Curriculum Vitae

PERSONAL INFORMATION

Youchao Wang

Department of Engineering, University of Cambridge

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EDUCATION

Oct 2019 – Present — **Ph.D. in Engineering** — University of Cambridge
Electrical Engineering Division, Department of Engineering

Oct 2018 – Oct 2019 — **M.Phil. in Engineering** — University of Cambridge
Electrical Engineering Division, Department of Engineering

Sep 2016 – Jun 2018 — **B.Eng. in Electronic Engineering** — University of Manchester
First class honours. GPA top 1%. Second year direct entry.

Sep 2014 – Jun 2018 — **B.Eng. in Electrical Engineering** — North China Electric Power University, Beijing
Joint 2+2 programme with University of Manchester.

WORK EXPERIENCE

Jan 2020 – Present — **Undergraduate Supervision Tutor** — University of Cambridge
Gave individual supervision courses to Third-year Engineering students taking 3B2 Integrated Digital Electronics. Course contents include FPGA and microelectronics.

Gave supervisions to Second-year Engineering students at St John's College. Course contents include Linear Systems and Control, Communications, Fourier Transforms & Signal and Data Analysis.

Jan 2019 – Mar 2019 — **Part Time Research Assistant** — Department of Engineering, University of Cambridge
Embedded system circuit design and embedded system software development.

Aug 2018 – Sep 2018 — **Research Assistant** — Department of Engineering, University of Cambridge
Research topic: Deriving physically-inspired sensor signal invariants using a physics specification language.

Jul 2017 – Sep 2017 — **Research Assistant** — School of Electrical and Electronic Engineering, University of Manchester
Research topic: "Internet of Things" LoRaWAN sensor system for protecting rivers and watercourses.

PROJECT PORTFOLIO

Nov 2020 – Present — **Raspberry PI Cluster System for Computer Generated Holography**
Supporting and leading an M.Res. student on a multi-node cluster system hologram generation project.
Focus: Distributed computing, Computer generated holography, Embedded systems, Code optimization.

Oct 2019 – Present — **Opto-electronic Neural Network Processor for Deep Learning Applications**
Ph.D. Degree Research Project, Supervisor: Prof. Timothy Wilkinson
Focus: Optical information processing, Fourier optics, Spatial light modulator, Machine learning algorithms, FPGA, Hardware and software co-design.

Mar 2019 – Present — **Spatial Light Modulator Driver Platform for Holographic Displays**
Research Project, Supervisor: Prof. Timothy Wilkinson
Focus: Spatial light modulator display driver, Holography, PCB hardware design, FPGA implementation. Designed a bespoke multi-layer high-speed PCB and implemented customized FPGA firmware.

Mar 2019 – Oct 2019 — **Computer Generated Holography on a Digital Signal Processor System**
M.Phil. Degree Research Project, Supervisor: Prof. Timothy Wilkinson
Focus: Computer generated holograms, Digital signal processing, Algorithm implementation. Implemented multiple CGH algorithms within a high-end TI DSP processor board.

Aug 2018 – Mar 2019 — **Sensor Data Fusion using Automated Dimensional Function Synthesis**

M.Phil. Degree Research Project, Supervisor: Dr. Phillip Stanley-Marbell

Focus: Miniature hardware system design, Firmware implementation, Physics specification language compiler design. Key contributor to the construction of *Newton* computer language compiler for dimensional analysis.

Jun 2017 – May 2018

IoT Water Quality Monitoring System for Protecting Watercourses

Research Project, Supervisors: Prof. Bruce Grieve and Prof. Christopher Collins

Focus: Low-cost turbidity sensor design, Low power embedded system design, LoRaWAN system.

Developed a bespoke PCB board with multiple sensors and maintained the server communication.

SELECTED HONOURS

CSC Cambridge-Trust 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
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

POSITION OF RESPONSIBILITY

Reviewer of *Applied Optics*	2020 – Present
Vice-president of Cambridge Chinese Students and Scholars Association	2020 – Present
Second and Third Year School of EEE Student Representative, UoM	2016 – 2018
Chairman of NCEPU International Education School Students’ Union	2015 – 2016
Chairman of Tsinghua High School Students’ Union	2012 – 2013
Chairman and General Secretary of Tsinghua High School Model United Nations	2012 – 2013

PERSONAL INFORMATION

Subject related skills

- Software Programming: Proficient in C programming (Embedded C and compiler design). Know well in C++, Python (Tensorflow Framework), Java (Eclipse IDE), Matlab and Simulink.
- Hardware programming: Know well in Verilog and VHDL. 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 and 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 and FinalCut Pro.
- Proficient in photography, filmmaking and video editing.
- Experience in web development and server maintenance.

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

Driving licence Full clean driving licences in China and UK.

PUBLICATIONS

†corresponding author

[1] Guangyu Zhang, **Youchao Wang**†, Daoming Dong, and Timothy D. Wilkinson. "Raspberry PI Cluster System for Computer Generated Holography". In: *Conference submission*. 2021.

[2] Daoming Dong, Ralf Mouthaan, **Youchao Wang**, Andrew Kadis, and Timothy D. Wilkinson. "Holographic Foveated Rendering Effect with Multi-phase Spatial Light Modulator". In: *Conference submission*. 2021.

[3] Andrew Kadis, Ralf Mouthaan, Daoming Dong, **Youchao Wang**, Benjamin Wetherfield, Miguel Guendy, and Timothy D. Wilkinson. "Binary-Phase Computer-Generated Holography using Hardware-in-the-loop Iterative Optimisation". In: *Conference submission*. 2021.

[4] Daoming Dong, **Youchao Wang**†, Andrew Kadis, Ralf Mouthaan, and Timothy D. Wilkinson. "Foveated rendering algorithm for holographic displays". In: *Journal submission* (2021).

[5] Andrew Kadis, **Youchao Wang**, Daoming Dong, Peter J. Christopher, Ralf Mouthaan, and Timothy D. Wilkinson. "HoloBlade: An Open-Hardware Spatial Light Modulator Driver Platform for Holographic Displays". In: *Applied Optics* 60.4 (2021), A313–A322.

[6] Daoming Dong, **Youchao Wang**†, Andrew Kadis, and Timothy D Wilkinson. "Cost-optimized heterogeneous FPGA architecture for non-iterative hologram generation". In: *Applied Optics* 59.25 (Sept. 2020), pp. 7540–7546. URL: http://ao.osa.org/abstract.cfm?URI=ao-59-25-7540.

[7] **Youchao Wang**† and Timothy D Wilkinson. "OASys: Envisioning an Opto-electronic Accelerator for Deep Learning Applications". In: *Frontiers in Optics / Laser Science*. Optical Society of America, 2020, FM7D.1. URL: http://www.osapublishing.org/abstract.cfm?URI=FiO-2020-FM7D.1.

[8] Daoming Dong, Andrew Kadis, **Youchao Wang**, and Timothy D Wilkinson. "Computer-Generated Fresnel Holograms Using Field Programmable Gate Arrays". In: *Imaging and Applied Optics Congress*. Optical Society of America, 2020, HF1D.3. URL: http://www.osapublishing.org/abstract.cfm?URI=DH-2020-HF1D.3.

[9] Andrew Kadis, Daoming Dong, **Youchao Wang**, Peter Christopher, Ralf Mouthaan, and Timothy D Wilkinson. "HoloBlade: An Open Platform for Holography". In: *Imaging and Applied Optics Congress*. Optical Society of America, 2020, HF4D.4. URL: http://www.osapublishing.org/abstract.cfm?URI=DH-2020-HF4D.4.

[10] Fan Yang, **Youchao Wang**, Ralf Mouthaan, and T D Wilkinson. "Holographic Rendering of a Real-World Scene Captured with a Low-cost RGB-D Camera". In: *Imaging and Applied Optics Congress*. Optical Society of America, 2020, HF4D.3. URL: http://www.osapublishing.org/abstract.cfm?URI=DH-2020-HF4D.3.

[11] **Youchao Wang**, Daoming Dong, Peter J. Christopher, Andrew Kadis, Ralf Mouthaan, Fan Yang, and Timothy D. Wilkinson. "Hardware implementations of computer-generated holography: a review". In: *Optical Engineering* 59.10 (2020), p. 1.

[12] Peter J Christopher, **Youchao Wang**, and Timothy D Wilkinson. "Predictive search algorithm for phase holography". In: *Journal of the Optical Society of America A* 36.12 (2019), pp. 2068–2075.

[13] **Youchao Wang**, Daoming Dong, Andrew Kadis, Peter J Christopher, and Timothy D Wilkinson. "Computer-Generated Holography Using a Digital Signal Processor". In: *2019 IEEE Global Conference on Signal and Information Processing (GlobalSIP)*. Nov. 2019, pp. 1–5.

[14] Daoming Dong, **Youchao Wang**, Peter J. Christopher, Andrew Kadis, and Timothy D. Wilkinson. "Fixed-point accuracy analysis of 2D FFT for the creation of computer generated holograms". In: *2019 IEEE Global Conference on Signal and Information Processing (GlobalSIP)*. 2019, pp. 1–5.

[15] **Youchao Wang**, Sam Willis, Vasileios Tsoutsouras, and Phillip Stanley-Marbell. "Deriving equations from sensor data using dimensional function synthesis". In: *ACM Transactions on Embedded Computing Systems* 18.5s (2019).

[16] Gregory Brooks, **Youchao Wang**, and Phillip Stanley-marbell. “Safeguarding Sensor Device Drivers Using Physical Constraints”. In: *Proceedings of ACM EuroSys 2019 (poster)*. Dresden, 2019, p. 1.

[17] **Youchao Wang**, S. M.Shariar Morshed Rajib, Chris Collins, and Bruce Grieve. “Low-Cost Turbidity Sensor for Low-Power Wireless Monitoring of Fresh-Water Courses”. In: *IEEE Sensors Journal* 18.11 (2018), pp. 4689–4696.

[18] Xiaoke Jiang, Jun Bi, **Youchao Wang**, and You Wang. “Interest Set Mechanism to Improve the Transport of Named Data Networking”. In: *Proceedings of ACM SIGCOMM13 (poster)*. Hong Kong, China, 2013. URL: https://ndnsim.net/2.3/ndnsim-research-papers.html.

[19] Xiaoke Jiang, Jun Bi, **Youchao Wang**, and You Wang. *Tech Report : Interest Set Mechanism to Improve the Transport of Named Data Networking Transport*. Tech. rep. Tsinghua University, 2013, pp. 1–8. URL: http://netarchlab.tsinghua.edu.cn/%7B~%7Dshock/THU-NetArchLab-ICN-TR-ISTSET-20130517.pdf.