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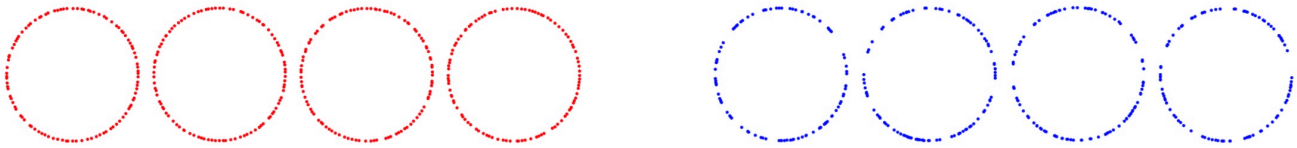
MATHEMATICS AND STATISTICS

QUEEN'S UNIVERSITY



SOME APPLICATIONS OF RANDOM MATRIX THEORY TO ANALYTIC NUMBER THEORY

Abstract. In this talk I'll survey some of the ways that ideas originating from the study of random matrices have had an impact on analytic number theory. I hope to discuss in particular: 1) the statistical spacing of zeros of the Riemann zeta function, and what this spacing has to say about arithmetic, 2) a resolution of conjectures of Saffari and Montgomery about the distribution of Rudin-Shapiro polynomials, using a connection to random walks on compact groups, and 3) recent work on the de Bruijn-Newman constant; de Bruijn showed that the Riemann hypothesis is equivalent to the claim that this constant is less than or equal to 0, and I will describe recent work showing the constant is greater than or equal to 0, confirming a conjecture of Newman. This includes joint work with J. Keating, E. Roditty-Gershon, and Z. Rudnick; and with T. Tao.

Brad Rodgers (University of Michigan)

Brad Rodgers obtained his Ph.D. in Mathematics from the University of California, Los Angeles in 2013 under the supervision of Terence Tao. From 2013 to 2015 he held a postdoctoral position at the Institut für Mathematik at the Universität Zürich. Since 2015, he is a Postdoc Assistant Professor at the University of Michigan. Dr. Rodgers's awards include the AMS-Simons Travel Grant (2013-2016) and a NSF research grant (2017-2020). His research interests include random matrix theory, analytic number theory. In particular, he focuses on the interaction of these disciplines with analysis, probability, and combinatorics.

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4:30pm · FEBRUARY 12 · 2018