

# Yuzhe Yang

<https://yyzharry.github.io/>

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## EDUCATION

**School of Electronic Engineering and Computer Science, Peking University**

*Aug. 2014 - Present*

- **Overall**      **Ranking: 4/53,**      **Cumulative GPA: 3.71/4,**      **Major GPA: 3.83/4**
- **Junior Year**      **Ranking: 1/53,**      **Cumulative GPA: 3.92/4,**      **Major GPA: 3.93/4**
- **Core Courses:** Information and Coding Theory (96/100), Methods of Mathematical Physics (97/100), Data Structure and Algorithm (96/100), Electrodynamics (99/100), Signals and Systems (93/100), Principle of Microcomputer (99/100), Computer Networks (Honor Track) (95/100), Principle of Circuit Analysis (92/100), Academic Writing and Report (92/100), Emerging Techniques for Modern Wireless Communications (94/100)

## Honors and Awards:

- 2017 National Scholarship (highest honor), Top 1/53
- 2017 Distinguished All-Round Leader-Student, Peking University, Top 1/53
- 2016 Samsung Scholarship, Samsung Electronics Co., Ltd, Top 3/53
- 2016 Distinguished All-Round Student, Peking University, Top 3/53
- 2015 Wu Si Scholarship, Peking University, Top 10%
- 2015 Outstanding Research Award, Peking University

## RESEARCH EXPERIENCE

**Research Assistant, Institute of Wireless Communications and Signal Processing**

*Advisor: Prof. Lingyang Song, School of EECS*

### 1. Optimal Trajectory Planning of Drones for 3D Mobile Sensing

*Jun. 2017 - Aug. 2017*

- Defined the “dominating path” using the concept of dominating set, established a multi-layer 3D network model formed by multiple 2D networks, formulate the problem as the minimum dominating path problem
- Theoretically analyzed and proved the mathematical expression of optimal shortest dominating path for the multi-layer 2D grid, determined the lower bound of the shortest path for different size of grids
- Proposed algorithm can save 32% less time, while covering 19% more sensing scope than existing solutions

### 2. Realtime Profiling of Fine-Grained 3D AQI Distribution using UAV Sensing

*Dec. 2016 - Jun. 2017*

- Designed a mobile sensing system based on UAV to construct realtime fine-grained 3D AQI (Air Quality Index) map
- Propose a novel distribution model that consists of a linear part using Gaussian Plume model (GPM), and a non-linear part using Artificial Neural Networks (ANN)
- Designed the adaptive monitoring algorithms for UAV measurement, formulated a sub-optimal trajectory planning algorithm
- Demo video can be found on YouTube: [https://www.youtube.com/watch?v=POX-kazz\\_Ec](https://www.youtube.com/watch?v=POX-kazz_Ec)

### 3. Outdoor 3D Spectrum Map Reconstruction via UAV Sensing

*Jul. 2016 – Dec. 2016*

- Assembled two UAVs with separated modules, adjusted their PID parameters by debugging motors' outputs (used SITL on Linux to do UAV simulation), and realized stable flying and loitering
- Divided outdoor complex space into cubes with regular shape, using an Android smartphone boarded on the UAV to sense the Wi-Fi intensity (RSS)
- Used random walking model via Markov chain for UAV to detect possible dramatic changes

## PUBLICATIONS

- **Yuzhe Yang**, Zijie Zheng, Kaigui Bian, Yun Jiang, Lingyang Song and Zhu Han. “Arms: A Fine-grained 3D AQI Realtime Monitoring System by UAV,” *IEEE Global Communications Conference (Globecom)*, Singapore, Dec. 2017.
- **Yuzhe Yang**, Zijie Zheng, Kaigui Bian, Lingyang Song and Zhu Han. “Realtime Profiling of Fine-Grained Air Quality Index Distribution using UAV Sensing,” submitted to *IEEE Internet of Things Journal*, Jul. 2017.
- Pengyu Zhao, **Yuzhe Yang**, Yuanxing Zhang, Kaigui Bian and Lingyang Song. “Optimal Trajectory Planning of

Drones for 3D Mobile Sensing,” submitted to *IEEE International Conference on Computer Communications (INFOCOM)*, May 2018.

- **Yuzhe Yang**, Zhiwen Hu, Zijie Zheng, Kaigui Bian and Lingyang Song. “3D Air Pollution Monitoring System in Urban Areas using UAV,” submitted to *IEEE ComSoc Student Competition: Communication Technology Changing the World*. Aug. 2017.

## COURSE PROJECTS

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### Dynamic webpages building

*Jan. 2017 - Present*

- Implemented a dynamic webpage by HTML/CSS (Bootstrap), JavaScript (jQuery), Python, Node.js and MySQL.
- Presented real-time 3D fine-grained Air-Quality-Index (AQI) map in Peking University.
- Scraped AQI data from Moji in real-time, and presented 2D AQI map in China, with local photo and AQI value.

### OFDM System Design and Simulation

*May 2017 - July 2017*

- Designed effective IIR filter to do signal processing on transceiver for OFDM symbol.
- Used BPSK/QPSK modulation, cyclic prefix (CP), up/down-sampling. Realized theoretical BER result.

### Microcomputer Designing

*Mar. 2017 - July 2017*

- Designed an elevator control system for microcomputers (single chip) by C51.
- Realized robust Finite-State-Machine with controlling of 6 floors, keyboard input, “Beep tone” by voice data stored in SPI Flash, graphic interface on TFT screen.
- Used multiple modules as LED, Lcd1602, keyboard, TFT, AD/DA and SPI Flash.

### Image Processing with MATLAB

*Mar. 2016 - July 2016*

- Used four different methods to process image combined with Gaussian Noise and Obfuscation
- Realized different algorithms and compared their performance
- Used two different ways to realize Constrained Least Squares Algorithm

### Adjustable Sawtooth-wave generator

*Mar. 2016 - July 2016*

- Theoretically calculated the parameters of each element, designed three plans and compared their performance, optimized some parameters and chose the best one
- Constructed new functions in Cadence to measure and simulate the function of the generator
- The project won Top 3 overall

### Multi-band filter

*Oct. 2015 – Dec. 2015*

- Designed a multi-band filter and realized it on a circuit board
- Innovatively used Active Filter to realize the function, with fewer components
- Realized two fixed bands (300~400, 2500~3000) and two changeable bands (1200~1600, 1700~2100) controlled by a switch

### Mine Sweeper

*Sept. 2014 – Dec. 2014*

- Designed a command-line game based on C++
- Incorporated functions including the Mine Sweeping game, timer, adjustable game difficulty, a leaderboard, colored UI, etc.

## SKILLS

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Technical: C/C++, Python, Linux, Assembly, MATLAB, VHDL, Git, Cadence, HTML/CSS, JavaScript, Node.js, SQL, LaTeX

## ENGLISH PROFICIENCY

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<b>TOEFL</b>	Total: 104	Reading: 30	Listening: 25	Speaking: 22	Writing: 27
<b>GRE</b>	Verbal: 153	Quantitative: 170	Analytical Writing: 3.5		