2025-06-01

Yanru Chen

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EDUCATION

University of California, San Diego, Ja Jolla, CA, USA

- Ph.D in Electronic and Computer Engineering (Nanoscale devices and system) Sep 2024 –
  - Cumulative GPA: 3.35 / 4.0

Tsinghua University, Shenzhen, China

- M.S. in Electronic Information (Intelligent Manufacturing) Aug 2021 – Jun 2024
  - Cumulative GPA: 3.78 / 4.0

Jilin University (Project 985), Changchun, Jilin, China

- B.E. in Electronic Science and Technology - Graduated with College Honors Aug 2017 – Jun 2021
  - Cumulative GPA: 3.53 / 4 (Ranked 6/108)

RESEARCH EXPERIENCES

Ng Lab (Flexible and Printed Electronics), University of California San Diego

- Graduate Research Student, Electrical and Computer Engineering Department Sep 2024 – Jan 2025
  - **Project: (1) Memristor fabrication & (2) Multimodal sensing glove**
  - Focus: MEMS & NEMS fabrication, Biomedical signal processing
  - Contributions:
    (1) Memristor project: 1) Developing a memristor array with a 1000x ON/OFF switching ratio using SnO2 (low-ε material) thin films fabricated via spin coating; 2) Optimized fabrication process and compared solvent compositions to improve yield; 3) Gained experience in fabrication, testing, and Nano3 facilities. Scaling on PCB for neuromorphic applications remained a challenge.
    (2) Multimodal sensing glove project: 1) Contributed to glove fabrication, signal extraction, processing, and data analysis in the later project stages; 2) Gained comprehensive knowledge of *Longitudinal Monitoring of Hypertonia through a Multimodal Sensing Glove*; 3) Exploring its application in Parkinson's disease assessment.

Micro-Electro-Mechanical System Laboratory, Tsinghua University

- Graduate Research Student, Division of Advanced Manufacturing Oct 2021 – Jun 2024
  - **Project: Wearable acetone gas sensor for the detection of the breath of diabetes patients**
  - Focus: Wearable sensors, Semi-conductor gas sensor, Microfabrication techniques
  - Contributions:
    (1) Synthesized ZnO nanospheres with large specific surface area.
    (2) Developed a universal method for incorporating ZnO nanoparticles onto a flexible porous PDMS framework, producing an intrinsic stretchable gas-sensitive material.
    (3) Analyzed the impact of UV light-assistance on the gas-sensitive response properties of ZnO.
    (4) Designed a low-modulus island-bridge structure, allowing 60% stretchability.
    (5) Conducted a comprehensive analysis of gas response at different frequencies for gas-sensitive sensors, confirming their feasibility for wearable breath analysis applications.
- Graduate Research Student, Division of Advanced Manufacturing Sep 2022 – Nov 2023
  - **Project: Laser-Induced Graphene Flexible Strain Sensor**
  - Focus: High-D Graphene, Flexible strain sensor, Microfabrication techniques
  - Contributions:
    (1) In-situ synthesized a first-ever made material laser-induced graphene-silicon carbide laminated nanosheet (LIG-SiC LNS) with intrinsic self-temperature compensation capability.
    (2) Analyzed the impact of laser-induced manufacturing parameters on strain sensor performance, resulting in a fivefold increase in electrical conductivity compared to previous work.
    (3) Created a human pulse wave velocity (PWV) testing demo, revealing a minimal 0.6% deviation compared to commercial instruments when assessing PWV .

Computational Medicine Laboratory, Western Ontario University

- Undergraduate Research Student, Internship program Jan 2020 – Aug 2020
  - **Project: Perfusion heterogeneity analysis in CT data using PM3 and machine learning segmentation**
  - Focus: Fractal dimension analysis, Machine learning, Reconstruct 3D perfusion maps
  - Contributions:
    (1) Segmented the kidneys from the 2D slices to reconstruct the whole organ 3D perfusion map.
    (2) Analyzed the 3D perfusion maps for perfusion heterogeneity using in house codes that compute local and global fractal dimensions.
    (3) Enhanced the functionality of our boxdimension based fractal dimension estimator.

State Key Laboratory of Integrated Optoelectronics, Jilin University

- Undergraduate Research Student, College of Electronic Science and Engineering Jun 2019 – Jun 2020
  - **Project: Dynamic Color Change Solar Cell Based on Pr2O3 Characteristics** (A Preparation Method for Structural Color in Dual Modulation Mode)
  - Focus: Structural Colors, nanofabrication, Electrochemical Oxidation-Reduction Reaction
  - Contributions:
    (1) Conducted detailed literature research, extracting essential insights to inform the project.
    (2) Identified optimal parameters, including doped ion concentration and crystallization temperature, to achieve the desired color-changing effect.
    (3) Designed a sandwich solar cell structure with a Pr2O3 glass base, perovskite layer, and gold nanoparticle electrodes. (This design enabled the precise control of structural colors by adjusting film thickness and nanoparticle properties.)

PUBLICATIONS

JOURNALS

[1] Y. Chen, Y. Liu, ...and M. Zhang*, "Porous PDMS–ZnO Wearable Gas Sensor for Acetone Biomarker Detection and Breath Analysis," Advanced Materials & Interfaces Oct 2024.

[2] Q. Xie, ...Y. Chen ...and X. Wang*, "Kirigami-Inspired Stretchable Piezoelectret Sensor for Analysis and Assessment of Parkinson's Tremor," Advanced Healthcare Materials Sep 2024.

[3] Y. Li, ...Y. Chen ...and X. Qian*, "Simultaneously encapsulation and formation of PDMS-MWCNTs composites for multi-directional microchannel force sensors," IEEE Sensors Journal Sep 2024.

CONFERENCES

[1] Y. Chen* , ... "*Enhanced Strain Resistance of Fractal Fiber Laser-Induced Graphene for Flexible Electrodes via Annealing and Plasma Etching*," in *MRS Fall Conference 2024*, Boston, Massachusetts, USA, 204 Accepted as Poster Presentation. (presented by Y. Chen)

[2] Y. Liu, Y. Chen (Co-first author), ...and M. Zhang*, "*ENHANCED ELECTRICAL CONDUCTIVITY IN LASER-INDUCED GRAPHENE-SILICON CARBIDE LAMINATED NANOSHEETS FOR FLEXIBLE STRAIN SENSORS AND PULSE WAVE VELOCITY ASSESSMENT*," in *IEEE MEMS Conference 2024*, Austin, Texas, USA, 2023 Accepted as Poster Presentation. (presented by Y. Chen)

[3] Yanru Chen, Sanjay R. Kharche, Yan Min Zhang, GH Janssen, and Christopher W. McIntyre, "*Quantifying microvascular alterations due to a pharmacological agent*," in *IEEE EMBC 2020*, Montreal, Quebec, Canada, 2020 Accepted as Oral Presentation (presented by Y. Chen).

[4] Sanjay R. Kharche, Yanru Chen (Student first author), and Christopher W. McIntyre, "*Fractal Dimension Based Texture Analysis of CT Perfusion Imaging*," in *IEEE EMBC 2020*, Montreal, Quebec, Canada, 2020 Accepted as Oral Presentation (presented by Y. Chen).

AWARDS & SCHOLARSHIPS

- 2024 Workshop on Learning and Information Theory - 2nd Best Oral Presentation Award Nov 2024
- Jacobs Fellowship, University of California San Diego Aug 2024
- ECE Department Fellowship, University of California San Diego Feb 2024
- Outstanding Undergraduate Graduation Project Award, Jilin University Jun 2021
- Excellent Student of the College (with first-class scholarships), Jilin University (Top 5%) 2018 – 2021
- MITACS Globalink Research Internship Award (Western University) Feb 2020
- Provincial Second Prize, 2019 National Mathematical Modeling Competition Nov 2019
- Third Prize, Electronic Smart Manufacturing' Innovation Competition, Jilin University Dec 2017
- Singer competition, Audience Favorite Award, Jilin University Nov 2017

PROFESSIONAL EXPERIENCES

Shenzhen Hanit Industrial Technologies Co., Shenzhen, Guangdong, China

- Assistant Engineer, Department of Hardware Jun 2023 – Oct 2023

Vivolight Medical Device & Technology Co., Shenzhen, Guangdong, China

- Algorithm Intern, Department of Algorithm Apr 2021 – May 2021

OTHER SKILLS

- Software & Program: MATLAB (Plotting; Signal Processing Toolbox), Python (NumPy, SciPy, TensorFlow), Arduino (Embedded Systems), AutoCAD (2D & 3D Modeling).