

Sriram Gopalakrishnan

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Education

University of Waterloo – Master of Science in Physics 2023
Indian Institute of Technology Madras – Bachelor of Technology in Engineering Physics (rank: 4/28) 2020

Skills

Languages: Python, C++, MATLAB, \LaTeX , Markdown, English, Hindi, Tamil
Design Tools: COMSOL RF Module, AWR Microwave Office (Cadence), LTSpice
Libraries & Frameworks: Git, C++ STL, NumPy, SciPy, Matplotlib, CUDA, Gmsh
Beginner Proficiency: PyTorch, XGBoost, Scikit-Learn, Docker

Experience

Independent Learning – Waterloo, Canada 2024

- Learnt and applied CUDA programming for image processing tasks: [git repo](#)
- Certified in generative AI with LLMs (by AWS and DeepLearning.AI): [verification](#)
- Wrote 20+ [blog posts](#) related to machine learning, distributed computing, and databases

Resident Ph.D. student, [Perimeter Institute for Theoretical Physics](#) – Waterloo, Canada 2021 – 23

- Modeled the spatial energy distribution in quantum systems at thermal equilibrium: [git repo](#), [report](#)
- Framed the evolution of local marginals with temperature as an initial value problem
- Simulated the model in Python using the generalized [RK4 algorithm](#) for coupled differential equations

Graduate Teaching Assistant, [University of Waterloo](#) – Waterloo, Canada 2022 – 23

- Led tutorials, led laboratory demonstrations, held office hours, set problems, graded, and proctored for 4 large undergraduate Physics and ECE classes (PHYS111L, ECE106, PHYS175, PHYS359)
- Received positive feedback from both students and professors: [lab feedback](#)

Bachelor's Thesis - Vector 3D FEM for EM scattering, [IIT Madras](#) – Chennai, India 2019 – 20

- Formulated from first-principles, and implemented in C++ a vector-based 3D Finite Element Method electromagnetic scattering applications in microwave [remote sensing](#): [git repo](#), [report](#), [thesis](#)
- Meshed a 3D domain tetrahedrally using [Gmsh](#), parsed the mesh output in C++ to create node and element data structures, developed a [novel algorithm](#) for edge creation with linear-time deduplication
- Implemented [Mie scattering](#) in C++ and MATLAB as a verification mechanism for FEM performance
- Formulated, implemented, and verified in C++ a dyadic Green's function formalism to propagate FEM near-fields to a far-field limit, a crucial capability in remote sensing software

Research Intern, [Tata Institute of Fundamental Research](#) – Mumbai, India 2019

- 2021: Publication in [Physical Review Applied](#) with [Nature coverage](#) [[PDF](#)]
- My [presentation](#) and [report](#) won a [best project award](#) out of 7 interns in Condensed Matter Physics
- Optimized the design of a novel [ring-resonator architecture](#) for superconducting qubits
- Simulated microwave scattering data for 6 relative angles in the architecture using [COMSOL's RF module](#)
- Transferred the above data to [AWR microwave office](#), where I measured inter-qubit coupling strength as a function of qubit frequency by sweeping the nonlinear inductance of each chip, repeated for 6 angles

Research Intern & NIUS scholar, [Homi Bhabha Centre for Science Education](#) – Mumbai, India 2017 – 20

- 2020: First-authored publication in [Superlattices and Microstructures](#) [[PDF](#)]
- Modeled and simulated in Python the energy levels of a 2D [quantum dot](#) in a magnetic field: [git repo](#)
- Found the model agreeing well with experiments on InGaAs-GaAs quantum dots
- Attended the NIUS Physics camp, wrote a short review on quantum many-body theory: [report](#)

Volunteering

Steering Committee Member, [QIndia](#) – Global 2021-Present

General Executive, [UWaterloo Table Tennis Club](#) – Waterloo, Canada 2022

Department Legislator Physics, [IIT Madras](#) – Chennai, India 2019-2020