# Anya Sims

⚲ University of Oxford     ✉ anya.sims@stats.ox.ac.uk     🔗 anyasims.github.io     ⭘ anyasims

## Education

**University of Oxford**                                                              Sept 2022 – 2026
PhD in Machine Learning and Modern Statistics
Supervisors:     Yee Whye Teh (OxCSML Group, and Research Director at Google DeepMind)
                 Jakob N. Foerster (FLAIR Lab Lead, and Meta AI)

**University of Cambridge**                                                          Sept 2018 – 2022
*MEng in Information and Computer Engineering*
BEng          First Class with Distinction (ranked 5/288)
              Department prize for best 3rd year project
              Top-ranked final exam performance in Information Engineering Instrumentation and Control
MEng          First Class with Distinction (ranked 8/261)
              Received Distinction for dissertation – Supervised by Phil Woodland
              Several Engineering Department and Jesus College Cambridge awards/scholarships each year

## Research Experience

*Current main project*

**Adversarial, Open-Ended RL Training for LLMs**
  Adversarial RL for LLMs on dynamically generated, open-ended, yet verifiable code tasks.
  *As part of FLAIR, Oxford.*

*First Author Papers*

**Fill-In-The-Gaps Reinforcement Learning for Mid-Training on Unstructured Text**          Mar 2026
  Eltayeb Ahmed*, **Anya Sims***, Thomas Foster, Tim Rocktäschel, Jakob N. Foerster
  *Under review for RLC 2026.*

**StochasTok: Improving Fine-Grained Subword Understanding in LLMs**          [ArXiv] June 2025
  **Anya Sims**, Thom Foster, Klara Kaleb, Tuan-Duy H. Nguyen, Joseph Lee, Jakob N. Foerster, Yee Whye Teh,
  Cong Lu
  *Accepted at ICLR 2026. Oral at BuildingTrust ICLR 2025 Workshop.*

**Reinforcing General Reasoning without Verifiers**          [ArXiv] May 2025
  Xiangxin Zhou*, Zichen Liu*, **Anya Sims***, Haonan Wang, Tianyu Pang, Chongxuan Li, Liang Wang, Min Lin, Chao
  Du
  *Accepted at ICLR 2026. Spotlight at MTI-LLM NeurIPS 2025 Workshop.*

**GEM: A Gym for Agentic LLMs**          [ArXiv] May 2025
  Zichen Liu*, **Anya Sims***, Keyu Duan*, Changyu Chen*, Simon Yu, Xiangxin Zhou, Haotian Xu, Shaopan
  Xiong, Bo Liu, Chenmien Tan, Chuen Yang Beh, Weixun Wang, Hao Zhu, Weiyan Shi, Diyi Yang, Michael
  Shieh, Yee Whye Teh, Wee Sun Lee, Min Lin
  *Accepted at ICLR 2026.*

**The Edge-of-Reach Problem in Offline Model-Based Reinforcement Learning**          [ArXiv] Feb 2024
  **Anya Sims**, Cong Lu, Jakob N. Foerster, Yee Whye Teh
  *In proceedings at NeurIPS 2024.*

*Core Contributor Papers*

**Evolution Strategies at the Hyperscale**          [ArXiv] Nov 2025
  Bidipta Sarkar*, Mattie Fellows*, Juan Agustin Duque*, Alistair Letcher[†], Antonio León Villares[†], **Anya Sims**[†],
  Dylan Cope[†], Jarek Liesen[†], Lukas Seier[†], Theo Wolf[†], Uljad Berdica[†], Alexander David Goldie, Aaron Courville,
  Karin Sevegnani, Shimon Whiteson, Jakob Nicolaus Foerster
  *Under review at ICML 2026.*

**LILO: Learning to Reason at the Frontier of Learnability** [ArXiv] Feb 2025
  Thomas Foster, **Anya Sims**, Johannes Forkel, Mattie Fellows, Jakob Foerster
  *In proceedings at NeurIPS 2025.*

*Other Papers and Research Projects*

**MARCOS: Deep Thinking by Markov Chain of Continuous Thoughts** [ArXiv] Sep 2025
  Jiayu Liu, Zhenya Huang, **Anya Sims**, Enhong Chen, Yee Whye Teh, Ning Miao
  *Under review at ICML 2026.*

**Fine-tuning LLMs using gradient-designed direct preference surrogate objectives**
  CDT Project supervised by Yee Whye Teh and Jakob N. Foerster, with Cong Lu, and Silvia Sapora.

**Investigating plasticity loss and the effects of non-stationary training in deep neural networks**
  CDT Project supervised by Yee Whye Teh and Chris Gamble (Google DeepMind).

**Sphering transformations for stable equivariant normalization in graph neural networks**
  CDT Project supervised by Yee Whye Teh and with Sheheryar Zaidi.

**Identifiable variational autoencoders for disentangled causal representation learning** Summer 2022
  *Research Placement Project – University of Cambridge*
  Supervised by José Miguel Hernández-Lobato and with Wenlin Chen.

**Efficient Decoding in End-to-End Speech Recognition in Transducer Language Models** 2021-22
  *MEng Dissertation – University of Cambridge*
  Supervised by Phil Woodland, with Tony Zheng.

## Industry Experience

**Associate Member**, *Sea AI Lab* Apr 2025 – Jan 2026
  ○ Working across several projects, including a comprehensive codebase of multi-task, multi-turn language environments for developing and scaling multi-turn RL algorithms for training LLMs with tool capabilities.

**Software Engineering Intern**, *Graphcore* Summer 2021
  ○ Worked within the AI Applications team to implement a codebase demonstrating several image recognition benchmarks on Graphcore's IPU in TensorFlow2. This involved coordinating loading of different stages of the model onto different IPU processing cores to maximize training and inference efficiency.

**Machine Learning Mentorship**, *Featurespace* Summer 2020
  ○ Self-led investigation of different deep learning methods on the Kaggle Abstraction and Reasoning Challenge.

**Software Engineering Intern**, *Softwire* Dec 2019
  ○ Website development – Worked primarily on asynchronous API calls component (JavaScript and React).

**Machine Learning Intern**, *Infosys* Summer 2019
  ○ Reproduced results from several recent papers on aspect-based sentiment analysis (TensorFlow and Keras).

## Other

| | | |
|---|---|---|
| **Teaching:** | **Advanced Topics in Statistical Machine Learning** | 2023 – 2024 |
| | *TA and Tutor, 4th Year Maths and MSc course* | |
| | SVMs, kernel methods, Bayesian machine learning, Gaussian processes, Bayesian optimization, deep learning, latent variable models. | |
| **Languages/Frameworks:** | Python, C++, Bash, PyTorch, JAX, vLLM, verl | |
| **Roles:** | Cambridge University Windsurfing Secretary (2020-2022) | |
| | Volunteer secondary school maths tutor (2018-2019) | |