Sungho Shin

Assistant Professor, Department of Chemical Engineering, Massachusetts Institute of Technology
Email: sushin@mit.edu | Cell: +1 617 715 5740 | Web: shin.mit.edu | LinkedIn: @sshin23 | Github: @sshin23

Education and Training

Argonne National Laboratory, Lemont, IL	2021–2024
Postdoc in Mathematics and Computer Science Division	
University of Wisconsin-Madison, Madison, WI	2021
Ph.D. in Chemical Engineering	
Seoul National University, Seoul, South Korea	2016
B.S. in Chemical Engineering and B.S. in Mathematics	

Professional Appointments

Assistant Professor	2024-Present
Department of Chemical Engineering, Massachusetts Institute of Technology, Cambridge, MA	
Postdoctoral Appointee (Supervisor: Mihai Anitescu)	2021-2024
Mathematics and Computer Science Division, Argonne National Laboratory, Lemont, IL	

Honors and Awards

COIN-OR Cup, Computational Infrastructure for Operations Research	2023
W. David Smith, Jr. Graduate Publication Award, AIChE	2023
Young Author Award, IFAC Conference on Nonlinear Model Predictive Control	2021
Young Author Award, IFAC International Symposium on Advanced Control of Chemical Processes	2021
CAST Directors' Student Presentation Award, AIChE	2020

Selected Publications

[P6] F. Pacaud, **S. Shin**, A. Montoison, M. Schanen, and M. Anitescu. Condensed-space methods for nonlinear programming on GPUs, 2405.14236. doi:10.48550/arXiv.2405.14236.

[P5] **S. Shin**, M. Anitescu, and F. Pacaud. Accelerating optimal power flow with GPUs: SIMD abstraction of nonlinear programs and condensed-space interior-point methods. *Electric Power Systems Research*, 236:110651. doi:10.1016/j.epsr.2024.110651.

[P4] F. Pacaud, M. Schanen, **S. Shin**, D. A. Maldonado, and M. Anitescu. Parallel interior-point solver for block-structured nonlinear programs on SIMD/GPU architectures. *Optimization Methods and Software*, arXiv:2301.04869. Accepted.

[P3] F. Pacaud, **S. Shin**, M. Schanen, D. A. Maldonado, and M. Anitescu. Accelerating condensed interior-point methods on SIMD/GPU architectures. *Journal of Optimization Theory and Applications*, pages 1–20, 2023, arXiv:2203.11875. doi:10.1007/s10957-022-02129-5.

[P2] J. Jalving, **S. Shin**, and V. M. Zavala. A graph-based modeling abstraction for optimization: Concepts and implementation in Plasmo.jl. *Mathematical Programming Computation*, 2022, arXiv:2006.05378. doi:10.1007/s12532-022-00223-3.

[P1] **S. Shin**, M. Anitescu, and V. M. Zavala. Exponential decay of sensitivity in graph-structured nonlinear programs. *SIAM Journal on Optimization*, 32(2):1156–1183, 2022, arXiv:2101.03067. doi:10.1137/21M1391079.

Synergetic Activities

Conference session organization: Organized "accelerated computing for mathematical programming" session at INFORMS Annual Meeting (2024)

Invited Seminars: Given several invited seminars about "Nonlinear optimization on GPUs", including Los Alamos National Laboratory (2024), Oklahoma State University (2024), Purdue University (2024), AIChE CAST Webinar series (2024), General Electric (2024), Hitach Energy (2024)