

# QIYUAN XU

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## EDUCATION

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<b>Zhejiang U. Chu Kochen Honors College</b>	B.E. in Computer Science	<i>Sep.2013 - Jun.2017</i>
<b>Zhejiang U.</b>	Master in Cyber Security	<i>Sep.2017 - Jun.2020</i>
<b>Nanyang Technological U.</b>	PhD candidate, supervised by <b>Conrad Watt</b>	<i>Aug.2022 - Now</i>

### Awards

Second-Class Scholarship for Elite Students in Basic Science, Zhejiang U.  
Scholarship for Excellence in Research and Innovation, Zhejiang U.  
Academic Scholarship, Zhejiang U.

## PUBLICATIONS

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- Neural Theorem Proving for Verification Conditions: A Real-World Benchmark.  
**Qiyuan Xu**, Xiaokun Luan, Renxi Wang, Joshua Ong, Peixin Wang, Haonan Li, Wenda Li, Conrad Watt. Accepted by **ICLR'26**, CORE ranking **A\***.
- A Minimalist Proof Language for Neural Theorem Proving over Isabelle/HOL.  
**Qiyuan Xu**, Renxi Wang, Peixin Wang, Haonan Li, Conrad Watt.  
Accepted by **OOPSLA'26**, CORE ranking **A**, CCF ranking **A**
- Generically Automating Separation Logic by Functors, Homomorphisms and Modules.  
**Qiyuan Xu**, David Sanan, Zhe Hou, Xiaokun Luan, Conrad Watt, Yang Liu.  
Published in **POPL'25**, CORE ranking **A\***, CCF ranking **A**
- Why the Proof Fails in Different Versions of Theorem Provers: An Empirical Study of Compatibility Issues in Isabelle. Xiaokun Luan, David Sanan, Hou Zhe, **Qiyuan Xu**, Chengwei Liu, Yufan Cai, Yang Liu and Meng Sun. Published in **FSE'25**, CORE ranking **A\***, CCF ranking **A**

## REMARKABLE EVENT

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As a key member in the team, established a new **world record** on 3KW Linpack testing, during the ASC Student Supercomputer Challenge 2016 <sup>1</sup>.

## COMPETITION HONORS

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ASC15 (ASC Student Supercomputer Challenge 2015) First Prize	
ASC16 First Class Award	ASC16 Highest LINPACK

## PATENTS

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- coinventor, CN109753288A, *Intelligent contract compiling method suitable for formal verification*
- coinventor, CN109918375A, *Large text storage, indexing and retrieval method based on block chain and distributed storage*
- coinventor, CN111311255A, *Intelligent contract formal verification and error correction method based on oracle machine*

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<sup>1</sup>This is reported by an official media <https://www.zju.edu.cn/english/2016/0505/c19573a811355/page.htm>

## ENGINEERING & RESEARCH EXPERIENCE

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**Research Associate & PhD student in Nanyang Technology University** 2022 - now.  
Supervisor: Conrad Watt, assistant professor, NTU, [conrad.watt@ntu.edu.sg](mailto:conrad.watt@ntu.edu.sg)

**Project:** *Phi-System*, a certified programming language & program verification framework built on top of Isabelle/HOL. It is based on a first-order fictional separation logic, equipped with an algebra-based generic automation mechanism and a symbolic execution engine for assisting certified programming.

**Projects:** Neural Theorem Proving for program verification.

**Senior engineer in Hangzhou Yunphant Network Technology Co.,Ltd** 2020 - 2022.  
Director: Dr. Butian Huang, founder & CEO, Yunphant Co.,Ltd, [hr@yunphant.com](mailto:hr@yunphant.com)

**Project 1:** *Prototype Phi-System*, a verification system aiming for generating certified smart contracts

**Project 2:** Blockchain-based Manufacturing Service Supply and Demand Matching Platform || Group member.  
*Key R&D Program of Zhejiang Province, No. 2021C01116*

Advisor: Dr. Zhenguang Liu, Zhejiang U.

- Audited key smart contracts, and found several deficiencies including a critical re-entry vulnerability resulting in stealing of total assets potentially.

**Graduate student in the lab of Very Large Information System, Zhejiang U.** 2017-2020  
Advisor: Dr. Liang Cai, Vice Dean of the Software College, Zhejiang U., [leoncai@zju.edu.cn](mailto:leoncai@zju.edu.cn).

**Project:** GPU based implementation of SM2 cryptographic algorithm.

- Implemented finite group operations of elliptical curves on the CUDA device, with hotpot written in manually optimized PTX assemble code.
- The work has been applied in the industrial product of Hyperchain (a blockchain platform raised in this laboratory), and its productive distribution for the Shanghai Stock Exchange.

**Key member in Supercomputing Team of Zhejiang University** 2014 - 2017.  
Advisor: Associate Prof. Jianhai Chen, Zhejiang U., [chenjh919@zju.edu.cn](mailto:chenjh919@zju.edu.cn).

**Project 1:** Parallel optimization – MASNUM ( marine science and numerical modeling) || Project Leader

- Implemented the first GPU-accelerated version of the MASNUM software, during the ASC16. The optimized software reached the theoretical performance peak of the GPU device, Nvidia Tesla K40.
- The final benchmark of the optimization in the ASC16 competition exceeded that of the opponents by more than 10 times.

**Project 2:** SKA (Square Kilometer Array telescope) data processing application Gridding || Project Leader

- Implemented a CPU-based cluster-scale parallel version of the hotpot of the SKA-Gridding, which is a 2-dim convolution, based on the MPI and OpenMP, specified for Intel Many Integrated Core.

## CONTRIBUTION TO SOFTWARE COMMUNITIES

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- Isabelle REPL, a basic infrastructure for AI-based theorem proving, allowing machine learning systems to connect the Isabelle theorem prover. <https://github.com/xqyww123/Isa-REPL>.
- Verification for Uniswap v3, a partial verification for the core functions of the famous smart contract Uniswap v3. <https://github.com/xqyww123/Uniswap-v>.
- I am also a contributor of the Crystal programming language (<https://github.com/crystal-lang/crystal>)