

Joshua Cheng

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EDUCATION

WASHINGTON UNIVERSITY IN ST. LOUIS

GPA: 3.69 / 4.00 **Major:** Chemical Engineering **Minor:** Computer Science, Nanoscale Engineering

St. Louis, MO
Expected May 2025

RESEARCH

Design of Copper-Ruthenium-Based Alloys for Oxygen Evolution Reaction Catalysts

St. Louis, MO

Senior Thesis Undergraduate Research | Materials Modeling and Microscopy Group - Advisor: Rohan Mishra Aug 2024 - Present

- Determined ternary phase systems with stable and miscible alloy compositions involving unstable yet active Cu-Ru binary
- Conducted density functional theory (DFT) simulations on select alloys to determine overpotential during reaction mechanism

Using Robotic Systems to Improve Battery Cathode Synthesis

Dallas, TX

EMERGE REU Participant | Multiscale Simulation Lab - Advisor: Kyeongjae Cho May 2024 - Aug 2024

- Python integration of robotic arm, liquid handler, and linear rail, towards automation of battery cathode synthesis
- Designed custom parts for sol-gel method workflow through 3D printing and alumina casting
- Synthesized NMC lithium coin cell batteries through cathode slurry casting and XRD analysis
- Presented poster at Summer Platform for Undergraduate Research (SPUR) Symposium

High-throughput Exploration of Thermodynamic Stability for High Entropy Alloys

St. Louis, MO

Undergraduate Research | Materials Modeling and Microscopy Group - Advisor: Rohan Mishra May 2022 - May 2024

- Extracted parameters of binary alloys for solid solution model using density functional theory simulations
- Calculated thermodynamic stability of high entropy alloys using convex-hull analysis and Materials Project intermetallics
- Analyzed results and trends with respect to constituent elements for potential future projects
- Presented relevant papers and research progress at weekly group meetings

ACTIVITIES AND LEADERSHIP

MAKERTECH

St. Louis, MO

Spartan Light Metal Products Makerspace – Washington University at St. Louis

Sep 2022 - Dec 2024

- Proficiency in Prusa 3D Printer, Form 3, Laser cutter, Bantam MiniMill, Cricut vinyl cutter, etc.
- Upkeep of Makerspace machinery and teaching new members on Makerspace operation

DESIGN LEAD

St. Louis, MO

WU Robotics Club – Washington University at St. Louis

Nov 2021 – Dec 2023

- Delegation and coordination of design tasks in pursuit of competing in submarine robotics MateROV
- Lead coordinator in development of mini-car design and competitive autonomous robot in PacBot at Harvard

MUSIC DIRECTOR AND MORALE/SOCIAL CHAIR

St. Louis, MO

Sensasians Acapella – Washington University at St. Louis

Dec 2021 – Dec 2024

- Facilitating tri-weekly club practice, arrangement of choir music, collaborating with group coordinators for effective meetings and concert preparation, and effective use of interpersonal skills to maintain morale

AWARDS

DEAN'S SELECT FELLOWSHIP

Nov 2024

Department Nomination for early admission to WashU IMSE PhD and \$5000 one-time bonus

JONSSON SCHOOL OF ENGINEERING AND COMPUTER SCIENCE AWARD

Aug 2024

2024 Summer Platform for Undergraduate Research Poster Award given to 43/~200 participants at UTDallas

EMERGING SECOND PLACE AT HACK WASHU

Oct 2022

Created visualizer for organic molecules, awarded 2nd place prize at WashU Hackathon

MCKELVEY UNDERGRADUATE RESEARCH SCHOLAR

Jan 2022

\$5000 Award used as research stipend

SKILLS & INTERESTS

Laboratory: DFT, 3D Printing and CAD, XRD, Benchwork

Programming: Python, Linux, Swift, Java, HTML/CSS, Git, Javascript, C++

Languages: English, Verbally Fluent in Chinese

Interests: Piano, Metalworking, Tennis, Acapella