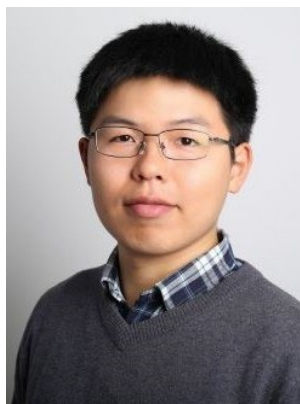




**Yifan Hu**  
Computer Science Department  
ETH Zurich

*Stochastic Hidden Convex Optimization and Its Applications*

**Wednesday, October 16th, 2024**

**12:00 PM**

**110 Frelinghuysen Road, Hill Center, Room 116**

**Zoom Meeting: Meeting ID: 969 0606 4706**

**Password: 745339**

<https://rutgers.zoom.us/j/96906064706?pwd=ZklvbExpRVBJQ3c5dUhhYTFuR2ZrZz09>

### Abstract:

**Light refreshments will be served in Hill 452, 11:20am**

General nonconvex optimization is notoriously challenging due to the difficulty in finding global optima. In this talk, we introduce stochastic hidden convex optimization, a class of benign nonconvex problems that admit a convex reformulation through a (possibly implicit) variable transformation. To solve such problems, our methods update entirely in the original variable space using gradient estimators of the original nonconvex objective, without requiring explicit knowledge of the transformation.

When estimators of this transformation are available, we develop the Mirror Stochastic Gradient (MSG) method and establish its sample and gradient complexities for achieving a global optimal solution, which match the lower bounds for stochastic convex optimization. When information about the transformation is totally absent, we further establish the global convergence rates of projected stochastic (sub)gradient methods. Extensive numerical experiments demonstrate the superior performance of our proposed methods in network revenue management tasks, achieving higher revenue and lower computational costs compared to state-of-the-art bid-price control policies.

**Bio:** Yifan Hu is a postdoc researcher jointly advised by Prof. Daniel Kuhn from EPFL and Prof. Andreas Krause from ETH Zurich in Switzerland. Prior to that, he obtained PhD in Operations Research from the University of Illinois at Urbana-Champaign, jointly advised by Prof. Xin Chen and Prof. Niao He. His research interests lie in data-driven decision-making with problems arising from optimization, machine learning, and operations research. He is interested in the theoretical foundations of optimization and statistics and in designing simple and efficient algorithms with provable guarantees for operations and data science applications.

