Lancelot Da Costa

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Overview

I am a mathematician working toward understanding and building intelligence. My work has formalized an influential theory of brain function (the free-energy principle), and I now use these ideas to develop AI that learns like we do: by actively exploring and building models of the world, an approach I call *active world modeling*.

Current Position

Max Planck Institute for Intelligent Systems — Tübingen, Germany
Postdoc, active world modeling, with Bernhard Schölkopf — Apr 2026 - Present

Education

Imperial College London — London, UK
Ph.D., Mathematics. Advisors: Grigorios A. Pavliotis, Karl Friston — 2019 - 2024
Yael Naim Dowker Prize for Joint Best Maths PhD Thesis 2025

University College London — London, UK
M.Res., Brain Sciences. Advisors: Karl Friston, Biswa Sengupta — 2018 - 2019

University of Cambridge — Cambridge, UK
M.A.St., Pure Mathematics (Part III of the Mathematical Tripos) — 2017 - 2018

University of Toronto — Toronto, Canada
Exchange Year, Mathematics — 2016 - 2017

EPFL (Ecole Polytechnique Fédérale de Lausanne) — Lausanne, Switzerland
B.Sc., Mathematics — 2014 - 2017

Research Experience

MPI for Intelligent Systems & ELLIS Institute Tübingen — Tübingen, Germany
Visiting Researcher, active world modeling, with Bernhard Schölkopf — Jul & Nov 2024, Jan 2025 - Mar 2026

VERSES AI Research Lab — Remote
ML Researcher, stochastic processes, world-modeling foundations, with Karl Friston, Chris L. Buckley — Apr 2023 - Jan 2025

MILA (Quebec AI Institute) — Montreal, Canada
Research Intern, causal representation learning, with Yoshua Bengio (Turing Award recipient) — Apr 2024

Imperial College London, Department of Mathematics — London, UK
Graduate Researcher (Ph.D.), stochastic processes, with Grigorios A. Pavliotis — Oct 2019 - May 2024

University College London, Wellcome Centre for Human Neuroimaging — London, UK
Graduate Researcher (M.Res., Ph.D.), theoretical neuroscience, with Karl Friston, Biswa Sengupta — Jan 2019 - May 2024

Lyon Neuroscience Research Center — Lyon, France
Visiting Researcher, theoretical neuroscience, with Jérémie Mattout — Jan 2023 - Sep 2023

University of Oxford, Mathematical Institute — Oxford, UK
Visiting Researcher, stochastic processes (CDT in Mathematics of Random Systems) — Oct 2019 - Sep 2023

University of Cambridge, Department of Geography — Cambridge, UK
Research Intern, topological data analysis, with Andrew Friend, Annemarie Eckes-Shephard — Jul 2018 - Sep 2018

University of Cambridge, Dept. of Pure Mathematics and Mathematical Statistics — Cambridge, UK
M.A.St. Thesis, algebraic topology, with Oscar Randal-Williams — Jan 2018 - May 2018

EPFL, Department of Mathematics — Lausanne, Switzerland
Research Intern, combinatorial geometry, with Maryna Viazovska (Fields Medalist) — Jul 2017 - Sep 2017

University of Toronto, Department of Mathematics — Toronto, Canada
B.Sc. Thesis, complex differential geometry, with John Bland — Apr 2017 - Jul 2017

European Centre for Research on Human Movement — Montpellier, France

Research Intern, theoretical neuroscience, with Benoit Bardy, Julien Lagarde Aug 2015 - Sep 2015

Publication list

*Legend: ⋆ Best paper/thesis award, ◇ Cover article & best paper finalist, † Equal contribution, * Corresponding author.*

Research output summary: 52 publications, including

- 36 journal articles (*Physics Reports, Nat. Comm., J. Phys. A, Proc. R. Soc. A, PNAS, Sci. Rep., Stud. Appl. Math.*)
- 1 conference paper (*NeurIPS*)
- 2 book chapters (*Handbook of Statistics*)
- 8 peer-reviewed workshop papers (*NeurIPS, ICML, IWAI*)
- 2 preprints & submitted manuscripts
- 3 theses

Google Scholar citations: 2928 citations, h-index: 24, i10-index: 29

Selected Publications Illustrating Research Trajectory

My work has developed along three interlocking strands: (1) formalizing principles of biological intelligence, such as the free-energy principle, through non-equilibrium stochastic processes and Bayesian mechanics; (2) developing active Bayesian inference as a physics-inspired statistical framework for agents, integrating variational inference with information-theoretic planning; and (3) active world modeling: agents that learn world models through explorative interaction.

Formalizing principles of biological intelligence

L Da Costa†*, N Da Costa†, C Heins, J Medrano, GA Pavliotis, T Parr, AA Meera, K Friston. A theory of generalised coordinates for stochastic differential equations. *Studies in Applied Mathematics,* 2025.

L Da Costa*, GA Pavliotis. The entropy production of stationary diffusions. *Journal of Physics A: Mathematical and Theoretical,* 2023.

L Da Costa*, K Friston, C Heins, GA Pavliotis. Bayesian mechanics for stationary processes. *Proceedings of the Royal Society A,* 2021.

Active Bayesian inference

L Da Costa*, N Sajid, T Parr, K Friston, R Smith. Reward Maximisation through Discrete Active inference. *Neural Computation,* 2023.

◇ **L Da Costa**†*, P Lanillos†, N Sajid, K Friston, S Khan. How active inference could help revolutionise robotics. *Entropy,* 2022.

A Barp†, **L Da Costa**†, G Franca†, K Friston, M Girolami, MI Jordan, GA Pavliotis. Geometric Methods for Sampling, Optimisation, Inference and Adaptive Agents. *Geometry and Statistics, Handbook of Statistics Series vol 46 (Eds. F Nielsen, AS Rao, CR Rao),* 2022.

Active world modeling

V Six†, F Panse†, M Fajeau†, **L Da Costa**†, M Sharma, A Amayuelas, TZ Xiao, D Hyland, P Hennig, B Schölkopf. Learning POMDP World Models from Observations with Language-Model Priors. *Advances in Neural Information Processing Systems (NeurIPS),* 2026. *arXiv:2605.13740.*

L Da Costa, S Namjoshi, MA Ansari, B Schölkopf. Natural Building Blocks for Structured World Models: Theory, Evidence, and Scaling. *World Modeling Workshop,* 2026. *arXiv:2511.02091.*

L Da Costa*, T Gavenčiak, D Hyland, M Samiei, C Dragos-Manta, C Pattisapu, A Razi, K Friston. Possible principles for aligned structure learning agents. *Neural Computation,* 2025. *arXiv:2410.00258.*

Journal Articles (36)

36. K Friston, **L Da Costa**, A Tschantz, C Heins, C Buckley, T Verbelen, T Parr. Active inference and artificial reasoning. *Nature Communications,* 2026. *arXiv:2512.21129.*
35. V Neacsu, WY So, D Rutar, **L Da Costa**, RA Adams, K Friston. Reviewing Structure Learning in and Out of the Active Inference Framework. *Minds and Machines,* 2026.
34. S Rubin, C Heins, T Mitsui, **L Da Costa**, K Friston. An elementary form of agency at planetary-scale. *Scientific Reports,* 2026.
33. **L Da Costa***, AK Seth, K Friston, MJD Ramstead, L Sandved-Smith. A Rosetta Stone hypothesis for neurophenomenology: mathematical predictions from predictive processing. *Neuroscience of Consciousness,* 2026. *arXiv:2409.20318.*

32. N Da Costa, M Pförtner, **L Da Costa**, P Hennig. Sample Path Regularity of Gaussian Processes from the Covariance Kernel. *Analysis and Applications,* 2026. *arXiv:2312.14886.*

31. L Sandved-Smith†, **L Da Costa**†. Metacognitive particles, mental action and the sense of agency. *Neuroscience of Consciousness,* 2025. *arXiv:2405.12941.*

30. **L Da Costa***, T Gavenčiak, D Hyland, M Samiei, C Dragos-Manta, C Pattisapu, A Razi, K Friston. Possible principles for aligned structure learning agents. *Neural Computation,* 2025. *arXiv:2410.00258.*

29. K Friston, T Parr, C Heins, **L Da Costa***, et al. Gradient-free de novo learning. *Entropy,* 2025.

28. A Tolchinsky, M Levin, C Fields, **L Da Costa**, et al. Temporal Depth in a Coherent Self and in Depersonalization: Theoretical Model. *Frontiers in Psychology,* 2025.

27. K Friston, C Heins, T Verbelen, **L Da Costa**, T Salvatori, D Markovic, A Tschantz, M Koudahl, C Buckley, T Parr. From pixels to planning: scale-free active inference. *Frontiers in Network Physiology,* 2025.

26. **L Da Costa**†*, N Da Costa†, C Heins, J Medrano, GA Pavliotis, T Parr, AA Meera, K Friston. A theory of generalised coordinates for stochastic differential equations. *Studies in Applied Mathematics,* 2025.

25. K Friston, **L Da Costa**, A Tschantz, A Kiefer, T Salvatori, V Neacsu, et al. Supervised structure learning. *Biological Psychology,* 2024.

24. A Paul, N Sajid, **L Da Costa**, A Razi. On efficient computation in active inference. *Expert Systems with Applications,* 2024.

23. C Heins, B Millidge, **L Da Costa**, RP Mann, K Friston, ID Couzin. Collective behavior from surprise minimization. *PNAS,* 2023.

22. **L Da Costa***, L Sandved-Smith. Towards a Bayesian mechanics of metacognitive particles: A commentary on "Path integrals, particular kinds, and strange things" by Friston, Da Costa, Sakthivadivel, Heins, Pavliotis, Ramstead, and Parr. *Physics of Life Reviews,* 2023.

21. K Friston, **L Da Costa***, DAR Sakthivadivel, C Heins, GA Pavliotis, MJD Ramstead, T Parr. Path integrals, particular kinds, and strange things. *Physics of Life Reviews,* 2023.

20. K Friston, **L Da Costa***, N Sajid, C Heins, K Ueltzhoeffer, GA Pavliotis, T Parr. The free energy principle made simpler but not too simple. *Physics Reports,* 2023.

19. **L Da Costa***, GA Pavliotis. The entropy production of stationary diffusions. *Journal of Physics A: Mathematical and Theoretical,* 2023.

18. **L Da Costa***, N Sajid, T Parr, K Friston, R Smith. Reward Maximisation through Discrete Active inference. *Neural Computation,* 2023.

17. MJD Ramstead, DAR Sakthivadivel, C Heins, M Koudahl, B Millidge, **L Da Costa**, B Klein, K Friston. On Bayesian Mechanics: A Physics of and by Beliefs. *Journal of the Royal Society Interface,* 2023.

16. C Heins, **L Da Costa**. Sparse coupling and Markov blankets: A comment on "How particular is the physics of the Free Energy Principle?" by Aguilera, Millidge, Tschantz and Buckley. *Physics of Life Reviews,* 2022.

15. T Champion, **L Da Costa**, H Bowman, M Grzes. Branching Time Active Inference: the theory and its generality. *Neural Networks,* 2022.

14. N Sajid, F Faccio, **L Da Costa**, T Parr, J Schmidhuber, K Friston. Bayesian brains and the Rényi divergence. *Neural Computation,* 2022.

◇ 13. **L Da Costa**†*, P Lanillos†, N Sajid, K Friston, S Khan. How active inference could help revolutionise robotics. *Entropy,* 2022.

12. **L Da Costa***, K Friston, C Heins, GA Pavliotis. Bayesian mechanics for stationary processes. *Proceedings of the Royal Society A,* 2021.

⋆ 11. K Friston, C Heins, K Ueltzhoeffer, **L Da Costa**, T Parr. Stochastic Chaos and Markov Blankets. *Entropy,* 2021.

10. K Ueltzhoeffer, **L Da Costa**, D Cialfi, K Friston. A Drive towards Thermodynamic Efficiency for Dissipative Structures in Chemical Reaction Networks. *Entropy,* 2021.

9. T Parr, **L Da Costa**, C Heins, MJD Ramstead, K Friston. Memory and Markov Blankets. *Entropy,* 2021.

8. K Friston, **L Da Costa**, T Parr. Some interesting observations on the free energy principle. *Entropy,* 2021.

7. K Ueltzhoeffer, **L Da Costa**, K Friston. Variational free energy, individual fitness, and population dynamics under acute stress. Comment on "Dynamic and thermodynamic models of adaptation" by Alexander N. Gorban et al. *Physics of Life Reviews,* 2021.

6. T Parr, N Sajid, **L Da Costa**, MB Mirza, K Friston. Generative models for active vision. *Frontiers in Neurobotics,* 2021.

5. **L Da Costa***, T Parr, B Sengupta, K Friston. Neural dynamics under active inference: plausibility and efficiency of information processing. *Entropy,* 2021.

4. K Friston, **L Da Costa**, D Hafner, C Hesp, T Parr. Sophisticated inference. *Neural Computation,* 2021.

3. **L Da Costa***, T Parr, N Sajid, S Veselic, V Neacsu, K Friston. Active inference on discrete state-spaces: a synthesis. *Journal of Mathematical Psychology,* 2020.
2. S Rubin, T Parr, **L Da Costa**, K Friston. Future climates: Markov blankets and active inference in the biosphere. *Journal of the Royal Society Interface,* 2020.
1. T Parr, **L Da Costa**, K Friston. Markov blankets, information geometry and stochastic thermodynamics. *Philosophical Transactions of the Royal Society A,* 2020.

Book Chapters (2)

2. A Barp†, **L Da Costa**†, G Franca†, K Friston, M Girolami, MI Jordan, GA Pavliotis. Geometric Methods for Sampling, Optimisation, Inference and Adaptive Agents. *Geometry and Statistics, Handbook of Statistics Series vol 46 (Eds. F Nielsen, AS Rao, CR Rao),* 2022.
1. N Sajid, **L Da Costa**, T Parr, K Friston. Active inference, Bayesian optimal design, and expected utility. *The Drive for Knowledge (Eds. IC Dezza, E Schulz, CM Wu),* 2022.

Conference Papers (1)

1. V Six†, F Panse†, M Fajeau†, **L Da Costa**†, M Sharma, A Amayuelas, TZ Xiao, D Hyland, P Hennig, B Schölkopf. Learning POMDP World Models from Observations with Language-Model Priors. *Advances in Neural Information Processing Systems (NeurIPS),* 2026. *arXiv:2605.13740.*

Preprints and Submitted Manuscripts (2)

2. A Tschantz, M Koudahl, H Linander, **L Da Costa**, C Heins, J Beck, C Buckley. Bayesian Predictive Coding. 2025. *arXiv:2503.24016.*
1. N Sajid, E Holmes, **L Da Costa**, C Price, K Friston. A mixed generative model of auditory word repetition. 2022. *bioRxiv.*

Peer-Reviewed Workshop Papers (8)

8. K Zaghw, A Pashea, M Pritsch, W Nuijten, K Friston, **L Da Costa**. Renormalising Generative Models for Active Inference: Foundations, Derivations, and Verification. *International Workshop on Active Inference (oral),* 2026. *arXiv:2608.09512.*
7. **L Da Costa**, S Namjoshi, MA Ansari, B Schölkopf, Natural Building Blocks for Structured World Models: Theory, Evidence, and Scaling. *World Modeling Workshop,* 2026. *arXiv:2511.02091.*
6. M Koudahl, A Tschantz, T Salvatori, H Linander, **L Da Costa**, J Beck, C Buckley. Bethe Predictive Coding: A Message Passing Realization of Expected Free Energy Minimization. *International Workshop on Active Inference,* 2025.
5. **L Da Costa***. Toward Universal and Interpretable World Models for Open-ended Learning Agents. *NeurIPS 2024 Workshop on Intrinsically Motivated and Open Ended Learning,* 2024. *arXiv:2409.18676.*
4. T Gavenčiak†, D Hyland†, **L Da Costa**, MJ Wooldridge, J Kulveit. Path Divergence Objective: Boundedly-Rational Decision Making in Partially Observable Environments. *NeurIPS 2024 Workshop on NeuroAI,* 2024.
3. D Hyland†, T Gavenčiak†, **L Da Costa**, C Heins, V Kovarik, J Gutierrez, MJ Wooldridge, J Kulveit. Free-Energy Equilibria: Toward a Theory of Interactions Between Boundedly-Rational Agents. *ICML 2024 Workshop on Models of Human Feedback for AI Alignment,* 2024.
2. N Sajid, P Tigas, Z Fountas, Q Guo, A Zakharov, **L Da Costa**. Modelling non-reinforced preferences using selective attention. *First Conference on Lifelong Learning Agents: Workshop Track,* 2022. *arXiv:2207.13699.*
1. **L Da Costa***, N Sajid, D Zhao, S Tenka. Active inference as a model of agency. *RLDM 2022 Workshop on Reinforcement Learning as a Model of Agency,* 2022.

Theses (3)

⋆ 3. **L Da Costa**. Probabilistic Principles for Biophysics and Neuroscience: Entropy production, Bayesian mechanics & the free-energy principle. *PhD thesis, Department of Mathematics, Imperial College London,* 2024. *arXiv:2410.11735.*
2. **L Da Costa**. Topological Hochschild Homology. *Part III essay, Department of Pure Mathematics, University of Cambridge,* 2018.
1. **L Da Costa**. The Uniformization theorem of Riemann Surfaces. *Bachelor thesis, Department of Mathematics, University of Toronto,* 2017.

Awards & Honors

Yael Naim Dowker Prize for Joint Best Maths PhD Thesis, Imperial College London 2025

Sir Michael Uren Prize Nominee (sole Dept. of Mathematics nominee for Imperial's most prestigious

student prize), Department of Mathematics, Imperial College London 2025

Best Poster Award, 5th International Workshop on Active Inference (IWAI) 2024

Sir Michael Uren Prize Nominee (sole Dept. of Mathematics nominee for Imperial's most prestigious student prize), Department of Mathematics, Imperial College London 2024

Schmidt Science Fellowship Finalist (∼80 worldwide across STEM), Schmidt Futures 2024
Nominated by Imperial College London (7 university-wide, 2023)
Nominated by the Department of Mathematics (1 department-wide, 2023)

Doris Chen Merit Award, Imperial College London 2023

Entropy Best Paper Award, *Entropy* (MDPI), for "Stochastic Chaos and Markov Blankets" 2023

Entropy Best Paper Award Finalist & Cover Article, *Entropy* (MDPI), for "How active inference could help revolutionise robotics" 2022

Distinguished Student Award, American Physical Society 2022

Bachelor Award, Municipality of Hesperange, Luxembourg 2017

Grants & Fellowships

Total academic funding secured: ∼€280,000

Travel Grant, Nanyang Technological University, Singapore (S$3,300) 2026

G-Research Excellence Grant, G-Research (£2,000) 2026

Travel Grant, Université Mohammed VI Polytechnique, Morocco (€500) 2025

Travel Grant, ELLIS Institute Tübingen, Germany (€600) 2024

Travel Grant, Max Planck Institute for Intelligent Systems, Tübingen, Germany (€500) 2024

Doris Chen Mobility Award, Imperial College London, UK (£900) 2023

Travel Grant, International Centre for Mathematical Sciences, Edinburgh, UK (£300) 2023

Travel Grant, Nanyang Technological University, Singapore (S$2,000) 2023

Travel Grant, Lorentz Center, the Netherlands (€600) 2023

G-Research Excellence Grant, G-Research (£2,000) 2022

AFR Individual PhD Grant, National Research Fund, Luxembourg (€170,000) 2019-2023

Mathematics of Random Systems PhD Studentship, EPSRC, UK (∼£50,000) 2019-2023

Industrial Training Grant, Aviva, UK (£2,000) 2019

Cambridge Mathematics Placements Grant, University of Cambridge, UK (£2,000) 2018

Clare Hall Scholarship, Clare Hall College, University of Cambridge, UK (£1,900) 2017

Exchange Outside Europe Scholarship, EPFL, Switzerland (CHF 1,500) 2016

CEDIES Scholarship, Ministry of Higher Education and Research, Luxembourg (€41,000) 2014-2019

Supervision and Mentorship

Total supervised and/or mentored: 11 students.

Output: 6 publications & 1 Best poster award.

Every master's and PhD student who has completed a project has published from it.

PhD Students (2)

2. Aman Pawar, **MPI for Dynamics of Complex Technical Systems** 2026 - Present
Topic: Principled hierarchies. *Output*: In progress.

1. David Hyland, **University of Oxford** 2023 - 2024
Topic: Multi-agent systems. *Output*: 2 publications & 1 Best poster award.

Master's Students (7)

7. Valentin Six, **MPI for Intelligent Systems** 2026 - Present
   Topic: Active world modeling. *Output*: 1 publication.
6. Mathis Fajeau, **Independent** 2026 - Present
   Topic: Active world modeling. *Output*: 1 publication.
5. Karim Zaghw, **University of Tübingen** 2025 - 2026
   Topic: Renormalising generative models. *Output*: 1 publication.
4. Andrew Pashea, **Independent** 2025 - 2026
   Topic: Renormalising generative models. *Output*: 1 publication.
3. Frederik Panse, **University of Tübingen** 2025 - 2026
   Topic: Active world modeling. *Output*: 1 publication.
2. Mohammed Abbas Ansari, **University of Tübingen** 2025 - 2026
   Topic: Structured world models. *Output*: 1 publication.
1. Dominic Zhao, **ETH Zürich** 2022
   Topic: Active inference agents. *Output*: 1 publication.

Undergraduate Students (2)

2. Mridul Sharma, **Independent** 2025 - 2026
   Topic: Active world modeling. *Output*: 1 publication.
1. Stan Majewski, **University College London** Summer 2020
   Topic: Computational modeling of Parkinson's disease. *Output*: Report.

Teaching Experience

Université Mohammed VI Polytechnique, College of Computing — Ben Guerir, Morocco
Guest Lecturer, Advanced Topics in AI, with Hamza Keurti — Fall term 2025

Alan Turing Institute — London, UK
Lecturer and Co-organiser, Deep Learning Workshop, with Stephen J. Eglen, James V. Stone — Jan 2020

University of Cambridge, Centre for Mathematical Sciences — Cambridge, UK
Lecturer and Co-organiser, Deep Learning Workshop for Aviva, with Stephen J. Eglen, James V. Stone — Dec 2019

EPFL, Department of Mathematics — Lausanne, Switzerland
Teaching Assistant, Advanced Analysis II, with Joachim Krieger — Spring term 2016

EPFL, Department of Mathematics — Lausanne, Switzerland
Teaching Assistant, Advanced Analysis I, with Nicolas Monod — Fall term 2015

Invited Talks

• *Highlighted talks.*

Conference Talks (4)

4. **Conference on Geometry, Dynamics and Learning**, Nanyang Technological University, Singapore, Singapore 2026
3. **Conference in Mathematics of Random Systems**, International Centre for Mathematical Sciences, Edinburgh, UK 2023
• 2. **March Meeting**, American Physical Society, Chicago, IL, USA 2022
1. **Mathematics of Data Science Conference**, remote 2020

Workshop Talks (10)

10. **6th Applied Active Inference Symposium**, Active Inference Institute, remote 2026
9. **Pre-ICML Workshop: Thinking about AI Capability**, Seoul, South Korea 2026
8. **6th International Workshop on Active Inference**, McGill, Montreal, Canada 2025
7. **Precision Healthcare Workshop**, McGill, Montreal, Canada 2025
6. **Computational Neurophenomenology Workshop**, Lorentz Center, Leiden, Netherlands 2023
5. **RLDM 2022 Workshop on RL as a Model of Agency**, Brown University, Providence, RI, USA 2022
4. **CDT in Mathematics of Random Systems Workshop**, University of Oxford, Oxford, UK 2021

3. **Deep Learning Workshop**, Alan Turing Institute, London, UK 2020
2. **Deep Learning Workshop for Aviva**, University of Cambridge, Cambridge, UK 2019
1. **Cambridge Mathematics Placements Workshop**, University of Cambridge, Cambridge, UK 2018

Invited Seminars (46)

46. **Basis Research Institute**, MARA team, remote 2026
45. **VERSES**, AI Research Lab, remote 2025
44. **Max Planck Institute for Intelligent Systems**, Bernhard Schölkopf's Department Retreat, Tübingen, Germany 2025
43. **VERSES**, AI Research Lab Retreat, Brighton, UK 2025
- 42. **Max Planck Institute for Intelligent Systems**, Bernhard Schölkopf's Department, Tübingen, Germany 2025
41. **VERSES**, AI Research Lab, remote 2025
40. **VERSES**, AI Research Lab, remote 2025
39. **Aarhus University**, Chris Mathys' Lab (ILAB), Aarhus, Denmark 2025
38. **VERSES**, AI Research Lab, remote 2024
37. **VERSES**, Research and Product Retreat, Oxford, UK 2024
36. **VERSES**, AI Research Lab, remote 2024
35. **Max Planck Institute for Intelligent Systems**, Bernhard Schölkopf's Department, Tübingen, Germany 2024
34. **VERSES**, AI Research Lab, remote 2024
33. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical neurobiology meeting, London, UK 2024
32. **Université de Montréal**, Guillaume Dumas' group, Montreal, Canada 2024
- 31. **MILA**, Yoshua Bengio's group, Montreal, Canada 2024
30. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2024
29. **VERSES**, AI Research Lab, remote 2023
28. **Lyon Neuroscience Research Center**, Jeremy Mattout's Brain Dynamics and Cognition Unit, Lyon, France 2023
27. **Nanyang Technological University**, Department of Mathematics, Singapore, Singapore 2023
26. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2023
25. **VERSES**, AI Research Lab, remote 2023
24. **Laureate Institute for Brain Research**, Ryan Smith's Lab, Tulsa, OK, USA 2022
- 23. **Harvard University**, Samuel Gershman's Lab, Cambridge, MA, USA 2022
22. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2022
21. **VERSES**, AI Research Lab, remote 2022
- 20. **MIT**, Joshua B. Tenenbaum's Lab, Cambridge, MA, USA 2022
19. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2021
18. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2021
17. **RIKEN Center for Brain Science**, Wako, Japan 2021
16. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2021
15. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2021
14. **Centre for Doctoral Training in Mathematics of Random Systems**, Fall retreat, remote 2020
13. **UCL**, Wellcome Centre for Human Neuroimaging, Methods meeting, London, UK 2020
12. **Free energy principle international reading group**, remote 2020
11. **Free energy principle international reading group**, remote 2020
10. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2020
9. **Centre for Doctoral Training in Mathematics of Random Systems**, Spring retreat, remote 2020
8. **UCL**, Wellcome Centre for Human Neuroimaging, Methods meeting, London, UK 2020
7. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2020
6. **UCL**, Wellcome Centre for Human Neuroimaging, Methods meeting, London, UK 2019
5. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2019

4. **UCL**, Active inference journal club, London, UK 2019
3. **UCL**, MRes in Brain Sciences project presentations, London, UK 2019
2. **UCL**, Wellcome Centre for Human Neuroimaging, Theoretical Neurobiology meeting, London, UK 2019
1. **UCL**, Wellcome Centre for Human Neuroimaging, Methods meeting, London, UK 2019

Extended abstracts (4)

⋆ *Best poster award.*

4. **L Da Costa**. Bayesian Structure Learning for Scalable Active Inference. *International Workshop on Active Inference,* 2025.
⋆ 3. D Hyland†, T Gavenčiak†, **L Da Costa**, C Heins, V Kovarik, J Gutierrez, MJ Wooldridge, J Kulveit. Free-Energy Equilibria: Toward a Theory of Interactions Between Boundedly-Rational Agents. *5th International Workshop on Active Inference,* 2024.
2. S Rubin, **L Da Costa**, K Friston. Earth system resilience through planetary active inference. *The 23rd EGU General Assembly,* 2021.
1. N Sajid, F Faccio, **L Da Costa**, T Parr, J Schmidhuber, K Friston. Bayesian Brains and the Renyi divergence. *The 30th Annual Computational Neuroscience Meeting,* 2021.

Service

Workshops and Sessions Co-organised

Machine Learning Summer School—the 50th edition, Max Planck Institute for Intelligent Systems — Tübingen, Germany
Lead organizer. — Aug - Sep 2026

NeurIPS'24 Conference, NeuroAI Workshop — Vancouver, Canada
Program committee member. — Dec 2024

Wellcome Centre for Human Neuroimaging, UCL, Theoretical Neurobiology Seminar Series — London, UK
Co-organiser and co-chair (5-6h of seminars/week). — Fall 2021 - Fall 2023

Wellcome Centre for Human Neuroimaging, UCL, Symposium on Amortising Active Inference — London, UK
Co-organiser and chair. — Sep 2022

3rd International Workshop on Active Inference — Grenoble, France
Program committee member. — Sep 2022

Alan Turing Institute, Deep learning workshop — London, UK
Co-organiser. — Feb 2020

Centre for Mathematical Sciences, University of Cambridge, Deep learning workshop for Aviva — Cambridge, UK
Co-organiser. — Dec 2019

Diversity & Inclusion Initiatives

University College London — London, UK
Mentor for Underrepresented Minorities seeking to pursue a PhD. Program led by Dr. Moutoussis. Fall 2023 - Summer 2024

Thesis Committees

Universitat Pompeu Fabra — Barcelona, Spain (remote)
Committee member, PhD proposal defense of Nefeli-Marina Rouska. — Sep 2026

Peer Review

PNAS, NeurIPS, IEEE TPAMI, IJCV, Neural Networks, Nature Scientific Reports, Neural Computation, Biological Cybernetics, Computational Brain & Behavior, PLOS ONE, IWAI, Entropy, WMW.

Professional Memberships

American Physical Society 2022

Outreach

● *Highlighted outreach activities.*

Podcasts and Interviews (7)

- 7. **Machine Learning Street Talk**, Active world modeling, to appear 2026
6. **Active Inference Institute**, Active Inference LiveStream 058.1 ∼ From pixels to planning, YouTube 2024
5. **Active Inference Institute**, Active Inference Insights 010 - Mathematics, Time, Selfhood, YouTube 2024
4. **The Singularity Project**, Episode 03, X Space/Twitter 2023
- 3. **Machine Learning Street Talk**, How to add knowledge to AI agents, Apple Podcasts, Spotify, YouTube (>10k views) 2023
2. **Active Inference Institute**, Geometric Methods for Sampling, Optimisation, Inference and Adaptive Agents, YouTube 2023
1. **Active Inference Institute**, Bayesian mechanics for stationary processes, YouTube 2021

Additional Skills

Programming: Python & probabilistic programming in JAX (fluent); MATLAB, R, C++ (rusty).
Languages: French (mother tongue), English & Spanish (fluent: C2), German (basic).