

Sriram Gopalakrishnan

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Education

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

Skills

Physics Simulation, Quantum Information, Convex Optimization, Numerical Methods, Generative AI, Device Architecture, Device Physics, Finite Element Methods, Statistics, Data Analysis, Object Oriented Programming
Languages: Python, C++, MATLAB, \LaTeX , Markdown, English, Hindi, Tamil
Design & Simulation: COMSOL RF Module, AWR Microwave Office (Cadence), LTSpice
Libraries & Frameworks: Git, C++ STL, NumPy, SciPy, Matplotlib, CUDA, R, SQL, Gmsh
Beginner Proficiency: PyTorch, XGBoost, Scikit-Learn, Docker

Experience

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 (100+ enrolled) undergraduate Physics and ECE classes (PHYS111L, ECE106, PHYS175, PHYS359)
• Received positive feedback from both students and professors: [lab feedback](#)

Thesis: Vector 3D FEM for Electromagnetics, NEMO Group @ IIT Madras — Chennai, India 2019–20
• Formulated from first principles, and implemented in C++ (using Object Oriented Design) a vector-based 3D Finite Element Method for electromagnetic scattering in 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; implemented a [novel algorithm](#) for edge creation with linear-time deduplication
• Implemented [Mie scattering](#) in C++ and MATLAB as a verification benchmark for FEM performance
• Formulated, implemented, and verified in C++ a [dyadic Green's function](#) formalism to propagate FEM near-fields to the far-field limit—a crucial capability in remote sensing software

Research Intern, QuMaC Lab @ Tata Institute of Fundamental Research — Mumbai, India 2019
• 2021: Publication in [Physical Review Applied](#) with coverage in [Nature](#) [PDF]
• Won the [Best Project Award](#) out of 7 interns in condensed matter physics: [presentation](#), [report](#)
• 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 RF Module](#)
• Translated scattering data into useful inter-qubit coupling data using [AWR Microwave Office](#)
• Discovered optimal angles and qubit frequencies that maximize the scalability of the architecture

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 good agreement with experiments on InGaAs-GaAs Quantum Dots
• Attended the NIUS Physics camp; co-authored a report on quantum many-body theory: [report](#)

Independent Learning — Waterloo, Canada 2024
• Implemented color-to-grayscale conversion and Gaussian blurring of images using CUDA: [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
• Helping teach a virtual course series (15+ enrolled) on foundations of quantum algorithms

Volunteering

Steering Committee Member, QIndia — Remote 2021–Present
General Executive, UWaterloo Table Tennis Club — Waterloo, Canada 2022
Department Legislator, Physics, IIT Madras — Chennai, India 2019–20