Department of Mathematics
University of Notre Dame

FELIX KLEIN SEMINAR

Speaker: Evangelos Nikitopoulos
University of California, San Diego

Date: Thursday, January 25, 2024
Time: 2:00 PM
Location: 125 Hayes-Healy Bldg
Zoom URL: NA

Lecture Title:

Noncommutative Stochastic Calculus

Abstract

Noncommutative or free probability is a branch of mathematics that is useful for describing the large-N limits of many $N \times N$ random matrix models. In this theory, classical probability spaces are replaced by pairs $(\mathcal{A}, \tau)$, where $\mathcal{A}$ is an (operator) algebra and $\tau \colon \mathcal{A} \to \mathbb{C}$ is a certain kind of linear functional. In such a pair, $\mathcal{A}$ and τ are conceptualized as the space of "noncommutative random variables" and the "expectation" functional on $\mathcal{A}$, respectively. The analogy with classical probability goes much further; indeed, there are notions of distribution, independence, L^p-spaces, conditional expectation, and more. My talk will focus on my recent joint work with David Jekel and Todd Kemp on developing a noncommutative theory of stochastic calculus (the study and application of stochastic integrals and quadratic covariation). I shall not assume any knowledge of stochastic calculus or free probability, so the talk will focus heavily on background and motivation. Time permitting, I shall also say a few words about applications in progress.

Evangelos Nikitopoulos - University of California, San Diego