

ILAN PRICE

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EDUCATION

PhD in Applied Mathematics | University of Oxford | *Start: Oct 2018, Expected grad: May 2024*

- **Focus:** sparse, low-dimensional, and/or efficient deep neural networks. **Advisor:** Prof. Jared Tanner
- **Teaching and Student Supervision:**
 - Teaching Assistant and/or Tutor for Oxford Maths 4th year and MSc courses: “Theories of Deep Learning” (2019, 2020, 2021); “Continuous Optimisation” (2020); “Random Matrix Theory” (2021).
 - Tutor for two courses at the Gene Golub SIAM Summer School 2021: “Perspectives on the theoretical understanding of deep networks”, and “Large-scale Optimization for Deep Learning”
 - Co-supervisor for Oxford Maths MSc thesis on few-shot learning.

MSc in Mathematical Modelling and Scientific Computing | University of Oxford | *2016 - 2017*

- Awarded with Distinction, ranked 4th in cohort
- Dissertation: Gaussian Processes for Flight Ticket Demand Unconstraining.

Bachelor of Science | Applied Mathematics & Philosophy | University of Cape Town | *2011 - 2013*

- Distinction (first-class pass) in all courses | 4 Course Medals (top in course)

SELECTED PUBLICATIONS

ICLR’24 **Price, I**, Nicholas Daultry Ball, Samuel C.H. Lam, Adam C. Jones, Jared Tanner (2024). Deep Neural Network Initialization with Sparsity Inducing Activations.

preprint **Price, I**, Alvaro Sanchez-Gonzalez, Ferran Alet, Timo Ewalds, Andrew El-Kadi, Jacklynn Stott, Shakir Mohamed, Peter Battaglia, Remi Lam, Matthew Willson (2023). GenCast: Diffusion-based ensemble forecasting for medium-range weather.

ICASSP’23 **Price, I**, Tanner, J (2022). Improved Projection Learning for Lower Dimensional Feature Maps.

AISTATS’22 **Price, I**, Rasp, S (2022). Increasing the accuracy and resolution of precipitation forecasts using deep generative models. *The 25th International Conference on Artificial Intelligence and Statistics*

ICML’21 **Price, I**, Tanner J (2021). Dense for the Price of Sparse: Improved Performance of Sparsely Initialized Networks via a Subspace Offset. *The 38th International Conference on Machine Learning*.

ICMLA’21 **Price, I**, Tanner, J, (2021). Trajectory growth lower bounds for random sparse deep ReLU networks. *The 20th IEEE International Conference on Machine Learning and Applications*.

WOAH’20 **Price, I**, Gifford-Moore, J, Fleming, J, Roichman, M, Thain, N, Dixon, L, Sorensen, J (2020). Six Attributes of Unhealthy Conversation. *Proceedings of the 4th Workshop on Online Abuse and Harms*.

EJOR’19 **Price, I**, Jaroslav, F, Daniel, H (2019). Gaussian processes for unconstraining demand. *European Journal of Operational Research* 275.2: 621-634.

SELECTED SCHOLARSHIPS AND AWARDS

- Alan Turing Institute PhD studentship (2018) | A studentship awarded by the Alan Turing Institute in London for PhD study in partnership with the institute | [Details here](#)
- Emirates Studentship (2018) | PhD funding award by the Mathematical Institute, University of Oxford
- Oxford-Weidenfeld and Hoffman Leadership Scholarship (2016) | A scholarship for future leaders from across the world to study at Oxford in parallel with a year-long leadership programme | [Details here](#)
- Skye Foundation Scholarship (2016) | Selected from a nationwide pool of candidates nominated by faculty deans from across South Africa, awarded based on academic merit | [Details here](#)
- Scholarships from University of Cape Town: Science Faculty Scholarship (2013); Twamley December Scholarship (2012); Humanities Entrance Scholarship, Twamley Undergraduate Scholarship (2011).

SELECTED RESEARCH AND ENGINEERING EXPERIENCE

Research Scientist | Google DeepMind | *Jun 2023 - present*

- Part of the Deep Learning team. Currently working on AI for weather and sustainability.

Research Intern | Google Brain | *Oct 2022 - Mar 2023*

- Hosted by Ruoxi Wang. Work focused on model efficiency in Deep Learning.

Research Scientist Intern | DeepMind | *May-Oct 2022*

- Hosted by Marta Garnelo in the Deep Learning team. Developed a diffusion model to perform probabilistic weather forecasting.

Machine Learning Research Intern | ClimateAI | *June-Oct 2021*

- Developed a GAN to correct and downscale (super-resolve) precipitation forecasts. The model approaches the performance of an operational regional high-resolution numerical weather model at a tiny fraction of the cost and time.
- Placed 1st in the company's internal tensor-completion Kaggle competition.

Machine Learning Engineer | Rhodes Artificial Intelligence Lab (RAIL) | *Feb-Aug 2017, Oct 2017 - Oct 2019*

- Applying machine learning for social good (pro-bono work, part-time).
 - Project 1) Uncovered archetypal user behaviour for an online learning platform by applying clustering and topic modeling techniques to data from 3100 students.
 - Project 2) (Project leader) Crowdsourced a new dataset of 44K comments annotated for subtly toxic attributes, and established baseline classification results with BERT. Partnered with Google Jigsaw.

Research Assistant | Oxford-Emirates Data Science Lab, University of Oxford | *Sep 2017 - Jul 2018*

- Mathematical modelling and data analytics for revenue management and service personalisation (full-time).
- Developed an algorithm for online multiple hypothesis testing with live data.

SELECTED TALKS AND ACADEMIC PRESENTATIONS

- Oral at ICASSP 2023, "Improved Projection Learning for Lower Dimensional Feature Maps" (Jun 2023)
- Presentation at ML Collective (DLCT): "Dense for the Price of Sparse: Training Extremely Sparse Networks from Scratch with Random Sparse Support" (Oct 2021)
- Invited Lecture at Gene Golub SIAM Summer School on Theory and Practice of Deep Learning, "Sparsity in Deep Learning" (Jul 2021)
- Spotlight at ICML 2021, "Dense for the Price of Sparse: Improved Performance of Sparsely Initialized Networks via a Subspace Offset" (Jul 2021)
- Poster presentation at LMS-Bath symposium on the Mathematics of Machine Learning, "Trajectory growth lower bounds for random sparse deep ReLU networks" (Aug 2020). [\[video\]](#)
- Guest presentation at African Institute for Mathematical Sciences: "Neural network expressivity and adversarial vulnerability" (Apr 2019)

SELECTED LEADERSHIP EXPERIENCE

Co-Director | Rhodes Artificial Intelligence Lab (RAIL) | *July 2018 - Sep 2019*

- Co-led a society of Oxford graduate students which undertakes (pro-bono) projects and public events focused on machine learning for social good (see rhodeslab.com).
- Sourced, scoped, and managed 4 projects with different partners; organised technical and 'literacy' training in machine learning for a combined 60+ people.

COO (2015), **National Head** (elected) (2014) | Habonim Dror SA (HDSA) Foundation, HDSA

- Was elected to lead HDSA, a countrywide, educational youth movement for South African Jewish youth with an annual turnover of approx. R10 million.
- Took the initiative to establish an endowment fund, and raised more than R2.5 million.
- Managed Habonim's 44 hectare campsite as a business to supplement the revenue of the NPO.
- Managed large scale projects including a summer camp involving 800-1000 people, lasting one month. Other responsibilities included strategic positioning and crisis management.