

# Subhransu S. Bhattacharjee | Résumé

CSIT Building, The Australian National University, Acton, ACT 2601  
☎ +61474224742 • ✉ Subhransu.Bhattacharjee@anu.edu.au • 🌐 1ssb.github.io  
✉ 1ssb.rudra@gmail.com 🌐 GitHub 🌐 LinkedIn 🌐 Google Scholar

## Education

### Doctor of Philosophy in Artificial Intelligence

*Intelligent Systems Cluster, School of Computing, ANU, Australia*

**Ongoing**  
April 2023-Present

- Supervisors: Rahul Shome, Dylan Campbell & Stephen Gould
  - Specialisations: Vision Language Models, Non-Convex Optimization, Diffusion Models & 3D Computer Vision
  - Attended: Robotic Vision Summer School, 2024; Optiver PhD Quant Lab Program, 2024
  - Thesis Topic: *Spatio-Semantic Hedging: A Probabilistic Spatial-Semantic Reasoning Framework using Generative Models*
- Courses Audited:** *Task & Motion Planning in Robotics, Convex Optimization, Differential Geometry & Probability Theory*

### Bachelor of Engineering

*College of Engineering, Computing & Cybernetics, ANU, Australia*

**First Class, Honours**  
July 2018 - Dec 2022

- Major in Mechatronic Systems Engineering (CGPA: 6.48/7.0, Graduated 3<sup>rd</sup> in Honors' cohort)
  - Minors in Mathematics & Electronic Communication Systems
- Courses Audited:** *Non-linear Control Theory, Network Optimization & Control, Information Theory, Mathematical Analysis*
- Summer School at the **London School of Economics**, 2019: Practical machine Learning: Grade-A
  - Online Certification in Game Theory, **Stanford University**
  - Thesis Project: Whiplash Gradient Descent Dynamics (Supervisor: Professor Ian Petersen). Find it [here](#).
  - Transferred to ANU from VIT, India, with CGPA: 9.34 (top 1% in ECE branch) & IELTS: 8.5 band.

## Scholarships & Awards

- 2023:** ANU International University Research Scholarship with HDR Merit Stipend
- 2022:** Highly Recommended in the Asian Control Conference
- 2021:** High Commendation Award in the Australia and New Zealand Control Conference
- 2020:** CECS Undergraduate International Scholarship and Partner Institute scholarship – 50% tuition scholarship.
- 2019:** VIT Chancellors' Special Achiever Award for Best Project in VIT Expo

## Publications

**Subhransu S. Bhattacharjee\***, Dylan Campbell & Rahul Shome: Believing is Seeing: Unobserved Object Detection using Generative Models, Preprint

**Subhransu S. Bhattacharjee\*** & Ian Petersen: Analysis of the Whiplash Gradient Descent Dynamics, DOI: 10.1002/asjc.3153, Asian Journal of Control, Special Edition, 2023

**Subhransu S. Bhattacharjee\*** & Ian Petersen: Analysis of closed-loop inertial gradient dynamics, DOI:10.23919/ASCC56756.2022.9828104, Asian Control Conference, 2022

**Subhransu Bhattacharjee\*** & Ian Petersen: A closed loop gradient descent algorithm applied to Rosenbrock's function, DOI:10.1109/ANZCC53563.2021.9628258, Australia and New Zealand Control Conference, 2021

## Experience

### Optiver APAC

*Quantitative Research Intern, Mentor: Cameron Chandler, Performance Engineer*

Nov 2024 – Feb 2025

- Developed and implemented high-performance mathematical models to optimize trading strategies.
- Performed statistical analyses on large-scale financial data to uncover market patterns and operational inefficiencies.
- Collaborated with traders and developers to build a proprietary, real-time machine learning decision-making system.

### Research School of Management, Australian National University

*Graduate Research Assistant Fintech & AI, Principal Investigator: Dr. Priya Muthukannan*

Sep 2023 – Sep 2024

- Conducted qualitative analyses of open banking regimes using dynamic capabilities frameworks.
- Delivered introductory courses in data analysis for Business Information Systems.
- Developed innovative frameworks to assess the impact of AI on banking responses to technological shifts.

## Research School of Engineering, Australian National University

Casual Sessional Academic Engineering, Employers: Prof. Ian Petersen & Prof. Iman Shames Jul 2022 – Sep 2023

- Tutored laboratory sessions for Advanced Control Systems (ENGN8824) for a cohort of 12 masters students.
- Facilitated interactive problem-solving sessions for 34 students in Network Optimization and Control (ENGN4628).
- Led focused tutoring sessions for 16 students in Power Systems and Electronics (ENGN4625).

## Research School of Computing, Australian National University

Undergraduate Researcher Foundational Deep Learning, Supervisor: Prof. Richard Hartley, FAA Mar 2022 – Jun 2022

- Applied neural networks to assess the invertibility of differentiable functions in non-linear processes, achieving a 72% RMSE hit rate through advanced positional encoding and transfer decoding.
- Demonstrated the limitations of normalizing flow networks for global invertibility, underscoring neural networks strength as local approximators for smooth functions.
- Developed an FPGA-based TIMER algorithm to quantify the computational effort required for minimum convergence, accounting for floating-point precision constraints.

## School of Engineering, Australian National University

Undergraduate Researcher Control & Optimisation, Supervisor: Prof. Ian Petersen, FAA Dec 2021 – Mar 2022

- Developed a deterministic algorithm that outperformed classical Nesterov-like methods for convex functions.
- Applied control theory to design universal Lyapunov-based methods for predicting convergence rates in high-resolution ODE models.

## Calcutta Electric Supply Corporation, India

Head Automation Intern Power Systems Automation, Supervisor: Mr. Arindam Sanyal, Director Mar – Aug 2021

- Led a cross-functional team of 17 (including 5 interns and 12 field workers) to design and implement a self-healing mechanism for the Ring Main Unit-based power system at Chitpur Hospital Substation during Indias second COVID-19 wave.
- Oversaw the real-time installation of high-voltage DC circuit breakers to integrate the substation with multiple power grids.

## Decimal Point Analytics, India

ML Research Intern Financial NLP, Supervisor: Mr. Paresh Sharma, MD Dec 2020 – Mar 2021

- Engineered and optimized a financial metadata database for a RoBERTa-based question-answering system, enhancing both accuracy and efficiency.
- Chaired client meetings for product reassessment and quality assurance, collaborating with diverse stakeholders to implement performance enhancements.
- Negotiated contract adjustments with the banking tribunal, focusing on stock option rollover mechanisms to optimize policy management.

## Laxmi Vilas Bank, India

Research Intern, Supervisor: Mr. Parthasarathi Mukherjee, Ex-CEO Sep – Nov 2020

- Devised a portfolio optimization method using competitive neural networks to analyze multiple time series datasets.

## DRDO, India

Summer Research Intern Passive Radar Signal Processing May – Aug 2020

- Developed a Kalman filterbased technique to rapidly select optimal matched filters for incoming radar signals via ambiguity functions, enabling fine-tuning of radar bursts to reduce signal uncertainty.
- Implemented an FPGA-based multi-processor interface for real-time analysis of long-range, noise-affected radar signals.

## Skills

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- **Programming Languages:** Python, C, C++, CUDA, R, Embedded C, Verilog, SQL, CSS, Javascript
- **Libraries & Frameworks:** PyTorch, TensorFlow, Pandas, NumPy, SciPy, Scikit-learn, Seaborn, Matplotlib
- **Scripting & Documentation Tools:** L<sup>A</sup>T<sub>E</sub>X, MATLAB, Shell Script, HTML, Nano
- **Software & Tools:** Git/GitHub, STM32Cube, Vivado, Simulink, LTSpice, SCADA, DigiSim, SLURM, Blender, SAS, Jupyter

## Certifications & Professional Service

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- **Certifications:** ANU Tutor (Teaching) Program, ANU Lab Training for Researchers, ANU AI in Research & Teaching, Machine Learning Production, Deeplearning.AI, Project Management, Google, Financial Markets, Yale, SCADA, Udemy
  - **Paper Reviewer:** IEEE Xplore (IROS, 2025; ICRA, 2025), ANZCC (2021), Asian Journal of Control (2023), Asian Control Conference (2022)
  - **Volunteering Experience:** Thread Together (2025), ANU Techlauncher Program (2024); Set4ANU Mentoring (2023–24); Australian Bureau of Statistics Census Program (2023); AIESEC VIT (2018-19); Friends of Tribal Society (2017–2018)
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