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EDUCATION

BS	Washington University in St. Louis	Biomedical Engineering	1999
BS	Washington University in St. Louis	Systems Science and Mathematics	1999
PhD	University of Iowa, IA	Biomedical Engineering	2003

Dissertation: *“The emu as a model for necrotic femoral head collapse”*
Advisor: Thomas D. Brown, PhD

HONORS/AWARDS

Dean’s Honorary Scholarship	1995-1999
NSF Graduate Research Fellowship	1999-2002
American Society of Biomechanics Microstrain Award	2001
American Society of Biomechanics Clinical Biomechanics Award	2002
American Society of Biomechanics Young Scientist Postdoctoral Award	2006

PROFESSIONAL SOCIETIES

Tau Beta Pi (<i>Engineering honor society</i>)	1998-present
American Society of Biomechanics	1999-present
Orthopaedic Research Society	2002-present
International Society of Biomechanics	2005-present

ACADEMIC EMPLOYMENT HISTORY

Assistant Professor, Dept. of Kinesiology and Nutrition	1/2007-present
	University of Illinois at Chicago
Assistant Professor, Dept. of Bioengineering	1/2007-present
	University of Illinois at Chicago
Research Assistant Professor, Musculoskeletal Biomechanics Laboratory	2006
	University of Illinois at Chicago
Postdoctoral Research Fellow, Musculoskeletal Biomechanics Laboratory.	2003-2006
<i>Director: Mark D. Grabiner, PhD</i>	University of Illinois at Chicago

Graduate Research Assistant, Orthopaedic Biomechanics Laboratory
Director: Thomas D. Brown, PhD

1999-2003
University of Iowa

Research Assistant, Orthopaedic Biomechanics Laboratory
Director: Matthew J. Silva, PhD

1997-1998
Washington University in St. Louis

CONSULTING

Reed Engineering Consultants Engineers and Scientists Hanover, NH
BioMedical Forensics Moraga, CA

TEACHING

Biomechanics of Musculoskeletal Tissues
Teaching Assistant: Engineering Statics

University of Illinois at Chicago
University of Iowa

Spring, 2008
Fall, 2001

STUDENTS

Master's Students:

Varun Bhatia (*expected graduation: May 2009*)

Master's Thesis Committees:

Stephanie J. Donovan (*thesis committee member, 2006*)

Paul M. Fowler (*thesis committee member, 2006*)

You-hau Chang (*thesis committee member, 2008*)

PhD Thesis Committees:

Valentina Ngai (*expected graduation: December, 2009*)

GRANTS AND FUNDING

2007 – 2010: “*Rehabilitation Engineering Research Center on Recreational Technologies and Exercise Physiology Benefiting Persons with Disabilities*” H133E070029

Submitted to: The National Institute on Disability and Rehabilitation (NIDR)

Role: Co-Investigator (25% effort)

Status: Funded

12/2004 – 12/2006: NRSA Postdoctoral Training Grant “*Finite element modeling of Colles' Fractures*” (NIA) 1 F32 AG25619-01

Submitted to: The National Institutes of Health

Role: Principal Investigator (100% effort)

Status: Complete

9/1999 – 8/2002: National Science Foundation Graduate Research Fellowship

Status: Complete

RESEARCH INTERESTS

Improve the quality of life of aging and disabled adults, specifically by reducing the incidence, severity, and long term consequences of fall-related fractures, poor bone quality, and poor overall health.

CURRENT PROJECTS

- Adapt rest-inserted functional loading to enhance bone quality in older women
- Finite element modeling of Colles' fractures
- Symmetrical and asymmetrical upper extremity impact biomechanics
- Mechanisms of recovery from a slip
- Development of technology and training to help older adults learn to avoid falling
- Shoulder biomechanics during exercise in manual wheelchair users; prevention of wheelchair-related repetitive motion injuries and improvement of fitness

PEER-REVIEWED PUBLICATIONS

1. Silva MJ, **Reed KL**, Robertson DD, Bragdon C, Harris WH, Maloney WJ. Reduced bone stress as predicted by composite beam theory correlates with cortical bone loss following cemented total hip arthroplasty. *Journal of Orthopaedic Research*. 17(4):525-31, 1999 Jul
2. **Reed KL**, Brown TD: Elastic Modulus and Strength of Emu Cortical Bone. *The Iowa Orthopaedic Journal* 21:53-58, 2001.
3. **Reed, K.L.**, Brown, T.D., Conzemius, M.G.: Focal Cryogen Insults for Inducing Segmental Osteonecrosis: Computational and Experimental Assessments of Thermal Fields. *Journal of Biomechanics* 36(9):1317-1326, 2003
4. **Reed, K.L.**, Conzemius M.G., Robinson R.A., Brown, T.D.: Osteocyte-Based Image Analysis for Quantitation of Histologically Apparent Femoral Head Osteonecrosis: Application to an Emu Model. *Computer Methods in Biomechanics and Biomedical Engineering* 7(1):25-32, 2004.
5. **Reed KL**, Brown TD, Conzemius MG. Contact stress distributions on the femoral head of the emu (*Dromaius novaehollandiae*). *in revision, Journal of Biomechanics*
6. **Troy KL**, Grabiner MD. Absence of visual feedback about an obstacle influences lower extremity trajectories during the recovery stepping response. *Experimental Brain Research* 161(3):343-350, 2005
7. **Troy KL**, Grabiner MD. Recovery responses to surrogate slipping tasks differ from responses to actual slips. *Gait and Posture* 24: 441-447, 2006
8. Bareither ML, **Troy KL**, Grabiner MD. Bone mineral density of the proximal femur is not related to dynamic joint loading during locomotion. *Bone* 38:125-129, 2006

9. Grabiner MD, **Troy KL**. Attention demanding tasks during treadmill walking reduce step width variability in young adults., *Journal of NeuroEngineering and Rehabilitation* (available online) 2005, **2**:25 doi:10.1186/1743-0003-2-25
10. **Troy, KL**, Grabiner, MD, 2007. Off-axis loads cause failure of the distal radius at lower magnitudes than axial loads: a finite element analysis. *J Biomech* 2007; 40(8):1670-1675.
11. **Troy KL**, Lundberg JH, Conzemius MG, Brown TD. 2007 “Habitual Hip Joint Activity Level of the Pinned Emu (*Dromaius novaehollandie*)” *I. Orthop. J.* 2007;27:17-23.
12. Grabiner MD, Donovan S, Bareither ML, Marone JR, Hamstra-Wright KL, Gatts S, **Troy KL**. Trunk kinematics and fall risk of older adults: translating biomechanical results to the clinic. *Journal of Electromyography and Kinesiology.* 2008 Apr;18(2):197-204.
13. **Troy KL**, Grabiner MD. Asymmetrical ground impact of the hands after a trip-induced fall: Experimental kinematics and kinetics. *Clinical Biomechanics* 2007; 22:1088-1095
14. Dingwell JB, Robb RT, **Troy KL**, Grabiner MD. Effects of an attention demanding task on dynamic stability during treadmill walking *Journal of NeuroEngineering and Rehabilitation*, Apr 21;5(1):12
15. **Troy KL**, Donovan SJ, Marone JM, Bareither ML, Grabiner MD. Modifiable performance domain risk-factors associated with slip-related falls. *Gait and Posture*, 2008 Oct;28(3):461-5
16. **Troy KL**, Donovan SJ, Grabiner MD. Theoretical contribution of the upper extremities to reducing trunk extension following a laboratory-induced slip. *J Biomechanics, in revision*

INVITED PUBLICATIONS

1. **Reed-Troy KL**, Grabiner MD. Neuromuscular and biomechanical elements of postural equilibrium. in *Gait Disorders Evaluation and Management* eds. Hausdorff JM and Alexander NB. Taylor and Francis Group, Boca Raton, FL 2005 p. 101-115

INVITED PRESENTATIONS

1. Faculty presenter, **Fall Prevention and Balance: A Rehabilitation Challenge and Opportunity: Prevention, Risk Assessment, and Interventions**, Rehabilitation Institute of Chicago, August 5-6 2004
2. Faculty presenter, **Fall Prevention & Balance: An Interdisciplinary Approach**, Rehabilitation Institute of Chicago, April 21-22, 2005
3. Research Seminar, **Putting the Brakes on Breaks: Aging, falls, and fractures**, Clemson University Dept. of Bioengineering, December 10, 2005

4. Departmental Seminar, **Putting the Brakes on Breaks: Aging, falls, and fractures**, University of Michigan Division of Kinesiology, January 6, 2006
5. Aging Initiative Speaker Series, **Stumbling onto a Solution: Trips and Slips in the Superannuated**, University of Illinois, Urbana-Champaign, March 6, 2006
6. Departmental Seminar, **It's all in the wrist: Understanding fall-related fractures**, University of Illinois at Chicago Department of Bioengineering, September 22, 2006
7. **Fall-related fractures and other topics of impact**, Midwest Connective Tissue Workshop at Rush University, October 20-21, 2006

POSTERS AND PRESENTATIONS

1. **Reed K.L.**, Brown T.D., Conzemius M.G.: Temperature Fields Surrounding a New Instrument for a Cryogenically-Induced Osteonecrosis Animal Model. *Proceedings of the 2000 Annual ARCO Meeting and International Symposium*, p. 13
2. **Reed K.L.**, Brown T.D.: Elastic, Yield, and Ultimate properties of Emu Cortical Bone, *Proceedings of the 4th Combined Meeting of the Orthopaedic Research Societies of The U.S.A., Canada, Europe, and Japan*, pp.35-36, 2001
3. **Reed K.L.**, Brown T.D., Conzemius M.G.: Design and Evaluation of a Cryogenic Probe to Induce Osteonecrosis in a Precise Location. *Proceedings of the 25th Annual Conference of the American Society of Biomechanics*, p.19, 2001
4. **Reed K.L.**, Brown T.D.: Elastic, Yield, and Ultimate Properties of Emu Cortical Bone. *Proceedings of the 25th Annual Conference of the American Society of Biomechanics*, p.73-74, 2001
5. **Reed K.L.**, Brown T.D., Conzemius M.G.: Design and Evaluation of a Cryogenic Probe to Induce Osteonecrosis in a Precise Location. *Proceedings of the 25th Annual Conference of the American Society of Biomechanics*, p.19, 2001.
6. **Reed K.L.**, Robinson R.A., Conzemius M.G., Brown T.D.: An Algorithm to Quantify Segmental Lesions in Necrotic Femoral Heads, *Proceedings of the 10th Annual Symposium on Computational Methods in Orthopaedic Biomechanics*, p.24, 2002.
7. **Reed K.L.**, Brown T.D., Conzemius M.G.: Thermal Finite Element Analysis of Osteocyte Kill Zones Achieved with a Cryo-Insult Probe. *Proceedings of the IV World Congress of Biomechanics*, p. 457, 2002.
8. **Reed K.L.**, Robinson R.A., Conzemius M.G., Brown T.D.: An Algorithm to Quantify Segmental Lesions in Necrotic Femoral Heads. *Proceedings of the IV World Congress of Biomechanics*, p. 469, 2002.

9. **Reed, K.L.**, Robinson, R.A., Conzemius, M.G., Brown, T.D.: An Algorithm to Quantify Segmental Lesions in Necrotic Femoral Head. *Transactions of the 49th Annual Meeting of the Orthopaedic Research Society*, p. 0151, 2003.
10. **Reed, K.L.**, Brown, T.D., Conzemius, M.G.: Thermal Finite Element Analysis of Experimental Osteonecrosis Lesions Achieved with a Cryo-Insult Probe. *Transactions of the 49th Annual Meeting of the Orthopaedic Research Society*, p. 0154, 2003.
11. **Reed, K.L.**, Brown, T.D.: Determination of Contact Stress Distributions on Emu Femoral Heads. *Transactions of the 49th Annual Meeting of the Orthopaedic Research Society*, p. 0429, 2003.
12. Brown, TD, **Reed, KL**, Conzemius, MG “Modeling Approaches in Hip Joint Biomechanics: The Emu as an Animal Model of Femoral Head Necrosis.” *Proceedings of the International Society of Biomechanics IXI Congress*, Dunedin, New Zealand, July 6–11, 2003.
13. **Reed, KL**, Conzemius, MG, Brown, TD. “Determination of Contact Stress Distributions on Emu Femoral Heads.” *Proceedings of the 27th Annual Meeting of the American Society of Biomechanics*, Toledo, Ohio, September 25–27, 2003, p. 10.
14. **Troy, KL**, Gavin CG, Grabiner MD. “Wrist kinematics and kinetics during ground impact following a fall” *Proceedings of the 28th Annual Meeting of the American Society of Biomechanics*. September, 2004. Portland, OR
15. **Troy, KL**, Grabiner MD. “The presence of an obstacle influences the stepping response during simulated and real trips” *Proceedings of the 28th Annual Meeting of the American Society of Biomechanics*. September, 2004. Portland, OR
16. **Troy, KL**, Gavin CG, Grabiner MD. “The effect of hand position on wrist kinematics at landing from a forward fall from a kneeling position” *Proceedings of the 28th Annual Meeting of the American Society of Biomechanics*. September, 2004. Portland, OR
17. Gavin CG, **Troy, KL**, Grabiner MD. “Quantification of upper extremity motion during a trip-induced fall in older adults” *Proceedings of the 28th Annual Meeting of the American Society of Biomechanics*. September, 2004. Portland, OR
18. **Reed-Troy, KL**, Gavin, CG, Grabiner, M.D. “Wrist kinematics and kinetics during ground impact following a fall” *Transactions of the 51st Annual Meeting of the Orthopaedic Research Society*, p. 601A, 2005
19. Bareither ML, **Reed-Troy KL**, Grabiner MD. “Bone mineral density of the proximal femur is not related to dynamic joint loading during locomotion” *Proceedings of the 29th Annual Meeting of the American Society of Biomechanics* Cleveland, OH; 2005

20. **Reed-Troy KL**, Grabiner MD. "Recovery responses to surrogate slips are different than actual slips" *Proceedings of the 29th Annual Meeting of the American Society of Biomechanics* Cleveland, OH; 2005
21. **Reed-Troy KL**, Grabiner MD. "Wrist kinetics during impact are affected by hand symmetry" *Proceedings of the 29th Annual Meeting of the American Society of Biomechanics* Cleveland, OH; 2005
22. Hamstra-Wright KL, **Reed-Troy KL**, Grabiner MD "Skill Acquisition occurs during fall-preventive motor response training" *Proceedings of the 29th Annual Meeting of the American Society of Biomechanics* Cleveland, OH; 2005
23. **Troy KL**, Grabiner MD. "Development and validation of a contact model to simulate Colles' fractures" *Transactions of the 52nd Annual Meeting of the Orthopaedic Research Society*, March 19-22, 2006
24. **Troy KL**, Donovan SJ, Marone JR, Bareither ML, Grabiner MD. "Concurrent control of multiple segments is required to avoid falling due to a slip" *World Congress of Biomechanics* Munich, Germany, 2006 (*invited*)
25. **Troy KL**, Grabiner MD. "Achievable changes in bone mineral density influence predicted distal radius fracture load" *World Congress of Biomechanics* Munich, Germany, 2006 (*invited*)
26. Fowler PM, **Troy KL**, Grabiner MD. "Mid-swing kinematic trunk states predict step width" *World Congress of Biomechanics* Munich, Germany, 2006 (*invited*)
27. Chu JJ, **Troy KL**, Fowler PM, Jessiman AW, Greenwald RM, Grabiner MD. "Validation of measuring basic stride kinematics from a treadmill with embedded pressure sensing" *World Congress of Biomechanics* Munich, Germany, 2006
28. Bareither ML, **Troy KL**, Grabiner MD. "Increased radial bone mineral density in young women – a result of axial loading?" *14th Annual Congress on Women's Health* Hilton Head, SC, 2006
29. **Troy KL**, Grabiner MD "Off-axis loads cause failure of the distal radius at lower magnitudes than axial loads: a finite element analysis" *Proceedings of the 30th Annual Meeting of the American Society of Biomechanics* Blacksburg, VA; 2006
30. **Troy KL**, Grabiner MD "Off-axis loads cause failure of the distal radius at lower magnitudes than axial loads: a finite element analysis" *Transactions of the 53rd Annual Meeting of the Orthopaedic Research Society*, February 11-14, 2007
31. **Troy KL**, Donovan SJ, Grabiner MD "Lateral falls after a slip are affected by medial/lateral slipping foot displacement" *Proceedings of the 31st Annual Meeting of the American Society of Biomechanics* Stanford, CA; 2007

32. Donovan SJ, **Troy KL**, Grabiner MD “Rapid shoulder flexion after a slip may assist fall avoidance” *Proceedings of the 31st Annual Meeting of the American Society of Biomechanics* Stanford, CA; 2007
33. **Troy KL**, Grabiner MD “Mechanical loading of the distal radius causes a temporary decrease in BMC in young women” *Transactions of the 54th Annual Meeting of the Orthopaedic Research Society*, March 2-5, 2008

LANGUAGES

English (native)

German (good reading, some writing, good conversational)

French (some reading, some writing, limited conversational)

POPULAR MEDIA HIGHLIGHTS

“Emu research could help fight Bo Jackson disorder” *Des Moines Register* [Associated Press] by Chuck Schoffner, May 25, 2001

Stiff, 2003, by Mary Roach. Page 137

“Slip and Fall”, interview by Giannifer Fields, broadcast on “Eight-forty-eight”, *Chicago Public Radio WBEZ 91.5* February 16, 2005

“The cure for clumsiness?” broadcast on “The Daily Planet”, *Discovery Channel Canada* April 4, 2005

“Falling Study is a Trip” by Julie Deardorff, *The Chicago Tribune*, section 13 “Q”, pg 7. June 12, 2005

“It’s all in the wrist: AHS researcher creates ‘virtual wrist’ to study, prevent wrist fractures” *AHS Magazine* Fall/Winter 2005

“Slip science: Labs research how to prevent falls” by Malcolm Ritter, Associated Press. Published in USA-Today May 17, 2007 Section: Technology, Science & Space