

# Hao Cui

Email: cuihao.1eo@gmail.com  
 cvhc@mail.ustc.edu.cn  
 h2cui@eng.ucsd.edu  
 Telephone: +1 619-535-8566  
 Website: <https://i-yu.me/>

## Education

### University of Science and Technology of China 2017–Now

*M.Eng.* in Electronics and Communication Engineering (GPA: 3.18/4.30)

**Highlight:** *Basics of Video Technology (A<sup>+</sup>), Computer Graphics (A<sup>-</sup>), Contemporary Cryptography: Principles & Practice (A<sup>-</sup>), Network Security (A<sup>-</sup>)*

### University of Science and Technology of China 2013–2017

*B.Eng.* in Computer Science and Technology (GPA: 3.71/4.30)

*B.Sci.* in Geophysics (GPA: 3.47/4.30)

**Highlight:** *Computational Methods B (A<sup>-</sup>), Computer Programming A (A<sup>+</sup>), Electronic Circuits (A<sup>+</sup>), C++ (A<sup>-</sup>), Computer Networks (A), Concepts of Operating System (A<sup>+</sup>), Discrete Mathematics I (A<sup>+</sup>), Principles of Artificial Intelligence (A), Principles of Compiler (A), Quantum Mechanics C (A<sup>-</sup>)*

## Research

### Department of Electrical and Computer Engineering, UC San Diego

**Research Intern** / Supervisor: Prof. Xinyu Zhang

**Project** – Deep-learning-based passive localization using WiFi CSI 2019–Now

- Realized automatic data generation of massive simulated CSI data for model training.
- Adapted Generative Query Network to WiFi CSI for environmental adaptation.

### CAS Key Laboratory of Electromagnetic Space Information, USTC

**Research Assistant** / Supervisor: Prof. Weiming Zhang

**Thesis Project** – Robust image watermarking against screen-shooting 2018–Now

- Ported screen-shooting resilient watermarking MATLAB code to C++ and Java (Android).
- Converted UnseenCode (see below) into a novel anti-screen-shooting watermarking method.
- Designed and trained specialized CNN models for watermark extraction.

**Project** – Multi-stage defense against adversarial examples for images 2018–2019

- Proposed a hybrid defense scheme to mitigate adversarial attack on CNN image classifiers, which combines four strategies: training-time data augmentation, model ensemble, multi-scale random filtering and abnormal distribution detection.
- 1st place (5,000 USD) in the defense track of the IJCAI-19 Alibaba Adversarial AI Challenge.

**Project** – Covert screen-camera communication system 2017–2019

- Proposed and implemented UnseenCode, an invisible on-screen barcode scheme that uses invisible high-frequency color fluctuation on the screen to represent data.
- Presented the work in both oral and demonstration sessions in INFOCOM 2019.

### School of Computer Science and Technology, USTC

**Thesis Project** – Exploiting mobile GPUs for efficient image processing 2016–2017

Supervisor: Prof. Yun Xu

- Designed and implemented a CPU/GPU hybrid image inpainting algorithm that takes advantages of shared global memory on mobile SoCs.

## School of Earth and Space Sciences, USTC

**Thesis Project** – Optimization of GMTSAR InSAR processing system 2016–2017  
Supervisor: Prof. Xianjie Zha

- Implemented a multi-threading version and a GPU version of InSAR image correlation module.
- Parallel versions significantly speed up InSAR processing without accuracy loss.

**Course project** – Image processing in the experiment of Zeeman effect 2015  
Supervisor: Dr. Yugang Guo

- Designed and implemented an Android application to automate the measurement of the radii of circular spectral lines obtained from interferometer photos.
- Special prize in the 11th Competition of Physical Research Experiment of USTC.

## Publications

- Zhang J., Chen D., Liao J., Fang H., Zhang W., Zhou W., **Cui H.**, & Yu N. (2020, accepted) Model Watermarking for Image Processing Networks. *AAAI Conference on Artificial Intelligence*
- Fang H., Zhang W., Ma Z., Zhou H., Sun S., **Cui H.**, & Yu N. (2019) A Camera Shooting Resilient Watermarking Scheme for Underpainting Documents. *IEEE Transactions on Circuits and Systems for Video Technology*
- **Cui H.**, Bian H., Zhang W., & Yu N. (2019) UnseenCode: Invisible On-screen Barcode with Image-based Extraction. *IEEE International Conference on Computer Communications*
- Fang H., Zhang W., Zhou H., **Cui H.**, & Yu N. (2019) Screen-Shooting Resilient Watermarking. *IEEE Transactions on Information Forensics and Security*
- **Cui H.**, & Zha X. (2018) Parallel Image Registration Implementations for GMTSAR Package. *Seismological Research Letters*

## Programming Works

Some personal coding works. All of them are open-sourced on GitHub.

- `AndroidEquationSolver`, `StacTool` (Java/Kotlin): Android math apps for chemistry students.
- `1ede-mr-mips` (C): A port of the Linux kernel to Mikrotik metarouter (MIPS).
- `rb-backup` (Bash): Incremental file backup with `rsync` and `btrfs/XFS` copy-on-write.
- `simple-pxe` (Bash): The netbooting service currently used in USTC.

## Skills

**Language:** I am a native Chinese.

- English: GRE General (AW4.0/V160/Q169), TOEFL 102 (R30/L28/S21/W23)
- Japanese: Japanese-Language Proficiency Test N2

**Productivity:** I have experience in a wide range of open-source tools and techniques.

- Programming: C/C++, Python, Java, UNIX shell...; Linux & Android applications.
- Development: parallel computing, image processing, machine learning...

## Extra Activities

*Server Administrator* of the CAS Key Laboratory of Electromagnetic Space Information 2017–Now

- In charge of a computing cluster consisting of 14 Linux servers with 74 GPUs.
- Help to maintain the network infrastructure (routers/switches/VPN) of the lab.

*President* of the USTC Linux User Group 2015–2016

*CTO & Vice President* of the USTC Linux User Group 2014–2015

- As one of the largest Linux user groups in China, we hold various events to promote free software to university students, and we provide online services like software mirrors to Chinese Linux users.

*Teaching Assistant* for the Computer Programming A course (USTC) 2016–2018

*First Prize* (ranked 4<sup>th</sup> in Henan) in the China National Olympiad in Informatics in Provinces 2010