Arash Sarshar

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EDUCATION

Ph.D. Computer Science, Virginia Tech, 2020

M.S. Electrical Engineering, Ferdowsi University, 2012

B.S. Electrical Engineering, Shahid Beheshti University, 2008

APPOINTMENTS

2023–2030 California State University, Long Beach
Assistant Professor, Department of Computer Engineering and Computer Science

2020–2022 Virginia Tech
Postdoctoral Associate, Department of Computer Science

RESEARCH AREAS

Scientific Machine Learning: Data-Driven and Equations-Based Modeling, Simulation, and Optimization

Computational Science: Numerical Methods for Forward and Inverse Problems, High-Performance Computing

PUBLICATIONS

Journal Articles

2024 A. Bhattacharjee, A. Popov, A. Sarshar, A. Sandu, "Improving the Adaptive Moment Estimation (ADAM) stochastic optimizer through an Implicit-Explicit (IMEX) time-stepping approach," *Journal of Machine Learning for Modeling and Computing*, 2024. https://doi.org/10.1615/JMachLearnModelComput.2024053508

2022 S. Roberts, A. Popov, A. Sarshar, A. Sandu, "A fast time-stepping strategy for ODE systems equipped with a surrogate model," *SIAM Journal on Scientific Computing*, 44 (3), A1405-A1427. https://epubs.siam.org/doi/abs/10.1137/20M1386281

2022 S. González–Pinto, D. Hernández–Abreu, M. S. Pérez–Rodríguez, A. Sarshar, S. Roberts, A. Sandu, "A unified formulation of splitting-based implicit time integration schemes," *Journal of Computational Physics*, Volume 448, 2022. https://doi.org/10.1016/j.jcp.2021.110766

2021 S. Roberts, J. Loeffeld, A. Sarshar, C. S. Woodward, A. Sandu, "Implicit multirate GARK methods," *Journal of Scientific Computing*, Volume 87, Issue 1, 2021. https://doi.org/10.1007/s10915-020-01400-z

2021 A. Sarshar, S. Roberts, A. Sandu, "Alternating Directions Implicit Integration in a General Linear Method Framework," *Journal of Computational and Applied Mathematics*, Volume 389, 15 January 2021. https://doi.org/10.1016/j.cam.2019.112619

2020 S. Roberts, A. Sarshar, A. Sandu, "Coupled Multirate Infinitesimal GARK Schemes for Stiff Systems with Multiple Time Scales," *SIAM Journal on Scientific Computing*, Vol. 42, No. 3, PP A1609–A1638. https://epubs.siam.org/doi/abs/10.1137/19M1266952

2020 S. Roberts, A. Sarshar, A. Sandu, "Parallel Implicit-Explicit General Linear Methods," *Communications in Applied Mathematics and Computational Science*, Volume 6, Issue 2, 2021. https://doi.org/10.1007/s42967-020-00083-5

2019 A. Sarshar, S. Roberts, A. Sandu, "Design of high-order decoupled multirate GARK schemes," *SIAM Journal on Scientific Computing*, Vol. 41, No. 2, PP A816-A847. https://epubs.siam.org/doi/abs/10.1137/18M1182875

2017 A. Sarshar, P. Tranquilli, B. Pickering, A. McCall, A. Sandu, C. J. Roy, "A Numerical Investigation of Matrix-Free Implicit Time-Stepping Methods for Large CFD Simulations," *Computers & Fluids*, Volume 159, 15 December 2017, Pages 53–63. https://doi.org/10.1016/j.compfluid.2017.09.014

2017 P. Tranquilli, S. R. Glandon, A. Sarshar, A. Sandu, "Analytical Jacobian-vector products for the matrix-free time integration of partial differential equations," *Journal of Computational and Applied Mathematics*, Volume 310, 15 January 2017, Pages 213–223. http://www.sciencedirect.com/science/article/pii/S0377042716302199

Conference Proceedings

2016 A. Sarshar, A. E. Tabari, "Design of a Stacked Stub-Loaded Patch Element for X-band Reflectarray Antenna with True Time Delay," *7th European Conference on Antennas and Propagation*, Gothenberg, Sweden. http://ieeexplore.ieee.org/xpl/abstractAuthors.jsp?reload=true&tp=&arnumber=6546931

Technical Reports

2024 J Barry-Straume, A Sarshar, AA Popov, A Sandu, "Physics-informed neural networks for PDE-constrained optimization and control," *Technical Report*, arXiv. arXiv preprint arXiv:2205.03377

2022 A. A. Popov, A. Sarshar, A. Chenault, A. Sandu, "A Meta-learning Formulation of the Autoencoder Problem for Non-linear Dimensionality Reduction," *Technical Report*, arXiv. https://arxiv.org/pdf/2207.06676

2019 A. Sarshar, S. Roberts, A. Sandu, "Linearly-Implicit General Linear Methods," *Technical Report*, Virginia Tech. https://vtechworks.lib.vt.edu/bitstream/handle/10919/109996/Technical-Report-Linearly-Implicit-GLM.pdf?sequence=1

INVITED TALKS

2024 "Uncertainty Quantification for Scientific Machine Learning Using Deep Operator Networks." Siam Annual Meeting 2024, Spokane, Washington. https://youtu.be/1iTHm9u9lro

2023 "Science-guided Machine Learning for Forward, Inverse, and Control Problems." Grand Valley State University, Michigan. https://people.cs.vt.edu/sarshar/talks/gvsu/

2022 "On Time-stepping Methods for Gradient-flow Optimization." Canadian Applied and Industrial Mathematics Society, SCMAI 2022, Ontario, Canada. https://sarshar.dev/files/adam-gark-slides.pdf

2020 "Linearly Implicit Genral Linear methods." SIAM Conference on Computational Science and Engineering 2021, Atlanta, Georgia.

2019 "Discrete Multirate GARK schems." SIAM Conference on Computational Science and Engineering 2019, Spokane, Washington. https://www.pathlms.com/siam/courses/10878/sections/14361/video_presentations/127463

CONFERENCE ACTIVITY

Sessions Organized

2024 "New Methods in Probabilistic and Science-Guided Machine Learning." Siam Annual Meeting 2024, Spokane, Washington.

2021 "Advances in Time-Stepping Methods for Multiphysics and Multiscale Problems - Parts I & II." SIAM Conference on Computational Science and Engineering, Atlanta, Georgia.

GRANTS AND AWARDS

2024 CSULB ORED Multidisciplinary Research Grant (joint).

COURSES TAUGHT

California State University, Long Beach

Artificial Intelligence

Pattern Recognition

Applied Machine Learning

Advanced Artificial Intelligence

Virginia Tech

Numerical Methods

Bahar Institute of Higher Education

Antennas and Wave Propagation

SERVICE

Service to the University

2024–2025	CSULB CECS/STATS Data Science Degree Committee
2024–2025	CSULB COE Awards Committee
2024–2025	CSULB CECS Graduate Curriculum Committee
2023–2024	CSULB CECS Undergraduate Curriculum Committee

Thesis Advising

Carol Gudumotu, Msc. in Computer Science, Fall 2023

PEER REVIEW

Academic Journal Peer Review

SIAM Journal on Scientific Computing

International Journal of Computer Mathematics

Computing and Visualization in Science

Geo-scientific Model Development

International Journal for Numerical Methods in Engineering

Journal of Applied Numerical Mathematics

Journal of Computational and Applied Mathematics

International Journal of Applied Mechanics

ICML Workshop on the Synergy of Scientific and Machine Learning Modeling

MEMBERSHIPS

Society for Industrial and Applied Mathematics
Institute of Electrical and Electronics Engineers
Association for Computing Machinery

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