RUICHEN JIANG

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EDUCATION

Tsinghua University Beijing, China
B.Eng. in Electronic Engineering (First Major) Aug 2016 - Jun 2020 (Expected)

- GPA: 3.86/4.0; Rank: 10/266
- Received the Academic Excellence Award (2017 - 19)

Tsinghua University Beijing, China
B.Sc. in Pure and Applied Mathematics (Second Major) Sept 2017 - Jun 2020 (Expected)

- GPA: 3.81/4.0

University of New South Wales Sydney, Australia
Exchange Student July 2018 - Nov 2018

- WAM: 94.25/100
- Achieved **2nd place (joint)** and **1st place (Australia)** in the 2nd Simon Marais Mathematics Competition

RESEARCH EXPERIENCE

The University of Hong Kong (Department of Electrical and Electronic Engineering) Pokfulam, Hong Kong
Research Assistant to Dr. Kaibin Huang, July 2019 - Sept 2019
Cooperative Diversity in Over-the-Air Computation by Relay Selection

- *Over-the-air computation* (AirComp) is a promising solution for ultra-fast aggregation in wireless networks where many devices transmit their messages simultaneously. However, channel fading can severely impair its performance.
- We incorporate cooperative diversity techniques into AirComp, investigating the power control at source nodes and relay schemes at relay nodes respectively. We develop and analyze a relay selection scheme where only the "best" relay amplifies the received signals and forwards to the fusion center. We show that this scheme achieves full spatial diversity by using a collection of distributed antennas. We plan to submit this work to a workshop in IEEE ICC 2020.

Tsinghua University (Department of Electronic Engineering) Beijing, China
Research Assistant to Prof. Sheng Zhou and Prof. Zhisheng Niu, March 2019 - Present
Reliable Communication in mmWave Vehicular Network Using Deep Learning

- Machine learning is a promising solution for mmWave wireless systems in vehicular network. Previous work has shown its potential in blockage prediction and beam selection problems.
- I built a simulation platform consisting of Wireless Insite, a ray-tracing simulator, and SUMO, a traffic simulator. It could generate more accurate channel data in the complicated mobility scenarios. In future, we seek to extend prior work by combining the channel information and situational awareness using recurrent neural networks, and investigate reliable communication with the presence of dynamic blockages.

Tsinghua University (Department of Electronic Engineering) Beijing, China
Research Assistant to Prof.Yuantao Gu, Dec 2018 - March 2019
Misclassification Rate of Spectral Algorithm in Stochastic Block Models

- Stochastic block model is a canonical random graph model for studying clustering and community detection algorithms. Spectral methods and its variants are simple and proved to achieve exact recovery threshold in the logarithmic degree regime.
- We pursued a uniform bound on the misclassification rate of spectral algorithms in general settings, especially between the exact and weak recovery regimes.

University of New South Wales (School of Electrical Engineering) Sydney, Australia
Research Assistant to Prof.Jinhong Yuan, July 2018 - Nov 2018
Iterative Soft Decoding of BCH Codes

- We explored a recently proposed coding scheme that performs iterative soft decoding of binary BCH codes.

SELECTED AWARDS AND HONORS

- Joint 2nd place in the 2nd Simon Marais Mathematics Competition, 2018 (among 355 participants)
- The China Scholarship Council (CSC) Scholarship, 2018
- Tsinghua Academic Excellence Award, 2017-19 (Top 5% of 266 students)
- 1st Prize for the 34th National Undergraduate Physics Olympic, 2017
- 3rd Prize for 19th Tsinghua Electronic Design Competition, 2017 (top 8 of 70 teams)

ADDITIONAL INFORMATION

- **Computer skills:** C/C++, MATLAB, Mathematica, Python, Linux, LaTeX
- **Language skills and proficiency:** Chinese (Native); English (TOEFL: 107, GRE: 170+156)
- **Extracurricular activities:** Drop-in Tutoring for STEM courses (Tutor: 2019.3-present); Electronic Engineering Student Association of Science and Technology (Member: 2017-2018)

RELEVANT COURSES

EE Courses
Theory and Methods for Statistical Inference (Current)
Principles and Design of Information Networks (A, 4.0/4.0)
Signal Processing for Communications (A-, 4.0/4.0)
Communications and Networks (A-, 4.0/4.0)
Probability and Stochastic Processes (A, 4.0/4.0)
Signal and System (A+, 4.0/4.0)
Data and Algorithm (A, 4.0/4.0)

Math Courses
Functional Analysis (Current)
Numerical Analysis (Current)
Convex Optimization (A+, 4.0/4.0)
Measures and Integrals (B+, 3.6/4.0)
Probability Theory (A, 4.0/4.0)
Complex Analysis (A-, 4.0/4.0)
Differential Equations (A-, 4.0/4.0)