Bibha Chowdhuri Memorial Lecture

5th June 2022 @ 4.30 pm

Living with a Star

Prof. Sarbani Basu

Yale University, USA

Abstract

We live in the backyard of a star. It is not a particularly big star, nor a particularly exotic one, but it controls life on Earth. We therefore need to understand how it behaves. We know the Sun changes on time-scales of decades and that solar emissions can damage technology. In this talk, I will discuss what we know about the Sun and the vast mysteries that remain. I will also touch upon how the Sun can affect our daily lives and what mitigation effects, and then focus on how we study the interior of the Sun to understand its structure and dynamics, and its time variation. The talk will showcase how some basic principles of physics help us in understanding the Sun and its interior.

About the speaker

Sarbani Basu is the William K. Lanman Jr. Professor of Astronomy at Yale University, USA. Prof. Basu conducts research in the fields of solar and stellar astrophysics using seismic data. She has been studying both the general properties and the details of the structure and dynamics of the Sun, focusing on solar-cycle dependences.

Prof. Basu joined the joint TIFR-University of Pune M.Sc. course in 1986 and later joined Dept of Astronomy and Astrophysics of TIFR for the PhD work. After completing her thesis in 1993, she held postdoctoral positions in London, Denmark, and at the Institute for Advance Study, in Princeton. She joined Yale University in 2000.

Prof. Basu has won several awards and accolades. She received the Vainu Bappu Gold Medal of the Astronomical Society of India in 1996 for her early work on helioseismology. In 2018, she was awarded the George Ellery Hale award of the Solar Physics Division of the American Astronomical Society. She was awarded the US National Science Foundation's CAREER award in 2004. She is an elected Fellow of the American Association for the Advancement of Science and the American Astronomical Society.

Prof. Basu believes that inclusion and equity in science begins at school. To this end, she works with school teachers from under-resourced regions to help then shore up their curricula and help maintain their students', particularly their female students', interest in science.

Website -- http://campuspress.yale.edu/sarbanibasu/

Special lecture #2

11th July 2022 @ 6.00 pm

From Surfaces to Nanotechnology to "NanoBio"

Prof. Shikha Varma

IOP, Bhubaneswar

Abstract

Surfaces Science and nanotechnology are used to manipulate matter on an atomic or molecular scale. They are also used to control the organization of technologically important objects into functional nano-materials. Biomolecules, like DNA, offer many unique properties as controllable and programmable scaffolds. Interactions between biomolecules and inorganic materials present many unique challenges and play important role in the design of novel hybrid materials and sensors.

About the speaker

Shikha Varma is faculty at Institute of Physics, Bhubaneswar, India. She is an experimental Condensed matter Physicist working in the areas of Surface, nanoscience, nano Bio interactions and Ion beam application based studies.

Prof. Varma did he M.Sc. from IIT Kanpur and did her PhD at Syracuse University Syracuse, (NY, USA). Her field of research involves fabrication and modulation of quantum dots and nanostructures on a variety of surfaces like semiconductors, oxides, graphene, bio-mimetic platforms etc. for understanding their Optical Response, Transport behavior and Biosensing, and utilizing for technologically important applications. She has published over 150 refereed research articles in these areas.

She has served on many national committees including special schemes of Government of India for women in STEM. Presently she is the Chair of the Accelerator User Committee (AUC), and member of the Governing Council of IUAC, New Delhi. She is active in science outreach programmes for undergraduate students and is also leading the Condensed Matter Physics Gender group in India.

Special lecture #3

22nd July 2022 @ 6 pm

The paradigm of particle physics

Prof. D. Indumathi

IMSc, Chennai

Abstract

How do we understand the interaction of particles at the fundamental level? How do we understand their properties? The talk shall focus on fundamental particles and their interactions and the modern understanding of how we understand the particles and their interactions as a unified whole.

About the speaker

Indumathi is a particle physicist and a professor at the Institute of Mathematical Sciences (IMSc), Chennai. Indumathi's primary area of research is high energy physics phenomenology. Her research interests include work on atmospheric and solar neutrinos, nucleon and nuclear structure functions, inclusive hadron production at colliders and QED at finite temperature. She has authored several research papers on these topics.

She has been one of the leaders of the proposed India-based Neutrino Observatory (INO) project, which aims to build an underground observatory to study atmospheric neutrinos. She has been involved in INO since its inception, and has played an important role in understanding the physics potential of the iron calorimeter (ICAL) detector to be hosted in INO. She has also been at the helm of the outreach activities of the INO collaboration. She has been passionate about encouraging young students to do science, and promoting diversity in science.

Special lecture #4

(jointly organised with TIFR ASET colloquium)

26th July 2022 @ 4.00 pm

Protecting Health and Climate through Domestic Cookstoves

Dr. Priyadarshini Karve

Samuchit Enviro Tech

Abstract

About 2 billion people across the world rely exclusively on solid biomass fuels to meet their domestic thermal energy needs. An estimated 2-3 billion or so people 'stack' traditional biomass fuels with 'modern' fuels like LPG or electricity. As long as an inefficient and smoky cookstove continues to be used in the house there will be adverse health impacts for the women and children and disastrous implications for climate change through GHG emissions and shrinking of green cover. The aggressive push for the so-called 'modern' fuels has not proved effective in the developing world so far. A science-based approach putting the user of the technology at the heart of the solution is a more effective way forward. The talk will describe the approach, present examples, and highlight the science and technology gaps where researchers may contribute.

About the speaker

Dr. Priyadarshini Karve completed Ph.D. in Physics from the University of Pune, in 1998. In a career spanning nearly 25 years, Dr. Karve invented a number of improved biomass burning cooking devices and "decentralised organic waste to fuel" technologies. She developed a methodology for technology selection and promotion to improve the adoption of clean cooking energy devices by end-users. In the past 5 years or so, her work has also focused on devising and promoting strategies for low carbon, sustainable urbanisation.

She has published more than 30 research papers in peer-reviewed journals and has contributed to technical books. She is actively involved in national and international organisations working on decentralised renewable energy, sustainable development, climate resilience, etc. Her work has been honoured by several national and international awards and has been featured in a number of national and international periodicals, publications, radio and television programmes, and podcasts.