Sivaraman Rajaganapathy

(612) 814-7892
Rochester, Minnesota
sivaraman.rajaganapathy@gmail.com

Research Fellow, Mayo Clinic

sivrmn.github.io/
linkedin.com/in/sivrmn

Education

Ph.D. in Electrical Engineering with Computer Science Minor   **2023**
University of Minnesota, Twin-Cities   GPA: *3.795/4*   Advisor: *Prof. Murti Salapaka*

Master of Technology in Systems and Control   **2013**
Indian Institute of Technology, Bombay   GPA: *9.82/10*

Bachelor of Engineering in Electrical Engineering   **2011**
University of Mumbai   GPA: *79.04/100*

Skills

Technical	**Python**, **MATLAB**, Simulink, Labview, Git, SQL, C, C++, R
Machine Learning Tools	Tensorflow, Keras, PyTorch, Pandas
Knowledge Base	Machine Learning, Artificial Intelligence, Optimization, Filtering, Estimation, Identification

Research Experience

New Clinical Applications Using Learning Algorithms   **MAR 2023 — PRESENT**
Research Fellow, Mayo Clinic

- **Optimized Treatment Regimen:** Mentored intern to develop an algorithm using reinforcement learning to optimize Alzheimer's disease treatment regimen, equivalent to the level of junior physicians *[Published in JAMIA]*
- **LLM Powered Clinical Synopsis:** Developed strategy and language model for the synthesis of cancer synoptic reports from clinical notes to reduce physician burden *[Presented in AMIA-CIC 2024]*
- **Clinical Trial Emulation:** Worked with cross-functional team to rapidly design tool for emulating heart-failure drug trials in a state-of-the-art cloud-based AI platform
- **Alzheimer's Disease Prediction:** Developing transformer based models to detect and subtype Alzheimer's disease using multi-modal electronic health records

Novel Data Driven Algorithms for Non-equilibrium Experiments   **JUN 2020 — FEB 2023**
Ph.D. Project

- Designed algorithm for quantifying errors in non-equilibrium experiments *[Presented in APS 2022]*
- Released Python based toolbox for error quantification and validated on experimental data

Deep Learning for Cardiac Rhythm Classification   **JUN — AUG 2019, 2021**
Research Internship, Boston Scientific Inc.

- Developed deep learning models to classify electrocardiograms from implantable devices
- Built framework for hyper-parameter search (model optimization) and for using unlabeled data
- Identified limitations in the training data that lead to the prediction errors
- Designed techniques to augment limited training data for improved machine learning model performance

Modeling Nano-Mechanics of Muscle Proteins   **JAN 2017 — JAN 2023**
Ph.D. Project

- Collaborated with biochemists to design force spectroscopy experiments characterizing single molecules of proteins linked to muscular dystrophy ***[Published in Nature - Scientific Reports 2019]***
- Implemented robust force control in an atomic force microscope *[Presented in ISPM 2018]*
- Developed Monte Carlo methods to capture molecules' observed behaviors
- Devised statistical tests to evaluate proteins for potential therapy
- Designed and conducted experiments revealing effect of expression system on proteins *[Presented in BPS 2020]*
- Automated experimental analysis, reducing processing time from 1 work day to 2 hours

Self-Learning Change Detection Algorithm   **SEPT 2015 — JUL 2020**
Ph.D. Project

- Devised learning based method for detecting events with unknown event size and timing with provable guarantees
- Incorporated methods to handle noise, sensor dynamics, and non-linear distortion
- Implemented Python toolbox ***[Published in Automatica 2022]***

Intelligent Identifier & Auto-Tuner   **JUL 2012 — JUN 2013**
Received Institute Silver Medal - Master's Thesis

- Developed an expert system to control a plant with limited human supervision from a cold start
- Created algorithm that found models with >60% fit for a large class of systems

PROFESSIONAL APPOINTMENTS

Research Fellow   **MAR 2023 — PRESENT**
Dept. of Artificial Intelligence and Informatics, Mayo Clinic   *Rochester, MN*

- **Research:** Conducted collaborative research to develop novel AI methods for clinical applications
- **Grant Involvement:** Assisted in the preparation and submission of grant proposals to support research initiatives
- **Mentorship:** Guided interns in research and professional development
- **Service:** Contributed to institutional activities, including peer review, journal club organization, and presentations

Research Intern   **JUN — AUG 2019, 2021**
Rhythm Management, Boston Scientific Inc.   *Arden Hills, MN*

- Developed deep learning algorithms for cardiac rhythm classification

Research and Teaching Assistant   **SEPT 2015 — FEB 2023**
University of Minnesota, Twin-Cities   *Minneapolis, MN*

- Conducted original research, designed and executed experiments, collaborated across disciplines
- Mentored students, upgraded 2 labs, leading to the college level John Bowers Excellence Award (2020)

Systems Validation Engineer   **JUN 2013 — JUN 2015**
Cypress Semiconductor Corporation   *Bengaluru, India*

- **Automating Validation:** Designed automation platform for comprehensive validation, responsible for EMI/EMC certification
- **Algorithm Development:** Developed auto-tuning algorithms for capacitive touch sensors and gesture detection

PUBLICATIONS

JOURNALS & PEER REVIEWED CONFERENCES
In Preparation/Review

Rajaganapathy, S., Hua, C. and Salapaka, M.V., "Quantifying Errors in the Jarzynski Estimator."

Published

Rajaganapathy, S., Chowdhury, S., Li, X., Buchner, V., He, Z., Zhang, R., Jiang, X., Yang, P., Cerhan, J.R. and Zong, N., 2025. "Synoptic reporting by summarizing cancer pathology reports using large language models." npj Health Systems, 2(1), p.11.

Hua, C., **Rajaganapathy, S.**, Slick, R.A., Vavra, J., Muretta, J.M., Ervasti, J.M. and Salapaka, M., "A Physics-Augmented Deep Learning Framework for Classifying Single Molecule Force Spectroscopy Data." In Forty-second International Conference on Machine Learning, July 2025.

Bhattarai, K., **Rajaganapathy, S.**, Das, T., Kim, Y., Chen, Y., *The Alzheimer's Disease Neuroimaging Initiative, The Australian Imaging Biomarkers and Lifestyle Flagship Study of Ageing*, Dai, Q., Li, X., Jiang, X., and Zong, N., "Using artificial intelligence to learn optimal regimen plan for Alzheimer's disease." JAMIA, Volume 30, Issue 10, July 2023, Pages 1645-1656.

Ramirez, M.P., **Rajaganapathy, S.**, Hagerty, A.R., Hua, C., Vavra, J., Gordon, W.R., Muretta, J.M., Salapaka, M.V. and Ervasti, J.M., "Phosphorylation alters the mechanical stiffness of a model utrophin fragment." Journal of Biological Chemistry, 299.2, 2023.

Rajaganapathy, S., Melbourne, J. and Salapaka, M.V., "Change detection using an iterative algorithm with guarantees." Automatica, 136, p.110075, 2022.

Rajaganapathy, S., McCourt, J.L., Ghosal, S., Lindsay, A., McCourt, P.M., Lowe, D.A., Ervasti, J.M. and Salapaka, M.V., "Distinct mechanical properties in homologous spectrin-like repeats of utrophin." Scientific reports, 9(1), pp.1-11, 2019.

Rajaganapathy, S., Melbourne, J., Aggarwal, T., Shrivastava, R. and Salapaka, M.V., "Learning and estimation of single molecule behavior." In 2018 Annual American Control Conference (ACC) (pp. 5125-5130). IEEE, June, 2018.

POSITIONS OF RESPONSIBILITY

AI Journal Club Organizer   **JAN 2024 — APR 2024**
Department of AI and Informatics | Mayo Clinic

Lab Safety Officer   **SEPT 2018 — FEB 2023**
Salapaka Lab | University of Minnesota, Twin-Cities

Graduate Student Mentor   **MAR 2022 — FEB 2023**
Electrical and Computer Engineering | University of Minnesota, Twin-Cities

Grants Review Committee   **MAR 2021 — AUG 2022**
Council of Graduate Students | University of Minnesota, Twin-Cities