Subhransu S. Bhattacharjee | Ph.D. Scholar

School of Computing, The Australian National University, Australia
+61474224742 • Subhransu.Bhattacharjee@anu.edu.au • 1ssb.github.io
GitHub ▪ LinkedIn ▪ Google Scholar

Bio: PhD researcher advancing generative and vision-language models to represent spatio-temporal uncertainty for reliable robotic decision-making; interests also include time-series uncertainty analysis in noisy regimes & resource efficient convex optimization.

Education

Doctor of Philosophy — **Resident Scholar**
School of Computing, Australian National University, Australia — *Apr 2023 – Expected Apr 2027*

- **Thesis Topic: Probabilistic 3D Spatio-Semantic Reasoning Framework using Generative Models for Robotic Decision Making**
- **Supervisors:** Dr. Rahul Shome, Dr. Dylan Campbell, and Prof. Stephen Gould

Bachelor of Engineering — **First Class Honours**
School of Engineering, Australian National University, Australia — *Jul 2018 – Dec 2022*

- **Major:** Mechatronic Systems Engineering (*Merit List* in the Honours cohort)
- **Minors:** Mathematics and Electronic Communication Systems
- **Certifications:** Game Theory, Stanford; Machine Learning Production; Project Management, Google; Financial Markets, Yale
- **Thesis project:** Whiplash Gradient Descent Dynamics (Supervisor: Prof. Ian Petersen)

Summer Schools: Robotic Vision Summer School (2024); London School of Economics (2019): Practical Machine Learning

Selected Publications and Preprints

Subhransu S. Bhattacharjee*, Hao Lu, Dylan Campbell & Rahul Shome: Into the Unknown: Towards using Generative Models for Sampling Priors of Environment Uncertainty for Planning in Configuration Spaces, arXiv (Under Review in ICRA)

Subhransu S. Bhattacharjee*, Dylan Campbell & Rahul Shome: Believing is Seeing: Unobserved Object Detection using Generative Models, IEEE/CVF Computer Vision and Pattern Recognition, 2025; Project Page

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

Scholarships & Awards

2025 VC Travel Grant (Winner), Australian National University.
2025 Invited attendee (fully funded), *Citadel & Citadel Securities PhD Summit*, London.
2025 Residential Mentor Scholarship, ANU.
2024 Optiver PhD Quant Lab Program (select participant).
2023 ANU International University Research Scholarship.
2023 Higher Degree by Research Merit Stipend.
2022 Highly Recommended Paper, *Asian Control Conference*.
2022 Highest in ENGN4627: Robotics.
2021 High Commendation, *Australia & New Zealand Control Conference*.
2021 ANU Chancellor's International Scholarship.
2020 Transferred to ANU from Vellore Institute of Technology (VIT), India.
2019 Chancellor's Special Achiever Award, VIT.
2019 Google & HUL Hackathon — Finalist.

Industry Experience

Optiver APAC, Sydney
Quantitative Research Intern (Machine Learning) — *Nov 2024 – Feb 2025*

- Analyzed large-scale market and microstructure data; identified inefficiencies in the **Korean** market.
- Co-built a proprietary real-time ML decision system; achieved **94%** accuracy in historical backtests.

Calcutta Electric Supply Corporation (CESC), India
Head Automation Intern Power Systems Automation, Supervisor: Mr Arindam Sanyal, Director — *Mar 2021 – Aug 2021*

- Led a team of **17** to implement an emergency self-healing mechanism for the ring-main-unit power system at Chitpur Hospital Substation during the second COVID-19 wave.

Decimal Point Analytics, India
ML Research Intern Financial NLP, Supervisor: Mr Paresh Sharma, MD *Dec 2020 – Jan 2021*
- Engineered and optimized a financial metadata store for a RoBERTa-based QA system.
- Coordinated client reviews for product reassessment and quality assurance with cross-functional stakeholders.

Defence Research and Development Organization (DRDO), India
Summer Research Trainee Passive Radar Signal Processing *May 2020 – Aug 2020*
- Developed a Kalman-filter method to select optimal matched filters for incoming radar signals.
- Implemented an *FPGA-based multiprocessor* interface for real-time analysis of long-range, noise-affected radar signals.

Academic Research

Research School of Management, Australian National University
Graduate Research Assistant FinTech & AI, PI: Dr Priya Muthukannan *Sep 2023 – Sep 2024*
- Analyzed open-banking regimes using a dynamic-capabilities lens to inform strategy.
- Delivered introductory data-analysis instruction for Business Information Systems.
- Built assessment frameworks for banks AI adoption and responses to technological shifts.

School of Computing, Australian National University
Undergraduate Researcher Foundational Deep Learning, Supervisor: Prof Richard Hartley, FAA *Mar 2022 – Jun 2022*
- Studied invertibility of differentiable mappings with neural networks; achieved a **72%** hit rate (RMSE criterion) using dense positional encodings.
- Demonstrated limitations of normalizing flows for global invertibility, highlighting locality of neural function approximation.

School of Engineering, Australian National University
Undergraduate Researcher Control & Optimisation, Supervisor: Prof Ian Petersen, FAA *Dec 2021 – Mar 2022*
- Designed Lyapunov-based approaches for predicting convergence rates in high-resolution ODE models; developed a complexity model for feedback systems without closed-form solutions.
- **Selected papers:**
  - ***Analysis of Closed-Loop Inertial Gradient Dynamics*** Asian Control Conference (ASCC) 2022.
  - ***A Closed-Loop Gradient Descent Algorithm Applied to Rosenbrocks Function*** ANZCC 2021.
- Open-source code: 1ssb/Whiplash.

Teaching & Service

- **Head Tutor, Cybernetics** School of Cybernetics, ANU (Mar 2025–Nov 2025): Co-designed and delivered project-based modules across microprocessors/robotics/ML; led NAO labs; coordinated assessments.
- **Tutor, Introduction to Machine Learning** School of Computing, ANU (Jun 2025–Nov 2025): Taught ML mathematics and optimization; marked exams for **250** students; ran tutorials and assessed projects.
- **Casual Sessional Academic Engineering** School of Engineering, ANU (Jul 2022–Sep 2023): Ran labs (ENGN8824, **12** MSc); led workshops (ENGN4628, **34**); delivered targeted tutoring (ENGN4625, **16**).

▪ **Reviewer**: CVPR 2026; AAAI 2025; IROS 2025; ICRA 2025–2026; Asian Journal of Control (2023); American Control Conference (2022); Australia & New Zealand Control Conference (2021–2022).
▪ **Volunteering Experience:** Friends of Tribal Society, 2017-18; Set4ANU Mentor 2023-24; Techlauncher Manager 2024

Skills

▪ **Languages:** Python; C/C++; CUDA; Embedded C; MATLAB; JavaScript; HTML/CSS; LaTeX
▪ **LLM/VLM APIs & Models:** OpenAI API (GPT-4o/4.1); Anthropic (Claude 3.5 *Sonnet*/Haiku); Google AI Studio (Gemini 1.5 Pro/Vision); Alibaba (Qwen2/Qwen2-VL); Meta (Llama 3/3.1); Mistral (Large; Pixtral); LLaVA 1.6; Florence-2; BLIP-2; CLIP; GroundingDINO; SAM/SAM2; Hugging Face Inference; Replicate; AWS Bedrock; Azure OpenAI
▪ **Vision & 3D & Generative:** Diffusion; segmentation/detection; 3D reconstruction; TorchVision; OpenCV; Open3D; PyTorch3D; trimesh
▪ **Performance/Systems:** Mixed precision (AMP); `torch.compile`; Inductor/TorchDynamo; custom CUDA kernels; Numba; CuPy; ONNX Runtime; TensorRT; Triton (GPU DSL); Nsight Systems/Compute
▪ **Data/Cloud/MLOps:** PySpark; SQL; Airflow; FastAPI; REST; Weights&Biases; Prometheus; Grafana; Git/GitHub; CI/CD (Actions)
▪ **Containers & HPC:** Docker; Podman; Apptainer (Singularity); NVIDIA Container Toolkit; Conda/Mamba; Lmod; SLURM

Selected Open Source Contributions: TorchKAN; Depth Anything V1; Depth Anything V2; Mangrove: A Dynamic Data Management System for Advanced AI Applications; Webcamdino: Realtime Webcam DINO features; Ray_Visualizer: A StreamLit App; RGBD_cropper_tool