

Faculty Candidate Seminar -- Purdue Computes: AI/ML**Manolis Vlatakis**FODSI Postdoc Fellow
UC Berkeley**Wednesday, April 10, 2024****1:30 P.M. – 2:30 P.M.****LWSN 3102A/B****Bridging the Gap between Theory and Practice: Solving Intractable Problems in a Multi-Agent Machine Learning World****Abstract**

Traditional computing sciences have made significant advances with tools like Complexity and Worst-Case Analysis. However, Machine Learning has unveiled optimization challenges, from image generation to autonomous vehicles, that go beyond the analytical capabilities of past decades. Despite their theoretical complexity, such tasks are often more manageable in practice, thanks to deceptively simple yet efficient techniques such as Local Search and Gradient Descent.

In this talk, we will delve into the effectiveness of these algorithms in complex environments and the development of a theory that transcends traditional analysis, bridging theoretical principles with practical applications. We will further explore the behavior of these heuristics in multi-agent strategic environments, evaluating their capacity to achieve equilibria through advanced machinery from Optimization, Statistics, Dynamical Systems, and Game Theory. The discussion will conclude with an outline of future research directions and my vision for a computational understanding of multi-agent Machine Learning.

Bio

Emmanouil-Vasileios (Manolis) Vlatakis Gkaragkounis is currently a Foundations of Data Science Institute (FODSI) Postdoctoral Fellow at the Simons Institute for the Theory of Computing, UC Berkeley, mentored by Prof. Michael Jordan. He completed his Ph.D. in Computer Science at Columbia University, under Professors Mihalis Yannakakis and Rocco Servedio, and holds B.Sc. and M.Sc. degrees in Electrical and Computer Engineering. Manolis specializes in the theoretical aspects of Data Science, Machine Learning, and Game Theory. His expertise includes beyond worst-case analysis, optimization, and data-driven decision-making in complex environments. Applications of his work span multiple areas from privacy, neural networks, to economics and contract theory, statistical inference, and quantum machine learning.