

Daniel Kornai

[Personal Site](#), [Google Scholar](#)

Education

PhD, Engineering (Computational Neuroscience & Machine Learning) 2024 → present

University of Cambridge, Division of Information Engineering

Thesis: Representations for Adaptive Reinforcement Learning in Minds and Machines

Summary: Formalizing novel non-stationary and compositional extensions of the MDP to study generalisation across changing RL tasks in biological and artificial agents.

Supervisors: Prof. Máté Lengyel, Prof. Guillaume Hennequin

MSc, Scientific and Data Intensive Computing 2023 - 2024

University College London, Dept. of Physics and Astronomy

Grade: Distinction

Thesis: Machine Learning for Causal Discovery from Timeseries Data

MSci, Biological Sciences (Computational Biology) 2018 - 2022

University College London, Division of Biosciences

Grade: First Class Honours

Thesis: Developing a Method for Species Delimitation from Genetic Data.

Research Appointments

Academic Visitor, Reinforcement Learning Theory 09/2026 → present

RLAI Lab, Dept. of Computing Science, *University of Alberta*

- Generalizing linear MDPs to the semi-Markov case under the supervision of Prof. Csaba Szepesvári. Studying how the resulting linear SMDPs help formalise controller-representation co-design.

Member of Technical Staff, Post-Training 03/2026 - 08/2026

Foundations Team, *Tzafon*

- Developed a method to mitigate context saturation by enabling agents to mutate their own interaction history. Wrote a custom distributed RL framework to handle mutable multimodal transcripts.

Researcher, Computational Neuroscience 06/2025 → present

Theory and Data Science Team, *Simons Collaboration on Ecological Neuroscience*

- Part of the core team using concepts from RL and Control Theory to build the mathematical foundations of Ecological Neuroscience, as part of a 10-year project funded by the Simons Foundation.

Academic Visitor, Systems Biology 01/2023 - 10/2023

Systems and Signals Group, Department of Mathematics, *Imperial College London*

- Developed ODE and SDE models of clonally expanding mtDNA mutations.

Research Associate, Statistical Genetics 06/2022 - 06/2023

Ziheng Yang Lab, Centre for Life's Origins and Evolution, *University College London*

- Created a species delimitation method for the multispecies coalescent model with gene flow.

Research Intern, Bioinformatics 06/2021 - 12/2021

Secrier Lab, Genetics Institute, *University College London*

- Explored genetic signatures of G0 cell cycle arrest in cancer using scRNA-seq data.

Publications

- **D. Kornai**, R. Silva, and N. Nikolaou. AGM-TE: Approximate generative model estimator of transfer entropy for causal discovery.
Fourth Conference on Causal Learning and Reasoning, June 2025
- **D. Kornai**, X. Jiao, J. Ji, T. Flouri, and Z. Yang. Hierarchical heuristic species delimitation under the multispecies coalescent model with migration.
Systematic Biology, August 2024
- A. J. Wiecek, S. J. Cutty, **D. Kornai**, M. Parreno-Centeno, L. E. Gourmet, G. Malagoli Tagliazucchi, D. H. Jacobson, P. Zhang, L. Xiong, G. L. Bond, A. R. Barr, and M. Secrier. Genomic hallmarks and therapeutic implications of G0 cell cycle arrest in cancer.
Genome Biology, May 2023

Presentations

- **D. Kornai**. An introduction to Markov decision processes for neuroscientists.
Talk at the 2025 Meeting of the Simons Collaboration on Ecological Neuroscience, November 2025
- **D. Kornai**, F. Insalata, H. Hoitzing, J. Aryaman, and N. S. Jones. Stochastic survival of the densest accounts for the expansion of mitochondrial mutations.
Poster at London Mathematical Biology Conference, September 2023

Reviewing Experience

- ICML (2026 Gold Reviewer)
- RLC (2026)

Teaching Experience

Participated in delivering the following 3rd year Engineering modules at the University of Cambridge:

- **3F7 Information Theory and Coding** (Small group teaching)
- **3F8 Statistical Inference** (Small group teaching)
- **3G3 Introduction to Neuroscience** (Demonstration, Marking)

Awards & Prizes

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| • Hamilton Cambridge International PhD Scholarship
Cambridge Trust & Selwyn College Cambridge | 2024 - 2028 |
| • Best MSc Thesis in Scientific and Data Intensive Computing
University College London Dept. of Physics and Astronomy | 2024 |
| • Best MSci Thesis in Biological Sciences
University College London Division of Biosciences | 2022 |