Xingjian Bai

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Education

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

- Advisor: Professor Kaiming He.
- Recipant of the Robert M. (1941) and Jacqueline M. Fano Fellowship.
- Research topics: generative models, AI for science.
- Planned graduation year: 2028/2029.

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 thesis won the **Departmental Prize** for the best project.

Publications

Xingjian Bai, Christian Coester, Romain Cosson "Unweighted Layered Graph Traversal: Passing a Crown via Entropy Maximization." ***SODA*** *(to appear) 2025.*

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.

Research Experience

He Vision Group, CSAIL, MIT Sep 2024 - Present
PhD student *Supervisor: Prof. Kaiming He*
Topics: Exploring new types of generative models in vision, drawing inspiration from Physics.

Visual Geometry Group (VGG), Oxford Oct 2023 - Apr 2024
Student Researcher *Supervisor: Prof. Christian Rupprecht, Luke Melas-Kyriazi*
Topics: Augmented diffusion models parametrized by fixed-point dynamic systems; enable flexible allocation of computational resources across the denoising process.

Stanford Vision & Learning Lab (SVL) Jul 2023 - Sep 2023
Visiting Research Intern *Supervisor: Prof. Jiajun Wu*
Topics: Enhance the compositionality of diffusion models with neural-symbolic control.

Algorithms and Complexity Theory Group, Oxford Mar 2023 - Aug 2023
Student Researcher *Supervisor: Prof. Christian Coester*
Topics: Design sorting algorithms that can leverage erroneous predictions from machine learning models; obtain sub-$O(n \log n)$ sorting complexity under mild assumptions.

Mathematics Institute, Oxford Jul 2022 - Apr 2023
Summer Research Intern *Supervisor: Prof. Jan Obłój*
Topics: Design adversarial attack algorithms grounded in distributional robust optimization (DRO) sensitivity analysis; offer new tools to analyze the robustness of neural networks.

AI Safety Research Lab, Oxford Nov 2022 - Mar 2023
Student Researcher *Mentor: Joar Skalse*
Topics: Explore a specific type of reward hacking caused by over-optimization in RL settings; develop a geometric explanation and an early-stopping algorithm to prevent it in training.

Awards & Honors

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

Regional Gold Medalist, World Finalist 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

Gold Medalist, first place 2018
Canadian Computing Olympiad (CCO), national team selection camp

Silver Medalist 2018
Chinese National Olympiad in Informatics (NOI)

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

Other Experience

Conferences and workshops reviewer Present
NeurIPS, ICLR, AISTAT, NAACL workshop

Class & Practical Demonstrator, Computer Vision 2024
Computer Science department, Oxford

Oxford Student Ambassador 2023
Mathematics Institute & Computer Science department
Participate in outreach events and teach algorithms to students from underdeveloped regions.

Practicals Demonstrator, Compilers 2022
Computer Science department, Oxford

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).