

Xuanwen Hua

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EDUCATIONAL BACKGROUND

- **University of Science and Technology of China, School of Physical Sciences, Department of Physics**
Undergraduate student enrolled in Aug., 2012 and graduated in Jun., 2016
B.S. Applied Physics, Jun., 2016
Overall GPA: 3.44/4.30
- **Stony Brook University, College of Engineering and Applied Sciences, Biomedical Engineering Department**
Second year Ph.D. student enrolled in Aug., 2016
Overall GPA: 3.60/4.00
- **Georgia Institute of Technology, The Wallace H. Coulter Department of Biomedical Engineering, Joint Georgia Tech & Emory University Biomedical Engineering Ph.D. Program**
Transferred Ph.D. student enrolled in Aug., 2018

RESEARCH INTERESTS

- Imaging sciences, especially biological imaging, super-resolution microscopy
- Microorganism motile behavior and environmental sensing
- Neuron Sciences, especially the mechanism, modeling and simulation
- Other biological, physical or bioengineering related research fields such as microfluidics, molecular robotics, etc.

RESEARCH EXPERIENCES

- *Stochastic Optical Reconstruction Microscopy (STORM)* **Feb., 2018-present**
Built up the optical system based on the Nikon Eclipse Ti-U fluorescent microscope. Developed a STORM controlling system based on the Hal4000 source codes provided by Hazen Babcock. Performed both 2D STORM and 3D STORM imaging for both mitochondria and microtubules and achieved a 30-40 nm lateral resolution.
- *Depth-Extended Fluorescence Microscopy:*
High-Resolution Whole-Cell Imaging with Double-Ring Phase Modulation **Aug., 2016-Jan., 2018**
Induced the wave optics model theoretically for the optical Fourier system with double-ring phase modulation and Min Gu's model for high NA objective lens. Simulated the three-dimensional point spread function (PSF) using MATLAB. Developed the Ortansia program with LabVIEW for PSF engineering. Operated experiments on the 100x objective lens and a double-ring mask interpolated Fourier system with 200 nm fluorescent beads to demonstrate the theoretical model. Performed biological imaging for mitochondria on this system and demonstrated a 5-micron depth-of-field (DOF) comparing with a 1-micron DOF for conventional imaging method.
- *Simultaneous Three-dimensional Tracking and Fluorescent Imaging of Microorganism Motility* **May, 2014-Nov., 2015**
Selected defocused microscopy to realize three-dimensional tracking from various approaches. Found appropriate functions in MATLAB to trace the living E. coli three-dimensionally based on the conclusion made in the project *Exploration of Object-Image Relations under the Defocused Microscope*. Designed the light path, constructed it and created programs in LabVIEW. Currently, adjusting the light path to match the configuration of the programs. Learning image processing and data analysis with MATLAB.
- *Simulation of action potential and magnetic field of two coupled neurons* **Mar., 2015-May, 2015**
Simplified the model of the action potential (AP) of two coupled neurons. Simulated the process of AP with MATLAB when external stimulations were injected into the two neurons. Figured out the characteristics of the surrounding magnetic field as the AP changed at different time.
- *Exploration of Object-Image Relations under the Defocused Microscope* **Oct., 2014-Dec., 2014**

Used the defocused microscopy to evaluate the effects of defocused imaging and analyzing the first-hand data. Confirmed the quadratic-linear model of the relationship between the defocused ring and the axial position of the bacteria.

PUBLICATION

- Sravan Munagavalasa, Bryce Schroeder, **Xuanwen Hua** and Shu Jia, “Spatial and Spectral Imaging of Point-Spread Functions Using a Spatial Light Modulator”, *Optics Communications* **404**, 51 (2017)
- **Xuanwen Hua**, Changliang Guo, Jian Wang, Deborah Kim-Holzappel, Bryce Schroeder, Wenhao Liu, Junhua Yuan, Jarrod French, Shu Jia, “Depth-Extended, High-Resolution Fluorescence Microscopy: Whole-Cell Imaging with Double-Ring Phase (DRiP) Modulation”, *Biomedical Optics Express* **10**, 204-214 (2019)

TEACHING EXPERIENCES

➤ Teaching Assistant

Mechanics, Dept. Physics, University of Science and Technology of China, Sept., 2015- Jan., 2016

Biomechanics, BME Dept., Stony Brook University, Sept., 2016- Dec., 2016

Biomedical Engineering Research Fundamentals, BME Dept., Stony Brook University, Feb., 2017- May, 2017

LANGUAGE SKILLS

➤ **Chinese (Mandarin):** native

➤ **English:** fluent

TECHNICAL SKILLS

➤ Computer Skills

C/C++ Programming, Mathematica, MATLAB, LabVIEW, Python, OriginLab, Latex, AutoCAD, OpenSCAD, etc.

➤ Scientific Skills

✓ **Specific physical experimental skills:**

STORM, optical microscopy, Nano-fabrication (Nano-scribe, photolithography), Optical tweezers, etc.

✓ **Specific biological skills:**

Microscopic preparation, cell culture and labeling, protein crystallization and structure analysis, etc.

HONORS AND SCHOLARSHIP

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| ➤ Bronze Prize for <i>Excellent Students of USTC</i> | Oct., 2015 |
| ➤ Second Prize in the <i>2015 School Electromagnetism Article Competition</i> | Jun., 2015 |
| ➤ Top Prize in the <i>10th Physical Research Oriented Experiment Competition</i> | Jan., 2015 |
| ➤ Silver Prize for <i>Excellent Students of USTC</i> | Dec., 2013 |
| ➤ Scholarship for <i>Excellent Freshman of USTC</i> | Sept., 2012 |

MEMBERSHIP AND AFFILIATIONS

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| ➤ Member of Zhao-Zhongyao Applied Physics Elites Group at USTC | Sept., 2014-Jun., 2016 |
| ➤ Vice President of Students' Vehicle Model Club at USTC | May, 2013-May, 2014 |

EXTRACURRICULAR ACTIVITIES

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| ➤ Post Presenter on 2017 BME Research Day held by BME Dept., SBU | Aug., 2017 |
| ➤ Volunteer of the <i>3rd International Conference on Selenium</i> , Hefei, China | Nov., 2013 |