

Xuran Cai

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Education

Oxford-Max-Plank joint Program , Doctor of Philosophy	Sep 2025 - Present German & UK
<ul style="list-style-type: none">• Joint Program by University of Oxford and Max Plank Institute• Major: Computer Science• Supervisor: Prof. Amir Goharshady(Oxford) and Prof. Rupak Majumdar(MPI)• Funding: Salary from MPI and Department Scholarship from Oxford	
Hong Kong University of Science and Technology , Master of Philosophy	Sept 2023 – June 2025 Hong Kong SAR
<ul style="list-style-type: none">• Major: Computer Science and Engineering• Supervisor: Prof. Amir Goharshady and Prof. Jiasi Shen• Funding: Postgraduate Scholarship	
University of Wisconsin-Madison , Bachelor of Science	Sept 2019 – May 2023 USA
<ul style="list-style-type: none">• GPA: 3.86/4.0• Major: Double Major in Computer Science and Mathematics• Graduate with Distinction and Major Distinction in CS	

Publications

Invariant Generation for Floating-Point Programs via Constraint Solving	October 2025
X. Cai, L. Chen, H. Fu, Submit to Object-Oriented Programming, Systems, Languages, and Applications, OOPSLA'26	
Efficient Algorithms for Partial Constraint Satisfaction Problems over Control-flow Graphs	December 2025
X. Cai, A.K. Goharshady, International Symposium on Software Engineering: Theories, Tools, and Applications, SETTA'25	
Enhancing Compiler Optimization Efficiency through Grammatical Decompositions of Control-Flow Graphs	July 2025
X. Cai, Mphil Final Thesis	
Series-Parallel-Loop Decompositions of Control-flow Graphs	June 2025
X. Cai, A.K. Goharshady, S. Hitarth, C.K. Lam Submit to Journal of Systems Architecture, JSA'25	
Faster Chaitin-like Register Allocation via Grammatical Decompositions of Control-Flow Graphs	March 2025
X. Cai, A.K. Goharshady, S. Hitarth, C.K. Lam International Conference on Architectural Support for Programming Languages and Operating Systems, ASPLOS'25	
Faster Lifetime-optimal Speculative Partial Redundancy Elimination for Goto-free Programs	November 2024
X. Cai, A.K. Goharshady International Symposium on Software Engineering: Theories, Tools, and Applications, SETTA'24	

Teaching Assistant Experiences

Functional Programming (practical) <ul style="list-style-type: none">• Institute: Oxford• Instructor: prof. Andrzej Murawski	MT Semester 2025-26
Honors Discrete Mathematical Tools for Computer Science <ul style="list-style-type: none">• Institute: HKUST• Instructor: prof. Amir Goharshady	Fall Semester 2024-25
Discrete Mathematical Tools for Computer Science <ul style="list-style-type: none">• Institute: HKUST• Instructor: prof. Sunil Arya and prof. Jiasi Shen	Spring Semester 2023-24
Introduction to Computer Networks <ul style="list-style-type: none">• Institute: UW-Madison• Instructor: prof. Suman Banerjee	Spring Semester 2021-22

Internship

Summer Intern Software Developer , Intel – Shanghai, China <ul style="list-style-type: none">• Worked on designing a service mesh structure with SGX hardware• Designed and implemented the stereotype of the system	June 2021 - Aug 2021
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Conference/Summer Schools

Setta'24 , Hong Kong SAR	Nov 26 - Nov 28, 2024
FM'24 , Milan, Italy	Sep 9 - Sep 13, 2024
Summer School on Discrete Mathematics , Prague, Czech Republic	July 1- July 5, 2024