

Berlin Mathematics Research Center

**MATH+**

Berlin Mathematical School

**BMS**

## MATH+ Friday Colloquium

**Friday 8 November 2019 at 14:15**

*Tea & Cookies starting at 13:00*

Loft, Urania, An der Urania 17, 10787 Berlin

### Sam Payne

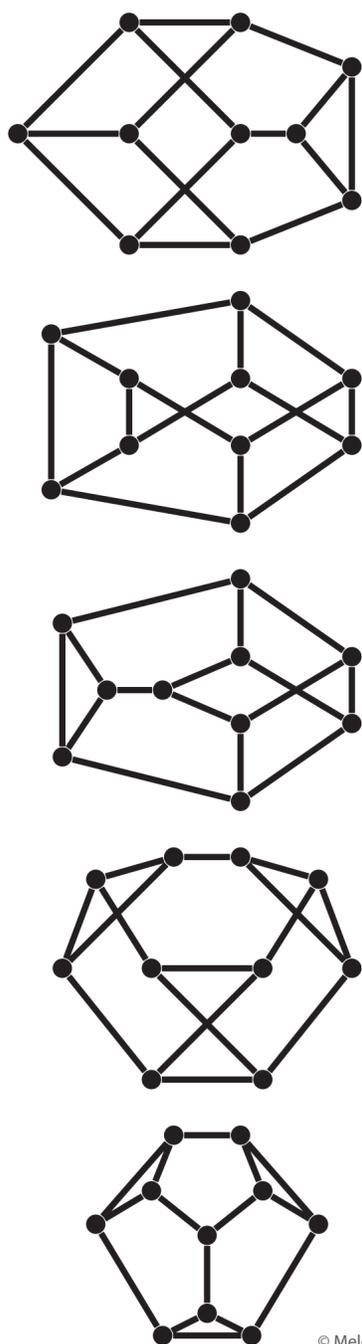
*(U Texas, Austin)*

#### Tropical curves, graph homology, and top weight cohomology of $M_g$

In his talk, Payne will discuss the topology of a space of stable tropical curves of genus  $g$  with volume 1. The reduced rational homology of this space is canonically identified with the top weight cohomology of the moduli space  $M_g$  of compact Riemann surfaces of genus  $g$  and also with the homology of Kontsevich's graph complex. As one application, he will show that  $H^{4g-6}(M_g)$  is nonzero for infinitely many  $g$ . This disproves a recent conjecture of Church, Farb, and Putman as well as an older, more general conjecture of Kontsevich. He will also give an independent proof of a recent theorem of Willwacher, that homology of the graph complex vanishes in negative degrees, using the identifications above and known vanishing results for  $M_g$ . In addition, he will prove a formula for the  $S_n$ -equivariant Euler characteristic of  $M_{g,n}$ , which was conjectured by Zagier.

This talk is based on joint work with M. Chan, C. Faber, and S. Galatius.

Sam Payne is a professor of mathematics at the University of Texas at Austin. His research focuses on the development and application of combinatorial methods in algebraic geometry. Payne received his PhD from the University of Michigan, Ann Arbor in 2006, and was a Clay Postdoctoral Research Fellow at Stanford from 2006 to 2010. Prior to joining UT Austin, he was a professor at Yale University (2010–2018), and held positions as a visiting researcher in Canada, Sweden, Belgium and at the FU Berlin (2010). His honors and awards include a Simons Fellowship (2018-2019) and a Max Planck-Humboldt Medal (2018).



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<https://arxiv.org/abs/1903.07187>