Curriculum vitae

Katherine A. Boyer, Ph.D.

CONTACT INFORMATION
University of Massachusetts-Amherst
30 Eastman Ln, 110 Totman Building
Department of Kinesiology — Office: 413 545-1717
School of Public Health and Health Science
Amherst, MA 01003 — kboyer@kin.umass.edu

CURRENT RANK: Associate Professor
DEPARTMENT: Kinesiology, School of Public Health and Health Science
Mechanical and Industrial Engineering (Adjunct)
Orthopedics and Physical Rehabilitation, University of Massachusetts Medical School (Adjunct)

EDUCATION AND TRAINING

Postdoctoral Scholar (*2006-2008).* Department of Mechanical Engineering, School of Engineering, Stanford University, CA, USA.

Advisors: Gary Beaupre, Ph.D
Tom Andriacchi, Ph.D

Ph.D *(2002-2006)* Mechanical Engineering Specialization in Biomechanics, Faculty of Mechanical and Manufacturing Engineering, University of Calgary, AB, Canada.

Advisor: Benno Nigg, Dr.sc.nat., Dr.h.c.

B.Sc. (*1997-2001)* Mechanical Engineering, Queen's University, Kingston, ON, Canada.

RESEARCH AND PROFESSIONAL EXPERIENCE

Adjunct Assistant Professor (February 2017 – present) Orthopedics and Physical Rehabilitation, University of Massachusetts- Medical School. Worcester MA.

Adjunct Assistant Professor (September 2014- present) Mechanical and Industrial Engineering, College of Engineering, University of Massachusetts-Amherst, Amherst MA.

Assistant Professor (September 2012- 2018) Department of Kinesiology, School of Public Health and Health Science. University of Massachusetts-Amherst, Amherst MA.

Research Associate (*February 2008- September 2012)* BioMotion Lab (Andriacchi group), Mechanical Engineering, School of Engineering, Stanford University, CA.

WOC employee (*June 2006 – September 2012)* Bone and Joint Research and Rehabilitation Center, Veterans Affairs Palo Alto Health Care System, CA. WOC= Worker without compensation.

Research Technician (*2001- 2004)* Human Performance Lab, Department of Kinesiology, University of Calgary, Canada.

Teaching assistant (*September - December 2002)* Department of Kinesiology, University of Calgary: KNES 363: Biomechanics of Musculoskeletal Tissue.

PUBLICATIONS

Refereed Journal Articles

1. Stein, BP and **Boyer K.A.** (Accepted 2020) Impact of parity on biomechanical risk factors for knee OA initiation. Gait and Posture

2. Steiner ES and **Boyer, K.A.** (Accepted 2020) Speed impacts joint power and work while walking in high heeled shoes. Footwear Science.

3. Boubre B, Daneault JF, **Boyer, KA,** Kim JH, Jasim, M, Bonato, P, Lee SI (Accepted 2020) A Simple Low-Cost Wearable Sensor for Long-Term Ambulatory Monitoring of Knee Joint Kinematics. Transactions on Biomedical Engineering.

4. Hafer J.F. **Boyer, K.A**. (2020) Knee extensor functional demand during gait in young and older adults. Journal of Applied Biomechanics. Apr 25: 1-8

5. Johnson R, Hafer J.F, Wedge R, **Boyer K.A.** (2020) Comparison of measurement protocols to estimate preferred walking speed between sites. Gait and Posture. Mar; 77:171-174

6. Hafer J.F., Kent J, Miller M, **Boyer K.A** (2019) The Roles of Sex and Physical Activity in Gait and Knee Extensor Function With Age. Journal of Applied Biomechanics. 35 (4): 263-271.

7. **Boyer K.A.,** Hafer J.F. (2019) The impact of exercise-induced osteoarthritis pain flares on walking kinematics, kinetics and muscle co-contraction. BMC Musculoskeletal Disorders. Mar 14;20 (1):107 [PMID:308721519]

8. Hafer J.F., Kent J, **Boyer K.A.** (2019) Physical activity and age-related biomechanical risk factors for knee osteoarthritis. Gait and Posture. 70. 24-29.

9. Jewell C, von Tscharner V, Hamill J, **Boyer, K.A,** (2019) Altered multi-muscle coordination patterns in habitual forefoot runners during a prolonged run. European Journal of Sport Sciences. 19 (8): 1062-1071.

10. Wyatt,H, Jewell, C, Weir, G, **Boyer K.A**, Hamill, J. (2018) Lower-limb coordination responses to knee bracing in females with anterior knee pain. Sports Injury and Medicine: JSIMD-139. DOI 10.29011/2576-9596.

11. Hafer J.F, **Boyer K.A.** (2018) Age related differences in segment coordination and its variability during gait. Gait and Posture. 62. 92-98.

12. **Boyer, K.A.** (2018) Biomechanical Response to Osteoarthritis Pain Treatment May Impair Therapeutic Efficacy. Exer. Sport Sci. Rev. *Invited Review*. Apr. 46 (2) 121-128.

13. Freedman Silvernail J, van Emmerik R.E.A, **Boyer K.A,** Busa, M.A, Hamill J. (2018) Comparisons of segment coordination: an investigation of vector coding. J. Applied Biomechanics. 42 (3).

14. Hamill, K., **Boyer, K.A.** & Weir, G. (2017). A paradigm shift is necessary to relate running injury risk and footwear design. Comment on Nigg et al. Current Issue in Sport Science.

15. **Boyer K.A.** Johnson R, Banks J, Jewell, C, Hafer J.F. (2017) Systematic Review and Meta-Analysis of Gait Mechanics in Young and Older Adults. Exp. Gerontology May 9:95 63-70. PMID 28499954

16. Hafer, J.F., Brown, A. **Boyer K.A**. (2017) Exertion and pain do not alter coordination variability in injured runners. Clinical Biomechanics. 47. 73-78. PMID28618309

17. Gruber A, Edwards, B, Derrick, T.R. Hamill, J. **Boyer, K.A**. (2017) A comparison of the ground reaction force frequency content in forefoot and rearfoot strike patterns. Gait and Posture. Apr 28: 56; 54-59. PMID 28499137

18. Hafer, J. **Boyer K.A**. (2017) Variability of segment coordination: Reliability analysis for treadmill walking and running. Gait and Posture. Jan; 51 222-227. PMID 27821354

19. Jewell C, **Boyer K.A**, Hamill J. (2017) Do footfall patterns in forefoot runners change over an exhaustive run? J Sports Sci. Jan; 35(1) 74-80. PMID 27003185

20. **Boyer K.A**. and Andriacchi, T.P., (2016) The nature of age-related differences in knee function during walking: Implication for the development of knee osteoarthritis. Plos One Dec 14;11(12) PMCID 5156354

21. **Boyer, K.A.,** Freedman Silvernail, J., Hamill, J., (2017) Age and sex influences on running mechanics and coordination variability in healthy runners. Journal of Sports Sciences. Nov;35(22):2225-2231

22. Hafer, J.F., Freedman Silvernail, J., Hillstrom H.J., **Boyer K.A.** (2016) Changes in coordination and its variability with an increase in running cadence. Journal of Sport Sciences 34 (15) 1388-95 PMID: 26588262

23. Silvernail, J., **Boyer, K.A.,** Rohr, E., Brueggemann, G.P., Hamill, J., (2015) Running mechanics and variability with aging. Medicine and Science in Sport and Exercise. Oct;47(10):2175-80.

    a. Silvernail, J., **Boyer, K.A.,** Rohr, E., Brueggemann, G.P., Hamill, J., (2015) Response: Letter to the Editor. Med Sci Sports Exerc. Oct;47(10):2249.

24. Bevill, S., **Boyer, K.A**., Andriacchi, T.P., (2014) The regional sensitivity of chondrocyte gene expression to coactive mechanical load and exogenous TNF-alpha stimuli. Journal of Biomechanical Engineering. 136 (9) :091005

25. **Boyer, K.A.,** Freedman Silvernail, J., Hamill, J., (2014) The role of running mileage on coordination patterns in running. Journal of Applied Biomechanics. 30 (5), 649-654

26. Gruber, A.H., **Boyer, K.A.,** Derrick, T.R., Hamill, J. (2014) Impact shock frequency components and attenuation in rearfoot and forefoot running. Journal of Sport and Health Science. 3 (2) 113-121

27. Federolf PA, **Boyer K.A.,** Andriacchi T.P. (2013) Application of principal component analysis in clinical gait research: Identification of systematic differences between healthy and medial knee-osteoarthritic gait. Journal of Biomechanics 46 (13) 2173-2178.

    a. Federolf, PA., **Boyer, K.A.,** Andriacchi, T.P. (2014) Response to Letter to the Editor regarding “Application of Principal Component Analysis in Clinical Gait Research”. Journal of Biomechanics, Apr 11, 47 (6) 1555-1556

28. Asay, J, **Boyer, K.A.,** Andriacchi, T.P. (2013), The Reliability of Gait Analysis for Measuring Knee Osteoarthritis Pain in Patients with Severe Chronic Pain. Journal of Orthopedic Research. Jul 31 (7), 1007-1012.

29. **Boyer, K.A.,** Federolf, P, Lin, C. Nigg, B.M., Andriacchi, T.P (2012) Kinematic adaptations to a variable stiffness shoe: mechanisms for reducing joint loading. Journal of Biomechanics 45 (9), 1619-1624.

30. **Boyer, K.A.** Andracchi, T.P. Beaupre, G.S. (2012) The role of physical activity in changes in walking mechanics with age. Gait and Posture. 36 (1) 149-153.

31. **Boyer, K.A.** Angst M. Giori, N.J., Asay, J. Andriacchi. (2012) Sensitivity of gait parameters to the effects of anti-inflammatory and opioid treatments in knee osteoarthritis patients. Journal of Orthopedic Research. 30 (7) 1118-1124.

32. Sohn, D.H., Sokolove, J., Sharpe,O., Erhart, J.C., Chandra, P.E., Lahey, L.J., Lindstrom, T.M., Hwang, I., **Boyer, K.A**., Andriacchi, T.P., Robinson, W.H., (2012) Plasma proteins present in osteoarthritic synovial fluid can stimulate cytokine production via Toll-like receptor 4. Arthritis Research & Therapy. 14 (1) R7

33. **Boyer K.A.,** Kiratli B.K., Andriacchi T.P. and Beaupre G.S . (2011) Maintaining femoral bone density in adults: is 10,000 steps enough? Osteoporosis International. 22 (12) 2981-2988.

34. **Boyer K.A,** Andriacchi T.P.,(2009). Changes in running kinematics and kinetics in response to a rockered shoe intervention. Clinical Biomechanics (Bristol , Avon) 24(10):872-6.

35. Boyer, K. A., Beaupre, G.S., Andriacchi, T.P., (2008). Gender differences exist in the hip joint moments of healthy older walkers. Journal of Biomechanics 41**,** 3360-3365

36. **Boyer, K. A.,** Nigg, B.M., (2007). Changes in muscle activity in response to different impact forces affects soft tissue compartment mechanical properties. Journal of Biomechanical Engineering 129,(4) 594-602.

37. **Boyer, K. A.,** Nigg, B. M., (2007). Quantification of the input signal for soft tissue vibration during running. Journal of Biomechanics. 40, (8), 1877-1880.

38. **Boyer, K. A.,** Nigg, B. M., (2006). Muscle tuning during running: Implications of an un-tuned landing. Journal of Biomechanical .Engineering 128**,** 815-822.

39. **Boyer, K.A**. Nigg, B.M. (2006) Movement within the soft tissue compartment during impact phase of running. Journal of Biomechanics. 39 (4), 645-651.

40. **Boyer, K.A.** Nigg, B.M. (2004) Muscle activity in the leg is tuned in response to impact force characteristics. Journal of Biomechanics 37 (10), 1583-1588.

Book Chapters

Boyer K.A. and Andriacchi, T.P., Basic Principles: Motion Analysis. In Delee and Drez Orthopedic Sports Medicine- Principles and Practice, 4th edition (2013). Frank, C. (Section editor). Saunders, Elsevier Inc, USA.

Nigg, B.M. and **Boyer, K.A.** Acceleration. In: Biomechanics of the musculo-skeletal system. (2007) Nigg, B.M. and Herzog, W. (eds.). John Wiley & Sons, Sussex, UK: pp 343-361.

SCHOLARSHIPS AND AWARDS

2011	Best Paper Finalist Clinical Biomechanics Award International Society of Biomechanics, Brussels, Belgium
2011	Young Investigator Award Finalist International Society of Biomechanics, Brussels, Belgium
2005	Dr. Benno Nigg Distinguished Faculty Achievement Graduate Scholarship, University of Calgary
2005	Dean's Research Excellence Award, University of Calgary, Canada
2004-2007	NSERC Post-graduate Scholarship, National Science and Engineering Research Council Canada
2004-2007	Alberta Ingenuity PhD Studentship, Alberta Ingenuity Fund
2004	Dean's Research Excellence Award, University of Calgary, Canada
2003	Young Investigator Award Finalist European College of Sport Science, Salzburg, Austria
2003	Province of Alberta Post-graduate Scholarship, Internal Award University of Calgary
2000	Deans Scholar, Queen's University, Canada
1997	Alexander Rutherford Scholarships, Alberta Government

RESEARCH SUPPORT

Current research support

NIH NIA R01 AG068102 Boyer (PI), Kent (Co-I), Umberger (co-I) 09/1/20 – 5/31/25
Muscle Fatigue, Gait Alterations and Increased Energy Cost of Walking in Aging.

NIH- NIA R01 AG058607 Kent (PI), Boyer (co-I), Miller (co-I) 08/15/19- 5/31/24
Muscle Fatigue and its Impact on Mobility Function in Aging.

NIH- NIBIB Trailblazer R21 Lee/Boyer Multi-PI 7/1/2018–3/30/21
A wearable mHealth System for the longitudinal monitoring of joint function in patients with knee OA.
1R21EB025284-01A1

Defense Health Agency SBIR P2: Prosthetic Alignment Capture, LaPrè (PI) 7/1/2018-6/30/2020
Sensorized Prosthetic Alignment Read-Out (SPARO)
Grant number: 118-1044-W81XWH-18-C-0324
Role. Boyer (Co -I)

Oofos Footwear Inc. Boyer (PI) 6/1/2018- 5/31/2021
Biomechanical effects of the OOFOS recovery footwear.

Complete research support

American College of Sports Medicine Foundation Doctoral Student Research Grant. Casto (Phd-Candidate) 05/01/18-12/30/19.
Role: Mentor

Consultant: Bayer Consumer Health 4/15/2017- 1/1/2019

Novartis Institute for Biomedical Research Busa (PI) 6/1/2018-5/31/2019
Comprehensive evaluation of new movement and behavioral assessment technology.
Role: Boyer (Co-I)

Cole Haan Inc. Boyer (PI) 09/01/2016-10/31/2017
The influence of shoe design on human locomotion

Fossil Partners with UMass Amherst Institute of Applied Life Sciences Seed Funding
Boyer, Sirard, co- PI 5/23/16-8/30/18
Misfit Shine detection of physical activity: Evidence and translation for a new clinical outcome tool.

De Luca Foundation. Jewell (PI) 11/1/2017-10/31/2018
The influence of patellofemoral pain on muscle coordination and segment coordination variability in runners. Role: Mentor

Bayer Consumer Health Inc. Boyer and Hamill (PI) 11/01/2016-1/15/2018
Effect of braces on lower body freedom of movement in individual with symptomatic anterior knee pain.

American Society of Biomechanics Graduate Student Grant – in –Aid Hafer (PI)
06/01/15-05/31/16.
The effect of age and physical activity status on inter-segment coordination.
Role: Mentor

American College of Sports Medicine Foundation Doctoral Student Research Grant. Hafer (PI)
07/01/14-06/30/15.
Physical Activity: A Mediator of Muscle Power, Knee Mechanics, and Fatigue?
Role: Mentor

University of Massachusetts-Amherst Faculty Research Grants. Boyer (PI) 1/1/2013-6/30/2014
An investigation of the inter-relationship between pain and gait mechanics through the application of a novel acute model of knee osteoarthritis flare.

INVITED PRESENTATIONS/SYMPOSIA

Boyer KA (2020) Probing the biomechanical response to joint pain. Keynote lecture. 5th Motion Analysis Research Center Symposium. Samuel Merritt University. Oakland CA.

Boyer KA (2020) Analysis techniques for quantifying movement coordination. Tutorial. 5th Motion Analysis Research Center Symposium. Samuel Merritt University. Oakland CA.

Boyer K.A (2019) Biomechanical and neuromuscular response to OA joint pain. Symposium Biomechanics and Osteoarthritis: Role of muscle on joint loading in OA structural and symptomatic processes. ISB/ASB 2019 Calgary Canada.

Boyer K.A. and Hafer J.F (2019) Running through the lifespan: Benefits and risks for female athletes. Symposium Run like a woman. ISB/ASB 2019 Calgary Canada

Boyer K.A. (2018) Probing the biomechanical response to the onset of joint pain. Nike Human Locomotion Symposium, 20th Biennial Meeting of the Canadian Society of Biomechanics. Halifax Canada.

Boyer, K.A. (2017) Biomechanical Markers of Osteoarthritis and Total Knee Replacement Patient Function. UMass FORCE Lecture Series. Department of Orthopedics and Physical Rehabilitation UMass Medical School.

Boyer K.A. (2017) Variability and coordination in human movement. Congress of the European College of Sports Science. Symposium Chair: Erich Muller, PhD. Essen, Germany.

Boyer K.A. (2017) Examining movement coordination and it's variability to understand pathological gait. ISB Working Group on Motor Control. ACSM Pre congress Symposium. Denver CO.

Boyer K.A. (2017) Gait related mechanisms of pain adaptation. Spring Seminar Series, Department of Kinesiology, University of Nevada Las Vegas

Boyer K.A. and Franklin P. (2016) Biomechanical Gait Analysis for Improving Clinical Outcomes: Applications for Orthopedics, Geriatrics and Community Based Research. UMCCTS 6th Annual Research Retreat.

Boyer K.A. (2015) Gait-related mechanisms of pain adaptation in older adults. Staffordshire Conference of Clinical Biomechanics. Stoke on Trent, UK.

Boyer K.A. (2015) Examining movement coordination and it's variability to understand pathological gait. Staffordshire Conference of Clinical Biomechanics. Stoke on Trent, UK.

Boyer K.A. (2015) Gait related mechanisms of pain adaptation. Spring Seminar Series, Department of Health and Exercise Science, Colorado State University.

Boyer K.A (2014) Movement adaptation to pain treatment in medial knee OA. SoleScience 7th Annual Foot and Lower Extremity Symposium University of Western Ontario, London, Canada

Boyer K.A., (2014) Changes in knee joint mechanics in response to osteoarthritis pain and its treatment. 7th World Congress on Biomechanics, Boston, MA.

Boyer K.A., Freedman-Silvernail J, Strycharz S, Hamill J.(2014) Age and gender effects on movement coordination variability in running. 7th World Congress on Biomechanics, Boston, MA.

Boyer, K.A. (2013) Footwear intervention for treatment of medial compartment knee osteoarthritis. Pedorthic Association of Canada Annual Conference, Montreal, QC, Canada.

Boyer, K.A., Angst, M.S., Andriacchi, T.P., (2010) Gait mechanics: an objective marker/ mediator of pain and inflammation in osteoarthritis. Success Strategies for Emerging Faculty Conference, School of Engineering, University of Delaware.

Boyer, K.A. Nigg, B.M. (2006) Quantification methods for muscle tuning. Xth World Congress of Biomechanics. Munich, Germany.

Boyer K.A., Nigg B.M. (2005) Impact forces, soft tissue vibrations and muscle tuning. Pedorthic Association of Canada Annual Conference. Calgary, Alberta.

CONFERENCE ABSTRACTS AND PODIUM PRESENTATIONS (PEER-REVIEWED)

Steiner ES, **Boyer KA** Influence of variable stiffness shoes on secondary gait mechanics in knee osteoarthritis patients. Annual ISB/ASB Congress 2019 Calgary Canada

Casto E, Asmussen MJ, Hafer JF, **Boyer KA.** The impact of age on muscle activation patterns during prolonged walking. Annual ISB/ASB Congress 2019 Calgary Canada

Steiner ES, **Boyer KA** Impact of variable stiffness shoe on medial knee contact forces. Proceedings of the Footwear Biomechanics Congress. Footwear Science Vol 11 sup 1. 2019 Kananaskis Canada 2019.

Steiner, E. and **Boyer, K.A**.. Impact of exercise-induced pain on tibiofemoral contact forces in knee OA. Annual Conference of the American Society of Biomechanics, Rochester MN, 2018

Casto, E.M, Hafer, J.F. **Boyer, K.A..** Regular running in midlife may be protective of plantarflexor function following a prolonged walk. Annual Conference of the American Society of Biomechanics, Rochester MN, 2018

Wyatt,H, Jewell, C, **Boyer K.A**, Hamill, J. Hinged knee brace influence on thigh-shank coupling in females with anterior knee pain during walking and running. World Congress on Biomechanics, Dublin 2018

Hafer, J.F. **Boyer, K.A** Knee extensor functional demand during gait increases after a bout of exercise but does not differ by age. World Congress on Biomechanics, Dublin 2018.

Casto E, Hafer J.F, **Boyer K.A.** Differences in hamstring muscle quality between highly active and sedentary older adults. Annual Conference of the American Society of Biomechanics, Boulder, CO 2017

Hafer J.F, Kent J.A, **Boyer K.A.** The role of muscle function in gait mechanics at the knee: Older vs. young adults. Congress of the International Society of Biomechanics, July 23-27th Brisbane, Australia, 2017

Boyer K.A., Hafer, J.F. The impact of exercise-induced osteoarthritis pain flares on walking kinematics, kinetics and muscle co-contraction. Congress of the International Society of Biomechanics, July 23-27th,Brisbane, Australia. 2017

Hafer, J. **Boyer K.A.** Variability of segment coordination: Reliability analysis for treadmill walking and running. 40th Annual Meeting of the American Society of Biomechanics. Raleigh NC. 2016

Hafer J.F, **Boyer K.A.** Older adults display reduced segment coordination variability during walking. New England American College of Sports Medicine, Providence, RI, 2016.

Boyer, K.A. Freedman-Silvernail, J, Hamill, J. (2013) The role of running mileage on coordination patterns in running. XXIV Congress of the International Society of Biomechanics Natal, Brazil.

Boyer, K.A., Nigg, B.M., Federolf, P., Andriacchi, T.P (2011) Kinematic adaptations to a lateral stiffness shoe in walking. Footwear Science, Footwear Biomechanics Symposium.

Boyer, K.A., Rylander, Andriacchi, T.P. Beaupre, G.S. (2009). Gender and age specific relationships exist between walking and bone density. XXII Congress of the International Society of Biomechanics. July 5- 9th, Cape Town, South Africa

Boyer, K.A., Rylander, Andriacchi, T.P. Beaupre, G.S (2009) Inter-subject variability in ground reaction force – walking speed relationship is related to different motion of center of mass. ASME 2009 Summer Bioengineering Conference June 17-21, Resort at Squaw Creek, Lake Tahoe, CA, USA

Boyer, K.A., Rylander, J., Kiratli, B.J., Andriacchi, T.P. Beaupre, G.S. (2008) Physical Activity for maintaining healthy bone density with aging. 31st American Society of Biomechanics Conference, Ann Arbour Michigan.

Boyer, K.A., Andriacchi, T.P. Beaupre, G.S. (2007) Hip joint moments and bone mineral density in healthy older women. 30th American Society of Biomechanics Conference, Stanford, CA.

Boyer, K.A. Nigg, B.M. (2007) Variability in soft tissue compartment mechanical properties. 8th Footwear Biomechanics Symposium, Taipei, Taiwan.

Boyer K.A., Nigg B.M. (2005) Soft tissue compartment response to an unexpected surface change. XXth Congress of the International Society of Biomechanics, Cleveland Ohio.

Boyer K.A., Nigg B.M. (2004) Movement within the soft tissue package during impact phase of running. Canadian Society of Biomechanics Conference, Halifax Nova Scotia.

Boyer K.A., Nigg B.M. (2003) Muscle activity in the leg is tuned in response to impact force characteristics. Young Investigator Award Finals European College of Sport Science, Salzburg, Austria.

CONFERENCE ABSTRACTS AND POSTERS (PEER-REVIEWED)

Holmes S, Casto E, Steiner ES, **Boyer KA**. Influence of pain on knee extensor function in individuals with knee osteoarthritis. 2020 Annual Conference of the American Society of Biomechanics. Atlanta GA. * held remotely due to COVID pandemic.

Steiner ES, **Boyer, KA**. Relationship between changes in the knee adduction moment and medial compartment contact force with variable stiffness shoes. Osteoarthritis Research Society International World Congress 2020. Vienna Austria. **Cancelled due to COVID pandemic

Williams N, Steiner, E.S, Nanglo T, Mahmood J, Daneault JF, **Boyer K.A**. Lee, S.I (2019) A Low-Cost Wearable System to Estimate Free-Living 3D Ground Reaction Force. 2019 IEEE 16th International Conference on Wearable and Implantable Body Sensor Networks (BSN). Chicago IL

Casto E. Hafer, J.F. **Boyer, KA**. Impact of neuromuscular function on pain during walking in individuals with knee osteoarthritis. Osteoarthritis Research Society International World Congress. Toronto Canada 2019,

Perlin, B. Ramsay, J.W, **Boyer, K.A**. Load carriage effect on the ability to control dynamic movement. Annual Conference of the American Society of Biomechanics, Rochester MN, 2018

Jewell, C, Hamill, J. **Boyer, K.A**. Biomechanical response to acute patellofemoral pain in running. Annual Conference of the American Society of Biomechanics, Rochester MN, 2018

Casto E, **Boyer K.A.** Altered muscle synergies during gait in individuals with knee osteoarthritis. OARSI World Congress on Osteoarthritis. Liverpool UK, 2018

Jewell C, Hamill J, **Boyer, KA,** The influence of a tri-axial hinged knee brace on muscle activity distribution in healthy individuals. Congress of the International Society of Biomechanics, July 23-27th Brisbane, Australia, 2017

Boyer, K.A, Jewell, C, Hafer J.F. Muscle co-contraction and exercise induced pain flares in knee OA. 2017 OARSI World Congress on Osteoarthritis. Las Vegas NV, April 27-30, 2017. Selected as a poster tour stop.

Jewell, C., Rohr, E., Hamill, J., **Boyer, K.A.** Which is the primary factor influencing running stride parameters: age or lower limb strength? 40th Annual Meeting of the American Society of Biomechanics, Raleigh, NC, August 2-5th, 2016.

Boyer K.A, Jewell C, Hafer J.F. Role of knee mechanics in exercise induced osteoarthritis pain flares. Thematic poster. 40th Annual Meeting of the American Society of Biomechanics. Raleigh NC.

Hafer J.F, Kent J.A, **Boyer K.A**. The effect of running status on muscle quality in older adults. American College of Sports Medicine, Boston, MA, 2016. Published in Med Sci Sports Exerc. 2016 May;48(5 Suppl 1):685

Boyer K.A., Jewell C., Hafer J.F. Impacts of age, inactivity and knee osteoarthritis on movement coordination in walking. World Congress on Osteoarthritis. Osteoarthritis Research Society International. Amsterdam, NL. Published in Osteoarthritis and Cartilage, Vol. 24, S102-S103

Hafer J.F, Kent J.A, **Boyer K.A**. The effect of fatigue on knee mechanics in older adults: does physical activity matter? Annual Conference of the American Society of Biomechanics, Columbus, OH, 2015

Jewell, C, von Tscharner, **Boyer, K.A**. The effects of an exhaustive run on multi-muscle patterns in forefoot running. 39th Annual Meeting of the American Society of Biomechanics, Columbus, OH, August 5-9th, 2015.

Boyer, K.A. Jewell, C. Hafer, JF. (2015) Gait response to an acute physical activity stimulus in individuals with osteoarthritis pain. Proceedings of the XXV Congress of the International Society of Biomechanics Glasgow, Scotland.

Freedman-Silvernail J., **Boyer K.A.,** Hamill J. (2015) Coordination variability and overuse running injuries: a prospective investigation. Proceedings of the XXV Congress of the International Society of Biomechanics Glasgow, Scotland.

Whited, A, Gorton, G. Drvaric, D. **Boyer, K.A,** Hamill, J. (2015) Multi-segment foot coordination variability of the ponseti treated clubfoot. Proceedings of the XXV Congress of the International Society of Biomechanics Glasgow, Scotland.

Gruber, A.H., Edwards, W.B., Hamill, J., Derrick, T.R., **Boyer, K.A.** (2015) Ground Reaction Forces in Rearfoot and Forefoot Running Assessed by a Continuous Wavelet Transform. Medicine and Science in Sport and Exercise (suppl) 47:5S, 709–711

Boyer, K.A, Jewell C, Hafer J.F (2015) Gait adaptation to exercise- induced flares of osteoarthritis related knee pain. Proceeding of the Osteoarthritis Research Society International Congress, Seattle WA. .

Hafer J.F, **Boyer K.A.** The relationship between physical activity and knee extensor strength in individuals with OA: data from the Osteoarthritis Initiative. Osteoarthritis Research Society International, Seattle, WA, 2015

Hafer J.F, Freedman Silvernail J, **Boyer K.A**. The effect of increased running cadence on coordination. University of Massachusetts Amherst Life Sciences Graduate Research Symposium, 2014

Jewell C., **Boyer, K.A.,** Van Emmerik, R.E.A., Hamill, J.,(2014) Does footfall pattern in forefoot runners change over a prolonged run? Proceeding of the 7th World Congress on Biomechanics 2014;Boston, MA

Boyer K.A., Freedman-Silvernail J, Strycharz S, Hamill J. (2014) Age and gender effects on movement coordination variability in running. Proceeding of the 7th World Congress on Biomechanics;Boston, MA

Freedman-Silvernail J., **Boyer K.A.,** Van Emmerik R.E., Hamill J. (2014) Quantification of coordination pattern comparisons with vector coding. Proceeding of the 7th World Congress on Biomechanics; Boston, MA

Hafer J., Freedman-Silvernail J., Hillstrom H., **Boyer K.A.** (2014) The effect of increased running cadence on segment coordination. Proceeding of the 7th World Congress on Biomechanics; Boston, MA

Hafer J, Brown A, Hillstrom H, **Boyer K.A.** (2014) Changes in coordination variability with increased cadence running. Proceedings of the Gait and Clinicial Movement Analysis Society Conference; Delaware.

Boyer, K.A., Andriacchi T.P., (2014) Age-related differences in patterns of movement during walking: A risk factor for knee osteoarthritis? Proceeding of the Osteoarthritis Research Society International Congress. Paris, France

Boyer, K.A., Freedman-Silvernail, J, Hamill, J. (2013) The role of running mileage on coordination patterns in running. Proceedings of the XXIV Congress of the International Society of Biomechanics Natal, Brazil.

Boyer, K.A., Andriacchi K.A., Andriacchi, T.P.(2013) Interactions of joint kinematics and pharmacologic treatment for knee osteoarthritis pain. Osteoarthritis and Cartilage 21, s63-s312.

Boyer, K.A., Andriacchi, T.P., (2012) Aging related changes in walking kinematics: A potential pathway to changes in cartilage morphology. Proceedings of the ASME 2012 Summer Bioengineering Conference. Puerto Rico.

Boyer, K.A., Federolf, P. Andriacchi, T.P.(2012) Differences in Posture and Segment Movements in Gait of Knee OA Patients and Matched Controls Trans. of the 58th Meeting of the Orthopedic Research Society, San Franscisco, CA.

Boyer, K.A., and Andriacchi, T.P, Beaupre, G.S. (2011), The role of physical activity in changes in walking mechanics with age. Proceeding of the XXIII Congress of the International Society of Biomechanics, Brussels, Belgium.

Boyer, K.A., Nigg, B.M., Federolf, P., Andriacchi, T.P (2011) Kinematic adaptations to a lateral stiffness shoe in walking. Footwear Science, Footwear Biomechanics Symposium.

Boyer, K.A., Kiratli, BJ, Andriacchi, T.P. Beaupre, G.S. (2010), Maintaining Femoral Bone Density from Daily Walking in Post-Menopausal Females: How Many Steps per Day are Enough?, Trans. of the 57th Meeting of the Orthopedic Research Society, Long Beach, CA.

Asay, J, **Boyer, K.A.,** Andriacchi, T.P. (2010) The Reliability of Gait Analysis as a Tool for Measuring Knee Osteoarthritis Pain. Trans. of the 57th Meeting of the Orthopedic Research Society, Long Beach, CA.

Boyer, K.A. and Andriacchi, T.P (2010). Variable stiffness shoe alters muscle activations and knee joint moments. Proceeding of the 34th American Society of Biomechanics Conference. Providence, Rhode Island.

Asay J, **Boyer, K.A.** Andriacchi, T.P. (2010) Stair climbing adaptations to reduce quadriceps demand in patients with knee osteoarthritis are not associated with pain. Proceeding of the 34th American Society of Biomechanics Conference. Providence, Rhode Island.

Boyer, K. A., Bertin, J., Asay, J., Giori, N. J., Andriacchi, T. P., (2010). Gait adaptations with treatment of OA pain by NSAID or opioid. Trans.of the 56th Meeting of the Orthopedic Research.Society. New Orleans, LA

Sheets, A.L., **Boyer, K.A.,** Andriacchi, T.P., (2010) Effects of BMI, walking speed and age on shank and thigh soft tissue motion during gait. Trans.of the 56th Meeting of the Orthopedic Research.Society. New Orleans, LA

Boyer, K.A., Rylander, Andriacchi, T.P. Beaupre, G.S. (2009). Gender and age specific relationships exist between walking and bone density. Proceedings of the XXII Congress of the International Society of Biomechanics. July 5- 9th, Cape Town, South Africa

Boyer, K.A., Rylander, Andriacchi, T.P. Beaupre, G.S (2009) Inter-subject variability in ground reaction force – walking speed relationship is related to different motion of center of mass. Proceedings of the ASME 2009 Summer Bioengineering Conference June 17-21, Resort at Squaw Creek, Lake Tahoe, CA, USA

Boyer, K.A., Rylander, J., Kiratli, B.J., Andriacchi, T.P. Beaupre, G.S.(2008) Physical Activity for maintaining healthy bone density with aging. Proceeding of the 31st American Society of Biomechanics Conference. Ann Arbor, Michigan

Boyer, K.A., Blazek, K., Andriacchi, T.P. (2008) Effects of an unstable shoe construction in low speed running. Proceeding of the 31st American Society of Biomechanics Conference. Ann Arbor, Michigan

Blazek, K., **Boyer, K.A.,** Andriacchi, T.P (2008) Subject- specific changes in knee loading in response to an unstable shoe intervention. Proceeding of the 31st American Society of Biomechanics Conference. Ann Arbor, Michigan

Rylander, J., **Boyer, K.A.,** Andriacchi, T.P. Beaupre, G.S. (2008) The challenge of monitoring activity in the elderly. Proceeding of the 31st American Society of Biomechanics Conference. Ann Arbor, Michigan

Boyer, K.A., Andriacchi, T.P. Beaupre, G.S. (2007) Hip joint moments and bone mineral density in healthy older women. Proceeding of the 30th American Society of Biomechanics Conference, Stanford, CA.

Boyer, K.A. Nigg, B.M. (2007) Variability in soft tissue compartment mechanical properties. Proceeding of the 8th Footwear Biomechanics Symposium, Taipei, Taiwan.

Nnewihe, A., Chaudhari, A. M., Corazza, S., Mundermann, L., **Boyer, K. A.,** Andriacchi, T. P., (2007). Dependance of knee kinetics on inertial model of the shank during run-to-stop movements. Proceeding of the XXIst-Congress of the International Society of Biomechanics, Taiwan, Taipei.

Boyer, K. A., Beaupre G.S., Andriacchi T.P, (2007). Gender differences in hip joint kinetics in healthy older walkers as a consideration in treatment interventions for osteoporosis. Trans.of the 53rd Meeting of the Orthopedic Research.Society. San Diego, CA

Boyer, K.A. Nigg, B.M. (2006) Quantification methods for muscle tuning. Conference proceedings Xth World Congress of Biomechanics. Munich, Germany.

Boyer K.A., Nigg B.M. (2005) Soft tissue compartment response to an unexpected surface change. Conference proceedings XXth Congress of the International Society of Biomechanics, Cleveland Ohio.

Nigg, B.M., Stefanyshyn, D.J., Cole, G.K. and **Boyer, K.** Footwear research – past, present and future. In: Proc. 7th Symposium on Footwear Biomechanics (eds. J. Hamill, E. Hardin and K. Williams), Cleveland, Ohio, pp 14-17, 2005.

Boyer K.A., Nigg B.M. (2004) Movement within the soft tissue package during impact phase of running. Conference proceedings 13th Biennial Conference Canadian Society of Biomechanics, Halifax Nova Scotia.

Boyer K.A., Nigg B.M. (2003) Tuning of muscle activity to impact force characteristics. Book of Abstracts Alberta BME conference.

Nigg B.M. **Boyer K.A.** (2003) Mechanical Loading and Tissue Responses in Sport Activities. IOC World Congress on Sport Sciences, Athens.

Boyer K.A., Nigg B.M. (2003) Muscle activity in the leg is tuned in response to impact force characteristics. Book of Abstracts Young Investigator Award Finals, 8th Annual Congress European College of Sport Science, Salzburg, Austria. (Eds)Muller, E. Schwameder, H. Zallinger, G. Fastenbauer, V. pg. 153.

Nigg B.M., **Boyer K.A.,** Wakeling J. (2002) Quantification of soft tissue vibration in heel- toe running. Proceedings 4th World Congress of Biomechanics Conference. Calgary, AB, CAN.

INDUSTRY TECHNICAL REPORTS

Boyer K.A., Blazek, K., Andriacchi, T.P. (2008) Knee joint loading in walking and low speed running in the MBT shoe. Masai Barefoot Technologies, Switzerland.

Nigg
B.M., **Boyer K.A**., Wakeling, J., Stefanyshan D., Cole G. (2003) Shoe Midsole Materials, Impact Forces and Soft Tissue Vibrations. adidas International.

Nigg B.M., **Boyer K.A**., Wakeling, J., Stefanyshan D., Cole G. (2002) Shoe Midsole Materials, Impact Forces and Soft Tissue Vibrations. adidas International.

Wakeling, J. Nigg B. Rozitis A. **Boyer K.A** (2001) Impact Forces, Muscle Tuning, Tissue Vibrations. adidas International.

TEACHING EXPERIENCE

KIN697L *Advanced Clinical Biomechanics* University of Massachusetts-Amherst 2016, 2020. New course on aging and biomechanics created for PhD students with specialties in biomechanics.

KIN 735 *Advanced Biomechanics Lab Techniques*. University of Massachusetts-Amherst 2015. Graduate course on data analysis and signal processing of biomechanical signals.

KIN 530 *Mechanical Analysis of Human Movement,* University of Massachusetts-Amherst 2014-2018. (*Taught five times*) Instructor for graduate core course in biomechanics.

KIN 311 *Anatomy/Human Motion*. University of Massachusetts Amherst, 2013 - 2017. (*Taught five times*). Instructor for undergraduate elective course in tissue biomechanics and functional anatomy.

KIN 430 *Biomechanics*. University of Massachusetts Amherst, 2013, 2019 Instructor for lab-based undergraduate course on biomechanical aspects of human movement.

ME382A/B *Biomedical Engineering in Research and Development. (2011- 2012)* Department of Mechanical Engineering, Stanford University Graduate course. Guest Instructor and project mentor for project based graduate course on biomedical device design.

KNES 363 *Biomechanics of Musculoskeletal Tissue.* Fall 2003. University of Calgary. Instructor for undergraduate Kinesiology students who specialize in Biomechanics.

MENTORING & SUPERVISORY EXPERIENCE (at University of Massachusetts-Amherst)
Postdoctoral
Allison Gruber, PhD. 2013-2014 - Current position: Assistant Professor Indiana University Bloomington.

Graduate Students- Committee Chair or Co-Chair
Jocelyn Hafer, Ph.D. student. University Fellowship awardee. Graduated June 2017. Current position: Assistant Professor University of Delaware.
Carl Jewell, Ph.D. student. Graduated July 2018.
Erica Casto, Ph.D. student. Anticipated Graduation- 2021.
Ethan Steiner, M.S. student Graduated- 2019. Current Position New Balance Research Lab.
Bekah Perlin, M.S student Graduated- 2020.

Graduate Students- Committee Member
Justin Ortega, M.S. Anticipated Graduation 2021
Maggie Chen, PhD Candidate Nursing. Anticipated Graduation 2022
Samuel Carey, MS. Anticipated Graduation 2021
Gerardo Naravez, PhD Candidate BME. Anticipated Graduation 2021

Jacob Banks. PhD Candidate. Graduated 2020. Current Position Post-doctoral fellow Beth Israel Hospital.
Jonaz Moreno. MS. Graudated 2020. Current Position. PhD Student
Melanie Hosker, Ph.D Epidemiology, Graduated 2017
Erin Lamoureux, Ph.D. Nursing, Graduated August 2018
Russell Johnson, M.S/Ph.D. student. M.S. graduation -2015, PhD graduation 2019
Amy Whited, M.S. Graduated - 2015
Devin Kelly, M.S. Graduated- 2015
Erica Hartman, M.S. Graduated- 2016
Carl Jewell, M.S.. Graduated 2014
Devon Frayne, M.S. Graduated 2013

Undergraduate Students – Honors Theses & Research Projects
Michael Galletta 2018.
Brian Friscia 2017-2018– CHC Research Assistant Fellowship/CHC Honor Thesis Research grant.
Team "knee brace" Mechanical Engineer senior design team. 2016
Luke Areny 2016-2017- CHC Honors Thesis Research grant recipient.
Matthew MacLean 2016-2017- CHC Honors Thesis Research grant recipient.
Ethan Steiner 2015-2017
Team "Knee-benders" Mechanical Engineer senior design team. 2015
Katherine Jones, 2014-2015
Marni Millstein, 2014-2015- CHC Research Assistant Fellowship.
Sam Fraulini, 2013-2014
Matthew Cronin, 2013-2014- CHC Honors Thesis Research grant recipient.

Notable mentee awards and honors.
Skylar Holmes 2019-2020 University of Massachusetts Amherst Spaulding Smith Fellowship
Jocelyn Hafer 2013-2014. University of Massachusetts Amherst Graduate School Dean's Fellowship
Jocelyn Hafer 2013-2015. University of Massachusetts Amherst School of Public Health and Health Sciences Dean's PhD Fellowship
Erica Casto 2016. NEACSM M.S. best presentation award.
Jocelyn Hafer 2016 NEACSM David N. Camaione Doctoral Scholarship Award
Jocelyn Hafer 2017 International Society of Biomechanics Student Conference Travel Grant
Jocelyn Hafer 2017 Force and Motion Foundation Travel Scholarship
Jocelyn Hafer 2017 De Luca Foundation Student Travel Grant

INSTITUITIONAL SERVICE (at University of Massachusetts-Amherst)

University steering committees
NSF Advance Faculty Fellow. University of Massachusetts. 2019-2021
Member, Human Testing Center Steering Committee, Institute of Applied Life Science 2015- present
Member, Human Magnetic resonance Center steering Committee, Institute of Applied Life Science 2015- present
Member -Center for Personalized Health Monitoring Human Design Committee. 2014-2015
UMass-Amherst Institute of Applied Life Sciences Core Management committee, Human Testing Center. 2015- 2016
Committee Member, SPHHS Programmatic and Facilities Assessment Groups, 2013

Search and personnel committees
Co-Chair, Faculty Search Committee: Assist. Prof. Movement Neuroscience Dept. of Kinesiology, 2019-20

Co-
Chair, Faculty Search Committee: Assist/Assoc. Prof. Movement Neuroscience Dept. of Kinesiology, 2019-20
Co-Chair, Faculty Search Committee: Assist. Prof. Biomechanics Dept. of Kinesiology, 2019-20
Chair, Faculty Search Committee: Assist/Assoc. Prof. Biomechanics Dept. of Kinesiology, 2018-19
Member, Faculty Search Committee: Assistant Prof. IALS/Dept. of Kinesiology, 2017
Member, Search Committee, Senior Research Fellow: MR Physicist Institute of Applied Life Science 2016
Member, Kinesiology Department Personnel Committee, 2012- 2016
Member, Faculty Search Committee: Assistant Prof. Dept. of Kinesiology, 2014-2015
Member, Faculty Search Committee: Assistant Prof. Dept. of Mechanical and Industrial Engineering, 2014-2015
Member, Faculty Search Committee: Assistant Professor Computer Engineering, Department of Electrical and Computing Engineering, 2014.

Department and SPHHS committees
SPHHS Research Committee 2021
Curriculum committee, Kinesiology 2017-2019
Lead Judge, School of Public Health and Health Sciences Research Day. 2014, 2015, 2016, 2017
Doctoral Qualifying Exam Committee, Kinesiology. Member 2014, 2017 co-chair 2015, 2016
Judge, Mechanical and Industrial Engineering Senior Design Projects, 2014, 2015, 2016
Graduate Award Committee. Dept. of Kinesiology. 2015-2016

PROFESSIONAL SERVICE

Committees
International Society of Biomechanics, Executive Council. 2019-2021
Osteoarthritis Research Society International, Young Investigator Committee Chair 2017-2018
Osteoarthritis Research Society International, Young Investigator Committee member 2015-2019
Associate Editorial. Footwear Science Journal. January 2019-present
Editorial board member. Footwear Science Journal. January 2014-present
Osteoarthritis Research Society International, Initiative Review Committee – 2017-2019
Osteoarthritis Research Society International, Program Committee – 2018-2019

Professional Conference service
Awards committee, Footwear Biomechanics Symposium. 2017
Abstract reviewer, American Society of Biomechanics Conference (2013, 2015, 2016, 2017, 2018)
Session chair American Society of Biomechanics Conference (2007, 2017)
Session chair Osteoarthritis Research Society International OA congress 2015
Conference abstract reviewer, World Congress of Biomechanics (2014)
Session chair Congress of the International Society of Biomechanics (2012, 2017)
Conference awards judge. BioMechanical Engineering Conference (2010) Stanford.
Conference Scientific Committee. Stanford Center for Longevity Joint Health Workshop (2009)
Conference session chair North American Congress on Biomechanics (2008), Ann Arbor, MI.

Ad-Hoc Manuscript Reviewer

Journal of Biomechanics	Journal of Science and Medicine in Sport
Gait and Posture	Medicine & Science in Sports and Exercise
Osteoarthritis and Cartilage	Arthritis Care and Research
Physical Medicine and Rehabilitation	Journal of Applied Biomechanics
Footwear Science	Journal of Orthopedic Research
Journal of Sports and Health Science	Nature Review Rheumatology
Archives of Physical Medicine	BMC Musculoskeletal Disorders

Grant Proposal Reviewer (Ad Hoc)

2021	Musculoskeletal Rehabilitation Sciences (MRS) Study Section Feb 2021
2020	MOSS-B Special Emphasis Panel Study Section July 2020
2020	ZRG1 F10B-B Special Emphasis Panel Study Section July 2020
2019	Musculoskeletal Rehabilitation Sciences (MRS) Study Section Oct 2019
2014- 2018	Swiss National Science Foundation
2015-2016	Canada Foundation for Innovation- Merit review grant
2014	Natural Sciences and Engineering Research Council of Canada (NSERC) Collaborative Research and Development Grant
2012-2013, 2020	Mitacs-Accelerate Internship proposals, Canada
2011,12,16,17	Natural Sciences and Engineering Research Council of Canada (NSERC) Discovery Grants. Biological Systems and Functions

PROFESSIONAL SOCIETY MEMBERSHIPS

2004-2008	Canadian Society of Biomechanics
2004-2021	International Society of Biomechanics
2006-2021	American Society of Biomechanics
2006-2017	Orthopedic Research Society
2006-2021	Footwear Biomechanics Group
2013-2021	Osteoarthritis Research Society International