

Han Wang

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EDUCATION

Nanjing University Nanjing, China

M.E., College of Engineering and Applied Science (CEAS) 09.2018-06.2021

Major: Optical Engineering

Advisor: Prof. Xiaoshun Jiang and Dr. Shulin Ding

Research Areas: Optical frequency comb, optical microresonators, nonlinear optics, integrated photonics.

Master's Thesis: Dispersion Measurement and 1 μm Band Optical Frequency Comb Generation Based on Silica Microdisk Cavities

Harbin Institute of Technology Harbin, China

B.E., School of Electrical Engineering and Automation 09.2014-06.2018

Major: Optoelectronic Information Science and Engineering (Optoelectronic Instrument)

Advisor: Prof. Weibo Wang

Grade: 87.84/100, **Ranking:** 9/45.

Bachelor's Thesis: Kerr Optical Frequency Combs Generation in Silica Disk Microcavity

INTERN EXPERIENCES

AI Lab, Tencent Shenzhen, China

Technical Research Intern 04.2021-01.2022

Mentor: Dr. Jun Liao

Research Areas: Hyperspectral imaging, multispectral imaging, medical image processing, artificial intelligence.

ACADEMIC EXPERIENCES

04.2021-01.2022: Conducted research on **Multispectral, Hyperspectral Imaging and Artificial Intelligence for Medical Image Processing** at *AI Lab, Tencent*.

Advisor: Dr. Jun Liao

Project: Multispectral and Hyperspectral Imaging for Clinical Diagnosis

- Developed novel intelligent imaging systems to assist doctors in clinical diagnosis using hyperspectral, multispectral imaging and artificial intelligence methods.
- Mainly responsible for designing, building and testing multispectral imaging systems; guiding doctors to use these systems, and assisting doctors to do experiments; processing and analyzing spectral images using artificial intelligence methods; designing and simulating microscope systems; organizing experimental data and uploading it to the cloud regularly.

11.2017-04.2021: Conducted research on **Generation and Applications of Microcomb based on Silica Microresonators** at *College of Engineering and Applied Science, Nanjing University*.

Advisor: Prof. Xiaoshun Jiang and Dr. Shulin Ding

Project 1: Generation and Stabilization of Soliton Microcomb at 1550nm Band

Project 2: Kerr Frequency Comb Generation at 780nm and 1050nm Bands

Project 3: Depression Simulation and Measurement of Optical Microresonators

Project 4: Optical Imaging Based on Kerr and Soliton Microcomb (only simulation!)

- Generated soliton and soliton crystal at 1550nm band, Kerr microcomb at 780 and 1050nm band; stabilized soliton microcomb through locking pump laser frequency based on PDH locking technique; simulated and measured cavity depression of silica microcavity; simulated dynamics of microcomb generation using LLE model; investigated and simulated applications of optical frequency comb for imaging, ranging and spectroscopy.
- Mainly responsible for optical experiments (Q measurement, dispersion measurement, microcomb generation and characterization); finite element simulation of cavity depression, numerical simulation of microcomb generation and comb-based imaging methods; designing and building microcomb generation, characterization and stabilization systems, dispersion measurement systems, optical coupling system from free space to fiber and optical frequency doubling system; programming for instruments to remote control and data acquisition (including: optical spectrum analyzer, lasers, oscilloscope, arbitrary wave generators and linear DC power supplies); designing driver circuits for laser diode and TEC (thermoelectric cooler); designing machine elements.

07.2016-06.2017: Conducted research on **Fourier Ptychography Microscopy** (FPM, a recently developed computational imaging method with both large field-of-view and high spatial resolution) at *Center of Ultra-precision Optoelectronic Instrument Engineering, Harbin Institute of Technology*.

Advisor: Dr. He Zhang and Prof. Jian Liu

Project: Imaging Property Improvement of FPM for Depth of Field, Time Resolution and Spatial Resolution

- Extend the depth of field of FPM combining wavefront coding technique based on cubic-phase-modulation phase mask and DMD; decreased images processing time through parallel computing; decreased images capturing time or improved spatial resolution through illumination modulation using LCD.
- Mainly responsible for numerical simulation of imaging model; building optical imaging systems based on SLM, DMD and LCD; programming to data acquisition and image processing.

02.2015-07.2015: Conducted research on **Confocal Microscopy** at *Center of Ultra-precision Optoelectronic Instrument Engineering, Harbin Institute of Technology*.

Advisor: Dr. He Zhang and Prof. Jian Liu

Project: Principle and Application of Differential Confocal Microscope System (the Freshman Year Project, ranking 1/2).

- Designed and built a differential confocal microscope system with 15nm axial resolution and three-dimensional scanning imaging, including optics, electronics, mechanics and control.
- Mainly responsible for building optical setups, writing control, data acquisition and processing program using LabVIEW, as well as testing the microscope system.

PUBLICATION

4. L. Zhang*, J. Liao*, **H. Wang**, M. Zhang, D. Han, C. Jiang, Z. Jia, Y. Liu, C. Qin, H. Bu, J. Yao, Y. Liu, “Shortwave infrared hyperspectral imaging improves the accuracy of pathological sampling of multiple cancer species”, under review (2022).
3. M. Zhang*, J. Liao*, Z. Jia, C. Qin, L. Zhang, **H. Wang**, Y. Liu, C. Jiang, M. Han, J. Li, K. Wang, X. Wang, H. Bu, J. Yao, Y. Liu, “High dynamic range dual-modal white light imaging system improves the accuracy of tumor bed sampling after neoadjuvant therapy for breast cancer”, under review (2022).
2. J. Liao, X. Chen, G. Ding, P. Dong, H. Ye, **H. Wang**, Y. Zhang, J. Yao, “Deep learning-based single-shot autofocus method for digital microscopy”, **Biomedical Optics Express**, 13: 314-327 (2022).
1. J. Gu, J. Liu, Z. Bai, **H. Wang**, X. Cheng, G. Li, M. Zhang, X. Li, Q. Shi, M. Xiao, and X. Jiang, “Dry-etched ultra-high-Q silica microdisk resonators on a silicon chip”, **Photonics Research**, 9: 722-725 (2021).

SELECTED SKILLS

Programming: MATLAB, LabVIEW, Python, C++, Qt, Verilog HDL, Mathematica.

Hardware: FPGA, NI Data Acquisition Hardware, Arduino, Raspberry Pi, Industrial Camera, 3D Camera, Liquid Lens.

Software: COMSOL Multiphysics, Lumerical FDTD, IPKISS, ZEMAX, ENVI, Multisim, Altium Designer, SolidWorks, AutoCAD, Origin, GraphPad, Adobe Illustrator.

HONOURS & AWARDS

1. School level "Merit Student" honorary title, 2016
2. Virtual Instrument Scholarship-Group Award (ranking 2/4), 2016
3. Bronze Award in the 7th Harbin Institute of Technology “ZuGuang Cup” Creativity, Innovation and Entrepreneurship Competition (ranking 4/4), 2017
4. Third Prize in the 4th National Virtual Instrument Competition (ranking 1/5), 2017

TEACHING ASSISTANT

Practical Training of Optoelectronic Information Engineering, with Associate Prof. Shun Wang, autumn semester 2020, Nanjing University.