Sriram Gopalakrishnan

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Education

University of Waterloo (**Perimeter Institute**, **IQC**) – Master of Science in Physics 2024
Indian Institute of Technology Madras – Bachelor of Technology in Engineering Physics (rank: 4/28) 2020

Skills

Computational Physics, Linux, Python, C++, Bash, Numerical Methods, LaTeX, Trilingual Speaker (English, Hindi, Tamil), Advanced Data Analysis, Simulation Design, Quantum Information, Engineering Physics.
CELPIP-G English Scores: Listening 12/12, Speaking 12/12, Reading 11/12, Writing 10/12.

Experience

Junior Reactor Physicist, Candu Energy Inc (AtkinsRealis Nuclear) — Mississauga, ON Sep 2024–present
Towards reactor physics deliverables for Cernavoda 3 and 4 (C3&4) in preliminary design phase:

- Developed five sets of 25+ supercell neutron transport models (DRAGON-IST) encompassing all reactivity control devices and in-core structural materials part of the C3&4 core design. The five sets represented different operating conditions including: fresh startup, plutonium peak, beginning-of-life (BOL) equilibrium, and end-of-life (EOL) equilibrium. Lead author of the DRAGON-IST report for C3&4, and co-author of two other reports (BOL and EOL physics models). Supervisors: K. Ho, B. Arsenault.
- Developed the pre-equilibrium core-follow simulation (refueling) for C3&4 with spatial control on (RFSP-IST) from 0 to 700 full-power-days (transition from fresh-startup to equilibrium). This complex simulation involved careful updates of nominal relative zonal fluxes, moderator boron concentration, liquid zone bulk control, and channel dwell times as the simulation refueled the reactor in its approach to equilibrium. I also developed a dedicated post-processing pipeline (in Python and Bash) to externally monitor and plot key time-dependent properties: moderator boron concentration, maximum channel power, maximum bundle power, maximum channel power peaking factor, and fourteen liquid zone control fill levels. Co-author of the pre-equilibrium physics design report for C3&4. Supervisor: B. Arsenault.
- Officially verified a 2000 full-power-day BOL equilibrium core-follow simulation for C3&4. One minor finding led to a non-trivial 400 full-power-day shift in power-burnup data considered verified for cross-disciplinary analysis.
- Officially verified the calculation of end-flux-peaking-factors (EFPFs) at bundle-to-bundle and bundle-to-coolant interfaces from pre-verified DRAGON models. One major finding led to recalculation of EFPFs, and insights into flux gradient boundary conditions helped refine results.

Graduate Teaching Assistant, University of Waterloo — Waterloo, ON 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

Resident Graduate Student, Perimeter Institute for Theoretical Physics — Waterloo, ON 2021–23

- Modeled the spatial energy distribution in quantum systems at thermal equilibrium: Git repo, report
- Simulated the model in Python using the generalized RK4 algorithm for coupled differential equations

Vector 3D FEM for Electromagnetics, NEMO Group @ IIT Madras — Chennai, India 2019–20

- Formulated and implemented in C++ a vector-based 3D Finite Element Method for applications in remote sensing: Git repo, report, thesis

Research Intern & NIUS Scholar, Homi Bhabha Centre for Science Education — Mumbai, India 2017–20

- 2020: First-authored publication in Superlattices and Microstructures [PDF]
- Energy level simulation of 2D Quantum Dot in a magnetic field: Git repo

Research Intern, QuMaC Lab @ Tata Institute of Fundamental Research — Mumbai, India 2019

- 2021: Publication in Physical Review Applied with coverage in Nature [PDF]
- Won Best Project Award out of 7 interns in condensed matter physics: presentation, report