

Talia Amari Thomas

Ph.D. Candidate

George W. Woodruff School of Mechanical Engineering

Georgia Institute of Technology

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Date: September 2, 2026

Education

Ph.D. in Mechanical Engineering

Expected: Spring 2027

Georgia Institute of Technology | Atlanta, GA

Research Advisor: Matthew T. McDowell, Ph.D.

Thesis: Investigating Catalyst-Driven Graphitization of Lignocellulosic – Derived Carbons for High Performance Active Materials in Lithium-Ion Batteries

B.S. in Mechanical Engineering (Summa Cum Laude)

May 2019

North Carolina Agricultural & Technical State University | Greensboro, NC

Honors College

Employment History

08/2022-Present: Graduate Research Assistant in the McDowell Battery Laboratory, Georgia Institute of Technology, Atlanta GA

08/2023-Present: Laboratory Safety Manager in the McDowell Battery Laboratory, Georgia Institute of Technology, Atlanta GA

08/2021-05/2022: Chemistry Research Associate II at Zymogen, Cambridge, MA

06/2019-08/2021: Maintenance Engineer at Dow, Inc., Texas City, TX

01/2019-05/2019: Undergraduate Researcher in the North Carolina Renewable Ocean Energy Program, Coastal Studies Institute, NC

05/2018-08/2018: Industrial Solutions Reliability Intern at Dow, Inc., Lake Jackson, TX

05/2017-08/2017: Undergraduate Researcher in the Massachusetts Institute of Technology Summer Research Program (MSRP), Cambridge, MA

05/2016-08/2016: Product Development Intern at the General Electric Company (GE) Global Research, Niskayuna, NY

Honors & Awards

Women of Woodruff Fellowship Award	2026
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GT Strategic Energy Institute Spark Award	2025
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Georgia Tech Pathbreakers Fellow (Formerly UCEM), Georgia Institute of Technology	2024
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Flowers Fellowship, Georgia Institute of Technology	2024
Department Award for Service and Leadership, Georgia Institute of Technology	2024
NSF GRFP Honorable Mention, National Science Foundation	2024
Renewable Bioproducts Institute (RBI) Fellow, Georgia Institute of Technology	2023
Woodruff Interdisciplinary Research (IRF) Fellow, Georgia Institute of Technology	2022
Georgia Tech President's Fellow, Georgia Institute of Technology	2022
Dow AIChE Rising Star Award, Dow, Inc. & AIChE	2020
Dow Employee Resource Site Implementation Leader, Dow, Inc.	2019
Engineer of the Year Award, North Carolina A&T State University	2019
White House HBCU Scholar Nominee, U.S. Department of Education	2018
Stanford University Innovations Fellow, Stanford University	2017

Publications

1. D. Nam, D. Roh, E. Hwang, **T. A. Thomas**, M. Yen, W. J. Jeong, M. T. McDowell, "Active Hard Carbon with Void-Confined Tin for Sodium-Ion Battery Anodes," *Submitted*.
2. **T. A. Thomas**, Q. X. Tran, V. M. Thomas, S. Nair, M. T. McDowell, "Toward Sustainable Batteries: Process, Life Cycle, and Technoeconomic Analyses of Carbonized Lignin as an Alternative to Synthetic Graphite for Anode Materials," *ACS Sustainable Chem. Eng.* (2026). DOI: [10.1021/acssuschemeng.6c05806](https://doi.org/10.1021/acssuschemeng.6c05806)
3. **T. A. Thomas**, P. Ellison, D. Nam, J. Pepas, G. Zhang, S. G. Yoon, K. A. Cavallaro, E. P. Alsaç, H. Chen, M. T. McDowell, "Effect of Biomass Precursor Properties on Fe-Catalyzed Pyrolytic Graphite Behavior for Lithium-Ion Battery Anodes," *MRS Energy & Sustainability* (2026). DOI: [10.1557/s43581-026-00161-w](https://doi.org/10.1557/s43581-026-00161-w)
4. E. P. Alsaç, A. K. Sharma, S. G. Yoon, B. S. Vishnugopi, C. Wang, **T. A. Thomas**, D. L. Nelson, U. D. Eze, W. J. Jeong, J. M. Harris, P. P. Mukherjee, M. T. McDowell, "Linking Pressure to Electrochemical Evolution in Solid-State Conversion Cathode Composites." *ACS Appl. Mater. Interfaces* 18 (2025) 1626-1640. DOI: [10.1021/acsami.5c20956](https://doi.org/10.1021/acsami.5c20956).
5. S. G. Yoon, D. L. Nelson, W. J. Jeong, S. E. Sandoval, **T. A. Thomas**, K. A. Cavallaro, E. P. Alsaç, J. Shin, M. T. McDowell, "Deformable sodium metal current collectors for lithium solid-state batteries" *Matter* (2025) 102463. DOI: [10.1016/j.matt.2025.102463](https://doi.org/10.1016/j.matt.2025.102463).
6. S. G. Yoon, B. Vishnugopi, D. L. Nelson, A. X. B. Yong, Y. Wang, S. E. Sandoval, **T. A. Thomas**, K. A. Cavallaro, P. Shevchenko, E. P. Alsaç, C. Wang, A. Singla, J. Greer, E. Ertekin, P. Mukherjee, M. T. McDowell, "Interface morphogenesis with a deformable secondary phase in solid-state lithium batteries," *Science* 388 (2025) 1062-1068. DOI: [10.1126/science.adt5229](https://doi.org/10.1126/science.adt5229)
7. S. E. Sandoval, D. L. Nelson, H. Sridhara, **T. A. Thomas**, J. Lewis, K. A. Cavallaro, P. Shevchenko, N. Dasgupta, F. Usseglio-Viretta, D. Finegan, M. T. McDowell, "Visualizing Diverse Lithium Growth and Stripping Behaviors in Anode-Free Solid-State Batteries with Operando X-ray Tomography," *EES Batteries* 1 (2025) 1809-1821 DOI: [10.1039/D5EB00111K](https://doi.org/10.1039/D5EB00111K).
8. D. L. Nelson, S. E. Sandoval, J. Pyo, D. Bistri, **T. A. Thomas**, K. A. Cavallaro, J. A. Lewis, A. S. Iyer, P. Shevchenko, C. V. Di Leo, M. T. McDowell, "Fracture dynamics in silicon anode solid-state batteries," *ACS Energy Letters* 9 (2024) 6085-6095 DOI: [10.1021/acsenenergylett.4c02800](https://doi.org/10.1021/acsenenergylett.4c02800)

Publications (In Progress)

1. **T. A. Thomas**, N. Yutthasaksunthorn, K. Su Khin Zaw, S. Nair, M. T. McDowell, “Depolymerization-assisted Catalytic Graphitization of Lignin-based Anodes for Lithium-Ion Batteries,” *In Preparation*.

Patents & Invention Disclosures

1. **T. A. Thomas**, M. T. McDowell, Q. X. Tran, S. Nair, V. Thomas, “Wood-Derived Hard Carbon Anodes for High Performance Batteries” *Invention Disclosure*, 5/6/2025

Presentations

1. **T. A. Thomas**, Q. X. Tran, J. Pepas, G. Zhang, M. T. McDowell, S. Nair, V.M. Thomas, H. Chen, “Unlocking the Potential of Carbonized Lignin for Sustainable Battery Anodes—Coupling Life Cycle and Economic Assessments with Technical Advancements,” *Materials Research Society Spring Meeting*, April 2025, Oral Presentation
2. **T. A. Thomas**, Q. X. Tran, J. Pepas, G. Zhang, M. T. McDowell, S. Nair, V.M. Thomas, H. Chen, “Carbonized Lignin Anodes for Lithium-ion Batteries,” *Universidad Católica del Norte, Chile*, April 2025, Oral Presentation
3. **T. A. Thomas**, “Carbonized Lignin Hard Carbon Anodes for High Performance Batteries,” *Renewable Bioproducts Institute Conference*, March 2024, Poster Presentation
4. **T. A. Thomas**, “Functionalized Cellulose Matrices for Battery Materials,” *Georgia Tech Battery Day*, March 2023, Poster Presentation
5. **T. A. Thomas**, J. Pagan-Torres, D. Page, W. Rouse, R. Schulters, J. Thomas, “Optimization and Modeling of Rotating Mass Power Generation System for Off-Shore Wave Energy Harvesting on North Carolinian Coasts,” *NC Renewable Ocean Energy Program*, Spring 2019, Poster Presentation
- **1st Place Technical Poster, 2nd Place Overall**
6. **T. A. Thomas**, C. Cutlip, J. Kongoletos, Ph.D., L. Glicksman Ph.D, “Integrating Exterior Shading Techniques for Thermal Comfort” MIT MSRP Symposium & NSBE Technical Research Exhibition, August 2017 & March 2018

Invited Talks

1. “**Pathways to Sustainable Invention Series**” - Lemelson Foundation, Beyond Benign, NOBCCHE, October 14, 2021

Grants

1. Title of Project: Development and Electrochemical Investigation of Low-Temperature Graphitized Carbon Anodes from Starch Precursors
Company: Archer Daniels Midland (ADM)
Total Dollar Amount: \$ 250,000
Role: Co-author & Key Personnel

Period of Contract: 10/2026–04/2028

Community Service, Outreach, Involvement

- **Member**, North Carolina A&T State University Honors College Scholarship Review Committee, Fall 2021 - Spring 2026
- **Member**, Eugene C. Gwaltney, Jr, School Chair Search Committee, 2025
- **STEM GEMS Summer Camp Facilitator**, STEM GEMS camp at Georgia Tech, Summer 2025
- **President & Vice President of Recruiting**, GT Mechanical Engineering Graduate Student Association, Fall 2023 – Spring 2025
 - o Represent 900+ graduate students by leading professional development, social, and academic success initiatives, and supporting prospective student engagement.
- **GT Summer Undergraduate Research Experience (S.U.R.E.) Mentor**, Georgia Tech – Summer 2024
- **Board Member**, Woodruff School Community & Culture Advisory Board, Spring 2024 – Spring 2026
- **College Entrance Advisor**, Freelance Volunteering, Fall 2022 – Present
 - o Assisted several high school seniors each year in maneuvering the undergraduate application process by offering advisement on essay construction, community involvement, and scholarship identification
 - o \$500,000+ awarded in scholarships and over 50 acceptances cumulatively
- **Student Ambassador**, NC A&T College of Engineering, Spring 2018 – Spring 2019
- **Vice President**, Engineers Without Borders – NCA&T Chapter, Spring 2017 – Spring 2019
- **Global Impact Chair**, Alpha Kappa Alpha Sorority, Incorporated – NCA&T Chapter, Spring 2017- Spring 2019
- **Co-Captain**, North Carolina A&T State University Cheerleading, Spring 2016 – Spring 2019
- **Co-Founder**, Restoring Hope Outreach Program, Baltimore, MD, Fall 2013 – Spring 2019

Teaching Experience

Student Instructor, Georgia Tech – ME/MSE/ChBE/CHEM 4759 Electrochemical Energy Storage & Conversion | Spring 2026

- Delivered lectures on the fundamentals of electrochemical energy storage to a class of 45 students (student feedback: 4.5/5).
- Developed and implemented the final group project and expanded course content to incorporate life cycle assessments, techno-economic analysis, and circularity; created original lecture materials.

STEM Learning Pod Facilitator | Virtual - Fall 2020 – Spring 2022

- Observed and evaluated student performance in middle-school STEM courses
- Enhanced student engagement by offering a variety of instructional approaches and daily review sessions
- Evaluated and modified review plans to create a student-centered learning environment

Student Instructor, North Carolina A&T – MATH 101/102 | Fall 2017 – Spring 2019

- Develop and implement lesson plans for college students enrolled in Math 101/102
- Prepare students for upcoming state and national standardized tests

Individual Student Guidance

1. Lucille Dentice (Undergraduate)
 - Graduated: Spring 2024
 - Current Title: Ph.D. Student at University of Illinois – Urbana Champaign
 - Research Topic: TEMPO-oxidized cellulose nanofibers as a binder additive for silicon anodes in lithium-ion batteries
 - Awards: President’s Undergraduate Research Award
2. Anna Burson (Undergraduate)
 - Graduated: Spring 2025
 - Current Title: Ph.D. Student at University of California, Berkeley
 - Research Topic: Functionalized carbon anodes for flow cell energy storage applications
 - Awards: President’s Undergraduate Research Award, NSF GRFP
3. Phoebe Ellison (Undergraduate)
 - Graduated: Spring 2026
 - Current Title: Master’s Student at Georgia Tech
 - Research Topic: Lignin-based anode materials for lithium-ion batteries
4. Jiweon Kim (Graduate)
 - Current Title: Master’s Student at Georgia Tech
 - Research Topic: Hard carbon anode materials for sodium-ion batteries

Affiliation & Membership

Materials Research Society	Jan 2025-Present
Georgia Tech Mechanical Engineering Graduate Association	Aug 2022-Present
Alpha Kappa Alpha Sorority, Incorporated	Mar 2017-Present
National Society of Black Engineers	Aug 2015-Present
American Society of Mechanical Engineers	Aug 2015-Present

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