

SOUTHERN CALIFORNIA NUMBER THEORY DAY, UCSD

FEBRUARY 22, 2020

John Voight (Dartmouth College)

Title: Identities for $1/\pi^2$ and special hypergeometric motives

Abstract: More than a century ago, Ramanujan discovered remarkable formulas for $1/\pi$. Inspired by these discoveries, similar Ramanujan-like expressions for $1/\pi^2$ have been uncovered recently by Guillera. In this talk, we will propose an explanation for the provenance of these formulas: we recognize certain special hypergeometric motives as arising from Hilbert modular forms in an explicit way. This is joint work with Lassina Dembélé, Alexei Panchishkin, and Wadim Zudilin.

Melanie Matchett Wood (University of California Berkeley)

Title: Distributions of unramified extensions of global fields

Abstract: Every number field K has a maximal unramified extension K^{un} , with Galois group $\text{Gal}(K^{\text{un}}/K)$ (whose abelianization is the class group of K). As K varies, we ask about the distribution of the groups $\text{Gal}(K^{\text{un}}/K)$. We give a conjecture about this distribution, which we also conjecture in the function field analog. We give some results about $\text{Gal}(K^{\text{un}}/K)$ that motivate us to build certain random groups whose distributions appear in our conjectures. We give theorems in the function field case (as the size of the finite field goes to infinity) that support these new conjectures. In particular, our distributions abelianize to the Cohen-Lenstra-Martinet distributions for class groups, and so our function field theorems give support to (suitably modified) versions of the Cohen-Lenstra-Martinet heuristics. This talk is on joint work with Yuan Liu and David Zureick-Brown.

Chao Li (Columbia University)

Title: On the Kudla-Rapoport conjecture

Abstract: The Kudla-Rapoport conjecture predicts a precise identity between the arithmetic intersection numbers of special cycles on unitary Rapoport-Zink spaces and the derivatives of local representation densities of hermitian forms. It is a key local ingredient to establish the arithmetic Siegel-Weil formula, relating the height of generating series of special cycles on Shimura varieties to the derivative of Siegel Eisenstein series. We discuss a proof of this conjecture and global applications. This is joint work with Wei Zhang.

Daxin Xu (Caltech)

Title: Bessel F-isocrystals for reductive groups

Abstract: I will first review the relationship between the Kloosterman sums and the classical Bessel differential equation. Recently, there are two generalizations of this story (corresponding to GL_2 -case) for arbitrary reductive groups using ideas from the geometric Langlands program, due to Frenkel-Gross and Heinloth-Ngô-Yun. In the end, I will discuss my joint work with Xinwen Zhu where we unify previous two constructions from the p -adic aspect and identify the exponential sums associated to different groups as conjectured by Heinloth-Ngô-Yun.

Raphael Rouquier (University of California Los Angeles)

Title: Motives of Deligne–Lusztig varieties

Abstract: Deligne–Lusztig varieties are varieties over finite fields endowed with actions of finite groups of Lie type. I will discuss their motives and the independence in ℓ of their ℓ -adic cohomology.