

# Fanpeng Kong

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Suburb, State Postcode

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## Education

- 2013-2018**      **PhD, Electrical Engineering;** The University of New South Wales (Canberra)  
*Thesis title: Holographic Wavefront Sensor for Adaptive Optics*
- 2010-2013**      **M.Eng, Signal and Information Processing;** Ocean University of China
- 2006-2010**      **B.Eng, Electronic Information Engineering;** Ocean University of China

## Working Experience

- Oct 2017 - Now**      **Research Assistant,** The University of New South Wales, Canberra  
Continue research work from my PhD study on wavefront sensing, using holographic or Shack-Hartmann WFS and FPGA, and adaptive optics for Astronomy.
- Sep 2013 - Mar 2014**      **Electronic Engineer,** The University of New South Wales, Canberra  
Work on a VideoLogger board attached to a X8 drone to record raw images on CF card at high speed. Responsible for:
- Control and configure Ominivision CMOS sensor from FPGA, image acquisition
  - Retrieve GPS data through RS232 interface and append them to raw image frames
  - Decode raw image frames and GPS information stored in CF card in Matlab
  - System test, demonstration and documentation

## Key Engineering Skills

- Electronic Engineering**      Hardware design (Altium Designer & KiCad), PCB assembly and test  
Embedded system programming (MCU & ARM Cortex-M)  
FPGA design (logic & softcore) with Altera & Xilinx devices  
CCD & CMOS image sensor  
Graphic user interface design with PyQt  
Strong analytical and engineering skills for problem probing and solving
- Optics**      Optical image processing and numerical simulation  
Adaptive optics, wavefront sensing and correction  
Holography

<b>Programming Languages</b>	<b>Verilog, VHDL</b> <b>Python, C</b> and basic knowledge of C++ and Lisp
<b>Tools</b>	Emacs, Vim/Tmux and git

## Technical Experience

### PhD Project *FPGA Based Wavefront Sensing*

This is the electronic part of my PhD project, where a FPGA based wavefront sensing system has been developed.

- Implement FPGA logic for the control of the image sensor, image retrieving and processing, system control and communication interface with computer.
- Propose and implement an automatic spots detecting and tracking algorithm based on stream processing, which can be used for various wavefront sensors.
- Design a user interface in PyQt for the wavefront sensing system.

### Master Project *Small Three-Dimensional Laser Fluorescence System*

Design a compact and portable spectrometer based on FPGA, ARM processor and linear CCD.

- Hardware design, including PCB schematic, layout, assembly and verification.
- Embedded system driver development for a touch screen and SD card file system.
- FPGA design for generating the timing sequences for CCD & AD.
- Write a user interface in LabVIEW for the spectrometer.

### AMD Electronic Design Contest

*The design of image acquisition and processing system based on FPGA*

Measure the distance of an object based on stereoscopic pictures. I am responsible for the hardware design and test, writing the TFT LCD driver and optimizing the image processing algorithm from PC to the embedded system.

## Publications

### Journal

**F. Kong**, M. C. Polo and A. Lambert, "Centroid estimation for a Shack-Hartmann wavefront sensor based on stream processing," *Appl. Opt.* 56, 6466-6475 (2017).

**F. Kong** and A. Lambert, "Improvements to the modal holographic wavefront sensor," *Appl. Opt.* 55, 3615-3625 (2016)

**Kong Fanpeng**, Fu Youtao. Design of SD Card Read-Write Control Based on NIOS II. *Electronic Design Engineering*. 2013(13).

### Conference

**F. Kong** and A. Lambert, "An Improved Holographic Wavefront Sensor," in *Imaging and Applied Optics 2016*, page AOM4C.4. Optical Society of America, 2016

M. C. Polo, **F. Kong** and A. Lambert, "FPGA Implementations of Low Latency Centroiding Algorithms for Adaptive Optics" in *Imaging and Applied Optics 2018*, page OTh3E.3. Optical Society of America, 2018

**F. Kong**, M. C. Polo and A. Lambert, "On-sky results and performance of low latency centroiding algorithms for adaptive optics implemented in FPGA", Proc. SPIE 10772, 27-37 (2018).

## Extra

- Human Languages:
  - English (working proficiency)
  - Chinese (native speaker)
- Interests  
Photography, Squash, Swimming, Technology