

TEMPLE UNIVERSITY

Department of Mathematics

Analysis Seminar

Room 617 Wachman Hall

Monday, February 11 2019, 2:40 p.m.

*Homogenization of a class of one-dimensional
nonconvex viscous Hamilton-Jacobi equations
with random potential*

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Abstract: I will present joint work with Elena Kosygina and Ofer Zeitouni in which we prove the homogenization of a class of one-dimensional viscous Hamilton-Jacobi equations with random Hamiltonians that are nonconvex in the gradient variable. Due to the special form of the Hamiltonians, the solutions of these PDEs with linear initial conditions have representations involving exponential expectations of controlled Brownian motion in a random potential. The effective Hamiltonian is the asymptotic rate of growth of these exponential expectations as time goes to infinity and is explicit in terms of the tilted free energy of (uncontrolled) Brownian motion in a random potential. The proof involves large deviations, construction of correctors which lead to exponential martingales, and identification of asymptotically optimal policies.