

Youchao Wang

Department of Engineering, University of Cambridge

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Education

Ph.D. in Engineering

- Electrical Engineering Division, Department of Engineering.

University of Cambridge, UK, 2019 – present

M.Phil. in Engineering (By Research)

- Electrical Engineering Division, Department of Engineering.

University of Cambridge, UK, 2018 – 2019

B.Eng. Electronic Engineering (1st Class Honours)

- Second year direct entry. Final grade: 87%. Third year rank: 3/250. Second year rank: 1/240.

University of Manchester, UK, 2016 – 2018

B.Eng. Electrical Engineering and its Automation

- First and Second year final result: 83%. First year rank: 2/119.

North China Electric Power University, China, 2014 – 2018

High School Graduate

Tsinghua High School, China, 2011 – 2014

Project Portfolio

Optical Neural Network

2019 – present

- Ph.D. Degree Research Project, Supervisor: Prof. Timothy Wilkinson
- Focus: Optical information processing, Fourier optics, Spatial light modulator, Deep learning algorithms.

Interfacing a High Speed Ferroelectric Spatial Light Modulator

2019 – present

- Research Side-Project, Supervisor: Prof. Timothy Wilkinson
- Focus: Spatial light modulator display driver, Computer generated holograms, PCB hardware design, FPGA firmware implementation.

Computer Generated Holography on a Digital Signal Processor System

2019 – 2019

- M.Phil. Degree Research Project, Supervisor: Prof. Timothy Wilkinson
- Focus: Computer generated holograms, Digital signal processing, Algorithm implementation.
- Published a first-author conference paper focusing on the implementation of a fast hologram generation algorithm on a multi-core digital signal processor.

Sensor Data Fusion using Automated Dimensional Function Synthesis

2018 – 2019

- M.Phil. Degree Research Project, Supervisor: Dr. Phillip Stanley-Marbell
- Focus: Miniature hardware system design, Firmware implementation, Physics specification language compiler design.
- Published a first-author conference and journal double-track paper focusing on the implementation of a dimensional function synthesis compiler.

“IoT” Water Quality Monitoring System for Protecting Rivers and Watercourses

2017 – 2018

- B.Eng. Degree Individual Project, Supervisor: Prof. Bruce Grieve
- Focus: Low-cost turbidity sensor design, Low power system design, Encoding and decoding to enhance the data transmission efficiency
- Published a first-author journal paper focusing on the design of a low-cost turbidity sensor.

Embedded System Project Team Competition (3rd Rank Among 48 Groups)

2016 – 2017

- Second-year Team Project: Line-following robotic buggy using light-sensitive sensor array and ultrasound sensor.
- A major contributor to hardware design and software implementation, including buggy structural design, line-detection application, motor control and programming.
- Leading role in team organisation (team of 4).
- 90/100 personal project overall score.

Work Experience

Research Assistant

Department of Engineering, University of Cambridge, UK

Jan. 2019 – Mar. 2019

- Supervisor: Dr. Phillip Stanley-Marbell
- Embedded system circuit design and embedded system software development. Part time.

Research Assistant

Department of Engineering, University of Cambridge, UK

Aug. 2018 – Sep. 2018

- Supervisor: Dr. Phillip Stanley-Marbell
- Research topic: Deriving physically-inspired sensor signal invariants using a physics specification language
- Compiler Construction, Programming language design, Signal and Noise, Dimensional analysis, Physically-inspired high-level description language (*Newton*).

Research Assistant

School of Electrical and Electronic Engineering, University of Manchester, UK

Jul. 2017 – Sep. 2017

- Supervisors: Prof. Bruce Grieve in collaboration with Prof. Christopher Collins at University of Reading
- Research topic: "Internet of Things" LoRaWAN Sensor System for Protecting Rivers and Watercourses
- Internet of Things (IoT) in e-Agri, Hardware design, PCB design, Firmware design and implementation, Wireless communication.

Position of Responsibility

Electronic Engineering Third Year Student Representative 2017 – 2018

Electrical and Electronic Engineering Second Year Student Representative 2016 – 2017

Chairman of NCEPU International Education School Students' Union 2014 – 2015

Chairman of Tsinghua High School Students' Union 2012 – 2013

Chairman and General Secretary of Tsinghua High School Model United Nations 2012 – 2013

Selected Honours and Awards

CSC Cambridge Scholarship (Fully-funded Ph.D.) Jun. 2019

CSC Masters Programme Scholarship (Partially-funded M.Phil.) Jun. 2018

Third Year 3rd Prize in School of EEE, UoM (Top 3 of the year) Jun. 2018

2018 Beijing Outstanding Higher Education Graduate Title Jun. 2018

Second Year 1st Prize in School of EEE, UoM (Top 1) Oct. 2017

Beijing Capital University & College "Pioneer Cup" Outstanding Member Title Oct. 2016

3rd Prize Student Scholarship at NCEPU Sep. 2016

Entrepreneur Student Scholarship (Top 3) at NCEPU Dec. 2015

1st Prize (Top 2) Student Scholarship at NCEPU Sep. 2015

Special Award (Top 1‰) in National English Competition for College Students May. 2015

2nd prize (Top 10) in 20th National English Speaking Competition, Beijing region Dec. 2014

Key Skills

Subject Related

- **Software Programming:** Proficient in C programming (Embedded C and compiler design). Know well in C++, Python (Tensorflow Framework), Java (Eclipse IDE and Android software development), Matlab and Simulink.
- **Hardware programming:** Know well in Verilog and VHDL coding. Experience in HLS arithmetic C and Xilinx Vitis.
- **Hardware development:** Proficient in Altium Designer. Know well in Eagle, Designspark and NI Multisim (Circuit and PCB design). Know well in Solidworks and Fusion360 (Product design).
- **Environment:** Proficient in MplabX IDE and Code Composer Studio. Know well in Cadence Software (VLSI), Xilinx IDE and Quartus Prime (FPGA).
- **Embedded systems:** Proficient in the use of microcontrollers (ARM family, PIC family). Know well TI KeyStone DSPs and Lattice iCE40 FPGAs. Experience in Raspberry Pi, Beagle Bone Boards.

IT

- Proficient in MacOS and Linux (Ubuntu, Debian, etc.).
- Proficient in the use of \LaTeX (Invited talk *How to use \LaTeX* at University of Cambridge, 2019)
- Proficient in the use of Adobe Family (After Effect, Audition, Premiere, Photoshop and Illustrator), Microsoft Office Products, Corel VideoStudio, Edius, FinalCut Pro.
- Proficient in Photography, Filmmaking and Video Editing.

Language

- English (IELTS 8.0/9.0), Chinese (Native Speaker)

Interests

Photography, Tennis, Piano, Model United Nations.

Publication List

[1] [HARDWARE IMPLEMENTATIONS OF COMPUTER GENERATED HOLOGRAPHY: A REVIEW](#)

Youchao Wang, Daoming Dong, Peter Christopher, Andrew Kadis, Ralf Mouthaan, Fan Yang and Timothy Wilkinson. *In Submission*, 2019.

[2] [NOVEL PREDICTIVE SEARCH ALGORITHM FOR PHASE HOLOGRAPHY](#)

Peter Christopher, **Youchao Wang**, and Timothy Wilkinson. *Journal of Optical Society: A*, 2019.

[3] [COMPUTER HOLOGRAM GENERATION WITH ONE-STEP PHASE-RETRIEVAL USING A DIGITAL SIGNAL PROCESSOR BOARD](#)

Youchao Wang, Daoming Dong, Peter Christopher, Andrew Kadis and Timothy Wilkinson. In *Proceedings of GlobalSIP 2019*, 2019.

[4] [FIXED-POINT ACCURACY ANALYSIS OF 2D FFT FOR THE CREATION OF COMPUTER GENERATED HOLOGRAM](#)

Daoming Dong, **Youchao Wang**, Peter Christopher, Andrew Kadis and Timothy Wilkinson. In *Proceedings of GlobalSIP 2019*, 2019.

[5] [DERIVING EQUATIONS FROM SENSOR DATA USING DIMENSIONAL FUNCTION SYNTHESIS](#)

Youchao Wang, Sam Willis, Vasileios Tsoutsouras and Phillip Stanley-Marbell. *ACM Transactions on Embedded Computing Systems*, vol. 18, no. 5, 2019. (*Best Paper Award at the 2019 Embedded Systems Week*)

[6] [DISTRIBUTED WATER QUALITY MONITORING SYSTEM USING INTERNET OF THINGS WIRELESS PROTOCOL – LONG RANGE WIDE AREA NETWORK](#)

Shariar Morshed Rajib, **Youchao Wang**, Chris Collins and Bruce Grieve. *In Submission*, 2019.

[7] [SAFEGUARDING SENSOR DEVICE DRIVERS USING PHYSICAL CONSTRAINTS](#)

Gregory Brooks, **Youchao Wang** and Phillip Stanley-Marbell. In *Proceedings of ACM EuroSys 2019* (poster), Dresden, 2019.

[8] [LOW-COST TURBIDITY SENSOR FOR LOW-POWER WIRELESS MONITORING OF FRESH-WATER COURSES](#)

Youchao Wang, Shariar Morshed Rajib, Chris Collins and Bruce Grieve. *IEEE Sensors Journal*, vol. 18, no. 11, 2018. (Officially announced as **one of the 25 most downloaded Sensors Journal** papers in the months of October, November and December 2018, and **the 7th most popular document** as of January 2019)

[9] [INTEREST SET MECHANISM TO IMPROVE THE TRANSPORT OF NAMED DATA NETWORKING](#)

Xiaoke Jiang, Jun Bi, **Youchao Wang** and You Wang. In *Proceedings of ACM SIGCOMM13* (poster, Section 12), Hongkong, 2013.

[10] [TECH REPORT: INTEREST SET MECHANISM TO IMPROVE THE TRANSPORT OF NAMED DATA NETWORKING](#)

Xiaoke Jiang, Jun Bi, **Youchao Wang** and You Wang. *Tsinghua University*, 2013.

Referees

Available on request