Andrew L. Hitt, Ph.D.

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EDUCATION

Ph.D. in Materials Engineering Jan 2019 to Dec 2024
Rice University, Department of Materials Science and Nano-Engineering
Thesis: "Computational Analysis and Prediction of Defect Distribution
in Energy and 2-D Materials"
Committee: Ming Tang, Hanyu Zhu, Shengxi Huang

Sc.M. in Materials Science Sept 2017 to May 2018
Brown University, School of Engineering

Sc.B. with Honors in Materials Engineering Sept 2013 to May 2017
Brown University
Thesis: "A Novel Methodology for Investigating the Effects of Stress on
Surface Feature Nucleation and Growth in Sn"

International Asia Studies Program Sept 2015 to Dec 2015
The Chinese University of Hong Kong

RESEARCH EXPERIENCE

Mesoscale Materials Research Group Jan 2019 to Present
Rice University, Department of Materials Science and Nano-Engineering
PI: Prof. Ming Tang

- Derived geometric algorithms for predicting the shape and location of important features within 2D crystals from early-stage microscopy images
- Developed and maintained a Python package for efficient 2D crystal growth simulation to aid in machine learning and crystal analysis
- Constructed specialized analytical pipelines for high-throughput processing of nanotomography and *in situ* optical microscopy data
- Trained and refined machine learning models for prediction of material properties (e.g., grain boundary density) and detection of complex features

Chason Lab June 2016 to May 2018
Brown University, School of Engineering
PI: Prof. Eric Chason

- Developed an automated system for collecting and analyzing surface images, thermocouple readings, and stress measurements in situ for thin film thermal stress experiments
- Conducted experiments to quantify the relationship between stress and surface feature density in tin thin films

Operations, Information and Decisions Department 2014, 2015, 2018
University of Pennsylvania, Wharton School of Business
PI: Prof. Lynn Wu

- Analyzed the relationship between employee social networking, position within corporate hierarchy, and compensation
- Measured the influence of data literacy on corporate productivity metrics

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TEACHING AND MENTORING EXPERIENCE

Private Tutor   Nov 2020 to Sept 2024
Academic Coaching, Inc.
Subjects: Math, Physics, Chemistry, Computer Science; Standardized Testing

Research Instructor, AFOSR Workforce Development Program   March 2022 to Aug 2023
Rice University & Air Force Office of Scientific Research
Project: "AI-Assisted Image Analysis for 2D Materials Applications"
- Supervised a multidisciplinary team of four undergraduates from Rice University and University of Houston working on 2D materials analysis
- Produced a training curriculum for undergraduate researchers which covered scientific computing, machine learning, and image processing

Mentor, Research Experience for Community College Students   May 2022 to Aug 2022
Rice University, Office of STEM Engagement
Project: "Developing Methods of Analysis for the Growth of in-situ 2D Crystals"
- Supervised a student from San Jacinto College who contributed to a research project involving the geometric analysis of 2D crystal images

Mentor   Jan 2019 to May 2019
Rice University, Mesoscale Materials Research Group
Project: "Reconstruction of Polycrystalline Micrographs using Generative Adversarial Networks"
- Advised an undergraduate student from Rice University on their research project using adversarial networks to simulate grain growth

Graduate Teaching Assistant   Sept 2017 to Dec 2017
Brown University, School of Engineering
Course: Introduction to Materials Science (ENGN 0410)

SKILLS

Programming Languages: Python, C++; some experience with C#, Java, Ruby, Visual Basic

Data Analysis: scientific computing (MATLAB, Anaconda); database statistics (pandas, SQL, STATA, SAS); web-scraping; network analysis (Pajek); some experience with Palantir Foundry

Image Analysis: morphological processing; pre-processing; shape analysis (OpenCV); high-dimensional analysis and visualization (ImageJ); tomography and microscopy reconstruction (Avizo)

Machine Learning: neural networks; generative models; image regression; deep learning (Keras, TensorFlow); automated machine learning (AutoKeras); hierarchical clustering (SciKit-Learn)

Computational Techniques: Finite element analysis (Abaqus); solid modeling (SolidWorks); energetic phase predictions (CALPHAD); first principles atomistic simulation (*ab init)*

Laboratory Techniques: optical microscopy; scanning electron microscopy (SEM); electrodeposition; materials characterization; *in situ* observation and analysis; systems design

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PUBLICATIONS

Hitt, A. & Tang, M., 2026. SCRYiNG: A Python Package for Simulating the Evolution of 2D Polycrystal Growth. (manuscript in preparation).

Savsatli, Y., Wang, F., Guo, H., Li, Z., **Hitt, A.**, Zhan, H., Ge, M., Xiao, X., Lee, W., Agarwal, H., Stephens, R., Tang, M., 2024. In-Situ and Operando Observation of Zinc Moss Growth and Dissolution in Alkaline Electrolyte for Zinc-Air Batteries. ACS Energy Lett. 9, 3516 – 3525.

Fan, S., **Hitt, A.L.**, Tang, M., Sadigh, B., Zhou, F., 2024. Accelerate Microstructure Evolution Simulation Using Graph Neural Networks with Adaptive Spatiotemporal Resolution. Mach. Learn.: Sci Technol. 5. https://doig.org/10.1088/2632-2153/ad3e4b

Zhang, J., Zhai, T., Arifurrahman, F., Wang, Y., **Hitt, A.**, He, Z., Ai, Q., Liu, Y., Lin, C.-Y., Zhu, Y., Tang, M., Lou, J., 2024. Toward Controlled Synthesis of 2D Crystals by CVD: Learning from the Real-Time Crystal Morphology Evolutions. Nano Lett. 24, 2465–2472. https://doi.org/10.1021/acs.nanolett.3c04016

Liu, Y., Gong, X., Podder, C., Wang, F., Li, Z., Liu, J., Fu, J., Ma, X., Vanaphuti, P., Wang, R., **Hitt, A.**, Savsatli, Y., Yang, Z., Ge, M., Lee, W.-K., Yonemoto, B., Tang, M., Pan, H., Wang, Y., 2023. Roll-to-roll solvent-free manufactured electrodes for fast-charging batteries. Joule 7, 952–970. https://doi.org/10.1016/j.joule.2023.04.006

Hitt, A., Wang, F., Li, Z., Ge, M., Zhang, Y., Savsatli, Y., Xiao, X., Lee, W.-K., Stephens, R., Tang, M., 2022. Nanotomographic observation and statistical analysis of overcharging induced cracks in LiCoO2 single crystalline particles. Energy Storage Materials 52, 320–328. https://doi.org/10.1016/j.ensm.2022.08.011

Chason, E., Pei, F., Jain, N., **Hitt, A.**, 2019. Studying the Effect of Grain Size on Whisker Nucleation and Growth Kinetics Using Thermal Strain. J. Electron. Mater. 48, 17–24. https://doi.org/10.1007/s11664-018-6594-x

Chason, E., Vasquez, J., Pei, F., Jain, N., **Hitt, A.**, 2018. Quantifying the Effect of Stress on Sn Whisker Nucleation Kinetics. J. Electron. Mater. 47, 103–109. https://doi.org/10.1007/s11664-017-5802-4

ABSTRACTS

Wang, F., Ge, M., **Hitt, A.**, Xiao, X., Guo, H., Lee, W.-K., Savsatli, Y., 2021. Visualization of Mossy Zinc Electroplating Structure Evolution Via Operando Nanotomography. Meet. Abstr. MA2021-01, 265. https://doi.org/10.1149/MA2021-014265mtgabs

REFERENCES

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  Rice University

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Dr. Eric Chason
  Professor of Engineering
  School of Engineering
  Brown University

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