Exponent®
Engineering & Scientific Consulting

Dominick Guida, Ph.D.

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Professional Profile

Dr. Dominick Guida is a chemical engineer specializing in energy storage systems. He has extensive experience in obtaining commercially relevant insights from intricate datasets using custom-built analytical scripts. His focus is on characterizing complex phenomena within batteries, determining their impact on cell performance and safety, and translating those findings into predictive computational models at the cell level.

Prior to joining Exponent, Dr. Guida worked with an industry-leading battery manufacturer to study the degradation mechanisms and effects on battery safety and performance under real-world use conditions. During this time, he studied internal discharge mechanisms across different length scales using advanced characterization techniques, including X-ray tomography and diffraction, and developed a suite of analytical tools to extract quantitative insights from complex datasets. This resulted in a data processing pipeline that is currently being utilized for product development at a globally relevant battery manufacturer.

Beyond data collection and analysis, Dr. Guida utilized quantitative battery results in developing physics-based computational models capable of predicting battery performance and identifying possible points of failure with high accuracy under a range of conditions.

Dr. Guida completed his Ph.D. in chemical engineering at Northeastern University. There, he focused on data-driven model development for Zn-MnO2 batteries to predict critical performance metrics under real-world use conditions. The resulting high-fidelity model became an invaluable tool in product development centered on expanding the battery's optimal operating conditions.

Academic Credentials & Professional Honors

Ph.D., Chemical Engineering, Northeastern University, 2024

B.Ch.E., Chemical Engineering, University of Delaware, 2020

Prior Experience

Graduate Research Assistant, Northeastern University, 2020-2024

Publications

Guida, D. P.; Stewart, L. M.; Okasinski, J. S.; Wendling, M. T.; Chadderdon, X. H.; Gallaway, J. W. Modeling High Current Pulsed Discharge in AA Battery Cathodes: The Effect of Localized Charging during Rest. ACS Applied Energy Materials, 2025.

Guida, D. P.; Stavola A. M.; Chuang, A. C.; Okasinski, J. S.; Wendling, M. T.; Chadderdon, X. H.; Gallaway, J. W. Methods for tomographic segmentation in pseudo-cylindrical coordinates for bobbin-type batteries. ACS Measurement Science Au, 2023, 3, 5.

Guida, D. P.; Chuang, A. C.; Okasinski, J. S.; Wendling, M. T.; Chadderdon, X. H.; Gallaway, J. W. Discharge intermittency considerably changes ZnO spatial distribution in porous Zn anodes. Journal of Power Sources, 2023, 556, 232460.

Stavola, A. M.; Sun, X.; Guida, D. P.; Bruck, A. M.; Cao, D.; Okasinski, J. S.; Chuang, A. C.; Zhu, H.; Gallaway, J. W. Lithiation Gradients and Tortuosity Factors in Thick NMC111-Argyrodite Solid-State Cathodes. ACS Energy Letters. 2023, 8, 1273-1280.

Presentations

Guida, D. P.; Gallaway, J. W. Quantitative Analysis of Tomographic Images for Understanding Discharge Phenomena in Alkaline Zn-MnO2 Batteries. Presented at the 2023 Materials Research Society Fall Meeting, Boston, MA, November 2023.

Guida, D. P.; Gallaway, J. W. Density and Volume Fraction Distribution of ZnO Discharge Products in Cylindrical Alkaline Battery Anodes After Intermittent Use. Presented at the 242nd Electrochemical Society Meeting, Atlanta, GA, October 2022.

Guida, D. P.; Gallaway, J. W. Using High Energy X-Ray White Beam Tomography to Quantify the Location and Morphology of ZnO Discharge Products in Alkaline Batteries. Presented at the 241st Electrochemical Society Meeting, Vancouver, CA, June 2022.