

# 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

Scientific Computing, Data Analysis, Statistics, Generative AI, Device Physics, Device Architecture

**Languages:** Python, C++, MATLAB,  $\LaTeX$ , Markdown, English, Hindi, Tamil

**Design & Simulation:** COMSOL RF Module, AWR Microwave Office MMIC (Cadence), LTSpice

**Libraries & Frameworks:** Git, C++ STL, CUDA, NumPy, SciPy, Matplotlib, R, Gmsh

**Beginner Proficiency:** PyTorch, XGBoost, Scikit-Learn, Docker

## Experience

**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

**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

**Bachelor's Thesis: Vector 3D FEM for Electromagnetics**, [IIT Madras](#) — Chennai, India 2019–20

- Formulated from first principles, and implemented in C++ a vector-based 3D Finite Element Method for electromagnetic scattering in [remote sensing applications](#): [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](#)
- Transferred the data to [AWR Microwave Office MMIC](#); measured inter-qubit coupling strength as a function of qubit frequency by sweeping the nonlinear inductance of each chip, repeating it for all 6 angles
- 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](#)

**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](#)

## 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