

Echo St. Germain

PhD Student at Northeastern University

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Education

Doctor of Philosophy in Mechanical Engineering

Northeastern University, Boston MA

Materials Science Concentration

Recipient of a Chair's Fellowship

Sep 2023–

May 2028

Bachelor of Science in Mechanical Engineering

Northeastern University, Boston MA

Minors in History and Mathematics

Recipient of a Connections Merit Scholarship

Sep 2018–

May 2023

Work Experience

Communication Lab Fellow

Northeastern University, Boston, MA

Prof. Carter

- Holding weekly office hours to assist students in creating posters which highlight research while also being visually appealing
- Bookable for up to 5 hours a week to assist students in fellowship applications, presentations, literature reviews, and resumes
- Presenting workshops to students involved in the Platforms for Exchange and Allocation of Resources (PEAR) research traineeship program
- Created and presented a 1-hour workshop for students presenting at the COE PhD Research Expo/ the NU Impact Symposium as part of a 4-session poster workshop series

Nov 2024–

Present

Graduate Research Assistant

Northeastern University, Boston, MA

Prof. Levendis and Prof. Erb

- Exploring the combustion of iron particles as a source of clean energy storage and generation
- Investigating the formation of nanoparticles due to iron combustion
- Mentoring students interested in undergraduate research for credit

Sep 2023–

Present

R&D Materials Engineer

Fourier LLC, Boston, MA

- Continued the development of a novel thermoformable ceramic for thermal management applications

June 2022–

Aug 2023

Materials Engineering Co-op

Fortify, Boston, MA

- Assisted with various tasks in the formulation and printing workflow by setting up prints, post-processing parts, and performing material characterization using optical microscopes and tensile testing
- Explored the relationship between partly cured resin and various cleaning solvents

Jan 2022–

June 2022

Undergraduate Research Assistant

Northeastern University, Boston, MA

Prof. Erb

- Created ceramic resin samples using a custom vibration table and examined particle alignment after various vibration patterns using SEM imaging

Aug 2021–

Dec 2021

- Designed modifications to a vibrating base to reduce dampening, reducing variables that impact residence frequency
- Improved a Python script used to control the power of six motors by creating more power level options users
- Ran SolidWorks simulations on a spring base designed to offset the weight of the vibrators with minimal dampening

Hardware and Production Engineering Co-op

Jan 2021–
June 2021

Hydrow, Inc, Cambridge, MA

- Assembled a new optical encoder onto a flywheel using a code wheel and 3D printed parts designed in SolidWorks
- Researched various clutch and encoder methods to present the pros and cons to the hardware and production team
- Improved three testing rigs in the HydrowLabs by understanding how they operate and modifying CAD files
- Documented multiple independent experiments conducted on the Hydrow and shared the findings with other engineers

Mechanical Engineering Co-op

Jan 2020–
June 2020

Zaiput Flow Technology, Waltham, MA

- Reviewed and created new SolidWorks drawing files, parts, and assemblies following the ASME Y14.5M standards
- Assisted in the start of a new product idea going from theoretical math, SolidWorks drawings, 3D printed resin parts and conducting experiments in the early testing phase
- Researched Lean manufacturing and implemented approximately 100 unique Kanban cards to make inventory management less prone to errors
- Wrote standard operating procedures for the next intern detailing how to laser cut various materials and put together membranes

Teaching Assistant for Cornerstone of Engineering 1

Sep 2019–
Dec 2019

Northeastern University, Boston, MA

- Graded C++ programs and AutoCad drawings and gave relevant feedback to the students giving them a better understanding of their progress in the coursework
- Held office hours in the First Year Engineering Learning and Innovation Center to guide current freshmen with projects and assist the professor in grading exams

Publications

[1] D. Chang*, **E. St. Germain***, R. M. Erb, X. Mi, J. M. Bergthorson, Y. A. Levendis. An experimental study on the ignition temperature of iron particles in an electrically-heated drop-tube furnace. *Fuel*. 2026 <https://doi.org/10.1016/j.fuel.2025.136199>. *Co-first authors

[2] JE Bice, **E St. Germain**, SJ Wohlever , G Goddard , RM Erb. Thermoformable Boron Nitride Based All-Ceramics. *Adv Mater*. 2022 <https://doi.org/10.1002/adma.202203939>

Presentations

2025 MRS Fall Meeting & Exhibit, Materials Research Society. *Investigating the Combustion Synthesis of Iron Oxide Nanoparticles Within the Iron Fuel Cycle* E. St. Germain, R. Erb, Y. Levendis. Dec 2025

14th U.S. National Combustion Meeting, Eastern States Section of the Combustion Institute. *Effects of Heating Rate and Oxide Layer Growth on the Ignition of Iron Powder* St. Germain, E. Erb, R. Levendis, Y. March 2025

2024 MRS Fall Meeting & Exhibit, Materials Research Society. *Exploring the Practicality of Iron as a Sustainable Replacement to Coal* E. St. Germain, R. Erb, Y. Levendis. Dec 2024

Mechanical and Industrial Engineering Graduate Research Expo, Northeastern University. <i>Generation of Iron Oxide Nanoparticles Through Iron Combustion</i> E. St. Germain, R. Erb, Y. Levendis.	Oct 2024
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Posters

Mechanical and Industrial Engineering Graduate Research Expo, Northeastern University <i>Generation of Iron Oxide Nanoparticles Through Iron Combustion</i> E. St. Germain, R. Erb, Y. Levendis. <u>Won best poster award</u>	Oct 2024
Radcliffe Science Symposium on Alternative Energy, Harvard University. <i>An Overview of the Iron Fuel Cycle</i> E. St. Germain, R. Erb, Y. Levendis.	Sep 2024
Princeton-Combustion Institute Summer School, Princeton University. <i>Understanding Rapid Iron Oxidation During Various Combustion Conditions for a Carbon-Free Energy Cycle</i> E. St. Germain, R. Erb, Y. Levendis.	June 2024
RISE, Northeastern University <i>On the Performance of the Iron Fuel Cycle by Examining Combustion Products</i> E. St. Germain, J. Rossilli, R. Erb, Y. Levendis.	April 2024
ASEE Northeastern Section Conference, Fairfield University. <i>Byproduct Generation in the Iron Fuel Cycle: Research and Outreach</i> E. St. Germain, D. Chang, R. Erb, Y. Levendis.	April 2024
Mechanical and Industrial Engineering Graduate Research Expo, Northeastern University. <i>Understanding Rapid Iron Oxidation During Various Combustion Conditions for a Carbon-Free Energy Cycle</i> E. St. Germain, D. Chang, A. Panahi, R. Erb, Y. Levendis.	Oct 2023
Mechanical Engineering Capstone Day, Northeastern University "Vibration-Assisted Tape Casting and Printing of Ceramics" C. Bucci, J. Ly, E. St. Germain, O. Woktunik, B. Zhang	Dec 2022

Leadership

Outreach Coordinator <i>Engineering for Women's Health Conference, Northeastern University</i>	June 2024– Sept 2024
- Served on the program committee as the outreach coordinator for the 2024 Engineering for Women's Health Conference, a one-day event focused on highlighting research into women's health and the importance of this work - Assisted in event preparation and created a mentor/mentee speed dating activity for undergraduate and graduate students to meet with professors right before the event	
Rho Gamma Coordinator <i>Panhellenic Council, Northeastern University</i>	Feb 2021– Dec 2021
- Interviewed and trained seventy students during the spring and summer, preparing them to be recruitment guides in the fall - Aided the recruitment guides in assisting over five hundred students in meeting the ten national sororities on campus	
Data Team Lead <i>Sunrise Movement, Northeastern University</i>	Jul 2020– Jun 2021
Participated in national meetings to review financial regulations in political campaigning	
Rho Gamma (Recruitment Guide) <i>Panhellenic Council, Northeastern University</i>	Aug 2020– Nov 2020
Co-lead a group of twenty college students through the Northeastern Sorority recruitment process	

Educational Programming Co-Chair

Sigma Sigma Sigma, Northeastern University Chapter

Jan 2019–

May 2020

- Organized and advertised educational opportunities for fellow members of Sigma Sigma Sigma to participate in
- Ensured all members attended a minimum of 5 non-academic educational events

Mentorship / Outreach

Young Scholar Program Mentor

Northeastern University

July 2025–

Aug 2025

- Mentored two high school seniors as part of the YSP outreach program
- Spent ~ 100 hours with the students assisting them in understanding the goals of the research, big picture motivation, and important background information
- Trained the students in data analysis and sample preparation
- Provided feedback and advice for creating a poster and a short presentation

Science Fair Judge

Broadmeadow Elementary School Science Fair

Spring 2024

Fall 2025

- Volunteering yearly as an elementary school judge “connect with curious young minds and make lasting impressions as a real scientist”
- Questioning students on their thought process while creating and conducting their research along with potential next steps if they were to continue the project

Building Bridges Presenter

Northeastern University

Spring 2023

Fall 2023

Fall 2024

- Presenting to high school students as part of the yearly Building Bridges outreach program

Engineering with Fire

- Created and presented slides about energy generation and storage technologies, emphasizing iron fuel research
- Demonstrated some of the combustion principles by asking students to explain why certain phenomenon occurs with the controlled fires created in the room

Cool Materials

- Presented background information about why thermal management is critical for electronics and current lab research
- Created material for guided play with thermal changing rectangular slides, a hot plate, and various materials to place on the slides

Teaching

Petey Greene Program

Aug 2025–

Present

- Tutoring incarcerated people in college level math at the Boston Pre-Release Center
- Receiving training on methods of teaching for system-impacted people

Guess Lectures

ME 5640, Spring 2025

- "Utilizing additive manufacturing techniques to align thermally anisotropic particles"

ME 2340, Fall 2023

- "3D printing mini-lecture!"