



Founder's Day Lecture

Dr. Archana Sharma

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Mega Science: the engine of the 21st Century

In the twenty-first century, we have unprecedentedly advanced in science and technology. Our scientific indulgence and contemporary heritage is growing at an accelerated pace. Gigantic mega science and technological developments leave immense impact on societies and countries. Thus making science and scientists more authoritative in their conduct. As we speak, we have the power to define the course of nation's fate and its policies based on scientific progress and engagement. It also makes us, the scientific community, more responsible. Globally connected post-national world necessitates us to charter our path towards a sustainable planet, requiring a safe space for free flow of thought, and most importantly enhancement of international scientific partnership and public engagement. Major collaborative efforts, are thus becoming a norm towards augmenting scientific expertise towards the global UN sustained development goals. In this talk I explore the social function of the 21st century scientific advancement and the power it draws from several channels. I take the CERN model of scientific diplomacy as a case study to build an argument for the course of mega science development and how this knowledge would help make our country and this world healthy, kind, and a safe place for humanity.

Tuesday, 10 August 2021, 11 AM

Livestream on  YouTube

Archana Sharma is a senior scientist at the CERN Laboratory in Geneva, Switzerland. She has been active in the field since 1989 mainly working on instrumentation especially gaseous detectors. She is the pioneer of simulations and experimentation on wire chambers, resistive plate chambers and micro-pattern gaseous detectors over last three decades. Following a graduate degree in Nuclear Physics from BHU Varanasi, India, Archana received her Particle Physics Ph.D. from Delhi University in 1989, followed by an “Instrumentation for High Energy Physics” D.Sc. from the University of Geneva in 1996. Sharma also earned an executive MBA degree from the International University in Geneva in 2001. She is an internationally recognized expert for her experimental work on gaseous detectors for research in High Energy Physics. She currently serves as Senior Advisor for relations with International Organisations, serving as the focal point for CERN, notably for the United Nations system and other organisations based in Geneva.

Archana has worked on several CERN experiments both on R&D being involved in designing and prototyping, and on running laboratories for construction, installation and commissioning of large scale gaseous detectors. She is the founder and leader of CMS GEM Collaboration, for exploiting one of the most sensitive detectors for trigger and tracking in the CMS Experiment at LHC, with the highest discovery potential. The first station of three is being currently installed for data taking in 2021. These detectors are also being used in prototypes for applications such as homeland security and medical imaging.

Sharma pioneered the development of micro-pattern radiation detectors, her publications, review articles and special volume on Instrumentation on Particle Physics edited by her are widely referred to and cited. Since 2001, Sharma has led the construction of gaseous detectors and upgrades on the CMS experiment and is well known for incessantly mentoring students into professionals. She is the co-owner of patent on a family of detectors called THRAC – Timing and High Rate Capable devices. An IEEE Senior, recognition from the International Institute of Electronics and Engineers, she has also served several terms on the Transnational Committee, encouraging participation in this field from Asia.

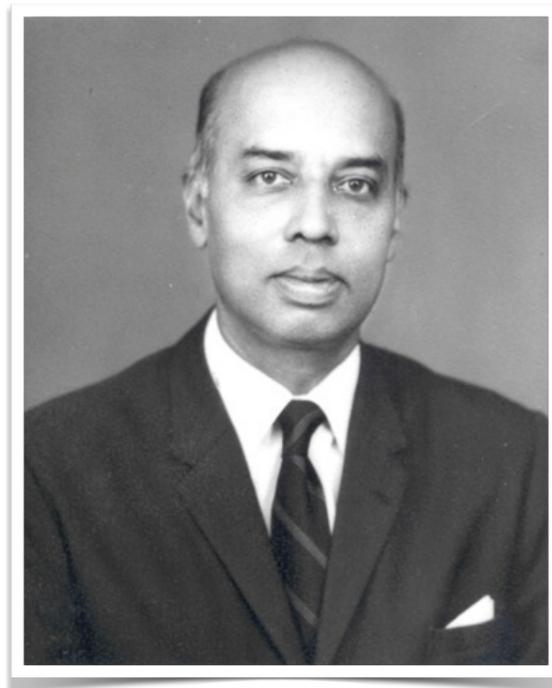
Archana has served on numerous committees and plays a vital role in advisory review boards for leading International Conferences, Publications and Symposia in the field. Archana is an examiner for European Commission Horizon 2020 projects and some national funding agencies and other international laboratories and experiments.

Dr. Sharma has been on board as honorary Adjunct professor in several institutions where she teaches courses on gaseous detectors and their applications in high energy physics and in other fields, like medical imaging and diagnostics, astronomy, space and PET. She has been very actively facilitating knowledge exchange and capacity building in the science and technology sector exploiting her mandate in the International Committee and the Career Committees at CERN, acting as advisor to the CMS Spokesperson.

Sharma is the principal author of over 250, co-author of over 1000 publications and is invited regularly for keynote talks in international conferences and public addresses in various science and technology events. Archana has been conferred with many prestigious awards and medals from NGO's in India as a champion of “Girls in STEM”. She has appeared on BBC, CNN and NDTV among others on several occasions and cited in the national media and printed press in India.

Finally, as an aside, Archana has founded and runs an NGO called Life Lab Education and Research Foundation based in New Delhi, with the main objective to create partnerships with educational institutions for the benefit of the students and teachers: www.lifelab.org.in

FOUNDER'S DAY – 10 AUGUST



Dr Manali Kallat Vainu Bappu (1927 – 82)

In 1971, the Government of India accorded autonomous research institute status to the Kodaikanal Observatory leading to the birth of the Indian Institute of Astrophysics. Dr M. K. Vainu Bappu, Director of the Observatory at that time, was the moving force behind the creation of the Institute. IIA's aim has been to promote, guide and conduct research in all branches of astrophysics; to establish and maintain astronomical observatories in the country; to co-operate and collaborate with other national and international organizations in the field of astrophysics and related areas; to train personnel and motivate them to take up research in astrophysics; and to disseminate knowledge and information concerning astrophysics as widely as possible. For almost fifty years, IIA has pursued these aims with considerable success. Today the activities of IIA involve astronomical studies covering almost all regions of the electromagnetic spectrum: from gamma-rays to low frequency radio waves. Vainu Bappu was responsible for the revival of optical astronomy in independent India. After a brilliant academic career at Nizam College, Hyderabad, followed by a doctoral degree at Harvard University,

Vainu Bappu worked at the Mount Wilson and Palomar Observatories in California as a Carnegie Fellow. He returned to India in 1954 and came to Kodaikanal in 1960 after a five-year stint as the Chief Astronomer of the Uttar Pradesh State Observatory, Nainital. He had achieved international recognition with the publication in 1957, of the seminal paper, co-authored with Olin C Wilson of Caltech, on the relationship between the Ca II K emission-line width and the luminosity in late-type stars, known today as the Wilson-Bappu Effect. Bappu initiated efforts towards establishing a modern optical observatory for night-time astronomy in peninsular India. The field station in Kavalur was established in 1968 and through Bappu's efforts it flourished into a full-fledged optical astronomy observatory within a decade. The main instrument in Kavalur, an indigenously built 2.34-m optical telescope, was planned by him, though he did not live to see the completion of his dream project as he succumbed to a heart condition in August 1982. After it was completed, the telescope and the observatory in Kavalur were named after Professor Bappu by the late Shri Rajiv Gandhi, then Prime Minister of India.

Bappu had a great love of nature and built the campuses in Kavalur and Bengaluru with meticulous care, planting trees including some rare ones, laying rose gardens, and ensuring that the scientists worked in an environment where the bounties of nature are manifest in their myriad colours.

Vainu Bappu inspired a whole generation of optical astronomers in the country and this tradition continues with the Institute training young and bright students to pursue a fruitful career in astronomy and astrophysics. A whole generation of astrophysicists was trained at the Institute and are pursuing their careers successfully in India and abroad. This generation is expected to carry forward Bappu's legacy by taking fresh initiatives in building larger telescopes and innovative instruments to keep India at the forefront of astronomical research.

The Founder's Day is an occasion when we all come together and pause for a while to take stock of our progress, to reassure ourselves that we are following the path charted out by the founder and make a fresh pledge to dedicate ourselves to the tasks ahead.

Founder's Day Lectures

- 2007** **Professor P. Balaram**
Measuring and Assessing Science
- 2008** **Professor C. N. R. Rao**
Doing Science in India : Personal Reflections
- 2009** **Professor Govind Swarup**
Experimental Astronomy in India : Some Lessons
- 2010** **Professor G. Padmanaban**
Growth of Biotechnology in India
- 2011** **Professor M. G. K. Menon**
The Founder of IIA - Vainu Bappu: Many Memories and the Lessons we can learn from him
- 2012** **Dr Anil Kakodkar**
Management of Mega Science Programmes
- 2013** **Professor G. Srinivasan**
Down Memory Lane: Vainu Bappu's Dreams Revisited
- 2014** **Professor B. V. Sreekantan**
Symbiotic Developments in Physics and Astronomy in the 20th Century: Where are they leading us in our search for "Reality"?
- 2015** **Professor S. M. Chitre**
Dr Vainu Bappu's Legacy to Solar Astronomy in India
- 2016** **Professor Rajaram Nityananda**
The Astronomy Mathematics connection
- 2019** **Professor Vinod K. Gaur**
Plate Tectonics and the Making of Himalaya - An ongoing Process
- 2020** **Professor Krishnaswamy VijayRaghavan**
The development of the ability to move