IOP Rugby Meeting: The 31st Annual Meeting for Teachers of Physics in Schools & Colleges, Wednesday 5 June 2019, Rugby School

Programme

09:30 – 10:45  Registration, coffee and exhibition in the Temple Speech Room
10:45 – 10:55  Welcome in Macready Theatre
10:55 – 11:40  Supermassive Black Holes: The Ultimate Galaxy Killers?
               Dr Rebecca Smethurst, University of Oxford
11:40 – 12:25  Measurements and process of the redefinition of the 4 SI units
               Dr. Michael de Podesta, NPL
12:25 – 13:45  Lunch in Sports Centre Café
               Exhibition and coffee in Temple Speech Room
13:45 – 14:45  Workshop session 1 in Science Faculty (see below for details)
14:45 – 15:45  Workshop session 2 in Science Faculty
15:45 – 16:00  Thanks to all and refreshments in the Science Faculty Atrium

Workshops

- Embedding formative assessment in 11–14 physics teaching, Mary Whitehouse
- Equipment for the 12 required practicals, Helen Pollard and Dan Cottle
- Saturday Science: Novel Physics Projects for STEM Clubs, Neil Downie
- Maths for KS3 and KS4 Physics, Lawrence Cattermole
- Barriers to physics, Jessica Rowson
- The Faulkes Telescope Project: bringing the universe in to the classroom, Paul Roche
- Press Start – a Gameful approach to curriculum development in Physics, Richard Parker
Lectures

**Supermassive Black Holes: The Ultimate Galaxy Killers?**
Dr Rebecca Smethurst, University of Oxford

There are over 1 billion galaxies in the Universe, each home to over a billion stars and one central supermassive black hole weighing in at up to a billion times the mass of the Sun. This lecture will focus on the research of astrophysicists trying to understand the current conflict between observations of galaxies and their supermassive black holes and our current best model of the Universe.

**Measurements and process of the redefinition of the 4 SI units**
Dr. Michael de Podesta, National Physical Laboratory

On 20th May 2019, four of the seven base units of the SI (the kilogram, kelvin, ampere and mole) were redefined. Significantly this change ushered in a subtle but profound shift in how we measure the world around us. Instead of using human-defined 'yardsticks', we will base our system of measurement on the most stable entities we have ever encountered – the constants of nature. In this talk I will discuss the rationale for the change, and the some of the details regarding the kelvin, kilogram and ampere.

Workshops

**Equipment for the 12 required practicals**
Helen Pollard and Dan Cottle, Institute of Physics

An opportunity to try all of the GCSE practicals, or concentrate on just one or two, if you prefer. We will identify and discuss different skills assessed through practical work and alternative equipment/set-up. As the use of Vernier scales is now explicit in the specification, we will cover reading Vernier callipers and micrometers.

**Embedding formative assessment in 11-14 physics teaching**
Mary Whitehouse, University of York

It is recognised that good formative assessment can lead to better learning. This workshop will look at strategies, together with some questions and tasks that can be used to support assessment for learning in 11-14 physics teaching.

**Saturday Science: Novel physics projects for STEM clubs**
Neil Downie

A lecture / demonstration of practical physics aimed at STEM Clubs. The novel projects from Vacuum Bazookas to Electric Worms use inexpensive kit, while some incorporate a BBC Microbit credit-card size nanocomputer. The workshop will cover the physics principles and analysis of the projects and allow for participants to have a go at a number of the demonstrations. More details on saturdayscience.org.

**Maths for KS3 and KS4 physics**
Lawrence Cattermole, Institute of Physics

This session will start with the idea that many students find much of the quantitative/mathematical skills needed for success in the physics curriculum difficult. We
will be looking at ways to make the equations more meaningful, by grouping them and by physically modelling them. Strategies will be highlighted for key areas of difficulty to make them more understandable and provide access for as many students as possible.

**Barriers to physics**  
Jessica Rowson, Institute of Physics

For most of history, physicists have been pale and male. Is this changing? Jessica Rowson looks at recent successes and what can be done at a classroom level to encourage participation and progression of all, through contexts, careers and inclusive teaching techniques.

**The Faulkes Telescope Project: bringing the universe in to the classroom**  
Dr Paul Roche, Cardiff University  
More details to follow.

**Press Start – a Gameful approach to curriculum development in physics**  
Richard Parker, Rugby School  
More details to follow.