

Emergent Research:

The PIMS Postdoctoral Fellow Seminar



Pacific Institute *for the*
Mathematical Sciences

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Modular Forms and their Role in Counting Combinatorial and Topological Objects



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ABSTRACT:

I will begin by introducing some of the most basic combinatorial objects - partitions. It turns out that their generating function is a prototypical example of a modular form. These are objects with infinite symmetry, in turn giving them extraordinary properties. I'll then talk about the asymptotic behaviour of various modular-type objects arising from combinatorics and topology using the Circle Method of Hardy-Ramanujan and Wright, as well as one can even obtain exact formulae. In particular, I'll highlight the asymptotic (non)-equidistribution properties of Betti numbers of various Hilbert schemes as well as t-hooks in partitions. This talk will include various works with configurations of my collaborators Kathrin Bringmann, Giulia Cesana, William Craig, Daniel Johnston, Ken Ono, and Aleksander Simoni.

For more information and registration:

<https://www.pims.math.ca/seminars/PIMSPDF>

SPEAKER BIO:

Joshua Males received his MMath (masters + bachelors) degree from Durham University, UK under the supervision of Jens Funke, before taking a year sabbatical in Durham. In late 2017, he joined Kathrin Bringmann's number theory group at the University of Cologne, Germany, where he earned his PhD in May 2021. Since August 2021, Joshua has been a PIMS postdoctoral fellow at the University of Manitoba, working under his mentor Siddarth Sankaran. His research focuses on modular forms and their use in number theory and beyond, with connections to combinatorics, topology, and arithmetic geometry. At the time of writing, Joshua has 8 published articles (4 solo author) and 6 preprints (1 solo author) as well as 3 more articles in the latter stages of preparation.

ABOUT PIMS PDF SEMINARS:

PIMS ongoing lecture series featuring our Postdoctoral Fellows every three weeks. You will have the opportunity to connect with emerging research in the mathematical sciences from a PIMS Postdoctoral Fellow. PIMS PDFs are amongst the top young researchers in Canada, and this is an excellent opportunity to learn about them, and their work.

