

EDUCATION

PhD in Computer Science – Princeton University

Expected June 2021

- Advised by [Ryan P. Adams](#). Developing machine learning methods to accelerate numerical simulation and engineering design, and numerical methods to accelerate optimization and inference in machine learning.

M.A. in Computer Science – Princeton University

June 2017

- Advised by [Han Liu](#). Analyzed security/safety of machine learning under data poisoning.

BE(Hons) in Mechatronics Engineering – University of Canterbury

Nov 2014

- Advised by [J. Geoffrey Chase](#). Developed signal processing algorithms for ICU ventilators. First class honors.

RECENT EMPLOYMENT

PhD intern – Google Brain

June 2017 – Sept 2017

- Brain team, Google Zurich. Worked with [Sylvain Gelly](#), [Olivier Teytaud](#), and [Karol Kurach](#).
- Used reinforcement learning to meta-learn generative adversarial network architectures and losses.

PhD intern – Google Search

May 2016 – Aug 2016

- Voice Search team, Google New York. Worked with [Pedro Moreno](#).
- Used transfer learning to improve recurrent neural network speech recognition for low-resource languages.

HONORS AND AWARDS

- **Gordon Y.S. Wu Fellowship in Engineering** (2015 – 2019): Selective Princeton graduate fellowship.
- **Travel awards**: NeurIPS (2016), CIFAR deep learning summer school (2016), ICLR (2019), ICML (2019).
- **Amazon Alexa Prize semifinalist** (2017, with the Princeton University “Pixie” team).
- **New Zealand National Scholarships** in Mathematics and Chemistry (2010).

ACTIVITIES AND SERVICE

- **Organizer**: NeurIPS 2020 Workshop on Machine Learning for Engineering Modeling, Simulation & Design.
- **Grants**: Co-wrote 4 proposals. Awarded: NSF *RI: Accelerating ML via Randomized Automatic Differentiation*.
- **Reviewer**: NeurIPS, ICML, ICLR, and NeurIPS Workshop on Machine Learning and the Physical Sciences.
- **Organizer**: Princeton Center for Statistics and Machine Learning Reading Group (2017 – 2018).
- **Organizer**: Princeton Deep Learning Reading Group (2016 – 2017).
- **Design Challenge Manager**, Engineers Without Borders NZ: organizing the “Odyssey Design Challenge” sustainable design competition run in participating universities throughout New Zealand. (2015).
- **Conference Manager**, Engineers Without Borders NZ: overseeing a team of nine to organize Engineers Without Borders NZ’s national conference on sustainable and humanitarian engineering. (2014).

TEACHING ASSISTANTSHIPS

- **Princeton**: COS495 Neural Networks, COS126 Intro to Computer Science.
- **University of Canterbury**: Mathematical Computing, Mathematics 1 and 2, Engineering Mechanics.

GRADUATE COURSEWORK

- Theoretical Machine Learning, Unsupervised Learning, Reinforcement Learning, Statistical Theory, Statistical Learning & Nonparametric Estimation, Advanced Algorithms, Advanced Networks, High Tech Entrepreneurship.

LANGUAGES AND TECHNOLOGIES

- **Proficient**: Python, PyTorch, Jax, Bash / Linux, AWS, Matlab, Fenics.
- **Familiar**: Tensorflow, Java, C/C++, R, HTML, Javascript, Scala, Spark, Hadoop, Google Cloud.

1. **Learning composable energy surrogates for PDE order reduction**
Alex Beatson, Jordan T. Ash, Geoffrey Roeder, Tianju Xue, Ryan P. Adams.
 Neural Information Processing Systems (NeurIPS), 2020. Oral presentation (1% of submitted papers). [Link](#).

2. **Randomized automatic differentiation**
 Deniz Oktay, Nick McGreivy, Joshua Aduol, **Alex Beatson**, Ryan P. Adams.
 Under submission, 2020. [Link](#).

3. **A data-driven computational scheme for the nonlinear mechanical properties of cellular mechanical metamaterials under large deformation**
 Tianju Xue, **Alex Beatson**, Maurizio Chiaramonte, Geoffrey Roeder, Jordan T. Ash, Yigit Menguc, Sigrid Adriaenssens, Ryan P. Adams, Sheng Mao.
 Soft Matter, 2020. [Link](#).

4. **Amortized finite element analysis for fast PDE-constrained optimization**
 Tianju Xue, **Alex Beatson**, Sigrid Adriaenssens, Ryan P. Adams.
 International Conference on Machine Learning (ICML), 2020. [Link](#).

5. **SUMO: Unbiased estimation of log marginal probability for latent variable models**
 Yucen Luo, **Alex Beatson**, Mohammad Norouzi, Jun Zhu, David Duvenaud, Ryan P. Adams, Ricky T. Q. Chen.
 International Conference on Learning Representations (ICLR), 2020.
 Spotlight presentation (6% of submitted papers). [Link](#).

6. **Efficient optimization of loops and limits with randomized telescoping sums**
Alex Beatson, Ryan P. Adams.
 International Conference on Machine Learning (ICML), 2019. [Link](#).

7. **Amortized Bayesian meta-learning**
 Sachin Ravi, **Alex Beatson**.
 International Conference on Learning Representations (ICLR), 2019. [Link](#).

8. **Continual learning in generative adversarial nets**
 Ari Seff, **Alex Beatson**, Daniel Suo, Han Liu.
 arXiv, 2017. [Link](#).

9. **Blind attacks on machine learners**
Alex Beatson, Zhaoran Wang, Han Liu.
 Neural Information Processing Systems (NeurIPS), 2016. [Link](#).

10. **Respiratory mechanics assessment for reverse-triggered breathing cycles using pressure reconstruction**
 Vincent Major, Simon Corbett, Daniel Redmond, **Alex Beatson**, Daniel Glassenbury, Yeong Shiong Chiew, Christopher Pretty, Thomas Desaive, Ákos Szlávecz, Balázs Benyó, Geoffrey M Shaw, J Geoffrey Chase.
 Biomedical Signal Processing and Control, 2016.

11. **The Clinical Utilisation of Respiratory Elastance Software (CURE Soft): a bedside software for real-time respiratory mechanics monitoring and mechanical ventilation management**
 Ákos Szlávecz, Yeong S Chiew, Daniel Redmond, **Alex Beatson**, Daniel Glassenbury, Simon Corbett, Vincent Major, Christopher Pretty, Geoffrey M Shaw, Balazs Benyo, Thomas Desaive, J Geoffrey Chase.
 Biomedical Engineering Online, 2014.