

## MATH-IMS Joint Pure Mathematics Colloquium Series The Chinese University of Hong Kong

*This Colloquium Series in Pure Mathematics is organized by the Department of Mathematics and the Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong. The series focuses on all areas of pure mathematics together with theoretical developments and applications.*

**Date:** March 21, 2023 (Tuesday)  
**Time:** 2:00PM-3:00PM (Hong Kong Time)  
**Venue:** LSB 222

## Cohomology groups of moduli spaces of curves

*Speaker: Professor Sam Payne  
University of Texas at Austin*

**Abstract:** The cohomology groups of moduli spaces of curves are important to several mathematical disciplines, from low-dimensional topology and geometric group theory to stable homotopy theory and quantum algebra. Algebraic geometry endows these groups with additional structures, such as Hodge structures and Galois representations, and the Langlands program makes striking predictions about which such structures can appear. I will survey recent results confirming several of these predictions and making progress toward calculating these groups and determining in which degrees they do and do not vanish.

Based on joint work with Jonas Bergström and Carel Faber; with Sam Canning and Hannah Larson; with Melody Chan and Søren Galatius; and with Thomas Willwacher.

**Bio:** Prof. Sam Payne is currently a professor at the University of Texas at Austin. He completed his A.B. at Princeton University in 2001, and his Ph.D. at the University of Michigan, Ann Arbor in 2006. After graduation, he became an assistant professor at Stanford and then Yale University, where he became a full professor in 2017. His research concerns the geometry, topology, and combinatorial structure of algebraic varieties and their moduli spaces. He has made many important contributions to tropical and non-archimedean geometry and their applications in algebraic geometry and combinatorics. Prof. Payne's fundamental contributions are widely recognized in the mathematical community, and he has received many awards including the Clay Fellowship in 2006, the Simons Fellowship and Max Planck-Humboldt Medal in 2018. He became a fellow of the American Mathematical Society in 2023.