Queen Mary University of London

Women in Mathematics 2019
Tuesday 12th March, The Octagon

Our talks from women in academia

11:15-11:45 - **The crux of stepping aside - to the left or to the right?** Dr Marie-Therese Wolfram (University of Warwick)

Humans are creatures of habit - whether we step to the left or right in case of a possible collision or how fast we move depends strongly on our personal preferences and cultural upbringing. However basic interaction rules, such as collision avoidance, can be analysed in minimalistic mathematical models. We will discuss different approaches in this talk and show that such simple interaction rules can already lead to lane formation or clogging at exits.

Partial Differential Equations | **Numerical Analysis** (Mathematical Modelling in the Life Sciences)

11:50-12:20 - **Computational algebra and topology: how does this inform biological process?** - Dr Heather Harrington (University of Oxford)

From epidemics spreading across the globe to proteins interacting inside a cell, biological systems have complex interactions that can behave in unexpected ways and generate vast amounts of data. Branches of abstract mathematics such as algebra and topology in combination with computing and statistics, can help us understand these systems by looking at their data in new ways. The talk will focus on how computational developments in abstract mathematics can provide new insights to biological systems with data.

Applied & Computational Algebra | **Topological Data Analysis** (Networks, Systems Biology)

13:40-14:10 - **From diffusing diseases with Dustin Hoffman to making microbes with mathematical models** - Prof Ivana Gudelj (University of Exeter)

Over the past 20 years, biology has become increasingly quantitative, with mathematics termed ‘biology’s next microscope, only better’, due to its power to reveal unsuspected and entirely new worlds within biology. My research uses mathematical models and laboratory experiments to understand how microorganisms cooperate and compete to cause disease. This can ultimately help us design sustainable strategies for managing infections and antibiotic resistance.

Applied Mathematics | **Dynamical Systems** (Computational Biology, Evolutionary Systems)

14:10-14:50 – **The mathematics of musical structures: from harmony to heartbeats**
- Prof Elaine Chew (Queen Mary University of London)

We shall examine how mathematical models allow us to describe how music works, which leads to a better understanding of music and new ways to create and interact with music. The inherent musicality of abnormal heart rhythms can be captured by these same models, enabling new ways to represent characteristics of different forms of cardiac arrhythmia.

Music Computing | Computational Analysis in Music & Cardiology (Mathematical Representation of Structures in Music and Arrhythmia Sequences, Computer-assisted Composition and Improvisation, Computational Music Structure Analysis)

15:45-16:15 – **Hidden figures: the stats behind CSI -** Dr Tereza Neocleous (University of Glasgow)

Forensic science, as portrayed on TV, is usually about finding a perfect match in just a few minutes. Real forensic casework takes considerably more time, and requires sources of uncertainty to be taken into account. I will present examples from my own research of how the evidential value of glass fragments and voice recordings can be obtained using statistical models, and discuss issues relating to evidence evaluation more generally.

Statistical Modelling | Forensic Statistics (Quantile Regression, Survival Data Analysis, Biostatistics)

For more information, please visit our event web page at qmul.ac.uk/maths/wim2019, or email maths@qmul.ac.uk