Jonathan B. Estrada

Curriculum Vitae
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Education

2017	Ph.D., Solid Mechanics, Brown University
	Dissertation Title: *Microcavitation as a neural cell damage mechanism in an in vitro model of blast traumatic brain injury*
	Research Advisor: *Christian Franck*
2013	Sc.M., Solid Mechanics, Brown University
2011	B.S., Materials Science and Engineering, Massachusetts Institute of Technology

Professional Appointments

2017 – present	Research Fellow, Mechanical Engineering, University of Michigan – Ann Arbor
	Research Advisor: *Ellen Arruda*
2017	Research Engineer, Solid Mechanics, Brown University

Refereed Journal Publications

(1 = These authors contributed equally.)

Scimone MT, Cramer III HC, Bar-Kochba E, Amezcua R, **Estrada JB**, Franck C (2018). Modular approach for resolving and mapping complex neural and other cellular structures and their associated deformation fields in three dimensions. *Nat Protoc* 13, 3042–3064.

Estrada JB, Barajas CR, Henann DL, Johnsen E, Franck C (2018). High strain-rate soft material racterization via inertial cavitation. *J Mech Phys Solids* 112, 291-317.

Bar-Kochba E, Scimone MT, **Estrada JB**, Franck C (2016). Strain and rate-dependent diffuse axonal injury path-omorphology of 3D neuron cultures under compression. *Sci Rep* 6(30550).

Stout DA[1], Bar-Kochba E[1], **Estrada JB**[1], Toyjanova J, Kesari H, Reichner J, Franck C (2016). Mean deformation metrics for quantifying 3D cell-matrix interactions in the absence of material properties. *Proc Natl Acad Sci U S A* 113(11).

Poellmann MJ, **Estrada JB**, Boudou T, Berent ZT, Franck C, Wagoner-Johnson AJ (2015). Differences in mor-phology and traction generation of cell lines representing different stages of osteogenesis. *J Biomech Eng* 137(12).

Estrada JB, Franck C (2015). Intuitive interface for the quantitative evaluation of speckle patterns for use in digital image and volume correlation techniques *J Appl Mech* 82(9).

Manuscripts in Preparation

Scimone MT, Hopkins P, Cramer III HC, **Estrada JB**, Franck C. Application of mild hypothermia successfully mitigates neural injury in a 4D in-vitro model of traumatic brain injury. (In review, *Sci Rep*)

Guasto JS, **Estrada JB**[1], Menolascina F[1], Burton LJ[1], Patel M, Franck C, Hosoi AE, Zimmer RK, Stocker R. The phylokinematics of sperm flagellar mobility. (Submitted)

Estrada JB, Cramer III HC, Scimone MT, Franck C. Microcavitation-based neural injuries in a 3D in vitro model of traumatic brain injury. (in prep)

Estrada JB, Luetkemeyer CM, Scheven UM, Arruda EM. Sensitivity-based virtual fields method for hyperelastic materials using displacement-encoded magnetic resonance imaging. (in prep)

Awards

The Oustanding Thesis Award (2017), *School of Engineering, Brown University*

Award for Excellence in Research (2017), *Sigma Xi society, Brown University chapter*

William N. Findley Award for best paper on Mechanical Behavior of Materials (2016), *School of Engineering, Brown University*

Jacob K. Javits (GAANN) Fellowship (2014, 2015), *US Department of Education*

NSF Graduate Research Fellowships Program, Honorable Mention (2012, 2013)

Award for Excellence (2012), *Graduate School, Brown University*

E. Paul Sorensen Graduate Fellowship (2012), *School of Engineering, Brown University*

2^{nd} place, Making and Designing Materials Engineering Contest (2009), *Department of Materials Science, MIT*

Conference Proceedings

(1 = talk, 2 = poster, $*$ = invited)

Estrada JB, Luetkemeyer CM, Scheven UM, Arruda EM, "Displacement-encoded magnetic resonance in soft orthotropic materials". Society of Experimental Mechanics, Reno, NV, June 2019

Luetkemeyer CM, **Estrada JB**[1], Scheven UM, Arruda EM, "Full-field characterization of soft orthotropic materials". Society of Engineering Science, Madrid, Spain, October 2018

Estrada JB[1], Cramer III HC, Scimone MT, Franck C, "Microcavitation as a neural cell damage mechanism in an in vitro model of blast traumatic brain injury". Society of Experimental Mechanics, Greenville, SC, June 2018

Estrada JB[1*], Cramer III HC, Scimone MT, Franck C, "Microcavitation as a neural cell damage mechanism in an in vitro model of blast traumatic brain injury". Society of Engineering Science, Boston, MA, July 2017

Estrada JB[1], Cramer III HC, Scimone MT, Mancia L, Johnsen E, Franck C, "Microcavitation as a neuronal damage mechanism in an in vitro model of blast traumatic brain injury". Biophysical Society, Los Angeles, CA, Feb 2017

Estrada JB[1], Barajas C, Scimone MT, Cramer III HC, Hopkins PR, Johnsen E, Franck C, "Microcavitation as a neuronal damage mechanism in an in vitro model of blast traumatic brain injury". Society of Engineering Science, College Park, MD, Oct 2016

Estrada JB, Bar-Kochba E, Stout DA, Toyjanova J, Kesari H, Reichner JS, Franck C[1], "Mean deformation metrics for quantifying 3D cell-matrix interactions". Society of Engineering Science, Oct 2016

Scimone MT[1], Levine A, **Estrada JB**, Cramer III HC, Hopkins PR, Franck C, "Quantifying hypothermia treatment efficacy on 3D neuronal cultures following traumatic brain injury". Biomedical Engineering Society, Minneapolis, MN, Oct 2016

Bar-Kochba E, Scimone MT, **Estrada JB**, Franck C[2] "Strain and rate-dependent neuronal injury in a 3D in-vitro model of Traumatic Brain Injury". Biophysical Society, New Orleans, LA, Feb 2016

Estrada JB[2], Scimone MT, Landauer AK, Franck C "Investigation of microcavitation as a neuronal damage mechanism in blast Traumatic Brain Injury". Biophysical Society, New Orleans, LA, Feb 2016

Estrada JB, Franck C[1] "Microcavitation as a neuronal damage mechanism in blast Traumatic Brain Injury". American Physical Society Meeting, Division of Fluid Mechanics, Boston, MA, Nov 2015

Estrada JB[1], Scimone MT, Franck C "Investigation of microcavitation as a neuronal damage mechanism in blast Traumatic Brain Injury". Society of Engineering Science, College Station, TX, Oct 2015

Estrada JB[1], Landauer AK, Franck C "Red-blue diffraction assisted image correlation for high-speed imaging". Society of Engineering Science, College Station, TX, Oct 2015

Scimone MT[1], Levine A, **Estrada JB**, Bar-Kochba E, Franck C,"Investigating the neuroprotective effects of hypothermia as a potential therapeutic for Traumatic Brain Injuries using a 3D neuronal cell model". Society for Engineering Science, College Station, TX, Oct 2015

Estrada JB[1], Franck C "Investigation of microcavitation as a neuronal damage mechanism in blast Traumatic Brain Injury". Society of Engineering Science, West Lafayette, IN, Oct 2014

Estrada JB[1], Oh C, Bar-Kochba E, Lopez-Fagundo C, Livi L, Hoffman-Kim D, Franck C. "3D traction forces of Schwann cells on compliant patterned substrates". Society of Engineering Science, West Lafayette, IN, Oct 2014

Estrada JB[1], Bar-Kochba E, Franck C. "Determining a failure strain envelope for neurons in uniaxial compression". Society of Engineering Science, Providence, RI, Jul 2013

Teaching Experience

Brown University

Graduate
Experimental Mechanics, TA/Lab Designer (Sp '13, Sp '15)

Undergraduate
Introduction to Engineering, TA (Fa '15, Fa '16)
Dynamics and Vibrations, TA (Sp '14)
Mechanics of Solids and Structures, TA/Lab Designer (Fa '13, Fa '14)
Biomechanics, TA (Fa '12)

High School
Introduction to Engineering, Lincoln School for Girls, Instr. of Record (Sp '16)
Mechanics of Materials and Catapult Engineering, Summer@Brown, Instr. of Record (Su '15, '16, '17)
Introduction to Engineering, Summer@Brown, Instr. of Record (Su '15, '16, '17)
Do you want to be an Engineer?, Summer@Brown, Instr. of Record (Su '13, '14)

Massachusetts Institute of Technology

Undergraduate
Introduction to Solid State Chemistry, edX platform (online), Moderator (Fa '12, Sp '13)
Introduction to Solid State Chemistry, Recitation Instructor (Fa '10, Sp '11)

Academic Service

Co-President (2019), Michigan Postdoc Association of the College of Engineering

Mechanical Engineering Representative (2018), Michigan Postdoc Association of the College of Engineering

Founder/Organizer (2018), Postdoc Seminar Series (University of Michigan College of Engineering)

Abstract and Poster Session Judge (2017, 2018), Engineering Graduate Symposium (University of Michigan College of Engineering)

Poster Session Judge (2018), Undergraduate Research Opportunity Program (University of Michigan)

Reviewer, Experimental Mechanics (2016, 2018), Scientific Reports (2018)

Founder/Organizer (2015-16), Continua Research Society (Solids, Fluids, and Materials student weekly seminar group, Brown University)

Community Outreach

Instructor (2018), Girls in Science and Engineering Camp (U of M, Ann Arbor, MI)

Demonstrations (2018), Preschool class at Gretchen's House (Ann Arbor, MI)

Demonstrations (2016), Kindergarten class at The French American School of Rhode Island

Brown University Chorus President (2015-2016)

Invited International Baccaleureate Seminar Speaker (2011), Northport High School

Selected Media Coverage

"Brown University researchers study how traumatic brain injuries occur" featured on **NBC10**.

"Shock waves may create dangerous bubbles in the brain" featured in the **Smithsonian Magazine**, **Phys.org**, **Neuroscience news**, **Science news for students**, among others.

"What concussion looks like in the brain, on the cellular level" featured on **CNN**, the Boston Globe's affiliate **STAT**, and **Providence Journal**.

"Brown partnership with Lincoln School inspires young women engineers" featured on **Brown news**.

Affiliations

Society of Experimental Mechanics

Society of Engineering Science

Biophysical Society