Mitchell Z. **Abrams**

PhD Candidate
1504 Glacier Dr, Durham NC 27713
(845) 596-6009 | mitchell.abrams@duke.edu | mzabrams | mitchell_abrams | 0000-0001-6818-5214 | Mitchell Z. Abrams

Education

Duke University
Durham, NC

PhD Candidate in Biomedical Engineering
Aug. 2019 - Present

Advisor: Dr. Cameron R. "Dale" Bass, Injury Biomechanics Lab
Current Research Focus: Sex Differences in Crash Epidemiology, Traumatic Brain Injury, Sex-Differences in Injury Outcomes
Cum. GPA: 3.957 / 4.0

Certificate in College Teaching
Aug. 2020 - Present

Duke University
Durham, NC

B.S. in Biomedical Engineering
May 2019

Minor in Computer Science

GPA: 3.411 / 4.0

Hebrew University, Rothberg International School
Jerusalem, Israel

Nativ College Leadership Program in Israel
Summer, Fall 2014

Honors & Awards

Sept 2022 **Gundolf Beier Award**, International Research Council on Biomechanics of Injury — *Porto, Portugal*
Sept 2022 **Best Presentation in Session**, International Research Council on Biomechanics of Injury — *Porto, Portugal*

Publications and Presentations

Journal Articles (peer reviewed)

[1] **M. Z. Abrams** and C. Bass. "Female vs. Male Relative Risk of Body System Injuries in Fatal and Non-Fatal Crashes". In: International Research Council on the Biomechanics of Injury. Porto, Portugal, Sept. 2022, pp. 33–44.

[2] **M. Z. Abrams** and C. R. Bass. "fars_cleaner: A Python package for downloading and pre-processing vehicle fatality data in the US". In: *Journal of Open Source Software* 7.79 (2022), p. 4678. DOI: 10.21105/joss.04678.

[3] C. Eckersley, J. Op 't Eynde, **M. Abrams**, and C. R. Bass. "Using Wavelet Analysis to Distinguish Cavitation Acoustic Emissions From Blunt Impact Noise". In: *Journal of Biomechanical Engineering* (July 2021). ISSN: 0148-0731. DOI: 10.1115/1.4051660.

[4] **M. Z. Abrams** and C. Bass. "Female vs. Male Relative Fatality Risk in Fatal Crashes". In: International Research Council on the Biomechanics of Injury. Munich, Germany, 2020.

[5] C. P. Eckersley, J. Op 't Eynde, **M. Abrams**, A. W. Yu, M. Li, J. Yao, and C. Bass. "Acoustic Detection of Blunt Induced Cavitation in the Head". In: *International Research Council on Biomechanics of Injury*. International Research Council on the Biomechanics of Injury. Munich, Germany, 2020.

Presentations

[6] **M. Z. Abrams** and C. Bass. *Female vs. Male Relative Fatality Risk in Fatal Crashes – United States and United Kingdom*. Abstract presented at 9th World Congress of Biomechanics 2022. Taipei, Taiwan. July 2022.

[7] **M. Abrams**, A. Murray, D. Levy, J. F. Luck, D. Chowbey, J. Op 't Eynde, and C. Bass. *Improvements In Baseline Drift Removal From EOG Signal And Headset Design*. Poster presented at 2018 Human Movement Science and Biomechanics Research Symposium, Chapel Hill. Mar. 2018.

[8] J. T. D'Angelo, A. Murray, J. Op 't Eynde, J. F. Luck, **M. Abrams**, and C. Bass. *Baseline drift removal with an electrooculography headset.* Poster presented at 2017 Human Movement Science and Biomechanics Research Symposium (HMSC). Chapel Hill. Mar. 2017.

[9] J. T. D'Angelo, A. Murray, J. Op 't Eynde, J. F. Luck, **M. Abrams**, and C. Bass. *Baseline drift removal with an electrooculography headset.* Poster presented at 2017 Visible Thinking Symposium, Duke University. Durham. Apr. 2017.

Non-Refereed Conference Presentations

[10] J. Bercaw, J. Venkatraman, M. Ortiz-Paparoni, D. Sherman, R. MacDonald, J. Kait, E. Dimbath, J. Luck, C. Bir, C. Bass, and **M. Abrams**. *Low-Level Validation of an In-Ear Sensor for Measuring Head Impact Exposure in American Football*. Poster presented at 2023 Ohio State Injury Biomechanics Research Symposium. May 2023.

[11] **M. Abrams** and C. Bass. *Female vs. Male Relative Fatality Risk In Fatal Crashes: 1975-2018*. Oral presentation at 2020 Ohio State Injury Biomechanics Research Symposium. May 2020.

[12] **M. Abrams**, J. F. Luck, P. Liu, K. Matthews, A. Mehlenbacher, J. Kait, and C. Bass. *Measuring High School Football Head Impact Exposure With An Instrumented Earpiece (DASHR): A Pilot Study*. Poster presented at 2019 Ohio State Injury Biomechanics Research Symposium. May 2019.

In Press, Submitted, or In Preparation

[13] **M. Z. Abrams** and C. Bass. "Female vs. male relative fatality risk in fatal motor vehicle crashes in the US, 1975-2020". Submitted.

[14] **M. Z. Abrams**, J. Venkatraman, D. Sherman, J. R. Bercaw, M. Ortiz-Paparoni, R. E. MacDonald, J. Kait, E. Dimbath, D. Pang, A. Gray, J. F. Luck, C. A. Bir, and C. Bass. "Biofidelity and Limitations of Instrumented Boil-and-Bite Mouthguard Systems for Assessment of Rigid Body Head Kinematics during Helmeted Head Impacts". In Preparation.

[15] **M. Z. Abrams**, J. Venkatraman, D. Sherman, M. Ortiz-Paparoni, J. R. Bercaw, R. E. MacDonald, J. Kait, E. Dimbath, D. Pang, A. Gray, J. F. Luck, C. A. Bir, and C. Bass. "Biofidelity and Limitations of Instrumented Mouthguard Systems for Assessment of Rigid Body Head Kinematics". In Press.

[16] M. Ortiz-Paparoni, J. Op 't Eynde, C. Morino, **M. Abrams**, D. Pang, J. Kait, F. Pintar, N. Yoganandan, J. Moore, D. Barnes, K. Loftis, and C. R. Bass. "Expanded Combined Loading Injury Criterion for the Human Lumbar Spine Under Dynamic Compression". Submitted.

[17] J. Venkatraman, **M. Z. Abrams**, D. Sherman, M. Ortiz-Paparoni, J. R. Bercaw, R. E. MacDonald, J. Kait, E. Dimbath, D. Pang, A. Gray, J. F. Luck, C. A. Bir, and C. Bass. "Biofidelity and Limitations of Instrumented Mouthguard Systems for Assessment of Rigid Body Head Kinematics during Boxing Head Impacts". In Preparation.

Professional Service

Reviewer, Traffic Injury Prevention 2023-Present
Reviewer, Journal of Emerging Investigators 2020-Present

Teaching Experience

BME 590: Neurotrauma — *Duke University*

Course Grader *Fall 2022*
Course Teaching Assistant *Fall 2020*

Developed and gave four guest lectures through the semester on topics including data visualization, statistics, modeling data, and assessing model results. Graded and developed assignments and exams through semester.

BME 535: Biomechanical Aspects of Blast and Ballistics — *Duke University*

Course Grader *Spring 2022*
Course Teaching Assistant *Spring 2020*

Assisted in transition to online teaching due to COVID-19. Graded and developed assignments and exams through semester.

EGR 103: Computational Methods in Engineering — *Duke University*

Lab Teaching Assistant *Spring 2019*

- Assisted students during class lab sections and with troubleshooting assignments.
- Developed and ran review sessions prior to each exam.
- Graded assignments and exams.

Open-Source Software (see GitHub)

- `fars-cleaner`

Skills

Programming MATLAB, Python, LaTeX, Java, C, C++, Arduino, R, RStudio
CAD/CAM Fusion360, Solidworks, OpenSCAD, MasterCAM
FEA/FEM LS-PrePost, LS-DYNA, Ansys Workbench
Electronics/Circuits Altium Designer, Soldering, PCB Design
Manufacturing 3D Printing, Laser Cutting, CNC Machining (Mill, Lathe, Router), Carbon Fiber/Fiberglass
Multimedia Adobe Illustrator, Adobe Photoshop, Adobe InDesign, Adobe Premiere Pro, Adobe Audition, Final Cut
Miscellaneous 3D Scanning, Raspberry Pi, Micro-CT Scanning, Home Automation (Home Assistant), Docker, Git, JupyterLab