VIGYAN
SAMAGAM

PUSHING THE FRONTIERS OF SCIENCE

Vigyan Samagam
"Scientre Stage"

In order to highlight the value and impact of fundamental research to a broad cross-section of audience including students, academicians and industry, and to further strengthen India's participation in mega-science projects, Department of Atomic Energy (DAE), Department of Science and Technology (DST) and National Council of Science Museums (NCSM) are jointly organising a multi-venue mega-science exhibition, Vigyan Samagam.

The following eight mega-science collaborations will be showcased in Vigyan Samagam:

- European Organisation for Nuclear Research (CERN)
- Facility for Antiproton and Ion Research (FAIR)
- India-based Neutrino Observatory (INO)
- International Thermonuclear Experimental Reactor (ITER)
- Laser Interferometer Gravitational-Wave Observatory (LIGO)
- Major Atmospheric Cerenkov Experiment (MACE)
- Square Kilometer Array (SKA)
- Thirty Meter Telescope (TMT)

A first-of-its-kind, Vigyan Samagam shall be hosted in a caravan mode at four major Indian cities as per the following schedule:

- Mumbai: 8th May to 7th July, 2019
- Bengaluru: 29th July to 28th September, 2019
- Kolkata: 4th November to 31st December, 2019
- Delhi: 21st January to 20th March, 2020

"Scientre Stage" is the inaugural, 2-day science event at each of the four cities, including the formal inauguration ceremony itself.

Inauguration

Welcome address
Mr. Ranajit Kumar, Head, NCPW, DAE, Mumbai

About the Speaker:

- Ranajit Kumar is an Outstanding Scientist & Head of Nuclear Controls & Planning Wing in the Department of Atomic Energy (DAE). He is a leading specialist with outstanding contribution in the area of international nuclear safeguards, nuclear security and nuclear safety. He is leading DAE in the area of international civil nuclear cooperation, international cooperation on nuclear science & technology including cooperation on mega sciences projects, negotiation and implementation of international safeguards in all obligated facilities of DAE, nuclear security policy formulation and implementation etc. He is also leading the cooperation on cutting edge mega science projects with various international organizations like International Thermonuclear Experimental Reactor (ITER), The European Organization for Nuclear Research (CERN), world's third Laser Interferometer Gravitational Wave Observatory (LIGO) in India, Square Kilometre Array (SKA), Thirty Meter Telescope (TMT), India based Neutrino Observatory (INO) and Facility for Anti-proton Research (FAIR). He is leading a team responsible for technical evaluation and grant of export / import and handling license of prescribed substances, equipment and technologies as well as nuclear related dual use goods, equipment and technology as covered under SCOMET list. He is also leading the activities of the Global Centre for Nuclear Energy Partnership (GCNEP), an institute established for promoting R&D, training and human resource development with a vision to promote safe, secure and sustainable nuclear energy, in partnership with countries like USA, France, UK and international organization like IAEA.
- He serves as a member in the Council of Management of Tata Institute of Fundamental Research (TIFR), in the International Thermonuclear Experimental Reactor (ITER) Council, in the BRIT (Board of Radiation & Isotope Technology) Board, DAE and in the "Standing Advisory Group of Safeguards Implementation (SAGSI)" of the Director General (DG) of International Atomic Energy Agency (IAEA). He served as a member from India to the Nuclear Security Guidance Committee (NSGC) of IAEA during 2012 – 2017.
- Ranajit Kumar obtained his Bachelor of Engineering (Electronics & Tele-Communication Engineering) from Bengal Engineering College, Calcutta University (presently known as IIEST - Indian Institute of Engineering, Science and Technology, Shibpur) in the year 1984. After completion of 1 year Orientation Course in Nuclear Engineering in Bhabha Atomic Research Centre (BARC) Training School (September, 1984 – August, 1985), he joined Reactor Control Division in BARC as R&D electronics engineer. In BARC, he has spent more than 31 years' in designing computer and microprocessor based system for application in Nuclear Safety and Nuclear Security. He was responsible for design, development, planning and implementation of nuclear security systems for different types of nuclear fuel cycle facilities including nuclear power plant, reprocessing and waste management plant, research laboratory etc.
- Shri Ranajit Kumar was awarded Technical Excellence Award of DAE in the year 2011. He was also awarded several group achievement awards of DAE.

About Vigyan Samagam

Dr. Praveer Asthana, Head, Mega Science Division, DST, New Delhi

About the Speaker:

- Dr. Praveer Asthana, an Adviser/Scientist-G in DST, is currently the Head of INSPIRE and Mega Science Divisions of DST. He did his Ph.D. in Theoretical Particle Physics from the University of Alberta, Canada and he joined DST in April 1989. Some of the major responsibilities handled by him in DST are – adoption of Science and Technology Policy 2003 by the Government, Nano Mission, establishment of SERB, KVPY, INSPIRE, the Women Scientists Scheme, scientific, administrative and budgetary affairs of 25 DST autonomous institutions and mega science projects like collaborations with CERN, Fermilab, KEK, Elettra, FAIR, DESY, TMT, INO and so on.

Address by Guest of Honour
Prof. Ashutosh Sharma, Secretary, DST, New Delhi

About the Speaker:

- Ashutosh Sharma is the Secretary to the Government of India since January 2015, heading the Department of Science and Technology (DST), where he helped initiate several new programs.
- Ashutosh received his PhD from the State University of New York at Buffalo (SUNYAB; 1988), his MS from the Pennsylvania State University (1984) and B.Tech. from IIT Kanpur (1982). He has been a professor (1997-), an Institute Chair Professor (2007-) and the Head (2003-05) of Chemical Engineering, and the founding Coordinator of Nanosciences Center and Advanced Imaging Center at the Indian Institute of Technology at Kanpur.
- He has published over 340 peer reviewed papers, filed over 15 patents, given over 150 invited or key note conference presentations and mentored a successful nanotechnology startup.
- Ashutosh is a recipient of numerous honors and awards including the inaugural Infosys Prize in Engineering and Computer Science, TWAS Science Prize of the World Academy of Sciences, Bessel Research Award of the Humboldt Foundation, J. C. Bose Fellowship, Bhatnagar Prize, Homi J. Bhabha Award of UGC, The Syed Husain Zaheer Medal and the Meghnad Saha Medal of INSA, Distinguished Alumni Awards of IIT Kanpur and SUNY Buffalo, Firodia Award and the Life-time Achievement Award of the Indian Science Congress.
- Ashutosh is an elected Fellow of The Indian National Science Academy, The Indian Academy of Sciences, The National Academy of Sciences, India and Indian National Academy of Engineering, The World Academy of Sciences (TWAS) and the Asia-Pacific Academy of Materials. He has also served on the Councils of the first two. He has been an associate editor of ACS Applied Materials and Interfaces, Proceedings of Indian National Science Academy and ASME Journal of Micro- and Nano-Manufacturing and has been on the editorial boards of several journals: Carbon; ACS Industrial and Engineering Chemistry Research; Current Science; Nanomaterials and Energy; Chemical Engineering Science; Journal of Colloid and Interface Science; Canadian Journal of Chemical Engineering and Indian Chemical Engineer.

Address by Guest of Honour
Mr. Arijit Dutta Choudhury, Director General, NCSM, Kolkata

About the Speaker:

- Mr. Arijit Dutta Choudhury is a science museum/centre professional and has been serving presently as the Director General of the National Council of Science Museums, under the Ministry of Culture, Government of India.
- He has more than 30 years of work experience in developing and operation of Science Centres under NCSM comprising development of exhibits, complete projects on turnkey basis etc. He joined the National Council of Science Museums (NCSM) in 1987 and worked in various capacities including Director of Science City, Kolkata. During his career spanning over 31 years in science education and communication, he has contributed immensely to the development of number of science museums/centres and other museums in the country, various exhibitions and activities and non-formal science education programmes for students, teachers and general public.
- He is a member of many Science Communication organizations and science museum/centre boards.

Address by Chief Guest
Dr. Anil Kakodkar, Member, AEC & Chairperson, RGSTC, Mumbai

About the Speaker:

- Anil Kakodkar is Chairman of Rajiv Gandhi Science and Technology Commission, Government of Maharashtra, and Former Chairman and currently a Member of Atomic Energy Commission.
- Kakodkar has been a key contributor to India's strategic programme and has worked for the development of the atomic energy programme in India throughout his professional life.
- Kakodkar received his BE from the Bombay University (1963) and M.Sc. from the Nottingham University (1969). He joined the Bhabha Atomic Research Centre (the then Atomic Energy Establishment) in 1964. He became the Director of BARC in 1996 and served as the Chairman, Atomic Energy Commission and Secretary to the Government of India, Department of Atomic Energy (DAE), during the years 2000 - 2009. He was DAE Homi Bhabha Chair Professor during Jan. 2010 – Jan. 2015 and INAE Satish Dhawan Chair of Engineering Eminence during Jan. 2015 to Jan. 2017.
- Kakodkar championed observer status for India at CERN (European Centre for Nuclear Research), partnership in the ITER (International Thermonuclear Experimental Reactor) project and exemption for nuclear trade from Nuclear Supplier's Group (NSG). Notable among his innovative contributions to human resource development activities are the establishment of NISER (National Institute of Science Education and Research), DAE-Mumbai University CBS (Centre for Basic Sciences) and HBNI (Homi Bhabha National Institute). He also led a committee set up by Government of Maharashtra to look at higher education in the State. Another high level committee under his Chairmanship has made comprehensive recommendations for improvement of safety on Indian Railway.
- Dr. Kakodkar presently devotes his time primarily on issues related to energy, education and societal development. He has been propagating the concept of CILLAGE, a knowledge based ecosystem for bridging city and village gaps for technology enabled sustainable development in rural areas.

VIGYAN SAMAGAM
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Keynote Address

Prof. V.S.Ramamurthy, Emeritus Professor, NIAS, Bengaluru

About the Speaker:

Prof. V. S. Ramamurthy is a well known Indian nuclear scientist with a broad range of contributions from basic research to science administration. Prof. Ramamurthy started his career in Bhabha Atomic Research Centre, Mumbai in the year 1963. During the period 1995-2006, Prof. Ramamurthy was fully involved in science promotion in India as Secretary to the Government of India, Department of Science & Technology (DST), New Delhi. He is currently Emeritus Professor, National Institute of Advanced Studies, Bangalore. Prof. Ramamurthy is an elected Fellow of the three Science Academies (IASc, INSA and NASI), the Engineering Academy (INAE) of India and The World Academy of Sciences (TWAS). In recognition of his services to the growth of Science and Technology in the country, Prof. Ramamurthy was awarded the Padma Bhushan by the Government of India in 2005.

Vote of Thanks

Mr. Reetesh Chaurasia, Scientific Officer, DAE, Mumbai

About the Speaker:

- Reetesh Chaurasia is a Scientific Officer and Member of Societal Outreach Programme Cell in the Department of Atomic Energy (DAE).
- Reetesh received his B. Tech. (Electronics Engineering, KNIT Sultanpur, 1998) and M. Tech. (Nuclear Engineering Technology, IIT Kanpur, 2011) degrees before joining the Bhabha Atomic Research Centre (BARC), Mumbai. He worked in Electronics Division (2001-2012) and Control & Instrumentation Division (2012-2013) of BARC. He contributed to initiating the Department's project on perception management and later joined its implementation group constituted at DAE.
- Reetesh is credited with curating a number of outreach programmes and introducing newer dimensions to DAE's communication strategy including engaging television, social, collaborative and creative media for science communication and public engagement. In recognition of his creative work, Reetesh received DAE Special Contribution Award in 2015.
- Reetesh currently manages the social media portals of DAE and is leading a team of content developers for TV, print and digital media outreach of DAE.

European Organisation for Nuclear Research (CERN)

European Organisation for Nuclear Research (CERN)

Dr. V.B. Chandratre, Electronics Division, BARC, Mumbai

Tech development challenges in HEP experiments: Achievements & spin-offs

Abstract:

- The talk will discuss challenges in development of instrumentation and systems for accelerator based high energy physics. It will focus on various issues in development of critical components for accelerator, detectors, readout out electronics and computational facilities. The talk will highlight and illustrate how these challenges were overcome with help of industrial partners and academic institutions during development and production phase. It will also indicate how it affected the seeding of other technologies required for the country. The talk will discuss the next phase of R&D engagement with the upcoming advance facilities.

About the Speaker:

- Dr. V B Chandratre completed his MSc (Physics) from Pune University and joined BARC in 1988 after completion of the 31st batch of BARC training school. He did his PhD from Mumbai University. He has been involved in development of Application Specific Integrated Circuits ASICs, large area semiconductor silicon detectors and development of front end electronics for High Energy Physics experiments. He has developed number of ASICs, large area silicon strip detector for CERN CMS and large area Pixel detector for prototype FoCAL ALICE experiment. He is recipient of Technical Excellence Award from the Department of Atomic Energy, India.

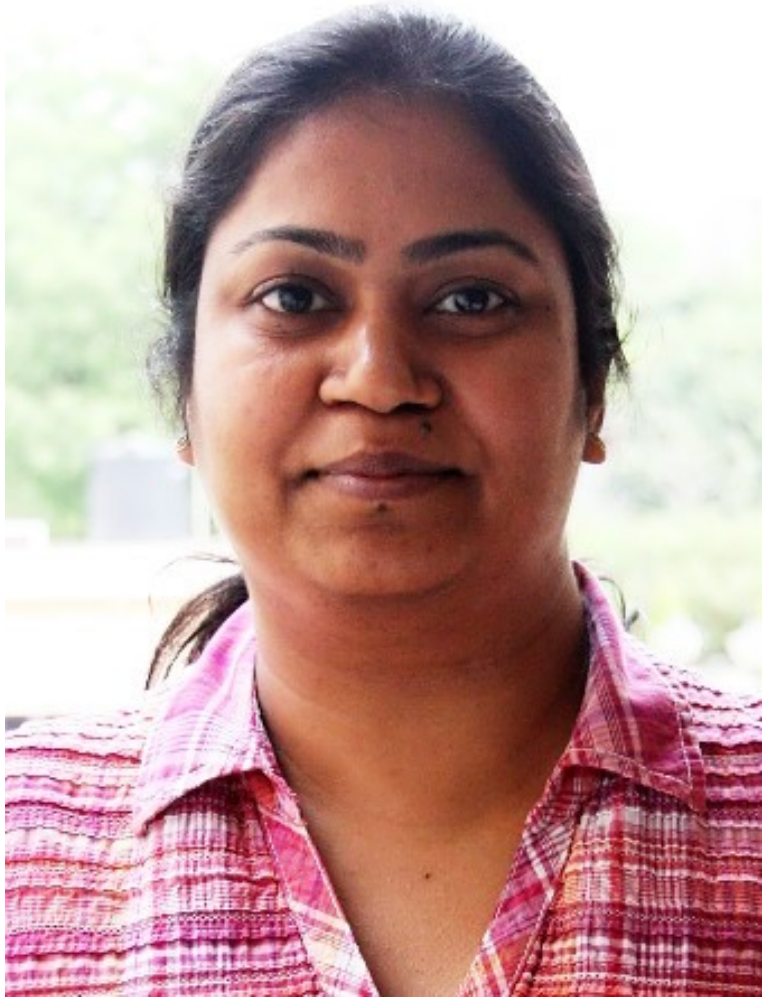
European Organisation for Nuclear Research (CERN)

Prof. Seema Sharma, IISER-Pune

India's Contribution to CMS Experiment at CERN

About the Speaker:

- Dr. Seema Sharma is an Associate Professor of Physics at the Indian Institute of Science Education and Research in Pune (IISER, Pune). She completed her PhD from TIFR, Mumbai and was a postdoctoral research fellow at Fermilab, USA before joining IISER-Pune. Dr. Sharma is an experimental particle physicists interested in understanding the fundamental building blocks of nature and their interactions using the proton proton collisions delivered by the Large Hadron Collider. Along with members of India-CMS collaboration, she is preparing for upgrading the CMS detector components to be able to sustain harsh radiation exposure as the LHC becomes more powerful in coming years. In her quest for unraveling the mysteries of nature, Dr. Sharma is playing a key role in searching for the new fundamental particles, and is presently leading the “SuperSymmetry Physics Group”, one of the three new physics search groups of the CMS experiments’ physics program.



European Organisation for Nuclear Research (CERN)

Dr. Subhasis Chattopadhyay, Variable Energy Cyclotron Centre, Kolkata

Exploration of micro-second old universe in the laboratory

Abstract:

- Collisions of two heavy ions like lead creates an extremely high density matter which is similar to that of the micro-second old universe. The state of matter known as Quark Gluon Plasma (QGP) consists of quarks and gluons, basis constituents of strongly interacting matter in a deconfined state. A dedicated experimental setup called A Large Ion Collider Experiment (ALICE) in LHC-CERN has been taking data with Pb+Pb collisions and concluded to have found QGP at LHC energy. Indian researchers have been participating in a big way in ALICE. In this presentation details on physics, technology with emphasis of India's participation will be discussed.

About the Speaker:

- Dr. Subhasis Chattopadhyay completed his MSc (Physics) from Calcutta University and joined VECC in 1988 after completion of the 31st batch of BARC training school. Dr. Chattopadhyay has been working on High energy heavy ion collisions to study the deconfined state of strongly interacting matter. He has worked in WA93 experiment for his PhD followed by WA98, STAR and currently in the ALICE experiment at CERN. He is involved in building advanced detector systems for these experiments. He is presently holding the position of the Spokesperson of the ALICE-India collaboration and Programme Director of the Indo-FAIR Co-ordination Centre at Bose Institute, Kolkata. He is recipients of Homi Bhabha Science and Technology award from the Department of Atomic Energy. So far fifteen students have completed PhD under his supervision.

European Organisation for Nuclear Research (CERN)

Mr. Suman Sarkar, BARC, Mumbai

Partnership of Indian Industries & further business opportunities with CERN

Abstract:

- India has contributed significantly in construction, commissioning and upgrade of Large Hadron Collider. The partnership continued post LHC era in constructing components for the new accelerators like Linac 4 and CLIC(CTF3). The large scale production of the components and equipment were done in Indian Industries and supplied to CERN under the supervision of RRCAT Indore as Nodal institute. The contributions qualified the stringent technical requirements and were used in the accelerators at CERN. Further to India becoming Associate Member of CERN, opportunities exist for Indian industries for doing business with CERN. The talk will discuss about the contributions of Indian industries, opportunities and ways of doing business with CERN. Forthcoming market surveys and calls for tenders from the CERN procurement service will be discussed keeping in view the current scenario.

About the Speaker:

- Mr. Suman Sarkar completed his B.E. (Mechanical) from Government Engineering College, Jabalpur in 1997 and joined BARC Training School in the 41st Batch. He got inducted into BARC as Scientific Officer in the year 1998. Since then he is involved in the development of various Nuclear Reactor Projects such as India's First 540 MWe Pressurized Heavy Water Reactor (PHWR), Prototype Fast Breeder Reactor (PFBR) and Compact Light Water Reactor. He received "Bhabha Group Achievement Award" in 2012 and 2014 for indigenous development of Calorimeter for assay of SNMs and for development of Gamma Scanners for core calibration facility respectively. He is carrying out several design and development work related to indigenous development of technology and national security. He is also CERN – Industrial Liaison Officer.

Major Atmospheric Cerenkov Experiment (MACE)

Project: Major Atmospheric Cerenkov Experiment (MACE)

Dr. A.K.Tickoo, Head, Astrophysical Sciences Division, BARC, Mumbai

MACE Gamma-Ray Telescope

Abstract:

- A large imaging atmospheric Cherenkov telescope MACE (Major Atmospheric Cherenkov Experiment) is being set up at Hanle, Ladakh by the HiGRO (Himalayan Gamma-Ray Observatory) collaboration comprising BARC, TIFR and IIA. The 21m diameter light collector of the telescope comprises 356 mirror panels of size ~ 984 mm x 984 mm where each panel consists of 4 indigenously developed diamond turned aluminium honeycomb mirror facets. The imaging camera of the telescope employs 1088 photomultiplier tubes and covers a field of view of ~ 4.3^{o} x 4.0^{o} with a resolution of ~ 0.125^{o}. Designed to operate at a trigger threshold energy ~ 20 GeV (1 GeV = 10^{9} eV), the telescope will play an important role in understanding very high energy processes in the Universe. Scientific objectives of the MACE telescope, its key design features and current status of the telescope will be presented in the talk.

About the Speaker:

- Dr. A.K.Tickoo completed his Master's degree in Physics in 1981 from Kashmir University. He is from the 30th batch (Physics discipline) of the BARC training school and has been associated with the gamma-ray astronomy programme of the Astrophysical Sciences Division for the last 32 years. He obtained his Ph.D degree from Mumbai University. At present he is the Head of Astrophysical Sciences Division of BARC and is contributing towards setting up of the 21 m diameter MACE (Major Atmospheric Cherenkov Experiment) telescope at Hanle.

Thirty Meter Telescope (TMT)

Project: Thirty Meter Telescope (TMT)

Dr. Luc Simard, DG, HAANRC, National Research Council of Canada

Designing and Building the TMT: A Story of Science, Technology and People

Abstract:

- The Thirty Meter Telescope (TMT) International Observatory is a partnership between China, India, Japan, Canada, the University of California and the California Institute of Technology to build a next-generation 30-m telescope with powerful adaptive optics systems and cutting-edge science instruments. It represents a gain of almost 200 times in sensitivity over existing large telescopes. The science cases span the full cosmic timeline from the first luminous objects in the Universe to our own Solar System, and TMT might even yield the first detection of life elsewhere in the Universe. This talk is a story of science, technology and people at the heart of this exciting new telescope.

About the Speaker:

- Luc Simard joined the National Research Council's Herzberg Astronomy and Astrophysics Research Centre in 2002 and is currently the Director General with a staff of over 130 scientists, engineers and support personnel. He obtained his PhD from the University of Victoria in 1996 and his scientific research has been dominated by work with large galaxy surveys. His primary interests lie in theoretical and observational tests of galaxy formation and evolution models. He is also heavily involved in astronomical instrumentation for large telescopes, particularly TMT and SKA as well as the development of software tools and methods for effective data mining of very large datasets. Luc also takes every opportunity to engage in public outreach promoting astronomy.

Project: Thirty Meter Telescope (TMT)

Prof. Eswar Reddy, Programme Director, India TMT & IIA, Bengaluru

India's Participation in the TMT project

Abstract:

- India participates in the TMT project at about 10% level with total approved outlay of Rs 1299.80 crores over 10 year construction period. India participates in the project mostly (70%) by in-kind contributions such as design, development and manufacturing of a number of systems: primary mirror segments, segment support assemblies, edge sensors, actuators, mirror coating plants, telescope control and observatory control software, back end science instruments etc. About 30% of India's contribution will be made in cash to meet project common objectives. India's participation in TIO is an extramural national project jointly funded by the Department of Science & Technology (DST) and the Department of Atomic Energy (DAE).

About the Speaker:

- B. Eswar Reddy is a professor at Indian Institute of Astrophysics, Bangalore and is the Programme Director of India Thirty Meter Telescope Project (TMT). Eswar obtained his PhD from Indian Institute of Astrophysics, Bangalore in 1997. He has done postdoctoral fellowships at Valparaiso University and University of Texas, US. He is an expert in stellar spectroscopy and his research interests include Galactic chemical evolution, Li-rich K giants and AGB/post-AGB stars. He has contributed significantly to his field of research and has many well cited publications.

Project: Thirty Meter Telescope (TMT)
Prof. Annapurni Subramaniam, IIA, Bengaluru
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Moderator:

- Annapurni Subramaniam is a professor at the Indian Institute of Astrophysics. She has about three decades of research experience and had published about 200 research publications in topics such as, star clusters, stellar populations, galaxies near the Milky Way, and ultra-violet astronomy. She has guided a large number of students. Annapurni heads the Indian team of the Observatory software (OSW), with the responsibility for software delivery starting from 2019 for the Thirty Meter Telescope (TMT). She is the calibration scientist of the UV Imaging Telescope (UVIT) onboard India's first space observatory, ASTROSAT.

Project: Thirty Meter Telescope (TMT)

Prof. Ajith Kembhavi, IUCAA, Pune & Chair, India TMT PMB

Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Ajit Kembhavi is Professor Emeritus and Raja Ramanna Fellow at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune. He was Director of IUCAA during 2009-2015. Professor Kembhavi is a distinguished astronomer who works on galaxies, quasars and other extragalactic objects, various areas of high energy astrophysics and X-ray and radio pulsars. He has published a large number of research papers and several books. He is involved in many international collaborations and for several years been involved with the Thirty Metre Telescope (TMT) Project and the LIGO India projects. He is now on the Apex Committees of these projects. In the field of data driven science, Professor Kembhavi has led the Virtual Observatory-India project for fifteen years and now leads a Big Data project supported by NKN. He is Vice-President of the International Astronomical Union and former President, Astronomical Society of India. He was a member of the Space Commission. He is a Fellow of the Indian Academy of Sciences and the National Academy of Sciences, India.

Project: Thirty Meter Telescope (TMT)
Dr. P. Sreekumar, Director, Space Science Program Office, ISRO HQ
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Dr. P. Sreekumar pursued his Ph.D in Physics at the University of New Hampshire, USA in the area of gamma-ray astronomy. As a core member of the science team of the Compton Gamma-Ray Observatory, he pursued his research in the area of extragalactic diffuse gamma-ray emission at NASA/ Goddard Space Flight Center for a decade. In 1999, he returned to India and headed the Space Astronomy Group at the ISRO Satellite Center. In 2013, he was deputed to be the Director of the Indian Institute of Astrophysics, Bangalore for a 5-year period. In July 2018, he returned to ISRO to head the Space Science Program Office at ISRO HQ. Dr. Sreekumar's research work includes cosmic rays, gamma-rays, x-rays and ultra-violet astronomy. He has contributed to the design and development of space payloads on Chandrayaan-1 as PI and as Co-PI. His current interest is on the development of multilayer mirrors for x-ray polarimetric studies.

Project: Thirty Meter Telescope (TMT)
Mr. S. Murali, CEO, General Optics Asia Ltd, Puducherry
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Mr. S. Murali is a B.Tech graduate from Madras University and obtained his M.S from Indian Institute of Technology (IIT) Madras. He is the Founder and Director of General Optics (Asia) Limited (GOAL), a hi-tech Precision Opto-electronics & Optical Instruments Company serving Defence, Space, Medical and Scientific Programmes. Under his leadership the company has received several recognitions and awards.

Square Kilometre Array (SKA)

Project: Square Kilometre Array (SKA)

Prof. Philip Diamond, Director-General, SKA Organisation

The SKA: exploring the cosmos from the dawn of time to the origins of life

Abstract:

- The Square Kilometre Array, a next-generation radio telescope, will change the way humanity views the Universe. Building on 70 years of radio astronomy developments, astronomers and engineers are preparing to construct what will be the largest scientific instrument on the planet. The SKA will be built in Australia and South Africa by a global collaboration of nations, including India. The science to be done by SKA encompasses almost the entire history of the Universe, from exploring the so-called Cosmic Dawn, when the first stars and galaxies were formed, to understanding how planets are formed in the present day. Along the way SKA will enable precise studies of the secrets of gravity, dark energy, dark matter and the molecular building blocks of life.

About the Speaker:

- Professor Philip Diamond is the Director-General of the SKA. He was appointed to this position in October 2012 and is leading the team designing and constructing the SKA, which, when completed, will be the largest scientific project on Earth. Prior to this he held the following posts: Director of CSIRO Astronomy and Space Science, Australia (2010-2012); Director of the Jodrell Bank Centre for Astrophysics, UK (2006-2010), Director of e-MERLIN, UK (1999-2006). He completed his PhD at the University of Manchester in 1982. He worked at the Onsala Space Observatory in Sweden (1982 – 1984) and the Max-Planck Institute for Radio Astronomy in Bonn, Germany (1984 – 1986) before moving to the National Radio Astronomy Observatory (NRAO) in the USA for 12 years (1987 – 1999). He held the position of Deputy Director of the NRAO's VLA and VLBA before moving back to the UK in 1999.

Project: Square Kilometre Array (SKA)

Prof. Nirupam Roy, Indian Institute of Science, Bangalore

New Science with the SKA: A giant leap in exploring the magical world

Abstract:

- From the first detection of radio wave of astrophysical origin in 1930s, Radio astronomy has walked a long way, and has helped in our quest to understand the universe. Now, scientists and engineers from all over the globe join hands to build the Square Kilometre Array (SKA), the next generation radio telescope with unprecedented capabilities enabled by advanced technologies. From "Cosmic Dawn" to "Cradle of Life", this talk is an overview of the plethora of transformational science that will be done with the SKA, and how the Indian science community is involved in some of the key SKA science drivers.

About the Speaker:

- Nirupam Roy did his Ph.D. from the National Center for Radio Astrophysics (NCRA-TIFR). He is currently an Assistant Professor and Convener of the Joint Astronomy Programme at the Indian Institute of Science. He is also one of the Ambassador Scientist of the Alexander von Humboldt Foundation in India. He was a Jansky Fellow at the National Radio Astronomy Observatory, USA, and then a Humboldt Fellow at MPIfR (Bonn) In Germany. Nirupam was awarded the INSA Medal for Young Scientists (2013) of the Indian National Science Academy. His main research interests include observational cosmology, study of Galactic novae and interstellar medium.

Project: Square Kilometre Array (SKA)

Prof. N. Udaya Shankar, Raman Research Institute, Bengaluru

Panel Discussion: Symbiosis between SKA and Indian Industries

About the Panel Moderator:

- N Uday Shankar did his Ph.D. from Bangalore University. His thesis work on new digital techniques to radio astronomy measurements was carried out at Raman Research Institute. From 2000,he is the Professor at RRI and an Emeritus Prof. from 2018. His main research interests include Signal processing for radio astronomy, Synthesis imaging, Control system for radio telescopes, Optical Interferometry, Low frequency Radio Astronomy, Giant Radio Galaxies. At present, he is an active member of a team involved in building an instrument to study the emission from the first stars born in this universe. He contributed significantly in the Design and development of a new technology 12m radio telescope (Preloaded Parabolic Dish concept). He has designed a substantial portion of the receiver system for the Mauritius Radio Telescope, installed the entire array and carried out 20,000 hours of observations with it along with his PhD students. At present he is the member of the International Astronomical Union (IAU) and the Chairman of the Bangalore Chapter of the Indian Physics Association.

Project: Square Kilometre Array (SKA)
Dr. M. R. Sheshadri, MD, Deepti Electronics & Electro Optics Ltd.
Panel Discussion: Symbiosis between SKA and Indian Industries

About the Panel Member:

- Dr. M. R. Sheshadri is the Managing Director of Deepti Electronics and Electro Optics Ltd. He founded the company in 2000.He has overseen its growth since then. Dr. Sheshadri obtained his PhD from the Indian Institute of Science, Bangalore in 1981 in Electro Optics. He obtained his Master of Science degree in Physics from Bangalore University. He was a Senior Scientist in the Aeronautical Development Establishment, a Govt. of India Research and Development Lab, from 1970 to 1993. He has worked extensively in the field of Electro - Optics and has led several projects. From 1993 - 2000 he was a professor in the Visveshwaraya Technological University, where he guided Graduate and Undergraduate students.

Project: Square Kilometre Array (SKA)
Ms. Ashita Gupta, COO, Smile Electronics Limited, Bengaluru
Panel Discussion: Symbiosis between SKA and Indian Industries

About the Panel Member:

- Ashita is the Chief Operating Officer, Smile Electronics Limited, Bangalore. Posses a BA in Economics from University of south Carolina, USA and Executive MBA from Harvard Business School, USA. With a background in Economics and Entrepreneurship, Ashita started her career as a consultant at the big four. For the past four years, she has played an active role in not only learning the know-hows of the EMS industry but also working at bringing in and retaining various global customers.

Laser Interferometer Gravitational-Wave Observatory (LIGO)

Project: Laser Interferometer Gravitational-Wave Observatory (LIGO)

Dr. Patrick Brady, Spokesperson of the LIGO Scientific Collaboration

Cosmic collisions - progress and prospects for gravitational-wave astronomy

Abstract:

- Gravitational waves, the elusive ripples in spacetime predicted by Albert Einstein a century ago, have been recently directly detected by the LIGO and Virgo observatories. These observations firmly established the new field of gravitational-wave astronomy. This talk will discuss the recent progress and prospects for gravitational-wave astronomy.

About the Speaker:

- Patrick Brady is Professor of Physics at the University of Wisconsin-Milwaukee and Spokesperson of the LIGO Scientific Collaboration. He is broadly interested in theoretical and experimental aspects of gravitation and gravitational-wave astronomy. Professor Brady received his PhD in Physics from the University of Alberta, working with Werner Israel. He was a research associate at University of Newcastle-upon-Tyne, a Prize Fellow at Caltech, and a research associate at University of California-Santa Barbara before joining the faculty of Wisconsin-Milwaukee. Professor Brady is a recipient of Research Corporation Cottrell Scholar Award and Sloan Research Fellowship, and a co-recipient of the Special Breakthrough Prize in Fundamental Physics 2016, Gruber Cosmology prize 2016 for the recent discovery of gravitational waves.

Project: Laser Interferometer Gravitational-Wave Observatory (LIGO)

Prof. Tarun Souradeep, Senior Professor, IUCAA, Pune

LIGO-India: An Indian Mega-science (Ad)venture

Abstract:

- The historic discovery of gravitational waves through direct detection by the LIGO observatories in the USA, in principle, opens up a new window for astronomy. In practice, however, the full exploitation of gravitational-wave astronomy will await the global array of LIGO like observatories including the planned LIGO-India observatory . I will review the momentous discovery, the potential of gravitational-wave astronomy and the promise of LIGO-India.

About the Speaker:

- Tarun Souradeep graduated as an engineer from IIT Kanpur. After short stint in automobile design he decided to pursue a PhD in Gravitation and Cosmology. As a faculty member at IUCAA since 2000, he has built and led a cosmology subgroup on Cosmic Microwave background (CMB) studies. Souradeep led the sole Indian group within the international team of the Planck CMB space mission of the European Space Agency. He has been elected fellow of the International Society on General Relativity & Gravitation and is a co-recipient of the Special Breakthrough Prize in Fundamental Physics 2016, Gruber Cosmology prize 2016 for the recent discovery of gravitational waves. He is also recipient of the Swarnajayanti fellowship, NASI-Scopus award, B.M. Birla Prize, Vikram Sarabhai research award and is a fellow of the Indian academy of Sciences and the National Academy of Sciences, India. He serves as the Science spokesperson and a project coordinator for the LIGO-India.

Project: Laser Interferometer Gravitational-Wave Observatory (LIGO)
Prof. Ajith Parameswaran, ICTS-TIFR, Bengaluru
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Moderator:

Ajith Parameswaran is Associate Professor at the International Centre for Theoretical Sciences, TIFR, Bangalore where he leads the Astrophysical Relativity group. His research spans various aspects of gravitational-wave physics and astronomy. He received his PhD from the Max Planck Institute for Gravitational Physics (Albert Einstein Institute) in Germany and has been a postdoctoral scholar at the Albert Einstein Institute and California Institute of Technology before joining the faculty of ICTS. He has been a Ramanujan Fellow, a CIFAR Azrieli Global Scholar and the head of the Max Planck Partner Group on Astrophysical Relativity at ICTS. As a member of the LIGO discovery team, he is the recipient of the 2016 Special Breakthrough Prize in Fundamental Physics and the 2016 Gruber Cosmology Prize.

Project: Laser Interferometer Gravitational-Wave Observatory (LIGO)
Prof. Rajesh Gopakumar, Director, ICTS-TIFR, Bengaluru
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Rajesh Gopakumar is a theoretical physicist and the director of the International Centre for Theoretical Sciences (ICTS-TIFR) in Bangalore. He did his undergraduate degree from IIT-Kanpur and PhD at Princeton University. After being a research associate at Harvard University he moved to Harish-Chandra Research Institute in 2001 to take up a faulty position. He is the recipient of the ICTP Prize (2006), the S.S. Bhatnagar Award (2009), the Swarnajayanthi Fellowship (2006), the J. C. Bose Fellowship (2015), the G. D. Birla Prize (2013) and the TWAS Prize in the Physical Sciences (2013). He is a Fellow of the Indian Academy of Sciences, the Indian National Science Academy and the National Academy of Sciences, India. He was elected fellow of the The World Academy of Sciences in 2015. He is a founding member of the Global Young Academy.

Project: Laser Interferometer Gravitational-Wave Observatory (LIGO)
Prof. Bala Iyer, ICTS-TIFR, Bengaluru
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Bala Iyer is a theoretical physicist who has done pioneering work in the theoretical modeling of astrophysical sources of gravitational waves. He spearheaded the Indian Initiative in Gravitational-wave Observations (IndIGO) in 2009, and has been the chairperson of this consortium ever since. This consortium did the initial spadework for the Indian mega science project LIGO-India. Prof. Iyer is an elected fellow of the American Physical Society and the International Society of General Relativity and Gravitation. He has been both the president and secretary of the Indian Association of General Relativity and Gravitation in the past. He is the editor-in-chief of the journal *Living Reviews in Relativity*, and is a member of the editorial board of the journal *Classical and Quantum Gravity*.

Project: Laser Interferometer Gravitational-Wave Observatory (LIGO)
Dr. Dilip Krishnaswamy, Reliance Jio Infocomm
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Dilip Krishnaswamy received a PhD degree in Electrical Engineering from the University of Illinois at Urbana-Champaign, and a BTech degree in Electronics and Communications Engineering from IIT Madras. He has worked as a Platform Architect at Intel, as a Senior Staff Researcher in the Office of the Chief Scientist at Qualcomm, and as a Senior Scientist at IBM Research. He is currently serving as a Vice President for New Technologies R&D at Reliance Jio Infocomm. Recently he has pursued research that utilizes random projections to reduce the complexity of gravitational wave detection in collaboration with IUCAA and IIT Gandhinagar.

India-based Neutrino Observatory (INO)

Project: India-based Neutrino Observatory (INO)

Prof. D. Indumathi, The Institute of Mathematical Sciences (IMSc), Chennai

What is common between life, the Universe and an Underground lab?

Abstract:

- Neutrinos hold the key to the evolution of the Universe as well as all life in the Universe. Just why this is so, and how the proposed India-based Neutrino Observatory (INO) can help in unfolding one of the important mysteries of the Universe, comprises the focus of one of the most ambitious and completely indigenous science projects proposed in India today. This talk will provide the necessary background to understand the science and engineering involved in building INO.

About the Speaker:

- D. Indumathi completed her PhD from the Institute of Mathematical Sciences, Chennai. She then worked in many institutions in India and abroad before returning here as a faculty member. She is interested in particle physics phenomenology, which tries to explain the observable Universe in terms of appropriate theories or models to reach a better understanding of it. She is interested in science education and science popularisation and outreach, especially to school and college students and the lay public.

Project: India-based Neutrino Observatory (INO)

Prof. Prafulla Behera, Associate Professors, IIT Madras

Probing neutrinos using ICAL at INO

Abstract:

- The India-based neutrino observatory is an underground research facility will be based in Pottipuram, Theni district of TamilNadu. The facility will host 51,000 ton magnetized Iron calorimeter (ICAL) detector along with few other experiments. The ICAL is aimed to measure the mass ordering of neutrinos using atmospheric muon neutrinos and muon anti-neutrinos. The magnetic field of 1.5 Tesla will allow ICAL to distinguish interaction initiated by neutrino or anti-neutrino. Neutrino less double Beta decay experiment will answer whether neutrino is Dirac or Majorana particle.

About the Speaker:

- Dr. Prafulla Kumar Behera is a associate professor at the Department of Physics IIT Madras since 2011. He obtained his Ph.D from Utkal University, working in BELLE experiment, KEK, Japan in 2003. He was a postdoctoral fellow at University of Pennsylvania, Philadelphia, USA from 2002 – 2006 working in BABAR experiment at SLAC, USA. Before joining IIT Madras, He was a research scientist at University of Iowa, USA from 2006 – 2011 working in ATLAS experiment. His areas of research interest include experimental collider physics including neutrinos. He is an active member of INO collaboration since 2011. He has authored more than 1100 international journal publication and part of the team, which discovered Higgs boson with the ATLAS experiment at CERN, July 2012.

Project: India-based Neutrino Observatory (INO)

Mr. T.S. Srinivasan, Head, Refuelling Technology Division, BARC, Mumbai

Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Moderator:

- Shri Srinivasan is a mechanical engineer from Birla Institute of Technology in the year 1984 and joined the 28th batch of Training School in BARC. He subsequently joined the Reactor Projects Division in BARC where he worked for the Compact Light Water Reactor Program. He was made the Head of the Reactivity Control Mechanism Section in 2012 and the Project Coordinator for INO in 2017. He became the Head of Refuelling Technology Division in 2019. He has won the Special Contribution Award of DAE in the year 2016 and has also received about a dozen Group Achievement Awards during his career spanning three decades.

Project: India-based Neutrino Observatory (INO)
Mr. Mohamed Saliya, Managing Director, iWave Systems, Bengaluru
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Mr. Saliya did his B.E from Madras University and M.E from Anna University. He worked as an Assistant Professor in Thiagarajar College of Engineering, Madurai and as scientist in ISRO. He was esponsible for developing mission critical Real-time systems software for the prestigious Satellites Missions such as IRS, INSAT and SROSS series of satellites of ISRO.
- Mr. Saliya also worked in DLR, German Spacecraft Operation Center (GSOC) Munich, where successfully developed and deployed a Knowledge-based, Fuzzy system for Telemetry Analysis and control of the German's Spacecraft ROSAT.
- Mr. Saliya headed the Embedded Software Group of Philips Semiconductors, responsible for developing embedded software for the Digital TV and Set Top Box platforms to support worldwide customers. He Co-founded iWave Systems Technologies Pvt. Ltd., specializing in Embedded Hardware and Software Design services and "System On Modules" (SOMs) development.

Project: India-based Neutrino Observatory (INO)
Mr. N.Shivakumar, Managing Director, Entec, Bengaluru
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Hailing from Hassan, Karnataka. Mr. Shivakumar is a Mechanical Engineer with over 30 years of experience in the field of Pneumatics and Thermal Management. He began his work at the Kudremukh Iron Ore Company, where he would work as Maintenance Engineer, he would later go on to work with Kirloskar Pneumatics as a Project Manager.
- Wanting to start his own business, he would start his first business in the manufacturing of Shell and Tube Heat Exchangers and installing compressed air lines. His knack for designing Heat Exchangers would lead to him being approached by Electronics and Radar Development Establishment a DRDO lab) lab to indigenously develop a Heat Exchanger for their Radar. With the assistance of the DRDO lab and M/s BEL the first working protype would be made. This system would go on to be the base for various other radar cooling systems currently being used.

International Thermonuclear Experimental Reactor (ITER)

Project: International Thermonuclear Experimental Reactor (ITER)

Dr. Sivathanu Pillai, Dr. DS Kothari Chair, Research & Innovation Centre, IITM

Innovation and Inspirational Leadership

Abstract:

- India is marching ahead to become a 5 Trillion Dollars economy, with at least 3rd position on the economic status in the world. Government of India has come out with "*Vision 2030*" identifying 10 key areas for achieving this mission. Economic progress depends on excellence in Science and Technology, which can make fundamental changes in the ground rules of economic Competitiveness and Environment resulting sustainable development. This needs Innovation in Science and Technology. Bright young minds of India should believe that We can do it. Inspiration comes from creative leaders and achievers. The talk will cover the innovation potential of Indian youth with live examples, and inspirational leaders who guided great achievements to put India ahead of many Nations.

About the Speaker:

- Dr. Sivathanu Pillai graduated in Electrical Engineering. He served in ISRO and DRDO for forty five years. He had the opportunity to work under great visionary leaders Dr. Vikram Sarabhai, Prof. Satish Dhawan and Dr. APJ Abdul Kalam which. made him a Technology Leader in the field of Satellite launch vehicles, guided missiles and Aerospace systems. Dr. Pillai's contributions to the successful development of SLV-3 as a core team member and evolution of PSLV configuration for ISRO have been remarkable. His skills in networking multiple institutions for the development of critical missile technologies overcoming technology denial regimes imposed by developed nations, enabled realization of Agni, Prithvi, Nag and Akash missiles under the IGMDP, as its Programme Director and Chief Controller R&D of DRDO.
- His outstanding leadership qualities, as CEO & MD of Brahmos Aerospace, made India proud to possess the fastest, highly precise and the most potent missile BRAHMOS which is now inducted in the Indian Armed Forces. BRAHMOS is a world leader in the family of Cruise Missile surpassing those in the development countries. As the Architect and Founder CEO&MD of the Joint Venture, Dr. Pillai is regarded as the "Father of BrahMos" which has become a role model for establishing joint ventures between India and any other country. Govt of India recognised his contribution with Padmashri in 2002 and Padmabushan in 2013.

Project: International Thermonuclear Experimental Reactor (ITER)

Dr. Eisuke Tada, Deputy DG, Relations coordinating officer, ITER, France

ITER - An overview and present status

Abstract:

- The ITER project was established in November 2006 by the ITER Agreement involving seven Members (China, the European Union, India, Japan, Korea, the Russian Federation and the United States of America). ITER is a critical step in the development of fusion energy to demonstrate scientific and technological feasibility.
- Extensive progress has been made in the on-site construction/installation and the production of the ITER tokamak and plant systems. The ITER Baseline schedule defines First Plasma in December 2025 and D/DT operation in late 2035. Currently, about 65 % of all work required for First Plasma has been completed, including manufacturing of first-of-a-kind tokamak components and completion of several buildings. This report summarizes overall status and recent progress of manufacturing and on-site assembly of ITER components and systems

About the Speaker:

- Eisuke Tada has served as one of two Deputy Directors-General at the ITER Organization since 2015. He works in close coordination with Director-General Bernard Bigot as well as with the heads of the seven Domestic Agencies of the ITER Members as a dedicated team in charge of managing the ITER Project.
- Prior to his current appointment, Mr. Tada was head of the Japanese Domestic Agency and responsible for all ITER-related activities in Japan including Japan's in-kind contributions. In particular, he has worked for development of ITER superconducting magnets, vacuum vessel and remote handling systems. He was one of the seven "ITER pioneers" who arrived on site in Cadarache in 2006 following the decision to site the ITER Project in France.

Project: International Thermonuclear Experimental Reactor (ITER)

Mr. Shrishail Padasalagi, Project Manager-IWS, ITER - India

Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Moderator:

- Shrishail graduated in Mechanical Engineering from Karnataka University Dharwad (KUD), joined IPR through Technical Training Program in 2002.
- He has worked in the area of Design Development and qualification of many diagnostics systems from conceptual level for SST1 and ITER. Major among which is the Far Infra-Red System developed for SST-1, to accommodate more than 500 optical components and is seismically isolated. He has contributed in the design qualification of Port Plugs for ITER in Seismic, Thermal and Hydraulic domain which led to development of many cost effective precision position controlling systems for diagnostic systems. Further he has been involved in different roles for manufacturing the ITER components like Cooling water systems, Cryostat, in wall shielding Blocks and Port Plug.
- As Head of Design Office Since 2009, he has enabled synchronous data exchange with all the countries involved in the ITER Project from India. Additionally, he has worked in as Configuration Control in charge of ITER from India since 2010. He is also the Project Manager of “VV In-Wall Shielding Blocks” ITER-India.

Project: International Thermonuclear Experimental Reactor (ITER)
Mr. M. Narayan Rao, Former C&MD, MIDHANI
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Mr. Narayana Rao joined in Bhabha Atomic Research Centre Training School and started his career in Nuclear Fuel Complex, Hyderabad. He has made contributions in the manufacturing strategic materials like zirconium, titanium, copper, silver alloys and stainless steels for all core structurals for the Indian nuclear power reactors.
- Mr. Rao has taken up assignment of Chairman & Managing Director of Mishra Dhatu Nigam Limited (MIDHANI), a defence PSU. With rich experience in making, shaping and treating of exotic ferrous and non-ferrous metals, he has remarkably contributed to the applications of strategic industries of Atomic Energy, Space, Aerospace, Defence and Energy sectors. In his tenure of nineyears as C&MD, he had not only contributed in development alloys but also productionised and turned-around the company.

Project: International Thermonuclear Experimental Reactor (ITER)
Mr. Praveen Bhatt, Head Nuclear PBU, L&T Heavy Engineering
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Mr. Praveen Bhatt did B.E. (Mechanical) from NIT Allahabad (1993) and M Tech in Machine Design from IIT BHU (1995). He joined L&T Heavy Engineering as a PGET in March 1995. Since then, working with L&T Heavy engineering in various roles. He is presently working as Head Nuclear Product Business unit of L&T Heavy Engineering. He was Head of Hazira Shipyard till 2016 before joining Nuclear business of L&T. He has worked in various Business Sectors of L&T Heavy engineering i.e. Defense & Aerospace, Power, Refinery and petrochemicals. He worked in various functions in L&T i.e. Design, Project execution, Production & Project management.

Project: International Thermonuclear Experimental Reactor (ITER)
Mr. Prasanth Sakhamuri, MD, Hind High Vacuum Bengaluru
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Prasanth Sakhamuri is a science graduate and completed his Masters in management at IRMA in 1986.
- An early entrepreneur who established the country's first stainless steel vacuum bottle and cryo container manufacturing unit in 1989. He then joined Hind High Vacuum Company Pvt.Ltd (HHV) and is currently its managing director. HHV is India's leading vacuum technology company building special purpose equipment and thin film technology, HHV has operations in India and the UK and has its products being sold all round the world including some of the most prestigious research institutions
- Prasanth was the founder of HHV Solar technologies limited which was India's first thin film technology based solar panel manufacturer. HHV has established India's largest flat optics and infrared optics fabrication unit in Bangalore and services multiple sectors that include Aerospace, Automotive and Defense.
- HHV's research and development program received the DST national award for successfully commercializing indigenous technology in 2018.

Facility for Antiproton and Ion Research (FAIR)

Project: Facility for Antiproton and Ion Research (FAIR)

Mr. Jörg Blaurock, Technical Managing Director of GSI and FAIR

FAIR – Universe in the Lab

Abstract:

- The particle accelerator facility FAIR (Facility for Antiproton and Ion Research) in Darmstadt, Germany, is one of the world's largest and most complex construction projects for cutting-edge international research. At FAIR, matter that usually only exists in the depth of space will be produced in the laboratory. In outstanding experiments scientists from all over the world will gain new insights into the structure of matter and the evolution of the universe from the Big Bang to the present.
- Construction began in the summer of 2017. Unique building structures are being erected on a 20-hectare site to house and operate high-tech research equipment. Cutting-edge technologies and innovative measuring methods and techniques are being developed for FAIR. In order to create the acceleration and experimental facilities, high-level scientists, engineers, and other experts are working in international partnership to advance new technological developments.
- FAIR is a multinational project with an investment volume of well over one billion euros, which is financed by the partner countries. India is one of the shareholders of the FAIR GmbH and participates in the FAIR project through numerous in-kind contributions for the accelerators and several experiments. It is one of the founding members of FAIR and carries a fundamental role in the project.

About the Speaker:

- Jörg Blaurock is the first joint Technical Managing Director of the GSI Helmholtzzentrum für Schwerionenforschung GmbH (GSI Helmholtz Centre for Heavy Ion Research) and the Facility for Antiproton and Ion Research in Europe GmbH (FAIR GmbH). Prior to this he has been working in international large-scale plant construction for over 20 years, overseeing full planning, delivery, assembly and commissioning of large technical facilities worldwide. Jörg Blaurock, born in 1964, studied mechanical engineering at the Helmut Schmidt University in Hamburg during his career as an officer in the Bundeswehr, where he worked until 1994. He went on to work for large scale plant construction firms Uhde GmbH and Lurgi GmbH in the turnkey production of petrochemical industrial plants at various international locations. In 2007 he joined Alstom, today General Electric, where he worked in a number of positions – most recently for General Electric Deutschland GmbH in Stuttgart. There, as Managing Director he was responsible for the turnkey delivery of utility steam generators for electricity-generating fossil-fuel power stations.

Project: Facility for Antiproton and Ion Research (FAIR)

Prof. Supriya Das, Associate Professor, Bose Institute, Kolkata

Research at FAIR: from neutron star to cancer therapy

Abstract:

- The Facility for Anti-proton and Ion Research (FAIR) is one of the largest accelerators being built at Darmstadt, Germany. A wide range of scientific research will be performed using this machine. The entire research program at FAIR has four distinct areas namely (i) Nuclear Structure, Astrophysics and Reactions, (ii) Study of matter at high baryon densities, (iii) Study of the structure of the hadrons and (ii) Atomic and Plasma physics and their application in radiation therapy. A large number of scientists and technologists are involved in the planning of the upcoming experiments to achieve the goals. Details of FAIR experimental programme with emphasis on India's involvement will be discussed.

About the Speaker:

- Dr. Supriya Das is currently an Associate Professor at the Department of Physics of Bose Institute Kolkata. Dr. Das obtained his PhD from the University of Jadavpur, Kolkata. During his doctoral research at Variable Energy Cyclotron Center, Kolkata, he worked on development of a gas based Photon Multiplicity Detector which was used to measure the number and spatial distribution of photons coming from the ultra-relativistic heavy-ion collisions in the STAR experiment at RHIC. Dr. Das spent two years at GSI working on the development of the Ring Imaging Cherenkov detector for the CBM experiment at FAIR. After coming back to the country he was at Saha Institute of Nuclear Physics for a short while working on Muon detection in ALICE experiment before joining Bose Institute to start a research group in experimental high energy physics.

Project: Facility for Antiproton and Ion Research (FAIR)
Prof. Sanjay Ghosh, Bose Institute, Kolkata
Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Moderator:

- Prof. Sanjay K. Ghosh did his Ph.D from Institute of Physics, Bhubaneswar in 1996, He then joined Bose Institute as CSIR, Research Associate. He worked in TRIUMF, Canada and VECC before joining Bose Institute as Sr. Lecturer in 2002. His is currently working in areas of particle physics and nuclear astrophysics. Prof. Ghosh has also been looking after the activities of BI-IFCC.

Project: Facility for Antiproton and Ion Research (FAIR)

Prof. Juergen Gerl, FAIR Project Lead Team – Head of Sub-Project NUSTAR

Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

Juergen Gerl is currently the Head of the NUSTAR project at FAIR. He obtained his PhD from University of Frankfurt in 1983. After working as a post doctoral research fellow at university of Canberra, Australia and Max Planck Institute, Heidelberg he joined GSI, Darmstadt in 1991. He has worked in the area of Nulear Structure, Astrophysics and Reaction in different capacities including the Technical Director of HISPEC, Technical Coordinator of NUSTAR before starting his current position.

Project: Facility for Antiproton and Ion Research (FAIR)

Mr. Rangarao Y, Managing Director, Vacuum Techniques Pvt. Ltd., Bengaluru

Panel Discussion: Leveraging collaboration for Indian science and industry

About the Panel Member:

- Mr. Rangarao started Vacuum Techniques about 30 years back in 1989 to serve the Indian vacuum industry and is now one of the largest vacuum equipment manufacturers in India serving Indian and Export markets. A sample of accomplishment includes supplying ISRO with various space simulation systems and actively supporting the Indian space program, manufacturing and installing India's largest Hypersonic Wind tunnel in Hyderabad for DRDL, and supplying chambers and systems to various Indian accelerators and cyclotrons at BARC, VECC and RRCAT. He has over 45 years of experience in the vacuum industry.

Industry Session

Industry Session
Mr. Suriyanarayanan S, DGM, L&T Valves Limited
Perspectives from Indian Industries

About the Panel Member:

- Mr. Suriyanarayanan did his B. Tech (Mech Engg.) from REC-Trichy and PGEMP from SP Jain Institute of Management. He has 15 years of experience in design and detail engineering. He has designed and developed high pressure valves for super critical thermal power plants as part of indigenization. He has worked extensively in ASME Nuclear certification, designed, developed and qualified many critical valves for civil nuclear applications. He handles classified projects for defense & Nuclear applications.

Industry Session
Mr. J. V. Nayak, Deputy Director, Tool Room, IDEMI
Perspectives from Indian Industries

About the Panel Member:

- Shri. J. V. Nayak is presently Deputy Director, Tool Room, IDEMI and has 33 years' experience in IDEMI. He holds a diploma in Tool and Die making. His expertise lies in design and manufacturing of press tools, Moulds and Die Casting dies, Jigs and Fixtures, Electro-Mechanical components etc. He was responsible for precision machining and manufacturing critical components for BARC, ISRO, LPSC & Godrej, L&T, IIT, Bombay and TIFR, Mumbai. He is also Technical Manager for Dimensional Metrology Lab (NABL Accredited as per ISO 17025).

Industry Session

Mr. Dinesh Kumar. A, Managing Director, M/s CT Control Technology (India) Pvt. Ltd.

Perspectives from Indian Industries

About the Panel Member:

- Shri. Dinesh Kumar is B.Sc (Engg) in Electrical Engineering from REC, Calicut and DIISC in Electronics Design Technology from IISc, Bangalore established M/s Control Technology in 1991 for designing and manufacturing instrumentation systems. He has been instrumental in designing and developing the first indigenous Electronics weigh feeders used extensively in steel and cement industries.
- Control Technology signed a Technology Transfer agreement for Sodium Instrumentation in 1998, with DAE, IGCAR and developed various instrumentation and control systems. The enterprise is recognised as source who can take up indigenous development of Electronics instruments and transducers.
- Control Technology occupies an enviable position of being the only supplier of Sodium instrumentation systems in India, for the measurement and control of liquid Sodium, for the prestigious 500MW Nuclear Power plant - Proto Type Fast Breeder Reactor (PFBR) of Department of Atomic Energy, under construction at Kalpakkam.
- Control Technology has supplied its products to IGCAR, ECIL, BHAVINI, BARC and other PSUs.