

***Curriculum Vitae***  
**MARIA A. SERRAT, PhD**

**Current Position**

Associate Professor  
Department of Biomedical Sciences  
Joan C. Edwards School of Medicine  
Marshall University

**Contact Information**

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**Education**

- 1999 BA Anthropology, Miami University, Oxford, OH
- 2002 MA Anthropology, Kent State University, Kent, OH (Dr. Owen Lovejoy, Mentor)  
*Thesis:* The surface anatomy, internal structure, and external morphology of the mammalian proximal femur with special reference to its developmental biology
- 2007 PhD Biological Anthropology, Kent State University (Dr. Owen Lovejoy, Mentor)  
*Thesis:* Environmentally-determined tissue temperature modulates extremity growth in mammals: A potential comprehensive explanation of Allen's rule

**Postgraduate Education**

- 2008-09 Cornell University College of Veterinary Medicine (Dr. Cornelia Farnum, Mentor)  
Cartilage imaging, *in vivo* multiphoton microscopy

**Professional Appointments**

- 2016-pres Associate Professor, Biomedical Sciences, Marshall University School of Medicine  
2017-pres Associate Professor, Clinical and Translational Sciences, Marshall University  
2015-pres Clinical Associate Professor, Orthopaedics, Marshall University School of Medicine  
2015-2016 Associate Professor, Anatomy and Pathology, Marshall University School of Medicine  
2014-2016 Assistant Professor, Clinical and Translational Sciences, Marshall University  
2013-2015 Clinical Assistant Professor, Orthopaedics, Marshall University School of Medicine  
2009-2015 Assistant Professor, Anatomy and Pathology, Marshall University School of Medicine  
2008-2009 Postdoctoral Associate, Biomedical Sciences, Cornell University, Ithaca, New York  
2007 Postdoctoral Fellow, Anatomy, Northeastern Ohio Universities College of Medicine  
2002-2007 Teaching Assistant, Anatomy, Northeastern Ohio Universities College of Medicine  
2003-2005 Teaching Fellow, Anthropology, Kent State University, Ohio  
2000-2002 Graduate Assistant, Anthropology, Kent State University, Ohio  
1998-1999 Research Assistant, Zoology, Miami University, Ohio  
1998 Summer Intern, Cleveland Museum of Natural History, Ohio

**Leadership Positions**

- 2019-2022 Board of Directors, American Association for Anatomy  
2020-pres Representative, Association of Anatomy, Cell Biology and Neurobiology Chairpersons

## Honors and Awards

2020	Top 5 Leadership Article, American Association for Anatomy <a href="https://tinyurl.com/y965anj8">https://tinyurl.com/y965anj8</a>
2019	Creativity in Teaching Award, Marshall University School of Medicine Class of 2022
2018	Young Faculty Presentation Award, American Association of Anatomists
2017	APSselect Award for Distinction in Scholarship in the Journal of Applied Physiology; APSselect is a highly selective monthly collection of outstanding scientific discoveries published across 10 American Physiological Society research journals
2017	Outstanding Creativity in Teaching Award, Marshall School of Medicine Class of 2020
2016	Outstanding Creativity in Teaching Award, Marshall School of Medicine Class of 2019
2016	Young Faculty Presentation Award, American Association of Anatomists
2015	Creativity in Teaching Award, Marshall University School of Medicine Class of 2018
2015	Dean's Award for Excellence in Basic Science Research, Marshall School of Medicine
2015	Basmajian Award for Excellence in Teaching Gross Anatomy and Outstanding Accomplishments in Biomedical Research, American Association of Anatomists
2014	Creativity in Teaching Award, Marshall University School of Medicine Class of 2017
2014	Academic Citizenship Excellence Award, Marshall University School of Medicine
2014	Young Faculty Presentation Award, American Association of Anatomists
2012	Excellence in Teaching Award, Marshall University School of Medicine Class of 2015
2011	Association of American Medical Colleges, Early Career Women Seminar Participant
2010	United States Bone and Joint Decade Young Investigator Initiative Participant
2008	Postdoctoral Fellowship Travel Award, American Association of Anatomists
2007	Juan Comas Prize, American Association of Physical Anthropologists
2006	Scholander Award, Runner-Up, American Physiological Society
2006	Excellence in Research, Graduate Student Senate, Kent State University
1999	Outstanding Undergraduate Research in Anthropology, Miami University
1999	Undergraduate Travel Presentation Award, Miami University
1999	Distinguished Student Achievement, Miami University

## Professional Memberships

2013	American Society for Bone and Mineral Research
2012	Orthopaedic Research Society
2009	American Physiological Society
2007	American Association for Anatomy
1999	Sigma Xi

## Research Specialization and Current Projects

- Growth and development, anatomy, bone elongation, drug delivery
- Cartilage and vascular imaging using *in vivo* multiphoton microscopy
- Temperature enhanced molecular delivery to growth plates
- Mechanisms of linear growth acceleration in pediatric obesity

## Research Support

### External Research Support

2021-26	NIH/NICHD R01HD105755-01	Submitted 10/05/20
	<i>Mechanisms of obesity enhanced bone lengthening in skeletal growth plates</i>	
	Role: PI	

This project combines *in vivo* multiphoton imaging with *ex vivo* protein and culture assays to determine how a high-fat diet promotes bone lengthening in juvenile mice. The hypothesis is a high-fat diet increases bioavailability of IGF-I in growth plates by decreasing local inhibitory IGF binding proteins.

Status: Pending review

- 2018-23 NIH/NIGMS  
1P20GM121299-01A1 (Sundaram) 02/15/18-01/31/23  
*Appalachian Center for Cellular transport in Obesity Related Disorders (ACCORD)*  
Subproject title: *Dysregulated growth factor transport and accelerated bone elongation in childhood obesity*  
Role: Subproject PI  
This mentored project uses *in vivo* multiphoton imaging to study the role of IGF-I transport in linear growth acceleration in juvenile obesity. The hypothesis is that increased IGF-I delivery to growth plates causes the increase in bone elongation rate. \$257,116 (FY 2020)
- 2020-21 NASA West Virginia Space Grant Consortium  
*Mechanisms Underlying Environmental Factors that Accelerate Linear Growth in Mice.*  
Role: PI Mentor  
This project provides a research stipend to Darby McCloud, a Marshall University undergraduate, to test the hypothesis that mice exposed to a high-fat diet will exhibit similar effects in weight-bearing and non-weight-bearing bones. This research is a competitive renewal of Ms. McCloud's 2019-2020 NASA research award. \$5,000
- 2019-20 NASA West Virginia Space Grant Consortium  
*Mechanisms Underlying Environmental Factors that Accelerate Linear Growth in Mice.*  
Role: PI Mentor  
This project provides a research stipend to Darby McCloud, a Marshall University undergraduate, to test the hypothesis that environmental factors such as warm temperatures and a high-fat diet will exhibit similar changes in growth plate histology consistent with increased bone elongation rate. This research is an extension of our NIH-funded projects to examine mechanisms of linear growth acceleration. \$5,000
- 2014-19 NIH/NIAMS  
R15AR067451-01 09/19/14-06/30/2019  
*Heat enhanced molecular delivery to growth plates for targeted bone lengthening.*  
Role: PI  
This multidisciplinary project uses *in vivo* multiphoton imaging and unilateral limb heating to study blood flow and molecular transport at cartilage-vascular interfaces of murine tibial growth plates. The hypothesis is that heat localizes delivery of systemic molecules into cartilage plates to promote bone lengthening. \$383,064 (Renewal Submitted 6/25/2019: Impact Score 42, Percentile 32)
- 2017-18 NASA West Virginia Space Grant Consortium  
*Modeling obesity-induced linear growth acceleration in mice.*  
Role: PI Mentor  
This project provides a research stipend to Chad Meadows, a Marshall University undergraduate, to test the hypothesis that mice on a high fat diet will exhibit

accelerated skeletal growth and diminished bone quality even before the onset of overt obesity. This pilot research characterizes linear growth rate and bone microstructure in obese and non-obese mouse models to support a larger-scale COBRE project.  
\$5,000

- 2017 University of Calgary Heritage Youth Researcher Grant 2017  
*Characterizing obesity-induced alterations in bone microstructure*  
PI: Campbell Rolian, University of Calgary  
Role: Co-investigator  
This project provided a research stipend to Rosie Zhao, a Grade 11 Alberta high school student, to test the hypothesis that mice on a high fat diet will exhibit diminished bone quality. The goal of this summer project was to perform and analyze micro-CT scans to obtain a quantitative assessment of bone microstructural changes that occur during juvenile obesity. This pilot research will support a larger-scale COBRE project.  
\$2,500 summer student stipend
- 2017 West Virginia STEM+ Family Travel Fund  
*Heat enhanced bone elongation in growth plates is IGF-I dependent.*  
Role: PI  
This project provided travel funding for a caregiver to accompany my infant daughter and me to the 2017 Annual Meeting of Orthopaedic Research Society in San Diego, CA while my husband was away at the WV State Police Academy. I would otherwise have been unable to present my research at this premier orthopaedic conference.  
\$800
- 2015 American Association of Anatomists Symposium Funding  
*Vascular and connective tissue imaging in situ: returning bone to the skeleton*  
Role: Chair and Organizer  
Travel award to defray expenses for invited speakers to participate in the session.  
\$4,000
- 2014-15 American Society for Bone and Mineral Research Grants in Aid Program  
*Heat enhanced molecular delivery to growth plates for targeted bone lengthening*  
Role: PI  
Co-Is: Rebecca Williams, Todd Milbrandt, David Puleo, Travis Salisbury, Gabriela Ion  
This multidisciplinary project is based on a scored, but unfunded NSF proposal submitted August 2012. Funding from this Grants in Aid Program enabled my lab to continue the research and strengthen an NIH R15 AREA submission. The hypothesis that heat localizes delivery of systemic molecules into cartilage plates to promote bone lengthening is tested using *in vivo* multiphoton imaging and western blotting to assess transport and activation of IGF-I in murine tibial growth plates.  
\$50,000
- 2014-15 NASA West Virginia Space Grant Consortium  
*Temperature effects on limb growth and IGF-I delivery to mouse bones.*  
Role: PI Mentor  
This project provides a research stipend to Miles Gray, a Marshall University undergraduate, to test the hypothesis that localized heat treatment will increase the delivery of growth-essential nutrients to the limbs of developing mice, using fluorescent protein labeling and thin layer chromatography validation techniques.  
\$5,000

- 2014-15 NASA West Virginia Space Grant Consortium  
*Unilateral heating to increase IGF-I uptake and bone length in mice.*  
 Role: PI Mentor  
 This project provides a research stipend to Holly Tamski, a Marshall University graduate student, to test the hypothesis that unilateral heating can be used to increase local delivery of IGF-I to the growth plate to enhance length of the extremities.  
 \$12,000
- 2013-14 CCTS University of Kentucky Pilot Grant Program (supported by NIH UL1TR000117)  
*Temperature enhanced bone elongation in growth plates.*  
 Role: PI  
 This multidisciplinary project supports data collection for a new NIH R15 AREA submission. The project uses *in vivo* multiphoton imaging and unilateral limb heating to study blood flow and molecular transport at cartilage-vascular interfaces of murine tibial growth plates. The hypothesis is that heat localizes delivery of systemic molecules into cartilage plates to promote bone lengthening.  
 \$25,000
- 2013-14 NASA West Virginia Space Grant Consortium  
*Unilateral heating: a novel model to induce differential extremity growth in mice.*  
 Role: PI Mentor  
 This project provided a research stipend to Jenna Vance, a Marshall University undergraduate, to test the hypothesis that routine application of heat on one side of growing mice will unilaterally increase limb length on the heated side.  
 \$5,000
- 2011-12 NASA West Virginia Space Grant Consortium Research Initiation Grant  
*Imaging skeletal growth plates using in vivo multiphoton microscopy.*  
 Role: PI  
 This project established a platform for live animal imaging using multiphoton microscopy to support bone elongation research at Marshall University.  
 NASA Technical Monitor: Dr. Jean Sibonga, Johnson Space Center, Bone Mineral Lab  
 \$20,000
- 2011 WV-INBRE Summer Research Program  
*Effects of omega-3 fatty acids on bone development.*  
 Role: PI Mentor  
 This project tested the hypothesis that perinatal exposure to omega-3 fats alters bone length, density, and osteoclast expression in adult mice.  
 Mentored research project of Rebekah Sine, Alderson-Broaddus College, Philippi, WV  
 Supported by NIH Grant 5P20RR016477 to the West Virginia IDeA Network for Biomedical Research Excellence. \$2,200
- 2010-11 NASA West Virginia Space Grant Consortium  
*Effects of temperature and exercise on knee growth plates.*  
 Role: PI Mentor  
 This project provided a research stipend to Morgan Efaw, a Marshall University undergraduate, to test the hypothesis that warm housing temperature and exercise increase the size of cartilage growth plates in the tibia and femur.  
 \$5,000

- 2010-11 NASA West Virginia Space Grant Consortium  
*The roles of temperature and exercise in facilitating wrist bone growth in mice.*  
 Role: PI Mentor  
 This project provided a research stipend to Laura Mader, a Marshall University undergraduate, to test the hypothesis that warm housing temperature and exercise increase the size of cartilage growth plates in the radius and ulna.  
 \$5,000
- 2009-12 NSF Major Research Instrumentation Grant MRI-R2 0959012  
*Acquisition of a Confocal/Multiphoton Microscope to Advance Cellular and Physiological Research at Marshall University*  
 PI: Michael Norton, PhD  
 Role: Major User and Oversight Committee Member.  
 This project provided support for a combined confocal/multiphoton system for high-resolution microscopy and *in vivo* imaging at Marshall University's core imaging facility  
 \$930,058
- 2009 American Association of Anatomists Postdoctoral Fellowship  
*Exercise and temperature effects on limb elongation: In vivo imaging of the growth plate.* Role: Co-PI with C.E. Farnum (postdoctoral mentor)  
 This study tested the hypothesis that exercise and temperature alter limb elongation by enhancing or reducing nutrient delivery to the growth plate.  
 \$20,000 awarded (returned \$6,700)
- 2005-07 NSF Doctoral Dissertation Improvement Grant, BCS-0524899  
*Effects of temperature on growth plate physiology in an experimentally-induced mouse model of Allen's rule.* Role: Co-PI with C.O. Lovejoy (dissertation mentor)  
 This research tested the hypothesis that ambient temperature regulates limb length in mammals through changes in vascular supply to growing long bones.  
 \$11,990
- 2004 Sigma Xi Grant-in-Aid of Research  
*Variation in mammalian proximal femoral ossification patterns.* Role: PI  
 The goal of this research was to determine whether variation in femoral ossification was related to body size, phylogeny, and/or locomotion in diverse mammals.  
 \$577

#### Internal Research Support

- 2015-16 Appalachian Clinical and Translational Science Institute Pilot Grant, Marshall University  
*Dysregulated growth factor transport and accelerated bone elongation in childhood obesity.* Role: PI  
 This project uses *in vivo* multiphoton imaging to collect pilot data for an NIH COBRE and/or equivalent R01 grant submission on molecular transport and linear growth acceleration in childhood obesity.  
 \$25,000
- 2013 MU-ADVANCE Path Forward Travel Award, Marshall University  
*Unilateral heat accelerates bone elongation and lengthens extremities of growing mice.*  
 Role: PI. Funds to present at Orthopaedic Research Society Meeting, New Orleans LA  
 \$1,000

- 2010-12 MU-ADVANCE Faculty Fellowship, Marshall University  
*Imaging skeletal growth plates using in vivo multiphoton microscopy.* Role: PI  
This project established a platform for live animal imaging using multiphoton microscopy to support bone elongation research; collaboration with Dr. R. Williams, a senior faculty mentor from Cornell University with biophysics and imaging expertise.  
\$40,000
- 2011 Research Equipment Funding, Marshall University  
*Imaging skeletal growth plates using in vivo multiphoton microscopy.* Role: PI  
Obtained cost-share funds from five Marshall University departments (Biomedical Sciences, MU-ADVANCE, Anatomy, Pharmacology/Physiology, and College of Science) to purchase a fluorescence stereomicroscope for Marshall's imaging facility.  
\$17,359 in kind purchase of fluorescence stereomicroscope for bone imaging research.
- 2011 MU-ADVANCE Mini Grant, Marshall University  
*Collaborative Research and Teaching at Cornell University.* Funds to travel to Cornell University for a collaborative research and gross anatomy teaching visit, Ithaca, NY.  
\$1,000
- 2010 MU-ADVANCE Mini Grant, Marshall University  
*Multiphoton imaging offers new insights into growth plate regulation.* Funds to present research at Gordon Conference on Cartilage Biology and Pathology, Ventura, CA  
\$1,000
- 2010 Cell Differentiation and Development Center, Marshall University  
*Determining how temperature and mechanical loading alter bone growth and gene expression in a bone culture model.* Role: PI  
\$9,000 in kind purchase of incubators to support tissue culture research.
- 2009 MU-ADVANCE New Faculty Fellowship, Marshall University  
Faculty development initiative to support laboratory setup and student salaries.  
\$10,000
- 2009 MU-ADVANCE Mini Grant, Marshall University  
*Wheel running activity reverses the cold limb phenotype in mice.* Funds to present research at International Congress of Vertebrate Morphology, Punta del Este, Uruguay  
\$1,000
- 2007 Kent State University Graduate Student Senate International Travel Grant  
*Effects of temperature on skeletal growth in mice.*  
For research travel to International Congress of Vertebrate Morphology, Paris, France  
\$1,000
- 2004-05 Kent State University Graduate Student Senate Research Grant  
*Skeletal proportions in mammals: the potential role of growth hormone.* Role: PI  
This research tested the hypothesis that expression of growth hormone, and/or its mediator IGF-I, correlated with differential growth plate activity in the mouse hindlimb.  
\$1,800
- 1998 Miami University Undergraduate Research Grant  
*Plant foods in high latitude environments: Implications for Neanderthal subsistence.*

The goal of this research was to document plant residues on stone tools produced through experimental processing for comparative fossil analysis using SEM. \$500.

### Peer-reviewed Publications

16. Racine HL, **Serrat MA**. The actions of IGF-1 in the growth plate and its role in postnatal bone elongation. *Current Osteoporosis Reports*. Jun;18(3):210-227. doi: 10.1007/s11914-020-00570-x. PMID: 32415542 PMCID: PMC7299241. 2020.
15. Racine HL, Meadows CM, Ion G, **Serrat MA**. Heat induced limb length asymmetry has functional impact on weight bearing in mouse hindlimbs. *Frontiers in Endocrinology*. Jun 4;9:289. doi: 10.3389/fendo.2018.00289. eCollection 2018. PMID: 29915560. PMCID: PMC5994414. 2018
14. **Serrat MA**, Ion G. Imaging IGF-I uptake in growth plate cartilage using in vivo multiphoton microscopy. *Journal of Applied Physiology*. 123(5):1101-1109. PMID: 28798204. 2017  
**Featured as Outstanding Scientific Discovery in APSselect October Collection**  
<https://www.physiology.org/doi/full/10.1152/jappphysiol.00645.2017%40apsselect.2017.4.issue-10>

*Please note that my career was disrupted by medical issues and family obligations in 2015-2017.*

13. **Serrat MA**, Schlierf TJ, Efaw ML, Shuler FD, Godby J, Stanko LM, Tamski, HL. Unilateral heat accelerates bone elongation and lengthens extremities of growing mice. *Journal of Orthopaedic Research*. 33(5): 692-8. PMID: 25639189. 2015
12. **Serrat MA**, Efaw ML, Williams RM. Hindlimb heating increases vascular access of large molecules to murine tibial growth plates measured by in vivo multiphoton imaging. *Journal of Applied Physiology*. 116(4):425-38 PMID: 24371019. PMCID: PMC3921350. 2014
11. **Serrat MA**, Dom AM, Buchanan JT, Williams AR, Efaw ML, Richardson, LL. Independent learning modules enhance student performance and understanding of anatomy. *Anatomical Sciences Education*. 7:406-16. PMID: 24616425. 2014
10. **Serrat MA**. Environmental temperature impact on bone and cartilage growth. *Comprehensive Physiology*. 4(2):621-55. PMID: 24715562. 2014  
**Invited Authoritative Review** (includes new data)
9. **Serrat MA**. Allen's rule revisited: Temperature influences bone elongation during a critical period of postnatal development. *Anatomical Record*. 296(10):1534-45. PMID: 23956063. 2013
8. **Serrat MA**, Williams RM, Farnum CE. Exercise mitigates the stunting effect of cold temperature on limb elongation in mice by increasing solute delivery to the growth plate. *Journal of Applied Physiology*. 109: 1869-1879. PMID: 20930127. PMCID: 3006398. 2010
7. **Serrat MA**. Measuring bone blood supply in mice using fluorescent microspheres. *Nature Protocols*. 4(12): 1749-1758. PMID: 19893510. 2009
6. **Serrat MA**, Williams RM, Farnum CE. Temperature alters solute transport in growth plate cartilage measured by in vivo multiphoton microscopy. *Journal of Applied Physiology*. 106(6): 2016-2025. PMID: 19372302. PMCID: PMC2692772. 2009

5. **Serrat MA**, King D., Lovejoy CO. Temperature regulates limb length in homeotherms by directly modulating cartilage growth. *Proceedings of the National Academy of Sciences USA*. 105(49): 19347-19352. PMID: 19047632. PMCID: PMC2614764. 2008  
**Rated 'Must Read' in Faculty of 1000 Biology**
4. **Serrat MA**, Lovejoy CO, King D. Age- and site-specific decline in insulin-like growth factor-I receptor expression is correlated with differential growth plate activity in the mouse hindlimb. *Anatomical Record*. 290(4): 375-381. PMID: 17514762. 2007
3. **Serrat MA**, Reno PL, McCollum MA, Meindl RS, Lovejoy CO. Variation in mammalian proximal femoral development: comparative analysis of two distinct ossification patterns. *Journal of Anatomy*. 210(3): 249-258. PMID: 17331175. PMCID: PMC2100278. 2007
2. **Serrat MA**, Vinyard CJ, King D. Alterations in the mechanical properties and composition of skin in human growth hormone transgenic mice. *Connective Tissue Research*. 48(1): 19-26. PMID: 17364663. 2007
1. Reno PL, DeGusta D, **Serrat MA**, Meindl RS, White TD, Eckhardt, RB, Kuperavage AJ, Galik K, Lovejoy CO. Plio-Pleistocene hominid limb proportions: Evolutionary reversals or estimation errors? *Current Anthropology*. 46: 575-588. 2005

#### Published Abstracts and Formal Research Presentations

61. **Serrat MA**, Machnicki AL, Song CA, Evans S, McCloud D. Mechanisms of linear growth acceleration in childhood obesity. **Chair, Invited Speaker and Organizer** of American Association for Anatomy Symposium (re-programmed from 2020), "The covert health consequences of obesity and hormone signaling: Paradoxical effects on bone and body composition," held at Annual Experimental Biology Meeting, Virtual, 27-30 April, 2021.
60. **Serrat MA**, Machnicki AL, Song CA, McCloud D. Local modulation of insulin-like growth-factor binding protein-4 regulates bone elongation in juvenile mice. Abstract Submitted for Annual Meeting of Orthopaedic Research Society, Virtual, 13-16 February, 2021.
59. **Serrat MA**, Machnicki AL, Song CA, Evans S, McCloud D. Mechanisms of linear growth acceleration in childhood obesity. **Invited Speaker and Organizer** of American Association for Anatomy Symposium, "The covert health consequences of obesity and hormone signaling: Paradoxical effects on bone and body composition," held at Annual Experimental Biology Meeting, San Diego, CA, 4-7 April, 2020. Meeting cancelled due to COVID-19.
58. Machnicki AL, Song CA, Evans S, Meadows CA, McCloud D, **Serrat MA**. High-fat diet increases IGF-I activity in skeletal growth plates before the onset of obesity. **Selected for Podium Presentation** by Allison Machnicki at Annual Experimental Biology Meeting, San Diego, CA, 4-7 April, 2020. **Finalist: Allison Machnicki American Association for Anatomy Postdoc Platform Presentation Award**. Meeting cancelled due to COVID-19, abstract published.
57. Song CA, Machnicki AL, Evans S, McCloud D, **Serrat MA**. High-fat diet alters serum cytokines before the onset of obesity. **Selected for Podium Presentation** by Cassandra Song at Annual Experimental Biology Meeting, San Diego, CA, 4-7 April, 2020. **Finalist: Cassandra Song**

**American Association for Anatomy Langman Graduate Student Platform Presentation Award.** Meeting cancelled due to COVID-19, abstract published.

56. Song CA, Machnicki AL, Evans S, McCloud D, **Serrat MA**. High-fat diet alters serum cytokines before the onset of obesity. Podium Presentation by Cassaundra Song at 2020 Health Science Research Day, Marshall University School of Medicine, Huntington, WV, 6 March 2020.
55. McCloud D, **Serrat MA**. Effects of a high-fat diet on the growing skeleton. Poster presentation by Darby McCloud at 2020 Health Science Research Day, Marshall University School of Medicine, Huntington, WV, 6 March 2020.
54. **Serrat MA**, Machnicki AL, Song CA, Evans S, Meadows CA, McCloud D. High-fat diet accelerates bone elongation and increases IGF-I activity in growth plates before the onset of obesity. Poster presentation at Annual Meeting of Orthopaedic Research Society, Phoenix, AZ, 8-11 February, 2020.
53. **Serrat MA**, Machnicki AL, Meadows CA, McCloud D, Thomas D, Hurley JD, Ion G. Heat increases IGF-I uptake in growth plate and perichondrium measured by *in vivo* multiphoton imaging. Poster Presentation at Experimental Biology Meeting. Orlando, FL, 6-9 April, 2019.
52. **Serrat MA**, Ion G, Thomas D. Heat increases IGF-I uptake in growth plate and perichondrium of mouse hindlimbs: Implications for human evolution. Poster presentation at American Association of Physical Anthropologists Annual Meeting. Cleveland, OH, 28 27-30 March, 2019. **Invited Symposium Participant.**
51. **Serrat MA**, Ion G, Thomas D. Heat increases IGF-I uptake in growth plate and perichondrium measured by *in vivo* multiphoton imaging. Poster presentation at American Society for Bone and Mineral Research Annual Meeting. Montréal, Québec, Canada, 28 Sept - 1 Oct, 2018.
50. **Serrat MA**, Racine HL, Meadows CA, Ion G. Heat induced limb length asymmetry has functional impact on weight bearing in mouse hindlimbs. Poster presentation at Experimental Biology Meeting, San Diego, CA, 21-25 April, 2018. **Winner: American Association of Anatomists Young Faculty Award.**
49. **Serrat MA** and Ion G. Imaging IGF-I uptake in growth plate cartilage using *in vivo* multiphoton microscopy. Invited podium presentation at Growth Factors Research Interest Group at Annual Meeting of Orthopaedic Research Society, New Orleans, LA, 10-13 March, 2018.
48. Meadows CA, **Serrat MA**. The TALLYHO mouse as a model of obesity-induced linear growth acceleration. Poster presentation by Chad Meadows at the 15<sup>th</sup> Annual Undergraduate Research Day at the West Virginia Capitol, Charleston, WV, 16 February 2018.
47. Meadows CA, Kim JH, Arthur S, Ion G, Racine HL, Kerby JC, **Serrat MA**. The TALLYHO mouse as a model of obesity-induced linear growth acceleration. Poster presentation by Chad Meadows at Experimental Biology Meeting, Chicago, IL, 22-26 April, 2017. **Winner: Chad Meadows American Association of Anatomists First Place Undergraduate Poster Competition.**
46. Racine HL, Meadows CA, Ion G, **Serrat MA**. Inhibiting IGF1 activity in the proximal tibial growth plate attenuates the bone-lengthening effects of temperature in hindlimbs of growing mice. **Selected for Podium Presentation** by Holly Racine at 2017 Experimental Biology Meeting. **Finalist: Holly Racine AAA Langman Graduate Student Platform Presentation Award.**

45. Racine HL, Meadows CA, Ion G, **Serrat MA**. Inhibiting IGF1 activity in the proximal tibial growth plate attenuates the bone-lengthening effects of temperature in hindlimbs of growing mice. **Selected for Podium Presentation** by Holly Racine at 2017 Health Science Research Day, Marshall University School of Medicine, Huntington, WV, 24 March 2017.
44. **Serrat MA**, Racine, HL, Meadows CA, Ion G. Heat enhanced bone elongation in growth plates is IGF-I dependent. Poster presentation at Annual Meeting of Orthopaedic Research Society, San Diego, CA, 19-22 March, 2017.
43. **Serrat MA**, Racine HL, Ion G, Kerby JC, and Meadows CA. Low dose IGF-I augments the bone-lengthening effect of targeted heat in the mouse hindlimb. Poster presentation at Experimental Biology Meeting, San Diego, CA, 2-6 April, 2016. **Winner: American Association of Anatomists Young Faculty Award.**
42. Racine HL, Ion G, Kerby JC, Meadows CA, and **Serrat MA**. Thermal imaging reveals temperature retention in hindlimbs of mice up to 4 hours after targeted intermittent limb heating. Poster presentation by Holly Racine at Experimental Biology Meeting, San Diego, CA, 2-6 April, 2016.
41. Racine HL, Ion G, Kerby JC, Meadows CA, and **Serrat MA**. Thermal imaging reveals temperature retention in hindlimbs of mice up to 4 hours after targeted intermittent limb heating. Poster presentation by Holly Racine at Marshall Health Science Research Day, Marshall University School of Medicine, Huntington WV, 11 March, 2016.
40. **Serrat MA**, Ion G, and Hughes K. Low dose IGF-I augments the bone-lengthening effect of targeted heat in the mouse hindlimb. Poster presentation at American Society for Bone and Mineral Research Annual Meeting. Seattle, WA, 9-12 October, 2015.
39. **Serrat MA** and Ion G. Imaging IGF-I uptake in growth plate cartilage using *in vivo* multiphoton microscopy. **Chair and Organizer** of American Association of Anatomists Symposium, "Vascular and connective imaging *in situ*: returning bone to the skeleton," held at Annual Experimental Biology Meeting, Boston, MA, 28 March - 1 April, 2015.
38. Kerby JC, Gray MX, Tamski HL, Heaberlin AA, Crow A, Ion G, and **Serrat MA**. Heat-enhanced extremity lengthening is growth rate dependent. **Selected for Podium Presentation** by Jenna Kerby at Experimental Biology Meeting, Boston, MA, 28 March - 1 April, 2015. **Winner: Jenna Kerby American Physiological Society Excellence in Professional Student Travel Award.**
37. Ion G and **Serrat MA**. Validating the biological activity of fluorescently-labeled IGF1 for *in vivo* imaging. Poster presentation at Experimental Biology, Boston, MA, 28 March - 1 April, 2015.
36. Tamski HL and **Serrat MA**. Infrared thermal imaging to collect quantitative surface temperatures from mice in unilateral limb heating study. Poster presentation at Experimental Biology Meeting, Boston, MA, 28 March - 1 April, 2015.
35. Gray MX and **Serrat MA**. Protein labeling methods to study temperature effects on IGF-I delivery to growing mouse bones. Poster presentation by Miles Gray at the 12<sup>th</sup> Annual Undergraduate Research Day at the West Virginia Capitol, Charleston, WV, 4 March 2015.
34. Heaberlin A., Crow N., Kerby J., Gray M., Tamski H., Ion G., **Serrat M.A**. Heat Effects on Extremity Lengthening are Growth Rate Dependent. Poster presentation at Rural Health

Research Day, Marshall University Joan C. Edwards School of Medicine, Huntington WV, 31 October 2014.

33. Vance JC and **Serrat MA**. Utilization of unilateral heat to increase extremity bone length in mice. Poster presentation by Jenna Vance at the first Research and Practice Day sponsored by the College of Health Professions, Marshall University, Huntington, WV, 25 April 2014. **Winner: Jenna Vance Outstanding Research Presentation.**
32. **Serrat MA** and Williams RM. Hindlimb heating increases vascular access of large molecules to murine tibial growth plates measured by in vivo multiphoton imaging. **Selected for Podium Presentation** at 2014 Experimental Biology meeting, San Diego, CA, 26-30 April, 2014. **Winner: American Association of Anatomists Young Faculty Award.**
31. Tamski HL, Stanko LM, Godby J, Efaw ML, Schlierf TJ, Salisbury TB, Ion G, and **Serrat MA**. Validation of a unilateral heating model to increase hindlimb length in growing mice. **Selected for Podium Presentation** by Holly Tamski at 2014 Experimental Biology meeting. **Finalist: Holly Tamski AAA Langman Graduate Student Platform Presentation Award.**
30. Vance JC and **Serrat MA**. Validation of a unilateral heating model to increase extremity length in mice. Poster presentation by Jenna Vance at the 11<sup>th</sup> Annual Undergraduate Research Day at the West Virginia Capitol, Charleston, WV, 30 January 2014.
29. Tamski HL, Stanko LM, Godby J, **Serrat MA**. Unilateral heat as a potential therapy for limb length inequalities. Poster presentation by Holly Tamski at the 2<sup>nd</sup> Annual Appalachian Regional Cell Conference, Charleston, WV, 26 October 2013.
28. **Serrat MA**, Schlierf TJ, Efaw ML, Shuler FD, Godby J, Stanko LM, Tamski, HL. Unilateral Heat Accelerates Bone Elongation and Lengthens Extremities of Growing Mice. **Selected for Podium Presentation** at Annual Meeting of Orthopaedic Research Society, New Orleans, LA, 15-18 March, 2014.
27. **Serrat MA**. Temperature effects on the growth plate and its vasculature. **Invited Speaker** at American Physiological Society Special Symposium, "Bone Physiology under Environmental Stress," held at Experimental Biology Meeting, Boston, MA, 20-24 April, 2013.
26. Shuler FD, **Serrat MA**, Dickherber J, Fortney T, Caughran A. Anatomical evaluation of the retrograde fibular intra-medullary start point. **Poster Finalist** at the 25<sup>th</sup> Annual Marshall University Joan C. Edwards School of Medicine Research Day. Huntington, WV 19 March 2013.
25. **Serrat MA** and Williams RM. Large molecule delivery to the growth plate increases with limb temperature measured by in vivo multiphoton imaging. *FASEB Journal*. 26: 715.4. 2012
24. Sine RK, Efaw ML, Williams AR, **Serrat MA**. Effects of Omega-3 Fatty Acids on Bone Development. Poster presentation by Rebekah Sine at the 9<sup>th</sup> Annual Undergraduate Research Day at the West Virginia Capitol, Charleston, WV, 26 January 2012.
23. **Serrat MA**. Multiphoton imaging offers new insights into growth plate regulation. Poster presentation at Gordon Research Conference on Cartilage Biology and Pathology, Ventura, CA, 6-11 March 2011.

22. Mader LE, Efaw ML, Williams AR, **Serrat MA**. Temperature and exercise effects on bone mineral density and growth plate morphology in mice. Poster presentation at the 8<sup>th</sup> Annual Undergraduate Research Day at the West Virginia Capitol, Charleston, WV, 25 January 2011.
21. **Serrat MA**, Williams RM, Farnum CE. Wheel running activity reverses the cold limb phenotype in mice. Oral presentation at the 9<sup>th</sup> International Congress of Vertebrate Morphology, Punta del Este, Uruguay, 26-31 July 2010.
20. **Serrat MA**, Williams RM, Farnum CE. Exercise mitigates the stunting effect of cold temperature on limb elongation in mice by increasing solute delivery to the growth plate. *FASEB Journal*. 24: 637.7. 2010.
19. **Serrat MA**, Williams RM, Farnum CE. Temperature effects on solute transport: *In vivo* imaging of the growth plate. *FASEB J*. 23: 649.6. 2009. **Finalist: AAA Postdoctoral Presentation Award.**
18. **Serrat MA**, Farnum CE, Williams RM, Lovejoy CO. Environment influences bone elongation during a critical period of postnatal growth. *American Journal of Physical Anthropology*. Suppl. 44: 364. 2009.
17. **Serrat MA**, Williams RM, Farnum CE. Temperature effects on solute transport: *In vivo* imaging of the growth plate. *Weill Cornell Postdoctoral Research Day*, podium presentation, Dec. 2008
16. **Serrat MA**, King, D. and Lovejoy CO. Effects of temperature on skeletal growth in mice. *Journal of Morphology*. 268(12): 1133. 2007. Oral presentation at the 8<sup>th</sup> International Congress of Vertebrate Morphology, Paris, France, 16-21 July.
15. **Serrat MA**, King, D. and Lovejoy CO. Effects of rearing temperature on long bone growth in mice: an experimental model for examining Allen's rule. *American Journal of Physical Anthropology*. Suppl. 44: 215. 2007 **Winner: Juan Comas Award**
14. **Serrat MA**, King, D, Lovejoy CO. Effects of temperature on skeletal growth in mice. *The Physiologist*. 49(6): C1-35. 2006 **Winner: Scholander Award**
13. **Serrat MA**, Lovejoy CO, King D. Age- and site-specific decline in IGF-I receptor expression and growth plate activity in the mouse hindlimb. *Integrative and Comparative Biol*. 45(6): 1071. 2005
12. **Serrat MA**, Reno PL, McCollum MA, Meindl RS, Lovejoy CO. Multivariate comparison of divergent ossification patterns of the mammalian proximal femur. *American Journal of Physical Anthropology*. Suppl. 38: 178-179. 2004
11. **Serrat MA**, Reno PL, McCollum MA, Meindl RS, Lovejoy CO. Variation in mammalian proximal femoral ossification patterns. *Journal of Morphology* 60(3): 328. 2004
10. **Serrat MA** and King D. Growth hormone expression in marrow cavities increases osteoblast proliferation in transgenic mice. *Midwest Connective Tissue Conference*. [unpub. abstract]. 2004
9. **Serrat MA**, Reno PL, Rosenman BA, Lovejoy CO. Developmental field fluctuation II: A potential basis for skeletal morphological variation. *American Journal of Physical Anthropology*. Suppl. 36: 189. 2003

8. Reno PL, **Serrat MA**, Meindl RS, Cohn MJ, Lovejoy CO. Hominoids, hindlimbs, and Hox: implications for hominid evolution. *American Journal of Physical Anthropology*. S36: 177. 2003
7. Selby M, Reno P, Meindl R, **Serrat M**, Lovejoy CO. Modules and locomotion in the evolution of the anthropoid hand. *American Journal of Physical Anthropology*. Suppl. 36: 189. 2003
6. **Kriz MA**, Reno PL, McCollum MA, Horton WE, and Lovejoy CO. Comparative analysis of mammalian proximal femoral development. *American Zoologist*. 41(6): 1498-1499. 2002
5. Reno PL, **Kriz MA**, McCollum MA, Lovejoy CO. Scanning electron microscopic analysis of regional histomorphological variation within the physis of the primate proximal femur. *American Journal of Physical Anthropology*. Suppl. 34: 130. 2002
4. **Kriz MA**, Reno PL, Lovejoy, CO. Morphometric variation in proximal femoral development in primates and mammals *American Journal of Physical Anthropology*. Suppl. 34: 97-98. 2002
3. Lovejoy CO, Reno PL, **Kriz MA**, and Rosenman BA. Developmental field fluctuation: a potential basis for skeletal morphological variation. *American Journal of Physical Anthropology*. Suppl. 34: 104. 2002
2. **Kriz M.** and Hamrick, MW. The postcranial evidence for primate superordinal relationships. *American Journal of Physical Anthropology*. Suppl. 32: 93. 2001
1. **Kriz M.** Articular scaling in the hominoid talocrural joint: The compromise between body size and locomotion. *American Journal of Physical Anthropology*. Suppl. 28: 175. 1999

## Patent Application

Methods and kits for promoting targeted bone growth. U.S. Patent Application (provisional) No.62/089,515. Filed December 9, 2014

## Education Activities

### Development of New Teaching Modalities

- |           |   |
|-----------|---|
| 2020-pres | Gross Anatomy, Department of Biomedical Sciences<br>Joan C. Edwards School of Medicine, Marshall University<br>Developed Pandemic Lecture Recordings using TechSmith Relay and assisted other faculty members in similar approaches<br>Recordings incorporate online videos, self-assessment, and demonstration videos along with standard PowerPoint slides. Abdomen (8 hours) |
| 2019-pres | Gross Anatomy, Department of Biomedical Sciences<br>Joan C. Edwards School of Medicine, Marshall University<br>Developed and Implemented Cadaver Teaching/ Review Videos for Gross Anatomy Upper Limb (1 hour); Thorax (1 hour); Abdomen (1 hour); Pelvis (1 hour)  |
| 2015      | Independent Learning Exercise in Renal Development (1 hour)<br>Integrated Kidney Laboratory for Excretory Block (2 lab hours)   |

2012-2013 Developed and Implemented Independent Learning Modules for Anatomy Curriculum  
Inguinal Canal (1 hour) and Brachial Plexus (1 hour)

Team-Taught Courses: Medical

2009-pres Gross Anatomy, Department of Biomedical Sciences  
Joan C. Edwards School of Medicine, Marshall University  
Laboratory Instructor for multiple regions (average 16-19 labs, 64-76 contact hours)  
Laboratory Orientation (4 lecture/lab hours)  
Lecturer for Abdomen and Circulation (9 lecture hours)

2014 Structural Basis for Medical Practice (1<sup>st</sup> Year Summer Dissection), Anatomy  
Joan C. Edwards School of Medicine, Marshall University (average 10 contact hours)  
Organize, supervise and evaluate summer student gross anatomy dissections

2013-2014 Surgical Anatomy (4<sup>th</sup> Year Elective), Department of Anatomy and Pathology  
Joan C. Edwards School of Medicine, Marshall University (average 6 contact hours)  
Supervise and evaluate surgically-relevant gross anatomy dissections

2007 Human Development and Structure, Department of Anatomy  
Northeastern Ohio Universities Colleges of Medicine and Pharmacy  
(presently Northeast Ohio Medical University)  
Lecturer and Laboratory Instructor

2007 Human Structure for Pharmacy, Department of Anatomy  
Northeastern Ohio Universities Colleges of Medicine and Pharmacy  
(presently Northeast Ohio Medical University)  
Lecturer and Laboratory Instructor

2002-2007 Human Gross Anatomy Laboratory, Department of Anatomy  
Northeastern Ohio Universities Colleges of Medicine and Pharmacy  
(presently Northeast Ohio Medical University)  
Laboratory Instructor

Additional Medical Student Lectures

2003-2007 "Alimentary Tract," Prepared and delivered lecture for Human Development and  
Structure, Northeastern Ohio Universities Colleges of Medicine and Pharmacy.

2004-2005 "Development of the Body Cavities, Respiratory System and GI tract," Prepared and  
delivered lecture for Human Development and Structure, Northeastern Ohio  
Universities Colleges of Medicine and Pharmacy.

Single-Instructor Courses: Undergraduate

2003-2005 Human Evolution  
Department of Anthropology, Kent State University

- 2004 Human Gross Anatomy  
Primer Course for Physician's / Surgical Physician's Assistants (18hrs)  
Cuyahoga Community College, held at N.E. Ohio Universities College of Medicine
- 2003 Quantitative Anthropology / Biostatistics  
Department of Anthropology, Kent State University
- 2001-2002 Topics in Human Evolution Laboratory  
Department of Anthropology, Kent State University

### **Graduate/Professional Education Activities**

#### Graduate Teaching

- 2020 Research in Biomedical Sciences (BMS 813)  
Marshall University School of Medicine, Instructor/ research mentor (16 contact hours)
- 2020 Special Topics Research Seminar (ACB 676)  
Marshall University School of Medicine, Course Director (Dr. Louise Risher, instructor)
- 2018 Obesity and Related Diseases Research Colloquium  
Marshall University School of Medicine, Lecturer (2 November 2018)
- 2018 Special Topics Research Seminar (ACB 676)  
Marshall University School of Medicine, Instructor (single-instructor, 16 contact hours)
- 2012-pres Responsible Conduct of Research, Scientific Integrity Course (BMS 644)  
Marshall University School of Medicine, Lecturer
- 2009-pres Neuroscience and Developmental Biology Literature Review (BMS 631)  
Marshall University School of Medicine, Lecturer and Participant
- 2014 Research in Cellular Processes (ACB 650)  
Marshall University School of Medicine, Instructor (single-instructor, 16 contact hours)
- 2014 Physiology (PHS 629)  
Marshall University School of Medicine, Circulation Lecture (14 Feb)
- 2013 Biomechanics Journal Club (BSC 580)  
Marshall University, Invited Research Lecture (20 Sept)
- 2013 Graduate Student Seminar Series (BMS 680)  
Marshall University School of Medicine, Seminar Speaker (4 Feb)
- 2001-2007 Morphological Analysis Seminar (ANTH 68613)  
Kent State University, Lecturer, Participant, and Teaching Assistant
- 2000-2006 Genetics in Development Seminar (ANTH 68095)  
Kent State University, Lecturer, Participant, and Teaching Assistant

## Graduate Program Membership

2009-pres Neuroscience and Developmental Biology Research Cluster  
Marshall University Biomedical Sciences Program, Doctoral Faculty Status

## Past and Current Trainees

<b>Trainee Name</b>	<b>Type</b>	<b>Institution</b>	<b>Training Period</b>	<b>Project</b>
Brandon Henderson	Medical Student (Class of 2023)	Marshall University School of Medicine	May 2020-Jul 2020	High-fat diet effects on bone microstructure. <b>Funded by MS1 Summer Stipend Program.</b>
Michael DeRosa	Medical Student (Class of 2023)	Marshall University School of Medicine	May 2020-Jul 2020	High-fat diet effects on bone microstructure. <b>Funded by MS1 Summer Stipend Program.</b>
Daniel Crow	Medical Student (Class of 2021)	Marshall University School of Medicine	Feb 2020-Jun 2020	High-fat diet effects on body composition and bone microstructure. Research Elective for BMS 813 course.
Sarah Evans	Undergraduate	Marshall University	Jan 2019-Jun 2020	Growth plate immunostaining in a mouse model of obesity.
Cassandra Song	Graduate Student (PhD)	Marshall University	Dec 2018-present	Growth factor transport and accelerated bone elongation in childhood obesity. <b>Platform Award Finalist for Experimental Biology 2020 Abstract.</b>
Allison Machnicki	Postdoctoral Associate	Marshall University School of Medicine	Aug 2018-present	Growth factor transport and accelerated bone elongation in childhood obesity. <b>Platform Award Finalist for Experimental Biology 2020 Abstract.</b>
John Hurley	Medical Student (Class of 2021)	Marshall University School of Medicine	Aug 2018-Dec 2018	Growth factor transport and accelerated bone elongation in childhood obesity; heat-enhanced bone elongation in growth plates.
Darby McCloud	Undergraduate	Marshall University	May 2018-present	Mechanisms Underlying Environmental Factors that Accelerate Linear Growth in Mice. <b>Funded by NASA WV Space Grant Consortium.</b>
Arrin Brooks	Graduate Student (MD/PhD)	Marshall University School of Medicine	Jan 2018-present	Grant writing, data analysis and manuscript development as part of ACB 676 Special Topics Research Seminar. PhD committee member.

<b>Trainee Name</b>	<b>Type</b>	<b>Institution</b>	<b>Training Period</b>	<b>Project</b>
Dominic Thomas	Medical Student (Class of 2021)	Marshall University School of Medicine	Jan 2018-Aug 2018	Heat enhanced molecular delivery to growth plates for targeted bone lengthening.
Evan Childers	Medical Student (Class of 2020)	Marshall University School of Medicine	Jun 2017-Aug 2017	Establishing radiographic landmarks to quantify bone length in a limb heating study. <b>Funded by MS1 Summer Stipend Program.</b>
James Gainer	Medical Student (Class of 2020)	Marshall University School of Medicine	Jun 2017-Aug 2017	Establishing radiographic landmarks to quantify bone length in a limb heating study. <b>Funded by MS1 Summer Stipend Program.</b>
Sarah Binion	Graduate Student (PhD)	Marshall University	Aug 2016-Oct 2016	Research rotation in biomedical sciences.
Sarah Stevens	Graduate Student (PhD)	Marshall University	Dec 2015-Mar 2016	Research rotation in biomedical sciences.
Rebecca Martin	Graduate Student (PhD)	Marshall University	May 2015-July 2015	Research rotation in biomedical sciences.
Casey Hazlewood	Medical Student (Class of 2018)	Marshall University School of Medicine	Jun 2015-Aug 2015	The TALLYHO mouse as a potential model of obesity-induced skeletal growth acceleration. <b>Funded by MS1 Summer Stipend Program.</b>
Chad Meadows	Undergraduate, Medical Student (Class of 2022)	Marshall University	May 2015-Aug 2018, June 2019-Aug 2019	Growth factor transport and accelerated bone elongation in childhood obesity; heat-enhanced bone elongation in growth plates. <b>Funded by NASA WV Space Grant Consortium. Winner: First Place Undergraduate Poster at 2017 Experimental Biology Meeting.</b>
Kaitlynn Hughes	Undergraduate	Marshall University	Nov 2014-July 2015	Temperature effects on limb growth and IGF-I delivery to mouse bones.
Adam Fischer	Graduate Student (PhD)	Marshall University	Aug 2014-May 2015	Grant writing and CV development as part of ACB 650 Research in Cellular Processes Class.
Nathaniel Crow	Medical Student (Class of 2017)	Marshall University School of Medicine	Jun 2014-Aug 2014	Heat effects on extremity lengthening are growth rate dependent. <b>Funded by MS1 Summer Stipend Program.</b>
Aaron Heaberlin	Medical Student (Class of 2017)	Marshall University School of Medicine	Jun 2014-Aug 2014	Heat effects on extremity lengthening are growth rate dependent. <b>Funded by MS1 Summer Stipend Program.</b>
Laura Kutz	Graduate Student (PhD)	Marshall University	Apr 2014-May 2014	Research rotation in biomedical sciences.

<b>Trainee Name</b>	<b>Type</b>	<b>Institution</b>	<b>Training Period</b>	<b>Project</b>
Angela Marchand	Graduate Student (MS)	Marshall University	Feb 2014-May 2015	Paleohistology of a Fetal Plesiosaur and an Ontogenetic Sequence of the Plesiosaur Long Bone (MS thesis committee member); histology sectioning for thesis.
Miles Gray	Undergraduate	Marshall University	Nov 2013-July 2015	Temperature effects on limb growth and IGF-I delivery to mouse bones. <b>Funded by NASA WV Space Grant Consortium.</b> <i>Current Anesthesiology Resident, University of Pittsburgh.</i>
Holly Tamski Racine	Graduate Student (PhD)	Marshall University	Jul 2013-Dec 2018	Unilateral heating to increase IGF-I uptake and bone length in mice. PhD advisee. <b>Platform Presentation Finalist at 2014 &amp; 2017 Experimental Biology Meetings. Funded by NASA WV Space Grant Consortium.</b> <i>Currently Assistant Professor, Biology, West Liberty University.</i>
Justin Godby	Medical Student (Class of 2017)	Marshall University School of Medicine	Jun 2013-Aug 2013	Unilateral heating: a novel model to induce differential extremity growth in mice. <b>Funded by MS1 Summer Stipend Program.</b>
Laura Stanko	Medical Student (Class of 2016)	Marshall University School of Medicine	Jun 2013-Aug 2013	Unilateral heating: a novel model to induce differential extremity growth in mice. <b>Funded by MS1 Summer Stipend Program.</b>
Jenna Vance Kerby	Undergraduate, Medical Student (Class of 2018)	Marshall University	Jan 2013-Jul 2015, Aug 2017	Utilization of unilateral heat to increase extremity bone length in mice. <b>Funded by NASA WV Space Grant Consortium 2013-14. Winner: Outstanding Research Presentation at College of Health Professions 2014 Research and Practice Day.</b> <i>Currently Emergency Medicine Resident, Wake Forest University.</i>
Thomas Schlierf	Medical Student (Class of 2014)	Marshall University School of Medicine	Jan 2013-Dec 2013	Unilateral heat accelerates bone elongation and lengthens extremities of growing mice. <b>2014 Abstract at Orthopaedic Research Society.</b>
Jason Dickherber	Medical Student (Class of 2016)	Marshall University School of Medicine	Oct 2012-June 2013	Anatomical evaluation of the retrograde fibular intra-medullary start point (co-advised with F. Shuler). <b>Poster Finalist at 2013 MUSOM Research Day.</b>
Aaron Dom	Medical Student (Class of 2015)	Marshall University School of Medicine	June 2012-Jan 2013	Independent learning modules enhance student performance and understanding of anatomy. <b>Published in Anatomical Sciences Education.</b>

<b>Trainee Name</b>	<b>Type</b>	<b>Institution</b>	<b>Training Period</b>	<b>Project</b>
James Buchanan	Medical Student (Class of 2015)	Marshall University School of Medicine	June 2012-Jan 2013	Independent learning modules enhance student performance and understanding of anatomy. <b>Published in Anatomical Sciences Education.</b>
Rebekah Sine	Undergraduate	Alderson-Broadus College	2011 June-July	Effects of omega-3 fatty acids on bone development. <b>Funded by WV-INBRE Summer Research Program.</b>
Ross DeChant	Graduate Student (MS)	Marshall University	Sept 2010-May 2011	Multiphoton imaging setup; gross anatomy prosection labeling;
Christopher Hearn	Graduate Student (PhD)	Marshall University	Sept 2010-Sept 2011	Research rotation in biomedical sciences; committee advising.
Scott Schwendiman	Graduate Student (PhD)	Marshall University	April 2010-May 2010	Research rotation in biomedical sciences
Alison Williams	Undergraduate and Graduate (non-thesis) Research Assistant	Marshall University	2010-2013	Research technician training; micro-CT analysis of bone density; Histology methods and in vivo imaging; mouse dissections and harvest.  Independent learning modules enhance student performance and understanding of anatomy. <b>Published in Anatomical Sciences Education.</b>
Morgan Efaw	Undergraduate and Graduate (non-thesis) Research Assistant	Marshall University	Nov 2009-May 2013	Effects of temperature and exercise on knee growth plates. <b>Funded by NASA WV Space Grant Consortium.</b>  Unilateral heat accelerates bone elongation and lengthens extremities of growing mice. <b>2014 Abstract at Orthopaedic Research Society.</b>  Large molecule delivery to the growth plate increases with limb temperature measured by in vivo multiphoton imaging. <b>Published in Journal of Applied Physiology.</b>  Independent learning modules enhance student performance and understanding of anatomy. <b>Published in Anatomical Sciences Education.</b>
Laura Mader	Undergraduate (pre-medical)	Marshall University	2009-11	Roles of temperature and exercise in facilitating wrist bone growth in mice. <b>Funded by NASA WV Space Grant Consortium.</b>
Barbara Linnehan	Undergraduate	Cornell University	2008-10	Effects of environmental temperature and exercise on serum leptin levels with implications for bone quality (co-advised with C. Farnum)

<b>Trainee Name</b>	<b>Type</b>	<b>Institution</b>	<b>Training Period</b>	<b>Project</b>
Craig Wang	Undergraduate	Cornell University	2009	Localization of VEGF in mouse growth plates using immunohistochemistry (C. Farnum, PI)
Timothy Vo	Undergraduate	Cornell University	2009	Histological analysis of mouse growth plates using BrdU and EdU incorporation (C. Farnum, PI)
Linell Bigelow	Undergraduate	Cornell University	2008-09	Localization of primary cilia on heart valves using histology and immunohistochemistry (C. Farnum, PI)

### **Invited Presentations**

- 2019 Biological Sciences Seminar Series, Marshall University  
Mechanisms of linear growth acceleration in childhood obesity (15 November).
- 2019 Health Sciences Research Retreat, Marshall University School of Medicine  
Mechanisms of linear growth acceleration in childhood obesity (23 August).
- 2018 Phi Delta Epsilon Medical Fraternity, Marshall University School of Medicine. Imaging IGF-I uptake in growth plate cartilage using in vivo multiphoton microscopy. (3 May).
- 2017 Health Sciences Research Retreat, Marshall University School of Medicine  
Progress Update: Growth factor transport and accelerated bone elongation in childhood obesity (18 August).
- 2016 Health Sciences Research Retreat, Marshall University School of Medicine  
Dysregulated growth factor transport and accelerated bone elongation in childhood obesity (26 August).
- 2014 University of Kentucky CTSA External Advisory Board Retreat. Invited poster presentation of CCTS pilot project: Temperature enhanced bone elongation in growth plates (13 October).
- 2013 Brock University, Biological Sciences, St. Catharines, ON (Host: Glenn Tattersall)  
Allen's Rule and the temperature-limb phenotype: Insights into processes of bone elongation (6 December).
- 2013 Kopchick Lab, Edison Biotechnology Institute, Ohio University  
Temperature enhanced bone elongation in cartilage growth plates (22 January).
- 2012 Biomedical Sciences Research Retreat, Marshall University School of Medicine  
Temperature enhanced bone elongation in cartilage growth plates (24 August).
- 2011 WV-INBRE Summer Research Program, Marshall University  
Building a research career as a new assistant professor (5 July).

- 2011 MU-ADVANCE Pat Logan Symposium of Scholars, Marshall University  
Building a professional career at Marshall with support from MU-ADVANCE (3 March).
- 2009 Department of Anatomy, Marshall University, Joan C. Edwards School of Medicine  
Skeletal variability and the environment: Mechanistic models of human bone elongation (16 February).
- 2009 Department of Anthropology, New York University  
Environmental inputs on limb elongation: an integrative model for human skeletal adaptation (10 February).
- 2009 Center for Animal Resources and Education, East Campus Facility, Cornell University  
Effects of the environment on skeletal growth in mice with relevance to animal husbandry practices (21 January).
- 2009 Bio-Imaging Group, Cornell University  
Temperature effects on solute transport: *In vivo* imaging of the growth plate (19 January).
- 2009 Anatomy and Neurobiology, Northeastern Ohio Universities College of Medicine  
Environmental inputs on bone elongation: *In vivo* imaging of the growth plate (15 January).
- 2008 Department of Anthropology, Harvard University  
Temperature and limb length in mice: A comparative model for human skeletal adaptation (21 February).
- 2007 Integrative Anatomy, University of Missouri, Columbia  
Environmentally-determined tissue temperature modulates extremity growth in mammals: A potential comprehensive explanation of Allen's rule (15 November).
- 2007 Department of Anatomy, Case Western Reserve University School of Medicine  
Effects of temperature on skeletal growth in mice (18 September).
- 2007 Department of Biomedical Sciences, Cornell University Veterinary College  
Environmentally-determined tissue temperature modulates extremity growth in mammals: A potential comprehensive explanation of Allen's rule (18 June).
- 2007 Department of Anatomy, Northeastern Ohio Universities College of Medicine  
Effects of temperature on skeletal growth in mice (24 May).

### Press Coverage

- 2020 "Marshall students receive grants from NASA West Virginia Space Grant Consortium."  
[https://www.herald-dispatch.com/news/marshall-students-receive-grants-from-nasa-west-virginia-space-grant-consortium/article\\_485403a2-2e76-5f1e-9bee-95f83bbcdfd5.html](https://www.herald-dispatch.com/news/marshall-students-receive-grants-from-nasa-west-virginia-space-grant-consortium/article_485403a2-2e76-5f1e-9bee-95f83bbcdfd5.html)

- 2019 "Marshall professor elected to AAA board." [https://www.herald-dispatch.com/business/personnel/article\\_96c5618f-cfe2-5ac7-a681-c0261fbcef1b.html](https://www.herald-dispatch.com/business/personnel/article_96c5618f-cfe2-5ac7-a681-c0261fbcef1b.html)
- 2019 "Serrat elected to American Association of Anatomists board of directors." <https://www.marshall.edu/wamnewsletter/2019/02/serrat-elected-to-american-association-of-anatomists-board-of-directors/>
- 2017 "Marshall University biomedical students shine at national spring meetings." <https://jcesom.marshall.edu/news/musom-news/marshall-university-biomedical-students-shine-at-national-spring-meetings/>
- 2015 "Researcher to receive national award from American Association of Anatomists." <http://www.marshall.edu/ucomm/university-communications-press-release-2/?pressid=3916>
- 2015 "Marshall School of Medicine researcher to receive national anatomy award; Marshall University represented by multi-disciplinary researchers at Experimental Biology conference." <http://jcesom.marshall.edu/news/musom-news/school-of-medicine-researcher-to-receive-national-anatomy-award/>
- 2014 "Serrat continues musculoskeletal research." <http://www.herald-dispatch.com/news/marshall/x1753198820/Serrat-continues-musculoskeletal-research>
- 2014 "School of Medicine researcher receives grant to continue musculoskeletal research." <http://jcesom.marshall.edu/news/musom-news/marshall-school-of-medicine-researcher-receives-grant-to-continue-musculoskeletal-research/>
- 2014 "MU School of Medicine receives \$50,000 grant for orthopaedic research." <http://www.marshallparthenon.com/news/mu-school-of-medicine-receives-50-000-grant-for-orthopaedic-research-1.2864641#.U3LzayhBAfM>
- 2014 "Congratulations to the ASBMR Grants in Aid Program Awardees." <http://www.asbmr.org/Publications/News/NewsDetail.aspx?cid=8e9508d6-369a-4c7d-a81f-518b4cdeaac9#.VCw6uiihgfM>
- 2014 "BMS Ph.D. student and advisor selected for podium presentations, and received notable award recognitions at national science conference." <http://www.marshall.edu/bms/2014/05/27/bms-ph-d-student-and-advisor-selected-for-podium-presentations-and-received-notable-award-recognitions-at-national-science-conference/>
- 2014 "Marshall School of Medicine researchers and students to present their findings at national orthopaedics meeting." <http://jcesom.marshall.edu/news/musom-news/researchers-present-at-ortho-conference/>
- 2014 Sponsored student research at Undergraduate Research Day at the WV Capitol, Highlighted in Herald Dispatch: <http://www.herald-dispatch.com/news/x1781485324/MU-students-to-present-work-at-Undergraduate-Research-Day>
- 2013 "Bones heat up research study: Dr. Maria Serrat examines temperature-based bone growth therapies." <http://www.marshall.edu/bms/files/2013/12/BMS-Magazine-2013->

Final-for-Web.pdf. **Feature story in Fall 2013 Biomedical Sciences Research Publication.**

- 2013 "Perspectives in Biomedical Sciences Research: Anatomy of a Bone Physiology Lab" Research presentation on career advice and bone imaging at "Science Cafe".  
<http://www.asbmb.org/PublicOutreach/Templates/PubOutreachDefault.aspx?id=40020>
- 2012 "Grant allows MU professor to study how temperature effects bone growth."  
[http://www.marshallparthenon.com/sports/grant-allows-mu-professor-to-study-how-temperature-effects-bone-growth-1.2793649#.UQ6u\\_o7HMfM](http://www.marshallparthenon.com/sports/grant-allows-mu-professor-to-study-how-temperature-effects-bone-growth-1.2793649#.UQ6u_o7HMfM)
- 2012 "MU-ADVANCE names faculty fellows, awards mini-grants"  
<http://www.herald-dispatch.com/news/marshall/x1034333354/MU-ADVANCE-names-faculty-fellows-awards-mini-grants?i=0>
- 2011 Sponsored student research at Undergraduate Research Day at the WV Capitol, Highlighted in Parthenon:  
<http://www.marshallparthenon.com/2.6881/marshall-students-prepare-for-annual-undergraduate-research-day-1.2446022#.UQ6vcY7HMfM>
- 2010 "Skeletons in the Closet," science program for middle school girls  
<http://www.herald-dispatch.com/news/x874709075/Middle-school-girls-attend-math-science-conference>

## **Professional Service**

### National and International

- 2021 Chair and Symposium Organizer for American Association for Anatomy Annual Meeting at Experimental Biology. Selected by competitive proposal application: "The covert health consequences of obesity and hormone signaling: Paradoxical effects on bone and body composition." (re-programmed from 2020 after competitive review)
- 2020 PhD Thesis Examiner  
The University of Adelaide, School of Biological Sciences, Australia
- 2020 Ad Hoc Tenure Reviewer  
The Ohio State University College of Medicine
- 2020 Symposium Organizer for American Association for Anatomy Annual Meeting at Experimental Biology in San Diego, CA. Selected by competitive proposal application: "The covert health consequences of obesity and hormone signaling: Paradoxical effects on bone and body composition." (Cancelled due to COVID-19)
- 2019 Interview and Fact Checking, NYTimes Anatomy Supplement for Kids (Dec 2019 Edition)
- 2019-pres Anti-Harassment Task Force, American Association for Anatomy Board of Directors
- 2019 Grant Reviewer for Marsden Fund, New Zealand

- 2019 Session Chair, American Association for Anatomy Annual Meeting at Experimental Biology in Orlando, FL.
- 2017-pres Board of Reviewers for The Anatomical Record Journal
- 2017-2018 Basmajian Award Selection Committee, American Association of Anatomists
- 2015-2019 Abstract Reviewer for Orthopaedic Research Society 2016, 2017, and 2020 Annual Meetings
- 2016 Session Chair, American Association of Anatomists Annual Meeting at Experimental Biology in San Diego, CA.
- 2015 Chair and Organizer of Symposium at American Association of Anatomists Annual Meeting at Experimental Biology in Boston, MA. Selected by competitive proposal application: "Vascular and connective imaging *in situ*: returning bone to the skeleton"
- 2014-2015 Grant Reviewer for Leakey Foundation
- 2013 Focus Group to Evaluate Grant's Anatomy Dissector for Lippincott Williams and Wilkins Publisher at Experimental Biology Meeting in Boston, MA
- 2012 Grant Reviewer for Graduate Women in Science National Fellowship Program
- 2012-2015 Poster Judge for Scholander Competition, American Physiological Society at Experimental Biology Annual Meeting
- 2006-pres Manuscript Reviewer for American Journal of Physiology (2011-2014: Regulatory, Integrative and Comparative Physiology; Renal Physiology), American Journal of Physical Anthropology (2018), Anatomical Record (2007, 2018), Anatomical Sciences Education (2016-17), Animal Biology (2008), Clinical Orthopaedics and Related Research (2018, 2020), Biological Reviews (2016), Bone (2019), Bone Reports (2016-2018), Building Bones (edited volume, 2015), Evolutionary Biology (2014), Frontiers in Endocrinology (2014-15), International Journal of Environmental Research and Public Health (2009-10), Journal of Applied Physiology (2012-2015, 2020), Journal of Biomechanics (2007), Journal of Human Evolution (2008), Journal of Orthopaedic Research (2010, 2016), Nutrients (2014, 2017), Peer Journal (2018) Primate Craniofacial Function and Biology (2006; edited volume), PLoS ONE (2012), Proceedings of the National Academy of Sciences (2011), Scientific Reports (2020), South African Journal of Science (2015), Toxicology (2019-2020), Yearbook of Physical Anthropology (2010)

### Regional

- 2019 Grant Reviewer for WVCTSI LAUNCH Pilot Grant Program  
West Virginia University, West Virginia Clinical and Translational Science Institute
- 2013 Poster Judge at Appalachian Regional Cell Conference, 26 October

### University and College

- 2020-pres SRIMS (Summer Research Internship for Minority Students) Selection Committee  
Marshall University, Joan C. Edwards School of Medicine
- 2018-2019 Grant Reviewer for COBRE ACCORD Pilot Grants  
Marshall University, Joan C. Edwards School of Medicine
- 2017-2018 Salary Committee for Restructuring Basic Science Research Compensation  
Marshall University, Joan C. Edwards School of Medicine
- 2017-pres Faculty Advisor, Phi Delta Epsilon Medical Fraternity  
Marshall University, Joan C. Edwards School of Medicine
- 2017 Excellence in Leadership Award Selection Committee  
Marshall University, Faculty Advancement, Joan C. Edwards School of Medicine
- 2016-pres Biomedical Sciences PhD Admissions Committee  
Marshall University, Joan C. Edwards School of Medicine
- 2016-pres Biomedical Sciences Graduate Student Award Committee  
Marshall University, Joan C. Edwards School of Medicine
- 2014-pres Curriculum Committee, Biomedical Sciences Representative (re-elected 2020)  
Marshall University, Joan C. Edwards School of Medicine
- 2011-pres Academic Standards Committee, Marshall University School of Medicine  
Responsible for reviewing medical student performance and helping make decisions  
and recommendations related to academic and/or professional deficiencies.
- 2015-2016 Biomedical Sciences Workgroup to Redevelop Research Clusters  
Marshall University, Joan C. Edwards School of Medicine
- 2015 Ad Hoc Tenure Committee Member  
Marshall University, School of Pharmacy
- 2015 Work-Effort Evaluation Form Group Member  
Marshall University, Joan C. Edwards School of Medicine
- 2015-2016 Biomedical Sciences PhD Interview Committee  
Marshall University, Joan C. Edwards School of Medicine
- 2014 Search Committee, Chair of the Department of Family Medicine and Community Health  
Marshall University, Joan C. Edwards School of Medicine
- 2013 Panelist on Research Skill and Publishing Strategies, 1 May 2013, Marshall University  
Joan C. Edwards School of Medicine.
- 2012 Grant Reviewer for Marshall Health Translational Pilot Grant Program, Marshall  
University Joan C. Edwards School of Medicine
- 2012-2016 Curriculum Block Integration Team Member

Participated in organization and coordination of Structure and Function Blocks II and V at Marshall University School of Medicine to help create a curriculum that is integrated and promotes life long learning. Reviewed block content with other team members to identify redundancies, gaps, and sequence of material, including identification of appropriate methods of pedagogy and assessment. Worked with other faculty on effectively delivering content.

- 2011-2013 LCME Citation Action Team  
Responsible for creating and following progress on action plans to address citations ED5a and ED33, Life Long Learning and Horizontal and vertical integration of curriculum. Contributed to summaries, tables, and examples for LCME briefing book. Duties include attendance at some curriculum committee meetings to monitor action plan progress, meetings with action team members and other faculty, meetings with Dean, and formal meetings with LCME site visitors.
- 2011-2012 Evaluation Committee, Marshall University School of Medicine  
Responsible for reviewing and identifying deficiencies in course and faculty evaluations
- 2011-2012 Poster Judge, Marshall University School of Medicine Annual Research Day
- 2011-2012 MU-ADVANCE, an NSF-funded program at Marshall University  
Wrote summary reports and met with external evaluator at end of granting period. Supplied evidence for positive outcomes of ADVANCE program. Participated Focus Group to gauge impact of networking/mentoring model.
- 2011 Hosted Visiting Researcher Seminar on Multiphoton Microscopy (7 Feb)  
Arranged University-wide seminar and luncheon for interested faculty with Dr. Rebecca Williams from Cornell University to advertise new technology available at Marshall.
- 2011 Grant Reviewer for Cell Differentiation and Development Center, Marshall University
- 2010-2012 Faculty Senate, Marshall University School of Medicine representative
- 2009-2011 LCME Medical Students Subcommittee, Marshall University School of Medicine  
Self-study task force to prepare final report for LCME site visit 13-16 March, 2011  
Met with LCME site visit team as junior faculty representative from Anatomy.
- 2009-pres Multiphoton Microscope Oversight Committee  
Marshall University Molecular and Biological Imaging Core  
Integral member of advisory committee for the purchase and management of NSF-funded confocal/multiphoton microscope. Help ensure that equipment is properly maintained and serviced. Helped secure loaner multiphoton laser after major equipment failure in October 2011, which was crucial for allowing investigators to continue research for over six months until a replacement was installed in May 2012. Continue to address all ongoing equipment and service contract concerns as needed.
- 2009-2016 Biomedical Sciences Graduate Program, Marshall University  
Participated in recruiting interested students to PhD program, interview candidates, meet interviewees and accepted students.

## Department

- 2019-pres Chair, Anatomy Oversight Committee  
Oversee cadaver usage and allocate bodies to appropriate programs for medical and health-sciences education and research. Review and approve requests for cadavers.  
Department of Biomedical Sciences, Marshall University School of Medicine
- 2019-pres Faculty Search Committee, COBRE Investigator  
Selection committee to hire a junior investigator for COBRE grant  
Dept of Clinical and Translational Sciences, Marshall University School of Medicine
- 2018-pres Research Coordinator, Gross Anatomy  
Responsible for reviewing and approving requests for access to cadaver specimens for research. Inspect off-site facilities and ensure that material is used and returned in accordance with rules and regulations of the Human Gift Registry of West Virginia.  
Department of Biomedical Sciences, Marshall University School of Medicine
- 2018-pres Laboratory Access Coordinator  
Responsible for granting/denying faculty and student access to gross anatomy and histology laboratories. Coordinate access for first year medical and physical therapy courses, graduate and medical electives, residents and faculty.  
Department of Biomedical Sciences, Marshall University School of Medicine
- 2018-2019 Faculty Search Committee, Histology  
Selection committee to hire a histologist  
Department of Biomedical Sciences, Marshall University School of Medicine
- 2018 Director of Human Gift Registry Search Committee  
Department of Biomedical Sciences, Marshall University School of Medicine
- 2016-pres Histology Core Facility Oversight and Maintenance  
Perform maintenance and user training, facilitate scheduling and reagent purchasing for all faculty, staff, and student users in department. Obtain quotes and arrange repairs for maintenance contracts.  
Department of Biomedical Sciences, Marshall University School of Medicine
- 2016-2017 Faculty Search Committee, Neuroanatomy  
Selection committee to hire a neuroanatomist  
Department of Biomedical Sciences, Marshall University School of Medicine
- 2012-2018 Anatomical Specimen Research Usage Liaison, Human Gift Registry  
Researched cadaver protocols at other institutions and created standardized protocol for cadaver usage requests at Marshall. Serve as liaison between Departments of Anatomy and Orthopaedics to facilitate medical student cadaver research projects.
- 2012-pres Anatomy Model Inventory and Instrument Acquisition  
Created exhaustive inventory of teaching model collection for gross anatomy; maintain inventory with new models; researched and helped acquire models and instruments to aid faculty in performing specialized dissections in the gross anatomy laboratory.  
Department of Biomedical Sciences, Marshall University School of Medicine

- 2009-2016 Histology Equipment Oversight and Maintenance  
Secured equipment for department, performed maintenance and user training.  
Department of Anatomy and Pathology, Marshall University School of Medicine
- 2012-2015 Faculty Search Committee, Neuroanatomy  
Selection committee to hire a senior level neuroanatomist  
Department of Anatomy and Pathology, Marshall University School of Medicine
- 2011-2012 Faculty Search Committee, Gross Anatomy  
Selection committee to hire a junior level gross anatomist  
Department of Anatomy and Pathology, Marshall University School of Medicine
- 2010-2012 Outreach Committee  
Creation and implementation of formal policy for anatomy outreach events; established protocol that now enables local high school students to visit gross anatomy laboratory.  
Department of Anatomy and Pathology, Marshall University School of Medicine
- 2009-2012 Human Gift Registry Memorial Service Planning Committee  
Invitations, program, and photo memorial board to recognize body donors. Worked with medical student liaison committee to encourage student participation and attendance.  
Department of Anatomy and Pathology, Marshall University School of Medicine
- 2000-2002 Graduate Student Senator  
Attended meetings, voted on behalf of Department, disseminated information  
Department of Anthropology, Kent State University

**Professional Development Activities** (selection of >75 notable activities and workshops since 2006)

- 2020 Managing Bias, online diversity training module to increase understanding of intercultural differences and to challenge bias, stereotyping and other forms of discrimination in universities. Everfi for Marshall University. (17 October)
- 2020 Phi Delta Epsilon Advisor Training Program, Plaid Learning Management System. Online training modules on mentoring college students, including providing feedback, preventing harassment and approaching conflict in a team setting. (12 October)
- 2020 Challenges and Solutions for Socially Distanced Anatomy Labs (30 July) and Virtual Anatomy (29 April) Discussions for Gross Anatomy Teaching during Pandemic. Series of interactive Zoom webinars hosted by American Association for Anatomy
- 2020 Common Difficulties of Orthopaedics that No One Talks About. Diversity Roundtable Discussion at Orthopaedic Research Society 2020 Annual Meeting (9 Feb)
- 2019 Leadership Corner Article, American Association for Anatomy September Newsletter
- 2018 Grant Review Training Session, presented by Uma Sundaram at Marshall University (7 December)

- 2018 Imaris Image Visualization and Analysis Workshop, presented by James Shaw at Marshall University (30 November)
- 2018 Top Hat Training, presented by Nitin Puri at Marshall University (20 September)
- 2018 Optimizing the Practice of Mentoring: An Online Curriculum for the Professional Development of Research Mentors, CTSI institute at the University of Minnesota (8 September)
- 2018 Write Winning Grant Proposals Workshop, presented by John D. Robertson of Grants Central at Marshall University (21-22 March)
- 2018 LCME Site Visit Preparation Seminar, presented by Veronica Cantanese at Marshall University Joan C. Edwards School of Medicine (17 January)
- 2017 Career Advancement Seminars for Junior Faculty, hosted by American Association of Anatomists at Experimental Biology 2017 (22-26 April)
- 2015 Write Winning Grant Proposals Workshop, presented by John D. Robertson of Grants Central at Marshall University (2-3 April)
- 2014 Career Advancement Seminars for Junior Faculty, hosted by American Association of Anatomists at Experimental Biology 2014 (26 April)
- 2014 International Association of Medical Science Educators (IAMSE) Spring Webinar Series. Attended two webinars for teaching enhancement (9 Jan, 16 Jan)
- 2013 Team Based Learning Workshop at Marshall University School of Medicine Training session by Dr. Brian Dzwonek, Associate Dean for Medical Student Education (13 December)
- 2013 Orthopaedic Research Society Professional Development Webinar: Women Should Ask. Seminar focused on enhancing success of female faculty. (20 November)
- 2013 International Association of Medical Science Educators (IAMSE) Fall Webinar Series. Attended three webinars for teaching enhancement (9 Sept, 3 Oct, 10 Oct)
- 2012 United States Bone and Joint Initiative Young Investigator Initiative (2-4 November) Attended second of two workshops in formal grant mentoring program.
- 2012 International Association of Medical Science Educators (IAMSE) Fall Webinar Series. Attended three webinars for teaching enhancement (6 Sept, 20 Sept, 10 Sept)
- 2012 Building Small Group Facilitation, seminar at Marshall University School of Medicine Training session by Dr. Elza Mylona for enhancing small group teaching (27 July)
- 2011-2012 Anatomy Education Formal Mentoring by Faculty at University of Virginia, McMaster, and Cornell University to aid in creation of active learning modules at Marshall.
- 2011 Budgeting Basics Workshop, Marshall University Research Corporation (13 October) Grant Development workshop focused on creating budgets for extramural applications

- 2011 Association of American Medical Colleges Early Career Women Faculty Professional Development Seminar (9-12 July)
- 2011 Approaches to Interactive Engagement, seminar at Marshall Univ. School of Medicine Training session by Dr. David Maloney to help faculty make lectures interactive (8 July)
- 2010 United States Bone and Joint Decade Young Investigator Initiative (29-31 October) Grant mentoring program to help junior faculty successfully obtain external funding
- 2010-2012 Professional Institutional Enhancement Seminars, Marshall Univ. School of Medicine Regular seminars geared at helping faculty improve research and teaching skills
- 2010 Writing Workshop: Publish and Flourish, Marshall University (28 June) Strategies to become a more prolific writer and scholar
- 2010 Teaching Workshops, Marshall University (13 May and 3 June) For the development of effective teaching strategies in medical education
- 2010 Grant Development, Marshall University (16 April) Policies and procedures for grant submission and tips for successful applications
- 2010 NSF Regional Grants Workshop, Cleveland OH (22-23 March) Information on current NSF policies, procedures and funding opportunities
- 2010 Copyright Compliance Workshop, Marshall University (31 March) Current copyright laws as they pertain to higher education
- 2010-2011 Scientific Integrity Seminar, Marshall University (8 March 2010 and 28 March 2011) Training in the responsible conduct of research
- 2009 Department Retreat, Anatomy and Pathology, Marshall University (6 November) Faculty development workshop for medical educators, issues of professionalism
- 2009 Teaching Workshop, Cornell University (27 May) Navigating path to successful teaching faculty position
- 2008-2009 Grant Writing Workshops, Cornell University Four-part in-depth series covering all aspects of grant writing and review processes
- 2008 CV Development, Cornell University (29 September) For the development and enhancement of a professional curriculum vitae
- 2008 Mentoring Workshop: On mentoring and being mentored, Cornell University (17 Jan) Philosophy of mentoring and developing effective mentor-mentee relationships
- 2008 Scientific Methods Workshop, T Sun, New York University (21 April) Survival skills for young biomedical researchers, held at Cornell University

## Outreach Activities

- 2020 "Pathway to a Bone Physiology Lab: Steps and Missteps" Presented research and academic advice to students in STEM Immersion Program, hosted by West Virginia State University (Zoom). The goal was to help first generation college students understand what it takes to be successful in academics and what type of jobs they could pursue with a degree in the STEM fields. 20 July 2020.
- 2019 Interview with NYTimes reporter Kim Tingley on our evolving understanding of how the body works for a NYTimes supplement for children. 22 November 2019.
- 2018 Discussed research with Phi Delta Epsilon medical fraternity members and gave presentation at monthly meeting. Marshall University School of Medicine, 3 May 2018.
- 2015 Sponsored student research at Undergraduate Research Day at the WV Capitol, **Highlighted in Herald Dispatch**: [http://www.herald-dispatch.com/news/undergraduate-research-day/article\\_6fe74363-0e97-5202-882b-2ec572296d95.html](http://www.herald-dispatch.com/news/undergraduate-research-day/article_6fe74363-0e97-5202-882b-2ec572296d95.html) (4 March)
- 2014 Sponsored student research at Undergraduate Research Day at the WV Capitol, **Highlighted in Herald Dispatch**: <http://www.herald-dispatch.com/news/x1781485324/MU-students-to-present-work-at-Undergraduate-Research-Day> (30 Jan)
- 2013 "Perspectives in Biomedical Sciences Research: Anatomy of a Bone Physiology Lab" Research presentation on career advice and bone imaging at "Science Cafe," an outreach project hosted by Marshall University Graduate Student Organization in collaboration with American Society of Biochemistry and Molecular Biology and Cabell Midland High School. The goal was to facilitate science literacy and advocacy to the local community, specifically senior level high school students. 6 March 2013. **Highlighted on ASBMB Public Outreach Site** <http://www.asbmb.org/PublicOutreach/Templates/PubOutreachDefault.aspx?id=40020>
- 2012 Interview with local high school student about bone imaging research; interview with Marshall University Student Newspaper about microscopy facility. **Highlighted in the Parthenon**: [http://www.marshallparthenon.com/sports/grant-allows-mu-professor-to-study-how-temperature-effects-bone-growth-1.2793649#.UQ6u\\_o7HMfM](http://www.marshallparthenon.com/sports/grant-allows-mu-professor-to-study-how-temperature-effects-bone-growth-1.2793649#.UQ6u_o7HMfM)
- 2011 Anatomy department outreach program for high school students  
Coordinated field trip for Anatomy class from Fairview High School (Ashland, KY) to Marshall University School of Medicine, 16 May 2011.
- 2011 Sponsored student research at Undergraduate Research Day at the WV Capitol, **Highlighted in the Parthenon**: <http://www.marshallparthenon.com/2.6881/marshall-students-prepare-for-annual-undergraduate-research-day-1.2446022#.UQ6vcY7HMfM>
- 2010 "Regulation of Bone Elongation" Presentation for local high school students in Huntington, WV. 13 May 2010, held at Marshall University.
- 2010 "Skeletons in the Closet," Expanding Your Horizons science program for middle school girls, sponsored by Association for Women in Science, 10 April 2010.

**Highlighted in The Herald Dispatch:** <http://www.herald-dispatch.com/news/x874709075/Middle-school-girls-attend-math-science-conference>

- 2009 "Anatomy in the Life Sciences" Presentation for Pre-Nursing / Allied Health Students, Boyd County High School, KY. 19 October 2009 held at Marshall University.
- 2008 Veterinary anatomy prosection, musculoskeletal system.  
Performed dissections to assist a graduate student learning anatomy.  
The Animal Body Course, Cornell University College of Veterinary Medicine
- 2008 Nomination: Dr. C. Owen Lovejoy, Recipient of Outstanding Mentorship Award  
Kent State University Graduate Student Senate (honored 5 March)
- 2005-2009 Educational lectures on the environment and institutional animal husbandry practices  
Kent State University and Cornell University
- 2006-pres Student mentoring: advise students and post-docs from various institutions on  
dissertation preparation, research methods, funding, and job search strategies. Edit  
papers and grants. Consult on animal husbandry, breeding, and experimental design.
- 2000-pres Peer mentoring in research-teaching: advise on teaching strategies and research  
methods; edit papers, share course materials, lecture handouts and slides; consult for  
*in vivo* imaging methods and troubleshooting, animal breeding/husbandry, IACUC  
protocols, lab setup, safety, and management.