Plenary Lectures
Conférences plénières

DEBORAH HUGHES HALLETT, Harvard Kennedy School and University of Arizona
Harnessing the Curiosity of Today's Students—Tomorrow's Decision Makers

Data illuminates many of the world's challenges—climate change, pandemics, inequality, injustice, recessions. Yet over the past few years there has been an uptick in skepticism: climate denial, vaccine hesitancy, and disinformation. What is the role of mathematics in these debates? This talk will argue that mathematics should embrace a major role. Engaging future citizens with data is our business—and arguably our responsibility—and certainly it is in the interest of society.

How do we engage students in understanding and critiquing data? We have a powerful ally in students' curiosity. While curiosity can't be dictated, it can be harnessed! Students see the world through their own lenses, yet we all share the same data. Harnessing their natural curiosity to gain insight into the worlds challenges showcases the mathematical sciences as central to the students' and the world's future.

JUDE DZEVELA KONG, York University
How mathematics can save lives: mathematical modeling to support infectious disease-based decision-making

Being generally perceived as a niche discipline, mathematical modeling has become extremely popular during the COVID-19 pandemic, being brought to the forefront of lay public attention and debate. Words such as 'flattening the curve' and 'reproduction number' have become a common part of the collective lexicon. In the era of evidence-based decision-making and evidence-based medicine, mathematical models are now considered as valuable and insightful tools as epidemiological surveys and randomized controlled clinical trials. Governmental institutions and public health authorities all over the world are relying more and more on mathematics, not only to forecast the epidemic in terms of trends and projections, but also to understand societal issues, like vaccine hesitancy and behavioral adherence to recommendations and mandates. Never as in this period, mathematicians and mathematical models are playing a key role in real-time delivery of reliable and comprehensive information to predict the spread of COVID-19 and its impact, and in guiding governmental policies and best practice. However, despite this increasing popularity, mathematical modeling still appears to be more an art rather than a science, with results sometimes highly conflicting, which are hard to reconcile. So, HOW do we design a mathematical model of an infectious disease outbreak? HOW can models be harnessed to inform public health measures at different stages of an outbreak? In this talk, I will try to provide answers to these questions.

EMMY MURPHY, Princeton University
Flexibility in contact and symplectic geometry

There is a notion of flexibility, which acts as a touchstone in a large number of geometric contexts. Originally framed by Gromov as the h-principle, the topic has expanded broadly to influence many fields. The talk will discuss flexibility in symplectic geometry, Stein geometry, and contact geometry, and how the notions of flexibility inter-relate between them. A particular interest here are the flexible/rigid dichotomies we see in these geometries, which has seen rapid progress in recent years. The talk will discuss the general notions and framework, and give a broad tour of recent developments.