

Lee F. Gabler, Ph.D.

Curriculum Vitae

Biocore, LLC
1627 Quail Run
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EDUCATION

- PhD Mechanical and Aerospace Engineering 2017
University of Virginia, Charlottesville, Virginia
Dissertation Title: *Development of Improved Metrics for Predicting Brain Strain in Diverse Impacts*
- BA Physics and Mathematics (*Summa Cum Laude*) 2011
Department of Physics and Astronomy
State University of New York (SUNY) College at Geneseo

PROFESSIONAL EXPERIENCE

- Senior Engineer 2017 – Present
Biocore, LLC
Charlottesville, VA
- Graduate Research Assistant 2011 – 2017
University of Virginia, Center for Applied Biomechanics
Charlottesville, VA
- Undergraduate Research Assistant 2009 – 2011
SUNY College at Geneseo, Nuclear Physics Laboratory
Geneseo, NY
- Tutor 2007 – 2011
SUNY College at Geneseo, Physics Learning Center
Geneseo, NY

AFFILIATIONS

- Biomedical Engineering Society 2019 – Present
American Physical Society 2010 – Present

PROFESSIONAL ACTIVITIES

Break-out Session Moderator, HeadHealthTech Symposium 2016
National Football League

Reviewer

Accident Analysis & Prevention
Annals of Biomedical Engineering
Applied Bionics and Biomechanics
Computer Methods in Biomechanics and Biomedical Engineering
International Journal of Crashworthiness
Journal of Biomechanical Engineering
Journal of Neurotrauma
Medical Engineering & Physics
Traffic Injury Prevention

HONORS AND AWARDS

Athanasίου ABME Student Award	2019
1 st Place Oral Presentation, UVERS	2017
Murray Mackay Young Researcher Award for Best Oral Presentation, IRCOBI	2014
Margaret H. Hines Award, Best Poster Presentation, IBS	2014
Phi Beta Kappa	2011
SUNY Geneseo Presidential Scholar	2010 – 2011
Academic All-America Cross Country, NCAA	2010
Pi Mu Epsilon, Mathematics National Honors Society	2009
Geneseo Foundation Scholarship	2009
Department of Physics and Astronomy Alumni Award	2009
Sigma Pi Sigma, Physics National Honors Society	2008
Duke Sells Memorial Scholarship and Dr. Myrtle Merritt Scholarship	2008
Phi Eta Sigma, SUNY Geneseo National Honor Society	2007
George L. and Elsie S. Williams Scholarship	2007
Arts in Science Award	2007
SUNYAC All-Academic List and Commissioner's List	2006 – 2011
SUNY Geneseo President's and Dean's List	2006 – 2011

RESEARCH INTERESTS / EXPERTISE

Injury biomechanics
Head injury and concussion
Lower limb injury
Constitutive modeling of biological materials
Human body finite element (FE) and multibody modeling
Injury criterion development and risk assessment
Injury mitigation
Wearable Head Impact Sensors

RELATED SKILLS

Post-mortem human and animal tissue handling and instrumentation (Biosafety Level 2)

Laboratory testing: dynamic data acquisition, instrumentation, high speed camera

Design of fixtures: Solidworks

Data analysis: MATLAB, Mathematica

Finite element modeling: LS-DYNA/PrePost, Hypermesh

Multibody modeling: ADAMS

Statistical analysis: Minitab, SPSS, R

Technical communication

Project management

Proposal/grant writing

PUBLICATIONS

A. Refereed Journal Publications

- A1. Gabler LF, Huddleston SH, Dau NZ, Lessley DJ, Arbogast KB, Thompson X, Resch JE, Crandall JR (2020) On-Field Performance of an Instrumented Mouthguard for Detecting Head Impacts in American Football. *Annals of Biomedical Engineering*. DOI: 10.1007/s10439-020-02654-2 (in press).
- A2. Bailey AM, Sanchez EJ, Park G, Gabler LF, Funk JR, Crandall JR, Wonnacott M, Withnall C, Myers BS, Arbogast KB (2020) Development and Evaluation of a Test Method for Assessing the Performance of American Football Helmets. *Annals of Biomedical Engineering*. DOI: 10.1007/s10439-020-02626-6.
- A3. Gabrieli D, Vigilante N., Scheinfeld R, Rifkin J, Schumm S., Wu T, Gabler LF, Panzer MB, Meaney DF (2019) A Multibody Model for Predicting Spatial Distribution of Human Brain Deformation following Impact Loading. *Journal of Biomechanical Engineering*. 142(9): 091015. DOI: 10.1115/1.4046866.
- A4. Gabler LF, Crandall JR, Panzer MB (2019) Development of a Second-Order System for Rapid Estimation of Maximum Brain Strain. *Annals of Biomedical Engineering*. 47(9): 1971-1981. DOI: 10.1007/s10439-018-02179-9.
- A5. Elkin BS, Gabler LF, Panzer MB, Siegmund GP (2019) Brain tissue strains vary with head impact location: A possible explanation for increased concussion risk in struck versus striking football players. *Clinical Biomechanics*. DOI: 10.1016/j.clinbiomech.2018.03.021.
- A6. Sanchez EJ, Gabler LF, Good AB, Funk JR, Crandall JR, Panzer MB (2019) A Reanalysis of Football Impact Reconstructions for Head Kinematics and Finite Element. *Clinical Biomechanics*. DOI: 10.1016/j.clinbiomech.2018.02.019.
- A7. Gabler LF, Crandall JR, Panzer MB (2018) Development of a metric for predicting brain strain responses using head kinematics. *Annals of Biomedical Engineering*. 46(7): 972-985. DOI: 10.1007/s10439-018-2015-9.

- A8. Gabler LF, Joodaki H, Crandall JR, Panzer MB (2018) Development of a Single-Degree-of-Freedom Mechanical Model for Predicting Strain-based Brain Injury Responses. *Journal of Biomechanical Engineering*, 140(3): 031002. DOI: 10.1115/1.4038357.
- A9. Sanchez EJ, Gabler LF, McGhee JS, Olszko AV, Chancey VC, Crandall JR, Panzer MB (2017) Evaluation of Head and Brain Injury Risk Functions Using Sub-Injurious Human Volunteer Data. *Journal of Neurotrauma*, 34(16) 2410-2424. DOI: 10.1089/neu.2016.4681.
- A10. Gabler LF, Crandall JR, Panzer MB (2016) Assessment of Kinematic Brain Injury Metrics for Predicting Strain Responses in Diverse Automotive Impact Conditions. *Annals of Biomedical Engineering*, 44(12): 3705-3718. DOI: 10.1007/s10439-016-1697-0.
- A11. Gabler LF, Crandall JR, Panzer MB (2016) Investigating Brain Injury Tolerance in the Sagittal Plane Using a Finite Element Model of the Human Head. *International Journal of Automotive Engineering*, 7(1): 37-43.

B. Refereed Conference Publications

- B1. Gabler LF, Crandall JR, Panzer MB, Praxl N, Wernicke P (2017) Development of Improved Brain Injury Predictors for Diverse Impacts. *61st Stapp Car Crash Conference*, Charleston, SC. (*short comm.*)
- B2. Gabler LF, Joodaki H, Crandall JR, Panzer MB (2016) Toward Development of a Single-Degree-of-Freedom Mechanical Model for Predicting Brain Injury. *IRCOBI Conference on the Biomechanics of Impact (Asia)*, Seoul, South Korea. (*abstract*)
- B3. Gabler L, Panzer M, Salzar R (2014) High-Rate Mechanical Properties of Human Heel Pad for Simulation of a Blast Loading Condition. *IRCOBI Conference on the Biomechanics of Impact (Europe)*, Berlin, Germany. (*research paper*)
- B4. Perry B, Gabler L, Bailey A, Henderson K, Brozoski F, Salzar R (2014) Lower Leg Characterization and Injury Mitigation. *IRCOBI Conference on the Biomechanics of Impact (Europe)*, Berlin, Germany. (*research paper*)
- B5. Perry BJ, Bailey AM, Gabler L, Henderson KA, Brozoski F, Salzar RS (2014) Optimization of Combat Boot Properties to Mitigate Underbody Blast Injuries to the Lower Extremity. *Personal Armour Systems Symposium*, Cambridge, UK. (*research paper*)
- B6. Gabler L, Stone J, Mourad P, Crandall J, Salzar R (2013) Region Specific Viscoelastic Properties of the Adult Rat Brain under Indentation following Traumatic Brain Injury. *IRCOBI Conference on the Biomechanics of Impact (Europe)*, Gothenburg, Sweden. (*research paper*)

C. Other Publications

- C1. Gabler L, Bailey A, Funk J, Crandall J, Arbogast KB, Myers B (2019) Development of a Metric for Ranking the Performance of Football Helmets. Biomedical Engineering Society Annual Meeting, Philadelphia, PA. (*abstract*)

- C2. Sanchez E, Gabler L, Rowson B, Rowson S, Duma S, Panzer M (2017) Brain Strain Patterns Associated with Football Impact Reconstructions. *National Neurotrauma Symposium*, Snowbird, UT. (poster)
- C3. Gabler LF, Rodenberger EJ, Crandall JR, Panzer MB (2016) Predicting Brain Injury Using Head Kinematics. *National Neurotrauma Symposium*, Lexington, KY. (poster)
- C4. Panzer MB, Gabler LF, Rodenberger EJ, Joodaki H, and Crandall JR (2016). Assessment of Brain Injury Criterion (BrIC). *In response to the National Highway Traffic Safety Administration's Request for public comment on the New Car Assessment Program* [Docket No. NHTSA-2015-0119] at: www.regulations.gov. (public comment)
- C5. Elkin BS, Gabler LF, Panzer MB, Siegmund GP (2015) Effect of Impact Location on Brain Tissue Strain in Football Helmet Impacts. *43rd International Workshop on Human Subjects for Biomechanical Research*, New Orleans, LA. (research paper)
- C6. Panzer MB, Gabler LF, Crandall JR. (2015) Evaluation of Kinematic Predictors for Brain Injury in Multiple Crash Modes. *Workshop on Angular Head Motions, IRCOBI Conference on the Biomechanics of Impact (Europe)*, Lyon, France. (presentation)
- C7. Alshareef AA, Gabler LF, Stone JR, Panzer MB (2015) Characterization of Brain Material Properties following Brain Blast Injury. *National Neurotrauma Symposium*, Santa Fe, NM. (poster)
- C8. Alshareef AA, Gabler LF, Stone JR, Panzer MB (2015) Changes in the Mechanical Response of Brain Tissue Following Primary Blast Injury. *Ohio State Injury Biomechanics Symposium*, Columbus, OH. (research paper)
- C9. Giudice JS, Gabler LF, Panzer MB (2015) A multi-stage inverse Finite Element method for determining the constitutive model for human heel pad under high rate axial loading. *Ohio State Injury Biomechanics Symposium*, Columbus, OH. (poster)
- C10. Gabler LF, Crandall JR, Panzer MB (2015) Investigating Brain Injury Tolerance in the Sagittal Plane Using a Finite Element Model of the Human Head. *Annual Congress for the Society of Automotive Engineers of Japan (Spring)*, Yokohama, Japan. (research paper)
- C11. Gabler LF, Crandall JR, Panzer MB (2014) On the Application of BrIC to the Biomechanics of Various Automotive Impact Scenarios. *42nd International Workshop on Human Subjects for Biomechanical Research*, San Diego, CA. (research paper)
- C12. Gabler LF, Panzer MB, Salzar, RS (2014) Modifying an Automotive based Finite Element Model of the Lower Extremity with High Rate Heel Properties for simulating a Blast Loading Condition. *Ohio State Injury Biomechanics Symposium*, Columbus, OH. (poster)
- C13. Perry B, Henderson K, Bailey A, Gabler L, Salzar R (2014) Mitigation of Underbody Blast Injuries to the Lower Extremity by Optimization of Combat Boot Properties. *Ohio State Injury Biomechanics Symposium*, Columbus, OH. (poster)
- C14. Gabler L, Crandall J, Salzar R (2013) Mechanical Response of the human sub-calcaneal heel pad under high rate compression. *Ohio State Injury Biomechanics Symposium*, Columbus, OH. (poster)

- C15. Gabler L, Crandall J, Salzar R, Shafieian M, Stone J (2012) Validation of spherical indentation methodology to characterize material properties of brain tissue. *Ohio State Injury Biomechanics Symposium*, Columbus, OH. (poster)

D. Presentations and Lectures

- D1. Development of a Metric for Predicting Brain Strain Responses using Head Kinematics. *2nd Annual Athanasiou ABME Student Award Session, Biomedical Engineering Society Annual Meeting*, Philadelphia, PA, October 2019.
- D2. Development of a Metric for Ranking the Performance of Football Helmets. *Biomedical Engineering Society Annual Meeting*, Philadelphia, PA, October 2019.
- D3. Development of Improved Metrics for Predicting Brain Strain in Diverse Impacts. *Dissertation defense*, Charlottesville, VA, December 2017.
- D4. Development of Improved Brain Injury Predictors for Diverse Impacts. *61st Stapp Car Crash Conference*, Charleston, SC, November 2017.
- D5. Development of an Improved Kinematic Brain Injury Criterion for Diverse Head Impact Conditions. *University of Virginia Engineering Research Symposium*, Charlottesville, VA, March 2017.
- D6. Investigating Brain Injury Tolerance in the Sagittal Plane Using a Finite Element Model of the Human Head. *Annual Congress for the Society of Automotive Engineers of Japan (Spring)*, Yokohama, Japan, May 2015.
- D7. High-Rate Mechanical Properties of Human Heel Pad for Simulation of a Blast Loading Condition. *IRCOBI Conference on the Biomechanics of Impact (Europe)*, Berlin, Germany, September 2014.
- D8. Lower Leg Characterization and Injury Mitigation. *IRCOBI Conference on the Biomechanics of Impact (Europe)*, Berlin, Germany, September 2014.
- D9. Modifying an Automotive based Finite Element Model of the Lower Extremity with High Rate Heel Properties for simulating a Blast Loading Condition. *The Ohio State University's 10th Annual Injury Biomechanics Symposium*, Columbus, OH, May 2014.
- D10. Region Specific Viscoelastic Properties of the Adult Rat Brain under Indentation following Traumatic Brain Injury. *IRCOBI Conference on the Biomechanics of Impact (Europe)*, Gothenburg, Sweden, September 2013.
- D11. Mechanical Response of the human sub-calcaneal heel pad under high rate compression. *The Ohio State University's 9th Annual Injury Biomechanics Symposium*, Columbus, OH, May 2013.
- D12. Validation of spherical indentation methodology to characterize material properties of brain tissue. *The Ohio State University's 8th Annual Injury Biomechanics Symposium*, Columbus, OH, May 2012.