Jonathan B. Estrada

Curriculum Vitae
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Education

2017	Ph.D., Solid Mechanics, Brown University
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
2017	Research Engineer, Solid Mechanics, Brown University
2011 – 2017	Graduate Research Assistant, Solid Mechanics, Brown University

Refereed Journal Publications

(1 = These authors contributed equally.)

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

Bar-Kochba E, Scimone MT, **Estrada JB**, Franck C (2016). Strain and Rate-dependent Diffuse Axonal Injury Pathomorphology of 3D Neuron Cultures Under Compression. *Sci Rep* 6(30550).

Estrada JB[1], Bar-Kochba E[1], Stout DA[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. *PNAS* 113(11).

Poellmann MJ, **Estrada JB**, Boudou T, Berent ZT, Franck C, Wagoner-Johnson AJ (2015). Differences in morphology 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).

Papers in Review

Scimone MT, Cramer III HC, Bar-Kochba E, Amezcua R, **Estrada JB**, Franck C (Sept 2017). 3D *in vitro* neuronal hydrogel model for cellular traumatic brain injury. Submitted to Nature Protocols.

Papers in Preparation

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

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

Conference Proceedings

(1 = talk, 2 = poster)

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, 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, 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, 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, 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, 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, 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, Feb 2016

Estrada JB, Franck C[1] "Microcavitation as a neuronal damage mechanism in blast Traumatic Brain Injury". Applied Physics Society Meeting, Division of Fluid Mechanics, 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, Oct 2015

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

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

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

Awards

2017	The Oustanding Thesis Award, School of Engineering, Brown University
2017	Brown Chapter of Sigma Xi Award for excellence in research Sigma Xi society, Brown University chapter
2016	William N. Findley Award for best paper on Mechanical Behavior of Materials, School of Engineering, Brown University
2014-15, 2015-16	Jacob K. Javits (GAANN) Fellowship
2012, 2013	NSF Graduate Research Fellowships Program Honorable Mention
2012	Award for Excellence, Graduate School, Brown University
2012	E. Paul Sorensen Graduate Fellowship, School of Engineering, Brown University

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, Section Leader (Fa '10, Sp '11)

Affiliations

Society of Experimental Mechanics
Society of Engineering Science
Biophysical Society

Research Experience

Dissertation title: Microcavitation as a neural cell damage mechanism in an *in vitro* model of blast traumatic brain injury

Dissertation work involves an experimental approach of inducing and quantifying inertial microcavitation based injury in primary dissociated neuronal 3D cultures, from reference laser scanning confocal imaging, high speed videography with a theoretical-numerical novel inertial microcavitation based ultra-high-strain rate rheometry technique, and post-injury confocal imaging and custom image processing algorithms. Critical injury thresholds are determined by correlating ceasing of intracellular esterase activity and actin fragmentation with kinematic quantities determined from bubble dynamics.

Community Outreach

2018	Founder/Organizer, Postdoc Seminar Series (U of M College of Engineering)
2016	Invited demonstration for Kindergarten class at The French American School of Rhode Island
2015-2016	Weekly Seminar Founder/Organizer, Continua Research Society (Solids, Fluids, and Materials student seminar group)
2015-2016	Brown University Chorus President
2013	Invited Speaker, Biophysical Journal Club, "Neuronal Damage as a Result of Induced Microcavitation"
2011	Invited International Baccaleureate Seminar Speaker, "The Material Edge: Interdisciplinary Design for Our Future", Northport High School