

# Boster, Kobayashi & Associates

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## James J. Mason, Ph.D., P.E. Curriculum Vitae

### Present Position

*Boster, Kobayashi & Associates, Livermore, CA 94551*

A consulting firm specializing in the technical aspects of accident reconstruction, failure analysis, highway design and injury causation. Typical assignments involve application of laws of physics and principles of engineering to vehicular accident reconstruction and product design/defect analysis.

### Professional Experience

*ARCCA Inc., Oakland, CA, 94612*

10/16-1/23     Senior Consultant: Providing analysis and opinions on fracture and fatigue of metals, plastics and welds, corrosion and motor vehicle accident reconstruction to the legal professions and insurance industries. Performed engineering evaluations of failed consumer and industrial products, analyses of equipment and machinery design, and evaluations of industrial failures. Coordinated and participated in metallurgical laboratory analyses, including SEM, EDS, chemistry, and x-ray examinations. Completed vehicle accident reconstruction and vehicle mechanical failure reconstructions, including passenger and commercial vehicle inspections. Executed vehicle systems downloads. Prepared oral and written reports that document observations, analysis, and conclusions. Gathered photographic evidence, conducted investigations to document onsite conditions, oversaw laboratory testing by third parties, and delivered expert witness testimony in deposition and trial.

*Rimkus Consulting Group Inc., Concord, CA 94520*

12/11-9/16     Principal Consultant: Provided analysis and opinions on biomechanics of injury, fracture and fatigue of metals, plastics and welds, corrosion and motor vehicle accident reconstruction to the legal professions and insurance industries. Completed vehicle accident reconstruction and vehicle mechanical failure reconstructions, including passenger and commercial vehicle inspections. Carried out biomechanical analyses of injury. Prepared oral and written reports that document observations, analysis, and conclusions. Gathered photographic evidence, conducted investigations to document onsite conditions, oversaw laboratory testing by third parties, and delivered expert witness testimony in deposition and trial. Personally managed more than 110 files per year.

*Department of Mechanical Engineering, Michigan State University, East Lansing, MI 48824*

5-10/12-11 Adjunct Professor: Served on thesis committees and advised PhD and MS students.

*Van Andel Research Institute, & Spectrum Health Care, Grand Rapids, MI, 49503*

8-09/11-11 Associate Professor: Scientific investigator and educator within the Translational Orthopedic Research Program (TORP) at the Van Andel Research Institute (VARI) jointly appointed to Spectrum Healthcare. Developed and participated in collaborative research programs with affiliated partner, TGen in Arizona, as well as with Michigan State University, the University of Michigan and other entities. Conducted translational research on orthopedics, fracture healing and osteoarthritis with particular attention paid to the role of Wnt signaling and mechanotransduction in these processes. Taught course on statistical methods.

*Brach Engineering LLC, Granger, IN 46530*

10-10/ 11-11 Failure Analysis and Accident Reconstruction Consultant: Provided analysis and opinions on fracture and fatigue of metals and plastics, and motor vehicle accident reconstruction to the legal professions and insurance industries.

*OrthoX, LLC, Granger, IN 46530 (formerly Granger Engineering, LLC)*

1-04/10-10 Founder and President: Raised over \$1.2M in Phase I and Phase II STTR grants from the National Science Foundation and matching funds from the State of Indiana to develop a biomaterial for orthopedic applications. Established quality system and manufacturing. Produced pilot production of first product. Increased testing requirements from the US FDA precluded going to market.

*Zimmer Holdings, Inc., Warsaw, IN 46580*

10-07/6-09 Associate Director of Trauma Research: Managed operation of Trauma Research laboratory where materials and devices for repair of fractured bones were tested. Used problem-solving and decision making skills to provide leadership needed to keep product development on budget, on time and done right. Directed external research program funding outside researchers. Directed Emerging Technology effort to identify and evaluate new technologies for innovative trauma products. Directed internal research program focused on publishable research related to repair of fractured bones. Used oral and written communication skills to convey results to customers.

9-06/10-07 Manager, Research Library: Managed operation of Research Library supporting US employees nationwide. Updated information technologies to include electronic document delivery, electronic cataloging, and electronic search data bases. Also, updated website and access to resources improving internal customer service.

5-05/10-07 Manager of Biomechanical Test Laboratory: Managed operation of Biomechanical Test Laboratory (BTL) where orthopedic materials and devices are tested in static loading, impact loading and biomechanical loading. Includes Anatomic Testing Lab where cadaver testing of devices and testing of cadaver bone samples is performed. Implemented productivity improvement and consistently met performance expectations and criteria.

5-05/10-07 Principal Engineer: Responsible for engineering research support of new product development which includes specification of testing for proof of concept, performance and reliability. Support knee, hip, elbow, ankle, and shoulder implant development as well as trauma products and surgical instruments. Used

oral and written communication skills to convey results, identify problems and propose solutions.

Project Manager, Cartilage Friendly Materials: Led and coordinated cross functional team, including external researchers, that developed new polymer materials for articulation against cartilage.

Project Team, NexGen Patellofemoral Implant: Led and coordinated efforts to prove safety and efficacy of new patellofemoral implant.

*James Mason Consulting, Granger, IN 46530*

8-99/5-05 Failure Analysis Consultant: Performed engineering evaluations of failed consumer and industrial products, analyses of equipment and machinery design, and evaluations of industrial failures. Coordinated and participated in metallurgical laboratory analyses, including SEM, EDS, chemistry, and x-ray examinations. Prepared oral and written reports that document observations, analysis, and conclusions. Delivered expert witness testimony in deposition and trial.

*Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN 46556*

1-06/12-07 Adjunct Professor: Served on thesis committees of several PhD and MS students.

5-05/12-05 Professor: Completed contracted research in machining, mechanics of hydrogels, and the performance of hydrogels in orthopedic implants.

5-99/5-05 Associate Professor (tenured): Performed research in several areas including: orthopedic biomaterials and engineering, high speed machining, fatigue of super-alloys, finite element analysis (FEA) and thermal fatigue of solder joints. Taught 26 courses.

9-00/5-05 Director of Mechanical Testing Facility: Set up centralized mechanical testing facility for department. Oversaw scheduling, maintenance and operation of facility used by faculty, undergraduate students and graduate students.

8-93/5-99 Clark Equipment Assistant Professor: Performed research in adiabatic shear band formation, dynamic fracture of polymer composites, high strain rate deformation of materials, examination of failure and initiation events in explosives, finite element analysis (FEA) and fatigue crack propagation. Repeatedly taught 8 courses.

*Indiana University, School of Medicine, Indianapolis, IN 46202*

9-03/9-04 Visiting Faculty: Performed research on bone mechanics and bone cell mechanics.

*London Centre, University of Notre Dame, London, England*

6-01/8-01 Associate Professor: Taught course on Engineering Ethics and Law.

## Education

California Institute of Technology

Ph.D. Solid Mechanics, Materials Science Minor 1993

Illinois Institute of Technology

Professional Science Master's Degree in Biology 2011

University of California, Berkeley

M.S. Materials Science and Engineering 1988

B.S. Mechanical Engineering and Materials Science and Engineering 1986

## Certifications and Training

Accredited Accident Reconstructionist (ACTAR), #2525	2019
iVe Vehicle System Forensics	2018
iVe Examiner awarded	2018
Crash Data Retrieval Technician I	2012
Crash Data Retrieval Technician II	2012
Commercial Vehicle Event Data Recorder Technician	2012
Ladder Safety Training (American Ladder Institute)	2012
Certified Forklift Operator	2012

## Professional Recognition and Honors

- Selected for membership in Independent Metallurgical Engineering Consultants of California
- Winner of MIRA Innovation of the Year Award (in the State of Indiana), 2010
- Appointed to the Corporate Affairs Committee of the Orthopedic Research Society, 2009-2013
- Listed in Marquis' *Who's Who in Science and Engineering*, 10th Anniversary Edition, 2007
- NIH Senior Faculty Fellow, Indiana Univ. School of Medicine, Oct 2003-Sep 2004
- Calgary Award in Orthopedics, IV World Congress on Biomechanics, Aug. 2002
- University of Notre Dame, College of Engineering, Teacher of the Year Award, 2001
- Selected to participate in the Loctite Summer Faculty Fellowship Program, 1999
- Department of Aerospace and Mechanical Engineering, Faculty Teaching Award, 1998
- Listed in Marquis' *Who's Who in Engineering*, 4th Ed., 1998-99
- Selected to participate in NAE's Frontiers of Engineering Symposium, 1997
- Office of Naval Research, Young Investigator 1996-99
- Clark Equipment Assistant Professor, University of Notre Dame 1995-96
- Achievement Rewards for College Scientists Foundation Fellow, 1992
- Charles Lee Powell Foundation Graduate Fellow, 1989
- Earl C. Anthony Fellow, California Inst. of Technology, 1988
- Tau Beta Pi Engineering Honor Society, UC Santa Barbara, UC Berkeley, 1983-86
- Pi Tau Sigma Mechanical Engineering Honor Society, UC Berkeley, 1985-86

## Professional Membership, Licensure and Service

- Independent Metallurgical Engineering Consultants of California (IMECA), 2014-*present*
- Licensed Professional Engineer, State of California, 2012- *present*,#M36002
- Licensed Professional Engineer, State of Washington, 2012- *present*, #49597
- Certified Accident Reconstructionist, ACTAR, 2018, #2525
- Orthopedic Research Society, 2008- 2013
- Industrial Advisor, Indiana University, Purdue University at Indianapolis (IUPUI) Bioengineering Department, 2005-2011
- Proposal Reviewer, National Science Foundation and National Institutes for Health
- Journal Reviewer for over 20 different journals

Dr. Mason has published 1 book, published 61 articles in peer reviewed journals, given 87 presentations at technical conferences, symposia and meetings, been granted 6 patents and delivered 73 invited lectures at companies, conferences and universities.

## Books

1. R. Matthew Brach, **James J. Mason**, Raymond M. Brach, *Vehicle Accident Analysis and Reconstruction Methods*, 3<sup>rd</sup> Edition, SAE International, Warrendale, PA, 2021

## Invited Lectures, Presentations and Papers

1. Wade Lanning and **James Mason**, "Failure Analysis- Investigating Loss," Geico Staff Counsel, August 25, 2021
2. Jaqueline Lewis-Devine and **James Mason**, "Connecting the Dots: Failure Analysis in Structures, Products & Humans," The Claims and Litigation Management Alliance, April 6, 2021
3. **James Mason** and Wade Lanning, "Mechanical Failure Analysis and Materials Science," Glascock, Street and Waxler, October 15, 2020.
4. **James Mason**, "Seats and Seatbelts; A Look at Crashworthiness," Robinson and Calcagnie, June 19, 2020
5. **James Mason**, "Seatback and Seatbelt Failure Mechanisms," Greene-Broillet, June 3, 2020
6. **James Mason**, "Seatback and Seatbelt Forensics," Walkup, Melodia and Kelly, May 20, 2020
7. **James Mason**, "Vehicle Forensics," Southern California Fraud Investigators' Association, Annual Meeting, Palm Springs, CA, November 12, 2019
8. **James Mason**, "Vehicle Forensics," Coleman Law Group, January 24, 2019
9. **James Mason**, "Infotainment and Telematics Systems in Passenger Vehicles," Southern California Fraud Investigators Association, Annual Meeting, October 24, 2018
10. **Brenden Morse and James J. Mason**, "Accident Reconstruction and Vehicle Data Systems," Sentry Claims Training, Salem, OR, May 15, 2018
11. **James J. Mason, PhD**, "Infotainment and Telematics Systems in Passenger Vehicles," Liberty Mutual SIU Meeting, Phoenix, AZ, March 29, 2018
12. **James J. Mason, PhD**, "Infotainment and Telematics Systems in Passenger Vehicles," East Bay Claims Association, Pleasant Hill, CA, February 14, 2018
13. **Wahlburg, T, McDevitt, A and Mason, J**, "Product Liability in Vehicle Accidents," San Francisco Trial Lawyers Association, San Francisco, CA, November 14, 2017
14. **Gerard W. White and James J. Mason, PhD**, "Crane Casualties and Recoveries", Annual Meeting, National Association of Subrogation Professionals, Austin, TX, November 6, 2017
15. **Brenden Morse and James J. Mason, PhD**, "Vehicle Telematics and Infotainment Systems," Southern California Fraud Investigation Association, Palm Springs, CA, October 4, 2017
16. **James J. Mason, PhD**, "Vehicle Information Systems" Claims Conference of Northern California, McClellan, CA, Sep 13, 2017
17. **James J. Mason, PhD**, "Accident Reconstruction and Vehicle Information Systems," Ardan and Associates, Woodland Hills, CA, July 6, 2017
18. **James J. Mason, PhD**, "Failure Analysis and Materials Science," Davis Rothwell- Earle & Xochihua, Portland, OR, May 5, 2017,
19. **James J. Mason, PhD**, "Accident Reconstruction and Medical Device Failure," Walkup, Melodia, Kelly & Schoenberger, San Francisco, CA, May 2, 2017
20. **James J. Mason, PhD**, "Materials Science in Fire Sprinkler Systems," Central Valley Claims Association, Stockton, CA, April 21, 2017
21. **James J. Mason, PhD**, "Accident Reconstruction: What Really Happened?," The Veen Firm, San Francisco, CA, January 25, 2017
22. **James J. Mason, PhD**, "Fire Suppression Systems," East Bay Claims Association, Pleasant Hill, CA, April 9, 2014

23. **James J. Mason, PhD**, "Moving Vehicle Accident Reconstruction," Allstate, Torrance, CA, March 7, 2014
24. **James J. Mason, PhD**, "Commercial Vehicle Accident Reconstruction," Low, Ball & Lynch, A Professional Corporation, Sacramento, CA, November 5, 2013
25. **James J. Mason, PhD**, "Metallurgical Failures in Heavy Equipment," Exponent Inc., Palo Alto, CA, August 22, 2013
26. **James J. Mason, PhD**, "Phantom Vehicle Investigations," Allstate Insurance, Stockton, CA, August 21, 2013
27. **James J. Mason, PhD**, "Vehicle Inspection and Accident Reconstruction," Law Offices of Kelly J. Sweeney, Seattle, WA, June 20, 2013
28. **James J. Mason, PhD**, "Biomechanics of Low Velocity Impacts," American Automobile Association of California, Santa Ana, CA, June 18, 2013
29. **James J. Mason, PhD**, "Injury Biomechanics; How People Get Hurt," Rimkus Arizona 3rd Annual Continuing Education Event, Phoenix, AZ, May 7, 2013
30. **James J. Mason, PhD**, "Injury Biomechanics; How People Get Hurt," Sedgwick Claims Management, Seattle, WA, November 20, 2012
31. **James J. Mason, PhD**, "Injury Biomechanics; How People Get Hurt," King County Risk Management, Seattle, WA, August 29, 2012
32. **James J. Mason, PhD**, "Injury Biomechanics; How People Get Hurt," Geico Insurance: 4180 Lind Avenue SW, Renton, WA 98057, July 12, 2012
33. **James J. Mason, PhD**, "Injury Biomechanics; How People Get Hurt," Progressive Insurance Inc., Bothell, WA, April 19, 2012
34. **Jim Mason**, "Uncertainty Analysis in Vehicle Accident Reconstruction," Exponent Inc., Phoenix, AZ, June 27, 2011
35. **Jim Mason**, "Biomechanics versus Mechanobiology," Civil Engineering Department, University of Wisconsin, Milwaukee, March 16, 2011
36. **Jim Mason**, "Transitioning from Biomechanics to Mechanobiology," Mechanical Engineering Department, Michigan State University, East Lansing, MI, April 27, 2010
37. **Jim Mason**, "Building a Business in Life Sciences," The Medical Mile Resource Group Lecture Series Keynote Speaker, The DeVos Center at Grand Valley State University's Pew Campus, Grand Rapids, MI, Mar 23, 2010
38. **Jim Mason**, "Future Directions for Patellofemoral Implants," Grand Rounds, Blodgett Hospital, Grand Rapids, MI, Mar 17, 2010
39. **Jim Mason**, "Mechanics and Materials Related to Patella Resurfacing," Institute of Orthopedic Research & Education, The Methodist Hospital, Houston, TX, Jun 21, 2009
40. **Jim Mason**, "Mechanical Engineering Education and Research in the 21st Century," the Petroleum Institute, Abu Dhabi, UAE, Apr 21, 2009
41. **Jim Mason**, "In-vitro force measurements with energy harvesting," Indiana University, Purdue University, Indianapolis (IUPUI), Indianapolis, IN, Apr 17, 2009
42. **Jim Mason**, "New Directions in the Treatment of Patellofemoral Joint Pain," Florida International University, Mar 13, 2009
43. **Jim Mason**, "Patella Mechanics and Materials," Aerospace and Mechanical Engineering Department, University of Notre Dame, Feb 17, 2009
44. **Jim Mason**, "Engineering the Patellofemoral Joint; Present and Future," Indiana University School of Medicine, Indianapolis, IN, Jan 26, 2009
45. **James Mason**, Brian Thomas, Mike Wallick, Don Yakimicki, "Phase-Separated Hydrogels Comprised of Both Hydrophilic and Hydrophobic Segments," TMS 2008, 137th Annual Meeting and Exhibition, New Orleans, LA, Mar 11, 2008

46. **J.J. Mason**, "Careers in Engineering Industry," Aerospace and Mechanical Engineering, University of Notre Dame, Notre Dame, IN, Sep 18, 2007
47. **J.J. Mason**, "High Strain Rate Behavior of Cancellous Bone," Mechanical Engineering Department of the Ohio State University, Columbus OH, Mar 4, 2005
48. **J.J. Mason**, "Thermal and Mechanical Issues for Minimally Invasive Implant Materials," University of Missouri, Kansas City, School of Dentistry, Oral Biology Research Seminar Series, May 28, 2003
49. **J.J. Mason**, "Effects of Pre-Cooling and Pre-Heating Procedures on Bone Cement Polymerization in Cemented Hip Replacements," 13th Interdisciplinary Research Conference on Biomaterials, Baltimore, MD, Mar 14-15, 2003
50. **J.J. Mason** and E. Corona, "Effects of Cyclic Mechanical Loading on Thermal Fatigue of Solder," Diversified Systems, Inc., Indianapolis, IN, Mar 13, 2003
51. **J.J. Mason**, "Bending and Springback in Laminated Steels," University of Illinois, Urbana-Champaign, Materials Interest Group, Mar 7, 2003
52. K. Vernaza-Pena and **J.J. Mason**, "Experimental Temperature Fields in Aluminum during Orthogonal Cutting under Different Rake Angles," JSME/ASME Int. Conference on Materials Processing, Honolulu, HI, Oct 15-18, 2002
53. **J.J. Mason**, "Mechanics and Materials Issues in the Next Generation of Orthopedic Implants," California Institute of Technology, Pasadena, CA, Jan 29, 2002
54. **J.J. Mason**, "Recent Research in Dynamic Fracture Mechanics and High Speed Machining," University of Science and Technology, China, Hefei, China, Jan 11, 2002
55. **J.J. Mason**, "Dynamic Fracture Mechanics Solutions for Orthotropic Materials," Ningbo University, Ningbo, China, Jan 10, 2002
56. **J.J. Mason**, "Current Research in Aerospace and Mechanical Engineering at the University of Notre Dame," Beijing University of Aeronautics and Astronautics, Beijing, China, Jan 8, 2002
57. **J.J. Mason**, "Thermomechanical Issues in Total Hip Arthroplasty", Tsinghua University, Beijing, China, Jan 7, 2002
58. **J.J. Mason**, "Temperature Field Measurements During Machining of Aluminum Alloys," National Institute of Standards and Technology, Gaithersburg, MD, June 12, 2001
59. **J.J. Mason**, "Temperature Field Measurements During Machining of Aluminum Alloys," Theoretical and Applied Mechanics Department, Cornell University, April 4, 2001
60. C. Rubio-Gonzalez, C.-Y. Wang and **J.J. Mason**, "Dynamic Stress Intensity Factor Due to Concentrated Loads on Semi-infinite Cracks in Orthotropic Materials," The 2000 ASME Int. Mechanical Engineering Congress and Exposition, Orlando, FL, November 9, 2000, in *Dynamic Failure in Composite Materials and Structures*, Ed. Y. Rajapakse and C.T. Sun, ASME Int., Pub., AMD-Vol. 243, pp 119-128
61. C. Rubio-Gonzalez and **J.J. Mason**, "Dynamic Crack Propagation in Orthotropic Materials," The 2000 ASME Int. Mechanical Engineering Congress and Exposition, Orlando, FL, November 9, 2000
62. **J.J. Mason**, "Dynamic Deformation and Failure," Loctite Corporation, Rocky Hill, CT, June 5, 1999
63. **J.J. Mason**, "Dynamic Fracture Initiation in Orthotropic Materials," 6.1/6.2 Workshop, Naval Surface Warfare Center at Carderock, Bethesda, MD, April 28-30, 1999
64. **J.J. Mason**, "Dynamic Fracture Initiation in Orthotropic Materials," Department of Civil Engineering at Duke University, Raleigh, NC, March 10, 1999
65. **J.J. Mason**, "Dynamic Fracture Initiation in Orthotropic Materials," Department of Mechanical Engineering, University of Alberta, Canada, October 29, 1998
66. **J.J. Mason**, "Applicability of Dynamic Fracture Mechanics to the Initiation of Adiabatic Shear Bands," Los Alamos National Laboratory, Los Alamos, NM, August 19, 1998

67. **J.J. Mason**, "Shear Dominated Fracture in Dynamic Punch Tests on High Strength Metals," 6.1/6.2 Workshop, Naval Surface Warfare Center at Carderock, Bethesda, MD, May 4, 1998
68. **J.J. Mason**, "Application of Dynamic Fracture Mechanics to Shear Band Initiation in Impact of Metals," Department of Civil Engineering at Duke University, Raleigh, NC, March 11, 1998
69. **J.J. Mason**, "Shear Failure of Metals in Dynamic Punching and Blanking Operations," A.G. Simpson Co., Toronto, Ont., August 22, 1997
70. J. Zimmerman and **J.J. Mason**, "The Effects of Loading and Material Microstructure Upon Shear Localization in C300," 116th Winter Annual Meeting of the American Society of Mechanical Engineers, San Francisco, CA, November 21, 1995
71. **J.J. Mason**, "Issues Involved in the Experimental Investigation of Mechanical Initiation of Solid Explosives," Wright Laboratory, Armament Directorate, Eglin AFB, FL, July 26, 1995
72. **J.J. Mason**, "Mechanisms and Effects of Heat Generation in Dynamic Fracture," Department of Engineering Science at the Ohio State University in Columbus, OH, April 13, 1994
73. J. Lambros, **J.J. Mason** and A.J. Rosakis, "An Experimental Investigation of Dynamic Mixed-Mode Fracture Initiation," SPIE 1991 Int. Symposium on Optical and Optoelectronic Applied Science and Engineering, San Diego, CA, 1991

### Journal Publications (Refereed/Reviewed)

1. Bart Williams, Travis Burgers, Juraj Zahatnansky, Andrew Vander Moren, Juan Vivanco, and James Mason, "Mice with a heterozygous Lrp6 deletion have impaired fracture healing," to appear in *Bone Research*, 2016
2. M. Hoffman, T. Burgers, J. Mason, B. Williams, D. Sietsema and C. Jones, "Biomechanical evaluation of fracture fixation constructs using a variable-angle locked periprosthetic femur plate system," *Injury*, **45**, 7, 1035-1041, 2014
3. Burgers TA, Hoffmann MF, Collins CJ, Zahatnansky J, Alvarado MA, Morris MR, Sietsema DL, **Mason JJ**, Jones CB, Ploeg HL, Williams BO, "Mice lacking Pten in osteoblasts have improved intramembranous and late endochondral fracture healing," *PLoS One* 8(5): e63857, 2013
4. B. Stulberg, T. Wright, A. Stoller, K. Mimnaugh, and **J. Mason**, "Bilateral patellar component shear failure of highly cross-linked polyethylene components: Report of a case and laboratory analysis of mechanisms," *Journal of Arthroplasty*; **27**, 5, 789-796, 2012
5. **Jim Mason** and Bart Williams, "SOST and DKK: Antagonists of LRP5 Signaling as Targets for Treating Bone Disease," *Journal of Osteoporosis*, Volume 2010, Article ID 460120, 9 pages, 2010
6. Pilcher, X. Wang, G. Niebur, **J. Mason**, B. Song, M. Cheng, and W. Chen, "High Strain Rate Testing of Bovine Cancellous Bone," *ASME Journal of Biomechanical Engineering*, **132**, 8, p. 081012, 2010
7. Robert J. Kane, Weimin Yue, **James J. Mason** and Ryan K. Roeder, "Improved Fatigue Life of Acrylic Bone Cements Reinforced with Zirconia Fibers." *Journal of the Mechanical Behavior of Biomedical Materials*, J Mech Behav Biomed Mater., **3**, 7 pp 504-11, 2010
8. Marlon O. Coulibaly, Debra L. Sietsema, **Jim Mason**, Bart Williams, and Clifford B. Jones, "Recent Advances in the Use of PINP as a Biomarker in Fracture Healing," *Critical Reviews in Eukaryotic Gene Expression*, , **20**, 2, pp 105-127, 2010
9. Travis Burgers, **Jim Mason**, Matthew Squire, Heidi-Lynn Ploeg, "Time-Dependent Fixation and Implantation Forces for a Femoral Knee Component - An In Vitro Study," *Medical Engineering & Physics*, **32**, pp. 968-973, 2010
10. Jeffrey E. Bischoff , Justin S. Hertzler, and **James J. Mason**, "Patellofemoral interactions in walking, stair ascent, and stair descent using a virtual patella model," *Journal of Biomechanics*, **42**, 11, pp. 1678-84, 2009



11. Brian H. Thomas, J. Craig Fryman, Kaifeng Liu, and **Jim Mason**, "Hydrophilic-Hydrophobic Hydrogels for Cartilage Replacement," *Journal of Mechanical Behavior of Biomedical Materials*, **2**, 6, pp. 588-95, 2009
12. T.A. Burgers, **J. Mason** and H.L. Ploeg, "Initial fixation of a femoral knee component: an *in vitro* and finite element study," *International Journal for Experimental and Computational Biomechanics*, **1**, 1, pp 23-44, 2009
13. Yan Zhou, Weimin Yue, Chaodi Li, and **James J. Mason**, "Static and fatigue mechanical characterizations of variable diameter fibers reinforced bone cement," *Journal of Materials Science: Materials in Medicine*, **20**, 2, pp 633-641, 2009
14. Shiva Kotha, Chaodi Li, Steven Schmid, **James Mason**, "Reinforcement of bone cement using zirconia fibers with and without acrylic coating", *Journal of Biomedical Materials Research*, **88A**, 4, pp 898-906, 2009
15. Kimberly Mimnaugh, Jian Yao, Michel Laurent, Roy Crowninshield, **James Mason**, and Cheryl Blanchard, "The Effect of Entrapped Bone Particles on the Surface Morphology and Wear of Polyethylene," *Journal of Arthroplasty*, **24**, 2, pp 303-309, 2009
16. **J Mason**, F. Leszko, T Johnson and R Komistek, "Patellofemoral Joint Forces," *Journal of Biomechanics*, **41**, 11, pp. 2337-2604, 2008
17. T Burgers, **J Mason**, G Niebur and H Ploeg, "Compressive Properties of Trabecular Bone in the Distal Femur," *Journal of Biomechanics*, **41**, 5, pp 1077-85, 2008
18. RV Kazban, KM Vernaza-Peña and **JJ Mason**, "Measurements of Forces and Temperature Fields in High-Speed Machining of 6061-T6 Aluminum Alloy" *Experimental Mechanics*, **48**, 3, pp 307-317, 2008
19. K. Liu, T. C. Ovaert and **J. J Mason**, "Preparation and Mechanical Characterization of a PNIPA Hydrogel Composite," *Journal of Materials Science: Materials in Medicine*, **19**, 4, pp 1815-1821, 2008
20. RV Kazban and **JJ Mason**, "Fluid Mechanics Approach to Machining at High Speeds: Part II A Potential Flow Model," *Machining Science and Technology*, **11**, 4, 491 – 514, 2007
21. RV Kazban and **JJ Mason**, "Fluid Mechanics Approach to Machining at High Speeds: Part I Justification of Potential Flow Models," *Machining Science and Technology*, **11**, 4, 475 – 489, 2007
22. B Kincaid, **J Mason** and L Schroeder, "Measurement of Orthopedic Cortical Bone Screw Insertion Performance in Cadaver Bone and Model Materials," *Experimental Mechanics*, **47**, 5, pp 595-607. 2007
23. Kotha S.P., Li C., McGinn P., Schmid S.R. and **Mason J.J.**, "Improved Mechanical Properties of Acrylic Bone Cement with Short Titanium Fiber Reinforcement" *Journal of Materials Science: Materials in Medicine*, **17**, 8, pp 743-748, 2006
24. S. P. Kotha, M. Lieberman, A. Vickers, S. R. Schmid, **J. J. Mason**, "Adhesion enhancement of steel fibers to acrylic bone cement through a silane coupling agent" *Journal of Biomedical Materials Research, Part A*, **76A**, No. 1, pp. 111-119, 2006
25. Tovar, A, Gano, S.E., **Mason, J.J.**, Renaud, J.E., , "Optimum Design of an Interbody Implant for Lumbar Spine Fixation", *Advances in Engineering Software*, **36**, Issue 9, pp 634-642, 2005
26. Y. Zhou, C. Li and **J.J. Mason**, "Fiber-end deformation effects in enlarged-end, fiber-reinforced composites," *Engineering Fracture Mechanics*, **72**, Issue 12, pp. 1980-1992, 2005
27. Jennifer L. Schriefer, Alexander G. Robling, Stuart J. Warden, Adam J. Fournier, **James J. Mason**, Charles H. Turner, "A comparison of mechanical properties derived from multiple skeletal sites in mice," *J. Biomechanics*, **38**, pp. 467-475, 2005

28. Y. Zhou, C. Li and **J.J. Mason**, "Shape Optimization of Randomly Oriented Short Fibers for Bone Cement Reinforcement," *Materials Science and Engineering A*, **393**, Issues 1-2, pp. 374-381, 2005
29. Y. Zhou, C. Li, J.E. Renaud, and **J.J. Mason**, "Improvement of Mechanical Properties of Bone Cement by Shape Optimization of Short Fibers," *Engineering Optimization*, **37**, No. 2, pp. 121-134, 2005
30. S.P. Kotha, C. Li, S.R. Schmid and **J.J. Mason**, "Fracture Toughness of Steel Fiber Reinforced Bone Cement," *J. Biomedical Materials Research Part A*, **70A**, No. 3, pp. 514-521, 2004
31. Li, Y. Wang, and **J. Mason**, "The Effects of Curing History on Residual Stresses in Bone Cement during Hip Arthroplasty," *J. Biomedical Materials Research Part B: Applied Biomaterials*, Vol. 70B, Issue 1, pp. 30-36, 2004
32. X.D. Wu, D.Z. Chen, **J.J. Mason** and S.R. Schmid, "Efficient Approximation Algorithms for Pairwise Data Clustering and Applications," *Int. J. of Computational Geometry and Applications*, Vol. 14, Nos. 1-2, pp. 85-104, 2004
33. Li, D. Yakimicki, and **J.J. Mason**, "Thermal Characterization of PMMA-based Bone Cement Curing," *J. Materials Science: Materials in Medicine*, **15**, No. 1, pp. 85-89, 2004
34. C.Li, S.Kotha, **J.J. Mason**, "Evaluation of the Effects of Implant Materials and Designs on Thermal Necrosis of Bone in Cemented Hip Arthroplasty," *Biomedical Materials & Engineering*, **13**, no. 4, pp. 419-428, 2003
35. Li, S.R. Schmid and **J.J. Mason**, "Effects of Pre-cooling and Pre-heating Procedures on Cement Polymerization and Thermal Osteonecrosis in Cemented Hip Replacements," *Medical Engineering and Physics*, **25**, no. 7, pp. 559-564, 2003
36. X. Wu, D.Z. Chen, **J.J. Mason**, and S.R. Schmid, "Pairwise Data Clustering and Applications," *Computing and Combinatorics Proceeding (COCOON 2003)*, **2697**, pp. 455-466, 2003
37. C. Li, S. Kotha, C.-H. Wang, **J. Mason**, D. Yakimicki, and M. Hawkins, "Finite Element Thermal Analysis of Bone Cement for Joint Replacements," *ASME J. Biomechanical Eng.*, **125**, no. 3, pp. 315-322, 2003
38. C. Rubio-Gonzalez and **J.J. Mason**, "Dynamic stress intensity factor due to concentrated loads on a propagating semi-infinite crack in orthotropic materials," *Int. J. Fracture*, **118**, No. 1, pp 77-96, 2002
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1. **James Mason**, "Information Systems in Vehicles," 30<sup>th</sup> Annual Anti-Fraud Conference, April 10, 2019
2. **James Mason**, "Infotainment and Telematics Systems in Passenger Vehicles," Western States Auto Theft Investigators," Annual Meeting, October 9, 2018
3. **Mason JJ**, "Failure Analysis," Claims Conference of Northern California, Annual Meeting, September 15, 2017
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5. Burgers TA, Xu J, Hoffman MF, Sietsema DL, Zismann V, Button B, Davidson P, Tao S, Tembe W, Kiefer J, **Mason JJ**, Williams BO, Trent J, Jones CB. "A Genetic Test to Predict Patient Response to rhBMP-2 for Lumbar Spinal Arthrodesis." American Society of Bone Mineral Research (ASBMR) Conference, Baltimore, MD. Oct. 2013.
6. Tanner JC, Burgers TA, Patthanacharoenphon C, Dubiel M, **Mason J**, Bohay JD, Anderson J. The effects of first ray instability on midfoot joint forces and forefoot ground distribution: a cadaveric study. American Academy of Orthopedic Surgeons (AAOS) Annual Meeting, Chicago, IL. March 2013.
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9. Burgers TA, Hoffmann MF, Morris M, Alvarado MA, Sietsema DL, **Mason J**, Jones CB, Williams BO. Mice lacking Pten in osteoblasts have improved intramembranous and late endochondral fracture healing. Oral presentation and poster. Van Andel Institute retreat, Thompsonville, MI. June 2012.
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19. Danese Joiner, Michael Morris, Donald Scholten, Ben Staal, George Vande Woude, Clifford Jones, Debra Sietsema, Yu-Wen Zhang, **Jim Mason,** "Disruption of Mitogen Inducible Gene 6 (MIG6) in the Mouse Genome Accelerates Surgical Induced Osteoarthritis and Down Regulates Wnt Signaling," American Society of Bone and Mineral Research (ASBMR) Annual Conference, San Diego, CA. Sept. 2011.
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23. Michael Morris, Danese Joiner and **Jim Mason,** "Development of Osteoarthritis of the Knee by Microsurgical Destabilization in murine Model," Grand Rapids Medical Education Partners, Research Day, April 27, 2011
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<sup>1</sup> Plenary poster presentation

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87. A.J. Rosakis, **J.J. Mason** and G. Ravichandran, "On the Amount of Plastic Work Converted to Heat: An Experimental Study Using the Split Hopkinson Pressure Bar," *Society of Engineering Science 29th Annual Meeting*, La Jolla, CA, 1992

## Press Coverage and Internet Publications

1. James J. Mason, "Investigating Carbon Bicycle Accidents," CLM, June 18, 2019, <http://clmmag.theclm.org/home/article/Investigating-Carbon-Bicycle-Accidents?tick=1273931192933073012>
2. "What Does Your Car Know About You," NBC Nightly National News," June 16, 2019. <https://www.nbcnews.com/nigW/hly-news/video/what-does-your-car-know-about-you-more-than-you-might-think-62057541987>
3. James Mason and Jeffrey Bradshaw, "CPVC: Chlorinated Polyvinyl Chloride Piping," On CPVC Fire Sprinkler Pipe .com, <http://cpvcfiresprinklerpipereport.com/cpvc-chlorinated-polyvinyl-chloride-piping>
4. Monica Scott, "Innovative joint cement holds hope for economy, pain relief," *Detroit Free Press*, Detroit MI, June 13 2010, <http://www.freep.com/article/20100613/NEWS06/6130446/1001/rss01>
5. Tony Conley, Radio interview, *The Toney Conley Show*, WILS, Lansing MI, June 7, 2010
6. Alex Nixon, "Grand Rapids researcher's new bone cement would compete with Stryker Corp. products," *Kalamazoo Gazette*, Kalamazoo, MI, June 03, 2010, [http://www.mlive.com/business/west-michigan/index.ssf/2010/06/grand\\_rapids\\_researchers\\_new\\_b.html](http://www.mlive.com/business/west-michigan/index.ssf/2010/06/grand_rapids_researchers_new_b.html)
7. Monica Scott, "Van Andel Institute researcher discovers more durable cement for joint replacements," *Grand Rapids Press*, Grand Rapids, MI June 02, 2010, [http://www.mlive.com/news/grand-rapids/index.ssf/2010/06/van\\_andel\\_institute\\_researcher\\_4.html](http://www.mlive.com/news/grand-rapids/index.ssf/2010/06/van_andel_institute_researcher_4.html)
8. IBJ Staff, "OrthoX receives top Mira award," *Indiana Business Journal*, Indianapolis, IN, May 17, 2010, <http://www.ibj.com/orthox-receives-top-mira-award-/PARAMS/article/19993>
9. Joseph Jackmovich, "Local business recognized for innovation in orthopedics," *South Bend Tribune*, South Bend, IN, May 17, 2010, <http://www.southbendtribune.com/article/20100517/THRIVE/305179999/1262/THRIVE>

## Proposals Funded at Granger Engineering, LLC (Total \$1,224,798)

1. W. Yue and **J. Mason**, "Commercialization of fiber reinforced bone cements with antibiotics," National Science Foundation, STTR Phase IIB Grant, Oct 1, 2008 to Mar 31, 2009, \$174,991
2. W. Yue and **J. Mason**, "Commercialization of a fiber reinforced bone cement," Indiana SBIR/STTR Commercialization Enhancement Program (ISCEP), State of Indiana, July 1, 2008 to June 30, 2010, \$349,982
3. **J. Mason**<sup>3</sup>, "SBIR/STTR Phase II: Variable Diameter Fiber Reinforced Biopolymers for Minimally Invasive Orthopedic Implants," Oct 1, 2006 to Sep 30, 2008, NSF, \$499,849

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<sup>3</sup> Principal investigator changed to Weimin Yue, May 2008

## Proposals Funded at Notre Dame (Total \$6,234,689)

1. **J. Mason**, R. Roeder, and G. Niebur, "Mechanical Characterization of Synthetic Biomaterials and Biological Tissues," Equipment Renewal and Restoration Program, The University of Notre Dame, Jan 1 to Jun 30, 2004, \$139,500
2. **J.J. Mason** and E. Corona, "Highly Integrated Multifunctional Structure with Embedded Subsystem Functionality," July 1, 2003 to Jan 31, 2005, Odysian Technology, Inc., \$306,000
3. **J.J. Mason** and E. Corona, "Circuit Boards for Delphi Automotive Applications," Jun 1, 2002 to May 31, 2003, Delphi Automotive Systems, \$22,276
4. **J.J. Mason**, "Thermomechanical Investigations of High Speed Machining of Aluminum," Sep 2002 to Aug 2005, NSF, Design, Manufacture and Industrial Innovations Program, \$124,309
5. E. Corona, S. Schmid, and **J.J. Mason**, "Bending and Springback of Laminated Steel," May 2001 to May 2003, MSC Laminates, \$30,000
6. **J.J. Mason**, S.R. Schmid, J.E. Renaud, B. Hilberry\*, G. Bruer\*, and C. Turner#, "Advanced Spinal Instrumentation," Mar 2001 to Feb 2003, Indiana 21st Century Research and Technology Fund, \$1,998,987
7. S.R. Schmid, **J.J. Mason**, and S. Paolucci, "Modeling of Investment Casting at Zimmer," Oct 2000 to Sep 2001, Zimmer Orthopedics, \$30,000
8. S.M. Batill, S.B. Skaar, J.W. Goodwine, **J.J. Mason** and M. Sen, "An Integrated Curriculum for Intelligent, Microprocessor-Based Mechanical Systems," Sep 2000 to Aug 2003, National Science Foundation, \$499,947
9. S.R. Schmid, **J.J. Mason**, A. Marsan, B. Hilberry\*, G. Bruer\*, and C. Turner#, "Minimally Invasive Orthopedic Implants," Feb 2000 to Jan 2002, Indiana 21st Century Research and Technology Fund \$2,200,000
10. J.E. Renaud, J.P. Thomas, **J.J. Mason** and A. Marsan, "Boeing Cooperative Research in Manufacturing," Boeing, Nov 1999 to Sep 2000, \$15,000
11. **J.J. Mason**, "Fatigue of U720 and AF2-1DA-6," Sep 1999 to Aug 2000, Ladish Co., Inc., \$5,000
12. **J.J. Mason**, "Machining of Aircraft Alloys," Jul 1998 to Jun 1999, NASA Space Consortium, University of Notre Dame, \$3,000
13. **J.J. Mason**, "Experimental Analysis of Thermomechanics in High Speed Machining of Aluminum," Jul, 1998 to Dec, 1999, ALCOA Foundation Award, \$40,000
14. **J.J. Mason**, "On the Application of Dynamic Fracture Mechanics to Continuous Fiber Reinforced Composite Materials," Jun, 1996 to May, 1999, Office of Naval Research: Young Investigator Program, \$309,452
15. J. Powers, R. Caspar and **J.J. Mason**, "Initiation of Detonation," Nov, 1995 to Sep, 1996, AFOSR, Summer Research Extension Program, \$25,000
16. **J.J. Mason** and K.M. Roessig, "The Initiation of Reactive Materials," Nov, 1995 to Sep, 1996, AFOSR, Summer Research Extension Program, \$25,000
17. **J.J. Mason**, "Shear of Energetic Materials," Nov, 1995 to Sep, 1996, AFOSR, Summer Research Extension Program, \$25,000
18. **J.J. Mason**, "Jump Start Proposal for AME 236—Mechanics of Solids," Aug, 1994 to Jul, 1995, Univ. of Notre Dame, Office of Univ. Computing, \$1,000
19. **J.J. Mason**, J. Powers and S. Schmid, "Acquisition of an Ultra-High-Speed Photographic /Microphotographic/Interferometric Equipment System," Sep, 1994 to Aug, 1997, NSF, Academic Research Infrastructure Program, \$427,718

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\* Purdue University

# Indiana University

20. **J.J. Mason**, "Application of the Potential Drop Method to Measurement of Dynamic Crack Length," Jun, 1994 to May, 1995, Univ. of Notre Dame, Faculty Research Program, \$7,500
4. **J. Mason**, Matching Funds for "SBIR/STTR Phase I: Variable Diameter Fiber Reinforced Biopolymers for Minimally Invasive Orthopedic Implants," Jun 1, 2004 to May 31, 2005, 21st Century Research and Technology Fund of the State of Indiana, \$99,988
5. **J. Mason** "SBIR/STTR Phase I: Variable Diameter Fiber Reinforced Biopolymers for Minimally Invasive Orthopedic Implants," Jun 1, 2004 to May 31, 2005, National Science Foundation, \$99,988

### Van Andel Institute Service

- Graduate Admissions Committee, Van Andel Institute Graduate School, 2010-*present*
- Accreditation Review Committee, Van Andel Institute Graduate School, 2010-*present*

### Post-Doctoral Researchers Supervised at the Van Andel Research Institute

Travis Burgers	<i>Wnt Signaling and Fracture Healing</i>	2010-2011
Danese Joiner	<i>Wnt Signaling in Osteoarthritis</i>	2010-2011

### Courses Taught at the Van Andel Institute

VAI 9006	Statistical Methods in Biology	Spring '11
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### University of Notre Dame Service

- Aerospace and Mechanical Engineering Awards Committee, 2004-2005
- Mechanical Engineering Graduate Studies Committee, 2000-2002
- Mechanical Engineering Committee on Appointments and Promotions, 1999-2002, 2004-2005
- Mechanical Engineering Curriculum Committee, 1997-2000, **Chair, 1998-2000**
- Faculty Advisor to student chapter of American Society of Mechanical Engineers, 1997-2000
- Aerospace and Mechanical Engineering Instructional Labs Committee, 1994-1997
- Committee on the Role of Materials Science in the College of Engineering, 1995-1996
- Member of Faculty Senate, 1994-1997

### Post-Doctoral Researchers Supervised at Notre Dame

Congyue Wang	<i>Dynamic Fracture of Composites</i>	1998-1999
Shiva Kotha	<i>Development of Reinforced Bone Cements</i>	2000-2002
Chaodi Li	<i>Thermal Finite Element Analysis of Bone Cement Curing</i>	2000-2003
	<b>Calgary Award Winner; Orthopedics,</b>	
	IV World Congress on Biomechanics, 2002	
Karinna Vernaza-Peña	<i>Temperature Fields in Orthogonal Cutting</i>	2002-2003

### Doctoral Dissertations Supervised at Notre Dame

Keith Roessig	<i>Applicability of Dynamic Fracture Mechanics to the Initiation and Propagation of Adiabatic Shear Bands</i>	May, 1998
	<b>First Prize Winner;</b> Student Paper Competition at the Southeastern Conference on Theoretical and Applied Mechanics, 1998	
Carlos Rubio-Gonzalez	<i>Dynamic Fracture Initiation in Composites</i>	Dec, 1999
Karinna Vernaza-Peña	<i>Temperature Fields in Orthogonal Cutting</i>	Dec, 2002
	<b>Second Prize Winner;</b> Society for Experimental Mechanics,	

Yan Zhou	National Student Paper Competition 2002 <i>Microdesigned Reinforcements for Biocomposites</i>	May, 2005
Roman Kazban	<i>Effect of Tool Parameters on Residual Stress and Temperature Generation in High Speed Machining of Aluminum Alloys</i>	Dec, 2005
Kaifeng Liu (co-advisor T. Ovaert)	<i>Mechanics of Hydrogels in Biomechanical Applications</i>	May 2009

### Master's Theses Supervised at Notre Dame

W. Rivera	<i>Stress Reversal Split Hopkinson Testing of Threaded Fasteners</i>	May, 1995
J. Zimmerman	<i>Effect of Aging Treatment and Loading Geometry on Shear Localization in Kalthoff Impact Tests of C-300 Steel</i>	Aug, 1995
L. Spicciati	<i>Finite Element Analysis of Dynamically Loaded Threaded Fasteners</i>	May, 1996
R. Caspar (co-advisor J. Powers)	<i>Shear Initiation of Explosives</i>	Aug, 1996
A. Rutten (co-advisor S. Schmid)	<i>Numerical Modeling of a Hip Stem Casting</i>	May, 2001
S. Long	<i>Finite Element Modeling of Bearing Cup Slip in an Aircraft Landing System</i>	May, 2001
Y. Wang	<i>Thermal Residual Stress Generation in Cemented Implants</i>	May, 2003
B. Torres	<i>Correlations between PC Board Strain and Solder Joint Fatigue Life</i>	May, 2003
A. Pilcher	<i>Mechanics of Spinal Injury During Impact</i>	May, 2004
D. Duffek	<i>Fatigue of Solder Under Combined Thermal/Mechanical Static/Dynamic Loading</i>	Aug, 2004
B. Hunt	<i>Hydrogels in Orthopedic Implants</i>	May, 2006

### Undergraduate Design and Research Projects Directed at Notre Dame

A Bi-Axial Split Hopkinson Bar: Design Synthesis and Feasibility Analysis	T. Ruddy, F. Brosnan, L. Bergman	Fall '93
A Biaxial Split Hopkinson Bar: Manufacture	T. Ruddy, F. Brosnan, L. Bergman	Spring '94
Finite Element Analysis of Scaphoid Bone Fracture	J. McKale	Spring/Fall '95, Spring '96
Design of a High Pressure Air Gun	D. Green,	Fall '95
Ultra-High-Speed Camera Support	E. Portune, D. Soykes	Fall '95
Manufacture of a High Pressure Air Gun	D. Green,	Spring '96
Ultra-High-Speed Camera Support	E. Portune, D. Soykes	Spring '96
Fatigue Testing of Mild Steel	S. Basu	Fall '96, Spring '97
Fatigue Testing of Super Alloys	T. Stuhldreher	Spring/Fall '98,
<b>Third Place Winner:</b> Old Guard Student Presentation Competition, ASME Region VI, 1999		
A 5 MPH Bumper Testing Apparatus	T. Stuhldreher, J. Knudsen	Summer '98
Examination of Void Formation Mechanisms During Bone Cement Curing	M. Hannon, J. Solis	Fall '01, Spring '02

Applications of Laser Peening in Orthopedic Implants	J. Hughes	Fall '01, Spring & Summer '02
Investigation of Hydrogels for Disk Replacement	T. Zawatsky	Summer '02
Calculation of 3D Object Skeletons by the Grass Fire Propagation Method	C. Dunstan	Summer '02
Thermal Measurements of Bone Cement Curing During Implantation in Sheep	A. Cienian, P. Stuhldreher, K. Bucci	Summer, Fall '02, Spring '03
Particle Image Velocimetry of High Speed Machining	R. Sharp, J. Blakely	Summer, Fall, '04

## Courses Taught at Notre Dame

### *Undergraduate Level*

AME/CE 236	Mechanics of Solids	Fall '93, Spring '94-'96, '98-'99, '01
AME 331	Mechanics of Solids Laboratory	Fall '97-'99
AME 442	Mechanical Behavior of Materials	Spring '97, '01, '03, '05
AME 446	Finite Element Methods for Structural Analysis	Spring '99-'00, '02-'03
AME 470	Senior Design Project	Fall '93, '95

### *Graduate Level*

AME 561	Mathematical Methods I	Fall '04
AME/CE 558	Elasticity	Fall '94-'96
AME/CE 559	Advanced Mechanics of Solids	Fall '01-'02, '05
AME 570	Advanced Measurements Laboratory	Spring '95
AME 698	Mechanics of Metal Cutting	Fall '04
AME 698	Dynamic Fracture Mechanics	Spring/Fall '97,
AME 698	Mechanics and Failure of Composite Materials	Spring '98
AME 698	Mixed Boundary Value Problems in Solid Mechanics	Fall '98
AME 698	Cell Mechanics	Fall '04
Short Course	Topics in Advanced Mechanics of Solids	Fall '99

## Laboratory and Facilities Development at Notre Dame

### *Materials Testing Laboratory*

At Notre Dame, Dr. Mason developed a 1000 square foot laboratory for investigations into the mechanics of materials. Through funding from the National Science Foundation, Alcoa Foundation and the University of Notre Dame, the laboratory was equipped with the following items:

- A stress reversal split Hopkinson bar for dynamic, high strain rate testing of materials in compression or compression followed by tension
- A dynamic orthogonal cutting Hopkinson bar
- A torsional split Hopkinson bar for dynamic, high strain rate testing of materials in shear
- An ultra-high-speed infrared detector array for measuring surface temperatures during dynamic deformation
- A Cordin model 330 ultra-high-speed camera capable of 2 million pictures per second
- A Cordin model 607 high intensity white light source for use with the 330 camera

- A Coherent 15 watt argon ion laser for use in dynamic high speed interferometry
- Two air guns capable of launching a 1 kg projectile at velocity in the range of 10 to 300 m/s
- Explosives testing tank and storage containers for performing experiments with explosive materials and the explosive loading of materials
- Two workstations, associated high speed oscilloscopes, data acquisition systems and optics for proper instrumentation of experiments using the above equipment
- Polishing, lapping and sectioning equipment for metallographic specimen preparation
- Hydraulic press for the manufacture of composite materials

### *Solid Mechanics and Structural Mechanics Testing Facility*

Dr. Mason also developed a 3500 square foot facility that contained most of the static and fatigue material testing equipment of the AME department and a small (500 square foot) class room area. In 2000, Jim saw a need for a centralized mechanical testing facility in the AME department. Until that time individual researchers had purchased and maintained a few servo-hydraulic mechanical testing machines on their own, while the department maintained screw-driven testing machines for the undergraduate courses. This was inefficient and resulted in the lack of certain capabilities with duplication of other capabilities. Dr. Mason was able to organize all these machines into a centralized facility where all researchers in the college could have access to them. In addition, he was able to secure funds to add significant capabilities including a combined tension/torsion machine, thermal control chambers, and the capability for testing soft materials, such as biological tissues at a cost of over \$450,000. After the lab was developed, Dr. Mason oversaw this facility including maintenance and scheduling

The following is a list of equipment that was located in this lab:

#### Testing Machines

- 3-ATS +/-10,000lb. static mechanical screw test machines with control consoles
- 1-Instron +/-20,000lb. static mechanical screw testing machine with control
- 2-MTS +/- 22,000lb. static/dynamic hydraulic testing machines with control consoles
- 1-Instron +/-20,000lb. static/dynamic material testing machine with integral hydraulic power supply and control console
- 1-Instron +/-20,000lb. and 10kip-in. static/dynamic Torque-Tension hydraulic testing machine with controls and console
- 1-Enduratec +/-1000lb. static/dynamic and 500in.-lb. Torque-Tension electro-mechanical material test machine with control and console
- 4-Hardnes testers: 1 Wilson Rockwell, 1 Wilson Superficial, 1 Wilson Tukon Testor, 1 Brinell 3000kg. load/10mm ball

#### Accessories:

- 1-ATS oven 0-1800 oF w/controls
- 1-Instron oven -100 to +400 oF w/controls
- Fracture Technology Associates fatigue testing software
- 1-Thermotron Environmental Test Chamber (-65C to +180C in 15 min.)with two remote enclosures
- 1-Instron 50hp hydraulic power supply for the Instron torque/tension and MTS machines
- 1-Haskris heat exchanger for 50hp Instron power supply
- Misc. grips and attachments