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KelvinHsu
Machine Learning Scientist

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Professional & Research Experience

09/2019 — Now **Senior Data Scientist** Boston Consulting Group (BCG GAMMA)

- Drove conceptualisation, development, and productionisation of novel solutions and frameworks for clients using Bayesian contextual multi-armed bandits, reinforcement learning, hierarchical Bayesian inference, optimisation, and simulation
- Led development of core library and simulator for a proprietary reinforcement learning package

06/2018 — 08/2019 **Consultant, Data Science** Westpac Banking Corporation

11/2014 — 07/2017 **Machine Learning Research Engineer** Data61, CSIRO (Formerly National ICT Australia)
Divisions: *Machine Learning Research Group*, *Engineering & Design*
Projects: *Big Data Knowledge Discovery under SIEF*

- **Research (Lead)**: **Led** design of a mutual differential entropy measure for GP classification; **Result**: Applied to informative path planning; Published at *ACRA* and included in *honours thesis*
- **Development (Contributer)**: GP **python** library (**PEP8 style**) for active & multiclass learning
- **Research (Contributer)**: Bayesian optimisation, AutoML, and scalable approximate inference

"Kelvin's active sampling work has **made feasible** *the simulation work currently undertaken by Ecologists at Macquarie University, which would otherwise cost expensive computing resources and many months in time." (Link)*

-**Dr. Simon O'Callaghan**, Senior Research Engineer

11/2013 — 02/2014 **Software Engineering Intern (Space Science)** CSIRO Astronomy & Space Science
Project: *Astronomical Source Finding – Interactive Data Visualisation*

- Developed an **interactive data visualisation software** for radio astronomical data in **python**
- Released modular parameter tracking software for *Duchamp*
- Inferred inter-galaxy interations from HI raio emission data personally collected from *ATCA*

"Kelvin has built a very impressive graphical interface that allows astronomers to make better sense, more quickly, of the results of their Duchamp search. It was a complex task, requiring **understanding of the various data structures and strong python programming skills***." (Link)*

-**Dr. Matthew Whiting**, Research Scientist (Computing) & Manager

11/2012 — 03/2013 **Research Scholar (Medical Physics)** The Institute of Biomedical Engineering and Technology

- **Verified** ultrasound response of bio-tissues under magnetic stimulation via dynamic simulation
- **Demonstrated** possibility of performing tumour treatments without direct physical contact

"He took this project well in his stride, requiring little supervision and assistance. He was **able to solve problems on his own and by liaising with industry supervisors***. In my experience this is fairly rare with engineering students who have not been exposed to research." (Link)*

-**Dr. Alistair McEwan**, Professor & Research Project Supervisor

Teaching Experience

02/2013 — 07/2019 **Tutor** School of Computer Science, Aerospace, Business Analytics, Mathematics, Statistics (University of Sydney)

- **Dean's Faculty Award Winner for Outstanding Tutoring 2017** (*See Award Recommendation*)
- **100% positive evaluations in anonymous student surveys since 2013** (extremely rare) — Main comments: Clear presentation, engaging style, friendly personality, emphathetic listener
- Taught courses at both undergraduate and postgraduate level in Machine Learning, Data Science, Statistics, Software Engineering, Systems Engineering, Space Engineering, and Risk Management (See my *LinkedIn* for detailed list and anonymous student feedback)

"Since 2013, Kelvin has always had a very high quantity of strong and enthusiastically positive comments, **without a single negative comment at all**. *Even amongst the excellent standard of tutors, this suggests to me that* **Kelvin is one of the best tutors of all time, even better than previous tutoring award winners**." *(Link)*

-**Dr. Jason Chan**, Course Coordinator & Lecturer

Education

2016 — 2019 **Doctor of Philosophy (Machine Learning)** University of Sydney & Data61, CSIRO
Research Areas: Bayesian inference, likelihood-free inference, kernel mean embeddings, Gaussian processes, active learning, Bayesian optimisation, variational inference, and deep learning

2011 — 2015 **Bachelor of Engineering (Mechatronic & Space Engineering) (Advanced Stream) & Bachelor of Science (Advanced Mathematics and Statistics)** University of Sydney
Graduated with **University Medal and First Class Honours**

Achievements & Awards

- The **University Medal** is awarded to the **top highest achieving graduate** (first place)
- University of Sydney Academic Merit Scholarship & Prize (every year)
- Dean's List of Excellence in Academic Performance (every year)
- First place in several units of study and Top 3 Presenter for Honours Thesis

Projects

- Research Leader in Physics Talent Program on Solar Energy (2014)
- Project Leader in Star Tracker Development with PIC18 microcontroller (2014)
- UAV (Drone) Safety Subsystem with Startup *Flirtey* (2014)
- CubeSat Development under QB50 regulations; Lead Presenter at *AIAA* (2014)

Publications

Hsu K. & Ramos. F, "Bayesian Deconditional Kernel Mean Embeddings", *International Conference on Machine Learning (ICML 2019)*

Hsu K. & Ramos. F, "Bayesian Learning of Conditional Kernel Mean Embeddings for Automatic Likelihood-Free Inference", *International Conference on Artificial Intelligence and Statistics (AISTATS 2019)*

Hsu K., Nock R. & Ramos. F, "Hyperparameter Learning for Conditional Kernel Mean Embeddings with Rademacher Complexity Bounds", *European Conference on Machine Learning (ECML-PKDD 2018)*, **Best Student Paper Award Winner**

Hsu K., O'Callaghan S., Reid A. & Williams S., "Informative seafloor exploration using the linearised differential entropy of Gaussian process classifiers", *Australasian Conference on Robotics and Automation (ACRA 2015)*

Professional Services

Program Committee & Expert Reviewer for International Conference on Machine Learning (ICML'20-21)
Program Committee & Reviewer for Conference on Neural Information Processing Systems (NeurIPS'20-21), International Conference on Learning Representations (ICLR'22), and Symposium on Advanced in Approximate Bayesian Inference (AABI'19-20)