Jinho Baik
University of Michigan
Totally asymmetric simple exclusion process

In a traffic flow of cars in a single lane, a slowly moving car affects the following vehicles. The totally asymmetric simple exclusion (TASEP) process is a simple probabilistic model for such a system. It is one of the fundamental models in the interacting particle systems. Furthermore, it is one of the first models for which the law of the fluctuations of the particle locations from their expected locations after a long time is determined. One way to obtain the probability distribution of a particle location is by solving the Kolmogorov forward equation, which is a non-constant coefficient linear PDE, and then taking the large time limit of the Fredholm determinant formula that arises. We discuss how this procedure works for the TASEP on the line and also for the TASEP on a ring which was studied recently.

Steven Bell
Purdue University West Lafayette
The theorem that is too good to be true and how it made me very happy

Joint work with Björn Gustafsson

Mergelyan’s theorem about approximating continuous functions on compact sets by complex rational functions has often been called a theorem that is too good to be true — but it is! I will describe my 40 year quest to better understand the relationship between the Bergman and Szegő kernels in planar domains and how Mergelyan’s theorem helped me check off this thing near the top of my bucket-list.

Sergiy Borodachov
Towson University
Optimal recovery of Sobolev classes using multivariate splines

We will start by discussing the general setting of the problem of optimal global recovery of functions from given discrete data. Then we will consider this problem on different classes
of multivariate functions and show how multivariate splines arise as exact solutions. If time permits, certain asymptotic results will also be discussed as well as the relation of optimal recovery to certain discrete geometric problems.

**Shaoyu Dai**  
Jinling Institute of Technology — visiting Purdue Fort Wayne  
**On existence of entire solutions of the Poincaré-Lelong equations in \( \mathbb{C}^n \)**

*Joint work with Yifei Pan*

Lelong first studied the Poincaré-Lelong equation \( \sqrt{-1} \partial \bar{\partial} u = f \), where \( f \) is a \( d \)-closed \((1,1)\)-form defined on \( \mathbb{C}^n \), by reducing it to Poisson’s equation \( \Delta u = \text{trace}(f) \), assuming suitable growth conditions on \( f \). We prove the existence of entire solutions of the Poincaré-Lelong equations for any \( f \) that is in the weighted Hilbert space with Gaussian measure, i.e., \( L^2_{(1,1)}(\mathbb{C}^n, e^{|z|^2}) \). One of the key ideas is to prove a \( L^2 \) version of the Poincaré Lemma for 2-forms, and apply Hörmander’s \( L^2 \) solutions for Cauchy-Riemann equations.

**Alyssa Genschaw**  
University of Connecticut  
**Parabolic measure**

We will discuss parabolic measure associated to a uniformly parabolic divergence form operator. We will give a brief overview of some recent results, including a Bourgain-type estimate, a criterion for non-doubling parabolic measure to satisfy a weak reverse Hölder inequality, and that BMO-solvability implies scale invariant quantitative absolute continuity of parabolic measure with respect to surface measure.

**Steven Hussung**  
Indiana University  
**Nontraditional notions of polynomial ordering with computational applications**

Nontraditional notions of polynomial degree and ordering will be discussed, with generalizations of several potential-theoretic results proceeding from Siciak-Zaharjuta type theory. I will focus particularly on numerical aspects, and will present generalizations of Fekete and Leja points in this setting, as well as discrete versions of each. I will also present two numerical asymptotic descriptions of the potential theoretic extremal function, generalized to this setting.
Juan Criado del Rey
KU Leuven

An equilibrium problem on the sphere with two equal charges

Joint work with Alan Groot and Arno Kuijlaars

We study the weighted equilibrium measure associated to a logarithmic external field generated by two point charges on the two-dimensional sphere. When the charges are small, the droplet is known to be the complement of two spherical caps, but as soon as the charges become large, the shape of the droplet changes. In this talk we will see how can we describe the shape of the droplet and what is the role of non-standard orthogonal polynomials in the solution of the problem.