Subhransu S. Bhattacharjee │ Résumé

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Education

Doctor of Philosophy in Artificial Intelligence　　　　　　　　　　　　　　**Ongoing**
Intelligent Systems Cluster, School of Computing, ANU, Australia　　　　　　*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　　　　　　　　　　　　　　　　　　　　**First Class, Honours**
College of Engineering, Computing & Cybernetics, ANU, Australia　　　　　　*July 2018 - Dec 2022*
- Major in Mechatronic Systems Engineering (CGPA: 6.48/7.0, Graduated 3rd 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).
- Transferred to ANU from VIT, India, with CGPA: 9.34 (top 1% in ECE branch) & IELTS: 8.5 band.

Scholarships & Awards

1. **2023:** ANU International University Research Scholarship with HDR Merit Stipend
2. **2022:** Highly Recommended in the Asian Control Conference
3. **2021:** High Commendation Award in the Australia and New Zealand Control Conference
4. **2020:** CECS Undergraduate International Scholarship and Partner Institute scholarship – 50% tuition scholarship.
5. **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, Sydney
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 using positional encoding.
- Demonstrated the limitations of normalizing flow networks for global invertibility, underscoring neural networks limitations 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.

Research 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.
- Conducted client meetings for product reassessment and quality assurance, collaborating with diverse stakeholders to implement performance enhancements.

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.

Armament Research and Development Establishment, DRDO, India

Summer Research Trainee — 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

- **Machine Learning & Data Science:** Python, R, TensorFlow, PyTorch, Scikit-learn, Pandas, NumPy, SciPy, Seaborn, Matplotlib, Jupyter
- **Programming Languages & Scripting:** C, C++, CUDA, Embedded C, Shell Script, LaTeX, MATLAB
- **Additional Tools & Frameworks:** Git/GitHub, PySpark, SQL, HTML, CSS, JavaScript, STM32Cube, Vivado, Simulink, LTSpice, SCADA, DigiSim, SLURM, Blender, SAS

Certifications & Services

- **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 (2017–18)

— References available upon request. —