# Pranav Acharya

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## Profile

A 4th Year PhD student at the University of Glasgow, carrying out simulation research of Resonant Tunnelling Diodes with Non-Equilibrium's Green's Function methodology, which considers the quantum behaviour of RTDs including quantum tunnelling. Has presented at EuroSOI-ULIS 2024, with a corresponding paper submitted for publication in SSE[1], and further coauthored for a SISPAD 2024 Machine Learning paper[2].
Has submitted first author papers[1, 3, 5, 6, 7], with two currently published[1, 3], one in press[5], and coauthored two papers[2, 4]. Research interests are Quantum Devices and Nano-electronic Devices.

### Electronics and Nanoengineering PhD at University of Glasgow 2021-2025

Simulation of Resonant Tunnelling Diodes with Non-Equilibrium's Green Function

### Theoretical Physics MPhys (Hons) at Lancaster University 2017-2021

*Grade:* First class honours
*Thesis project:* Quantum Monte Carlo simulations of 3D type 2 Quantum Dots.

## Skills

### Programming

- Experience with Python and C++
- Experience using TCAD software, specifically the custom software NESS developed in the University of Glasgow
- Learnt Quantum Computing and Machine Learning concepts from online courses

### Communication

- Helped host the 9th SINANO Summer School 2022 and presented at EuroSOI-ULIS 2024
- Took a role as a student advocate for the 1st and 2nd year of my PhD

### Learning and Improvement

- An early learning of Astronomy and MOOC certificates (https://github.com/Pranav-Acharya1/MOOC-Certificates), demonstrate a clear self-directed drive and passion for learning
- Completed an Emergency First Aid at Work Course, to be able to help colleagues in an emergency
- A shift from a Theoretical Physics Masters degree to a Nanoengineering PhD showcases a flexibility in shifting disciplines and learning related knowledge and skills
- A practice of Kendo, a sword based martial art, improving myself in the process

## Publications so far

[1] P. Acharya and V. Georgiev, "Interface roughness in resonant tunnelling diodes for physically unclonable functions," *Solid-State Electronics,* p. 109131, 2025/05/07/ 2025, doi: https://doi.org/10.1016/j.sse.2025.109131.

[2] P. Aleksandrov, P. Acharya, and V. Georgiev, "Diffusion-Based Machine Learning Method for Accelerating Quantum Transport Simulations in Nanowire Transistors," in *2024 International Conference on Simulation of Semiconductor Processes and Devices (SISPAD)*, 24-27 Sept. 2024 2024, pp. 1-4, doi: 10.1109/SISPAD62626.2024.10733041.

[3] P. Acharya *et al.*, "Analysis of Random Discrete Dopants Embedded Nanowire Resonant Tunnelling Diodes for Generation of Physically Unclonable Functions," *IEEE Transactions on Nanotechnology,* vol. 23, pp. 815-821, 2024, doi: 10.1109/TNANO.2024.3504963.

[4] T. Liu *et al.*, "The study of electron mobility on ultra-scaled silicon nanosheet FET," *Physica Scripta,* vol. 99, no. 7, p. 075410, 2024/06/21 2024, doi: 10.1088/1402-4896/ad56d9.

### In Press

[5] P. Acharya *et al.*, "Impact of Interface Roughness Correlation on Resonant Tunnelling Diode Variation: A NEGF Analysis", *Scientific Reports*

### Under review

[6] P. Acharya *et al.*, "Sensitivity of Resonant Tunneling Diodes to Barrier Variation and Quantum Well Variation: A NEGF Study", *Micro and Nanostructures*

[7] P. Acharya *et al.*, "An Introductory Review of Resonant Tunneling Diodes", *Nanotechnology*