Sooyon Chang

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Department of Mechanical Engineering, Purdue University, West Lafayette, IN

EDUCATION

Purdue University, West Lafayette, IN, USA | Aug 2024 – Present
Ph.D. in Mechanical Engineering (in progress)

Advisor: Prof. Partha P. Mukherjee

Cornell University, Ithaca, NY, USA | Aug 2022 – May 2024
M.S. in Mechanical Engineering

Advisor: Prof. Zhiting Tian
Thesis: Enhancement of Electrical Conductivity in CNT Networks for Highly Stable n-Type Thermoelectrics

SUNY Korea, South Korea (Stony Brook University) | Feb 2018 – Dec 2021
B.S. in Mechanical Engineering
GPA: 3.87/4.00 | Summa Cum Laude | Valedictorian

RESEARCH INTERESTS

Chemo-Mechanical Coupling of Solid-State Batteries (SSB), SSB fabrication and testing, thermal stability of SSB, Thermoelectrics, Energy Storage Materials, Interface Stability

RESEARCH EXPERIENCE

Energy and Transport Sciences Laboratory (ETSL), Purdue University | Graduate Research Assistant

| Aug 2024 – Present

- Developing pressure-based soft-short diagnostics through electrochemical and post-mortem analysis
- Studying thermal stability and failure mechanisms in anode-free solid-state batteries

ZT Group, Cornell University | Graduate Research Assistant | Aug 2022 – May 2024

- Led DOE-funded research on n-type CNT thermoelectric thin films
- Devised hypothesis and checked how polymer aggregation affects the electrical conductivity of films

- Optimized CNT dispersion, polymer doping, and thin-film synthesis
- Conducted electrical, thermal, and structural characterization

SUNY Korea, Korea | Undergraduate research

Reliability Engineering – Automotive & Electronics Industry Projects

Prof. Changwoon Han | Sep 2021 – Jun 2022

Improving the reliability of the airbreather (Hyundai motors)

- Identified failure modes via stress–strength modeling
- Quantified failure probability linked to defoamant degradation

Improving the reliability of Multilayered ceramic capacitors during production (Amotech)

- Derived equations for the homogenization of periodic materials displacement (elastic modulus, coefficient of thermal expansion)
- Implemented MATLAB calculation for periodic material property calculations
- Conducted ANSYS simulations to assess process-induced reliability risks

GPS-Free Path Planning for Autonomous Delivery Vehicles

Prof. Brad Jongseong Choi | Mar 2021 – Dec 2021

- Built autonomous delivery vehicle using LiDAR, SLAM, ROS, and Velodyne sensors
- Generated costmaps from 3D point clouds; corrected coordinate frames and transforms
- Designed mechanical CAD drawings for aluminum delivery box

PUBLICATIONS

1. **Chang, S**., et al. Unusual Electrical Conductivity Enhancement in Stable n-Type Carbon Nanotube Networks. Small Methods, 2024. https://doi.org/10.1002/smtd.202400585
2. Shi, L., **Chang, S**., Tian, Z. Freestanding and Flexible Micrometer-Thick PEDOT:PSS Film with High Power Factor. ACS Applied Energy Materials, 2024. https://doi.org/10.1021/acsaem.4c02568

CONFERENCE PRESENTATIONS

Women in ME Symposium, Purdue University |2025.10.27

"Pressure-Based Operando Diagnostics of Failure Pathways in Anode-Free Solid-State Batteries"

ECS Fall Conference, Chicago |2025.10.12-2025.10.17

"Pressure-Based Operando Diagnostics of Failure Pathways in Anode-Free Solid-State Batteries"

Materials Research Society (MRS) Fall Meeting |2023.11.26-2023.12.01

"Enhancing the Power Factor of SWNT Thin Films for Organic Thermoelectrics"

KSME Spring Conference: Field of Reliability |2022.03.23-2022.03.25

"Design and Validation for Enhancing the Reliability of Air Breather of Vehicle Transmission."

TEACHING EXPERIENCE

Undergraduate TA, SUNY Korea

AMS 261, applied calculus 3 |2020. 08.24-2020.12

AMS 161, applied calculus 2 |2018.08.27-2018.12.21

SCHOLARSHIPS AND AWARDS

Undergraduate, SUNY Korea

Encouragement award (4 semesters), Academic excellence full tuition scholarship (2 semesters), Merit scholarship (1 semester) |2018- 2021

SUNY Korea Project Expo Poster, MEC Departmental Winner for autonomous delivery vehicle, "Baero."

Graduated with honor academic honor of Summa Cum Laude |2021.12

Selected as the valedictorian for 2021 Fall Graduation of SUNY Korea |2021.12

TECHNICAL SKILLS

Experimental: Thin-film synthesis, CNT processing, SEM, FIB-SEM, EDX, Raman spectra, XPS, TGA/ DSC, XRD, PPMS, Solid state cell fabrication, Battery testing (Biologics and Neware)
Design: Fusion 360, AutoCAD, Siemens NX

Computational & Simulation: MATLAB, Python, ANSYS, LabVIEW, GAMESS, LAMMPS, Quantum ESPRESSO