



AMBER RATH STERN, PH.D., P.E.
PRINCIPAL
DIRECTOR, BIOMECHANICS

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Dr. Amber Rath Stern specializes in the fields of biomechanical analysis and mechanical engineering. She also has extensive experience in computational modeling, mechanical testing, inquiry and analysis of national motor vehicle injury and vehicle crash databases, and experimental design. Prior to joining ESi, Dr. Stern conducted research concerning eye injury mechanics and the biomechanics of bone as an Assistant Professor at the University of Missouri - Kansas City. As a Research Engineer at Southwest Research Institute and a Graduate Assistant at Virginia Tech and Wake Forest's Center for Injury Biomechanics, she conducted a wide range of research in the fields of human injury tolerance, crash testing, and injury causation. While a Post-Doctoral Fellow at the world-renowned Wake Forest Institute for Regenerative Medicine, Dr. Stern developed bioreactors and studied how cells and tissues respond to applied mechanical loads.

At ESi, Dr. Stern applies her expertise to a wide range of investigative scenarios, including accident reconstruction, slips, trips, and falls, product liability claims, workers' compensation claims, premises liability claims, injury causation, and motor vehicle injury analysis, including restraints, ejection, and occupant kinematics. Dr. Stern has also been involved in the development and validation phases of several consumer and commercial products and continues to collaborate with several universities on research funded by the National Institutes of Health.

Dr. Stern has received numerous national and international honors and awards, including the American Society of Biomechanics' Young Scientist Post-Doctoral Award, the American Society for Bone and Mineral Research Young Investigator Award, and she was most recently recognized with the inaugural University of North Carolina at Charlotte College of Engineering Mechanical Engineering and Engineering Science Department Alumni Award. She regularly publishes in scientific journals and presents at conferences, with well over 100 articles, abstracts, and presentations to her name. Dr. Stern is an adjunct faculty member of the Department of Mechanical Engineering at the University of North Carolina at Charlotte and is a member of the department's Advisory Board and the College of Engineering's Strategic Planning Committee. She also serves as a reviewer for several international journals and conferences.

Areas of Specialization

Impact Biomechanics	Injury Incidence	Rollovers
Injury Causation	Motion Analysis	Sports and Exercise Equipment
Injury Mechanisms	Occupant Kinematics	Consumer Products
Slips, Trips, and Falls	Restraints / Seatbelts / Airbags	Workers Compensation
Accident Reconstruction and Analysis	Experimental Testing and Failure Analysis	Injury Tolerance
		Computational Modeling

Education

B.S., Mechanical Engineering, Minor in Mathematics. University of North Carolina at Charlotte
M.S., Mechanical Engineering, Biomedical Option. Virginia Tech
Ph.D., Biomedical Engineering, Biomechanics Track & Graduate Certificate in Engineering Education.
Wake Forest University and Virginia Tech
Post-Doctoral Fellowship, Regenerative Medicine and Biomedical Engineering.
Wake Forest Institute for Regenerative Medicine (WFIRM)

January 2025



Licensed Professional Engineer (P.E.)

State of Florida	License Number: 81701	Expiration Date: February 28, 2025
State of Georgia	License Number: PE039386	Expiration Date: December 31, 2025
State of Kentucky	License Number: 40498	Expiration Date: June 30, 2026
State of North Carolina	License Number: 041814	Expiration Date: December 31, 2025
State of South Carolina	License Number: 31578	Expiration Date: June 30, 2026
State of Tennessee	License Number: 118692	Expiration Date: October 31, 2025
State of Texas	License Number: PE# 146229	Expiration Date: June 30, 2025
National Council of Examiners for Engineering and Surveying (NCEES) (No. 59124)		

Positions Held

Engineering Systems Inc., Charlotte, North Carolina

- Director of Biomechanics, 2018 - Present
- Principal, 2020 - Present
- Senior Managing Consultant, 2017 - 2019
- Senior Consultant, 2016 - 2017
- Senior Staff Consultant, 2015
- Staff Consultant, 2013 - 2014

University of North Carolina at Charlotte, Charlotte, North Carolina

- Adjunct Faculty, Department of Mechanical Engineering and Engineering Sciences, 2015 - Present
- Advisory Board, Department of Mechanical Engineering and Engineering Sciences, 2015 - Present
- College of Engineering Strategic Planning Committee, 2021 - Present

University of Missouri - Kansas City, Kansas City, Missouri

- Adjunct Assistant Professor, Department of Mechanical Engineering, 2013 - 2020
- Assistant Professor, Department of Mechanical Engineering, 2011 - 2013
- Assistant Professor, Department of Oral and Craniofacial Sciences, 2011 - 2013

Wake Forest Institute for Regenerative Medicine (WFIRM), Winston-Salem, North Carolina

- Postdoctoral Fellow, 2009 - 2010

Wake Forest University, Winston-Salem, North Carolina

- Graduate Research Assistant, Wake Forest Institute for Regenerative Medicine (WFIRM) 2008 - 2009
- Graduate Research Assistant, Crash Injury Research and Engineering Network (CIREN) 2007 - 2008

Southwest Research Institute, San Antonio, Texas

- Research Engineer (part-time), 2007 - 2010
- Research Engineer (full-time), 2005 - 2007

Virginia Tech, Center for Injury Biomechanics, Blacksburg, Virginia

- Graduate Research Assistant, 2003 - 2005

University of North Carolina at Charlotte, Charlotte, North Carolina

- Teaching Assistant, 2001 - 2003

Siemens-Westinghouse Turbine and Generator Plant, Charlotte, North Carolina

- Intern, 2001

Professional Affiliations/Honors

Professional Affiliations and Reviewer Activities:

American Society of Mechanical Engineers (ASME), Member, Reviewer
Bioengineering Division Executive Committee, Member
American Society for Testing and Materials (ASTM)
Committee E30 on Forensic Sciences, Member
Committee F24 on Amusement Rides and Devices, Member
Orthopedic Research Society (ORS), Member, Reviewer
Biomedical Engineering Society (BMES), Member, Reviewer
Society of Automotive Engineers (SAE), Member, Reviewer
Society of Women Engineers (SWE), Member, Award Judge, Reviewer
American Society of Biomechanics (ASB), Member
Journal of Bone and Mineral Research, Reviewer
Tissue Engineering, Reviewer
United States Collegiate Inventors Competition, Judge
Frontiers in Bioengineering and Biotechnology - Biomechanics, Review Editor

Honors:

University of North Carolina at Charlotte College of Engineering Mechanical Engineering and Engineering Science Department Alumni Award: 2022
Charlotte Business Journal 40 Under 40: 2018
American Society of Biomechanics Young Scientist Post-Doctoral Award: 2014
American Society for Bone and Mineral Research Mentored Career Development Award: 2013
United States Bone and Joint Initiative Young Investigator: 2012
American Society for Bone and Mineral Research Young Investigator Award: 2012
American Society for Bone and Mineral Research and Advances in Mineral Metabolism
John Haddad Young Investigator Award: 2012
International Bone and Mineral Society Sun Valley Workshop on Musculoskeletal Biology
Alice L. Jee Memorial Young Investigator Award: 2008, 2009
American Society of Mechanical Engineers Graduate Teaching Fellowship: 2007 - 2009
United States Collegiate Inventors Competition, Finalist: 2007
Enhanced Safety of Vehicles International Collegiate Student Safety Technology Design Competition,
First Place Award: 2007
American Society of Mechanical Engineers Summer Bioengineering Conference
Ph.D. Student Paper Competition, Third Place: 2006
Society of Automotive Engineers Excellence in Oral Presentation Award: 2005
Phi Kappa Phi, National Graduate Fellowship Recipient: 2003
University Honors Program Graduate (University of North Carolina at Charlotte): May 2003
Tau Beta Pi Honor Society
Golden Key International Honor Society

Continued Education

- Investigation of Pedestrian Collisions
Institute of Police Technology and Management, University of North Florida, Jacksonville, Florida
- Safety Belt Examinations
Institute of Police Technology and Management, University of North Florida, Jacksonville, Florida
- OSHA General Industry Training - 10 Hour
Pure Safety, Nashville, Tennessee
- Human Factors in Traffic Crash Reconstruction
Institute of Police Technology and Management, University of North Florida, Fort Myers, Florida
- Understanding Bloodstain Pattern Analysis
Bevel, Gardner & Associates, Ann Arbor, Michigan
- Traffic Crash Investigation - 1
Northwestern University Center for Public Safety, Evanston, Illinois
- Air and Foundation Brake Training
Bendix Commercial Vehicle Systems LLC, Brake Training School, Huntersville, North Carolina
- Traffic Crash Reconstruction - 1
Northwestern University Center for Public Safety, Ann Arbor, Michigan
- MADYMO Introductory Training
TASS International, Livonia, Michigan
- Premises Safety Training - Slip, Trip, and Fall
Engineering Systems, Inc., Fort Myers, Florida
- The 35th International Workshop on Human Subjects for Biomechanical Research
The United States National Highway Traffic Safety Administration, San Diego, California
- Injury Biomechanics: Advanced Technologies and New Frontiers
Virginia Tech Center for Injury Biomechanics, Blacksburg, Virginia
- TrueGrid Training Course
XYZ Scientific Applications, Inc., Livermore, California
- Introduction to LS-DYNA Course and Training
Livermore Software Technology Corporation, Livermore, California
- The 33rd International Workshop on Human Subjects for Biomechanical Research
The United States National Highway Traffic Safety Administration, Washington, D.C.
- 16th Annual Short Course on Probabilistic Analysis and Design: Computational
Methods and Applications, Southwest Research Institute, San Antonio, Texas
- Crash Reconstruction and Analysis Workshop
Virginia Tech, Blacksburg, Virginia
- The 32nd International Workshop on Human Subjects for Biomechanical Research
The United States National Highway Traffic Safety Administration, Nashville, Tennessee
- Fundamental and Advanced Concepts for Automobile and Sports Injury Biomechanics
Virginia Tech, Roanoke, Virginia

The 31st International Workshop on Human Subjects for Biomechanical Research
The United States National Highway Traffic Safety Administration, San Diego, California

Classroom Teaching Experience

Survey of Biomedical Engineering
Advanced Impact Biomechanics
Injury Biomechanics
Engineering Dynamics
Essential Engineering
Engineering Mechanics (Statics)
Engineering Design and Economics
Introduction to Biomedical Engineering
Computational Modeling
Introduction to Engineering Practices and Principles

Publications/Presentations

Journal Publications

*Please note previous names used: Amber L. Rath and Amber Rath Bonivtch

1. Shibata PA, Mathias AC, Light AE, Meza-Arroyo M, Sprague JK, **Stern AR**. "Comparative Lumbar Spine Acceleration Data During Daily and Dynamic Activities, Tasks of Daily Driving, and Low Speed Lateral Vehicle Impacts." *Biomedical Sciences Instrumentation*, 55(2) 2019: 316-323.
2. Shibata PA, Mathias AC, Light AE, Meza-Arroyo M, Sprague JK, **Stern AR**. "Head Acceleration Measurements During Vehicle Driving Tasks and Lateral Impacts Relative to Head Accelerations During Daily and Dynamic Activities." *Biomedical Sciences Instrumentation*, 55(2) 2019: 277-284.
3. **Stern AR**, Yao X, Wang Y, Berhe A, Dallas M, Johnson ML, Yao W, Kimmel DB, Lane NE. "Effect of Osteoporosis Treatment Agents on the Cortical Bone Osteocyte Microenvironment in Adult Estrogen-deficient, Osteopenic Rats." *Bone Reports*, 2018 8:115-124.
4. Shah KM, Stern MM, **Stern AR**, Pathak JL, Bravenboer N, Bakker AD. "Osteocyte Isolation and Culture Methods." *BoneKEy Reports*, 2016 Sep 14;5:838.
5. Gorski JP, Huffman NT, Vallejo J, Brotto L, Chittur SV, Breggia A, **Stern A**, Huang J, Mo C, Seidah NG, Bonewald L, Brotto M. "Deletion of Mbtsp1 (PCSK8, S1P, SKI-1) in Osteocytes Stimulates Soleus Muscle Regeneration and Increased Size and Contractile Force with Age." *Journal of Biological Chemistry*, 2016 Feb 26; 291(9):4302-4322.
6. Xiao Z, Cao L, Liang Y, Huang J, **Stern AR**, Dallas M, Johnson ML, Quarles LD. "Osteoblast-Specific Deletion of Pkd2 Leads to Low-Turnover Osteopenia and Reduced Bone Marrow Adiposity." *PloS one*, 9(12) 2014, e114198.
7. Javaheri B, **Stern AR**, Lara N, Dallas M, Zhao H, Liu Y, Bonewald LF, Johnson ML. "Deletion of a Single β -catenin Allele in Osteocytes Abolishes the Bone Anabolic Response to Loading." *Journal of Bone and Mineral Research*, 29(3) 2014 Mar:705-715.
8. **Stern AR**, Nicoletta DP. "Osteocyte Mechanical Strain." *Bone*, 54 2013:191-195.
9. **Stern AR**, Stern MM, Van Dyke ME, Jaehn K, Prideaux M, Bonewald LF. "The Isolation and Culture of Primary Osteocytes from the Long Bones of Skeletally Mature and Aged Mice." *BioTechniques*, 52(6) 2012 Jun:361-373.

10. Sponsel W, Gray W, Groth S, **Stern A**, Walker J. "Paintball Trauma and Mechanisms of Optic Nerve Injury: Rotational Avulsion and Rebound Evulsion." *Investigative Ophthalmology & Visual Science*, 52(13) 2011:9624-9628.
11. Gray W, Sponsel W, Scribbick F, **Stern A**, Weiss C, Groth S, Walker J. "Numerical Modeling of Paintball Impact Ocular Trauma: Identification of Progressive Injury Mechanisms." *Investigative Ophthalmology & Visual Science*, 52(10) 2011:7506-7513.
12. Danelson KA, Gayzik FS, **Stern AR**, Hoth JJ Stitzel JD. "Design, Development, and Analysis of a Surrogate for Pulmonary Injury Prediction." *Annals of Biomedical Engineering*, 39(10) 2011:2560-2567.
13. **Stern AR**, Stern MM, Van Dyke ME. "Transduction of Strain to Cells Seeded onto Scaffolds Exposed to Uni-Axial Stretching: A Three-Dimensional Finite Element Study." *Journal of Mechanics in Medicine and Biology*, 12(1) 2012:1-16.
14. Sponsel W, Gray W, Scribbick F, **Stern A**, Weiss C, Groth S, Walker J. "Blunt Eye Trauma: Empirical Histopathologic Ballistic Impact Thresholds in Fresh Mounted Porcine Eyes." *Investigative Ophthalmology & Visual Science*, 52(8) 2011:5157-5166.
15. **Rath AL**, Bonewald LF, Ling J, Jiang JX, Van Dyke ME, Nicoletta DP. "Correlation of Cell Strain in Single Osteocytes with Intracellular Calcium, but Not Intracellular Nitric Oxide, in Response to Fluid Flow." *Journal of Biomechanics*, 43(8) 2010:1560-1564.
16. Nicoletta DP, Feng JQ, Moravits DE, **Bonivtch AR**, Wang Y, Dusevich V, Yao W, Lane N, Bonewald LF. "Effects of Nanomechanical Bone Tissue Properties on Bone Tissue Strain: Implications for Osteocyte Mechanotransduction." *Journal of Musculoskeletal Neuronal Interactions*, 8(4) 2008: 330-331.
17. **Bonivtch AR**, Ling J, Jiang JX, Van Dyke ME, Bonewald LF, Nicoletta DP. "Fluid Flow Induces an Increase in Cell Strain and Intracellular Calcium Production in Osteocytes." *Journal of Musculoskeletal Neuronal Interactions*, 8(4) 2008:352-353.
18. **Rath Bonivtch A**, Bonewald LF, Nicoletta DP. "Tissue Strain Amplification at the Osteocyte Lacuna: A Microstructural Finite Element Analysis." *Journal of Biomechanics*, 40(10) 2007: 199-206.
19. Kennedy EA, **Bonivtch AR**, Manoogian SJ, Stitzel JD, Herring IP, Duma SM. "The Effects of Extraocular Muscles on Static Displacements of the Human Eye." *Biomedical Sciences Instrumentation*, 42 2006: 372-377.
20. **Rath AL**, Manoogian SJ, Duma SM, Bolton BJ, Crandall JR. "An Evaluation of a Fiber Optic Based Sensor for Measuring Chest and Abdominal Deflection." *SAE Transactions: Journal of Passenger Cars*, 113(3) 2005: Paper Number 2005-01-0745.
21. Kemper AR, McNally C, Kennedy EA, Manoogian SJ, **Rath AL**, Stitzel JD, Duma SM, Matsuoka F. "Material Properties of Human Rib Cortical Bone from Dynamic Tension Coupon Testing." *The Stapp Car Crash Journal*, 49 2005: 199-230.
22. **Rath AL**, Jernigan MV, Stitzel JD, Duma SM. "The Effects of Depowered Airbags on Skin Injuries in Frontal Automobile Crashes." *Plastic and Reconstructive Surgery*, 115(2) 2005: 428-435.
23. Jernigan MV, **Rath AL**, Duma SM. "Severe Upper Extremity Injuries in Frontal Automobile Crashes: The Effects of Depowered Airbags." *The American Journal of Emergency Medicine*, 23(2) 2005: 99-105.
24. Duma SM, **Rath AL**, Jernigan MV, Stitzel JD, Herring IP. "The Effects of Depowered Airbags on Eye Injuries in Frontal Automobile Crashes." *The American Journal of Emergency Medicine*, 23(1) 2005: 13-19.

25. Duma SM, Hansen GA, Kennedy EA, **Rath AL**, McNally C, Kemper AR, Smith EP, Brolinson PG, Stitzel JD, Davis MB, Bass CR, Brozoski FT, McEntire BJ, Alem NM, Crowley JS. "Upper Extremity Interaction with a Helicopter Side Airbag: Injury Criteria for Dynamic Hyperextension of the Female Elbow Joint." *The Stapp Car Crash Journal*, 48 2004: 155-176.
26. Kennedy EA, Voorhies KD, Herring IP, **Rath AL**, Duma SM. "Prediction of Severe Eye Injuries in Automobile Accidents: Static and Dynamic Rupture Strength of the Eye." *Annual Proceedings of the Association for the Advancement of Automotive Medicine*, 48 2004: 165-179.
27. Jernigan MV, **Rath AL**, Duma SM. "Analysis of Burn Injuries in Frontal Automobile Crashes." *The Journal of Burn Care & Rehabilitation*, 25(4) 2004: 357-362.
28. Stitzel JD, Cormier JM, Barretta JT, Kennedy EA, Smith EP, **Rath AL**, Duma SM. "Defining Regional Variation in the Material Properties of Human Rib Cortical Bone and its Effect on Fracture Prediction." *The Stapp Car Crash Journal*, 47 2003: 243-266.

Book Chapters

1. Prideaux M, **Stern AR**, Bonewald LF. "Isolation of Murine and Human Osteocytes." *Methods in Molecular Biology: Osteoporosis and Osteoarthritis*, Vol. 2221, Ch. 1, 2021: 3-13.
2. **Stern AR**, Bonewald LF. "Isolation of Osteocytes from Mature and Aged Murine Bone." *Methods in Molecular Biology: Osteoporosis and Osteoarthritis*, Vol. 1226, Ch. 1, 2015: 3-10.

Abstracts and Conference Proceedings

1. Van Poppel J, **Stern AR**, Fortenbaugh D, Wilcox G. "A Parametric Study of an Adaptive Load-Limiting Restraint System with Weight Sensing Considerations." Paper Number 19-0057. *The 26th International Technical Conference on the Enhanced Safety of Vehicles (ESV)*, Eindhoven, Netherlands: June 12, 2019.
2. Shibata PA, Mathias AC, Light AE, Meza-Arroyo M, Sprague JK, **Stern AR**. "Head Acceleration Measurements During Vehicle Driving Tasks and Lateral Impacts Relative to Head Accelerations During Daily and Dynamic Activities." *56th Annual Rocky Mountain Bioengineering Symposium*, Milwaukee, Wisconsin: April 13, 2019.
3. Shibata PA, Mathias AC, Light AE, Meza-Arroyo M, Sprague JK, **Stern AR**. "Comparative Lumbar Spine Acceleration Data During Daily and Dynamic Activities, Tasks of Daily Driving, and Low Speed Lateral Vehicle Impacts." *56th Annual Rocky Mountain Bioengineering Symposium*, Milwaukee, Wisconsin: April 12, 2019.
4. **Stern AR**. "MADYMO as a Tool for Evaluating Alternative Designs: A Product Liability Case Study." *MADYMO Users Meeting*, Ann Arbor, Michigan: September 27, 2016.
5. Shibata P, **Stern A**, Roberts J, Stegemann J. "Analysis of an Unexpected Impact to the Crown of the Head." *XXVIIIth Annual International Occupational Ergonomics and Safety Conference*, Chicago, Illinois: June 9-10, 2016.
6. Knox EH, Mathias AC, **Stern AR**, Van Bree MP, Brickman DB. "Methods of Accident Reconstruction: Biomechanical and Human Factors Considerations." *Proceedings of the ASME 2015 International Mechanical Engineering Conference and Exposition*. Houston, Texas: November 13-19, 2015.
7. Yao X, Berhe A, Bai X, Wang L, Liu Y, **Stern A**, Yao W, Johnson M, Wang Y, Lane N. "Sequential Treatments with Alendronate, Parathyroid Hormone (1-34) and Raloxifene Alter Cortical Bone Matrix Composition and Quality in Ovariectomized Rats by Raman Spectroscopy." *American Society for Bone and Mineral Research 38th Annual Meeting*, Seattle, Washington: October 9-12, 2015.

9. **Stern AR**, Cline T, Meers C, Billings B, Van Dyke M, Bergman C, Register T, Liu Y, Johnson M, Bonewald L, Stern M. "Osteocyte Strain Transmission is Reduced Due to Age-related Changes in the Microstructural, Micromechanical, and Macromechanical Properties of Bone." *7th World Congress of Biomechanics*, Boston, Massachusetts: July 10, 2014.
10. Brickman D, **Stern AR**. "Bungee Cord Eye Injury Accident Reconstruction." *XXVIth Annual International Occupational Ergonomics and Safety Conference*, El Paso, Texas: June 5-6, 2014.
11. Cline TL, Stern MM, Van Dyke M, Bergman C, Liu Y, **Stern AR**. "Age Effects on Bone Microarchitecture and Osteocyte Sensing of Skeletal Loading." *American Society for Bone and Mineral Research 36th Annual Meeting*, Baltimore, Maryland: October 3-7, 2013.
12. Meers C, Johnson M, Liu Y, Register T, **Stern AR**. "Age Effects on the Macromechanical and Micromechanical Properties of Bone." *American Society for Bone and Mineral Research 36th Annual Meeting*, Baltimore, Maryland: October 3-7, 2013.
13. Yao X, Yao W, Bai X, **Stern AR**, Johnson ML, Wang Y, Lane N. "Effects of Anti-Resorptive Agents on Ovariectomised (OVX) Rat Cortical Bone: Raman Spectroscopy and Multivariate Analyses." *American Society for Bone and Mineral Research 36th Annual Meeting*, Baltimore, Maryland: October 3-7, 2013.
14. Stern M, Billings A, Bergman C, Register T, **Stern AR**. "Altered Bone Microarchitecture and Material Properties as well as Reduced Osteocyte Frequency Predict Significant Changes in the Transmission of Strain to Osteocytes within Aged Cortical Bone of Non-Human Primates." *American Society for Bone and Mineral Research 35th Annual Meeting*, Minneapolis, Minnesota: October 12-15, 2012.
15. Gorski JP, Huffman NT, Breggia A, Rosen C, Chittur S, **Stern A**, Dallas M, Seidah NG, Bonewald LF. "Inactivation of SKI-1 in Osteocytes Leads to Obesity in Adult Mice and Suggests a New Bone to Brain Endocrine Pathway Regulating Body Mass." *American Society for Bone and Mineral Research 35th Annual Meeting*, Minneapolis, Minnesota: October 12-15, 2012.
16. Javaheri B, **Stern A**, Dallas M, Robling A, Johnson M. "Major Gender-related Differences in Bone Mass and Strength in Aged Sost Knockout Mice." *American Society for Bone and Mineral Research 35th Annual Meeting*, Minneapolis, Minnesota: October 12-15, 2012.
17. **Stern AR**, Billings A, Stern M, Bergman C, Register T. "Age Effects on Osteocyte Lacunar and Canalicular Microarchitecture in Non-Human Primate Cortical Bone." *American Society for Bone and Mineral Research Topical Meeting: Bone and Skeletal Muscle Interactions*, Kansas City, Missouri: July 17-18, 2012.
18. Billings A, Stern M, Bergman C, Register T, **Stern AR**. "Aging Bone: Age Effects on Osteocyte Lacunar and Canalicular Microarchitecture." *American Association for Dental Research Annual Meeting*, Tampa, Florida: March 21-24, 2012.
19. Liu R, Lei T, Dallas M, **Stern A**, Ye L. "Periodontal Defect in Hypophosphatemic Rickets Mice Model." *American Association for Dental Research Annual Meeting*, Tampa, Florida: March 21-24, 2012.
20. **Stern AR**, Stern MM, Van Dyke ME, Bonewald LF. "The Isolation and Culture of Primary Osteocytes from the Long Bones of Skeletally Mature and Aged Mice." *American Society for Bone and Mineral Research 34th Annual Meeting*, San Diego, California: September 16-20, 2011.
21. Stern MM, **Stern AR**, Bergman C, Kritchevsky S, Van Dyke ME. "Aged Perivascular Mesenchymal Stem Cells Derived from Adipose Tissue Are Hyperproliferative and Resistant to the Induction of Osteogenic and Adipogenic Differentiation." *American Society for Bone and Mineral Research 34th Annual Meeting*, San Diego, California: September 9, 2011.
22. **Stern AR**, Stern MM, Bonewald LF, Van Dyke ME, Nicoletta DP. "Differences in the Biological Responses of Osteocytes Exposed to Imposed Shear Stresses and Substrate Deformations." *AIMM/ASBMR John Haddad Young Investigators Meeting*, Snowmass, Colorado: April 4-8, 2011.

23. **Rath AL**, Bonewald LF, Van Dyke ME, Nicoletta DP. "Microstructural Variation in the Bone Matrix and Cell Attachments Modify Strain Amplification on the Osteocyte." *North Carolina Tissue Engineering and Regenerative Medicine Conference*, Winston-Salem, North Carolina: November 13, 2009.
24. **Rath AL**, Stern MM, Bonewald LF, Van Dyke ME, Nicoletta DP. "Substrate Stretching and Fluid Flow Induce Distinct Responses in Intracellular Calcium and Intracellular Nitric Oxide Production in Osteocytes." *North Carolina Tissue Engineering and Regenerative Medicine Conference*, Winston-Salem, North Carolina: November 13, 2009.
25. **Rath AL**, Stern MM, Bonewald LF, Van Dyke ME, Nicoletta DP. "Substrate Stretching Induces an Increase in Intracellular Calcium but Not Intracellular Nitric Oxide in Osteocytes." *American Society for Bone and Mineral Research 31st Annual Meeting*, Denver, Colorado: September 11-15, 2009.
26. **Rath AL**, Stern MM, Bonewald LF, Van Dyke ME, Nicoletta DP. "The Effects of Fluid Flow and Substrate Deformation on the Biological and Strain Responses of Osteocytes." *IBMS Sun Valley Workshop: Musculoskeletal Biology*, Sun Valley, Idaho: August 9-12, 2009.
27. **Bonivtch AR**, Mathis JT, Van Dyke ME. "Strain Transduction in Cells Seeded on a Scaffold Exposed to Uni-Axial Stretching: A Three-Dimensional Finite Element Study." *The Society for Biomaterials 2009 Annual Meeting and Exposition*, San Antonio, Texas: April 22-25, 2009.
28. **Bonivtch AR**, Ling J, Jiang JX, Van Dyke ME, Bonewald LF, Nicoletta DP. "Fluid Flow Induces an Increase in Cell Strain and Intracellular Calcium Production in Osteocytes." *The 55th Annual Meeting of the Orthopedic Research Society*, Las Vegas, Nevada: February 22-25, 2009.
29. **Bonivtch AR**, Mathis JT, Van Dyke ME. "Strain Transduction in Cells Seeded on a Scaffold Exposed to Uni-Axial Stretching: A Three-Dimensional Finite Element Study." *The 55th Annual Meeting of the Orthopedic Research Society*, Las Vegas, Nevada: February 22-25, 2009.
30. **Bonivtch AR**, Bonewald LF, Nicoletta DP. "Microstructural Variation in the Bone Matrix and Cell Attachments Modify Strain Amplification on the Osteocyte." *The 17th Annual Symposium on Computational Methods in Orthopedic Biomechanics*, Las Vegas, Nevada: February 21, 2009.
31. **Bonivtch AR**, Mathis JT, Van Dyke ME. "Strain Transduction in Cells Seeded on a Scaffold Exposed to Uni-Axial Stretching: A Three-Dimensional Finite Element Study." *The Tissue Engineering International and Regenerative Medicine Society-North America 2008 Annual Conference & Exposition*, San Diego, California: December 7-10, 2008.
32. **Bonivtch AR**, Ling J, Jiang JX, Van Dyke ME, Bonewald LF, Nicoletta DP. "Fluid Flow Induces an Increase in Cell Strain and Intracellular Calcium Production in Osteocytes." *The 10th Annual North Carolina Tissue Engineering and Regenerative Medicine Conference*, Research Triangle Park, North Carolina: November 7, 2008.
33. **Bonivtch AR**, Mathis JT, Van Dyke ME. "Strain Transduction in Cells Seeded on a Scaffold Exposed to Uni-Axial Stretching: A Three-Dimensional Finite Element Study." *The 10th Annual North Carolina Tissue Engineering and Regenerative Medicine Conference*, Research Triangle Park, North Carolina: November 7, 2008.
34. **Bonivtch AR**, Bonewald LF, Ling J, Jiang JX, Nicoletta DP. "Direct Correlation of Osteocyte Deformation with Calcium Influx in Response to Fluid Flow Shear Stress." *American Society for Bone and Mineral Research 30th Annual Meeting*, Montreal, Quebec, Canada: September 12-16, 2008.
35. **Bonivtch AR**, Ling J, Jiang JX, Van Dyke ME, Bonewald LF, Nicoletta DP. "Fluid Flow Induces an Increase in Cell Strain and Intracellular Calcium Production in Osteocytes." *American Society for Bone and Mineral Research 38th International Sun Valley Workshop on Skeletal Tissue Biology* Sun Valley, Idaho: August 3- 6, 2008.

36. Nicolella DP, Feng JQ, Moravits DE, **Bonivtch AR**, Wang Y, Dusevich V, Yao W, Lane N, Bonewald LF. "Effects of Nanomechanical Bone Tissue Properties on Bone Tissue Strain: Implications for Osteocyte Mechanotransduction." *American Society for Bone and Mineral Research 38th International Sun Valley Workshop on Skeletal Tissue Biology* Sun Valley, Idaho: August 3- 6, 2008.
37. Sponsel WE, Gray W, **Bonivtch AR**, Nicolella DP, Walker J, Scribbick F. "Paintball Trauma: Empirical and Mathematical Models to Assess Blunt Periocular Injury Reveal Likely Mechanism for Optic Nerve Traction/Avulsion." *Joint Meeting of the German Retina Society and the International Society of Ocular Trauma*, Würzburg, Germany: June 19-22, 2008.
38. Sponsel WE, Gray W, **Bonivtch AR**, Nicolella DP, Walker J, Scribbick F. "Paintball Trauma: Empirical and Mathematical Models to Assess Blunt Periocular Injury Reveal Likely Mechanism for Optic Nerve Traction/Avulsion." *The Association for Research in Vision and Ophthalmology Annual Meeting*, Fort Lauderdale, Florida: April 27-May 1, 2008.
39. **Bonivtch AR**, Gayzik FS, Danelson KA, Stitzel JD. "Design, Development, and Analysis of a Pulmonary Surrogate for Use in Crash Test Dummies." *Charlotte Biotechnology Conference*, Charlotte, North Carolina: October 12, 2007.
40. **Bonivtch AR**, Bonewald LF, Nicolella DP. "Microstructural Variation in the Bone Matrix and Cell Attachments Modify Strain Amplification on the Osteocyte." *American Society for Bone and Mineral Research 29th Annual Meeting*, Honolulu, Hawaii: September 16-19, 2007.
41. Gayzik FS, **Bonivtch AR**, Dalenson KA, Stitzel JD. "Design, Development, and Analysis of a Pulmonary Surrogate for Use in ATDs." *20th Enhances Safety of Vehicles Conference*, Lyon, France: June 18-21, 2007.
42. Sponsel WE, Gray W, **Bonivtch AR**, Weiss CE, Scribbick FW, Walker JD, Nicolella DP. "Investigation of Paintball Ocular Trauma: A Path Towards Safer Paintballs." *The Association for Research in Vision and Ophthalmology Annual Meeting*, Fort Lauderdale, Florida: May 6-10, 2007.
43. **Bonivtch AR**, Moravits DM, Bonewald LF, Nicolella DP. "Alterations in the Osteocyte Microenvironment Affect the Strain Sensed by the Osteocyte." *24th Annual Houston Conference on Biomedical Engineering Research*, Houston, Texas: February 9, 2007.
44. **Bonivtch AR**, Francis WL, Moravits DE, Paskoff GR, Shender BS, Thacker BH, Nicolella DP. "Development, Verification, and Validation of a Parametric Cervical Spine Injury Prediction Model." *Society of Women Engineers Conference*, Kansas City, Missouri: October 12-14, 2006.
45. **Bonivtch AR**, Moravits DM, Bonewald LF, Nicolella DP. "Alteration in the Osteocyte Microenvironment Affect the Perilacunar and Canalicular Tissue Strain." *American Society for Bone and Mineral Research 28th Annual Meeting*, Philadelphia, Pennsylvania: September 15-19, 2006.
46. **Bonivtch AR**, Francis WL, Moravits DE, Thacker BH, Pintar F, Yoganandan N, Nicolella DP. "Cervical Spine Geometry: Female Vertebrae Cannot be Scaled from Male Vertebrae." *American Society of Biomechanics Annual Meeting*. Blacksburg, Virginia: September 6-9, 2006.
47. **Bonivtch AR**, Francis WL, Pintar F, Yoganandan N, Koebbe M, Shender B, Paskoff G, Thacker BH, Nicolella DP. "Development, Verification, and Validation of a Parametric Cervical Spine Injury Prediction Model." *5th World Congress of Biomechanics*, Munich, Germany: July 2-August 4, 2006.
48. **Bonivtch AR**, Francis WL, Moravits DE, Paskoff GR, Shender BS, Thacker BH, Nicolella DP. "Development, Verification, and Validation of a Parametric Cervical Spine Injury Prediction Model." *2006 ASME Summer Bioengineering Conference*, Amelia Island, Florida: June 21-25, 2006.
49. **Bonivtch AR**, Kennedy EA, Manoogian SJ, Stitzel JD, Herring IP, Duma SM. "The Effects of the Extraocular Muscles on the Loading Response of the Human Eye Under Static Loading Conditions." *2006 ASME Summer Bioengineering Conference*, Amelia Island, Florida: June 21-25, 2006.

50. Francis WL, **Bonivtch AR**, Moravits DE, Paskoff GR, Shender BS, Thacker BH, Nicolella DP. "Probabilistic Response of a Validated and Verified Parametric Cervical Spine Finite Element Model." *2006 ASME Summer Bioengineering Conference*, Amelia Island, Florida: June 21-25, 2006.
51. Huyse L, **Bonivtch AR**, Fleming JB, Waldhart CJ, Riha DS, Thacker BH. "Verification of Stochastic Solutions Using Polynomial Chaos Expansions." *47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Newport, Rhode Island: May 1-4, 2006.
52. Nicolella DP, Francis WL, **Bonivtch AR**, Pintar F, Yoganandan N, Koebbe N, Thacker BH. "Development, Verification, and Validation of a Parametric Cervical Spine Injury Prediction Model." *47th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference*, Newport, Rhode Island: May 1-4, 2006.
53. Riha D, **Bonivtch AR**, Huyse L. "Efficient Use of Polynomial Chaos Expansions in Engineering Applications." *Propulsion - Safety and Affordable Readiness (P-SAR) Conference*, Jacksonville, Florida: March 28-30, 2006.
54. McMaster FJ, **Bonivtch AR**, Blinn MP, McKeighan PC, Thomsen M. "Spectrum Coupon Testing of Load Transfer Joints Utilizing the Forcetek® Rivetless Nutplate System for an Aging Military Aircraft." *The 9th Joint FAA/DoD/NASA Aging Aircraft Conference*, Atlanta, Georgia: March 6-9, 2006.
55. **Bonivtch AR**, Francis WL, Moravits DE, Paskoff GR, Shender BS, Bass CR, Lucas FA, Pintar F, Yoganandan N, Koebbe M, Thacker BH, Nicolella DP. "Development, Verification, and Validation of a Parametric Cervical Spine Injury Prediction Model" *The 33rd International Workshop on Human Subjects for Biomechanical Research*, Washington, D.C.: November 8, 2005.
56. Francis WL, **Bonivtch AR**, Moravits DE, Paskoff GR, Shender BS, Bass CR, Lucas FA, Pintar F, Yoganandan N, Koebbe M, Thacker BH, Nicolella DP. "Probabilistic Response of a Validated and Verified Parametric Cervical Spine Finite Element Model." *The 33rd International Workshop on Human Subjects for Biomechanical Research*, Washington, D.C.: November 8, 2005.
57. Kennedy EA, **Bonivtch AR**, Herring IP, McNally C, Manoogian SJ, Stitzel JD, Duma SM. "Effects of the Extraocular Muscles on the Loading Response of the Human Eye Under Static and Dynamic Loading Conditions." *The 33rd International Workshop on Human Subjects for Biomechanical Research*, Washington, D.C.: November 8, 2005.
58. **Rath AL**, Manoogian SJ, Duma SM, Bolton BJ, Crandall JR. "A Fiber Optic Based Sensor for Measuring Chest and Abdominal Deflection Under Impact Loading." *The Proceedings of the 29th Annual American Society of Biomechanics Conference*, Cleveland, Ohio: August 2005.
59. Kennedy EA, Voorhies KD, **Rath AL**, Brozoski F, Duma SM. "Rupture Pressures for Human and Porcine Eyes Under Static and Dynamic Loading." *The Proceedings of the 29th Annual American Society of Biomechanics Conference*, Cleveland, Ohio: August 2005.
60. Duma SM, Kennedy EA, Herring IP, **Rath AL**. "Static and Dynamic Rupture Pressures of Human and Porcine Eyes." *The Association for Research in Vision and Ophthalmology Annual Meeting*, Ft. Lauderdale, Florida: May 1-5, 2005.
61. **Rath AL**, Manoogian, SJ Duma, SM Bolton, BJ Crandall JR. "An Evaluation of a Fiber Optic Based Sensor for Measuring Chest and Abdominal Deflection." *Society of Automotive Engineers 2005 World Congress & Exhibition*, Detroit, Michigan: April 11-14, 2005. SAE Paper # 2005-01-0745.
62. **Rath AL**, Duma SM. "An Analysis of the Acceptance Rates of Submitted AAAM Abstracts." *The Proceedings of the 48th Association for the Advancement of Automotive Medicine Conference*, Key Biscayne, Florida: October 2004.
63. Kemper AR, McNally C, Kennedy EA, **Rath AL**, Manoogian SJ, Stitzel JD, Duma SM, Matsuoka F, Hasegawa J. "Methods for Dynamic Material Testing of Human Cortical Bone Specimens." *The 32nd International Workshop on Human Subjects for Biomechanical Research*, Nashville, Tennessee: October 31, 2004.

64. Duma SM, **Rath AL**. "Fundamental Principles of Injury Biomechanics." *Fundamental and Advanced Concepts for Automobile and Sports Injury Biomechanics, A Two-Day Instructional Course*, Roanoke, Virginia: October 22-23, 2004.
65. Duma SM, Kennedy EA, **Rath AL**. "Introduction to Automobile Safety." *Fundamental and Advanced Concepts for Automobile and Sports Injury Biomechanics, A Two-Day Instructional Course*, Roanoke, Virginia: October 22-23, 2004.
66. **Rath AL**, Duma SM. "Automobile Injury Scaling and Patterns." *Fundamental and Advanced Concepts for Automobile and Sports Injury Biomechanics, A Two-Day Instructional Course*, Roanoke, Virginia: October 22-23, 2004.
67. **Rath AL**, Duma SM. "Using Federal Crash Data and Injury Scaling Techniques." *The Fundamentals of Automobile and Sports Injury Biomechanics Conference*, Roanoke, Virginia: February 7, 2004.
68. Stitzel JD, Kennedy EA, **Rath AL**, Duma SM. "Computer Modeling Techniques Thoracic Injury Biomechanics." *The Fundamentals of Automobile and Sports Injury Biomechanics Conference*, Roanoke, Virginia: February 7, 2004.

Presentations and Invited Lectures

1. **Stern AR**, Eckersley CP. "Biomechanics: Its Use in Claims and Litigation." *Nick Schnyder Law Firm*, Virtual: October 29, 2024.
2. **Stern AR**. "Biomechanics: Understanding Its Use in Claims and Litigation." *MEGR 2279-Introduction to Biomedical Engineering, University of North Carolina at Charlotte*, Charlotte, North Carolina: September 20, 2024.
3. **Stern AR**. "Biomechanics: Understanding Its Use in Claims and Litigation." *MEGR 2279-Introduction to Biomedical Engineering, University of North Carolina at Charlotte*, Charlotte, North Carolina: October 27, 2023.
4. **Stern AR**, Eckersley CP. "Biomechanics: Understanding Its Use in Claims and Litigation." *North Carolina Association of Defense Attorneys, Fall Seminar*, Greensboro, North Carolina: October 6, 2023.
5. **Stern AR**, Eckersley CP. "Biomechanics: Understanding Its Use in Claims & Litigation." *MGC School of Rock | Workers' Compensation & Liability Jam Session*, Charlotte, North Carolina: June 22, 2023.
6. **Stern AR**. "Biomechanical Analysis: When People Are the Parts That Fail." *MEGR 2279-Introduction to Biomedical Engineering, University of North Carolina at Charlotte*, Charlotte, North Carolina: October 28, 2022.
7. **Stern AR**. "Biomechanical Analysis in the Private Sector." *Wake Forest University*, Winston-Salem, North Carolina: October 21, 2022.
8. **Stern AR**, Rogers JR. "Heavy Truck Rollovers: Occupant Injury & Kinematics." *North Carolina Association of Defense Attorneys*, Virtual: September 14, 2022.
9. **Stern AR**. "Biomechanical Analysis: When People Are the Parts That Fail." *MEGR 2279-Introduction to Biomedical Engineering, University of North Carolina at Charlotte*, Charlotte, North Carolina: December 3, 2021.
10. **Stern AR**. "Biomechanical Analysis in the Private Sector." *Wake Forest University*, Winston-Salem, North Carolina: October 29, 2021.
11. **Stern AR**. "The Art of Not Being There: Staying Connected in the Virtual World." *2021 Diversity & Inclusion/Women in Law Webinar*, Virtual: March 25, 2021.
12. Kelley ME, **Stern AR**. "Biomechanics in Criminal Cases." *North Carolina Office of Indigent Defense Services (IDS), 2021 IDS Forensic Science Education Series*, Virtual: March 18, 2021.

13. **Stern AR**, Roberts JM. "Low Speed Vehicle Collision Analysis." *Ohio Association of Civil Trial Attorneys*, Virtual: November 18, 2020.
14. **Stern AR**. "Biomechanical Analysis: When People Are the Parts That Fail." *MEGR 2279-Introduction to Biomedical Engineering, University of North Carolina at Charlotte*, Charlotte, North Carolina: November 13, 2020.
15. **Stern AR**. "Biomechanical Analysis in the Private Sector." *Virginia Tech - Wake Forest University School of Biomedical Engineering and Sciences*. Winston-Salem, North Carolina: October 23, 2020.
16. **Stern AR**. "Heavy Truck Rollovers: Occupant Injury & Kinematics." *Arkansas Trucking Seminar*, Virtual: September 17, 2020.
17. **Stern AR**. "Visualization of Analysis Methods and Results in Biomechanics." *South Carolina Women Lawyers Association Annual Meeting*, Columbia, South Carolina: November 8, 2019.
18. **Stern AR**. "Biomechanical Analysis: When People Are the Parts That Fail." *MEGR 2279-Introduction to Biomedical Engineering, University of North Carolina at Charlotte*, Charlotte, North Carolina: October 25, 2019.
19. **Stern AR**, Stigge JD. "Low-Speed Vehicle Collision Analysis." *Baylor Evnen, LLP*, Lincoln, Nebraska: July 29, 2019.
20. **Stern AR**, Rogers JC. "Low-Speed Vehicle Collision Analysis." *FCCI Florida Claim Seminar*, Sarasota, Florida: October 9, 2018.
21. **Stern AR**. "Workers' Comp: The Basics of Falls: From Slip/Trip to Falling from Heights." *North Carolina Association of Defense Attorneys Fall Seminar for Insurance Claims Managers & Defense Counsel*, Greensboro, North Carolina: September 28, 2018.
22. **Stern AR**. "The Basics of Falls: From Slip/Trip to Falling from Heights." *Western Tennessee Chapter of the CLM*, Memphis, Tennessee: August 23, 2018.
23. **Stern AR**. "Biomechanics: Understanding Its Use in Claims and Litigation." *Cranfill Sumner & Hartzog LLP*, Charlotte, North Carolina: August 14, 2018.
24. **Stern AR**, Gray AE. "Engineering Graduate School and MBA Considerations." *ENGR 3295-Multidisciplinary Professional Development, University of North Carolina at Charlotte*, Charlotte, North Carolina: January 26, 2018.
25. **Stern AR**. "Biomechanical Analysis in the Private Sector." *Virginia Tech - Wake Forest University School of Biomedical Engineering and Sciences*. Winston-Salem, North Carolina: January 19, 2018.
26. **Stern AR**. "Impact Biomechanics." *MEGR 2279-Introduction to Biomedical Engineering, University of North Carolina at Charlotte*, Charlotte, North Carolina: September 29, 2017.
27. Wilson CR, **Stern AR**. "Breaking the Chain: Strategies for Attacking the Issue of Causation." *North Carolina Association of Defense Attorneys Winter Workshop*, Durham, North Carolina: January 27, 2017.
28. **Stern AR**. "Impact Biomechanics." *MEGR 2279-Introduction to Biomedical Engineering, University of North Carolina at Charlotte*, Charlotte, North Carolina: October 5, 2016.
29. **Stern AR**. "MADYMO as a Tool for Evaluating Alternative Designs: A Product Liability Case Study." *MADYMO Users Meeting*, Ann Arbor, Michigan: September 27, 2016.
30. **Stern AR**. "Biomechanical Analysis for Use in Claims and Litigation." *Lamson, Dugan & Murray*, Omaha, Nebraska: July 8, 2016.
31. **Stern AR**. "Biomechanics: Understanding Its Use in Claims & Litigation." *North Carolina Association of Defense Attorneys 38th Annual Meeting*, Hilton Head, South Carolina: June 13, 2015.

32. **Stern AR.** "American Society of Biomechanics Young Scientist Post-Doctoral Award Presentation: Osteocyte Strain Transmission is Reduced Due to Age-related Changes in the Microstructural, Micromechanical, and Macromechanical Properties of Bone." *7th World Congress of Biomechanics*, Boston, Massachusetts: July 10, 2014.
33. **Stern AR.** "What do you do when no data exists?" *Nelson Mullins Riley & Scarborough LLP*, Columbia, South Carolina: September 5, 2013.
34. **Stern AR.** "ESI Consulting Capabilities." *Smith Moore Leatherwood LLP*, Greenville, SC: August 5, 2013.
35. **Stern AR.** "Aging Bone: Age Effects on Osteocyte Sensing of Skeletal Loading." *Consortium for Orthodontic Advances in Science and Technology: Neuro-Musculo-Skeletal Interactions in Health and Disease*, Chapel Hill, North Carolina: October 19-21, 2012.
36. **Stern AR.** "Biomedical Engineering: Impact and Injury Mechanics." *UMKC Women's Center and School of Computing and Engineering - Turner High School*, University of Missouri at Kansas City, Kansas City, Missouri: May 9, 2012.
37. **Stern AR.** "Aging Bone: Age Effects on Osteocyte Sensing of Skeletal Loading." *AIMM/ASBMR John Haddad Young Investigators Meeting*, Snowmass, Colorado: April 9 - 13, 2012.
38. **Stern AR.** "Osteocyte Mechanotransduction." *UMKC Center of Excellence in the Study of Dental and Musculoskeletal Tissues Seminar Series*, University of Missouri at Kansas City, Kansas City, Missouri: January 18, 2012.
39. **Stern AR.** "Biomedical Engineering as a Major and Field of Research." *Math and Physics Institute*, Independence, Missouri: October 21, 2011.
40. **Stern AR.** "Biomedical Engineering as a Major and Field of Research." *Cottey College National Chemistry Week/Journal Club*, Nevada, Missouri: October 18, 2011.
41. **Stern AR, Stern MM.** "Transitioning from Postdoc to Assistant Professor." *Professional Development Seminar*, Oral Biology Department, University of Missouri at Kansas City, Kansas City, Missouri: June 22, 2011.
42. **Stern AR.** "Biomedical Engineering: Impact and Injury Mechanics." *Cottey College Summer Sciences Program*, Nevada, Missouri: June 15, 2011.
43. **Stern AR.** "Biomedical Engineering: Impact Biomechanics." *ME 111-Essential Engineering*, University of Missouri at Kansas City, Kansas City, Missouri: April 13, 2011.
44. **Stern AR, Stern MM, Bonewald LF, Van Dyke ME, Nicoletta DP.** "Differences in the Biological Responses of Osteocytes Exposed to Imposed Shear Stresses and Substrate Deformations." *AIMM/ASBMR John Haddad Young Investigators Meeting*, Snowmass, Colorado: April 4 - 8, 2011.
45. **Stern AR.** "The Effects of Strain and Perilacunar Environment on the Mechanotransduction of Osteocytes." *Undergraduate and Graduate Engineering Seminar, Department of Civil and Mechanical Engineering, University of Missouri at Kansas City*, Kansas City, Missouri: January 22, 2010.
46. **Stern AR.** "Development of a Novel Pulmonary Surrogate for Augmenting the Capability of Anthropomorphic Test Devices: Lungs for Crash Test Dummies." *Undergraduate and Graduate Engineering Seminar, Department of Civil and Mechanical Engineering, University of Missouri at Kansas City*, Kansas City, Missouri: January 22, 2010.
47. **Rath AL, Bonewald LF, Van Dyke ME, Nicoletta DP.** "Microstructural Variation in the Bone Matrix and Cell Attachments Modify Strain Amplification on the Osteocyte." *North Carolina Tissue Engineering and Regenerative Medicine Conference*, Winston-Salem, North Carolina: November 13, 2009.

48. **Rath AL**, Stern MM, Bonewald LF, Van Dyke ME, Nicoletta DP. "The Effects of Fluid Flow and Substrate Stretching on the Mechanotransduction of Osteocytes." *Virginia Tech - Wake Forest University School of Biomedical Engineering and Sciences 7th Student Research Symposium*, Blacksburg, Virginia: May 14, 2009.
49. **Bonivtch AR**, Mathis JT, Van Dyke ME. "Strain Transduction in Cells Seeded on a Scaffold Exposed to Uni-Axial Stretching: A Three-Dimensional Finite Element Study." *Society for Biomaterials 2009 Annual Meeting and Exposition*, San Antonio, Texas: April 24, 2009.
50. **Rath AL**, Stern MM, Bonewald LF, Nicoletta DP, Van Dyke ME. "Mechanical Strain Induces Changes in Gene Expression and the Cytoskeleton in Osteocytes." *Wake Forest Institute for Regenerative Medicine 2nd Annual Research Retreat*, Asheville, North Carolina: March 23-24, 2009.
51. **Bonivtch AR**. "The Effects of Strain and Perilacunar Environment on the Mechanotransduction of Osteocytes." *Graduate Seminar, Department of Biomedical Engineering, Columbia University*, New York, New York: March 6, 2009.
52. **Bonivtch AR**, Ling J, Jiang JX, Van Dyke ME, Bonewald LF, Nicoletta DP. "Fluid Flow Induces an Increase in Cell Strain and Intracellular Calcium Production in Osteocytes." *The 55th Annual Meeting of the Orthopedic Research Society*, Las Vegas, Nevada: February 23, 2009.
53. **Bonivtch AR**, Bonewald LF, Nicoletta DP. "Microstructural Variation in the Bone Matrix and Cell Attachments Modify Strain Amplification on the Osteocyte." *The 17th Annual Symposium on Computational Methods in Orthopedic Biomechanics*, Las Vegas, Nevada: February 21, 2009.
54. **Bonivtch AR**, Ling J, Jiang JX, Van Dyke ME, Bonewald LF, Nicoletta DP. "Fluid Flow Induces an Increase in Cell Strain and Intracellular Calcium Production in Osteocytes." *The 10th Annual North Carolina Tissue Engineering and Regenerative Medicine Conference*, Research Triangle Park, North Carolina: November 7, 2008.
55. **Bonivtch AR**, Bonewald LF, Ling J, Jiang JX, Nicoletta DP. "Direct Correlation of Osteocyte Deformation with Calcium Influx in Response to Fluid Flow Shear Stress." *American Society for Bone and Mineral Research 30th Annual Meeting: Working Group on Rheumatic Diseases and Bone*, Montreal, Quebec, Canada: September 14, 2008.
56. **Bonivtch AR**, Gayzik FS, Danelson KA, Stitzel JD. "Pulmonary Surrogate for Use in Anthropomorphic Testing Devices: Lungs for Crash Test Dummies." *Collegiate Inventors Competition*, Pasadena, California: October 31, 2007.
57. **Bonivtch AR**. "CIREN Case Review and Biomechanics Overview." *The Center for Excellence for Research, Teaching and Learning Summer Students*, Winton-Salem, North Carolina: June 29, 2007.
58. **Bonivtch AR**, Stitzel JD. "Use of Real-World Crash Data to Understand Injury Mechanisms." *Injury Biomechanics: Advanced Technologies and New Frontiers*, Blacksburg, Virginia: March 23-24, 2007.
59. **Bonivtch AR**, Kennedy EA, Manoogian SJ, Stitzel JD, Herring IP, Duma SM. "The Effects of the Extraocular Muscles on the Loading Response of the Human Eye Under Static Loading Conditions." *2006 ASME Summer Bioengineering Conference*, Amelia Island, Florida: June 21-25, 2006.
60. **Bonivtch AR**, Francis WL, Moravits DE, Paskoff GR, Shender BS, Bass CR, Lucas FA, Pintar F, Yoganandan N, Koebbe M, Thacker BH, Nicoletta DP. "Development, Verification, and Validation of a Parametric Cervical Spine Injury Prediction Model." *The 33rd International Workshop on Human Subjects for Biomechanical Research*, Washington, D.C.: November 8, 2005.
61. **Rath AL**, Manoogian, SJ Duma, SM Bolton, BJ Crandall JR. "An Evaluation of a Fiber Optic Based Sensor for Measuring Chest and Abdominal Deflection." *Society of Automotive Engineers 2005 World Congress & Exhibition*, Detroit, Michigan: April 11-14, 2005.
62. **Rath AL**, Manoogian SJ, Kennedy EA, Stitzel JD, Duma SM. "The Effects of Extraocular Muscles on Eye Biomechanics." *The Virginia Tech - Wake Forest University School of Biomedical Engineering and Sciences 4th Student Research Symposium*, Meadows of Dan, Virginia: May 12, 2005.

63. **Rath AL**, Duma SM. "Automobile Injury Scaling and Patterns." *Fundamental and Advanced Concepts for Automobile and Sports Injury Biomechanics, A Two-Day Instructional Course*, Roanoke, Virginia: October 22-23, 2004.
64. **Rath AL**, Duma SM. "Using Federal Crash Data and Injury Scaling Techniques." *The Fundamentals of Automobile and Sports Injury Biomechanics Conference*, Roanoke, Virginia: February 7, 2004.