

Xingjian Bai

St John's College,
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[Github] [Scholar]
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Education

Master of Mathematics and Computer Science, University of Oxford Oct 2023 – Present

Bachelor of Arts, University of Oxford Oct 2020 – July 2023

Mathematics and Computer Science

- First Year: Distinction with **Gibbs Prize** (the best performance in CS)
- Second & Third Year: First Class

Research Experience

Visual Geometry Group (VGG), Oxford Oct 2023 - Present

Student Researcher

Supervisor: Prof. Christian Rupprecht, Luke Melas-Kyriazi

Topics: Develop diffusion models parametrized by fixed-point dynamic systems, which enable dynamic allocation of computational resources across denoising timesteps.

Stanford Vision & Learning Lab (SVL)

Jul 2023 - Sep 2023

Undergraduate Visiting Research Intern

Supervisor: Prof. Jiajun Wu

Topics: Enhance the compositionality of diffusion models with neural-symbolic control; distill the understanding of abstract relations from Large Language Models.

Algorithms and Complexity Theory Group, Oxford

Mar 2023 - Aug 2023

Student Researcher

Supervisor: Prof. Christian Coester

Topics: Innovated sorting algorithms leveraging erroneous predictions from machine learning models; obtained optimal, sub- $O(n \log n)$ comparison complexity with good predictions.

Mathematics Institute, Oxford

Jul 2022 - Apr 2023

Summer Research Intern

Supervisor: Prof. Jan Oblój

Topics: Proposed adversarial attack algorithms grounded in distributional robust optimization (DRO) sensitivity analysis; advanced the understanding of robustness of neural networks.

AI Safety Research Lab, Oxford

Nov 2022 - Mar 2023

Student Researcher

Mentor: Joar Skalse

Topics: Explored reward hacking due to over-optimization in Reinforcement Learning settings; developed a geometric explanation and an early-stopping algorithm to prevent it in training.

Publications

Xingjian Bai, Christian Coester “Sorting with Predictions.” *NeurIPS 2023*. [arXiv]

Xingjian Bai, Guangyi He, Yifan Jiang, Jan Obloj “Wasserstein Distributional Robustness of Neural Networks.” *NeurIPS 2023*. [arXiv]

Xingjian Bai, Luke Melas-Kyriazi “Fixed Point Diffusion Models.” *CVPR under review*. [arXiv]

Jacek Karwowski, Oliver Hayman, Xingjian Bai, Klaus Kiendlhofer, Charlie Griffin, Joar Skalse “Goodhart’s Law in reinforcement learning.” *ICLR 2024*. [arXiv] [Post]

Xingjian Bai, Ruining Ma, Yulong Lou “Containing Invasive Species via Cellular Automaton and AI.” *Journal of Undergraduate Mathematics and Its Applications (UMAP)*, 2021.

Hannah Rose Kirk, Yennie Jun, Paulius Rauba, Gal Wachtel, Ruining Li, **Xingjian Bai**, Noah Broestl, Martin Doff-Sotta, Aleksandar Shtedritski, Yuki M. Asano “Memes in the Wild: Assessing the Generalizability of the Hateful Memes Challenge Dataset.” *Proceedings of the 5th Workshop on Online Abuse and Harms (WOAH)*, 2021. [arXiv]

Awards & Honors

NeurIPS Scholar Award <i>Conference on Neural Information Processing Systems (NeurIPS)</i>	2023
Regional Gold Medalist, going to ICPC World Final <i>International Collegiate Programming Contest (ICPC)</i>	2023
Outstanding Winner & American Maths Society Best Paper (1 / 10053) <i>37th Mathematical Contest in Modeling</i>	2021
"Hack the Hackers' Hack" award, best out of 66 teams <i>Oxford Hackathon</i>	2020
Full Score <i>USA Computing Olympiad Open</i>	2019
First place among the national team <i>Canadian Computing Olympiad</i>	2018
Silver Medalist <i>Chinese National Olympiad in Informatics</i>	2018
First place in Beijing, 395 / 400 points <i>Chinese National Olympiad in Informatics Provincial - middle school division</i>	2016

Other Experience

Class & Practical Demonstrator, Computer Vision <i>Computer Science department, Oxford</i> Help to design sheets and practical sessions; teach classes to 15 students every week.	Present
Oxford Student Ambassador <i>Mathematics Institute & Computer Science department</i> Participate in outreach events and teach algorithms to students from underdeveloped region.	Present
Workshop Reviewer <i>NeurIPS Workshop on Self-Supervised Learning - Theory and Practice</i>	2023
Practicals Demonstrator, Compilers <i>Computer Science department, Oxford</i>	2022
Workshop Reviewer <i>NAACL Workshop on Online Abuse and Harms</i>	2022

Skills & Interests

Programming Languages: Proficient in C++, Python; experienced in Julia, Java, Scala, Haskell.
Hobbies: Marathon (4h 7min), tennis, table tennis, the game of Go (3 Dan).