

## Machine Learning and Physics Seminar Series

Thursday, 5 December 2019 at 2.30pm  
Dennis Sciama Lecture Theatre, Denys Wilkinson building

### Machine Learning Mathematical Structures

**Professor Yang-Hui He**  
University of London

Using string compactification as a playground and inspired by the landscape of vacua, we show how classes of computationally difficult problems in geometry, combinatorics and mathematical physics can be solved stochastically using machine-learning without recourse to traditionally exponential-running algorithms. The success of such “experiments” presents the possibility of efficiently estimating features in vacuum selection as well as of uncovering new conjectures in mathematics.

Yang-Hui He obtained his BA (summa cum laude) in physics with a certificate in mathematics from Princeton University. After a Distinction at the Mathematical Tripos from Cambridge, he obtained his PhD in theoretical physics, specializing in the interface between algebraic geometry and string theory, from MIT. He then did his postdoc at UPenn working on Calabi-Yau compactifications before moving to Oxford as FitzJames Fellow at Merton College and STFC Advanced Fellow in theoretical physics. Yang-Hui is currently professor of mathematics and senior tutor for research at City, University of London, while holding a Chair in Physics at Nankai University, China and remaining a tutor at Merton. In the field of the interdisciplinary studies between mathematics physics, geometry and applications of machine-learning, Prof. He has published over 170 research papers as well as 3 books.