

# Xingjian Bai

St John's college, St Giles Street  
Oxfordshire, UK, OX1 3JP

[Github] [Scholar]  
xingjianbai0914@gmail.com

## Education

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### University of Oxford

Oct 2020 – Present

*Mathematics and Computer Science*

- First Year: Distinction with Gibbs Prize (best performance in CS)
- Second & Third Year: First Class
- Selected courses: Combinatorial Optimisation; Theory of Deep Learning; Stochastic Analysis.

## Publications

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Karwowski, J., Hayman, O., Bai, X., Kiendlhofer, K., Griffin, C., Skalse, J. “Goodhart’s Law in reinforcement learning.” *Under review*, [arxiv:2310.09144](https://arxiv.org/abs/2310.09144).

Bai, X., Coester, C. “Sorting with Predictions.” *Conference on Neural Information Processing Systems (NeurIPS)*, 2023.

Bai, X., He, G., Jiang, Y., Obloj, J. “Wasserstein Distributional Robustness of Neural Networks.” *Conference on Neural Information Processing Systems (NeurIPS)*, 2023.

Bai, X., Ma, R., Lou, Y. “Containing Invasive Species via Cellular Automaton and AI.” *Journal of Undergraduate Mathematics and Its Applications (UMAP)*, **AMS Best Paper award**, 2021.

Kirk, H. R., Jun, Y., Rauba, P., Wachtel, G., Li, R., Bai, X., Broestl, N., Doff-Sotta, M., Shtedritski, A., Asano, Y. M. “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.

## Research Experience

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### Stanford Vision & Learning Lab (SVL)

Jul 2023 - Present

*Summer Research Intern*

*Supervisor: Prof. Jiajun Wu*

Topics: Enhance the compositionality of diffusion models with a neural-symbolic approach. Distill the understand of abstract relations from Large Language Models to enhance generation.

### Visual Geometry Group (VGG), Oxford

Feb 2023 - Present

*Student Researcher*

*Supervisor: Prof. Christian Ruppert*

Topics: Develop a novel denoising framework for diffusion models using fixed-point differential equations, enabling dynamic allocation of computational resources across timesteps.

### Theoretical CS Group, Oxford

Mar 2023 - Aug 2023

*Student Researcher*

*Supervisor: Prof. Christian Coester*

Topics: Innovated sorting algorithms utilizing predictions possibly from machine learning models; obtained optimal sub- $O(n \log n)$  comparison complexity with sufficiently accurate predictors.

### 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.

### Oxford 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.

## Awards & Honors

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<b>NeurIPS Scholar Award</b> <i>Conference on Neural Information Processing Systems (NeurIPS)</i>	2023
<b>Regional Gold Medalist, going to ICPC World Final</b> <i>International Collegiate Programming Contest (ICPC)</i>	2023
<b>Outstanding Winner (top out of 10053 papers)</b> <i>37th Mathematical Contest in Modeling</i>	2021
<b>"Hack the Hackers' Hack" award, best out of 66 teams</b> <i>Oxford Hackathon</i>	2020
<b>Full Score</b> <i>USA Computing Olympiad Open</i>	2019
<b>Global Bronze Medalist</b> <i>the S.-T. Yau High School Science Award</i>	2019
<b>First place among the national team</b> <i>Canadian Computing Olympiad</i>	2018
<b>Silver Medalist</b> <i>Chinese National Olympiad in Informatics</i>	2018
<b>First place in Beijing, 395 / 400 points</b> <i>Chinese National Olympiad in Informatics Provincial - middle school division</i>	2016

## Other Experience

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<b>Oxford Student Ambassador</b> <i>Mathematics Institute &amp; Computer Science department</i> Participate in outreach events; teach algorithms to students from underdeveloped areas.	Present
<b>Practicals Demonstrator, Machine Learning, Oxford</b> <i>Computer Science department</i>	Present
<b>Teaching Assistant, Compilers, Oxford</b> <i>Computer Science department</i>	2022
<b>Workshop Reviewer</b> <i>NAACL, Workshop on Online Abuse and Harms (WOAH)</i>	2022
<b>Machine Learning for Alignment Bootcamp (MLAB)</b> <i>Redwood Research, Berkeley</i> Intense 3-week program focusing on ML interpretability and alignment.	2022
<b>Summer Research Intern</b> <i>Intelligent Computing team, Megvii Research Institute</i> Participated in FaceBook Image Retrieval challenge; built vision transformer pipelines.	2021
<b>Project Lead</b> <i>Oxford Strategy Group – Digital</i> Evaluated the robustness of the AI systems in JOOX, a music platform.	2021

## Skills & Interests

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**Programming Languages:** Proficient in C++, Python; experienced in Julia, Java, Scala, Haskell.  
**Interested Games:** Codeforces; the game of Go (3-Dan).  
**Hobbies:** tennis, jogging, swimming, table tennis, ultimate frisbee.