OSCAR DAVIS

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https://github.com/olsdavis

EDUCATION

PhD in Computer Science, University of Oxford — Oct 2023 – Jul 2026
- Funded by Project CETI and Intel. Supervised by Prof M. Bronstein, Dr İ. Ceylan, Dr J. Bose.

MSc in Advanced Computer Science, University of Oxford — Oct 2022 – Aug 2023
- Supervised by Prof M. Bronstein and Dr İ. Ceylan. Obtained with distinction. Best dissertation prize (see below).

Visting Student, Imperial College, London — Sep 2021 – Jul 2022
- Supervised by Prof A. Gervais. Funded by Swiss scholarship. Finished with distinction.

BSc in Computer Science, EPFL — Sep 2019 – Jul 2022

RESEARCH EXPERIENCE

Research Intern at Microsoft Research, Cambridge, with Dr J. Gladrow & Dr K. Kalinin Nov 2023 – Feb 2024
- Engineering work on Diffusion Models, Latent Diffusion Models, VAEs, simple video models, Neural ODEs.
- Theoretical analyses of Diffusion Models via SDEs, PDEs. *(Patented.)*

MSc Dissertation, Information Theory for GNNs, with Dr. I. Ceylan, Prof. M. Bronstein Feb 2023 – Aug 2023
- Developed a formal information-theoretic framework to fully characterise informational bottlenecks in Graph Neural Networks, including over-smoothing and over-squashing. The analysis involved advanced concepts in information theory, and linear algebra. **Received the Tony Hoare Prize for the best dissertation of the year.**

BSc Research Project, DeFi analysis, with Prof A. Gervais — Jan 2022 – Aug 2022
- Analysed DeFi markets on the Ethereum and BNB Chain blockchains, quantified offered financial security.
- Created a program in Go using a custom GPU version of Bellman-Ford in CUDA to detect real-time arbitrage opportunities, and to quantify historically how much more assets could have been extracted, scanning $864\times$ more markets than previous SOTA within 1.5 ± 1.2 seconds, outperforming past arbitrage by on average 0.06 ETH and up to 4.4 ETH.

Student Research Project, Scala 3.0 Compiler Extension, with Prof M. Odersky — Jun 2021 – Sep 2021
- Participated to the thread-safe re-implementation of "lazy-vals", in the Scala 3.0 compiler.

PUBLICATIONS

Generalised Flow Maps for Few-Step Generative Modelling on Riemannian Manifolds — Sep 2025
Davis, O., Boffi, N., Albergo, M., Bronstein, M., Bose, J.
NeurIPS 2025 FPI + pre-print coming soon!

SOAPIA: Siamese-Guided Generation of Off Target-Avoiding Protein Interactions [...] — May 2025
Vincoff, S.*, **Davis, O.***, Tong, A., Bose, J., Chatterjee, P.
ICML 2025 FM4LS.

FORT: Forward-Only Regression Training of Normalizing Flows — May 2025
Rehman, D., **Davis, O.**, Lu, J., Tang, J., Bronstein, M., Bengio, Y., Tong, A., Bose, J.
ICML 2025 GenBio (**Best paper award**). arXiv: arxiv.org/abs/2506.01158

SOAPI: Siamese-guided Generation of Off-Target-Avoiding Protein Interactions — Mar 2025
Vincoff, S., **Davis, O.**, Tong, A., Bose, J., Chatterjee, P.
ICLR 2025 GEM (**Spotlight**).

Fisher Flow Matching for Generative Modeling over Discrete Data May 2024
Davis, O., Kessler, S., Petrache, M., Ceylan, I., Bronstein, M., Bose, J.
NeurIPS 2024. arXiv: arxiv.org/abs/2405.14664. GitHub: github.com/olsdavis/fisher-flow.

TEACHING EXPERIENCE

Co-Lead TA for generative modelling at EEML 2025, Sarajevo (Bosnia and Herz.) Jul 2025
- Writing and presenting a geometric generative modelling tutorial (flow matching, Riemannian flow matching).

Graduate Teaching and Research Scholarship in CS, Oriel College, Oxford Apr 2025 – Present
- Teaching undergraduate-level courses to students of Oriel College. Admissions interviews.

TA for Geometric Deep Learning, University of Oxford, under Prof. M. Bronstein Jan – Mar 2025
- Teaching PyTorch implementations of geometric models (equi-/invariance) and others (*e.g.,* neural diffusion).

TA for OÄW Winter AI School 2025, OÄW, Vienna (Austria) Jan 2025
- Gave two PyTorch tutorials: one on implementing Graph Neural Networks; one on (Riemannian) flow matching.

TA for Graph Representation Learning, University of Oxford, under Dr. İ Ceylan Oct – Dec 2023 and 2024
- Teaching PyTorch and PyTorch Geometric (for Graph Neural Networks, and Knowledge Graph Learning).

TA for Object-Oriented Programming (Java), EPFL, under Dr M. Schinz Feb – Jun 2020
- Second most prolific helper on the student forum. Leader of marking group for final projects.

ACADEMIC ACHIEVEMENTS & OTHERS

ICML 2025 GenBio – Best paper award May 2025
- For *FORT: Forward-Only Regression Training of Normalizing Flows*, 2nd author.

G-Research Grant for PhD Students and Postdocs (£1k) Feb 2024

Tony Hoare Prize for the best MSc Dissertation, University of Oxford Sep 2023
- Prize awarded for my dissertation titled "Information-Theoretic Perspectives on Graph Neural Networks."

Swiss Study Foundation Scholarship Sep 2021
- Granted based on academic performance (almost 100% GPA on my last term's exams).

French Scientific Baccalaureate with Advanced Mathematics 2019
- Obtained high honours, and 100% in Mathematics, with the Advanced Mathematics option.

French National Mathematics Olympiads 2017
- Obtained a distinction in the Bordeaux academy.

SERVICE

NeurIPS Top Reviewer 2025