**A&G Highlights Meeting Programme**

**January 10th 2025**

16:00 **Prof Mike Lockwood (President)**

Welcome and Announcements

16:05 **Mr Nilan Choudhury**

 The Square Root of a Sonnet

16:20 **The Harold Jeffreys Lecture: Dr Jessica Irving (Bristol University)**

 Hearing planetary hearts: seismology of the cores of Earth and Mars

17:20 **Dr Chris Lovell (University of Portsmouth)**

 Accelerated modelling of the entire observable Universe

17:50 **Prof Mike Lockwood (President)**

Closing Remarks

**Drinks RAS, Burlington House**

**Abstracts**

**The Square Root of a Sonnet**

Nilanjan P. Choudhury will share his experiences of telling stories of science through the medium of theatre. He will discuss and read a short scene from his popular play "The Square Root of a Sonnet" which was last performed at the Royal Institution, London in July 2024. This two-act play on the history and science of black holes, is based on the lives and works of two towering scientists of the 20th century - the brilliant Indian-American astrophysicist S. Chandrasekhar and his mentor, Sir Arthur Eddington of Cambridge University.

**Hearing planetary hearts: seismology of the cores of Earth and Mars**

In her Harold Jeffreys Lecture Dr Jessica Irving (University of Bristol) will explore what seismology has revealed about the structure of the cores of Earth and Mars – a topic on which Jeffreys spent considerable time. Our understanding of Earth’s core has evolved from early ideas of an inaccessible central kernel of seismically slow material, through the discovery and measurement of the inner core, to present investigations into the properties of the dynamic heart of our planet. Seismological data from the InSight geophysical mission were the first to probe the deep Martian interior, which is now the second planetary core to be seismically detected.

**Accelerated modelling of the entire observable Universe**

The latest space based telescopes, such as the James Webb Space Telescope and Euclid, are now regularly probing the earliest galaxy populations, formed less than a billion years after the Universe formed. Numerical simulations are a key tool in the astrophysicists toolbox that allow us to understand the complex processes occurring in these distant galaxies. But how do we compare our theoretical models to actual observations? And what can we learn about both galaxies and cosmology from these sophisticated models?

In this talk I'll review how we model galaxies using numerical simulations, with a particular focus on how we model the light they emit across the whole electromagnetic spectrum. I'll also talk about some of the exciting new methods from statistics and machine learning that are helping to accelerate our models, and provide new insights into both astrophysics and cosmology.

**Biographies**

**Mr Nilan Choudhury**

Nilanjan P. Choudhury is a Bangalore based theatremaker and novelist. He has written two plays on science history—The Square Root of a Sonnet and The Trial of Abdus Salam, which have received wide critical acclaim and have been staged across multiple cities in India , UK and the USA. He is currently working on a new play about India's first woman particle physicist. He has been a part of over 300 stage performances with Bangalore’s leading theatre companies including the Centre for Film and Drama and others.

Mr. Choudhury's most recent novel is Song of the Golden Sparrow – a fictional retelling of the history of free India. His previous novel Shillong Times is a coming- of-age story set against the ethnic conflict in the hill town of Shillong during the 1980s and was nominated for the Indian Sahitya Akademi Award in 2023. His earlier novels include a mythological thriller and a contemporary detective caper set in Bangalore. Mr. Choudhury is a post graduate in Physics from the Indian Institute of Technology, Kanpur.

**Dr Jessica Irving (University of Bristol)**

Jessica Irving received her MSci in 2005 and PhD in 2009 from the University of Cambridge, where she was also a Postdoctoral Researcher. She was an Assistant Professor at Princeton University and is now Associate Professor in Global Seismology at the University of Bristol. Her research encompasses Earth's core, mantle and oceans, as well as Mars and other planetary bodies.

**Dr Chris Lovell (University of Portsmouth)**

Dr. Christopher Lovell is a Dennis Sciama Fellow at the University of Portsmouth. His research focuses on numerical simulations of galaxy evolution, in particular how to model the electromagnetic emission from galaxies, whilst also leveraging the latest statistical and machine learning methods. He received a Phd in Astronomy from the University of Sussex in 2019, supervised by Prof. Peter Thomas and Dr. Stephen Wilkins. He has held postdoctoral roles at the University of Hertfordshire and the University of Tokyo. Recently he was awarded the 2024 Winton Award from the Royal Astronomical Society for his work on forward modelling extreme star forming galaxies. He is a member of the Euclid, Learning the Universe, CAMELS and FLARES international collaborations