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*
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 - Present
Summer 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." *Conference on Neural Information Processing Systems (**NeurIPS**)*, 2023. [arXiv]

Xingjian Bai, Guangyi He, Yifan Jiang, Jan Obloj "Wasserstein Distributional Robustness of Neural Networks." *Conference on Neural Information Processing Systems (**NeurIPS**)*, 2023. [arXiv]

Xingjian Bai, Luke Melas-Kyriazi "Fixed Point Diffusion Models." *Under review.*

Jacek Karwowski, Oliver Hayman, **Xingjian Bai**, Klaus Kiendlhofer, Charlie Griffin, Joar Skalse "Goodhart's Law in reinforcement learning." *Under review.* [arXiv] [Post on LessWrong Forum]

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*, 2021. [arXiv]

Awards & Honors

NeurIPS Scholar Award 2023
Conference on Neural Information Processing Systems (NeurIPS)

Regional Gold Medalist, going to ICPC World Final 2023
International Collegiate Programming Contest (ICPC)

Outstanding Winner & American Maths Society Best Paper (1 / 10053) 2021
37th Mathematical Contest in Modeling

"***Hack the Hackers' Hack***" **award, best out of 66 teams** 2020
Oxford Hackathon

Full Score 2019
USA Computing Olympiad Open

First place among the national team 2018
Canadian Computing Olympiad

Silver Medalist 2018
Chinese National Olympiad in Informatics

First place in Beijing, 395 / 400 points 2016
Chinese National Olympiad in Informatics Provincial - middle school division

Other Experience

Oxford Student Ambassador Present
Mathematics Institute & Computer Science department
Participate in outreach events; teach algorithms to students from underdeveloped areas.

Practicals Demonstrator, Machine Learning, Oxford Present
Computer Science department

Reviewer 2023
Workshop on Self-Supervised Learning - Theory and Practice, NeurIPS

Teaching Assistant, Compilers, Oxford 2022
Computer Science department

Reviewer 2022
Workshop on Online Abuse and Harms, NAACL

Skills & Interests

Programming Languages: Proficient in C++, Python; experienced in Julia, Java, Scala, Haskell.
Hobbies: Marathon PB: 4 h 7min; 10 KM PB: 42 min; Tennis; the game of Go (3-Dan).