mr. Rehmatullah, Mr. Sikandar Zaman, Mr. Salim Mehmood, Mr. Arif Ali and Mr. T.Z. Faruqi.



## From the International Media

### Extreme weather is affecting nuclear power's reliability

Jul 27, 2021

ANS - Nuclear Newswire

A new analysis shows that hurricanes and typhoons have become the leading causes of nuclear plant outages, at least in North America, South and East Asia. This was stated by tech website Ars Technica reports in the article "Nuclear power's reliability is dropping as extreme weather increases." The analysis was written by Ali Ahmad, an energy policy and economics scholar at the Harvard Kennedy School, and was published in the July issue of the online journal Nature Energy. Past research has shown that rising temperatures due to climate change create cooling problems for nuclear plants, according to the article. Now, an analysis looking at a broader range of climate events shows that it's not just hot weather that puts these plants at risk—it's the full range of climate disturbances.

The latest analysis calculates that the frequency of climate-related nuclear plant outages is almost eight times higher than it was in the 1990s. The analysis also estimates that the global nuclear fleet will lose up to 1.4 percent—about 36 TWh—of its energy production in the next 40 years and up to 2.4 percent, or 61 TWh, by 2081-2100.

The author analyzed publicly available databases from the International Atomic Energy Agency to identify all climate-linked shutdowns (partial and complete) of the world's 408 operational reactors. Unplanned outages are generally very well documented and available data made it possible to calculate trends in the frequency of outages that were linked to environmental causes over the past 30 years, according to the article. The author also used more detailed data from the last decade (2010-2019) to provide analyses of the types of climate events that have had the most impact on nuclear power.

But a good news is that some projects are already underway to adapt nuclear plants to inhibit climate change. For example, the Department of Energy recently invested in a project researching methods to reduce the amount of water needed by nuclear facilities (e.g., advanced dry cooling). Other nuclear technologies, such as pebble-bed, molten salt, and advanced small modular reactors, may also provide more climate-resistant solutions.

### Micro-reactors show potential but face challenges

July 28, 2021

ANS Nuclear Cafe

A recently released technical report from Idaho National

Laboratory finds "significant potential" for deploying micro-reactors on a global scale, but also confronts "significant challenges in achieving the technical capacities, meeting regulatory requirements and international accords, achieving competitive costs, and gaining public acceptance."

In the report, Global Market Analysis of Micro-reactors, authors David Shropshire from INL, Geoffrey Black from Boise State University, and Kathleen Araújo from the CAES Energy Policy Institute at Boise State assessed the unique capabilities of micro-reactors and their potential deployment in specific global markets in the 2030-2050 timeframe.

The authors' assessment methods include developing unique micro-reactor deployment indicators and matching use cases to define future profile markets. Both top-down and bottom-up analysis techniques are used to evaluate emerging market trends, derive a range of possible demands, and rank potential markets in 63 countries, including current nuclear users and newcomer countries.

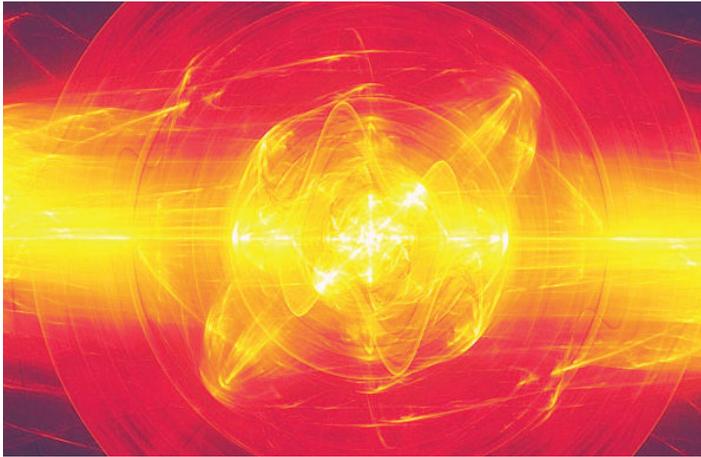
Powerful potential- Micro-reactors have potential to expand nuclear power's contribution in North America and Western Europe that otherwise shows low future growth, according to the report. Mid-term deployments beginning around 2035 could expand micro-reactors to areas in Eastern Europe and Asia where energy infrastructure is under development, and to support new nuclear markets in emerging economies. Longer term deployment (2040-50) could support urban markets and megacities lacking access to energy and susceptible to climate change, as well as disaster relief by replacing portable diesel generators.

### Physicists made a major breakthrough in Fusion Reactor Development: Plasma twice as hot as the Sun

Sep 01, 2021

SCIENCE

An experimental nuclear fusion reactor took a substantial step towards providing clean, limitless energy by harnessing the power of atomic fusion, according to a recent study published in Nature. The news "Major Advance" announced by physicists involves ongoing efforts to confront energy losses inherent in the design of the experimental Wendelstein 7-X nuclear fusion technology. Stellarators are distinct in comparison to the more conventional, symmetrical, and donut-shaped tokamak fusion reactors, because the former employ maddeningly complex structures full of labyrinthine twists and turns. But like all other nuclear fusion reactors, the aim is to generate conditions one could only "see" (and then instantly die) from inside the mass of the sun. This is executed by subjecting plasma streams to unconscionable heights of pressure and temperature, leaving atoms no alternative but to collide and fuse with one another, producing unprecedented



*A 3D-generated image of fiery hot plasma*

amounts of usable energy.

Understandably, the W7-X reactor is so overwhelmingly complex that only supercomputers could have designed it, which uses a series of 50 superconductive magnetic coils to hold plasma in place as it's looped around a spiraling circular chamber. The groundbreaking experiments heated plasma to extremely high temperatures of 36 million °F (20 million °C), far exceeding temperatures of the sun, at 27 million °F (15 million °C). And the W7-X could be capable of even higher temperatures.

The engineering behind this advanced technology was organized to tackle one persistent barrier to fully-functioning capability, unique to stellarator designs. This happens when collisions between heated particles push some out of their proper orbit, leading some to stray out of the magnetic field. And, in the W7-X, the magnetic field cage was specifically designed to avoid this tricky energy loss problem. But to confirm that the engineering came through, scientists at the Princeton Plasma Physics Laboratory (PPPL) and the Max Planck Institute for Plasma Physics carried out a novel evaluation of the stellarator's groundbreaking experiments. This involved an emphasis on diagnostic data gathered via X-ray imaging crystal spectrometers, which revealed a substantial drop in neoclassical transport.

This means that the high temperatures witnessed by the physicists would not have been possible if the heat loss had happened. So it worked. "This showed that the optimized shape of the W7-X reduced the neoclassical transport and was necessary for the performance seen in this experiment," said Novimir Pablant, a physicist at PPPL, in a New Atlas report. "It was a way of showing how important the optimization was." In other words, this record-breaking success means the W7-X is physically capable of confining heat that can soar to temperatures twice than found in the sun's core. But there's still much work to be done, including confronting other pesky

heat loss issues. More experiments will go forward in 2022, including a novel water-cooling system that will enable longer experimental durations, but, for now, nuclear fusion remains an indispensable window into the future of clean energy production.

### **China prepares to test thorium-fuelled nuclear reactor**

10 September 2021

NATURE News

Scientists are excited about an experimental nuclear reactor using thorium as fuel, which is about to begin tests in China. Although this radioactive element has been trailed in reactors before, experts say that China is the first to have a shot at commercializing the technology. The reactor is unusual in that it has molten salts circulating inside it instead of water. It has the potential to produce nuclear energy that is relatively safe and cheap, while also generating a much smaller amount of long-lived radioactive waste than conventional reactors. Operated by the Shanghai Institute of Applied Physics (SIAP), the Wuwei reactor is designed to produce just 2 megawatts of thermal energy, which is enough to power up to 1,000 homes. But if the experiments are a success, China hopes to build a 373-megawatt reactor by 2030, which could power hundreds of thousands of homes. These reactors are among the "perfect technologies" for helping China to achieve its goal of zero carbon emissions by around 2050.

Thorium has been tested as a fuel in other types of nuclear reactor in countries including the United States, Germany and the United Kingdom, and is part of a nuclear programme in India. But it has so far not proved cost effective because it is more expensive to extract than uranium and, unlike some naturally occurring isotopes of uranium, needs to be converted into a fissile material. Compared with light-water reactors in conventional nuclear power stations, molten-salt reactors operate at significantly higher temperatures, which mean they could generate electricity much more efficiently. China's reactor will use fluoride-based salts, which melt into a colorless, transparent liquid when heated to about 450 °C. The salt acts as a coolant to transport heat from the reactor core. In addition, rather than solid fuel rods, molten-salt reactors also use the liquid salt as a substrate for the fuel, such as thorium, to be directly dissolved into the core.

## **Nuclear News - International**

### **Exotic four-quark particle spotted at Large Hadron Collider Nature News - 10 August 2021**

Rare tetra-quark is one of dozens of non-elementary particles discovered by the accelerator, that could help to test theories about strong nuclear force. The Large Hadron Collider (LHC)

near Geneva, Switzerland is a big hadron discoverer. The latest hadron made its debut at the virtual meeting of the European Physical Society on 29 July 2021, when particle physicist Ivan Polyakov at Syracuse University in New York unveiled a previously unknown exotic hadron made of four quarks. Most of the LHC's new hadron types have been spotted by LHCb, one of the four giant detectors in the 27-kilometre circular tunnel that holds the LHC. Tetra-quarks are extremely unusual. Most known hadrons are made of either two or three quarks. The first tetra-quark was spotted at the High Energy Accelerator Research Organization (KEK) in Tsukuba, Japan, in 2003, and LHCb has seen several more.

doi: <https://doi.org/10.1038/d41586-021-02174-6>

### **Nuclear Technology for Life: An Event Organized by Pakistan during the IAEA General Conference**

As a sideline activity in the 65th Annual General Conference of IAEA, Pakistan Atomic Energy Commission (PAEC) organized an event to showcase its experience in developing and implementing nuclear science and technology in the fields of agriculture and biotechnology, health care, nuclear power generation and training of personnel. PAEC also participated in the exhibition at the main lobby of IAEA Headquarters. At the event, DG IAEA visited Pakistan's pavilion and lauds achievements of PAEC in peaceful applications of nuclear technology. In his tweet he said "Impressive to see how quickly Pakistan's scientists were able to produce climate resilient strains of cotton – an inspiring example of the peaceful application of nuclear science benefiting society".

## **Nuclear News - National**

### **Permanent shutdown of KANUPP**

On 1st August, 2021, Pakistan's first nuclear power plant (KANUPP) was shutdown permanently at 1641 hrs. The reactor achieved criticality on first 1st August, 1971 at 1641 hrs. KANUPP belongs to first generation of commercially operated Pressurized Heavy Water Reactors (PHWR). Out of first four NPPs, two were installed at Canada, one in India and one in Pakistan. All reactors except KANUPP were shutdown several years ago. Only KANUPP has achieved fifty years of safe operation. It was the major milestone in the development of nuclear industry related to power generation and to achieve other strategic goals. It is a true symbol of success and pride for Pakistan.

### **Pakistan Elected to the IAEA Board of Governors The Nation, Islamabad – September 24, 2021**

In a major diplomatic achievement at global level Pakistan has been elected to the International Atomic Energy Agency (IAEA) Board of Governors for 2021-2023. "The 65th General Conference of the IAEA has elected Pakistan by acclamation to serve on the IAEA's Board of Governors for the term 2021-2023", Pakistan Permanent Envoy to IAEA Ambassador Aftab Khokhat told The Nation on phone. Comprising 35 members, the IAEA Board of Governors is one of the two highest policy-making organs of the IAEA, along with the annual General Conference. Pakistan is one of the founding members of the IAEA and has had a regular presence at its Board of Governors over the years.



*Chairman PAEC, Mr. Muhammad Naeem addressing the audience of 'Nuclear Technology for Life'*



Isolating the power supply from the plant to the grid- KANUPP shutdown for ever

Earlier Chairman Pakistan Atomic Energy Commission Mr. Muhammad Naem, who is leading Pakistan's delegation to the 65th General Conference of the International Atomic Energy Agency (IAEA), met Director General IAEA Rafael Mariano Grossi. The ongoing collaboration between Pakistan and the IAEA was reviewed. Director General Grossi said that "impeccable collaboration between Pakistan and the Agency will continue to grow". The Chairman PAEC apprised the Director General about Pakistan's recent accomplishments in expanding the use of nuclear technologies in the fields of power generation, health, agriculture and industry.

### Outstanding Achievements for NIAB

Joint IAEA-FAO Division has honored Pakistan by bestowing three awards in recognition of Pakistan's advancement in the application of nuclear technology for the achievement of Sustainable Development Goals, including food security:

1. Outstanding Achievement Award on Nuclear Institute for Agriculture and Biology (NIAB)
2. Team Achievement Award for work in the same area to a group of four scientists in NIAB



Dr. Kashif Riaz Khan receiving the certificate by DG IAEA

3. Young Scientist Award to Dr. Kashif Riaz Khan from NIAB for his work in plant mutation breeding and related technologies

The Winners were presented certificates by Mr. Rafael Mariano Grossi, DG IAEA during IAEA's 65th General Conference on September 20, 2021.

### Symposium on Radiation Safety in Medical Practices

Pakistan Nuclear Regulatory Authority (PNRA) organized a virtual Symposium on "Radiation Safety in Medical Practices" on July 29, 2021. Around one hundred twenty (120) participants from PNRA and twenty three (23) medical centers across the country with diverse educational background attended the symposium.

Three well experienced foreign professionals from Japan and Brazil shared their experiences with the participants during the symposium.

**Virtual Symposium on "Radiation Safety in Medical Practices"**  
NISAS Lecture Hall (2<sup>nd</sup> Floor) PNRA HQ July 29, 2021 (1500-1800 Hrs)

	
Proton Therapy	Cyclotron
	<b>Dr. Ralph Santos-Oliveira</b> President Brazilian Association of Radiopharmacy, Brazil Topic: QC of Radiopharmaceutical and Role of Internal Dosimetry in Radiation Safety
	<b>Dr. Juan Carlos Manrique Arias</b> Radioisotope & Radiopharmaceutical Chemist Doctors Hospital Monterrey, N.L. Mexico Topic: Radiation Safety in the Production of Novel PET Radioisotopes
	<b>Dr. Ayano Makinaga</b> Nuclear Data Researcher at Hokkaido University, Japan Topic: Design and Shielding of Proton Therapy Facilities
Coordinator: Dr. Muhammad Shahid, PSO, NISAS Email: m.shahid@pnra.org Cell: +923336920690 (Ext:317)	

The topics covered included irradiation techniques, beam delivery options, shielding & design requirements in proton therapy facility, QC procedures for production of radiopharmaceuticals ( $^{123}\text{I}$ ,  $^{124}\text{I}$ ,  $^{64}\text{Cu}$ ,  $^{68}\text{Ga}$ ). Feedback of the participants indicated that the session was interactive, informative, and beneficial. The participants suggested arranging more symposiums on other relevant topics for the benefit of all stakeholders.

### Webinar on '50 Years of Nuclear Power in Pakistan' Dawn - August 17, 2021

The Centre for International Strategic Studies (CISS) hosted a webinar on '50 Years of Nuclear Power in Pakistan' in connection with the decommissioning of Pakistan's first nuclear power plant, KANUPP. CISS has underscored the need for building additional nuclear reactors to help meet Pakistan's rising energy demands as they curb greenhouse gases emissions and counter impact of climate change through low-carbon electricity generation. The main objective of the webinar was to highlight the role of peaceful uses of nuclear technology for the socio-economic development, pursuance of Sustainable Development Goals (SDGs) and addressing energy needs of Pakistan.

Chairman of the Pakistan Atomic Energy Commission (PAEC) Mr. Muhammad Naeem stated during the occasion that the inauguration of K-2 is a milestone in Pakistan's quest to increase the share of clean energy in national and global mix. He mentioned that this year Pakistan has completed 65 years of its journey in the field of application of nuclear technology for the socio-economic development of the country. This journey started in 1955 with medical centres, agriculture centres, and research and development. Pakistan was the 15th nation of the world that had the opportunity to have a nuclear power plant when we started our journey. At that time even Korea and China were not in the field when we started operating KANUPP. Following India's first nuclear test in 1974, an embargo was unfairly placed on Pakistan even though Pakistan did not commit any violation. As a result, restrictions on supply of parts and technical assistance for KANUPP were imposed, but Pakistani scientists and engineers overcame this difficulty in a very able manner. KANUPP was kept functional and continued providing power supply to the national grid for 50 years. He also revealed that another 1100MW power plant would become functional over the next 8-10 months. Both K-2 and K-3 power plants will provide 2200MW of uninterrupted

and clean electricity to the national grid for the next 80 years.

Ambassador Naqvi, Executive Director of CISS emphasized the increasing role of peaceful use of nuclear power capabilities in pursuit of the socio-economic development. Regarding Pakistan-China cooperation in helping set up power plants, Ambassador Naqvi highlighted that the 1986 bilateral cooperation agreement enabled the country to achieve this remarkable degree of energy production through nuclear power.

Dr. Ansar Parvez, a former chairman of PAEC, said Pakistan's nuclear power generation and peaceful application of nuclear technology in the country was helping to pursue the United Nations SDGs. The benefits of nuclear technology expand to different fields, including medicine, health, agriculture, industry, water resource management and electricity production.

Mr. Parvez Butt, a former chairman of PAEC, reiterated that to keep pace with technological advancements across the globe, effective utilization of nuclear technologies is crucial for national development.

### Recalling the old memories

PNS Council (1995-97)



From left to right (sitting): Dr. M. Ashraf Ch, Dr. N.M. Butt (President), Dr. Ishfaq Ahmad (Chairman PAEC), Mr. Sultan Skandar Khan, and Dr. K. A. Shahid  
(Standing): Dr. Samina Iftikhar, Dr. M. Danial Saeed, Mr. S. D. Orfi, Dr. Mubbashir Ahmed, Mian M. Jamil Ahmed, Dr. Ihsan Afghani and Ms. Naseem Naheed Rana

## News about PNS Members

### PNS Lifetime Member honored with Civil Awards on 14th August 2021

1.	Mr. Muhammad Naeem	Nishan-i-Imtiaz
2.	Dr. Inam-ur-Rehman	Hilal-i-Imtiaz
3.	Mr. Jamshed Azim Hashmi	Hilal-i-Imtiaz
4.	Dr. Qamar Mehboob	Hilal-i-Imtiaz
5.	Dr. M. Masood ul Hassan	Sitara-i-Imtiaz
6.	Engr. Aslam Umer	Sitara-i-Imtiaz
7.	Mr. Zulifqar Ali	Pride of Performance
8.	Dr. Muhammad Siddique	Pride of Performance
9.	Mr. Shabbir Ahmad	Pride of Performance
10.	Dr. Samina Roohi	Tamgha-i-Imtiaz
11.	Dr. Irfan ullah Khan	Tamgha-i-Imtiaz
12.	Dr. Muhammad Aftab Rafiq	Tamgha-i-Imtiaz

### PNS Lifetime Members elevated



Dr. Masood Iqbal, CS has been appointed as Member (Science), PAEC



Mr. Naveed Maqbool, CS has been appointed as Member (Corporate), PNRA



Mr. Muhammad Rahman, CE has been appointed as Member (Executive), PNRA

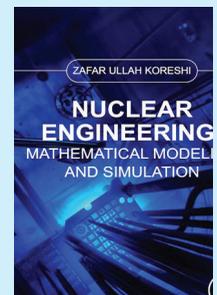


Dr. Mian Qamar ul Haq, S.I. CS, has been appointed as DG PINSTECH

### A recent book by Prof. Dr. Zafar Ullah Koreshi (PNS Lifetime Member)

Nuclear Engineering - Mathematical Modeling and Simulation  
Published by Elsevier, 2021 (available Feb 2022)  
<https://inspectioncopy.elsevier.com/book/details/9780323906180>

The book presents the basics of diffusion and transport theory followed by applications of Monte Carlo Simulation for the design and optimization of nuclear systems. It begins with an overview of basic nuclear physics and atomic radiation and the interaction of radiation; charged particles, neutrons, x-rays and gamma-rays, with matter. The third chapter presents nuclear technologies



covering nuclear power plants including the pressurized water reactor (PWR), the boiling water reactor (BWR), the heavy water reactor (HWR), the gas cooled reactor (GCR), the fast breeder reactor (FBR), Generation-IV designs, propulsion reactors for submarines and rockets as well as advanced compact and portable micro nuclear reactors (MNR)s for specialized applications in space and the inertial confinement and magnetic confinement fusion technologies particularly in the context of the International Thermonuclear Experimental Reactor (ITER). The mathematical foundations of diffusion, transport and stochastic formulations are introduced in chapter four followed by three chapters covering neutron diffusion, neutron and photon transport and Monte Carlo (MC) simulation. The reader is then given an overview, in chapter eight, of some commonly used deterministic and MC computer codes for core and criticality design, coupled analysis, and safety analyses. This is followed, in chapter nine, by the essentials of optimization methods covering modern computing-intensive artificial intelligence (AI) and expert systems' based approaches presently used for nuclear systems' multi-objective design optimization, core management and pattern optimization, radiation shielding design optimization, optimal control and several other areas. Monte Carlo simulation for nuclear systems, both fission and fusion, followed by a comparison of Monte Carlo Simulation and Deterministic Methods. There are some hands-on exercises in MC simulation particularly in the context of the MCNP and Open MC codes. The optimization of nuclear systems by both deterministic and stochastic methods focusing on practical design challenges in fission and fusion. Finally, medical applications of MC simulation are briefly introduced in chapter fourteen.

#### About the Author:

Dr. Zafar Ullah Koreshi [B.Sc. (Hons) Nuclear Engineering, Queen Mary College, University of London (UK); M.S. Nuclear Engineering, University of Wisconsin, Madison (USA), Ph.D Nuclear Engineering, University of Cambridge] is Professor at the Air University, having contributed also as Dean Faculty of Engineering and currently is Dean Graduate Studies at Air University. His experience has been in the Pakistan Atomic Energy Commission, Dr A Q Khan Research Laboratories, National University of Sciences and Technology, and at Air University, Islamabad. He has published in several leading international journals. Dr Koreshi has been Track Chair at the International Conference on Nuclear Engineering held in the USA, China and Japan.



#### Obituary



Dr. Muhammad Younas, a Lifetime Member of PNS lost his fight with the deadly Covid-19 during the 4th wave in August 2021. The dedicated and hardworking researcher with an utmost positive attitude having excellent team spirit was Principal Scientist, Physics Division, PINSTECH. He did his M.Sc. Physics from University of the Punjab and then joined PIEAS for MS (Materials Engineering) in session 2007-09. He completed his PhD in Experimental Condensed Matter Physics from the University of Hong Kong in 2016. He published 26 research papers in well reputed high impact factor journals in addition to contributing in a book. He was a regular user of Synchrotron light sources. He had the honor to be invited to present his synchrotron based research at UNESCO Headquarters, Paris (France) and received a letter of appreciation from SESAME Council. He also contributed significantly towards some important on-going projects of PAEC. In addition to his research work, he supervised research work of two M.S. students and was currently guiding a PhD student.

May his soul rest in eternal peace (Ameen).

## Message from the President

Dr. Imtihan Elahi Qureshi, *T./*

It is time to rejoice over the recognition of Pakistan Atomic Energy Commission (PAEC) at world stage, as 65th General Conference session (20-24 Sept. 2021) of IAEA saw the popularity of Pakistan's pavilion "Nuclear Technology for Life", and awards for Pakistani scientists conferred by IAEA Director General, Rafael Mariano Grossi. At home, prestigious civil awards, including the highest award of 'Nishan-i-Imtiaz', were bestowed upon twelve lifetime members of PNS on the occasion of nation's 74th Independence Day, 14th August 2021. These successes have been prominently displayed on PNS website and are included in this issue of Newsletter. PNS is proud to felicitate all our scientists, engineers and administrators who have made it possible through their hard work and dedication to achieve these honours.



Meanwhile, during the last couple of months, phenomenal changes have occurred in the security landscape of our neighborhood. A ragtag militia in Afghanistan has toppled the government installed by a super power and defeated armies of 51 countries, in spite of their efforts spanning over two decades and with the expenditure topping two trillion dollars. The human cost borne by Afghanistan and its neighbor Pakistan has been colossal. The death and destruction during this misconceived 'war on terror' has wreaked havoc on the lives and livelihoods of millions in the region. There is no doubt that Pakistan has paid the heaviest price after Afghanistan itself, in terms of innocent lives lost and economic costs borne. During these trying times India has been doing its best to aggravate the security situation in Pakistan and destabilize the country through its open propaganda and policies at the world stage, as well as covert operations of well-documented terrorist activities. Of all the transgressions of India, perhaps the most despicable and horrendous acts have been played-out in virtual space. Hundreds of internet sites and fake media outlets were setup by India throughout the world, which have been working for decades to spread a negative image of Pakistan, as revealed by European Union's DisinfoLab report based on a study spanning 15 years. Billions of dollars were spent in Afghanistan to support a puppet government, some of whose functionaries were at its pay roll, with the sole purpose of using Afghan soil to conduct terrorist activities in Pakistan. The fact that Pakistan's major 'ally' in Afghanistan kept its eyes closed while Indian spies and their proxies were killing Pakistan army personnel and civilians from their bases in Afghanistan, was a mega-show of duplicity on the part of a 'friend'. The focus of attention of a 'transactional' friend has now shifted towards a real friend of Pakistan. The 'China containment' is now the name of the game, with flexing of military muscle across indo-pacific region and through defense pacts among the three most aggressive countries located far away from each other. Once again, our neighboring India is playing the role of a stooge in sabotaging the regional harmony and trade connectivity envisioned by Pakistan and China. In an ideal world, the nuclear societies of India, Pakistan and China should be working side-by-side for the uplift of almost 40% of world population concentrated in these countries. Indian leaders have failed to realize that it is this very demographic strength that bothers the colonial powers of the yester years, and the present new superpower with its neo-colonial vision.

This is not to say that Pakistan does not have an image problem. Whereas the concerted campaign of India to malign Pakistan is a serious threat, there is no reason why Pakistani intelligentsia should not be equally vehement in its projection of Pakistan as a land of resilient and courageous people with boundless energy and potential to stand tall among the comity of nations. I call upon PNS Members to take up their pens to let the world know, what they know about the indomitable spirit of Pakistanis to excel in every walk of life, whenever the circumstances are right. PNS is steadfast in its call to scientific community all over the world, and regional countries in particular, to stand-up for a world-order, which is based on equality of nations, freedom to exercise their choices of governance, end of occupations and an international financial system that guarantees reduction of economic disparities among countries of the global North and South. The members of PNS are welcome to write about international developments in science and technology, make comments on the S&T policies and practices in Pakistan and indeed constructive suggestions for PNS programmes and better performance. These 'opinion' pieces will be given space in this Newsletter for wider dissemination.

## Proposed calendar of Activities October – December 2021

Month	Activity Type	Title of Activity	Coordinator
Oct.	Seminar	Nuclear Power trends in Pakistan and the world at large, Karachi	Dr. Muhammad Jamil
Oct.	Social Event	A short hike of 4 km on Trail-4 for PNS Members/ families, Islamabad	Syed Zahid Hussain Waqar A. Butt
Nov.	Seminar	Security of nuclear and radioactive material- Pakistan's efforts, PNRA HQ, Islamabad	Dr. M. Sadiq
Nov.	Seminar	Nuclear Technology and Environment, PAS, Islamabad	Dr. Niaz Ahmad
Dec.	Seminar	Role of nuclear techniques in the development of agriculture sector in Pakistan, NIAB, Faisalabad	Dr. Uzma Maqbool Dr. Niaz Ahmad
Dec.	Lecture/ Annual Dinner/ Annual Meeting	Advances in Nuclear Sciences (Dr. Ishfaq Ahmad Annual Lecture)/ Dinner for PNS families, Islamabad Club	Dr. Imtihan Qureshi Dr. Muhammad Mohsin

## Announcements

1. International Conference on the Development of Preparedness for National and International Emergency Response (EPR2021), Vienna, Austria, 11 – 15 Oct. 2021
2. International Conference on Radioactive Waste Management: Solutions for a Sustainable Future, IAEA HQ, Vienna, Austria, 1 – 5 Nov. 2021
3. Career Development Workshop for Women in Physics, Online, 17-19 Nov. 2021
4. Joint ICTP-IAEA Workshop on Medical Physics Aspects of Stereotactic Radiotherapy Techniques, Seibersdorf, Wien - Austria, 6-10 Dec. 2021
5. 1st International Conference on Accelerators for Research and Sustainable Development: From Good Practices towards Socioeconomic Impact, IAEA HQ, Vienna, Austria, 23- 27 May 2022
6. IAEA International Conference on the Safety and Security of Radioactive Sources, Vienna, Austria, 20- 24 June 2022
7. IAEA's International Symposium on Managing Land and Water for Climate-Smart Agriculture, IAEA HQ, Vienna, Austria, 25- 29 July 2022

## Benefits to become PNS Lifetime Member

1. Growing professional circle by strengthening connections with peers in relevant fields
2. Free access to nuclear related webinars, online courses and discussions to share views and enhance knowledge of current issues, challenges and opportunities in nuclear science and technology
3. Group visits at various S&T organizations/ universities
4. Free e-copy of quarterly PNS Newsletter
5. Login facility at PNS website with a secure password
6. A colorful Lifetime Membership Card with a photo
7. 50% reduction in PNS conferences fee
8. 20-30% fee reduction in conferences arranged by other organizations
9. 25% discount in fee on courses offered by Pakistan Institute of Management (PIM)
10. 50% reduction in Annual Gala Dinner at Islamabad Club
11. Social programmes like family picnic/ hikes, trip to Northern areas, etc.
12. Registration/ Lifetime Membership Fee is only Rs. 2,100/-.
13. Membership Form is available at [www.pns.org.pk](http://www.pns.org.pk) (Form and Fee can be deposited online in PNS Bank Account at NBP, Margalla Br. Islamabad, **IBAN: PK18NBPA1725004018982691**).



Issue 4/2021

October-December, 2021

# PNS Newsletter

A Quarterly Newsletter of the Pakistan Nuclear Society

## Patron:

Dr. Imtinan Elahi Qureshi, T.I.

## Editor-in-Chief:

Mr. Waqar Ahmad Butt

## Editors

Dr. Riffat M. Qureshi

Dr. Muhammad Sadiq

Dr. M. Javed Akhtar



PNS Council with dignitaries at the AGM

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## From the desk of Editor-in-Chief

In contrast to the last quarter (July-Sept. 2021) in which most of the physical activities were hampered due to pandemic situation, this quarter has been very fertile for PNS as far as academic and social activities are concerned. Useful links have been established with national as well as international organizations and societies. Now, the emphasis has shifted from the restricted phrase of 'peaceful applications of nuclear technology' to the 'socio-economic development of the country using nuclear science and technology and allied disciplines'. Ambitious programmes having real impact are being chalked out for the future endeavors. Experienced scientists, engineers and technologists are being engaged to transfer tacit knowledge to the future generation. A list of experts in various S&T fields has been maintained. The Scientific Advisory Board (SAB) has been restructured. Valuable guidance and advice from Board Members will definitely lead to further heights. A resolution of establishing an Administrative Advisory Board (AAB) has been approved by PNS Members during the Annual General Meeting (AGM) for solid support at very high level. But our complaint to worthy lifetime members of PNS still persists; in spite of reminding and requesting again and again, the Members are not coming up with fruitful suggestions, innovative ideas, writing short articles or even criticism for the improvement of this newsletter. Not even a single letter to the editors has been received so far. Let me recall that PNS is not a Society of nine Council Members only but all worthy members are its stake holders. They have equal rights to participate and play their part in its programmes. It's a matter of great satisfaction that all Council Members have complete harmony among them and are committed to see this Society at par with the well-established similar societies in the developed world. But this dream can only come true when its Members spare some of their valuable time for actively taking part in its programmes and put their efforts for a useful purpose. The Society Offices are open six days a week and the Members are most welcome to have relevant discussions on a cup of tea. Let's join hands for a greater national cause.

## Vision

The vision of Pakistan Nuclear Society (PNS) is to become a resource centre for disseminating information about peaceful uses of nuclear science and technology for socio-economic development in Pakistan and a hub of promoting this cause worldwide along with international partners for global environmental and economic stability. The principal tools to be used for this purpose would be PNS Website and PNS Newsletter.

## Contact Us

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## Activities during the 4th quarter

### Annual General Meeting

As per requirement of the Constitution, the Annual General Meeting (AGM) of PNS Members has to be held at least once in a year. Consequently, the AGM took place at Islamabad Hotel on 18th December 2021 followed by a dinner. A large number of Members along with their spouses and adult children participated (the number was above one hundred). Dr. Shamim Ahmad Chaudhry, the first elected President of PNS was the Guest of Honor. The welcome address with introductory remarks was given by Dr. Imtihan Elahi Qureshi, President PNS. He recounted new initiatives which the present Council took during the past one year, especially the restart of PNS quarterly Newsletter with an improved look and making the website of the Society more attractive and dynamic. The Council wished to take PNS at par with the well-established similar Societies in the world. He expressed his grievance that in spite of the fact that all Council Members are exerting a lot in terms of time and money by utilizing their personal resources, yet no concrete support in terms of logistic and financial assistance is being provided from the organizations which are regarded as custodians of the Society. Similarly, the academic contribution for the Newsletter from PNS Lifetime Members is very little in spite of the fact that intellectual resources of highly qualified and vastly experienced professionals is there in PNS.



President PNS, Dr. Imtihan Elahi Qureshi presiding the AGM- All Council Members on the stage

The annual report was presented by Dr. Mohammad Mohsin, General Secretary PNS in which he said that amidst Covid-19 related restrictions, PNS has been able to make decent impact in advancing its mandate through online platforms and physical academic sessions by organizing three Webinars and four Seminars in different cities. Scientific Advisory Board (SAB) of PNS comprising of ten eminent professionals of highest repute has been reconstituted. As a part of outreach initiatives, interactions, discussions and MOU's of mutual cooperation have been signed in areas of common scope with institutions like Pakistan Physical Society (PPS) and South



Audience during the AGM

Asian Strategic Stability Institute (SASSI). Communication channels have also been opened up with International Nuclear forum like China Nuclear Society (CNS), International Nuclear Societies Council (INSC) etc. Side by side with academic ventures, the Society has highlighted the welfare related issues of retired employees of strategic organizations and also arranges social activities like hiking/picnic events for its Members.

The idea for establishing an Administrative Advisory Board (AAB) was put forward to the Members in the form of a Resolution. Majority of the Members present in AGM raised their hands in its favor. The objective of this Board is to complement the mandate of SAB for creating greater visibility of PNS in print/social media and awareness among the administration of strategic organizations as well as policy makers in the sectors of S&T, safety & security, international relations and industrial development.

Keeping up the tradition to be in line with the mandate, a special technical lecture was arranged during the AGM. A renowned scientist, Dr. Jean-Pierre Charles REVOL who has been associated with CERN for a very long time and was the Chairman of the Joint CERN-Pakistan-Committee gave a fascinating talk on "Accelerator-Driven Systems towards Sustainable Nuclear Fission Energy" (Online from Geneva, Switzerland). The lecture was dedicated to Dr. Ishfaq Ahmad, former Chairman PAEC in recognition of his meritorious services to the nation.



Online lecture by Dr. Revol from Geneva, Switzerland

In the end, the Guest of Honor, Dr. Shamim Chaudhry addressed the audience. He recalled the early days when PNS was formed about 30 years ago by some thoughtful scientists in PINSTECH. He elaborated that after passing through different phases, PNS is now an established forum comprising of more than 1000 lifetime members. He praised all those who played their part to obtain the envisioned objectives of the society. He lauded the present Council for putting new life by efficiently organizing various programmes. He urged the organizations involved in nuclear S&T to support PNS as it is a very effective forum to promote the soft image of the country in the nuclear field.

### One-day seminar on Advances in Nuclear Medicine

Pakistan Nuclear Society (PNS) and Gujranwala Institute of Nuclear Medicine (GINUM) jointly organized a seminar on Advances in Nuclear Medicine at GINUM Gujranwala on 4th November 2021 with logistic support by Pakistan Atomic Energy Commission (PAEC) and financial assistance from Pakistan Science Foundation (PSF) for making the event successful. The President PNS, Dr. Imtihan Elahi Qureshi, highlighted the role of nuclear techniques, diagnosis and treatment of various pathologies. He also shed light on the activities of PNS for the promotion of scientific collaboration with various renowned organizations. He emphasized that such programmes are to highlight the contributions of nuclear professionals in national development through peaceful uses of nuclear technology.

Director GINUM, Dr. Sohail Murad, in his welcome address, thanked PNS and PSF for supporting this important scientific venture. He said that such educational events update the doctors and technical staff about the advancement in their field. With the help of such programmes, state-of-the-art practices can be implemented successfully.

During the scientific discourse, an online keynote lecture was delivered by Dr. Arif Shiekh, Medical Director and Consultant Nuclear Physician in Kettering Health Ohio, USA on “Evolving Updates in PET Molecular Imaging”. Dr. Arif comprehensively discussed the evolution and impact of new PET tracers, updates in technical developments, and future directions in oncology, cardiology, neurology and infection PET imaging.



*Inaugural Session at GINUM Auditorium*

He shared the new tracers approved for molecular imaging in the last 2 years resulting in fast growth of new indications filling prior ‘gaps’ in patient management paradigms.

This was followed by a talk on “SPECT-CT: Second Life for Conventional Nuclear Medicine” by Dr. Zaheer Chiragh, Consultant Nuclear Physician, Saudi Arabia. He elaborated the evolution of hybrid imaging and its growing applications in conventional nuclear medicine imaging. He explained the clinical efficacy of SPECT-CT, especially in musculoskeletal pathologies. He concluded that advancement in hybrid SPECT-CT imaging has resulted in improved contrast & resolution, higher detectability & sensitivity and it has improved clinical decision making manifold.

Dr. Arzoo Fatima, Head Department of Nuclear Medicine & PET, INMOL, Lahore thoroughly introduced the theranostic concept in her lecture titled “Theranostic – Current status”. The role of established and approved beta and alpha emitters as a therapeutic agent in selected cancers was comprehensively explained with published international landmark clinical trials and experience from Pakistan. She shared technical details and lessons learned from local experience for the practical use of all aspiring nuclear physicians.

Dr. Shazia Fatima, Head Department of Nuclear Medicine and Pathology at NORI, Islamabad and Executive Member of PNS Council, underscored the future outlook for theranostics. She shed light on radiopharmaceuticals pairs which are currently being investigated in various international clinical trials with very promising and encouraging results. For widespread



*Speakers and presenters*



use of theranostics in all nuclear medicine departments of Pakistan, she suggested the need for better collaboration between all nuclear medicine centers, local productions of these theranostic radiopharmaceuticals to reduce the cost and indigenous research to overcome the current limitations of these therapies.

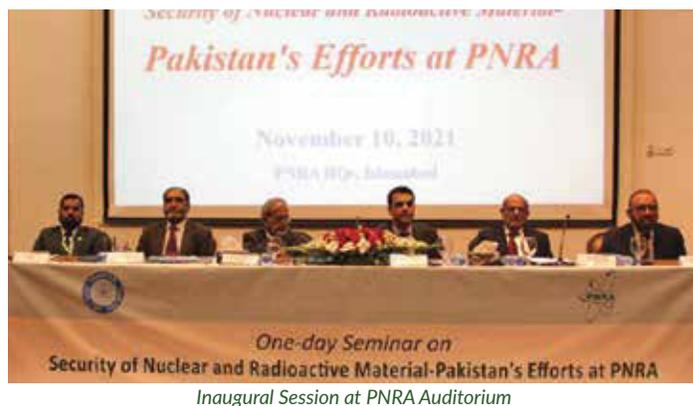
Dr. Basit Iqbal, Head Department of Nuclear Medicine, GINUM comprehensively covered the advances in the field of nuclear cardiology. He compared the current status of Nuclear Medicine in cardiac diagnostic algorithm with Cardiac CT and cardiac MR imaging. He emphasized that all these modalities have a collaborative rather than competitive role.

The Chief Guest of the event, Dr. Mohammad Sohaib, Director NMO Division, PAEC, highlighted the role of PAEC in health sector. He gave overview of PAEC activities in health sector through its 19 cancer hospitals. He emphasized the role of nuclear techniques in diagnostic and therapeutic that is being successfully utilized in all PAEC cancer hospitals. He shared that these cancer hospitals of PAEC are collectively accommodating 80% cancer burden of the country through its diagnostic and treatments services.

While thanking the speakers, participants and organizers of GINUM and PNS, the General Secretary PNS, Dr. Muhammad Mohsin, stressed the need for sustainable nuclear medicine services throughout the country with the addition of more nuclear medicine centers and trained manpower.

### **Seminar on the Security of Nuclear and Radioactive Materials at PNRA**

Pakistan Nuclear Society (PNS) in collaboration with Pakistan Nuclear Regulatory Authority (PNRA) organized a seminar on the security of nuclear and radioactive materials to highlight the achievements of PNRA for the establishment and sustainability of national nuclear security regime in the country. The seminar was held at PNRA HQ, Islamabad on 10th November 2021. More than fifty participants from various relevant organizations attended the half day activity. The opening remarks were given by Dr. Imtihan Elahi Qureshi, President PNS. He emphasized the need of sustainable



nuclear security efforts at national level in compliance with UN Security Council resolutions and various international legal instruments signed by Pakistan. He commended PNRA for playing a pivotal role in framing national legislations and regulations for ensuring nuclear security at national level. He also elaborated the objectives of PNS as a representative body of high-profile nuclear professionals in the country. He noted that the services of PNS members for securing Pakistan's status as responsible nuclear state and playing crucial role in socio-economic development of the country is not well projected at the national level.

A message by the founding Chairman PNRA, Mr. Jamshed Azim Hashmi, HI, TI who is regarded as the pioneer of nuclear security regime in Pakistan, was shared with the audience. In his message, he recognized the determination of PNRA authorities for establishment of nuclear safety and security initiatives and appreciated all those who contributed in this effort.

In the technical session, the first talk was given by former Chairman PNRA, Mr. Anwar Habib, HI on global nuclear security instruments. He explained the requirements set by international instruments about state's responsibility for nuclear security and how Pakistan has fulfilled its responsibilities in this regard. Mr. Muhammad Khaliq, Head Nuclear Security of Materials and Facilities Section at IAEA shared the conceptualization of Pakistan's National Nuclear Security Action Plan (NNSAP) Project through a virtual talk. He informed the participants about PNRA contribution



*Speakers and presenters*



*Seminar participants*

for presenting national stance related to international instruments on nuclear security and how the government of Pakistan mandated PNRA to play its role in strengthening national nuclear security regime. Dr. Muhammad Sadiq, Advisor to Chairman PNRA talked on PNRA's achievements in the area of nuclear security through NSAP project and highlighted the challenges faced in this regard. Mr. M. Qayyum, DG (Licensing & Authorization/Inspection and Enforcement), PNRA enlightened the participants with brief overview of the national regulatory framework on nuclear security. He explained that two independent regulations have been established to address the physical protection of nuclear materials and associated facilities and security of radioactive sources. Mr. Anayat Ullah, PSO, PNRA spoke on PNRA regulatory oversight for materials out of regulatory control. He emphasized that nuclear security is not limited to implementation of regulations on radioactive materials but also to establish a system for keeping watch over materials out of regulatory control and presented outcome of PNRA's efforts in this area.

Mr. Usman Jadoon, DG (UN & ACDIS), MoFA was the chief guest in the closing session. In his concluding remarks, he underlined the fact that Pakistan has made tremendous contribution in maintaining national nuclear security which is well recognized internationally. All these efforts have elevated the image of Pakistan as a responsible state. He emphasized that the relevant national institutes must continue these efforts in future.

### **Seminar on Afforestation of Global Deserts for Sustainable Future of Earth Environments**

Pakistan Nuclear Society (PNS) and Pakistan Academy of Sciences (PAS) jointly organized a seminar on Afforestation of Global Deserts for Sustainable Future of Earth Environments on 24th November 2021 at PAS Auditorium in Islamabad. The

speakers focused on 'deserts' as the target for future sources of energy, food production and even water harvesting. The futuristic scenarios discussed in the seminar were preceded by an equally thought-provoking presentation by the President PNS, Dr. Imtihan Elahi Qureshi, who dispelled the notion that nuclear technology is something to be shunned, claiming that the achievement of Sustainable Development Goals (SDGs) of the United Nations is, in fact, not possible without employing nuclear power plants for energy production, nuclear techniques for agricultural productivity, nuclear radiations for diagnosis and therapies of cancer treatment, using of stable and naturally occurring isotopes for monitoring of water resources, pollution types and levels, and global atmospheric precipitations. He noted that the role of peaceful uses of nuclear technology as well as the contributions of nuclear professionals in economic development is not well projected at the national level.

Introducing the purpose and theme of the Seminar, former Pakistan Atomic Energy Commission's Hydrologist and Executive Member of PNS Council, Dr. Niaz Ahmad said that greening of deserts is necessary due to the increasing food demand of a rapidly increasing world population. Initiatives by countries for greening Deserts, like China, Sahara Green



*Address by the Chief Guest, Dr. Yusuf Zafar*



*Speakers and presenters*

Wall Project by African Union, Saudi Arabia and UAE have been globally recognized as successful models in this respect. The Chief Guest of the event, Dr. Yusuf Zafar, former chairman PARC, gave figures of crop productions such as chillies, ispaghol, castor, grams, etc. that are being successfully grown at the fringes of Thar desert in Pakistan. He regarded it as a failure of the government policies that Pakistan has become a net importer of food, with a trade deficit of US\$ 4 Billion. He pointed out that Food security entails not only quantity of available food but also its acceptable quality for human consumption.

In the second session, Chairman PCRWR, Dr. M. Ashraf Choudhry highlighted the potentials of deserts as sources of livelihood and food security for future generations, using technologies that are currently available. He cautioned against the intensive cultivation practices, as well as imprudent choices of crops with respect to the water requirement for each category. He particularly identified rice crops as the highest water consumers. Desert dwellers depend on live stock, which needs water for survival. The conventional technique of retaining rain water in ponds is the natural way of harvesting. He said that rice export is equivalent to the export of scarce fresh water of Pakistan. Dr. Usman Ali Abbasi of Arid Agricultural University Rawalpindi elaborated various farm practices, such as drip irrigation, as viable options in Pakistan due to limited water availability. The Pakistan Meteorological Department's expert Mr. M. Irfan Virk presented data on the role of deserts in defining the global climate changes.

He also gave technical details of weather and climate, type of deserts based on climate, basic concepts of atmospheric circulation, climate type and climate change. Dr. Imtiaz Ahmad, Advisor PAEC, outlined the results of studies on the 'water footprint' of commodities that have become part of life styles throughout the world. He stressed that the 'virtual water' that is locked up because of consumption patterns will lead to catastrophic shortages of fresh water for drinking, in view of rapidly increasing world population. Considering that only 3 % of the total water on earth is fresh water, there should be a strong emphasis that water is a scarce commodity and has high economic worth.

While thanking the speakers, participants and organizers of PAS and PNS, the General Secretary PNS, Dr. Muhammad Mohsin, stressed upon the need for public awareness about issues affecting their future and the role that electronic and print media can play in this connection. At the end of the session, Seminar Shields were presented to the speakers as well as the organizers as token by Engr. Parvez Butt, NI, HI, SI, former Chairman PAEC/Secretary MoST.

### **Webinar on Public Perception of Nuclear Technology and the Role of Scientific Community**

The Arms Control and Disarmament Centre (ACDC) at the Institute of Strategic Studies Islamabad (ISSI) hosted a webinar on the Role of Pakistan's Peaceful Nuclear Programme in Socio-economic Development of the country on November



*Seminar participants*



Webinar presenters

11, 2021.

Ambassador Aizaz Ahmad Chaudhry, Director General ISSI in his welcome address elaborated that the nuclear capability not only provided security from the Indian aggression but it is also serving the people of Pakistan in many sectors including energy, environment, agriculture and medicine.

Malik Qasim Mustafa, Director ACDC in his opening remarks said that Pakistan is making use of peaceful nuclear technology in almost all sectors to bring socio-economic development of the country. He added that there are 84 research and education institutes, 88 medical radiation facilities, 229 industrial radiation facilities, 5286 diagnostic X-ray facilities and 347 other radiation facilities operating in Pakistan.

Mr Muhammad Naeem, NI, HI, SI, Chairman, Pakistan Atomic Energy Commission (PAEC) was the keynote speaker on this occasion. He briefed about leading role of PAEC in developing national and international collaborations to enhance the applications of nuclear technology for achieving the sustainable development goals (SDGs) in Pakistan.

Mr. Parvez Butt, NI, HI, SI, former Chairman PAEC provided a comprehensive overview of Nuclear Power Generation and Energy Security in the country. He said that nuclear power is a mature technology and a sustainable energy option. It is an essential part of the solution to the energy crisis in Pakistan for its contribution to stabilizing electricity prices, enhancing energy security and a clean environment.

Dr. Tariq Mahmud Shah, Director, Nuclear Institute for Agriculture and Biology (NIAB), highlighted climate change, yield stagnation, declining soil fertility, blights and rusts as emerging threats. To augment the application of nuclear technologies in the agriculture sector, Pakistan should concentrate on mutation techniques, innovation and advanced training of scientists and experts.

Mr. Asghar Ali Khan, former Director, National Centre for Non-destructive Testing (NCNDT) talked about the Application of Nuclear Technologies in Industry. He sketched out the various industrial applications of nuclear techniques for NDT of materials, radio-gauges, radiotracers, radiation processing, materials analysis and characterization.

Dr. Shazia Fatima, Head of Nuclear Medicine Department,

NORI expressed her views on the Use of Nuclear Technologies in the Health Sector. She said that for a common man the word 'nuclear' is a synonym of 'destruction'. There is a need to change the narrative and create awareness about the beneficial applications of nuclear technology in health sector.

Mr. Waqar Ahmad, Executive Member, Pakistan Nuclear Society elaborated the efforts of PNS to promote the peaceful applications of nuclear techniques in the areas of agriculture, health, environment, industry, water management and electricity generation. He added that awareness of the general public regarding peaceful uses of nuclear technology is necessary to dilute the impression that the organizations involved in nuclear science and technology are only producing nuclear weapons.

Mr. Khalid Mahmood, Chairman BOG ISSI in his concluding remarks said that Pakistan started its peaceful nuclear programme much earlier than its nuclear weapon programme. The nuclear community of Pakistan is dedicated to their national cause and their achievements must be recognized.

### Webinar on Pakistan's Energy Security and Role of Nuclear Technology

A webinar on 'Pakistan's Energy Security and Role of Nuclear Technology' was organized by the Strategic Vision Institute (SVI), Islamabad on 10th December 2021. Dr Ansar Parvez, HI, SI, Adviser to the National Command Authority on Nuclear Power during his address cautioned against lowering priority for nuclear energy in the power generation mix and called for expanding its share to at least 20 per cent of the electricity generation capacity. Dr Parvez, who has previously headed Pakistan Atomic Energy Commission (PAEC) underscored the importance of nuclear energy and said that it should continue to play an important role in the generation mix as it was cheap, reliable and had a higher productive capacity factor. His contention was that nuclear plants unlike most of the other generation sources are base-load plants that produce electricity at a constant rate to meet the continuous demand. Mr. Waqar A. Butt, Executive Member, Pakistan Nuclear Society



Webinar presenters



(PNS) who has served for more than 30 years in experimental nuclear field spoke on the applications of nuclear technology in agriculture, health, industry, environment, water resources and electricity generation for sustainable development. He lauded the efforts of scientists and engineers of different S&T organizations in respective domains that have led the ever expanding programmes for national development.

Another expert Dr Zafar Ali said that Pakistan accords utmost importance to nuclear security and technology regulations as a national responsibility. Over the years Pakistan has established a comprehensive and effective national nuclear regulatory regime, which covers nuclear materials and other radioactive materials and associated activities. He said that the regulatory arrangements while preventing proliferation of weapons of mass destruction should not hamper international cooperation in the peaceful uses of technology.

Former Chairman PAEC, Engr. Pervez Butt chaired the session and shared his life long experience in the field of nuclear power generation in the country.

### A Lecture on Science Diplomacy

A special session was dedicated to 'Science Diplomacy' in the 7th International Conference on Aerospace Science and Engineering (ICASE21). The three-day conference was held at the Institute of Space Technology, Islamabad, on 14th – 16th Dec. 2021. As a keynote speaker, the President PNS, Dr. Imtinan Elahi Qureshi, elaborated the emerging trends in the concept and practice of Science Diplomacy. He pointed out the widening role of science advisors in decision making processes at national and interstate level, in view of the complexity of global issues with strong scientific underpinnings. Dr. Qureshi noted that the developing countries, especially Pakistan, have failed to create structural arrangements for interactivity between scientists and diplomats. The bureaucracy as well as political leadership lacks understanding of the importance of informed decision making based on scientific data. He proposed the reinstatement of the post of Science Advisor to the Prime Minister of Pakistan, as is the practice in most

industrialized countries. It is also necessary to restart the functioning of a Working Group composed of eminent scientists to assist Science Diplomacy Division of the Ministry of Foreign Affairs.

### Exchange of Gifts between PINSTECH and PNS

To further strengthen the ties between Pakistan Nuclear Society and Pakistan Institute of Nuclear Science & Technology (PINSTECH), Director General PINSTECH, Dr. Qamar ul Haq was invited during the monthly Council meeting of PNS on 5th October 2021 at PAEC Rest House, Islamabad. President PNS and all council members welcomed the distinguished guest on his arrival to the Board Room. The event started with exchange of pleasantries by both sides followed by a simple ceremony of exchange of gifts in which DG PINSTECH handed over the framed picture of PINSTECH to President PNS and President PNS gifted the book "One Hundred Reasons to be a Scientist" translated in Urdu to DG PINSTECH. Dr. Imtinan Elahi Qureshi acknowledged the role of PINSTECH in promoting and supporting the cause of PNS and thanked DG PINSTECH for donating priceless framed picture. The President also informed about key improvements like regular working of PNS office and some other traditions set by the present PNS Council. Dr. Qamar appreciated PNS Council for their voluntary services and contribution for the nuclear community. He also appreciated the new improved and dynamic look of PNS website. He assured his continued patronage and support to PNS activities.



DG PINSTECH presenting the gift to PNS

### Outreach

#### Visit to Pak-Austria University of Applied Sciences and Technology, Haripur

A group of PNS Council Members comprising of Dr. Imtinan Elahi Qureshi, Dr. Muhammad Tahir Khaleeq, Dr. Muhammad Mohsin, Mr. Ghulam Sarwar, Dr. Niaz Ahmad and Mr. Waqar Ahmad Butt paid a visit to Pak-Austria Fachhochschule-Institute of Applied Sciences and Technology (PAF-IAST) located in Mang, Haripur on 17th Oct. 2021. Dr. Muhammad



caption goes here



Meeting at the Conference Room of the University

Mujahid, Rector of the University accompanied by two of his senior colleagues, Dr. Nasser Ali Khan, Project Director (former Vice Chancellor Hazara University) and Dr. Sharifullah Khan, Dean of the Faculty of Electrical, Computer, IT and Design (FECID) received the delegation. Wide ranging topics of mutual interest were discussed during the meeting. Dr. Mujahid highlighted that the main focus of the Institute is to produce highly skilled professionals to take up challenging jobs in industry after graduation and completion of hands-on training and a semester-long internship in various industrial units. A number of specialized research centers have been established to cater for world-class R&D. Artificial Intelligence, Nanotechnology, Mineral Resources, Transportation/ Railways and Food are the target technologies for research and innovation in different Centres of Excellence. The teaching faculty is highly qualified, with almost all having doctorate degrees from abroad, the class-rooms have internet connected smart boards, and labs are equipped with best possible training apparatus.

Dr. Mujahid gave a comprehensive presentation about the development of various phases of the university. He elaborated that the syllabi adopted for the 18 graduate and undergraduate programmes spread in multiple teaching departments are at par with Austrian and Chinese universities, which are collaborating with PAF-IAST in its educational and research programmes.



Visit to IT Lab

Dr. Imtihan Qureshi, congratulated the university authorities for their meticulous planning and hard work spanning over several years under the patronage of Prof. Dr. Atta-ur-Rahman, former Chairman Higher Education Commission. He offered the whole-hearted support of Pakistan Nuclear Society towards their ambitious future plans.

At the end, it was agreed by both sides that close cooperation will be maintained and joint academic activities will be conducted as and when feasible. The meeting was followed by a tour of the academic blocks, auditoriums, high-performance computer facility, laboratories and other infrastructure of the Institute.

## From the International Media

### Tackling Soil Salinity in Pakistan

*Mohammad Zaman*

*IAEA Department of Nuclear Sciences and Applications*

*December 5, 2021*

Commemorating 2021 World Soil Day, IAEA published a short report on Combatting Soil Salinization using Nuclear Techniques. The report contains that one fourth of Pakistan's agricultural land is affected by salinity. However, the country's experts, in collaboration with the IAEA and the FAO, have developed different mitigation options to address this problem. These include the application of gypsum or acids to remove salts from the soil, of animal manure and chemical fertilisers to build up soil fertility, by using salt-tolerant crops, scrapping salts from surface soil and removing them through good irrigation water.

Excess fertilizer not taken up by plants contributes to increased soil salinity. Therefore, applying just the right amount of fertilizer is a key. Scientists use N-15, a stable isotope of nitrogen, which helps to determine the exact amount of N crops need.

Another way in which nuclear techniques are used is measuring the moisture content of the soil, so that the right amount of irrigation can be applied at the time the plants need it most. While conventional moisture sensors do not work properly under saline conditions, the soil moisture neutron probe functions well and is the most suitable sensor.

"Thanks to the collaboration with the IAEA, the problem of salinity in Pakistan was addressed by applying bio-saline agriculture technology which transformed the white face of our land into green," said Wajid Ishaque, Principal Scientist at the Nuclear Institute for Agriculture and Biology (NIAB) in Pakistan.

## Renowned Pakistani Scientist Dr. Rafi Muhammad Chaudhry, SK, SI

Father of nuclear research programme of Pakistan  
(1st July 1903 – 04 December 1988)

Prof. Dr. Rafi Muhammad Chaudhry was a world famous nuclear physicist and a professor of particle physics at the Government College Lahore. He is regarded as the pioneer of experimental nuclear physics in Pakistan. His teaching on modern physics influenced many of his students to pursue career in the field of nuclear physics who later joined top ranking R&D institutions and organizations in Pakistan such as Pakistan Atomic Energy Commission (PAEC).



After doing MSc in Physics from Aligarh University in 1929, Dr. Rafi proceeded to Cambridge (U.K.) for his Ph.D. at Cavendish Laboratory under the supervision of Prof. Rutherford, a Nobel Laureate. During his studies/ research he met with genius minds like Chadwick, Moon, Geiger, Cockcroft and Walton. After completing his doctorate, he served at Islamia College Lahore from 1933-1938. He then joined Aligarh University and served as full Professor in Physics there from 1938-1943. Later, he became Chairman of the Physics Department at Aligarh University. In 1948 he joined Government College Lahore where he laid foundations of the “High Tension Laboratory” in 1952 equipped with 1.2 MeV Cockcroft-Walton Generator. This laboratory has a major contribution to the experimental Physics where many top physicists like Dr. Ishfaq Ahmad, Dr. Samar Mubarikmand, Dr. Inam-ur-Rahman, Dr. N.M. Butt, Prof. Tahir Hussain, Dr. G.D. Alam, Dr. Ahsan Mubarak and Dr. Hameed Ahmad Khan were trained. The laboratory contained essential equipment for advanced nuclear research, such as nuclear radiation detectors, ion sources, atomic discharge, etc.

Dr. Rafi M. Chaudhry is remembered by his colleagues and students as an excellent teacher and a man of strong discipline. In recognition of his untiring services to development of S&T in Pakistan, the Government of Pakistan decorated him with the Civil Awards of Sitara-i-Khidmat in 1959 and Sitara-i-Imtiaz in 1982. Dr. Rafi remained active in research throughout his life.

(Dr. Riffat M. Qureshi)

### A historic photo



The President of Pakistan, Mr. Muhammad Ayub Khan, in discussion with the designer of PINSTECH, Mr. Edward Durrell Stone (extreme left). Dr. I.H. Usmani is standing next to the President.

## Nuclear News - International

### **Nuclear Technology publishes special issue on the Manhattan Project ANS News - December 7, 2021**

A special issue of the ANS journal Nuclear Technology has been published to observe the 75th anniversary of the Trinity experiment, the world's first nuclear explosion, on July 16, 1945, near Alamogordo, N.M. The experiment was a first step towards the conclusion of the Manhattan Project and the end of World War II. The issue, **The Manhattan Project Nuclear Science and Technology Development at Los Alamos: A Special Issue of Nuclear Technology** was sponsored by Los Alamos National Laboratory and curated by Mark Chadwick. The issue doesn't focus on the military aspects of the experiment but instead focuses on the scientific value of the experiment to the nuclear community. Twenty three papers published in the issue are open access, which means that a subscription is not required to read this contribution to the history of science. The issue can be accessed on the journal's platform, hosted by Taylor & Francis, publisher of ANS's technical journals.

## Nuclear News - National

### **Revalidation of Operation licenses by PNRA**

Pakistan Nuclear Regulatory Authority (PNRA) awarded operating licenses to C-1/C-2 and PARR-1, issued design certificate to ICCG and fuel load permit to K-3 in a ceremony held on 23rd December 2021 at PNRA HQs. These licenses were issued after rigorous review of periodic safety reports and other licensing submissions of these installations and satisfactory resolution of licensing queries.

(Dr. M. Sadiq, PNRA)

### **PAEC chief inaugurates linear accelerator at NORI The News - October 22, 2021**

The Chairman of the Pakistan Atomic Energy Commission

(PAEC), Muhammad Naeem, NI, HI, SI, inaugurated a linear accelerator at Nuclear Medicine, Oncology and Radiotherapy Institute (NORI); the top-notch public sector cancer hospital of Islamabad. The inauguration was performed at an awareness raising ceremony that packaged a seminar on breast cancer under the slogan 'Give Hope Save Lives,' and a walk-a-cause. A medical linear accelerator (LINAC) is the device most commonly used for external beam radiation treatments for patients with cancer. It delivers high-energy X-rays or electrons to the region of the patient's tumor. These treatments can be designed in such a way that they destroy the cancer cells while sparing the surrounding normal tissue.

Speaking as Chief Guest, Mr. Naeem termed early diagnosis as the key to cancer cure. In this context, he appreciated the role of 18 cancer hospitals in general and NORI in particular. He informed that the construction of 19th cancer hospital of PAEC in Gilgit (GINOR) has been completed and it will soon become operational.

Dr. Faheem, Director NORI thanked the Chairman for his unwavering support to the cause of upgrading NORI and other cancer hospitals being run under the aegis of PAEC in general. He also thanked President of Patient Welfare Society (PWS) of NORI, Aizaz Ahmad Chaudhry, for his valuable assistance, and saluted the whole team of NORI for dedicating their lives to providing relief to ailing cancer patients.

Cancer survivors including former Foreign Secretary, Aizaz Ahmad Chaudhry, and Member of Patient Support Group NORI, Samina Zafar, shared their experience of fighting the disease with the help of NORI team. She urged families of patients to extend all possible emotional support to them, and appreciated the dedication and professionalism of NORI doctors especially Dr. Faheem, Dr. Humera Mahmood, and Dr. Kashif.

In the end, the Head of the Oncology Department of NORI, Dr. Humera Mahmood, announced the names of teams winning the 'Breast Cancer Awareness Poster Competition'. Muhammad Naeem and Member Science PAEC, Dr. Masood Iqbal, distributed prizes among winners and shields among guests.

## Announcements

1. World Nuclear Fuel Cycle 2022, 22-24 March 2022, The Hague, The Netherlands
2. 1st International Conference on Accelerators for Research and Sustainable Development: From Good Practices towards Socio-economic Impact, 23-27 May 2022, IAEA HQ, Vienna, Austria
3. IAEA International Conference on the Safety and Security of Radioactive Sources, 20-24 June 2022, Vienna, Austria
4. IAEA's International Symposium on Managing Land and Water for Climate-Smart Agriculture, 25-29 July 2022, IAEA HQ, Vienna, Austria
5. IAEA Safeguards Symposium, 31 Oct.- 04 Nov. 2022, Vienna, Austria



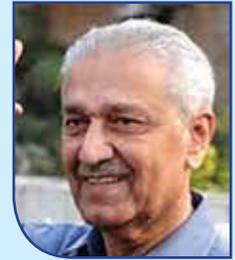
## News about PNS Members

### Obituary

#### Dr. Abdul Qadeer Khan

An iconic figure of Pakistan's nuclear weapons programme

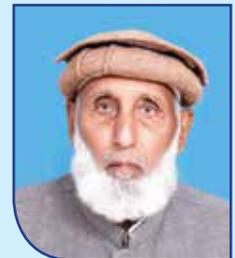
Dr. Abdul Qadeer Khan, a legend in the history of Pakistan, passed away after a prolonged illness. He made critical contributions in the national venture of acquiring nuclear deterrence capability, which involved thousands of scientists and engineers spread across 25 establishments. His major contribution was in uranium enrichment segment at A. Q. Khan Research Laboratories, in support of nuclear programme led by Pakistan Atomic Energy Commission (PAEC). This great venture enabled Pakistan to become 7th Nuclear Power in the world. Apart from his exceptional competence as manager of a sensitive project, he will be remembered through several other facets of his personality, which include: intense desire and measures taken to see Pakistan's progress in various technological fields, such as metallurgy and vacuum technology; establishment of educational institutions, providing best possible facilities to his coworkers and subordinates; interest in literature and patronage of literary figures as well as journalists; affiliation with Muslim heritage and efforts for resurgence of scholarship in the Muslim world. He was soft spoken, humble in attitude, respectful and caring, hardworking and a dedicated person. He courageously faced the onslaught of large-scale nefarious propaganda directed at him and Pakistan's nuclear programme. For his meritorious service to the nation, he was awarded the highest civil award 'Nishan-i-Imtiaz'. He died at the age of 85 and buried with State honors in Islamabad. He is remembered by the people as Mohsin-e-Pakistan. May ALLAH Kareem rest the departed soul in eternal peace (Ameen).



#### Dr. Manzur Ahmad Atta

A Pioneer Scientist of PAEC

Dr. Manzur Atta was born in April 1936 in a small village about 20 km from Faisalabad. After completing M.Sc. Physics from the Government College, Lahore in 1959, he joined the Government College, Faisalabad as a lecturer. In 1962, he joined PAEC and proceeded to Imperial College London for research leading to Ph.D. There he worked on the development of Thermionic Emitters for Energy Conversion under the supervision of Nobel Laureate Professor Denis Gabor and obtained Ph.D. in 1966. He returned to Pakistan in 1967 and worked on projects of national importance and did pioneering work in the development of Solar Energy at Atomic Energy Centre, Lahore. He was responsible for drafting Pakistan's Nuclear Safety and Radiation Protection Ordinance, 1984 and Pakistan Nuclear Safety and Radiation Protection Regulations, 1990. These were milestones in the PAEC history. In view of his performance in the field of health physics, he was made Head of the Health Physics Division of PINSTECH in 1988. He played a key role in the establishment and execution of four major facilities of international level at PINSTECH, namely:



i) Extension of continuous air particulate monitoring network to detect any radioactivity released locally or through incident/accident or nuclear explosion at the global level; ii) Mobile radiation monitoring laboratory to strengthen radiation protection measures in response to radiological emergencies; iii) Automation of thermo-luminescent dosimetry service to improve personnel dosimetry at the national level; and iv) Secondary standard dosimetry laboratory to provide full range of calibration service in the country. The scope of Environmental monitoring programme was enlarged to cover environment pollution caused due to emission of radioactive gases by initiating research work on "Radon Monitoring" for the first time. He published about 88 Scientific and Technical papers/reports, articles and edited two books on Solid State Physics-1974 and Nuclear Safety and Radiation Protection-1978. He was promoted as Deputy Chief Scientist in 1990 and retired on 31st March 1996. He had very good management and administrative skills. He was very polite, humble, helping and pious person and always met everyone with a smiling face. Dr. Manzur became victim of Lung Cancer and breathed his last on 12th October, 2021 in PAEC Hospital, Islamabad. May ALLAH Kareem rest the departed soul in eternal peace and place him at a high position in Jannah.

(Mr. S.D. Orfi, former President PNS)  
(Dr. Babar Manzoor Atta s/o Dr. Manzur Atta)

### Civil Award to PNS Lifetime Member



The Government of Pakistan has conferred the civil award 'Sitara-e-Imtiaz' to Mr. Faizan Mansoor, Chairman PNRA, a lifetime member of PNS in a ceremony held on 15th September 2021. This is a matter of pride for the prestigious Society.

### Social Events

#### A short hike cum picnic of PNS members and their families on Trail-5

Pakistan Nuclear Society organized a short hike for its members and their families living in Rawalpindi and Islamabad along Trail-5 on 24th October 2021. More than 60 persons, maintaining a gender balance, participated in this venture which was only 4km to and fro up to the first spring on the track. The event provided a chance for the families to meet each other. Matters related to academic activities of PNS were also discussed on this occasion. Thanks to the meticulous arrangements made by Mr. Zahid Hussain, Executive Member PNS, refreshments were served along with special tea prepared on-spot. The participants thoroughly enjoyed this hike-cum-picnic event and desired to have such social events more frequently.



#### Annual Dinner of PNS Members and their families

After closure of the AGM, some entertainment events were arranged before the dinner. A well-known artist Mr. Nasir Baig who is popular for his TV programme "Qissa go" presented a couple of poems and a short story about Jinnah and Ratti in his melodious voice. Two employees of from PAEC Centres, Mr. Shakir from Applied Chemistry Lab (ACL) played Rubab and Mr. Naveed from PINSTECH played Tabla.





## The Resolution for AAB

*The following resolution was approved by the majority votes of PNS Members present during the AGM on 18th December 2021 at Islamabad Hotel, Islamabad*

### Resolution on “Establishment of PNS Administrative Advisory Board”

**Whereas**, the Pakistan Nuclear Society (hereinafter referred to as “PNS” or “the Society”) is a nongovernmental, non-profit, independent academic organization, incorporated in 1990 under the Registration of Societies Act 1860;

**Whereas**, the PNS has a mandate to promote education and research in nuclear sciences and allied disciplines, as well as protect the interests of the professionals associated with these fields;

**Whereas**, the Society also acts as a think-tank to advance nuclear-related national interests at international level, informing relevant public policy, and creating public awareness about socio-economic benefits of nuclear technology;

**Whereas**, the Society is governed by an Executive Council comprising nine office bearers elected by its Members, in accordance with the provision of its Constitution and prescribed “Rules and Regulations”;

**Whereas**, the PNS has no regular sources of income and lacks adequate support from public as well as private sector, impinging upon the effective performance of its role;

**Whereas**, there is a need to associate a group of prominent high-profile national personalities in the working of PNS for guiding and assisting PNS Council in its administrative and financial affairs; it is, therefore, resolved as under:

1. There shall be an “Administrative Advisory Board” (AAB) of PNS, comprising of no more than 10 outstanding personalities as its members.
2. The AAB members shall be nominated after due diligence about their suitability and inducted for a term of two years through consensus in the PNS Council meeting.
3. The AAB will work on voluntary and honorary basis to complement the mandate of “Scientific Advisory Board” (SAB), which is entrusted to advise PNS Council on purely technical matters.
4. The members of AAB will elect their own President and meet as often as feasible in PAEC Rest House with hospitality and logistical support provided by PNS.
5. The Terms-of-Reference of the AAB shall be as follows:
  - I. To monitor the public profile of PNS and recommend ways and means for creating greater visibility of the Society in print and electronic media;
  - II. To generate awareness among the administrations of strategic organizations that patronage PNS in their self-interest;
  - III. To help devise schemes for financial autonomy of PNS, through commercial projects, endowment mechanisms and donation opportunities;
  - IV. To approach policy makers in the sectors of nuclear safety and security, international relations, science and technology and industrial development for engaging PNS members in their consultative committees.
  - V. To undertake general lobbying for achieving aims and objectives of the Society.

## Message from the President

**Dr. Imtihan Elahi Qureshi, T.I**

In the first Newsletter under the present Executive Council of PNS, I had candidly expressed my expectations from three stake-holders; (i) the nuclear community, especially the lifetime members of PNS, (ii) the senior officials of strategic organizations, and (iii) the office bearers of PNS including the members of Executive Council. On completion of the first year of our tenure, it is worthwhile to take stock of what has been achieved by which group with respect to their anticipated roles and obligations.



I will start with the performance of incumbent Executive Council, because it is this elected body, which was entrusted to run the affairs of the Society in accordance with the aims and objectives laid down in its constitution. A report in this respect was presented in the Annual General Meeting held on 18th December 2021 by the honorable General Secretary, which is partially reproduced in this issue of the Newsletter. What is immediately noticeable in this report is the high aspirational level of the team at the outset of the tenure, with commensurate achievements during the ensuing months, in spite of working conditions that can hardly be regarded as ideal. It is worth recalling that the team consists of 9 members, who perform their functions on honorary basis and devote only their spare times for Society's work, which varies from person-to-person. The PNS does not have even a single paid employee, nor is any volunteer assistance available for office work. How is it then that in one year the Society was able to organize 5 major seminars in four different cities, hold three webinars with international participation, arrange visits to 11 organizations and Institutes to cultivate partnerships, hold three social events in Islamabad, participate in several academic functions as speakers, publish a high-quality quarterly Newsletter, create and maintain a highly informative website, while planning and submitting proposals to relevant authorities for the welfare of PNS members? It can be said without exaggeration that our team has outperformed many forums that have scores of employees with hefty salaries and lavish facilities. The one word that explains the outstanding performance of PNS Council is 'dedication'. These efforts deserve the highest gratitude and greatest respect from those parties who stand to make substantial gains because of Society's work.

What the Society is primarily focused on is the advancement of nuclear science and technology and allied disciplines in the country and protection of the interests of professionals engaged in these fields. The major part of its work is devoted to the promotion of peaceful uses of nuclear technology. Hence those organizations and groups that undertake such work find their achievements highlighted from the platform of PNS. That constitutes a significant advantage for them in terms of public relations. It would be reasonable to expect that the Society gets institutional patronage for its services. It is especially incumbent upon PNS lifetime members occupying high-level positions in strategic organizations to ensure that the Society gets the necessary resources that it requires for performing its functions smoothly. Unfortunately, the score card in this respect leaves much to be desired. In fact, the card shows a figure of zero in terms of the recurrent grants, endowments, and donations.

Nuclear Societies all over the world perform dual roles of advocating the advantages of safe and peaceful uses of nuclear techniques for socio-economic development, and provide necessary networking to relevant professionals for safeguarding their interests and advancing their careers. These objectives require human and financial resources, which are made available from a variety of sources. Many of these avenues for generating funds for the PNS are non-existent, because of a highly centralized state-owned system for managing nuclear-related activities in the country. Within this system, the PNS exists as a unique entity, which provides an independent channel of communication between managers and workers. Hence there is a general consensus on the usefulness of this forum within both groups. For its lifetime members as well as other nuclear professionals, the PNS is a highly prized forum that provides a group identity to nuclear community. The preservation and enhancement of its role and respectability is, consequently, a shared responsibility of all members, whether in service or retired. To what extent is this fact recognized by PNS general membership can be gauged from the level of support that the individuals provide to the Society. The output in this sector is actually far from encouraging.

In conclusion, I am obliged to make rather grim end-of-year observations:

1. The present team of Executive Council members is highly committed to serve the cause of PNS. If no support is forthcoming from relevant quarters even after one year of unfulfilled promises, there is a distinct chance of their getting demotivated.
2. The members of PNS are the proud owners of a 30-year long legacy and an unmatched platform in terms of its prestige. If they chose not to take any action in their personal capacities for the uplift of this Society, it will eventually lose its relevance.
3. The Society and its office bearers represent collective dignity of those who have made invaluable contributions for the interests of the country in most crucial sectors. It will not be in the interest of nuclear community if this honorific status is compromised under any circumstances.



## Proposed calendar of Activities January-June, 2022

Month	Activity	Title	Coordinator(s)
January (3rd week)	Popular Lecture	40 years in PAEC, PIEAS -TBD	Mr. Waqar A. Butt
January (4th week)	Seminar	Implications, care and prevention of COVID-19, PAEC Hospital, Islamabad	Dr. Abdul Majeed
February (2nd week)	Seminar	Role of Satellite Technology for National Development, SUPARCO, Islamabad	Dr Tahir Khaleeq
February (3rd week)	Social event	Short hike/ picnic on Margalla Hills, Trial-5, Islamabad	Syed Zahid Hussain
February (4th week)	Seminar	Long term safety of NPPs, KANUPP, Karachi (Joint activity with PNRA)	Syed Yusuf Raza Dr. Arif Ahmad A Rep from PNRA
March (2nd week)	Seminar	Nuclear Techniques in Agriculture, NIA, Tandojam	Dr. Saima Mir
March (4th week)	Seminar	Prospects, exploration and usage of rare earth elements in Pakistan, AEMC, Lahore	Dr. Niaz Ahmad
April (2nd week)	Seminar	Preventive measures and role of various sectors during a nuclear emergency, PNRA, Islamabad	Ms. Shazia Fayyaz
April (3rd week)	Exhibition	Books and authors of science in Pakistan at National Library, Islamabad (Joint activity with NBF, PASTIC & MoE)-TBC	Mr. Waqar A. Butt
May (3rd week)	Workshop	Role of Mathematics in S&T development, Panjab Univ. Lahore-TBC	Mr. Ghulam Sarwar Dr. Niaz Ahmad
May (3rd week)	Seminar	Recent advances in Nuclear Medicine, LINAR, Larkana	Dr. Shazia Fatima
June (1st week)	Seminar	Quality improvement of Indigenous products, Sialkot-TBC	Dr. Niaz Ahmad
June (3rd week)	Seminar	Importance of Human Resource Development & Capacity Building for Sustenance of National S&T programmes, HEC, Islamabad	Dr. Mohammad Mohsin Mr. Waqar A. Butt
June (4th week)	Seminar	Advances in Nuclear Medicine, CINAR, Quetta	Dr. Shazia Fatima

## Benefits to become PNS Lifetime Member

1. Growing professional circle by strengthening connections with peers in relevant fields
2. Free access to nuclear related webinars, online courses and discussions to share views and enhance knowledge of current issues, challenges and opportunities in nuclear science and technology
3. Group visits at various S&T organizations/universities
4. Free e-copy of quarterly PNS Newsletter
5. Login facility at PNS website with a secure password
6. A colorful Lifetime Membership Card with a photo
7. 50% reduction in PNS conferences fee
8. 20-30% fee reduction in conferences arranged by other organizations
9. 25% discount in fee on courses offered by Pakistan Institute of Management (PIM)
10. 50% reduction in Annual Gala Dinner at Islamabad Club
11. Social programmes like family picnic/hikes, trip to Northern areas, etc.
12. Registration/Lifetime Membership Fee is only Rs. 2,100/-.
13. Membership Form is available at [www.pns.org.pk](http://www.pns.org.pk) (Form and Fee can be deposited online in PNS Bank Account at NBP, Margalla Br. Islamabad, **IBAN: PK18NBPA1725004018982691**)