

2025 IE Summer Internship Project

Project title	Towards Parameter Free Decentralized Stochastic Optimization
Project description	<p>There is a growing interest in designing optimization algorithm using adaptive learning rates (a.k.a. stepsize) to solve (stochastic) optimization problems. This has become particular relevant to train large language model systems and more general neural networks. This project aims to extend these methods to decentralized settings where data are distributed among different machines (referred to as agents). This is challenging because agents do not have access locally to the optimization functions and/or data at the other nodes of the network, and they may not know the exact topology of the network. This prevent the use of existing approaches as developed in the centralized setting. The project will focus on understanding the existing methods in the centralized setting first, and then extend such techniques to the networking setting. Potential outcomes of this project will be a report and possibly a paper for submission to a leading machine learning conference.</p>
Host professor name	Gesualdo Scutari
Professor/lab websites	https://engineering.purdue.edu/~gscutari/
Contact information to whom applicants can direct questions	gscutari@purdue.edu
Other comments	Potential interns must have a strong analytical background in calculus, linear algebra, and basic knowledge on optimization methods. Prior experience with decentralized optimization is an advantage, but not required.



Edwardson School of
Industrial Engineering