Marquise D. Bell

mdb16@rice.edu | +1 (940) 781-0038

PhD Candidate
Department of Mechanical Engineering
Rice University

6100 Main St, Houston, TX 77005
+1 (713) 348-4906
marquisebell.com

Education

Rice University
PhD in Mechanical Engineering | GPA: 3.80/4.0 — Jul. 2020-present
Advised by Daniel J. Preston

Baylor University
BS in Mechanical Engineering | GPA: 3.71/4.0 — Aug. 2016-May 2020
Minors: Computer Science, Mathematics

Professional Experience

I am a mechanical engineering PhD candidate at Rice University in the Preston Innovation Lab. My current work focuses on the thermodynamics, heat transfer, and phase-change processes of soft materials—namely textiles—for assistive wearable devices.

Preston Innovation Lab, Rice University – Houston, TX — Jul. 2020-present
Graduate Research Assistant
Studying heat transfer, thermodynamics, materials science, and phase-change processes in soft wearable materials

NASA Visiting Technologist Experience – Cleveland, OH — Jun. 2023-Aug. 2023
Graduate Research Fellow
Performed thermal mechanical analysis on individual material layers comprising a textile-based wearable Joule heater with integrated temperature sensing as part of the NASA Space Technology Graduate Research Opportunity (NSTGRO)

NASA Visiting Technologist Experience – Houston, TX — May 2022-Aug. 2022
Graduate Research Fellow
Performed mechanical durability experiments on the wearable textile-based Joule heating materials fabricated as part of the NASA Space Technology Graduate Research Opportunity (NSTGRO)

Disney Imagineering – Glendale, CA — May 2021-Jul. 2021
Mechanical Ride Team Intern
Designed column support calculator for future ride attractions and assisted on ride designs

ExxonMobil Corporation – Spring, TX May 2019-Aug. 2019
Strategic Global Accounts Intern
Optimized account report dashboards utilizing a faster and more accurate database

BNSF Railway – Kansas City, KS Jun. 2018-Aug. 2018
Mechanical Foreman I Intern
Enhanced the materials billing method to General Electric and supervised the organization of tools through calibration and database updates

Awards and Honors

NextProf NEXUS Future Faculty Workshop – Atlanta, GA 2023
Institute of Biosciences & Bioengineering (IBB) – Travel Grant 2023
Carbon Hub Annual Meeting – Best Poster Presentation (3rd Place) 2022
MRS Fall Meeting – Institute of Physics Best Presentation Award 2022
SES Annual Technical Conference – Travel Grant 2022
NSTGRO Fellow 2021
GEM Associate Fellow 2020
Dean's List (x4), 3.75+ semester GPA 2017, 2018, 2020
Pi Tau Sigma Honor Society 2018
ExxonMobil's Future Leaders Academy 2018

Academic Activities

Publications

- T.F. Yap, A. Rajappan, **M.D. Bell**, R. Rasheed, C.J. Decker, D.J. Preston, "Thermally Accelerated Curing of Platinum-Catalyzed Elastomers," *Cell Reports Physical Science*, (*in press*), 2024
- **M.D. Bell**, K. Ye, T.F. Yap, A. Rajappan, Z. Liu, Y.J. Tao, D.J. Preston, "Rapid In Situ Thermal Decontamination of Wearable Composite Textile Materials," *ACS Applied Materials & Interfaces*, 15(37), 2023.
- R.A. Shveda,* A. Rajappan,* T.F. Yap, Z. Liu, **M.D. Bell**, B. Jumet, V. Sanchez, D.J. Preston (*Equal Contribution) "A Wearable Textile-Based Pneumatic Energy Harvesting System for Assistive Robotics," *Science Advances*, 8(34), 2022.
- B. Jumet, **M.D. Bell**, V. Sanchez, D.J. Preston, "A Data-Driven Review of Soft Robotics," *Advanced Intelligent Systems*, 2100163, 2022.

Conference Presentations

- **M.D. Bell,** S. Urbina, A. Rajappan, A.I. Eujayl, T.F. Yap, B. Jumet, M. Enriquez, D.J. Preston, "Powering Soft Wearable Robots with Thermopneumatic Body Heat Harvesting," *Robotics Gordon Research Conference*, Ventura, CA, Jan. 13-19, 2024.
- **M.D. Bell,** A.I. Eujayl, B. Jumet, A. Rajappan, T.F. Yap, E. Noce, S. Urbina, C.-L. Tran, D.J. Preston, "A Textile-Based Body Heat Recovery System to Power Wearable Soft Devices," *Society of Engineering Sciences* (*SES*) *Annual Technical Conference*, Minneapolis, MN, Oct. 8-11, 2023.
- **M.D. Bell,** K. Ye, T.F. Yap, A. Rajappan, Z. Liu, Y.J. Tao, D.J. Preston, "In Situ Thermal Decontamination of Composite Textile Materials as Reusable PPE," *Carbon Hub Annual Meeting*, Houston, TX, May 05, 2023. (**Best Poster Prestation Award, 3rd Place**)
- V. Vo, A. Rajappan, B. Jumet, **M.D. Bell**, D.J. Preston, "Sheet-Based Fluidic Diodes for Integrated Circuitry in Soft Robots," *Rice Undergraduate Research Symposium* (*RURS*), Houston, TX, Apr. 10–12, 2023.
- **M.D. Bell,** T.F. Yap, K. Ye, A. Rajappan, C.J. Decker, Y.J. Tao, D.J. Preston, "A Heat-Based Self-Decontaminating Textile Material for Wearables," *Materials Research Society* (*MRS*) *Fall Meeting*, Boston, MA, Nov. 27 – Dec. 02, 2022. (**Institute of Physics Best Presentation Award**)
- **M. D. Bell,** T.F. Yap, A. Rajappan, C.J. Decker, D.J. Preston, "A Self-Heating Wearable Material for In Situ Thermal Decontamination**,"** *Society of Engineering Sciences* (*SES*) *Annual Technical Conference*, College Station, TX, Oct. 16–19, 2022.
- **M.D. Bell**, T.F. Yap, A. Rajappan, J.C. Hsu, C.J. Decker, V. Tat, C.T.K. Tseng, D.J. Preston, "Composite Wearable Textile Materials with Spatial Control of Joule Heating," *American Physical Society* (*APS*) *March Meeting*, Chicago, IL, Mar. 14–18, 2022.
- A.I. Eujayl, **M.D. Bell**, B. Jumet, T.F. Yap, M.P. Nemitz, V. Sanchez, A. Rajappan, D.J. Preston, "Powering Soft Wearable Devices Using Body Heat," *Gulf Coast Undergraduate Research Symposium* (*GCURS*), Houston, TX, Oct. 31, 2020.
- **M.D. Bell,** T.F. Yap, A. Rajappan, J.C. Hsu, C.J. Decker, C.T. Tseng, D.J. Preston, "Thermal Inactivation of Viruses on Self-Decontaminating Wearable Textiles," *GEM Annual Board Meeting and Conference*, Houston, TX, Sep. 09–11, 2021.

Teaching and Mentorship

Teaching

- **Rice University, MECH 587 – Guest Lecture (SP 2024)**
  Delivered a review lecture on the Navier-Stokes equations, simple solutions to the Navier-Stokes equations, Couette and Poiseuille flow, and boundary conditions.
- **Rice University, MECH 503 – TA (SP 2021)**
  Investigation of the integration of the computer into the area of design. Includes such subjects as optimization, finite element analysis, and commercial software.
- **Rice University, MECH 472 – TA (FA 2020)**
  Design and synthesis of systems based on applications of thermodynamics, fluid mechanics, heat transfer, economics, and optimization theories.
- **Baylor University, EGR 1301 – TA (FA 2019 – SP 2020)**
  Introduction to the engineering profession. Topics include engineering disciplines, ethics, the impact of technology on the world, analysis and design using a team design project, and computer-aided design and problem solving.
- **Baylor University, Center of Academic Success and Engagement – Tutor (FA 2019 – SP 2020)**
  Reviewed materials from all coursework I had attained a B+ or higher, namely: intro to computer science, intro to engineering, partial differential equations, and other engineering courses.

Undergraduate Students Advised

- **Mateo Gonzalez, Rice University** (Nov. 2023-present)
  Research Project: Patterning textiles for 2D thermal gradients
  Current Position: Materials science student at Rice University
- **Megan Enriquez, Rice University** (Sep. 2023-present)
  Research Project: Wearable textile-based heating devices for advanced spacesuit applications
  Current Position: Mechanical engineering student at Rice University
- **Cat Tran, Rice University** (Jan. 2023-Aug. 2023)
  Research Project: Thermal characterization of wearables powered by human body heat
  Current Position: Mechanical engineering student at Rice University
- **Leighton Less, Rice University** (Jun. 2022-Dec. 2022)
  Research Project: Characterization of thermal bonding for layered fabrication approaches
  Current Position: Mechanical engineering student at Rice University
- **Sofia Urbina, Louisiana Tech University** (Jun. 2022-Aug. 2022)

Research Project: Layer-based fabrication of an appendable assistive digit
Current Position: PhD student at Rice University

- **Divya Wagh, Rice University** (Mar. 2022-May 2022)
  Research Project: Creating a GUI for thermal data acquisition
  Current Position: Mechanical engineering graduate from Rice University
- **Aman Eujayl, Rice University** (Aug. 2020-Aug. 2022)
  Research Project: Harvesting human body heat to power wearables
  Current Position: PhD student at California Institute of Technology

Leadership

- Rice University Graduate Student Ambassador, *Aug. 2022-present*
- Rice University Mechanical Engineering Graduate Student DE&I Committee Member, *Aug. 2022-present*
- Rice University Graduate Student Pathways Mentor, *Jul. 2022-Apr. 2023*
- Rice University Mechanical Engineering Graduate Student Association President, *Apr. 2022-Apr. 2023*
- Rice University Black Graduate Student Association Treasurer, *Apr. 2022-Apr. 2023*
- Rice University Mechanical Engineering Graduate Student Association Treasurer, *Apr. 2021-Apr. 2022*
- "*Hirschi Men Can*" Hirschi High School Scholarship Co-Founder, *Sep. 2020*
- Baylor University Beta Beta Chapter of Pi Tau Sigma VP, *Aug. 2019-May 2020*
- Baylor University Chapter of the National Society of Black Engineers VP, *Aug. 2019-May 2020*
- Mission Waco Student Worker, *Sep. 2016-May 2020*

Journal Peer-Reviewer

- Energies
- Advanced Intelligent Systems
- Advanced Functional Materials
- ACS Applied Materials & Interfaces