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**EDUCATION**

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- Ph.D., Computer Science** *2018 - 2023*  
University of Southern California (USC)
- B.E., Computer Science** *2013 - 2017*  
University of Science and Technology of China (USTC)
- Relevant Coursework:** Advanced Algorithm, Advanced Program Analysis and Verification, Computer-Aided Verification, Formal Method for Robotics, Quantitative Information Flow and Side Channels, Compilers, Data Structure, Operating Systems, Computer Architecture, Computer Network, Computer Organization, Parallel Computing, Introduction to Artificial Intelligence, etc.

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**WORKING EXPERIENCE**

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- [Google Intern] Exploring a New Recognition Feature for Nest Cameras** *May-Aug 2022*
- Explored various machine learning (ML) algorithms
  - Built a prototype to demonstrate the feasibility
  - Contributed a new algorithm to production code
  - Significantly optimized code speed with a new data structure

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**RESEARCH EXPERIENCE**

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- Verifying/Falsifying the Robustness of KNNs against Data-Poisoning Attacks** *2019 - 2021*
- Proposed a method for soundly over-approximating the KNN behaviors during both parameter tuning and prediction phases under data-poisoning attacks
  - Used SAT-solver-based method to detect data-poisoning vulnerability
  - Developed optimizations to prune the search space without losing accuracy
  - Achieved high accuracy and high efficiency on both small and large datasets
- Applying Static Analysis for Constraint-Based Precomputation using LLVM** *2018 - 2019*
- Developed sound static analysis techniques on LLVM bitcode to identify precomputation opportunities
  - Used an SMT-solver-based method to optimize the precomputation policy
  - Applied a semantic-preserving transformation to generate optimized LLVM bitcode
  - Added a number of enhancements to LLVM compiler to automate the above procedures
- Privacy-Preserving Image Trading through Crowdsourcing** *2016 - 2017*
- Led a five-member team
  - Designed a privacy-aware crowdsourcing-based image trading system
  - Designed an image selection algorithm, which first uses a pre-trained CNN model to extract embedding features, then uses an autoencoder to reduce feature dimensions, and uses clustering to select images
  - Optimized computation and communication overhead in both servers and clients sides
- Optimizing HPC Applications** *2016*
- Optimized two classical scientific softwares (Lammps and Splotch) on a ten-node cluster with 3000W power constraint. Ranked 4th in the Final of 2016 International Student Cluster Competition (ISC)
  - Implemented and optimized a two-path shortest algorithm on a CPU/GPU heterogeneous platform

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**SELECTED COURSE PROJECT**

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- Schedule Multi-Robot Systems using Sound Deadlock Detection** *Jan-May 2021*
- Personal project of 'Formal Methods for Robotics', advised by Prof. Jyotirmoy V. Deshmukh
  - Designed a scheduling algorithm with reduced computation cost and increased robot utilization
  - Applied the latest sound deadlock prediction method for coordination efficiency and effectiveness
- Game: Cooking Journey** *Aug-Dec 2019*
- Wrote a game, Cooking Journey, combining both cooking and racing games using Unity
  - Team Project of 'Advanced Mobile Devices and Game'
  - Collaborated with other three students Using Bitbucket
  - Invited by Prof. Mike Zyda to attend USC Games Showcase

## Implemented a MIPS-Based CPU on FPGA

2015

- Personal project of ‘Computer Organization’
- Implemented a verified five-stage pipeline MIPS-based CPU on the FPGA using Verilog HDL

## TEACHING EXPERIENCE

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### Teaching Assistant of CSCI310: Software Engineering

*Spring 2022, Fall 2022*

- Taught students to use Java, JUnit, Cucumber, Ant, GitHub, Android Studio, Firestore database
- Mentored students to build Android games and a booking application

## PUBLICATION

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1. Proving Robustness of KNNs Against Adversarial Data Poisoning

**Yannan Li**, Jingbo Wang, Chao Wang

22nd International Conference on Formal Methods in Computer-Aided Design (**FMCAD 2022**)

2. Falsifying the Robustness of KNNs under Data-Poisoning Attacks

**Yannan Li**, Jingbo Wang, Chao Wang (Under Submission)

3. Constraint-Based Analysis for Energy Optimization via Precomputation

**Yannan Li**, Chao Wang (Under Submission)

4. Synthesizing Fair Decision Tree Learning via Iterative Constraint Solving

Jingbo Wang, **Yannan Li**, Chao Wang

34th International Conference on Computer Aided Verification (**CAV 2022**)

5. CrowdBuy: Privacy-friendly Image Dataset Purchasing via Crowdsourcing

Lan Zhang, **Yannan Li**, Xiang Xiao, Xiang-Yang Li, Junjun Wang, Anxin Zhou, Qiang Li

37th IEEE International Conference on Computer Communications (**INFOCOM 2018**)

## TECHNICAL SKILLS

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### Programming Languages

C, C++, Python, TensorFlow, Java, Shell, Verilog HDL, HTML

### Compilers

LLVM, Java Soot (Static Analysis, Program Transformation)

### Verification/Synthesis

Z3 (SAT/SMT Solver), SyGus (Program Synthesis)

### Miscellaneous

Android Studio, JUnit, Cucumber, Unity (Game Engine)