Asymptotics of Fredholm determinants associated with higher dimensional kernels

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In this talk, we consider the Pearcey kernel and the hard edge Pearcey kernel, which appear in random matrix theory and many other stochastic models. They are viewed as higher dimensional kernels in the sense that they can be characterized by 3×3 matrix-valued Riemann-Hilbert problems. We establish integral representations for Fredholm determinants of integral operators with these kernels, which involve Hamiltonians associated with certain nonlinear differential equations. We also derive large gap asymptotics for the determinants and obtain asymptotic statistical properties for the related point processes.

Joint work with Shuai-Xia Xu (Sun Yat-sen University, China) and Lun Zhang (Fudan University, China).