DARREN CHENG

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Education

Carnegie Mellon University — Pittsburgh, PA
Doctor of Philosophy in Mechanical Engineering — Anticipated May 2025
Master of Science in Mechanical Engineering — Dec 2022

University of Michigan — Ann Arbor, MI
Bachelor of Science in Engineering, Mechanical Engineering — Apr 2017
International Engineering Minor, Art and Design Minor

Skills

Programing: Python (pandas, numpy, scipy, matplotlib), Git, Jupyter, Matlab, SQL, Excel VBA
Technical: Data pipeline automation, Measurement system design, Real-time data processing
Soft Skills: Cross-functional teamwork, Technical documentation, Stakeholder presentations

Experience

Carnegie Mellon University — Pittsburgh, PA
Graduate Research Assistant — Aug 2020 – Present
Quantifying Urban vs. Rural Nucleation Rates using Newly Developed Particle Instrumentation

- Developed instrumentation to measure sub-3 nm atmospheric aerosols, enhancing sensitivity and increasing measurement frequency by 100x
- Designed, conducted experiments, and built quantitative models to evaluate the performance of new particle measurement techniques, leveraging approaches grounded in established scientific literature
- Designed and implemented a Python-based data pipeline for a custom particle sizing instrument, integrating real-time data collection, analysis, and visualization thus improving lab-wide access to high-resolution aerosol size distributions to derive quantitative insights about air quality
- Authored scripts to automate data processing and visualization of large sets of field observation data to uncover patterns and correlations in aerosol nucleation activity

HP Inc. — Corvallis, OR
R&D Process and Tooling Engineer — July 2017 – July 2020

- Improved plastic welding processes through design of experiments and statistical analysis, and implemented leak test solutions through fixture design and test optimization to ensure product quality for 10 + SKUs at for a 20 part-per-minute production line
- Collaborated with international cross functional teams and interfaced with contract manufacturers to align on process improvements and new products
- Spearheaded and supported implementation of a new weld joint design for a cost avoidance of $2 million in capital investment
- Chaired Young Employee Network focused on providing opportunities for professional development and networking to increase employee engagement with 3 – 4 events per quarter with an average attendance of 30 - 50

Environmental Protection Agency — Ann Arbor, MI
ORISE Intern — July 2016 – Apr 2017

- Collaborated with a team conducting emissions compliance testing on heavy-duty gasoline vehicles
- Created Excel VBA tool to process test data and create visuals, reducing the time required by 98.4%
- Evaluated methods to correlate on-road low-cost testing to lab-grade high-cost testing to enhance screening and selection of vehicles to test

Publications

Cheng, D., Amanatidis S., Lewis, G. S., Jen C. N., “Fast and sensitive measurements of sub-3 nm particles using Condensation Particle Counters For Atmospheric Rapid Measurements (CPC FARM)”, Atmospheric Measurement Techniques, 18, 197-210, 2025
Cheng, D., Kiguru, J., Jen C. N., “Detection efficiency of a water condensation particle counter using electrically neutral sulfuric acid and sulfuric acid-dimethylamine clusters”, Aerosol Science and Technology, [Accepted]

Conferences

Cheng, D., Casalnuovo, D. A., Troller, C., Jen, C. N. “Nucleation Closure Study from 2023 Pittsburgh Field Campaign” American Association for Aerosol Research, Albuquerque, NM, October 25, 2024 [Conference Presentation]
Cheng, D., Amanatidis S., Lewis, G. S., Jen, C. N. “The Condensation Particle Counters For Atmospheric Rapid Measurements (CPC FARM): Instrument Description and Field Results” American Association for Aerosol Research, Albuquerque, NM, October 23, 2024 [Conference Presentation]
Cheng, D., Kuang, C., Jen, C. N. “Dependence of Pulse Height Distribution on Particle Size, Composition, and Concentration for 1-7 nm Particles” American Association for Aerosol Research, Raleigh, NC, October 6, 2022 [Conference Poster]

Patent

Jen, C. N., Casalnuovo, D. A., **Cheng, D**. 2024 Reactive Condensation Particle Counter for the Detection of Trace Atmospheric Gases U.S. Patent Application No. 18/441,844, Filed: February 14, 2024, Patent Pending

Teaching Assistant Experience

Carnegie Mellon University Pittsburgh, PA
Teaching Assistant – Fluid Mechanics Jan – May 2021

- Led weekly recitations, wrote and graded exam questions

Additional Experience

Cup of Wontons LLC Pittsburgh, PA
Co-Founder Oct – Dec 2023 & Sept – Nov 2024

- Sold freshly prepared wonton soup at the local farmer’s market; managed operations, finances, and customer relations, generating over $1000 in average weekly revenue