Xingjian Bai

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[Github] [Scholar] [Website]

Education

Ph.D. in Computer Science, Massachusetts Institute of Technology Sep 2024 – Present

- Potential Advisor: Kaiming He

Master of Mathematics and Computer Science, University of Oxford Oct 2023 – July 2024

Bachelor of Arts, University of Oxford Oct 2020 – July 2023
Mathematics and Computer Science

- Graduated with Distinction and the **Gibbs Prize,** for the best performance in CS exams.
- Final-year project titled "Efficient and Adaptive Image Generation with Fixed Point Diffusion Models" won the **Departmental Prize for the best project.**

Research Experience

Visual Geometry Group (VGG), Oxford Oct 2023 - Apr 2024
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 Obłój*
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, Luke Melas-Kyriazi "Fixed Point Diffusion Models." ***CVPR 2024.*** [arXiv]

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]

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	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

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

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).