

Curriculum Vitae

MICHAEL T. BUTCHER

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EDUCATION

- 2006 Ph.D., Zoology, **University of Calgary**
(completed first 3.5 years of degree studies at *Florida State University*)
Thesis Title: “From Molecules to Muscles: Equine digital flexor muscle contractile physiology and function”
- 2000 M.S., Biological Sciences, **Wake Forest University**
Thesis Title: “Age associated differences in the leading forelimb fetlock joint kinematics of Thoroughbred racehorses”
- 1996 B.S., Exercise Science (minor: Biology). **Christopher Newport University**

PROFESSIONAL EXPERIENCE

- 2008-present Assistant Professor, Department of Biological Sciences, Youngstown State University
- 2006-08 Postdoctoral Fellow, Department of Biological Sciences, Clemson University
Project Title: “Evolution of tetrapod limb bone design: Testing the relationship between limb bone loads and locomotion,” Project Funding: NSF
- 2004-06 Research Assistant, Department of Biological Sciences, University of Calgary
- 2002-04 Teaching Assistant, Department of Biomedical Engineering, College of Engineering, College of Medicine, Florida State University
- 2001-04 Teaching Assistant, Department of Nutrition, Food & Exercise Sciences, College of Human Sciences, Florida State University
- 2000-01 Chemical Hygiene Officer, Department of Biology, Wake Forest University
- 1998-00 Teaching Assistant, Department of Biology, Wake Forest University

HONORS & AWARDS

- 2013 Mentor of the Year Award, Youngstown State University
- 2013 Dean’s Reassign Time Award (OEA 24.4, 3 h), Youngstown State University
- 2013 Research Professorship Award, Youngstown State University (9 h reassignment time)
- 2012 Sigma Xi Young Investigator Award
- 2012 Distinguished Professor Award for Scholarship, Youngstown State University
- 2012 Dean’s Reassign Time Award (OEA 24.4, 3 h), Youngstown State University
- 2012 Research Professorship Award, Youngstown State University (6 h reassignment time)
- 2011 Who’s Who American Professionals (2012 edition)

- 2011 Dean's Reassign Time Award (OEA 24.4, 4 h), Youngstown State University
- 2010 Research Professorship Award, Youngstown State University (8 h reassignment time)
- 2010 Dean's Reassign Time Award (OEA 24.4, 6 h), Youngstown State University
- 2009 Research Professorship Award, Youngstown State University (8 h reassignment time)
- 2009 Dean's Reassign Time Award (OEA 24.4, 3 h), Youngstown State University
- 2004 Excellence and Innovation in Science Education Award, Society for Integrative and Comparative Biology (SICB)
- 1996 Alpha Chi Academic Honor Society, Christopher Newport University
- 1995 VAPHERD Outstanding Student Major Award, Christopher Newport University

GRANTS & SCHOLARSHIPS

- 2012 Research Assistantship Award, Youngstown State University (\$1800)
- 2013 NSF-IOS Grant, "Preliminary Proposal: Ontogeny and the Evolution of Bone and Muscle in the Platyrrhine Prehensile Tail – an Integrative Investigation." PI: JM Organ, Co-PIs: **MT Butcher**, MR Allen, G Perry.
- 2012 Research Assistantship Awards (x2), Youngstown State University (\$3600)
- 2012 NSF-IOS Grant, "Collaborative Research: Natural Selection on Growth and Locomotor Development in Eastern Cottontail Rabbits (*Sylvilagus floridanus*)." PIs: JW Young, **MT Butcher**, GA Smith, Co-PI: C Fellmann, 2012-2014 (\$76,922 – Funded)
- 2011 NSF-BCS Grant, "The Biomechanics of Arboreal Stability: an Integrative Analysis". PI: JW Young, SP: **MT Butcher** (\$255,839 – Funded)
- 2011 Undergraduate Student Research Grant (USR), Youngstown State University (\$1000)
- 2011 Research Assistantship Awards (x3), Youngstown State University (\$5400)
- 2011 University Research Council (URC) Grant, Youngstown State University. "The functional anatomy of the raccoon (*Procyon lotor*): an omnivore with a diverse locomotor and behavioral repertoire" (\$3500)
- 2010 University Research Council (URC) Grant, Youngstown State University. "Functional specialization in the forelimb of the American badger (*Taxidea taxus*)" (\$3500)
- 2010 Research Assistantship Award (RA), Youngstown State University (\$1800)
- 2009 NSF-MRI-R2 Grant, "MRI-R2 Acquisition: Establishment of a Core Facility for the Hierarchical Analysis of Bone." PI: CJ Vinyard, Co-PIs: JGM Thewissen, JW Young, WE Horton, WJ Landis, SP: **MT Butcher**, 2010-2013 (\$583,523 – Funded)
- 2009 University Research Council (URC) grant, Youngstown State University. "Limb bone loading during terrestrial locomotion in the opossum (*Didelphis virginiana*)" (\$4900)
- 2006 University of Calgary, Dept. of Biological Sciences, Graduate Research Scholarship (\$4,100 CAD)
- 2005 University of Calgary, Faculty of Graduate Studies, Graduate Faculty Council Scholarship (\$5,000 CAD)

PRESENTATIONS

Invited presentations:

Muscle structure and function: simple approaches to understanding muscle architecture and physiology. IU School of Medicine, Department of Anatomy and Cell Biology Seminar, Feb. 27, 2013

Bones and muscles: comparative and integrative approaches to structure and function. John Carroll University, Department of Biology Seminar, Nov. 8, 2012

Bones and muscles: comparative and integrative approaches to structure and function. YSU, Department of Biological Sciences Graduate Seminar Series, Sept. 30, 2011

Functional specialization of the intrinsic musculature of the american badger (*Taxidea taxus*). University of Akron, Department of Biology Seminar, Sept. 22, 2011

Myosin isoform fiber type in the tail of the Virginia opossum (*Didelphis virginiana*). NEOMED, Department of Anatomy and Neurobiology Seminar, Feb. 10, 2011

Femur loading mechanics in river cooter turtles (*Pseudemys concinna*) during terrestrial locomotion: New perspectives and Future directions. YSU, Department of Biological Sciences Graduate Seminar Series, Oct. 1, 2010

Femoral loading patterns in turtles and opossum: Coincidence or evolutionary link? Clarion University, Department of Biology Seminar, Nov. 13, 2009

Loading patterns of the femur in opossum (*Didelphis virginiana*) during terrestrial locomotion. YSU, Department of Biological Sciences Graduate Seminar Series, Sept. 18, 2009

Femur loading mechanics in river cooter turtles (*Pseudemys concinna*) during terrestrial locomotion. Youngstown State University, Department of Biological Sciences Seminar Nov. 7, 2008

From horses to turtles, bones to muscle, and fibers to filaments: integrative and comparative approaches to the study of animal function. Rensselaer Polytechnic Institute, Department of Biology Seminar, March 12, 2008

To do work or not to do work? A division of labor for equine digital flexor muscles during locomotion. Clemson University, Department of Biological Sciences Seminar, Nov. 17, 2006

Muscle fiber organization and function. University of Calgary, Department of Biological Sciences, Spotlight On Research, March 1, 2006

Locomotion: simple models, comparative insight. Florida State University, Department of Biology, April 16, 2004

Force and work output characterizations of equine forelimb digital flexor muscle fibers: a preliminary analysis. Florida State University, College of Human Sciences (CHS) Honors and Awards Banquet, April 6, 2004

Force and work output characterizations of equine forelimb digital flexor muscle fibers: a preliminary analysis. Florida State University, College of Human Sciences (CHS) Student Research and Creativity Day, Feb. 28, 2004

Great Apes vs. Cercopithecoid Monkeys: Understanding locomotion *via* nuances in forelimb joint morphology. Florida State University, Department of Chemical Engineering, Biomedical Engineering Society Forum, April 24, 2003

How We Move: Locomotion and movement from a mechanical perspective. Florida State University, CHS Graduate Student Advisory Committee Research Colloquium, April 2, 2003

Putative role of the collateral ligaments of the distal sesamoid bone in *Equus*. Florida State University, College of Human Sciences (CHS) Student Research and Creativity Day, Feb. 28, 2003

Age differences in the leading forelimb fetlock joint kinematics of Thoroughbred racehorses. Wake Forest University, Department of Biology Seminar, Mar. 22, 2000

Conference presentations: (* = student author)

Rose JA*, **Butcher MT**. Forelimb muscle architecture and force production potential in the eastern mole (*Scalopus aquaticus*). QUEST, YSU: April 2, 2013.

Rupert JE*, **Butcher MT**. Analysis of myosin heavy chain (MHC) isoforms in the prehensile tails of didelphid marsupials: functional differences in arboreal versus terrestrial opossums. QUEST, YSU: April 2, 2013.

Rupert JE*, **Butcher MT**. Analysis of myosin heavy chain (MHC) isoforms in the prehensile tails of didelphid marsupials: functional differences in arboreal versus terrestrial opossums. Oral presentation: Society for Integrative and Comparative Biology Annual Meeting, San Francisco, CA: Jan. 5, 2013

Butcher MT, Jacobowitz S, Oruganti P. American Medical Student Association (AMSA): The Youngstown State University Student Chapter. QUEST, YSU: April 3, 2012

Jordan M*, **Butcher MT**. Performance enhancement: Myosin heavy chain isoform changes to sport-specific training. QUEST, YSU: April 3, 2012

Rupert JE*, **Butcher MT**. Analysis of myosin heavy chain isoforms in prehensile tails of didelphid marsupials: muscle specializations for arboreal versus terrestrial locomotion. QUEST, YSU: April 3, 2012

Aiello BR*, **Butcher MT**. Correlating bone loading and muscle function in the hindlimb of the river cooter turtle (*Pseudemys concinna*). QUEST, YSU: April 3, 2012

Aiello BR*, Blob, RW, **Butcher MT**. Correlating bone loading and muscle function in the hindlimb of the river cooter turtle (*Pseudemys concinna*). Oral presentation: Society for Integrative and Comparative Biology Annual Meeting, Charleston, SC: Jan. 7, 2012

Aiello BR*, Blob, RW, **Butcher MT**. Correlating bone loading and muscle function in the hindlimb of the river cooter turtle (*Pseudemys concinna*). Oral presentation: SICB Southeast Regional Meeting, Winston-Salem, NC: Oct. 22, 2011

Moore AL*, **Butcher MT**. Forelimb muscle architecture of the american badger (*Taxidea taxus*) and groundhog (*Marmota monax*). Poster presentation: APS Experimental Biology Annual Meeting, Washington D.C.: April 11, 2011

Moore AL*, **Butcher MT**. Forelimb muscle architecture of the american badger (*Taxidea taxus*) and groundhog (*Marmota monax*). QUEST, YSU: April 5, 2011

Moore AL*, Budny JE*, **Butcher MT**. Functional specialization in the forelimbs of two digging animals: american badger (*Taxidea taxus*) and groundhog (*Marmota monax*). QUEST, YSU: April 5, 2011

Hosseininejad J*, **Butcher MT**. The biomechanics of turtle limbs: An electrical engineer's perspective. QUEST, YSU: April 5, 2011

Gorvet MA*, **Butcher MT**. Analysis of myosin heavy chain isoform fiber type at the protein level in opossum caudal muscle. QUEST, YSU: April 5, 2011

Butcher MT, Hazimihalis PJ*. Myosin isoform fiber type in the tail of the Virginia opossum (*Didelphis virginiana*). Oral presentation: Society for Integrative and Comparative Biology Annual Meeting, Salt Lake City, UT: Jan. 5, 2011

- Moore AL*, **Butcher MT**. Forelimb muscle architecture of the american badger (*Taxidea taxus*) and groundhog (*Marmota monax*). Oral presentation: Society for Integrative and Comparative Biology Annual Meeting, Salt Lake City, UT: Jan. 6, 2011
- Moore AL*, **Butcher MT**. Forelimb muscle architecture of the groundhog (*Marmota monax*). Oral presentation: SICB Southeast Regional Meeting, Blacksburg, VA: Nov. 6, 2010
- Hazimihalis PJ*, **Butcher MT**. Myosin isoform fiber type and architecture in the tail of the Virginia opossum (*Didelphis virginiana*). Oral presentation: SICB Southeast Regional Meeting, Blacksburg, VA: Nov. 6, 2010
- Hazimihalis PJ*, **Butcher MT**. Muscle architecture and fiber type in the tail of the opossum: Specializations for arboreal vs. terrestrial locomotion. QUEST, YSU: April 6, 2010
- Butcher MT**, Hudzik NB*, White BJ*, Wolff LM*, Gosnell WC*, Parrish JHA, Blob RW. Patterns of strain in the femur of the opossum (*Didelphis virginiana*) during terrestrial locomotion. QUEST, YSU: April 6, 2010
- Butcher MT**, Hudzik NB*, White BJ*, Wolff LM*, Gosnell WC*, Parrish JHA, Blob RW. Patterns of strain in the femur of the opossum (*Didelphis virginiana*) during terrestrial locomotion. Poster Presentation: Society for Integrative and Comparative Biology Annual Meeting, Seattle, WA: Jan. 3-7, 2010
- Gosnell WC*, **Butcher MT**, Maie, T, Blob RW. Ground reaction forces on the hindlimb of opossum (*Didelphis virginiana*) during terrestrial locomotion: implications for femoral loading. Poster Presentation: Society for Integrative and Comparative Biology Annual Meeting, Seattle, WA: Jan. 3-7, 2010
- Butcher MT**, Parrish JHA, Blob RW. Loading patterns of the femur in opossum (*Didelphis virginiana*) during terrestrial locomotion. Poster Presentation: Society for Integrative and Comparative Biology Annual Meeting, Boston, MA: Jan. 3-8, 2009
- Butcher MT**, Espinoza NR, Blob RW. The mechanics of bone loading during terrestrial locomotion in river cooter turtles (*Pseudemys concinna*): validation of stress analyses by *in vivo* strain recordings. Oral Presentation: Society for Integrative and Comparative Biology Annual Meeting, San Antonio, TX: Jan. 3-6, 2008
- Butcher MT**, Shugart SK*, Espinoza NR, Blob RW. The mechanics of bone loading during terrestrial locomotion in river cooter turtles (*Pseudemys concinna*). Oral Presentation: 8th International Congress of Vertebrate Morphology Meeting, Paris, France: July 16-21, 2007
- Butcher MT**, Hermanson JW, Ducharme NG, Bertram JEA. Equine digital flexor muscle contractile function studied *in vivo*. Oral Presentation: Society for Integrative and Comparative Biology Annual Meeting, Phoenix, AZ: Jan. 3-7, 2007
- Butcher MT**, Chase PB, Hermanson JW, Bertram JEA, Clark AN, Syme DA. Physiological comparisons of the equine deep and superficial digital flexor muscle fibres. Oral Presentation: Canadian Society of Zoology Annual Meeting, University of Alberta, Edmonton, AB Canada: May 3-7, 2006
- Butcher MT**, Chase PB, Hermanson JW, Bertram JEA, Clark AN, Syme DA. Work and power characteristics of skinned fibers from the deep and superficial digital flexor muscles in the forelimbs of horses. Oral Presentation: Society for Integrative and Comparative Biology Annual Meeting, Orlando, FL: Jan. 4-8, 2006
- Butcher MT**, Chase PB, Hermanson JW, Bertram JEA, Clark AN. A tale of three muscles: physiological comparisons of equine deep and superficial digital flexors and soleus muscle fibers. Oral Presentation: Society for Integrative and Comparative Biology Annual Meeting, San Diego, CA: Jan. 4-8, 2005

- Butcher MT**, Chase PB, Hermanson JW, Bertram JEA, Clark AN. Physiological characterization of equine digital forelimb flexor muscles: force, work and in vitro motility analyses. Oral Presentation: 5th International Conference on Equine Locomotion (ICEL), Michigan State University, East Lansing, MI: May 17-20, 2004
- Butcher MT**, Chase PB, Hermanson JW, Bertram JEA, Clark AN. Force and work output characterizations of equine forelimb digital flexor muscle fibers. Poster Presentation: Society for Integrative and Comparative Biology Annual Meeting, New Orleans, LA: Jan. 5-9, 2004
- Butcher MT**, Bertram JEA. Newton's Laws of Motion and jumping performance: A lab exercise investigating jump distance increases due to added hand-held weight. Oral Presentation: Society for Integrative and Comparative Biology Annual Meeting, New Orleans, LA: Jan. 5-9, 2004
- Butcher MT**, Bertram JEA, Bezuidenhout AJ. Putative role of the collateral ligaments of the distal sesamoid bone in *Equus*. Poster Presentation: Society for Integrative and Comparative Biology Annual Meeting, Toronto, Canada: Jan. 4-8, 2003
- Butcher MT**, Bertram JEA, Usherwood JR. The geometry of galloping. Poster Presentation: 4th World Congress of Biomechanics Meeting, Calgary, Canada: Aug. 4-9, 2002
- Butcher MT**, Ashley-Ross MA. Age differences in the leading forelimb fetlock joint kinematics of Thoroughbred racehorses. Oral Presentation: Society for Integrative and Comparative Biology Annual Meeting, Atlanta, GA: Jan. 4-8, 2000
- Butcher MT**, Ashley-Ross MA. Age differences in the leading forelimb fetlock joint kinematics of Thoroughbred racehorses. Poster Presentation: Perspectives In Biology (PIB) Symposium, Wake Forest University, Winston-Salem, NC: Nov. 12-13, 1999

ABSTRACTS

- Rupert JE, Moriera A, **Butcher MT**. Analysis of myosin heavy chain (MHC) isoforms in the prehensile tails of didelphid marsupials: functional differences in arboreal versus terrestrial opossums. *Integr Comp Biol.* 53(suppl 1): E186.
- Blob RW, Maie T and **Butcher MT**. Locomotor loading of the femur in opossums provides insight into the evolution of femoral shape in synapsids. 2012 SVP Annual Meeting.
- Aiello BR, Blob RW and **Butcher MT**. 2012. Correlation of bone loading and muscle function in the hindlimb of the river cooter turtle (*Pseudemys concinna*). *Integr Comp Biol.* 52(suppl 1): E3.
- Moore AL and **Butcher MT**. Forelimb muscle architecture of the american badger (*Taxidea taxus*) and groundhog (*Marmota monax*). 2011 APS Experimental Biology Meeting.
- Moore AL and **Butcher MT**. 2011. Forelimb muscle architecture of the american badger (*Taxidea taxus*) and groundhog (*Marmota monax*). *Integr Comp Biol.* 51(suppl 1): E95.
- Hazimihalis PJ and **Butcher MT**. 2011. Myosin isoform fiber type in the tail of the Virginia opossum (*Didelphis virginiana*). *Integr Comp Biol.* 51(suppl 1): E55.
- Blob RB, **Butcher MT**, Gosnell WC and Parrish JHA. 2011. Locomotor loading of the femur in opossums: safety factors, loading regimes, and an explanation for mediolateral bending. *Integr Comp Biol.* 51(suppl 1): E12.
- Gosnell WC, **Butcher MT**, Maie T and Blob RW. 2010. Ground reaction forces on the hindlimb of opossum (*Didelphis virginiana*) during terrestrial locomotion: implications for femoral loading. *Integr Comp Biol.* 50(suppl 1): E235.

- Butcher MT, Hudzik NB, White BJ, Wolff LM, Gosnell WC, Parrish JHA and Blob RW. 2010. Patterns of strain in the femur of the opossum (*Didelphis virginiana*) during terrestrial locomotion. *Integr Comp Biol*. 50(suppl 1): E211.
- Butcher MT, Parrish JHA and Blob RW. Loading patterns of the femur in opossum (*Didelphis virginianis*) during terrestrial locomotion. *SICB 2009 Annual Meeting Final Program and Abstracts*, online posting format.
- Butcher MT, Espinoza NR and Blob RW. The mechanics of bone loading during terrestrial locomotion in river cooter turtles (*Pseudemys concinna*): validation of stress analyses by *in vivo* strain recordings. *SICB 2008 Annual Meeting Final Program and Abstracts*, CD format final program.
- Wright KM, **Butcher MT** and Blob RW. 2007. Limb bone loading in salamanders during terrestrial locomotion. *ICVM 8 abstracts, Journal of Morphology* 268(12): 1151.
- Espinoza NR, Pruette ME, **Butcher MT**, Wright KM, Gosnell JS and Blob RW. 2007. Correlations of limb kinematics and bone strain in frogs and toads. *ICVM 8 abstracts, Journal of Morphology* 268(12): 1070.
- Butcher MT, Shugart SK, Espinoza NR and Blob RW. 2007. The mechanics of bone loading during terrestrial locomotion in river cooter turtles (*Pseudemys concinna*). *ICVM 8 abstracts, Journal of Morphology* 268(12): 1055.
- Cirilo SR, Espinoza NR, Pruette ME, Wright KM, Gosnell JS, **Butcher MT** and Blob RW. Limb bone strain rates across diverse locomotor modes: Hopping, jumping and walking. *SICB 2007 Annual Meeting Final Program and Abstracts*, CD format final program.
- Butcher MT, Hermanson JW, Ducharme NG and Bertram JEA. Equine digital flexor muscle contractile function studied *in vivo*. *SICB 2007 Annual Meeting Final Program and Abstracts*, CD format final program.
- Butcher MT, Chase PB, Hermanson JW, Bertram JEA, Clark AN and Syme DA. Physiological comparisons of the equine deep and superficial digital flexor muscle fibres. *Canadian Society of Zoologists Bulletin*, Spring 2006, 37(2): 37.
- Bertram JEA, Nordgren A and **Butcher MT**. External power production in walking and running under simulated gravity changes: correlation with metabolic cost. *SICB 2006 Annual Meeting Final Program and Abstracts*, CD format final program.
- Butcher MT, Chase PB, Hermanson JW, Bertram JEA, Clark AN and Syme DA. Work and power characteristics of skinned fibers from the deep and superficial digital flexor muscles in the forelimbs of horses. *SICB 2006 Annual Meeting Final Program and Abstracts*, CD format final program.
- Butcher MT, Chase PB, Hermanson JW, Bertram JEA and Clark AN. A tale of three muscles: physiological comparisons of equine deep and superficial digital flexors and soleus muscle fibers. *SICB 2005 Annual Meeting Final Program and Abstracts*, 156.
- Butcher MT, Chase PB, Hermanson JW, Bertram JEA and Clark AN. 2004. Physiological characterization of equine digital forelimb flexor muscles: force, work and *in vitro* motility analyses. *Equine and Comparative Exercise Physiology* 1(2): A5.
- Cooper RC, Bertram JEA and **Butcher MT**. Keeping your feet firmly on the ground: influence of step length on required foot friction. *SICB 2004 Annual Meeting Final Program and Abstracts*, 256.
- Butcher MT, Chase PB, Hermanson JW, Bertram JEA and Clark AN. Force and work output characterizations of equine forelimb digital flexor muscle fibers. *SICB 2004 Annual Meeting Final Program and Abstracts*, 259.

Butcher MT and Bertram JEA. Newton's Laws of Motion and jumping performance: A lab exercise investigating jump distance increases due to added hand-held weight. *SICB 2004 Annual Meeting Final Program and Abstracts*, 363.

Hermanson JW, Ducharme NG, **Butcher MT** and Bertram JEA. Activity and function of equine digital flexor muscles. *SICB 2003 Annual Meeting & Exhibition Final Program and Abstracts*, 192.

Butcher MT, Bertram, JEA and Bezuidenhout AJ. Putative role of the collateral ligaments of the distal sesamoid bone in *Equus*. *SICB 2003 Annual Meeting & Exhibition Final Program and Abstracts*, 130.

Butcher MT, Bertram JEA and Usherwood JR. The Geometry of Galloping. 2002 *Proceedings of the 4th World Congress of Biomechanics*. CD format final program.

Butcher MT and Ashley-Ross MA. 2000. Age differences in the kinematics of the fetlock joint of the leading forelimb during galloping in Thoroughbred racehorses. *American Zoologist* 39(5): 106A.

PUBLICATIONS

Journal articles: (* = student author)

Aiello BR*, Blob RW, **Butcher MT**. Correlation of muscle function and bone strain in the hindlimb of the river cooter turtle (*Pseudemys concinna*). *J Morphol*, In press.

Moore AL*, Budny JE*, Russell AP, **Butcher MT**. 2013. Architectural specialization of the intrinsic thoracic limb musculature of the American badger (*Taxidea taxus*). *J Morphol* 274: 35-48. (impact factor: 1.711)

Hazimihalis PJ*, Gorvet MA*, **Butcher MT**. 2013. Myosin isoform fiber type and fiber size in the tail of the Virginia opossum (*Didelphis virginiana*). *Anat Rec* 296: 96-107. (impact factor: 1.473)

Panta Y, **Butcher MT**. 2012. Development of an integrative biomechanics for STEM majors. *Proceedings of the American Society for Engineering Education Annual Conference & Exposition*.

Gosnell WC*, **Butcher MT**, Maie T, Blob RW. 2011. Femora loading mechanics in Virginia opossums (*Didelphis virginiana*): torsion and mediolateral bending in mammalian parasagittal locomotion. *J Exp Biol* 214: 3455-3466. (impact factor: 3.040)

Butcher MT, Hudzik NB*, White BJ*, Gosnell WC*, Parrish JHA, Blob RW. 2011. *In vivo* strain in the femur of the opossum (*Didelphis virginiana*) during terrestrial locomotion: testing hypotheses of evolutionary shifts in bone loading and design. *J Exp Biol* 214: 2631-2640.

Sheffield KM*, **Butcher MT**, Shugart SK*, Gander JC*, Blob RW. 2011. Locomotor loading mechanics in the hindlimbs of tegu lizards (*Tupinambis merianae*): comparative and evolutionary implications. *J Exp Biol* 214: 2616-2630.

Butcher MT, Chase PB, Hermanson JW, Clark AN, Brunet NM, Bertram JEA. 2010. Contractile Properties of Muscle Fibers from the Forelimb Deep and Superficial Digital Flexors of Horses. *Am J Physiol Regul Integr Comp Physiol* 299: R996-R1005. (impact factor: 3.058)

Butcher MT, Hermanson JW, Ducharme NG, Mitchell LM, Soderholm LV, Bertram JEA. 2009. Contractile behavior of the forelimb digital flexors during steady-state locomotion in horses (*Equus caballus*): an initial test of muscle architectural hypotheses about *in vivo* function. *Comp Biochem Physiol A: Mol & Integr Physiol* 152: 100-114. (impact factor: 2.235)

Butcher MT, Espinoza NR, Cirilo SR*, Blob RW. 2008. *In vivo* strains in the femur of river cooter turtles (*Pseudemys concinna*) during terrestrial locomotion: tests of force-platform models of loading mechanics. *J Exp Biol* 211: 2397-2407.

- Butcher MT, Blob RW. 2008. Mechanics of limb bone loading during terrestrial locomotion in river cooter turtles (*Pseudemys concinna*). *J Exp Biol* 211: 1187-1202. Corrigendum: *J Exp Biol* 211: 2369.
- Cooper RC*, **Butcher MT**, Bertram JEA. 2008. Step-length and required friction walking. *Gait Posture* 27: 547-551.
- Butcher MT, Hermanson JW, Ducharme NG, Mitchell LM, Soderholm LV, Bertram JEA. 2007. Superficial digital flexor tendon lesions in racehorses as a sequelae to muscle fatigue: a preliminary study. *Equine Vet J* 39: 540-545.
- Butcher MT, Bertram JEA, Bezuidenhout AJ. 2006. Collateral ligaments of the distal sesamoid bone in the digit of *Equus*: Re-evaluating mid-stance function. *J Morphol* 267: 1177-1185.
- Gutmann AK, **Butcher MT**, Jacobi B*, Bertram JEA. 2006. Constrained optimization in human running. *J Exp Biol* 209: 622-632.
- Butcher MT, Bertram JEA. 2004. Jump distance increases while carrying hand-held weights: Impulse, history and jump performance in a simple lab exercise. *J Sci Edu Technol* 13: 285-297.
- Butcher MT, Ashley-Ross MA. 2002. Age differences in fetlock joint kinematics of Thoroughbreds. *J Biomech* 35: 563-571.

Manuscripts in review/revision:

- Rose JA*, Sandefur M*, Huskey S, Demler JL*, **Butcher MT**. Forelimb muscle architecture and force production potential in the eastern mole (*Scalopus aquaticus*). In revision 2, *Journal of Morphology*
- Lee DV, Tutor NC*, **Butcher MT**, Bertram JEA. Collision based dynamics of human walking and running in relation to other mammalian gaits. In review, *Proceedings of the Royal Society B*
- Rupert JE***, Moriera A, Cordero Schmidt E, VandeBerg JL, Rodriguez Herrera B, **Butcher MT**. Myosin heavy chain (MHC) isoform expression in the prehensile tails of didelphid marsupials: functional differences between arboreal and terrestrial opossums. In review, *Journal of Experimental Biology*

Manuscripts in preparation:

- Rose, JA*, Moore AL*, Russell AP, **Butcher MT**. Functional anatomy of the digging apparatus in *Taxidea*. In prep for *Journal of Mammalogy*
- Rupert JE*, Rose, JA*, **Butcher MT**. Architectural specialization of the intrinsic thoracic limb musculature of the groundhog (*Marmota monax*). In prep for *Journal of Morphology*
- Rupert JE*, Vandeberg JL, Walker GR, **Butcher MT**. Analysis of myosin heavy chain isoforms in the prehensile tail of *Monodelphis domestica*: Does MHC isoform composition change with ontogeny?. In prep for *Nature*
- Butcher MT, Chase PB, Hermanson JW, Syme DA, Bertram JEA. Work and power measurements in single, skinned fibers from deep and superficial digital flexor muscles of horses. In prep for *Experimental Physiology*

Other publications:

- Butcher MT**. 2001. Chemical Hygiene and Safety Plan. Dept. of Biology, Wake Forest University. (Ed. Dan Johnson) *Version #1.03* (rev. 8/1/2001).

TEACHING EXPERIENCE

- 2012 Assistant Professor, Youngstown State University. BIOL 6991/94: Research Methods, (Fall 2012)

- 2012 Assistant Professor, Youngstown State University. BIOL 6911: Comparative Biomechanics (I developed this course), (Spring 2012)
- 2011-13 Assistant Professor, Youngstown State University. BIOL 4861: Senior Biology Capstone Experience, (Spring 2011; Spring 2013)
- 2010-11 Assistant Professor, Youngstown State University. BIOL 6989: Graduate Research Experience (Supervised 3 student projects)
- 2009-12 Assistant Professor, Youngstown State University. BIOL 3730L: Human Physiology Lab (Spring 2009, Spring/Fall 2010; Fall 2011; Spring/Fall 2012)
- 2009-13 Assistant Professor, Youngstown State University. BIOL 4850Z: Problems in Biology, Muscle Function (Supervised 11 undergraduates for laboratory research)
- 2009-11 Laboratory Coordinator, Youngstown State University BIOL 1551: Anatomy & Physiology I Lab (Spring/Fall 2009-2011)
- 2009 Assistant Professor, Youngstown State University. BIOL 4839/6998: Selected Topics in Physiology (Spring 2009; Animal Locomotion)
- 2008-12 Assistant Professor, Youngstown State University. BIOL 3705: Introduction to Human Gross Anatomy (Fall 2008/Spring 2009; Spring 2010; Fall 2012)

Teaching assistant posts:

- 2001-04 Florida State University. Labs Taught:
 BME 4403-4C: Quantitative Anatomy & Systems Physiology I&II (also, *guest lecturer*)
 PET 3322: Anatomy & Physiology I (Spring 2003)
 PET4060: Biomechanics (Fall 2001-Spring 2004)
- 1998-00 Wake Forest University. Labs Taught:
 BIOL 320: Comparative Anatomy (Spring 2000)
 BIOL 112: Comparative Physiology (Fall 1998- Summer 2000)

THESIS ADVISING

Current Students:

- Joe Copploe, MS expected Summer 2014
 Jake Rose, MS expected Fall 2014

Graduate Students:

- Joseph Rupert, MS 2013
 Michele Jordan, MS 2012
 Brett Aiello, MS 2012
 Lexi Moore, MS 2011
 Pano Hazimihalis, MS 2010

Undergraduate supervised research:

- 2012 Dylan Graban, senior Biological Sciences major, YSU. Project: Quantification of forelimb muscle architecture in the groundhogs (*Marmota monax*).
- 2012 Matt Madgar, senior Biological Sciences major, YSU. Project: Quantification of forelimb muscle architecture in the groundhogs (*Marmota monax*).
- 2012 Laura Kosiorek, senior Biological Sciences major, YSU. Project: MHC distribution in the caudal muscles of *Monodelphis domestica*.

- 2012 Jennifer Delmer, senior Biological Sciences major (pre-vet), YSU. Project: Quantification of forelimb muscle architecture in the Eastern moles.
- 2011 Jacob Rose, undergraduate research associate (Supported by URC grant #02-12 to MT Butcher)
- 2011 Lindsey Russo, senior Exercise Science major, YSU. Butcher research laboratory website renovation.
- 2011 Marc Gorvet, undergraduate research associate (Supported by URC grant #03-10 to MT Butcher; RA Summer 2011-12; USR 2011-2013)
- 2011 Joseph Budny, senior Biological Sciences major, YSU. Project: Forelimb muscle architecture in the Virginia opossum.
- 2010-11 Justin Hosseininejad, senior Electrical Engineering, YSU. Senior Thesis Project: The biomechanics of turtle limbs: An electrical engineer's perspective (make implant strain gauges, assemble electrical hardware, test recording software, write analysis code)
- 2010-11 Lisa Braden, senior Biological Sciences major, YSU. Project: Forelimb muscle architecture in the groundhog, *Marmota monax*. Data collection.
- 2010-11 Kara Vitus, senior Biological Sciences major, YSU. Project: Forelimb muscle architecture in the groundhog, *Marmota monax*. Data collection.
- 2010-11 Carissa Bellflower, senior Biological Sciences major, YSU. Project: Correlation of bone strain and muscle function in the femur of the river cooter turtle, *Pseudemys concinna*.
- 2010 Alyson Cadman, senior Exercise Sciences major, YSU. Project: Muscle fiber type distribution in the tail of the Virginia opossum. Data analysis.
- 2009-10 Bartholomew White, senior Biological Sciences major, YSU. Project: Bone loading patterns in the femur of *Didelphis virginiana*.
- 2009-10 Nathan Hudzik, senior Biological Sciences major, YSU. Project: Bone loading patterns in the femur of *Didelphis virginiana*.
- 2009 Emily Roth, undergraduate research associate (Supported by URC grant #01-09 to MT Butcher)
- 2009 David Drevna, undergraduate research associate (Supported by URC grant #01-09 to MT Butcher)

PROFESSIONAL MEMBERSHIP

Sigma Xi
 American Physiological Society (APS)
 National Education Association/Ohio Education Association (NEA-OEA)
 Society for Integrative and Comparative Biology (SICB)

REFEREE SERVICE

Reviewer for the Journals: *Cells Tissues Organs*, *Journal of Anatomy*, *Journal of Zoology*, *Journal of Animal Science*, *Journal of Equine Veterinary Science*, *Journal of Advanced Research*, *Journal of Experimental Biology*, *BMC Biochemistry*, *Journal of Royal Society Interface*

PROFESSIONAL & PUBLIC SERVICE

2012-13 Faculty Advisor, American Medical Student Association (AMSA)

2012 Biological Sciences Group Leader, Fall YSU Crash Days (Oct. 20 & Nov. 17)

2012-13 President, Sigma Xi YSU Chapter

2012 Job Shadowing Experience, Biotechnology Program MCCTC (4 students: Feb. 2 & 14)

2011 Biological Sciences Representative, Fall YSU Open House

2011-13 Biological Sciences Group Leader, YSU STEM Showcase (Fall and Spring)

2011-13 Moderator, QUEST, Youngstown State University

2010-11 Seminar Host, Drs. Valerie Bennett (Clarion University: Oct. 8 2010), Jake Socha (Virginia Tech: Oct. 22, 2010) and Jesse Young (NEOUCOM: Feb. 18, 2011)

2010 Judge, Lake To River Science Fair, Youngstown State University

2010 YSU STEM College Representative, Canfield Fair, Canfield, OH

2009-10 Marshal, Fall/Spring Commencement Ceremonies, Youngstown State University

2009-12 Interviewer, BS/MD Program, Youngstown State University

2009-10 Faculty Representative, Animal Facilities Planning Committee, Dept. of Biological Sciences, Youngstown State University

2009-13 Judge, Biology Day, Dept. of Biological Sciences, Youngstown State University

2009 Judge, QUEST, Youngstown State University

2008-09 Faculty Representative, Health and Safety Committee, Dept. of Biological Sciences, Youngstown State University

2008 Invited Speaker, Graduate School Forum, Wake Forest University
Topic: 'Continuing Education after a Master's Degree: How to Get a Post Doc'

2001-02 Instructor, ACSM Health and Fitness Instructor Workshop, Florida State University,
Lecture: Functional Anatomy and Biomechanics

PUBLIC DISSEMINATION OF RESEARCH

Print-digital media:

Articles profiling my research on opossum tail muscle structure/function include:

- Telling *Tails*. By Ashley Luthern, *The Vindicator*, March 2013
<http://www.vindy.com/news/2013/feb/26/telling-tails/>
- Student Success: In search of the Woolly Opossum. *YSU Update*, October 2012
<http://www.ysunews.com/woolly-opossum-research-ysu-student-success/>

Articles profiling my research on turtle bone and muscle biomechanics include:

- Turtles a key to hurdles. By Ashley Luthern, *The Vindicator*, April 2012
<http://www.vindy.com/news/2012/apr/25/tortoises-and-ysu-pair/?print>
- Research contributes to evolutionary understanding. By Andrea Armeni, *YSU Update*, Jan 2012
- Turtles on Treadmills, Graduate Student Research Leads to Scientific Advances:
<http://www.youtube.com/watch?v=ybxWHDwgIjk&feature=youtu.be>
- What Turtles Can Tell You. *YSU Biological Sciences Newsletter*, December 2011

Articles profiling my research on horse muscle biomechanics include:

- Research could make racehorses healthier. By Britta Snowberger, *YSU Update*, July 2009

Articles profiling my research on human walking biomechanics include:

- Minimising the cost to get by. Inside *JEB* article. *J Exp Biol* 209(4), i.

COLLABORATORS

Jesse W. Young, Dept. of Anatomy and Neuroscience, NEOMED

Gregory A. Smith, Dept. of Biology, University of Akron

Richard W. Blob, Dept. of Biological Sciences, Clemson University

Jason M. Organ, Dept. of Anatomy and Cell Biology, Indiana University, School of Medicine

GRADUATE & POSTDOCTORAL ADVISORS

Richard W. Blob, Post Doctoral Advisor, Dept. of Biological Sciences, **Clemson University**

John E.A. Bertram & Douglas A. Syme, Dissertation Co-Advisors, Dept. of Cell Biology and Anatomy & Dept. of Biological Sciences, respectively, **University of Calgary**, Alberta Canada

Miriam A. Ashley-Ross, Masters Thesis Advisor, Dept. of Biology, **Wake Forest University**