# Xingjian Bai

St John's College,
Oxfords, UK, OX1 3JP

[Github] [Scholar]
xingjianbai0914@gmail.com

## *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 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).