

Yajie Guan, PhD

Personal info

Name: Yajie (Cathy) Guan

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Citizenship: Australia (currently holding E3 Visa)

Professional Summary

Skilled test engineer with 10+ years of experience in optical sensors, embedded systems, and industrial testing. Five years of experience in optical sensors, with a strong background in applied optics gained through research at the ANU Centre for Gravitational Astrophysics PhD projects. Developed advanced knowledge in lenses, optical resonators, fibres, lasers, as well as hands-on engineering prototyping. Contributed to projects on cavity-enhanced spectroscopy sensors and fibre array acoustic/stress sensor. Three years in a start-up environment focusing on electronic device projects, including hardware verification, QA/QC, and testing for MPSoC systems. Specialized in bare-metal and functional testing for embedded systems. Additionally, has two years of experience with FPGA-based LiDAR systems, specializing in automated testing and calibration for Class 1 laser systems and SiPM sensor characterization. Known for excellent collaboration with cross-functional teams and international partners, particularly in Asia, and proficient in multiple programming languages. Eager to integrate machine learning algorithms into testing processes to drive innovation and efficiency.

Personal skills

<i>Programming Software</i>	Matlab; Python; LabView; C/C++; Verilog; Hardware Description Language (HDL); Visual Studio; Vivado; Vitis; LTspice; Solidwork; Machine Learning tools (Pytorch, scikit-learn);
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<i>Optical skills</i>	free-space optics sensing (gas sensing, spectroscopy, gravitational wave, etc.); optical fibre sensing (acoustic sensor; pressure/strains sensor, etc.); free-space cavity design, simulation and implementation with lens; experience of integrated photonic devices and opto-electronic devices ; photodetector design and simulation, SiPM testing development laser mode matching; laser stabilization; polarization analysis and simulation;
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<i>Electronic skills</i>	test design with embedded processor; digital system test design (FPGA, SoC, DDR, I2C/SPI, QSPI, eMMC, Ethernet MAC, SFP, WiFi, USB, SATA, JESD etc.); analog system design and testing (ADC, DAC, trigger, etc.); electronic circuit design and simulation; testing station fixtures design and prototype; electronic devices handling (oscilloscope, spectrum analyser, probes, etc.);
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Education

Australian National University 2015 - 2022
Doctor of Philosophy in Engineering and Physics (Photonics)

- Advisor: Professor. Jong Chow
- Thesis title: Novel cavity - enhanced techniques for metrology

Australian National University 2012 - 2014
Bachelor of Engineering with First Class Honors

- Major: Electronic engineering.
- Minor: Physics.
- GPA: 6.6/7.0

Beijing Institute of Technology 2010 - 2012
Bachelor of Engineering

- Major: Optical Information Science and Technology.
- GPA: 4.0/4.0

Honors and Awards

2019 - 2020	Postgraduate Research Scholarship
2017 - 2019	Australian Government Research Training Program Scholarship
2016 - 2017	Australian Postgraduate Award
	Higher Degree By Research (HDR) Supplementary Scholarship
2015 - 2016	HDR Fee Remission Merit Scholarship
	ANU PhD Scholarship
2014 - 2014	Outstanding Graduates with First Class Honors
2012 - 2014	ANU CECS Undergraduate International Scholarship
2012 - 2012	National Scholarship (top 0.2%)
2010 - 2011	University First Prize scholarship (top 1%)

Industry experience

MicroVision 2023 - Present
Staff Test Engineer

Liquid Instruments 2019 - 2023
Embedded Test and QA Engineer

Major responsibilities and roles

Calibration Automation Development 2023 - Present
develop an automated calibration and testing plan for FPGA-based LiDAR devices, including Class 1 laser system, MEMS scanning and SiPM detection sensitivity with various ambient environments; managing both hardware and software interfaces; processing PointCloud data to produce performance KPIs; and designing and prototyping test fixtures; work with optical team for design validation.

QA/QC Test Development 2019 - 2023
Create the hardware test plan for the manufacturing line; test automation scripting; baremetal (embedded) tests to verify the product functionalities in a multiprocessors systems with respect to the SoC (including the DDR, Bluetooth, EMAC, eMMC, USB, QSPI, JTAG, WiFi, SFP, SATA, I2C/SPI or other interconnected buses and etc); generate test documents and specification of the product.

Hardware Design 2019 - 2021
Develop hardware circuitry that meets certain functionalities and requirements, including high speed ADC and DAC; circuitry simulations and validations; PCB review.

Optical Cavity Enhanced Laser Absorption Molecular Trace Sensing 2015 - 2020
Develop a high-sensitivity molecular trace detection system using an optical cavity-enhanced laser absorption technique; start from scratch with cavity design and hands-on alignment; design customised high bandwidth stabilization systems for different lasers; develop a high speed data acquisition system.

Acoustic Sensing using Optical Interferometry 2018 - 2020
Design and implement an acoustic sensing systems using optical interferometry; free space interferometer alignment; customised feedback system to stabilize the interferometry; algorithm for noise reduction and signal processing.

Optical Fibre Array Sensing 2013 - 2014
Implement a interferometry sensor with time-delay technique to reduce lead fiber noise; FPGA development for encoding and modulation; signal processing including high speed acquisition and interpolation.

Publication and Talks

Polarization impedance measurement cavity enhanced laser absorption spectroscopy
Y. J. Guan, C. P. Bandutunga, J. Dong, T. T. Lam, R. Fleddermann, M. B. Gray, and J. H. Chow.
Vol. 29, Issue 21, pp. 33836-33849 (2021)

A double-pass cavity-enhanced spectrometer with a polarization analyzed readout.
Guan, Y., Bandutunga, C., Gray, M. B., and Chow, J. H.
In Conference on Lasers and Electro-Optics (2021a), page AM4P.5. Optica Publishing Group.

Using polarization to measure absorption in cavity enhanced spectroscopy.
Guan, Y., Bandutunga, C., Gray, M. B., and Chow, J. H.
In OSA Optical Sensors and Sensing Congress 2021b (AIS, FTS, HISE, SENSORS, ES), page ETh1A.3. Optica Publishing Group.

Quantum Noise Limited Trace Gas Cavity Enhanced Polarization Spectroscopy
Y. J. Guan, J. Dong, C. P. Bandutunga, R. Fleddermann, T. T. Lam, M. B. Gray, and J. H. Chow.
Light, Energy and the Environment 2018 (E2, FTS, HISE, SOLAR, SSL), OSA Technical Digest (Optical Society of America, 2018), paper EW3A.8.

Cavity Enhanced Polarization Impedance Matching Spectroscopy
J. Dong, T. T. Lam, R. Fleddermann, Y. Guan, C. P. Bandutunga, D. E. McClelland, M. B. Gray, and J. H. Chow
Light, Energy and the Environment 2015, OSA Technical Digest (Optical Society of America, 2015), paper ETh2A.2.

Cavity Polarization Mode Impedance Matching Spectroscopy
Y. J. Guan, J. Dong, T. T. Lam, R. Fleddermann, C. P. Bandutunga, D. E. McClelland, M. B. Gray, and J. H. Chow.
Oral Presentation at The Australian and New Zealand Conference on Optics and Photonics (ANZCOP) 2017

Double Pass Cavity Enhanced Absorption Measurement with Scattering Minimisation
Y. J. Guan, C. P. Bandutunga, J. Dong, R. Fleddermann, M. B. Gray, T. T. Lam, and J. H. Chow.
Oral Presentation at The Australian and New Zealand Conference on Optics and Photonics (ANZCOP) 2015

References

Available upon request