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## Department of Computer Science Colloquium Talk

Optimization in Machine Learning: From Fundamentals to State-of-the-Art



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**Date:** Wednesday, April 12, 2023

**Time:** 10:00am-11:00am.

**Location:** Petty Science Building 227

### Abstract:

Mathematical optimization plays a fundamental role in machine learning because many problems in this field can be formulated as optimization problems. In this talk, we will explore the mathematical foundations of optimization in machine learning and discuss its applications in various subfields of the discipline. Starting from the basic concepts of convex optimization, we will discuss how optimization techniques are used to train models in supervised and unsupervised learning, as well as deep learning. The optimization of deep neural networks is challenging because of the high dimensionality of the parameter space and the non-convexity of the optimization problem. We will also delve into more advanced optimization methods, such as stochastic gradient descent and its variants, and examine their effectiveness in handling large-scale and non-convex optimization problems. Through this talk, attendees will gain a deeper understanding of how optimization drives the progress of machine learning and its potential for future research.

### Biography:

Qianqian Tong is an assistant professor in the department of Computer Science at University of North Carolina Greensboro. She obtained a Ph.D. degree in the department of computer science from University at Connecticut, M.S and B.S in Mathematics from Zhengzhou University, China. She has published several papers in top-tier artificial intelligence and data mining conferences and journals --- AAAI, ICDM, Neurocomputing, Parallel Computing, Information Science, etc. Her primary research focuses on large-scale machine learning and stochastic optimization.