



## Mathematics and CS Seminar

# Non-equilibrium fluctuations, conservative stochastic PDE, and parabolic-hyperbolic PDE with irregular drift

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Host: Julian Fischer

Far-from-equilibrium behavior in physical systems is widespread. A statistical description of these events is provided by macroscopic fluctuation theory, a framework for non-equilibrium statistical mechanics that postulates a formula for the probability of a space-time fluctuation based on the constitutive equations of the system. This formula is formally obtained via a zero noise large deviations principle for the associated fluctuating hydrodynamics, which postulates a conservative, singular stochastic PDE to describe the system out-of-equilibrium. In this talk, we will focus particularly on the fluctuations of certain interacting particle processes about their hydrodynamic limits. We will show how the associated MFT and fluctuating hydrodynamics lead to a class of conservative SPDEs with irregular coefficients, and how the study of large deviations principles for the particles processes and SPDEs leads to the analysis of parabolic-hyperbolic PDEs in energy critical spaces. The analysis makes rigorous the connection between MFT and fluctuating hydrodynamics in this setting, and provides a positive answer to a long-standing open problem for the large deviations of the zero range process.

**Tuesday, March 19, 2024 04:15pm - 05:15pm**

Office Bldg West / Ground floor / Heinzl Seminar Room (I21.EG.101)



This invitation is valid as a ticket for the ISTA Shuttle from and to Heiligenstadt Station.

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