Stanford University
Departments of Mathematics and Statistics

PROBABILITY SEMINAR

4:30pm, Monday, September 28, 2015
Sequoia Hall Room 200
Cookies served at 4pm, 1st floor Lounge.

Speaker: Naomi Feldheim
Department of Mathematics, Stanford University

Title: Winding of planar stationary Gaussian processes

Abstract:
Consider random stationary complex-valued Gaussian functions defined on the real axis. That is, random paths, invariant under time-shifts, whose finite marginals are (centered) Gaussian. Such processes are used by physicists to model objects such as polymers and random flux lines of magnetic fields. The winding number of the process on a large interval represents the “entanglement” of the polymer or the flux line in space.

In this talk, we explain how to use elementary complex and harmonic analysis, combined with well-known Gaussian properties, in order to obtain exact formulae for the mean and variance of this quantity, and prove a central limit theorem. In doing so, we give rigorous proofs to predictions by physicists (e.g., Le Doussal–Etzioni–Horovitz). The talk will be self-contained, with special emphasis given to tools which may find applications elsewhere.

This is joint work with Jeremiah Buckley.