Wen Sui

University of California, Berkeley, USA | **Prof. Liwei Lin's lab, 1113 Etcheverry Hall**

Email: wen.sui@berkeley.edu

EDUCATION

University of Florida, Gainesville, USA Aug. 2024

Ph.D. in Electrical and Computer Engineering | **GPA: 4.0/4.0**

Core Courses: Semiconductor Device Fabrication, Nanodevices, Principles & Design of MEMS Transducers, Resonant MEMS, Optical Engineering, Biophotonics, Laser Theory and Design, Quantum Devices & Quantum Engineering, Applied Magnetic and Magnetic Materials.

Northeastern University, China Jan. 2019

M.S. in Fluid Mechanics and Engineering | **GPA: 87.34/100, Ranking: 1/367**

Northeastern University, China Jun. 2016

B.E. in Process Equipment & Control Engineering **GPA: 88.99/100, Ranking: 1/67 & 4/560**

EXPERIENCE

Postdoctoral Scholar **University of California, Berkeley**

Mechanical Engineering Department Aug. 2024-Present

Research Interests: The design, fabrication and implementation of sensing systems for intelligent construction and smart living.

R&D Co-Op (BAW Modeling & Simulation) **Skyworks Solutions, Inc**, Irvine, CA

Department of Acoustic Engineering, Technology & Manufacturing Group Aug. 2023-Dec. 2023

Systems Engineer Intern **Applied Materials, Inc**, Santa Clara, CA

Engineered Optics, Office of the CTO at Applied Materials May. 2022-Aug. 2022

Graduate Research Assistant (PhD) **University of Florida**

Interdisciplinary Microsystems Group, Aug. 2019-Present

Research Interests: Wide Bandgap (WBG) MEMS & NEMS for Harsh Environment Applications (High Temperature, Radiation, *etc.*), Piezoelectric MEMS & NEMS, Lamb Wave Resonators (LWR), Bulk Acoustic Wave Resonators (BAW), High Temperature Internet of Things (IoT) Sensors, Optomechanics.

Thrust I: Wide Bandgap (WBG) Semiconductor MEMS for High Temperature Application

- Micromachined AlScN-on-SiC Resonant Transducers Operating in High-Temperature Environment
- Thermal Response of GaN/AlN Heterostructure Multimode Micro String Resonators
- GaN MEMS Lamb Wave Resonators Operating at High Temperature up to 800°C

Thrust II: Radiation Effects on MEMS Resonators

- Effects of Ion-Induced Displacement Damage on GaN/AlN MEMS Resonators
- Probing Heavy Ion Radiation Effects on Mechanical Properties of Silicon Micromechanical Resonators

Thrust III: MEMS IoT Sensor

- Micromachined Thin Film Ceramic PZT Multimode Resonant Temperature Sensor
- Integrated Graphene NEMS Temperature Sensor

Thrust IV: Pressure Sensing Based on Ultra-Wide Bandgap (UWBG) Semiconductor NEMS

- Surface Adsorption and Air Damping Behavior of β-Ga_2O_3 Nanomechanical Resonators

Graduate Research Assistant (Master) Northeastern University

Lab of Vacuum and Thin Films Device, Aug. 2016–Jan. 2019

Thrust I: Mechanical Strain Effects on Resistive Switching of Flexible Memory Device Oct. 2017–Jan. 2019

- Mechanical Strain Effects on Resistive Switching of Flexible Polymer Thin Films Embedded with ZnO Nanoparticles

- Interfacial Effects on Resistive Switching of Vacuum Spray Deposited Polymer Thin Films Embedded with TiO_2 Nanoparticles Under Bending Strain

Thrust II: Temperature Effects on Resistive Switching and Charge Transport Oct. 2017–Jan. 2019

- Temperature Dependent Electron Transport In Oligo (3-methylthiophene) Derivative Molecular Devices
- Temperature-Dependent Fatigue Failure of Flexible Poly(9,9-dioctylfluorene-alt-benzothiadiazole) (PFBT)–ZnO Nanoparticle Hybrid Resistive Switching Memory Devices

Thrust III: High Density Information Storage based on Organic-inorganic Hybrid Devices Jun. 2016-Dec. 2017

- Interfacial Effects on Resistive Switching of Polymer Films Embedded With Different Nanomaterials

TEACHING AND TUTORING EXPERIENCE

ECE, University of Florida **Gainesville, USA**

Teaching Assistant of EEL3008 Physics of EE Spring 2022

Teaching Assistant of EEL4930&5934 Introduction to Quantum Devices and Quantum Engineering Fall 2021

School of Mechanical Engineering and Automation, Northeastern University **Shenyang, China**

Position: Teaching Assistant of Vacuum Physics Technology and Measurement Technique Fall 2015

- Instructed undergraduates experimental operations in vacuum evaporation coating and vacuum magnetron sputtering machine

TECHNICAL SKILLS

- 4+ Year Experience in Micro/Nano Semiconductor Fabrication
  - Photo Lithography, E-beam Lithography, Wet Etch, Dry Etch, Film Deposition, Focused Ion Beam (FIB), etc.
- Finite Element Analysis Software: COMSOL Multiphysics, Abaqus
- CAD & CAM Software: SolidWorks, Sharp3D, AutoCAD, 3DsMax
- Mathematic Software: Matlab, Mathematica
- Statistical Software: JMP
- Computer Programming: LabVIEW, Python
- Optical Measurement: Optical Laser Interferometer
- Electrical Measurement: Probe Station, Spectrum Analyzer, Network Analyzer & Semiconductor Characterization System, Phase-Locked Loop (Zurich)
- Microscope: Raman Spectroscopy, SEM, TEM, AFM
- Quantum Chemistry: Gaussian-09 Package, Atomistic Tool Kit (ATK)
- General Engineering Software: Origin, Microsoft Visio, CorelDRAW, etc

PEER-REVIEWED JOURNAL PAPERS & PATENT

- **Wen Sui**, Philip X.-L. Feng, "AlScN-on-SiC MEMS Lamb Wave Resonators Operating at High Temperature up to 800°C", ***Applied Physics Letter*** **125**, 022201 (2024). DOI: 10.1063/5.0185606.
- **Wen Sui**, S M Enamul Hoque Yousuf, Yuncong Liu, Stephen J. Pearton, and Philip X.-L. Feng, "Surface Adsorption and Air Damping Behavior of β-Ga_2O_3 Nanomechanical Resonators", ***Advanced Material Technologies*** **9**, 2301356 (2024). DOI: 10.1002/admt.202301356.
- **Wen Sui**, Tahmid Kaisar, Haoran Wang, Yihao Wu, Jaesung Lee, Huikai Xie, Philip X.-L. Feng, "Micromachined Thin Film Ceramic PZT Multimode Resonant Temperature Sensor", ***IEEE Sensors Journal*** **24**, 7273-7283 (2024) DOI: 10.1109/JSEN.2023.3294125.
- **Wen Sui**, Haoran Wang, Jaesung Lee, Afzaal Qamar, Mina Rais-Zadeh, Philip X.-L. Feng, "AlScN-on-SiC Thin Film Micromachined Resonant Transducers Operating in High-Temperature Environment up to 600°C", ***Advanced Functional Materials*** **32**, 2202204 (2022). DOI: 10.1002/adfm.202202204.
- **Wen Sui**, Xuqian Zheng, Ji-Tzuoh Lin, Jaesung Lee, Jim L. Davidson, Robert A. Reed, Ronald D. Schrimpf, Bruce

W. Alphenaar, Michael L. Alles, Philip X.-L. Feng, "Effects of Ion-Induced Displacement Damage on GaN/AlN MEMS Resonators", ***IEEE Transactions on Nuclear Science*** **69**, 216-224 (2022). DOI: 10.1109/TNS.2022.3143550.

- **Wen Sui**, Xuqian Zheng, Ji-Tzuoh Lin, Bruce W. Alphenaar, Philip X.-L. Feng, "Thermal Response and TC*f* of GaN/AlN Heterostructure Multimode Micro String Resonators from −10°C up to 325°C", ***Journal of Microelectromechanical Systems*** **30**, 521-529 (2021). DOI: 10.1109/JMEMS.2021.3089703.
- Peilun Yu, **Wen Sui**, Jianchang Li, "Temperature-Dependent Fatigue Failure of Flexible Poly (9,9-dioctylfluorene -alt- benzothiadiazole) (PFBT)–ZnO Nanoparticle Hybrid Resistive Switching Memory Devices", ***The Journal of Physical Chemistry C*** **24**, 27722-27731 (2021). DOI: 10.1021/acs.jpcc.0c07068.
- **Wen Sui**, Chi Zhang, Heyuan Xu, Jianchang Li, "Mechanical Strain Effects on Resistive Switching of Flexible Polymer Thin Films Embedded with ZnO Nanoparticles", ***Materials Research Express*** **5**, 066425 (2018). DOI: 10.1088/2053-1591/aacd8a.
- Jianchang Li (PI), **Wen Sui**, Yue Li, "Interfacial Effects on Resistive Switching of Vacuum Spray Deposited Polymer Thin Films Embedded with TiO_2 Nanoparticles under Bending Strain", ***Organic Electronics*** **61**, 170-176 (2018). DOI: 10.1016/j.orgel.2018.05.042.
- **Wen Sui**, Chi Zhang, Jianchang Li, "Design of a Small-Scale Vacuum Fabrication System for Studying Organic Light-Emitting Diodes", ***VACUUM***, 56, 6-9 (2018). DOI: 10.13385/j.cnki.vacuum.2019.03.02.
- **Wen Sui**, Yue Li, Jianchang Li, "Temperature Dependent Electron Transport in Oligo (3-Methylthiophene) Derivative Molecular Devices", ***Organic Electronics*** **47**, 1-8 (2017). DOI: 10.1016/j.orgel.2017.04.031.
- Jianchang Li (PI), **Wen Sui**, Yue Li, "Interfacial Effects on Resistive Switching of Polymer Films Embedded with Different Nanomaterials", ***The Journal of Physical Chemistry C*** **121**, 13723-13728 (2017). DOI: 10.1021/acs.jpcc.7b03116.
- Yue Li, **Wen Sui**, Jianchang Li, "Interfacial Effects on Resistive Switching of Flexible Polymer Thin Films Embedded with TiO_2 Nanoparticles", ***The Journal of Physical Chemistry C*** **121**, 7944-7950 (2017). DOI: 10.1021/acs.jpcc.7b00690.
- Jianchang Li (PI), Sijia Shao, **Wen Sui**, "A Wide Range Precision Vacuum Air Leakage Valve", Patent #: CN103994232A, filed August 20, 2014.

Peer-Reviewed Conference Papers & PRESENTATIONS

- **Wen Sui**, Mark Sheplak, Philip X.-L. Feng, "Gallium Nitride MEMS Lamb Wave Resonators Operating at High Temperature Up To 800°C", ***Proc. 37th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2024)***, Austin, Texas, USA, January 21-25 (2024).
- **Wen Sui**, Tahmid Kaisar, Haoran Wang, Yihao Wu, Jaesung Lee, Huikai Xie, Philip X.-L. Feng, "Thin Film PZT Multimode Resonant MEMS Temperature Sensor", In ***Proc. IEEE SENSORS 2022***, Dallas, Texas, USA, October 30-November 2 (2022). DOI: 10.1109/SENSORS52175.2022.9967330.
- **Wen Sui**, Haoran Wang, Jaesung Lee, Afzaal Qamar, Mina Rais-Zadeh, Philip X.-L. Feng, "AlScN-on-SiC Diaphragm Multimode Micromechanical Resonators for High-Temperature Sensing Applications", ***Proc. International Conference and Exhibition on High Temperature Electronics Network (HiTEN 2022)***, Oxford, United Kingdom, July 18-20 (2022). DOI: 10.4071/001c.89964.
- **Wen Sui**, Xuqian Zheng, Ji-Tzuoh Lin, Bruce W. Alphenaar, Philip X.-L. Feng, "Temperature Dependence of Multimode Gallium Nitride/Aluminum Nitride (GaN/AlN) Heterostructure String Resonator", ***Proc. 34th IEEE International Conference on Micro Electro Mechanical Systems (MEMS 2021)***, 478-481, Gainesville, FL, USA, January 25-29 (2021). DOI: 10.1109/MEMS51782.2021.9375389.
- **Wen Sui**, Haoran Wang, Jaesung Lee, Afzaal Qamar, Mina Rais-Zadeh, Philip X.-L. Feng, "AlScN-on-SiC Thin Film Micromachined Resonant Transducers Operating in High-Temperature Environment up to 600°C", ***Present in Joint Conference of the European Frequency & Time Forum & IEEE Intl Frequency Control***

Symposium (EFTF-IFCS), Paris, France, April 24-28 (2022).

- **Wen Sui**, Xuqian Zheng, Ji-Tzuoh Lin, Jaesung Lee, Jim L. Davidson, Robert A. Reed, Ronald D. Schrimpf, Bruce W. Alphenaar, Michael L. Alles, Philip X.-L. Feng, "Effects of Ion-Induced Displacement Damage on GaN/AlN MEMS Resonators", ***Present in IEEE Nuclear and Space Radiation Effects Conference (NSREC 2021)***, Virtual, July 19-23 (2021).
- **Wen Sui**, S M Enamul Hoque Yousuf, Xuqian Zheng, and Philip X.-L. Feng, "Pressure Response and Air Damping of β-Ga_2O_3 Nanomechanical Resonators", ***Present in Joint Conference of the European Frequency & Time Forum & IEEE Intl Frequency Control Symposium (EFTF-IFCS)***, Virtual, July 7-17 (2021). **(Best Paper Finalist)**
- **Wen Sui**, Fan Ye, Arnob Islam, Jaesung Lee, Philip X.-L. Feng, "Ultrawide Frequency Tuning of Atomic Layer van der Waals Heterostructure Electromechanical Resonators", ***Present in the 67th American Vacuum Society (AVS) International Symposium***, Virtual, October 25-28 (2021).

ACADEMIC COMPETITION

Mathematical Contest in Modeling, USA 2015

Topic: Generic Model for Searching "Missing" Airplanes MH370

- **Honorable Mention Award**; Leader of a three-member team
- Build general models to search airliners out of contact by using ordinary differential equation method, the Bayes methods, the analytical hierarch process (AHP), and the geometrical analysis method; and then improved, optimized and validated the models

Undergraduate Mathematical Contest in Modeling, China 2014

- **1st Prize in Liaoning province**
- Leader of a three-member team; designed and simulated the dynamic change of creative flat-folding table

LEADERSHIP & SEVERCE ROLES

- Interdisciplinary Microsystems Group Leadership Council, University of Florida 2020–2022
- Class Leader, Northeastern University 2016–2019
- Leader, Study Department in Student Union, Northeastern University 2013–2016

AWARDS & HONORS

Graduate

- Wilson and Marie Collins Endowment for Graduate Fellowships, ECE, University of Florida 2023
- IMG Excellence in Research Award, University of Florida 2022
  - This award is the highest recognition on a student for his or her research and is a mark of academic distinction for IMG students
- The Finish Line Awards ($9,000 Fellowship), University of Florida 2022
- Margaret A. Ross Fellowship, ECE, University of Florida 2020–2022
- Best Poster Award, NanoDay UF, University of Florida 2021
- Best Paper Finalist, Joint Conference of the European Frequency & Time Forum & IEEE Intl Frequency Control Symposium (EFTF-IFCS). 2021
- Outstanding Master's Thesis in Liaoning Province 2019
- Outstanding Graduate in Liaoning Province 2019
- National Scholarship, twice 2017,2018
- Outstanding Graduate Student in Shenyang City 2018
- 2018 China Merit Graduate Scholarship, Chinese Vacuum Society, National Level 2018
  - Awarded to five students each year, the other four from Peking University, Tsinghua University, Chinese

Academy Institute, Hefei University of Technology

- Advanced Individual in Academic Innovation, twice, Northeastern University 2017,2018
- Graduate President Scholarship, Northeastern University 2016
- First-class Scholarship, twice, Northeastern University 2016,2017

Undergraduate

- Outstanding Graduate in Liaoning Province 2016
- Outstanding University Student in Shenyang City 2015
- National Scholarship, twice 2013,2015
- Zhongbei Tongci Scholarship 2014
  - Awarded to one student of the department each year who displays excellent in academic study
- First-class Scholarship, five times, Northeastern University 2012–2016