Joshua Freeman

British and French citizen interested in Software Engineering.

Education

09/2023- : Master of Science, Computer Science, ETH Zürich, Switzerland.
- Applied Category Theory (Andrea Censi, Gioele Zardini, Jonathan Lorand) (6/6).

10/2022-08/2023: Year abroad in Computer Science, University of Oxford, United Kingdom.
- Quantum Information (First).
- Compilers (First).
- Computer Security (First).

09/2020-08/2023: Bachelor of Science, Computer Science, Ecole Polytechnique Fédérale de Lausanne, Switzerland.
- Introduction to Machine Learning (Mathieu Salzmann, 5.75/6).
- Classical Mechanics (6/6).
- Theory of Computation (5.5/6).
- Probabilities and Statistics (Raphaël Berthier, 5.5/6).

Research Experience

- Postgraduate Research Fellow, Yale BIDS, (Summer 2024). Designing and running experiments for a fine-tuned model that recognizes antibiotic pellets. Improving the distributed computing DiSCO platform.
- *Exploring Memorization and Copyright Violation in Frontier LLMs: A Study of the New York Times v. OpenAI 2023 lawsuit* (02/2024-09-2024). The articles of the New York Times lawsuit are extremely memorized, as shown through my 3 experiments and 8 metrics, comparing 4 different model providers. In review for the CS&Law proceedings. Accepted at NeurIPS SafeGenAI.
- *Causality in Classical Discrete Symplectic Mechanics: Separability of Spekkens' Symplectomorphisms*, Student researcher, *Oxford Quantum Group* (06/2023-08/2023).
  - 3 months of research in Foundations of Quantum Physics in the Oxford Quantum Group.
  - Proving an original theorem under Jon Barrett and Aleks Kissinger, showing that quantum causality results apply to a hidden variable theory.
  - Two 1h long presentations on Spekken's toy theory (foundational physics research).
- microbian: Participating to an Open-Source operating system for the micro:bit chip with Mike Spivey (08/2023-09/2023).
  - Writing the RNG driver.
  - Implementing a round robin scheduling algorithm (C).
- *Recognition of unexploded ordnance using transfer learning* (10/2022-10/2023).
  - Preparing classification models to help Ukrainian deminers with Maksym Andriushchenko.
  - Mostly using CLIP with grad-cam. Achieved 80+% accuracy.
- *HPShape: Re-thinking Word2Vec* (08/2022-09/2022, see HPShape on github).
  - Changed the architecture of Word2Vec neural embeddings. Was planning on doing persistent homology on the embeddings of Harry Potter, but overtrained to <30% accuracy.

Work Experience

- Software Development Internship, Neur.on (12/2023-05/2024)
  - Unit and Endpoint Testing: multiplying test converage by four.
  - Backend and frontend development of a statistics dashboard with 8 metrics.
- Founder and secretary, EPFL's philosophy society (08/2021-80/2022).
  - Organised conferences and workshops, welcoming 40+ people.

Distinctions (talks, publications, grants, fellowships...)

- Upcoming poster at the NeurIPS 2024 SafeGenAI Workshop.
- Talk at TEDxEcublens x EPFL Open Days on Transfer Learning in the AI revolution.
- Yale School of Medicine LiGHT lab for medical AI research visit (2024):
  - 12'800$ Total fellowship from LiGHT.
  - 13'400$ Total fellowship from 3 Swiss foundations combined (Mil and Braginsky Stiftungs, and AKL).

Community Service

- Meals officer, the Jewish Society of Oxford (03/2023).
  - Organised Shabbat and weekday meals for 8 weeks. Attended by 100+.
  - Organised a collaboration between JSOC and the Gatehouse, a local soup kitchen.
- Volunteer, *Entraide Le Relais* (06/2020-07/2020).
  - Furnished a 45 room halfway house.
- Volunteer, *Oxford Gatehouse* (12/2022-06/2023).
  - Serving and making food for Oxford's economically precarious.
- Volunteer, *Lausanne Soup Kitchen* (01/2021-09/2022).
- Helpline volunteer, *Abrapa* (03/2020-04/2020)
  - Helpline caller to help take care of elderly people during the covid crisis.

Teaching Experience

- Graduate Teaching Assistant in Applied Category Theory (11/2023-12/2023).
  - Wrote new test cases for 11 coding exercises in ETH's Applied Category course.
  - CI/CD Github actions integration of grading.
- Undergraduate Teaching Assistant in physics, EPFL (09/2021-12/2021).
  - Mentored 50+ first-year students in Sylvain Bréchet's Physics-101, delivering weekly interactive classes on Newtonian mechanics.
- Founder, Students for Students (08/2021-09/2021).
  - Co-writing and teaching of the physics lesson in 2021 (first edition).
  - Managed and led a team of 73 people (details at s4s.fun).
  - First edition: 140+ students.
  - Second edition: 500+ students. Co-wrote the physics lesson again, and taught in exercise sessions of 30 people.
  - Third edition: 500+ students. Gave the opening talk in front of 600 people.

Skills: Native in **English** and **French**. Intermediate (B2) in **Spanish**. Basic level (A2) of **Hebrew**.
Projects/courses in: Python, Java, Scala, VHDL, MIPS and NIOS ASM, LaTex, Git, and C/C++, FPGA.
Experience with Haskell, ML languages, Mercurial, ARM ASM.