

QIYUAN XU

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EDUCATION

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

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.

PUBLICATION

- A Minimalist Proof Language for Neural Theorem Proving over Isabelle/HOL.
Qiyuan Xu, Renxi Wang, Peixin Wang, Haonan Li, Conrad Watt.
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.
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. Accepted by FSE'25, CORE ranking **A***, CCF ranking **A**

REMARKABLE EVENT

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

COMPETITION HONORS

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

PATENTS

- 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, CN111562906A, *Smart contract development and verification method based on Noesia logic*
- coinventor, CN111311255A, *Intelligent contract formal verification and error correction method based on oracle machine*

ENGINEERING & RESEARCH EXPERIENCE

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

Project: *Phi-System*, a certified programming language & program verification framework built on top

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

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.

Senior engineer in Hangzhou Yunphant Network Technology Co.,Ltd 2020 - 2022.

Director: Dr. Butian Huang, founder & CEO, Yunphant Co.,Ltd, 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.

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.

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

- 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>)