






Janith Petangoda

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 London, UK

Professional Experience

Software Engineer; Uncertainty Quantification in Financial Modelling

Signaloid Limited [↗](#)

Apr 2024 – present
Cambridge, UK

Skills: C, Go, Rust, Python, Quantitative Finance, Uncertainty Quantification, Monte Carlo methods

Research Associate in Probabilistic Computing

Physical Computation Laboratory [↗](#), University of Cambridge

Apr 2022 – Apr 2024
Cambridge, UK

Skills: C, Go, Python, OCaml, Verilog, Automation scripting (Make), Processor design, Uncertainty Quantification, Gaussian Processes, Bayesian Neural Networks, Monte Carlo methods, Embedded Systems

- Wrote research papers (see Publications section).
- Designed and implemented an extensible tensor operation and automatic differentiation framework in C for use in embedded systems.
- Developed an SDK for running uncertainty tracking experiments on the Signaloid Cloud Compute Engine [↗](#).
- Wrote firmware for flash storage on embedded systems.
- Collaborated on topics including Control Theory (handling uncertainty in closed-loop control) and Materials Science (Lagrangian modelling of dislocation dynamics).

Research Student Placement

PROWLER.io (now SecondMind Labs) [↗](#)

Aug 2018 – May 2019
Cambridge, UK

Skills: PyTorch, Python, Multi-task Reinforcement Learning, Deep Learning, Variational Inference

- Devised and implemented multi-task RL models using PyTorch.
- Wrote a paper: Disentangled Skill Embeddings for Reinforcement Learning [↗](#)
- Gave an oral presentation [↗](#) at the Learning Transferrable Skills workshop at NeurIPS 2019.

🎓 Education

PhD in Computing: On the Structure of Learning and Transfer in Machines

Imperial College London; Supervised by Prof. Marc Deisenroth [↗](#)

Oct 2017 – Jun 2022
London, UK

Skills: Reinforcement Learning, Gaussian Processes, Differential Geometry, Linear Algebra, Measure Theory, Transfer Learning, Multi-task Learning, Meta Learning, Deep Learning, PyTorch, Tensorflow, JAX

- Thesis [↗](#) introduced a differential-geometric first-principles theory of learning and transfer in machines.

MEng in Aerospace Engineering (First Class Honors)

University of Sheffield

Sep 2013 – Jun 2017
Sheffield, UK

Skills: Control Theory, Thermodynamics, Fluid Dynamics, Aerodynamics, Machine Learning, Materials Science, Electrical and Electronic Engineering, Differential Equations, Linear Algebra, Finite Element Methods, Computational Fluid Dynamics

- Thesis [↗](#) (supervised by Prof. Neil Lawrence) explored the use of Model-based Reinforcement Learning for control of a simulated robotic system.

🛠 Skills

Software Engineering: {High-level, Low-level, Hardware (Verilog)} programming, Git, GitHub, LaTeX, Scripting, Docker, GCP.

Research: Machine Learning, Differential Geometry, Probability, Linear Algebra, Science Communication.

Machine Learning: Deep Learning, Gaussian Processes, Reinforcement Learning, {Multi-task, Meta, Transfer} learning.

🔗 Programming Languages

Python

Deep understanding of core language, Machine Learning frameworks (NumPy, PyTorch, Tensorflow), web frameworks.

Go

Developed a SDK for interacting with the Signaloid Cloud Compute Engine API [↗](#), other automation tools.

Rust

Created an automation tool that generates API endpoints on GCP with GitHub integration. Contributed to Meilisearch [↗](#).

C

Architected and developed a Machine Learning framework and wrote firmware for embedded systems.

Web / Cloud

Designed and built websites for UCL-ELLIS (paid) and Farming on Crutches (not paid). Built backend REST API on GCP.

OCaml

Completed Advent of Code (2023) problems and wrote a build-utility tool. Contributed to the OCaml compiler [↗](#).

Projects

- Gaussian Process Predictions with Uncertain Inputs Enabled by Uncertainty-Tracking Microprocessors** Nov 2023 – present
Cambridge, UK
Submitted to MLCNP Workshop at NeurIPS 2024
Skills: *Gaussian Processes, C, Python, Uncertainty Quantification, Monte Carlo methods, Microprocessor design*
• Formulated a method using an uncertainty-tracking microprocessor to efficiently compute the Gaussian Process predictive posterior distribution on uncertain inputs.
- The Monte Carlo Method and New Device and Architectural Techniques for Accelerating It** Jan 2023 – Dec 2023
Cambridge, UK
Submitted to MLCNP Workshop at NeurIPS 2024
Skills: *C, Go, Python, Uncertainty Quantification, Monte Carlo methods, Microprocessor design*
• Conceived a unified view of the Monte Carlo method.
• Designed, implemented, and analysed experiments that compared Monte Carlo methods to automatic uncertainty quantification using an uncertainty-tracking microprocessor.
- On the structure of learning and transfer in machines** May 2021 – Jun 2022
London, UK
PhD Thesis
Skills: *Reinforcement Learning, Differential Geometry, Measure Theory, Transfer Learning, Multi-task Learning, Meta Learning, Deep Learning*
• Presented a poster [↗](#) at the Mathematics of Machine Learning Symposium 2020 [↗](#)
- Disentangled Skill Embeddings for Reinforcement Learning** Aug 2018 – May 2019
Cambridge, UK
Research Student project at PROWLER.io
Skills: *Python, PyTorch, Reinforcement Learning, Transfer Learning, Variational Inference, Machine Learning*
Refer to the Professional Experience section for details.
• Gave oral presentation [↗](#) at the Learning Transferrable Skills workshop at NeurIPS 2019.
- Development of Machine Learning based controller for problems of control** Sep 2016 – Apr 2017
Sheffield, UK
MEng dissertation (Supervisor: Prof Neil D. Lawrence [↗](#))
Skills: *Python, Reinforcement Learning, Gaussian Processes, Robotics*
Refer to the Education section (MEng) for details.
• Documented experience and progress of the project on blog posts [↗](#).
- Sheffield Eco Motorsports** Sep 2015 – Apr 2017
Sheffield, UK
Co-founder and Technical Director of University engineering team
Skills: *Technical Director, Leadership and Team Management, Fund raising, Gaussian Processes, DC Motor design, Materials Science and Manufacturing*
Founded (obtained funding, recruited team, etc) and led a student engineering team [↗](#) to compete at the Shell Eco Marathon [↗](#).
• Documented 2 years of experience founding and leading the team on a blog post [↗](#).
• Gave a public presentation on the car at the Sheffield Festival of Science and Engineering 2017.
- Electronic Analogues of Regulatory Networks in Biological Systems** Jun 2015 – Jul 2015
Sheffield, UK
Sheffield Undergraduate Research Experience project
Skills: *Dynamical Systems, Genetic Regulatory Systems, Analog Computing, Analog Electronics design*
Engineered analog circuits that simulate genetic regulatory systems (supervised by Prof Nick Monk)
• Presented a poster [↗](#) at the Physics of Living Matter 2016 symposium.

Publications

- On the structure of learning and transfer in machines** 2022
J Petangoda; (PhD Thesis)
- Learning to Transfer: A Foliated Theory** 2021
J Petangoda, MP Deisenroth, and NAM Monk; (Under review at JMLR)
- GENNI: Visualising the Geometry of Equivalences for Neural Network Identifiability** 2020
D Lengyel, J Petangoda*, et al; (DiffGeo4DL Workshop at NeurIPS 2020)*
- A Foliated View of Transfer Learning** 2020
J Petangoda, NAM Monk, and MP Deisenroth; (ArXiv)
- Disentangled Skill Embeddings for Reinforcement Learning** 2019
J Petangoda, S Pascual-Diaz, V Adam, P Vrancx, and J Grau-Moya; (Learning Transferrable Skills Workshop at NeurIPS 2019)