

# CIAN EASTWOOD

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## Summary

A machine learning researcher with proven expertise in representation learning, self-supervised learning, fine-tuning, robustness, adaptation and generalization. 8 years of post-graduate research and 2 years in industry. Interested in robustness, generalization and interpretability.

## Education

### PhD in Machine Learning

University of Edinburgh & Max Planck Institute for Intelligent Systems, Tübingen

Sept 2018 – Feb 2024

UK & Germany

- Supervisors: Prof. Chris Williams and Prof. Bernhard Schölkopf.
- Thesis: “Shift happens: How can we best prepare machine learning systems?”
- Research: Robustness, out-of-distribution generalization, domain adaptation, causality, fine-tuning, in-context learning, self-supervised learning, representation learning and disentanglement.
- Awards: Enlightenment Scholarship, NUI Travelling Doctoral Studentship.

### MSc in Artificial Intelligence – Distinction (84%)

University of Edinburgh

Sept 2016 – Sept 2017

UK

- Thesis: “Experiments with information-maximising generative adversarial networks”
- Courses: Various courses in AI, e.g. probabilistic modelling and reasoning, natural language understanding, practical machine learning
- Awards: **Best Thesis**, The Informatics Scholarship, UK/EU Masters Scholarship.

### Exchange Program

University of Toronto

Aug 2014 – Dec 2014

Canada

- Courses: Programming languages, computer networks, compilers, and formal methods of software design.

### BSc in Computer Science – First-Class Honours (88%)

National University of Ireland (NUI), Maynooth

Sept 2012 – June 2016

Ireland

- Thesis: Minimising Volatility, Maximising Diversification.
- Courses: Broad range of courses in computer science and mathematics.
- Awards: Intel Medal—**graduated top of class**, STEM Scholarship, Entrance Scholarship.

## Professional Experience

### Student Researcher (PhD)

Google DeepMind

Sept – Dec 2023

London, UK

- Large-scale generative transformers for continuous data (see [1]).

### Research Scientist Intern

Spotify

Jun 2023 – Aug 2023

London, UK

- Learning representations of high-dimensional treatments (e.g., playlists).
- Part of the Causal Inference Lab.

### Research Intern (AI)

Meta

Aug – Dec 2022; Jan – April 2023

New York, USA; London, UK

- Self-supervised representation learning for improved downstream performance (see [2]).
- Part of FAIR Labs.

### Research Assistant

University of Edinburgh

Nov 2017 – Sept 2018

Edinburgh, UK

- Deep generative models for human motion synthesis.
- Collaborative research environment, with Prof. Taku Komura.

### Intern Analyst

Accenture

Feb 2015 – Aug 2015

Dublin, Ireland

- Large-scale professional software development.

# Publications

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- [1] “GIVT: Generative Infinite-Vocabulary Transformers”  
M Tschannen, **C Eastwood**, F Mentzer  
*Preprint, Under Review* (2023)
- [2] “Self-Supervised Disentanglement by Leveraging Structure in Data Augmentations”  
**C Eastwood**, J von Kügelgen, L Ericsson, D Bouchacourt, P Vincent, B Schölkopf, M Ibrahim  
*NeurIPS 2023 Workshop on Causal Representation Learning*
- [3] “Spuriousity Didn’t Kill the Classifier: Using Invariant Predictions to Harness Spurious Features”  
**C Eastwood\***, S Singh\*, A Nicolicioiu, M Vlastelica, J von Kügelgen, B Schölkopf  
*37<sup>th</sup> Conference on Neural Information Processing Systems (NeurIPS 2023)*
- [4] “DCI-ES: An Extended Disentanglement Framework with Connections to Identifiability”  
**C Eastwood\***, A Nicolicioiu\*, J von Kügelgen\*, A Kekić, F Träuble, A Dittadi, B Schölkopf  
*11<sup>th</sup> International Conference on Learning Representations (ICLR 2023)*
- [5] “Probable Domain Generalization via Quantile Risk Minimization”  
**C Eastwood\***, A Robey\*, S Singh, J von Kügelgen, H Hassani, G J Pappas, B Schölkopf  
*36<sup>th</sup> Conference on Neural Information Processing Systems (NeurIPS 2022)*
- [6] “Align-Deform-Subtract: An Interventional Framework for Explaining Object Differences”  
**C Eastwood\***, N Li\*, C K I Williams  
*ICLR 2022 Workshop on Objects, Structure and Causality*
- [7] “On the DCI Framework for Evaluating Disentangled Representations: Extensions and Connections to Identifiability”  
**C Eastwood\***, A Nicolicioiu\*, J von Kügelgen\*, A Kekić, F Träuble, A Dittadi, B Schölkopf  
*UAI 2022 Workshop on Causal Representation Learning*
- [8] “Source-Free Adaptation to Measurement Shift via Bottom-Up Feature Restoration”  
**C Eastwood\***, I Mason\*, C K I Williams, B Schölkopf  
*10<sup>th</sup> International Conference on Learning Representations (ICLR 2022, **Spotlight**)*
- [9] “Unit-Level Surprise in Neural Networks”  
**C Eastwood\***, I Mason\*, C K I Williams  
*NeurIPS 2021 Workshop “I Can’t Believe it’s Not Better” and PMLR 163:33-40 (**Spotlight & Didactic Award**)*
- [10] “Learning Object-Centric Representations of Multi-Object Scenes from Multiple Views”  
N Li, **C Eastwood**, R Fisher  
*34<sup>th</sup> Conference on Neural Information Processing Systems (NeurIPS 2020, **Spotlight**)*
- [11] “A Framework for the Quantitative Evaluation of Disentangled Representations”  
**C Eastwood**, C K I Williams  
*6<sup>th</sup> International Conference on Learning Representations (ICLR 2018)*

# Awards

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- 2022    NeurIPS Top Reviewer
- 2022    ICLR Highlighted Reviewer
- 2019    NUI Travelling Doctoral Studentship in Artificial Intelligence
- 2018    University of Edinburgh Enlightenment PhD Scholarship
- 2017    Informatics Dissertation Prize (Award for best thesis in the MSc Artificial Intelligence)
- 2016    Informatics Masters Scholarship
- 2016    UK/EU Masters Scholarship
- 2016    The Intel Medal (Award for best results in the BSc Computer Science)
- 2012    NUI Undergraduate STEM Scholarship
- 2012    NUI Undergraduate Entrance Scholarship
- 2012    600 points in The Leaving Certificate (Final secondary-school exams, 99.7th percentile nationally)

## Invited Talks

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- [A] “Distribution shift and causal/disentangled representations”  
*Computational Intelligence, Vision, and Robotics Lab, New York University, December 2022*
- [B] “Probable domain generalization via quantile risk minimization”  
*Copenhagen Causality Lab, University of Copenhagen, November 2022 (virtual)*
- [C] “Shift happens: How can we best prepare?”  
*(Neuro)Science of Deep Learning Group, Massachusetts Institute of Technology, November 2022 (virtual)*
- [D] “Tackling distribution shift and out-of-distribution generalization”  
*Seminar on Out-of-Distribution Generalization, Saarland University, November 2022 (virtual)*

## Community Service/Engagement

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- 2023    Reviewer: ICLR, ICML; Organizing Committee: Conference on Causal Learning and Reasoning (CLeaR); Co-Organizer: NeurIPS Causal Representation Learning workshop.
- 2022    Reviewer: NeurIPS, ICLR.
- 2021    Reviewer: NeurIPS.

## Skills

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- Programming    Python (PyTorch, JAX, Pandas, NumPy, Scikit-learn. etc.)
- Miscellaneous    Linux, Shell (Bash/Zsh),  $\text{\LaTeX}$ , Git

References available upon request.