Lige LIU

Massachusetts Institute of Technology, Cambridge, 02139, USA
(857)999-6795 xtllg@mit.edu

EDUCATION

Massachusetts Institute of Technology, Cambridge, USA Sept. 2018 - Present
Department of Nuclear Science and Engineering

University of Science and Technology of China (USTC), Hefei, China Sept. 2014 - Jul. 2018
Bachelor of Science in Condensed Matter Physics
GPA: 91.4/100 Ranking: Top 5% in the Department of Physics
Core Course: Solid State Physics (93, Top 2), Quantum Mechanics, Theoretical Mechanics (94, Top 2), Electromagnetism (100, Top 1), Thermodynamics and Statistical Physics (91, Top 1), Mathematical Analysis (98, Top 1)

Stanford University, Stanford, USA June 2017 - Dec. 2017
- Selected as an internship student (18 out of 200) for the Stanford Undergraduate Visiting Researcher (UGVR/REU) Program, supervised by Professor Debbie G. Senesky

RESEARCH EXPERIENCE

Department of Physics, Massachusetts Institute of Technology
Advisor: Professor Riccardo Comin,
Project: Developing a Novel Tip-enhanced Raman System
Research Assistant Aug. 2019 - Present
- Developed the framework and control system for the near-field scattering platform.
- Implementing the mechanical design in the cryostat.

Department of Electrical Engineering, Stanford University
Advisor: Professor Debbie G. Senesky,
Project: Designing and Simulating AlGaN/GaN High Electron Mobility Transistors (HEMTs)
Research Assistant June 2017 - Dec. 2017
- Received systematic training on device simulation and modeling, got familiar with basic device fabrication process in the cleanroom.
- Independently established a set of physical models in Sentaurus with over 20 adjustable parameters, to simulate the electrical behavior of AlGaN/GaN HEMTs.
- Well calibrated the simulation models with experimental data, and achieved an agreement with experimental data with over 95% accuracy.
- Proposed new fabrication process based on the simulation results, contributed to the device process, and successfully enhanced the on-off ratio by 3 orders of magnitude in the fabricated devices.

Hefei National Lab for Physical Sciences at the Microscale & Department of Physics, USTC
Advisor: Professor Qingyou Lu
Project: Developing a novel and ultracompact Scanning Tunneling Microscope (STM)
Research Assistant Sept. 2016 - Mar. 2018
- Independently designed and established a complete STM system including scanning head, control circuits, and shock-isolating platform.
- Invented, manufactured and tested a novel Piezoelectric Motor (PM) with controllable friction force,

high rigidity, large step size, high output force and low threshold voltage.
- Developed and implemented a simulation model for the PM in COMSOL and optimized its topology.
- Proposed and tested a novel and efficient controlling waveform to drive the motor, successfully increased the step size of the motor by 400% and decreased the threshold voltage by 50% compared to traditional Inertial Piezoelectric Motor (IPM).
- Acquired atomically resolved Highly Oriented Pyrolytic Graphite (HOPG) STM images under harsh environment of large vibration and large environmental noise.

Project: Investigating crystal structure and magnetic domains in $LaCoO_3/SrTiO_3$ thin films
Research Assistant Jan. 2017 - Mar.2018
- Systematically learned the theories on ferromagnetism (FM) material.
- Received systematic training on magnetic field and temperature control, became familiar with the operation of a superconducting magnet system.
- Obtained field dependent magnetic force microscope (MFM) images of $LaCoO_3$ samples in a temperature of 4.2 - 300 K, and in a magnetic field of 0 - 8 T.
- Developed a theoretical model to understand the formation of cloud-like magnetic domain patterns in $LaCoO_3$ thin films, and verified the model in the experiment.

PUBLICATION AND PATENT

- Liu, L.G., Ge, W.F., Meng, W.J., Hou. Y. B., Zhang. J., Lu, Q.Y.. New design for inertial piezoelectric motors. *Review of Scientific Instruments* **89**, 033704 (2018).
- Liu, L.G.. The controlling method for an inertia piezoelectric motor with opposite friction and reduced resistance. *Patent Office of the People's Republic of China,* XQ35948595111.
- Liu, Z. X., Liu, L.G., Liu, L.W.. Aerobic devices, water environment control devices and live aquatic products distribution boxes. *Patent Office of the People's Republic of China*, ZL201720023363.6.
- Liu, Z. X., Liu, L.G., Liu, L.W.. A live aquatic product distribution box and delivery car. Patent Office of the People's Republic of China. *Patent Office of the People's Republic of China*, ZL201720023350.9.

SELECTED HONORS AND CERTIFICATE

Undergraduate Research Project - University-level excellence (2 out of 20)	2017
University-level Excellent League Member (1 out of 50)	2016
Mathematics Competition for College Students - First prize (10 out of 500)	2015
Outstanding Students - Gold prize (2 out of 50)	2014 - 2016

ADDITIONAL SKILLS

Programming:	C, C++, Java, Python, Matlab, Mathematica, LaTeX
Nanofarbrication:	Photo Lithography, Inductively Coupled Plasma Etching, Metal Ebeam Deposition, Plasma-enhanced Chemical Vapor Deposition
Charaterization:	STM, AFM, MFM, SEM, TEM, FIB, XRD, Raman
Engineering Software:	CAD, LabVIEW, Eagle, SolidWorks, COMSOL, nextnano, Sentaurus