LMS Women in Mathematics Day 2021

Titles and Abstracts

Friezes in algebra and combinatorics

Karin Baur (University of Graz and University of Leeds)

Frieze patterns of integers have first been studied by Coxeter and Conway-Coxeter in the 70s. These patterns can be realised via triangulations of polygons and matchings. Since the discovery of the link between triangulated polygons and cluster algebras or cluster categories sparked the interest in friezes. In this talk, we recall the geometric interpretation of friezes (finite and infinite) and discuss their properties, including the growth behaviour in the infinite case.

How is statistics applied in industrial research? Shirley Coleman (Newcastle University)

Statistics has a fundamental role to play in the smooth functioning of industrial processes, in their continuous improvement and increasingly in innovative approaches to challenging new procedures. Whilst sound data quality is always vital and exploratory data analysis is inspirational, there are more and more opportunities to work magic with complex non-linear and unstable processes using the vast quantities of data available and ready access to fast, slick computer power. The talk will include examples from the speaker's experience, and emphasise that ensuring the groundwork of any research project is well thought through is definitely a major influence on success.

The ubiquity of quiver moduli Victoria Hoskins (Radboud University)

Moduli spaces are geometric solutions to classification problems. One of the simplest examples is moduli spaces of quiver representations, which generalise many classification problems in linear algebra. Despite their simplicity, quiver moduli spaces are very rich geometic objects which appear in algebraic geometry, mathematical physics, symplectic and hyperkähler geometry, as well as representation theory. In this talk, I will introduce quiver representations and their moduli spaces and talk about their geometry and their interaction with different areas of mathematics.

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Working as a Statistical Consultant — Sarah Littler (Select Statistical Services)

Sarah's talk will focus on her experience of working as a statistical consultant, covering her background and how she came to work in this area. She will discuss the sorts of projects and challenges that she and her colleagues at Select tackle as consultant statisticians working with real-World data, including the wider skills required in the role. This session will also include a high-level overview of the statistical software R, and the advantages it can offer for data analysis. Not only is R a powerful tool for carrying out statistical analysis, but it can also be used to implement complex data manipulation, to create powerful visualisations to convey the insights gained from the analysis and even produce interactive web-applications.

The equivalence problem for singularities in analytic dynamical systems

Christiane Rousseau (Université de Montréal)

A central problem in local dynamics is the equivalence problem: when are two systems locally equivalent under a change of coordinates? In the neighbourhood of a singular point, representatives of equivalence classes could be given by normal forms. But, most often, the changes of coordinates to normal form diverge. Why? What does it mean? In this talk, we will discuss a class of singularities for which we can solve the equivalence problem both for the singularities and for their unfoldings in families depending on parameters. We will explain the common geometric features of these singularities. In particular we will highlight how the study of the unfolding of these singularities allows understanding both the singularities themselves, and the geometric obstructions to the existence of analytic changes of coordinates to normal form.

Commutative K-theory — Ulrike Tillmann FRS (University of Oxford)

Vector bundles over a compact manifold can be defined via transition functions with values in a linear group. Often one imposes conditions on these transition functions. For example for real vector bundles one may ask that their images lie in the special linear group to encode orientability. Commutative K-theory arises when we impose the condition that the transition functions commute with each other whenever they are simultaneously defined. We will introduce commutative K-theory (and some natural variants of it), and survey what we know about these generalised cohomology theories.