CURRICULUM VITAE

Sarah Calve
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Education

BS	2000	Materials Science and Engineering, Cornell University, Ithaca, NY
MS	2005	Molecular, Cellular and Developmental Biology, University of Michigan, Ann Arbor, MI
PhD	2006	Macromolecular Science and Engineering, University of Michigan, Ann Arbor, MI

Professional Experience

Postdoctoral Fellow, Developmental Biology, Northwestern University Feinberg School of Medicine, August 2006 – April 2011
Senior Research Fellow, Orthopaedic Research Laboratories, University of Michigan, May 2011 – July 2012
Assistant Professor, Weldon School of Biomedical Engineering, Purdue University, August 2012 – March 2019
Assistant Professor, Department of Biological Sciences, Purdue University, February 2013 – Present
Leslie A. Geddes Assistant Professor of Biomedical Engineering, Purdue University, March 2019 – Present
Visiting Associate Professor, Department of Mechanical Engineering, University of Colorado Boulder, May 2019 - present
Leslie A. Geddes Associate Professor of Biomedical Engineering, Purdue University, starting August 2019
Associate Professor, Department of Mechanical Engineering, University of Colorado Boulder, starting January 2020

Honors and Awards

GE-Rackham Merit Fellowship, University of Michigan, 2000 – 2005
Lubrizol Fellowship, 2001
NRSA Postdoctoral Fellow, NIH, 2007 – 2009
Finalist in Postdoctoral Poster Competition for the American Association of Anatomists, Experimental Biology, 2008
Runner-up, American Association of Anatomists Postdoctoral Platform Award, Experimental Biology, 2010
NIH Director's New Innovator Award, 2017
BMES-CMBE Rising Star Junior Faculty Award, 2018
National Academy of Engineering, Japan–America Frontiers of Engineering Symposium Invitee, 2018
Journal of Biomechanical Engineering, "Spotlight on the Future" Invited Paper, 2018
American Association of Anatomists, Young Faculty Travel Award (awarded to the top 5 reviewed abstracts submitted to 2018 Experimental Biology conference by assistant professors), 2018
Cellular and Molecular Bioengineering, "Young Innovator Issue" Invited Paper, 2019

Scientific and Professional Societies

Member, American Association of Anatomists, 2007 – 2012; 2017 – present
Member, American Society of Matrix Biology, 2014 – present

Member, Biomedical Engineering Society, 2015 – present

Courses Developed

Course Number	Course Title	Semester and Year	Enrollment	Percentage of Responsibility	Administrative or supervisory responsibility
BME 595	Regenerative Medicine	Fall 2014	18	100	100
BME 204	Biomaterials&Biomechanics	Spring 2017	90	100	100

Courses Taught at Purdue

Course Number	Course Title	Semester and Year	Enrollment	Percentage of Responsibility	Administrative or supervisory responsibility
BME 695	CLA	Fall 2012	5	100	100
BME 204	Biomechanics	Spring 2013	71	100	100
BME 204	Biomechanics	Spring 2014	76	100	100
BME 595	Regenerative Medicine	Fall 2014	18	100	100
BME 204	Biomechanics	Spring 2015	90	100	100
BME 204	Biomechanics	Spring 2016	90	100	100
BME 595	Regenerative Medicine	Fall 2016	22	100	100
BME 204	Biomaterials&Biomechanics	Spring 2017	90	100	100
BME 595	Regenerative Medicine	Fall 2017	22	100	100
BME 204	Biomaterials&Biomechanics	Spring 2018	90	100	100
BME 595	Regenerative Medicine	Fall 2018	18	100	100
BME 595	Regenerative Medicine	Fall 2019	18	100	100

PhD and MS thesis-based committees chaired

Student name	Degree	Graduation date	Name of Co-chair
Andrew Ready	M.S.	July 2014	Kevin Otto
Zhiyu Li	M.S.	July 2015	
Juan Martin Silva	M.S.	July 2018	Alyssa Panitch
Yue Leng	Ph.D.	May 2020	
Andrea Acuña	Ph.D.	May 2020	Craig Goergen
Aya Saleh	Ph.D.	May 2020	Tamara Kinzer-Ursem
Alita Miller	M.S.	May 2020	
Julian Jimenez	M.S.	December 2020	
Kathryn Jacobson	Ph.D.	December 2020	David Umulis
Alexander Ocken	Ph.D.	May 2021	
Chenwei Duan	Ph.D.	May 2022	Preeti Sivasankar
Sarah Lipp	MD/Ph.D.	May 2022	

PhD and MS thesis-based committee member (chair):

Sarah Libring (L. Solorio), Mazin Hakim (L. Solorio), Thomas Jenkins (D. Little), Kun Ho Kim (S. Kuang), Benjamin Seelbinder (C. Neu), Alycia Berman (J. Wallace, C. Goergen), Xiaoyu Xu (R. Main), Janelle Salameh (M. Figueiredo), Melanie Venderley (R. Main, E. Nauman), Kari Verner (R. Main); Silvia Canelon (J. Wallace), Nelda Vazquez (A. Panitch), Luyao Cai (C. Neu), Tanaya Walimbe (P. Sivasankar), Celina Twitchell (A. Panitch), Brian Golz (R. Main), Julia Fraseur (T. Kinzer-Ursem), Matt Thompson (C. Neu, D. Umulis), Kateri Fites (C. Neu), Robert Wilson (C. Neu),

Logan Worke (C. Neu), Meghan Canter (T. Kinzer-Ursem), Alexandra Lawrence (A. Pantich, C. Neu), Shishir Biswas (E. Nauman).

Undergraduate Special Projects Directed
Caleb McDaniel (Summer 2013), SURF
*Winner of best Bioengineering poster at the 2013 SURF Research Symposium
Anusorn Mudla (May 2013 – April 2014), HHMI, DURI, Honors Thesis
Jim McCarthy (Summer 2013), SURF
Andrew Schlib (Summer 2013), SURF
Alexander Carle (Fall 2013), Honors Project
Mitchell Ayers (Summer 2014), SURF
Alex Waters (Summer 2014), HHMI
Michael Drakopoulos (Summer 2015), SURF
*recipient of a 2017 Gates-Cambridge Scholarship and NSF GRFP
Benjamin Sather (Fall 2016), Honors Project
Shipeng Xu (Summer 2017), SURF
Alita Miller (Summer 2018), SROP
Nicklaus Iavagnilio (Summer 2018), SURF
*Winner of best Bioengineering podium presentation at the 2018 SURF Research Symposium
Emmarie Ballard (Summer 2019), SURF

Undergraduate research assistants
Caleb McDaniel, Anusorn Mudla, Nicholas Braun, Jim McCarthy, Alexander Carle, Andrew Schlib, Mitchell Ayers, Alex Waters, Michael Drakopoulos, Shiv Panigrahi, Alexander Ocken, Lindsey Gengelbach, Emily Watkins, Peter Marshall, Jay Qiu, Sawyer Kieffer, Madeline Ku, Mukunda Aithal, Benjamin Sather, Nithya Sridhar, Jacob Wagner, Gabrielle Mitchell, Caroline Hollier, Alita Miller, Shipeng Xu, Nicklaus Iavagnilio, Sydney Sofronici, Kristin Barringhaus, Emmarie Ballard

Research Grants and Contracts Received
Completed
NIHT-90, Regenerative Medicine Training Program at NUFSM Kessler (PI), "Extracellular and Genetic Control of Muscle Regeneration," 03/01/07 – 02/29/09, Direct costs: $86,408, Role: Trainee.

Purdue University OVPR Equipment Program, "Biomaterials Testing System," 12/01/2013 – 05/31/2014, Total costs: $98,000, Role: Co-PI (Julie Liu, PI).

Indiana Clinical and Translational Science Pilot Funding, "Imaging limb development in vivo to guide tissue engineering of muscle and tendon in vitro," 01/01/13 – 12/31/14, Direct costs: $10,000, Role: PI.

Symic Biomedical, "Testing of aggrecan mimic for the treatment of osteoarthritis," 06/08/14 – 08/07/15, Direct costs $8,353.22, Role: PI.

Nexxt Spine LLC, "Testing the response of different titanium surfaces on osteoblast behavior," 08/01/2015-09/15/2015, Direct costs: $1,150 + 80 hours salary from the Purdue Technical Assistance Program, Role: PI.

Nexxt Spine LLC, "Testing the compatibility of new metal-based spinal *implants*," 08/12/2016 – 12/31/2016, total costs: $6,507, Role: PI.

NIH R03, "Imaging the role of hyaluronic acid in skeletal muscle assembly during murine forelimb development," 04/01/2014 – 03/31/2017, Direct costs: $150,000, Role: PI.

Indiana Clinical and Translational Science Pilot Funding, "Mass Spectrometric Analysis of Tissue Assembly to Inform Tissue Engineering Strategies," 09/01/15 – 08/31/17, Direct costs: $9,900, Role: PI.

Showalter Research Trust, "Design of 3D hydrogels for the treatment of volumetric muscle loss," 07/01/2016 – 06/30/2018, total costs: $75,000, role: PI.

Purdue University OVPR Equipment Program, "CellScale Biaxial Material Tester," 03/01/2018 – 05/31/2018, Total costs: $82,000, Role: Co-PI (Thomas Siegmund, PI).

NIH R21, "Bioorthogonal labeling of extracellular matrix assembly," 04/01/2016 – 03/31/2019, Direct costs: $275,000, role: PI. (With one year no-cost extension).

Current

NIH R01, "Pathobiology and biomechanics of vocal fold dehydration," 07/01/2016 - 06/30/2021, Direct costs: $1,250,000, Role: co-I (Preeti Sivasankar, PI).

NIH DP2 Director's New Innovator Award Program, "Defining the mechanical link that unites the musculoskeletal system during limb development," 09/30/2017 – 06/30/2022, Direct costs: $1,500,000, Role: PI.

NIH R01, "Biomechanical influence of ECM remodeling on the developing enthesis," 09/01/2017 - 08/31/2022, Direct costs: $1,445,223, Role: PI.

NIH R01, "Driver Genes for Engineered Rotator Cuff Development," 12/01/2018 – 11/30/2023, Role: Co-I, (Dianne Little, PI).

NSF BMMB, "Systems Mechanobiology of Wound Healing," 06/01/2019 – 05/31/2022, Total costs: $415,885, Role: co-PI (Adrian Buganza-Tepole, PI).

Showalter Trust, "Transforming the cell membrane to guide cell growth," 06/15/2019 – 06/14/2020, Total costs: $75,000, Role: co-I (Shelley Claridge, PI).

Pending

NIH R01, "Multi-scale modeling to predict long-term growth and remodeling of skin in response to stretch," 07/01/2019 – 06/30/2024, Role: Co-I (Adrian Buganza-Tepole, PI).
Impact Score: 27; Percentile: 7%

PUBLICATIONS

*Corresponding author

Refereed journal papers

1. Seidel, A., Liivak, O., Calve, S., Adaska, J., Ji, G.D., Yang, Z.T., Grubb, D., Zax, D.B. and *Jelinski L.W. (2000). "Regenerated spider silk: processing, properties, and structure," Macromolecules, 33, 775-780.

2. Calve, S., Dennis, R. G., Kosnik, P., Baar, K., Grosh, K., and *Arruda, E.M. (2004). "Engineering of functional tendon," Tissue Engineering, 10, 755-761.

3. *Garikipati, K., Arruda, E.M., Grosh, K., Narayanan, H., and Calve, S. (2004). "A continuum treatment of growth in biological tissue: mass transport coupled with mechanics," Journal of the Mechanics and Physics of Solids, 52, 1595-1625.

4. Borschel, G.H., Huang, Y.C., Calve, S., Arruda, E.M., Lynch, J.B., Dow, D.E., Kuzon, W.M., Dennis, R.G., and *Brown, D.L. (2005). "Tissue engineering of recellularized microvascular grafts" Tissue Engineering, 11, 778-786.

5. *Garikipati, K., Olberding, J.E., Narayanan, H., Arruda, E.M., Grosh, K. and Calve, S. (2006). "Biological remodelling: stationary energy, configurational change, internal variables and dissipation," Journal of the Mechanics and Physics of Solids, 54, 1493-1515.

6. Arruda, E.M., Mundy, K., Calve, S., and *Baar, K. (2006). "Regional variation of tibialis anterior tendon mechanics is lost following denervation," Journal of Applied Physiology, 101, 1113-1117.

7. Larkin, L.M, Calve, S., Kostrominova, T.Y. and *Arruda, E.M. (2006). "Structure and functional evaluation of tendon-skeletal muscle constructs engineered in vitro," Tissue Engineering, 12, 3149-3158.

8. Arruda, E.M., Mundy, K., Calve, S., and *Baar, K. (2007). "Denervation does not change the ratio of collagen I and collagen III mRNA in the extracellular matrix of muscle," American Journal of Physiology - Regulatory, Integrative and Comparative Physiology, 292, R983 – R987.

9. Kostrominova, T.Y., Calve, S., Arruda, E.M. and *Larkin, L.M. (2009). "Ultrastructure of myotendinous junctions in tendon-skeletal muscle constructs engineered in vitro," Histology and Histopathology, 24, 541-550.

10. *Calve, S., Lytle, I.F., Grosh, K. Brown, D.L. and Arruda, E.M. (2010). "Implantation Increases tensile strength and collagen content of self-assembled tendon constructs," Journal of Applied Physiology, 108, 875-881.

11. Calve, S., Odelberg, S.J. and *Simon, H.-G. (2010). "A transitional extracellular matrix instructs cell behavior during muscle regeneration," Developmental Biology, 344, 259 – 271.

12. Calve, S. and *Simon, H.-G. (2011). "High resolution 3D imaging: evidence for cell cycle reentry in regenerating skeletal muscle," Developmental Dynamics, 240, 1233 – 1239.

13. Calve, S. and *Simon, H.-G. (2012). "The biochemical and mechanical environment cooperatively regulate skeletal muscle regeneration," FASEB J, Vol. 26, 2538 – 2545.

14. Hagerty, P., Lee, A., Calve, S., Lee, C.A., Vidal, M. and *Baar, K. (2012). "The effect of growth factors on both collagen synthesis and tensile strength of engineered human ligaments," Biomaterials, Vol. 33, 6355 – 6361.

15. Calve, S., Issac, J., Gumucio, J.P, and *Mendias, C.L. (2012). "Hyaluronic acid content is increased via upregulation of HAS1 and HAS2 during muscle hypertrophy," American Journal of Physiology – Cell Physiology, Vol. 303, C577 – 588.

16. *Mendias, C.L., Roche, S.M., Lynch, E.B., Harning, J.A., Davis, M.E., Sibilsky Enselman, E.R., Jacobson, J.A., Claflin, D.A., Calve, S. and Bedi, A. (2015). "Reduced muscle fiber production and disrupted myofibril architecture in patients with chronic rotator cuff repairs." Journal of Shoulder and Elbow Surgery, Vol. 24, 111 – 119. *Study was the recipient of the Neer Award.

17. *Calve, S., Ready, A., Huppenbauer, C., Main, R and *Neu C.P. (2015). "Optical clearing in dense connective tissues to visualize cellular connectivity in situ." PLoS ONE, DOI:10.1371/journal.pone.0116662.

18. *Neu, C.P., Novak, T., Gilliland, K.F., Marshall, P. and *Calve, S. (2015). "Optical clearing in collagen-and proteoglycan-rich osteochondral tissues." Osteoarthritis and Cartilage, Vol. 23, 405 – 413.

19. Lawrence, A., Xu, X, Calve, S., Neu, C.P. and *Panitch, A. (2015). "Synthesis and characterization of a lubricin mimic (mLub) to reduce friction and adhesion on the articular cartilage surface." Biomaterials, Vol. 73, 42 – 50.

20. Sharma, S., Vazquez-Portalatin, N., Calve, S., and *Panitch, A. (2016). "Biomimetic molecules lower catabolic expression and prevent chondroitin sulfate degradation in an osteoarthritic ex vivo model." ACS Biomaterials Science & Engineering, Vol. 2 (2), 241 – 250.

21. Xu, X., Li, Z., Cai, L., *Calve, S. and *Neu, C. (2016). "Mapping the nonreciprocal micromechanics of individual cells and the surrounding matrix within living tissues," Scientific Reports, 6, 24272, DOI:10.1038/srep24272.

22. *Calve, S., Witten, A.J., Ocken, A.R. and *Kinzer-Ursem, T. (2016). "Incorporation of non-canonical amino acids into the developing murine proteome," Scientific Reports, 6, 32377, doi: 10.1038/srep32377.

23. Xu, X., Li, Z., Leng, Y., *Neu, C.P. and *Calve, S. (2016). "Knockdown of the pericellular matrix molecule perlecan lowers in situ cell and matrix stiffness in developing cartilage," Developmental Biology, Vol. 418 (2), 242-247.

24. Lovdal, A.L., Calve, S., Yang, S., Van Alstine, W., Binkert, C.A. and *Klausen, K. (2017). "Evaluation of a bioabsorbable self-expandable vein stent-base made of poly(L-lactide) in vitro and in vivo," Cardiovascular and Interventional Radiology, Vol 40 (1), 112-119.

25. Witten, A.J., Traore, M.A., Gengelbach, L.M., Wang, X., Umulis, D.M., *Calve, S. and *Kinzer-Ursem, T.L. (2017). "Fluorescent imaging of protein myristoylation during cellular differentiation and development," Journal of Lipid Research, 58 (10), 2061 – 2070.

26. Acuña, A., Drakopoulos, M.A., Leng, Y., Goergen, C.J. and *Calve, S. (2018). "Three-dimensional visualization of extracellular matrix networks during murine development," Developmental Biology, 435 (2), 122-129.

27. Leng, Y., Abdullah, A., Wendt, M.K. and *Calve, S. (2018) "Hyaluronic acid, CD44 and RHAMM regulate myoblast behavior during embryogenesis," Matrix Biology, Special Issue on Hyaluronan Biology, DOI: 10.1016/j.matbio.2018.08.008.

28. Seelbinder, B., Ghosh, S., Rafeuse, M., Langer, S., Goergen, C., Calve, S. and *Neu, C.P. (2018) "Epigenetics drive mechanosensitive reorganization of the nucleus during cardiac lineage commitment," on BioRxiv DOI: 10.1101/455600

29. Silva Garcia, J.M., Panitch, A.P. and *Calve, S. (2019) "Biomechanical control of skeletal muscle cell behavior using peptide-functionalized hyaluronic acid hydrogels," Acta Biomaterialia, 84, 169 – 179.

30. Walimbe, T., Calve, S., Panitch, A. and *Sivasankar, P. (2019) "Incorporation of types I and III collagen in tunable hyaluronan hydrogels for vocal fold tissue engineering," Acta Biomaterialia, 87, 97 – 107.

31. Acuña, A., Sofronici, S.H., Goergen, C.J. and *Calve, S. (2019) "In situ characterization of native extracellular matrix deformation," accepted for publication at *Experimental Mechanics* (**invited**).

32. Lycke, R., Walls, M.K. and *Calve, S. (2019) "Computational modeling of developing cartilage using experimentally determined geometries and material properties," accepted for publication at *Journal of Biomechanical Engineering* for the "Spotlight on the Future" issue (**invited**).

33. Saleh, A.M., Wilding, K.M., Calve, S., Bundy, B.C. and *Kinzer-Ursem, T.L. (2019) "Non-canonical amino acid labeling in proteomics and biotechnology," accepted for publication at *Journal of Biological Engineering* for Emerging Leaders in Biological Engineering Thematic Series (**invited**).

Publications Under Revision

34. Saleh, A.M., Jacobson, K., Kinzer-Ursem, T.L. and *Calve, S. "Non-canonical amino acid labeling of the developing mouse reveals differential dynamics of intracellular and extracellular proteins," under revision for *Cellular and Molecular Bioengineering* Young Innovators 2019 Special Issue (**invited**).

Refereed symposium paper

Calve, S. and Simon, H.-G. (2008). Extracellular Control of Limb Regeneration. *Proceedings of the International Union of Theoretical and Applied Mechanics (IUTAM) Symposium on Cellular, Molecular and Tissue Mechanics*, Eds. E.M. Arruda and K. Garkipati, Springer, Woods Hole, Massachusetts, June 18-21, 2008.

Books and chapters in books

Garikipati, K., Narayanan, H., Arruda, E.M., Grosh, K., and Calve, S., "Material Forces in the Context of Biotissue Remodeling," *Mechanics of Material Forces*, Eds. P. Steinmann and G.A. Maugin, Springer, 2004.

Arruda, E.M., Calve, S., Garikipati, K., Grosh, K., and Narayanan, H., "Characterization and Modeling of Growth and Remodeling in Tendon and Soft Tissue Constructs," *Mechanics of Biological Tissue*, Eds. G.A. Holzapfel and R.W. Ogden, Springer, 2006.

Contributed conference/symposium presentations

*presenter, graduate/undergraduate student

*Calve, S., Arruda, E.M., Dennis, R.G., Grosh K. and Pasyk, K., "Poster: Tissue Engineering of Fibroblast Constructs and Anisotropic Collagen Gels," Materials Research Society Spring Meeting, San Francisco, CA, April, 2002.

*Calve, S., Arruda, E.M., Dennis R.G. and Grosh, K., "Influence of Mechanics on Tendon and Muscle Development," WCCM V Fifth World Congress on Computational Mechanics, Vienna, Austria, July, 2002.

*Calve, S., Dennis, R.G., Kosnik II, P.E., Grosh, K. and Arruda, E.M., "Engineering of Functional Tendon," ASME 2003 Summer Bioengineering Conference, Key Biscayne, FL, June, 2003.

*Calve, S., Arruda, E.M., Dennis, R.G., Baar, K., Grosh, K. and Garikipati, K., "Mechanical And Biochemical Characterization Of Self-Assembling Tendon Constructs," 7TH US National Congress on Computational Mechanics, Albuquerque, NM, July 2003.

(Keynote) *Arruda, E.M., Grosh, K., Garikipati, K., Narayanan, H. and Calve, S., "A Continuum treatment of Growth in Soft Biological Tissue: Coupling of Mass Transport and Mechanics," 7TH US National Congress on Computational Mechanics, Albuquerque, NM, July 2003.

*Calve, S., Dennis, R.G., Grosh, K. and Arruda, E.M., "Mechanics of Self-Assembling Tendon Constructs," 40TH Annual Technical Meeting of the Society of Engineering Science, Ann Arbor, MI, October 2003.

*Calve, S., Baar, K., Dennis, R.G. and Arruda, E.M., "Poster: Morphological and Mechanical Characterization of Self-Assembling Tendon Constructs," Experimental Biology 2004, Washington, DC, April 2004.

*Arruda, E.M., Calve, S., Garikipati, K., Grosh, K., and Narayanan, H., "Characterization and Modeling of Growth and Remodeling in Tendon and Soft Tissue Constructs," 2004 IUTAM on Mechanics of Biological Tissue, Graz, Austria, June 2004.

*Calve, S., Baar, K., Narayanan, H., Garikipati, K., Grosh, K., Dennis, R.G. and Arruda, E.M., "Development of Constitutive Models to Describe Growth in Soft Tissues: Experimental Basis," McMat 2005, Baton Rouge, LA, June 2005.

*Calve, S., Syed, F.N., Dennis, R.G., Grosh, K., Garikipati, K., and Arruda, E.M., "Mechanical Characterization of Growth in Fibrin-Based Tendon Constructs," ASME 2005 Summer Bioengineering Conference, Vail, CO, June 2005.

*Calve, S., Arruda, E.M., Mundy, K., Dennis, R. and Baar, K., "The Effect of Denervation and Aging on the Heterogeneous Material Properties of the Tibialis Anterior Tendon," XXth Congress of the International Society of Biomechanics, Cleveland, OH, August 2005.

*Calve, S., Kostrominova, T.Y., Arruda, E.M. and Larkin, L.M., "Poster: Functional Evaluation of Engineered Three-Dimensional Muscle-Tendon Constructs," BMES 2006, Chicago, IL, October 2006.

*Calve, S., Guzman, C., Krcmery, K. and Simon, H.-G., "Poster: Extracellular and Genetic Control of Muscle Regeneration," 46th Annual Midwest Developmental Biology Meeting, Chicago, IL, June 2007.

*Simon, H.-G. and Calve, S., "Using Extracellular Cues to Study Regeneration *In Vitro*," Experimental Biology 2008, San Diego, CA, April 2008.

*Calve, S. and Simon, H.-G., "Poster: Extracellular Control of Limb Regeneration," IUTAM Symposium on Cellular, Molecular and Tissue Mechanics, Woods Hole, MA, June 2008.

*Calve, S. and Simon, H.-G., "The Extracellular Matrix Plays an Active Role in Muscle Regeneration," Experimental Biology 2010, Anaheim, CA, April 2010.

*Calve, S. and Simon, H.-G., "Extracellular control of skeletal muscle plasticity," Gordon Research Seminar on Tissue Repair & Regeneration, New London, NH, June 2011.

*Calve, S. and Simon, H.-G., "The Mechanical and Biochemical Environment Controls Cellular Differentiation During Muscle Regeneration," ASME Summer Bioengineering Conference, Nemacolin, PA, June 2011.

*Calve, S., Issac, J., Gumucio, J.P, and Mendias, C.L., "Poster: Hyaluronic Acid Content in Skeletal Muscle is Increased via Upregulation of HAS1 and HAS2 During Muscle Hypertrophy," Tissue Engineering & Regenerative Medicine International Society, Houston, TX, December 2011.

*Calve, S., Issac, J., Gumucio, J.P, and Mendias, C.L., "Poster: Hyaluronic Acid Content is Increased via Upregulation of HAS1, HAS2 and HAS3 During Muscle Hypertrophy," Keystone Symposium on Mechanisms of Whole Organ Regeneration, Breckenridge, CO, April 2012.

*Neu, C.P., Novak, T.A., Ready, A., Fites, K., Main R., *Calve S. "Poster: Optical clearing of collagen- and proteoglycan-rich osteochondral tissues." 7th World Congress on Biomechanics, Boston, MA, July 2014.

*Xu X., Calve S., Neu C.P. "Mapping Biomechanical Properties of the Pericellular Matrix During Embryonic Limb Development in Mice." 7th World Congress on Biomechanics, Boston, MA, July 2014.

Neu, C.P., Novak, T., Gilliland, K.F., Marshall, P. & *Calve, S. "Poster: Optical clearing of ECM-rich osteochondral tissues." American Society of Matrix Biology Biennial Meeting, Cleveland, OH, October 2014.

Neu, C.P., Novak, T., Gilliland, K.F., Marshall, P. & *Calve, S. "Deep Imaging of Collagen- and Proteoglycan-Rich Tissues using Optical Clearing." Orthopaedic Research Society 2015 Annual Meeting, Las Vegas, NV, March 2015.

*Seelbinder, B., Calve, S. & Neu, C.P. "Mechanical decoupling of nuclei from the cytoskeleton indicate mechanosensitivity in a myocardiocyte pathology model." Summer Biomechanics, Bioengineering and Biotransport Conference 2015, Snowbird, Utah, June 2015.

Lawrence, A., Xu, X., Calve, S. Neu, C.P., *Panitch, A. "Poster: Lubricin Mimic Reduces Friction on the Articular Cartilage Surface." Biomedical Engineering Society Annual Meeting, Tampa, FL, October 2015.

*Xu X, Li Z., Neu C.P., & Calve S. "Poster: Mapping Biomechanical Properties of Living Biological Tissues Using Atomic Force Microscopy and Immunofluorescence Microscopy." Biomedical Engineering Society Annual Meeting, Tampa, FL, October 2015.

*Xu X, Li Z., Neu C.P., & Calve S. "Poster: Mapping the Effect of Perlecan on the Biomechanical Properties of Developing Murine Cartilage." Orthopaedic Research Society 2016 Annual Meeting, Orlando, FL, March 2016.

*Seelbinder, B., Ghosh, S., Calve, S. & Neu, C.P. "Analysis of Chromatin Mechanics During Cardiomyocyte Contraction Using Nuclear Spatial Strain Maps Reveals New Protective Mechanism." Summer Biomechanics, Bioengineering and Biotransport Conference 2016, National Harbor, MD, June 2016. **Selected for the PhD student speaking competition.**

Xu X, Li Z., Leng, Y., Neu C.P., & *Calve S. "Poster: Perlecan knockdown lowers in situ cell and matrix stiffness in developing cartilage." Gordon Research Conference on Musculoskeletal Biology and Bioengineering, Andover, NH, August 2016. **Selected as part of the Poster Preview session that showcases posters of particular interest and worthy of highlight.**

*Acuña, A., Drakopoulos, M.A., Sather, B., Goergen, C. & Calve, S. "Measurement of Displacement Fields of Native Extracellular Matrix Fibrils Loaded *In Situ*." Biomedical Engineering Society Annual Meeting, Minneapolis, MN, October 2016.

*Drakopoulos, M.A. & Calve, S. "A Method to Characterize Extracellular Matrix Composition and 3D Structure During

Embryonic Development" Biomedical Engineering Society Annual Meeting, Minneapolis, MN, October 2016.

*Ocken, A.R., Kieffer S., Kinzer-Ursem, T.L., & Calve, S. "Poster: *In Vivo* Incorporation of Non-Canonical Amino Acids to Determine Protein Turnover During Tissue Assembly." Biomedical Engineering Society Annual Meeting, Minneapolis, MN, October 2016.

*Witten, A.J., Traore, M.A., Calve, S., & Kinzer-Ursem, T.L. "Poster: Visualization of protein myristoylation during cellular differentiation." Biomedical Engineering Society Annual Meeting, Minneapolis, MN, October 2016.

Drakopoulos, M.A. & *Calve, S. "3D visualization of the extracellular matrix during embryonic development." American Society of Matrix Biology Biennial Meeting, St. Petersberg, FL, November 2016.

*Calve, S., Ocken, A.R., Jacobson, K., Kieffer, S., Kinzer-Ursem, T.L. "Poster: *In Vivo* Incorporation of Non-Canonical Amino Acids into the Extracellular Matrix of Developing Mice." American Society of Matrix Biology Biennial Meeting, St. Petersberg, FL, November 2016.

Xu X, Li Z., Leng, Y., Neu C.P., & *Calve S. "Poster: Perlecan knockdown lowers in situ cell and matrix stiffness in developing cartilage." American Society of Matrix Biology Biennial Meeting, St. Petersberg, FL, November 2016.

(Keynote) Calve, S., Witten, A.J., Ocken, A.R., Kieffer, S. and *Kinzer-Ursem, T.L. "Incorporation of Non-Canonical Amino Acids into the Developing Murine Proteome." American Institute of Chemical Engineers (AIChE) Annual Meeting, San Francisco, CA, November 2016.

*Ghosh, S., Haudenschild, D., Calve, S., Neu, C.P. "Poster: Deep Imaging Of Traditional Histological Staining in Cartilage Tissue Using Optical Clearing and Confocal Microscopy." Orthopaedic Research Society 2017 Annual Meeting, San Diego, CA, March 2017.

*Acuña, A., Drakopoulos, M.A., Sather, B., Goergen, C. & Calve, S. "In situ Characterization of Native Extracellular Matrix Fibril Deformation." Summer Biomechanics, Bioengineering and Biotransport Conference, Tucson, AZ, June 2017.

*Walimbe, T., Silva Garcia, J.M., Panitch, A., Calve, S., & Solorio, L. "Poster: Tunable Hyaluronan Hydrogels for Studying Biomechanically Induced EMT of Breast Cancer." Biomedical Engineering Society Annual Meeting, Phoenix, AZ, October, 2017.

*Calve, S., Acuña, A. & Goergen, C. "Measurement of heterogeneous extracellular matrix fibril deformation in situ." BMES-Cell and Molecular Bioengineering Conference, Key Largo, FL, January 2018. **Selected for the 2018 Rising Star Junior Faculty Award**

Acuña, A., Drakopoulos, M.A., Goergen, C. & *Calve, S. "Poster: Three-Dimensional Visualization of the Extracellular Matrix During Murine Development." Experimental Biology, San Diego, CA, April 2018. **Selected for 2018 AAA Faculty Travel Award (awarded to the top 5 reviewed abstracts submitted by assistant professors)**.

Lycke, R.J., Xu, X., Neu, C.P., Nauman, E.A. & *Calve, S. "Chondrocyte stiffness increases in tandem with matrix stiffness during development to maintain a constant intracellular strain." World Congress of Biomechanics, Dublin, Ireland, July 2018.

*Acuña, A., Goergen, C. & Calve, S. "Poster: In Situ Measurement of Native Extracellular Matrix Fibril Strain." World Congress of Biomechanics, Dublin, Ireland, July 2018.

*Barthold, J., St. Martin, B., Calve, S. & Neu, C.P. "Decellularized Cartilage Microparticles in a Hyaluronic Acid Gel as a Chondrogenic Scaffold for Cartilage Tissue." World Congress of Biomechanics, Dublin, Ireland, July 2018

*Seelbinder, B., Ghosh, S., Calve, S. & Neu, C.P. "Nuclear reorganization during cardiomyocyte differentiation is driven by epigenetic modifications," World Congress of Biomechanics, Dublin, Ireland, July 2018.

Ocken, A.R., Ku, M. & *Calve, S. "Poster: Perlecan knockdown significantly alters ECM composition during cartilage development," Gordon Research Conference on Musculoskeletal Biology and Bioengineering, Andover, NH, August 2018.

*Jacobson, K.R., Ocken, A.R., Miller, A.F., Kinzer-Ursem, T.L and Calve, S. "Proteomic Analysis of Extracellular Matrix Dynamics during Mouse Forelimb Development," American Society of Matrix Biology Biennial Meeting, Las Vegas, Nevada, October 2018.

*Leng, Y., and Calve, S. "RHAMM and CD44 Differentially Regulate the Influence of Hyaluronic Acid on Embryonic Myoblasts," American Society of Matrix Biology Biennial Meeting, Las Vegas, Nevada, October 2018.

*Ocken, A.R., Ku, M. and Calve, S. "Poster: Perlecan Knockdown Significantly Alters ECM Composition during Cartilage Development," American Society of Matrix Biology Biennial Meeting, Las Vegas, Nevada, October 2018.

*Saleh, A., Jacobson, K., Kinzer-Ursem, T.L. & Calve, S. "Poster: *In vivo* labeling and enrichment of newly synthesized proteins during embryonic development," Biomedical Engineering Society annual meeting, Atlanta, GA, October, 2018.

*Seelbinder, B., Ghosh, S., Calve, S. & Neu, C.P. "Intranuclear Tensile Strains Mediate Chromatin Reorganization During Cardiac Maturation," Biomedical Engineering Society annual meeting, Atlanta, GA, October, 2018.

*Calve, S., Ocken, A.R., Ku, M. "Perlecan knockdown significantly alters overall ECM composition during cartilage development," Gordon Research Conference on Cartilage Biology and Pathology, Galveston, TX, March 2018

*Calve, S., Lycke, R.J., Ocken, A.R., Ku, M., Nauman, E.A. "Building physiologically-relevant models of developing cartilage," Experimental Biology, Orlando, FL, April 2019.

*Jacobson, K.R., Lipp, S.N., Ocken, A.R., Kinzer-Ursem, T.L., & Calve, S. "Proteomic analysis of extracellular matrix dynamics during mouse forelimb development," American Society of Mass Spectrometry of Mass Spectrometry Annual Meeting, Atlanta, GA, June 2019.

Invited conference/symposium presentations

Feb 13, 2013 "Biomechanical regulation of skeletal muscle regeneration," Invited speaker for Gordon Research Conference on Fibronectin, Integrins & Related Molecules, Ventura, CA.

Oct 26, 2015 "Biomechanics of the developing ECM," Keynote speaker for the 52nd Annual Meeting for the Society of Engineering Science, College Station, TX.

Nov 19, 2015 "Imaging the role of the extracellular matrix during tissue assembly," Plenary speaker for the VI Seminars in Biomedical Basic Sciences, Universidad de Antioquia, Medellin, Columbia.

March 9, 2017 "Biomechanical testing across multiple scales," Keynote speaker for National Biomechanics Day, Montana State University, Bozeman, MT.

Oct 17, 2018 "Extracellular matrix dynamics during musculoskeletal development," Invited speaker for the Biomedical Engineering Society's 2018 meeting, Atlanta, GA.

Oct 24, 2018 Invited participant for "*Your Last Year in Grad School: Steps to Finishing your PhD*" panel at 42nd Annual Macromolecular Science and Engineering Symposium, University of Michigan, Ann Arbor, MI.

October 2019 "Non-canonical amino acid labeling of the developing mouse reveals differential dynamics of intracellular and extracellular proteins," Invited speaker for the Biomedical Engineering Society's 2019 Young Innovator special session, Philadelphia, PA.

Invited colloquium/seminar series presentations

Sept 28, 2012 "The extracellular matrix plays an active role during muscle regeneration," Seminar in Developmental Biology, Oregon Health & Science University, Portland, OR.

Jan 28, 2013 "Biomechanical regulation of skeletal muscle regeneration," Big 10 BME Seminar Exchange Program, University of Minnesota, Minneapolis, MN.

Mar 1, 2013 "Biomechanical regulation of skeletal muscle regeneration," Indiana University School of Medicine – Northwest, Gary, IN.

Mar 21, 2013 "The extracellular matrix plays an active role during muscle regeneration," Department of Biological Sciences, Purdue University, West Lafayette, IN.

Apr 9, 2013 "The extracellular matrix plays an active role during muscle regeneration," Purdue Student Pugwash, Purdue University, West Lafayette, IN.

Feb 24, 2014 "The extracellular matrix plays an active role during tissue assembly," BMS/IBSC Grad Seminar Program, Purdue University, West Lafayette, IN.

Sept 3, 2015 "3D imaging of the extracellular matrix," Department of Biology, University of Kentucky, Lexington, KY.

May 1, 2018 "Extracellular matrix dynamics during musculoskeletal development," Macromolecular Science and Engineering Center, University of Michigan, Ann Arbor MI.

May 17, 2018 "Extracellular matrix regulation of the developing musculoskeletal system," Department of Biomedical Engineering, University of California, Davis, CA.

June 12, 2018 "Extracellular matrix regulation of the developing musculoskeletal system," Summer Undergraduate Research Fellowship seminar series, Purdue University, West Lafayette, IN.

Jan 21, 2019 "Extracellular matrix regulation of musculoskeletal assembly," Department of Mechanical Engineering, University of Colorado, Boulder, CO.

Feb 28, 2019 "Extracellular matrix regulation of musculoskeletal assembly," CPB/BMS Grad Seminar Program, Purdue University, West Lafayette, IN.

Oct 2, 2019 "Mapping the material properties of the extracellular matrix during development," Chemical and Materials Engineering, University of Kentucky, Lexington, KY.

U.S. and International Patents Awarded

New System For Forming a Skeletal Muscle Construct Comprises a Substrate, Primary Muscle Cells, Anchors Secured to the Monolayer in Spaced Relationship, a Secondary Tissue Provided in Contact With the Monolayer. Patent # US2008193810-A1. Larkin, L.M., Arruda, E.M., Calve, S., Kostrominova, T.Y., Syed-Picard, F.N.

System and Method for Guided Self-Organization of Tendon and Ligament Tissue in Culture. Patent # US2008199953-A1. Dennis, R.G., Arruda, E.M., Calve, S., Kosnik, P.E.

School Committee Activities

Sept 2012 – Aug 2014	Graduate Committee, member, Weldon School of Biomedical Engineering
Sept 2013 – Apr 2015	Search Committee, member, Department of Basic Medical Sciences
Sept 2014 – May 2017	Undergraduate Curriculum Committee, member, Weldon School of Biomedical Engineering
July 2016 – May 2017	Graduate Admissions Committee, member, Weldon School of Biomedical Engineering
Sept 2017 – Jan 2018	Chair, Engineered Biomaterials and Biomechanics Area, Weldon School of Biomedical Engineering
Aug 2017 – Jan 2018	Research Committee, Weldon School of Biomedical Engineering
Jan 2018 – May 2019	Chair, Research Committee, Weldon School of Biomedical Engineering
May 2019 – Present	Graduate Committee, member, Weldon School of Biomedical Engineering
May 2019 – Present	Awards Committee, member, Weldon School of Biomedical Engineering

Starting August 2019	Primary Committee, Weldon School of Biomedical Engineering

University-Wide Committee Activities

Sept 2014 – Jan 2015	Professional Practice/Co-op, BME representative
Jan 2015 – May 2018	Engineering Curriculum Committee, College of Engineering, BME representative
Dec 2017 – May 2018	PULSe Admissions Committee
Jan 2017 – present	PULSe Executive Committee, Biotechnology Training group representative

Service to Government or Professional Organizations

Track Chair - Orthopedic and Rehabilitation Engineering, 2017 BMES Meeting, Phoenix, AZ October 11-14, 2017.

Working group leader, *Manipulating Tissue Regeneration and Biological Responses In Vivo*, Regenerative BioX Workshop, University of Colorado – Boulder, 2018.

Guest Editor, with David Umulis, for a Special Issue of *Developmental Dynamics*: 50 Years of Positional Information in Development, Disease and Repair to be published April 2020

Ad hoc reviewer: Acta Biomaterialia (received $200 honorarium in June 2013 as recognition for quality of reviews), Matrix Biology, Biomaterials, Advanced Healthcare Materials, Tissue Engineering, Experimental Mechanics, Journal of Biomechanics, PLoS ONE, Journal of Biophotonics, Computer Methods in Biomechanics and Bioengineering, Cellular and Molecular Bioengineering, Biotechnology Journal, Biomedical Optics Express, Connective Tissue Research, Regenerative Biology, Stem Cells and Development, Journal of Biomedical Materials Research, International Journal of Sports Nutrition and Exercise Metabolism

Conference abstract reviewer: SB3C 2015, SB3C 2019

Ad hoc proposal reviewer: NSF BMMB study section (2013), NIH BMBI study section (2013), National Academy of Sciences Pakistan – US Science and Technology Cooperation review panel (Phase 6: 2015, Phase 7: 2017), NSF IOS-Activation study section (2015), Indiana CTSI CTR Pilot Grant Review (2017, 2018), United States – Israel Binational Science Foundation (2018), NIH SBSR study section (2018, 2019)