

Matt Y. Cheung

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#: 510-936-4240

Location: Fremont CA/Houston TX

Summary

PhD student working on advancing the safety of medical devices and AI.

Education

Ph.D. Electrical & Computer Engineering, Rice University, Houston, TX Aug. 2023 - Present

- Advisors: Ashok Veeraraghavan ([Rice Computational Imaging Lab](#)) and Guha Balakrishnan ([Rice Vision and Imaging Group](#))
- Trainee in NIH NLM Training Program in Biomedical Informatics and Data Science
- Topics of interest: Uncertainty Quantification (Conformal Prediction) for Medical Imaging - Image Reconstruction, Segmentation, Classification.

M.S. Electrical & Computer Engineering, Rice University, Houston, TX Aug. 2020 - Dec. 2023

- Advisor: Ashok Veeraraghavan ([Rice Computational Imaging Lab](#))
- Thesis: [Wearable Blood Pressure Monitoring Devices: Understanding Heterogeneity in Design and Evaluation](#)
- Coursework in [Neural Methods for Image Synthesis](#), Network Science, Information Theory, Random Processes, Computer Vision, Linear Algebra for Dynamical Systems, Regression and Linear Models.
- Teaching Assistant for Undergraduate and Graduate courses in [Computer Vision](#), Linear Algebra for Data Science, and Linear Algebra for Dynamical Systems

B.S. Electrical Engineering (cum laude), University of California, Davis Sep. 2015 – Jun. 2020

- Graduate Coursework in Optical Microscopy, Large Scale Scientific Computing, Computational Imaging and Solid State Device Physics
- Undergraduate Coursework in Signal Processing, Electromagnetics, and Solid State Device Physics
- Tau Beta Pi CA Lambda Chapter, UC Davis Cycling Team

Relevant Skills

- Deep Learning: Time-series, Generative Models, Image reconstruction
- Programming: Python (PyTorch, Tensorflow, NumPy, SciPy, Pandas, scikit-learn, Matplotlib), MATLAB, Docker, LaTeX, Markdown
- Math and Statistics: Meta-Analysis, Conformal Prediction, Linear Regression

Academic Research Experience

Graduate Research Assistant, Rice University, Houston, TX Dec 2020 - Present

- Uncertainty Quantification for Medical Imaging: developed novel conformal prediction frameworks and methods for medical imaging problems.
- Medical Imaging: bring safer imaging and radiotherapy solutions to low to middle-income countries, collaborating with the [Court Lab](#) at M.D. Anderson
- Wearables and Meta-analysis: developed a new analysis technique to understand heterogeneity in wearable blood pressure monitoring devices
- Neurophysiological monitoring: engineered novel solutions for [Smart Helmet](#) and [Sleeping Cap](#)
- Reviewer for IEEE BHI, IEEE PAMI, IEEE ICHI, Biomedical Optics Express, MobiCom, ICLR

Undergraduate Research Assistant, Yang Research Laboratory, Davis CA Sep. 2018 – Jul. 2020

- Simulated Deep Diffractive Neural Networks using a combination of different modulation techniques
- IT work: managing the ubuntu-based server setup, upgrading and resource distribution

Undergraduate Research Assistant, Kovnir Group, Davis CA Mar. 2016 – May. 2017

- Research focused on solid state and materials chemistry, namely thermoelectric materials

- Synthesized type I clathrate compounds (cesium zinc antimonides and nickel phosphides) in vacuum sealed silica tubes
- Examined sample compositions using Powder X-Ray Diffraction (PXRD)
- Determined annealing recipes to optimize purity of synthesized compound from PXRD analysis

Pre-prints/Publications

- **Cheung, M.Y.**, Veeraraghavan, A. and Balakrishnan, G., 2025. COMPASS: Robust Feature Conformal Prediction for Medical Segmentation Metrics. arXiv preprint arXiv:2509.22240. <https://arxiv.org/abs/2509.22240> (under review)
- **Cheung, M.Y.**, Netherton, T.J., Court, L.E., Veeraraghavan, A. and Balakrishnan, G., 2025. Metric-Guided Conformal Bounds for Probabilistic Image Reconstruction. (2025, long oral, UNSURE Workshop @ MICCAI) <https://arxiv.org/abs/2404.15274>
- **Cheung M.Y.**, Zorek S., Netherton T.J., Court L.E., Al-Kindi S., Veeraraghavan A. & Balakrishnan G., 2025, When are diffusion priors helpful in sparse reconstruction? A study with sparse-view CT, 22nd IEEE International Symposium on Biomedical Imaging (ISBI 2025)
- **Cheung M.Y.**, Netherton T.J., Court L.E., Veeraraghavan A. & Balakrishnan G., “Regression Conformal Prediction under Bias” (2024+) <https://arxiv.org/abs/2410.05263>
- **Cheung, M.Y.**, Sabharwal, A., Coté, G.L. and Veeraraghavan, A., 2024. Wearable Blood Pressure Monitoring Devices: Understanding Heterogeneity in Design and Evaluation. IEEE Transactions on Biomedical Engineering.
- Topalli, G., Fan, Y., **Cheung, M.Y.**, Veeraraghavan, A., Hirzallah, M. and Chi, T., 2024. An ultrasonic transceiver for non-invasive intracranial pressure sensing. IEEE Transactions on Biomedical Circuits and Systems.
- Topalli, G., Fan, Y., **Cheung, M.Y.**, Veeraraghavan, A., Hirzallah, M. and Chi, T., 2024, February. 17.11 A 9mW Ultrasonic Through Transmission Transceiver for Non-Invasive Intracranial Pressure Sensing. In 2024 IEEE International Solid-State Circuits Conference (ISSCC) (Vol. 67, pp. 334-336). IEEE.
- Alemohammad, S., Babaei, H., Balestrieri, R., **Cheung, M. Y.**, Humayun, A. I., LeJeune, D., ... & Baraniuk, R. G. (2021, June). Wearing a mask: Compressed representations of variable-length sequences using recurrent neural tangent kernels. In ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP) (pp. 2950-2954). IEEE.

Patents

- Taiyun, C.H.I., **Cheung, M.Y.**, Topalli, G., Veeraraghavan, A. and Hirzallah, M., Baylor College of Medicine and William Marsh Rice University, 2025. Portable non-invasive intracranial pressure sensor. U.S. Patent Application 19/047,399.

Poster Presentations

- **Cheung M.Y.**, Netherton T.J., Court L.E., Veeraraghavan A. & Balakrishnan G., Metric-guided Image Reconstruction Bounds via Conformal Prediction (Poster). AI in Healthcare Conference, Rice University, Sep 12 2024.
- **Cheung, M.Y.**, Sabharwal A., Coté G.L. & Veeraraghavan A., “Wearable Blood Pressure Monitoring: Understanding Heterogeneity in Evaluation” (Poster). Digital Health Workshop, Rice University, Sep 13 2023. And Aug 27 2024
- **Cheung M.Y.**, Netherton T.J., Court L.E., Veeraraghavan A. & Balakrishnan G., Metric-guided Image Reconstruction Bounds via Conformal Prediction (Poster). Digital Health Initiative: Health Equity Workshop, Rice University, Apr 23 2024.
- **Cheung M.Y.**, Netherton T.J., Court L.E., Veeraraghavan A. & Balakrishnan G., Uncertainty Quantification in Radiotherapy Planning (Poster). 33rd Keck Annual Research Conference, Rice University, Oct 20 2023.

Invited Talks

- “Getting a handle on hallucinations for medical image reconstruction” – Vanderbilt DBMI Grand Rounds, Nashville TN, Apr 16 2024.
- “Towards Trustworthy Medical Imaging” Unpacking Digital Twins in Oncology – Challenges and Perspectives Workshop, AI in Healthcare Conference, Houston TX, Sep 12 2024.

- “Wearable Blood Pressure Monitoring: Understanding Heterogeneity in Design and Evaluation” 46th Annual International Conference of the IEEE Engineering in Medicine and Biology, Orlando FL, Jul 18 2024.

Professional Experience

Quality Reliability Engineering Intern, Texas Instruments, Dallas TX Jun 2019 – Sep 2019

- Applied technical knowledge of Packaging, Device Physics, Assembly BOM Material, Risk Assessment, Qualifying Standards (QSS-009-501, AEC-Q100), and Qualification by Similarity (QBS) for assessing quality of high volume semiconductor device production
- Developed and applied statistical drift analysis techniques for High Voltage Power Gate Driver reliability customer mission profiles
- Designed system level Reliability test procedures for failure mechanisms of new and existing products
- Developed String Similarity and Clustering Algorithms for Data Cleanup and Integrity
- Developed database tools for data transform and automation

Software Development Intern (R&D, Engineering), [Enovix Corporation](#), Fremont CA

Jun. 2017 – Sep. 2017, Dec. 2017 – Jan. 2018, Jun. 2018 – Sep. 2018, Dec. 2018 – Jan. 2019

- Worked on next-generation lithium-ion batteries using new 3D cell architecture and high-capacity silicon anode to increase energy density and improve safety.
- Developed tools and analyzed Electrochemical Impedance Spectroscopy Data for cell component characterization, cell modeling (electrical analogs), process control, failure detection and process improvement
- Developed Signal Processing and Feature Extraction algorithms for Metrology
- Developed curve fitting and learning algorithms to predict battery fade at earlier stages of testing
- Automated data extraction, processing and visualization for important lithium-ion battery and semiconductor wafer manufacturing parameters such as Statistical Process Control Charts, Pareto Charts and Trend Plots
- Updated and maintained SQL databases
- Integrated Python and VBA for live process control

Mentoring

- Adilkhan Kairzhan (Rice ECE, May 2025 - Present)
- Leslie Espinoza (Rice Statistics, Apr. 2025 - Aug. 2025)
- Luke Yuen (Rice MECH, REU, May 2023 - Dec. 2024, now pursuing an MS in Mechanical Engineering at Stanford)
- Rachel Gu (Rice ECE, REU, May 2023 - Dec. 2024, ECE Distinction in Research and Creative Work, now Engineer at Tetra Tech)
- Cindy Pineda (Lone Star Community College Biotechnology, [NSF START](#), Nov 2023 - August 2024)
- Desiree Gutierrez (TAMU, [PATHS-UP](#) REU, May 2023 - July 2023)

Honors and Awards

- D2K Mentoring Fellowship (August 2024, January 2025)
- Appointed to the [National Library of Medicine \(NLM\) Training Program in Biomedical Informatics and Data Science](#) (June 2023, June 2024)
- [PATHS-UP](#) Fellow (2022, 2023, 2024, 2025)
- [PATHS-UP](#) Student Seed Fund Award (October 2023)
- Graduate Student Distinguished Mentoring Fellowship (October 2023)
- Rice Fellow (Aug. 2020)
- John Eric Peckham Memorial Scholarship, UC Davis Undergraduate and Prestigious Scholarships (Sep. 2019)
- Joseph Bonnheim Memorial Scholarship, UC Davis Undergraduate and Prestigious Scholarships (Sep. 2016, Sep. 2017, Sep. 2018, Oct. 2019)
- Outstanding Senior Design Project Award, UC Davis Department of Electrical & Computer Engineering (May. 2019)

- Texas Instruments Scholar Award, UC Davis Department of Electrical & Computer Engineering (May. 2019)
- Arthur & Julia Suran Endowment Scholarship, UC Davis College of Engineering (Aug. 2018). Recipients are selected by the faculty of the Department of Electrical and Computer Engineering.
- Scholarship for Outstanding Performance in Major, UC Davis Department of Chemistry (May. 2016)
- Kraft Prize, UC Davis Undergraduate Scholarships, Honors and Prizes (Jan. 2016). Given to freshmen, who in their first quarter of attendance at UC Davis, have achieved the highest grade point averages.
- ESF Chairman's Award for Academic Excellence, English Schools Foundation (Aug. 2015). Awarded to IB Diploma Programme (IBDP) Candidates, affiliated with the English Schools Foundation, who attained 42 or above out of a maximum score of 45