

ADRIAN BUGANZA TEPOLE, PhD
Associate Professor, Department of Mechanical Engineering, Columbia University
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EDUCATION

PhD in Mechanical Eng.	Stanford University, USA	06/2012-08/2015
MS in Mechanical Eng.	Stanford University, USA	09/2010-06/2012
BS in Mechatronics Eng.	Universidad Panamericana, Mexico	08/2005-07/2010

EXPERIENCE

Associate Professor	Columbia University, USA	07/2025-
Adjunct Professor	Purdue University, USA	07/2025-
Associate Professor	Purdue University, USA	08/2021 – 06/2025
Assistant Professor	Purdue University, USA	08/2016-07/2021
Postdoctoral Fellow	Harvard University, USA	10/2015-08/2016
Visiting Researcher	California Institute of Technology, USA	02/2015-03/2015
Research Assistant	Stanford University, USA	09/2010-08/2015
Research Assistant	Universidad Panamericana, Mexico	01/2008-07/2010
Robotics Teacher	Universidad Panamericana High School, Mexico	09/2009-07/2010

HONORS AND AWARDS

Harrington Fellow at University of Texas Austin	08/2024-06/2025
ASME Y.C. Fung Early Career Medal	2024
Miller Visiting Professor at University of California Berkeley	01/2022-05/2022
Stanford Graduate Diversity Summer Research Grant	06/2014-09/2014
Diversifying Academia, Recruiting Excellence Fellowship	09/2014-08/2016
Stanford Graduate Fellowship	09/2011-08/2014
Claudio X Gonzalez Fellowship	09/2010-08/2011
Mexican National Council for Science and Technology Scholarship	09/2010-08/2015
Mexican Department of Public Education Scholarship	08/2005-07/2009

JOURNAL PUBLICATIONS

[Google scholar](#). Citations 4160, H-index 32

Prof. Buganza Tepole's students and postdocs are underlined

100. Madariaga A, Lohr MJ, Lin CY, Fuhg J, **Tepole AB**, Rausch MK. An Affordable, Openly-Shared Planar Biaxial Device to Study the Multiscale Mechanics of Soft Materials. *Experimental Mechanics*. 2026 Mar 9:1-8.

99. Das S, Brindise MC, Payne JM, Solorio L, **Tepole AB**, Vlachos P. Subcutaneous tissue structural feature identification using unsupervised machine learning. *Computers in Biology and Medicine*. 2026 Apr 1;205:111553.

98. Chockalingam S, **Tepole AB**, Kumar A. The phase-field model of fracture incorporating Mohr-Coulomb, Mogi-Coulomb, and Hoek-Brown strength surfaces. *Engineering Fracture Mechanics* (2026): 112108.

- 97. Wilkinson M**, Goparaju K, Nunez-Alvarez L, Goergen CJ, Arrieta AF, **Tepole AB**. Bayesian Inference Framework to Identify Skin Material Properties in vivo from Active Membranes. *Journal of Biomechanical Engineering*. 2026 Feb 26:1-22.
- 96. Thani A, Tepole AB**. Physics informed surface autoencoders for thin shell analysis. *Computer Methods in Applied Mechanics and Engineering*. 2026 Apr 15;452:118764.
- 95. Tac V, Amiri-Hezaveh A**, Rausch MK, Bechtel GN, Costabal FS, **Tepole AB**. Fully data-driven inverse hyperelasticity with hyper-network neural ODE fields. *npj Computational Materials*. 2026 Mar 10.
- 94. Ledwon JK**, Proгри B, Applebaum SA, Vignesh O, Yau A, Aguilar AH, **Tepole AB**, Gosain AK. Hippo Pathway Regulates Cell Proliferation in Skin Epidermis Exposed to Mechanical Forces. *Journal of Cellular and Molecular Medicine*. 2025 Jun;29(12):e70674.
- 93. Jones RE**, **Tepole AB**, Fuhg JN. Differentiable neural network representation of multi-well, locally-convex potentials. *Journal of Computational Physics*. 2026 Jan 14:114688.
- 92. Suarez-Gomez D**, Perez-Rosas NC, Miranda-Contreras GI, Colom-Braña SR, Zhang W, Mim MS, Tan S, Gazzo D, **Tepole AB**, Deng Q, Reeves GT. CalciumInsights: An Open-Source, Tissue-Agnostic Graphical Interface for High-Quality Analysis of Calcium Signals. *bioRxiv*. 2025 Jun 8:2025-06.
- 91. Amiri-Hezaveh A**, Tan S, Deng Q, Umulis D, Cunniff L, Weickenmeier J, **Tepole AB**. A Physics-Informed Deep Learning Deformable Medical Image Registration Method Based on Neural ODEs. *International Journal of Computer Vision*. 2025 Jun 8:1-26.
- 90. Amiri-Hezaveh A, Tepole AB**. A Physics-Augmented Machine Learning Constitutive Model for Damage in Solids. *arXiv preprint arXiv:2508.05638*. 2025 Jul 23 (minor revisions at JMPS)
- 89. Putluru DR**, **Tepole AB**, Gomez H. Mixed-dimensional fluid–structure interaction simulations reveal key mechanisms of cerebrospinal fluid dynamics in the spinal canal. *Fluids and Barriers of the CNS*. 2025 Jul 30;22(1):81.
- 88. Harbin Z**, Fisher C, Voytik-Harbin S, **Tepole AB**. Computational modeling of patient-specific healing and deformation outcomes following breast-conserving surgery based on MRI data. *Annals of Biomedical Engineering*. 2025.
- 87. Laudo J, Han T**, Ledwon J, Figueroa AE, Gosain AK, Lee T, **Tepole AB**. Predictive Modeling of Human Skin Deformation and Growth During Tissue Expansion in Postmastectomy Breast Reconstruction. *Journal of Biomechanical Engineering*. 2025 Jul 1;147(7).
- 86. Ding C**, Li L, Wang Y, Nguyen HA, Zhang W, Chan DD, Umulis DM, Staiger CJ, **Buganza AT**, Deng Q. Reactive Oxygen Species Counteract Wound Contraction and Promote Wound Healing. *Biophysical Journal*. 2025.
- 85. Laudo J, Han T**, Figueroa AE, Ledwon J, Gosain A, Lee T, **Tepole AB**. Development and calibration of digital twins for human skin growth in tissue expansion. *Acta Biomaterialia*. 2025 Mar 25.
- 84. Tepole AB**, Jadoon A, Rausch M, Fuhg JN. Polyconvex Physics-Augmented Neural Network Constitutive Models in Principal Stretches. *International Journal of Solids and Structures*. 2025, 113469.
- 83. Nagle M**, Conroy Broderick H, **Tepole AB**, Fop M, Ní Annaidh A. A machine learning approach to predict in vivo skin growth. *Scientific Reports*. 2024 Jul 29;14(1):17456.
- 82. Nunez-Alvarez L**, Ledwon JK, Applebaum S, Proгри B, **Han T**, **Laudo J**, **Tac V**, Gosain AK, **Tepole AB**. Tissue expansion mitigates radiation-induced skin fibrosis in a porcine model. *Acta Biomaterialia*. 2024 Nov 1;189:427-38.
- 81. Moreno-Flores O**, Holland M, Ledwon J, Gosain AK, **Tepole AB**. Numerical investigation of new rete ridge formation in a multi-layer model of skin subjected to tissue expansion. *Journal of Biomechanics*. 2024 Nov 1;176:112346.

- 80. Tac V**, Kuhl E, **Tepole AB**. Data-driven continuum damage mechanics with built-in physics. *Extreme Mechanics Letters*. 2024 Sep 1;71:102220.
- 79. Mendenhall CA**, Hardan J, Chiang TD, Blumenschein LH, **Tepole AB**. Physics-Informed Neural Network for Scalable Soft Multi-Actuator Systems. In 2024 IEEE 7th International Conference on Soft Robotics (RoboSoft) 2024 Apr 14 (pp. 716-721). IEEE.
- 78.** Peirlinck M, Hurtado JA, Rausch MK, **Tepole AB**, Kuhl E. A universal material model subroutine for soft matter systems. Accepted at *Engineering with Computers* 2024 .
- 77.** Montes A, Barroso A, Wang W, O'Connell G, **Tepole AB***, Mofrad M*. Integrin Mechanosensing relies on Pivot-clip Mechanism to Reinforce Cell Adhesion. *Biophysical J*. 2023:2023-12. Co-corresponding
- 76. Tac V**, Rausch MK, Billionis I, Costabal FS, **Tepole AB**. Generative Hyperelasticity with Physics-Informed Probabilistic Diffusion Fields. In review, Preprint: *Engineering with Computers*. 2024.
- 75.** Song G, Gosain AK, **Tepole AB**, Rhee K, Lee T. Exploring uncertainty in hyper-viscoelastic properties of scalp skin through patient-specific finite element models for reconstructive surgery. *Computer Methods in Biomechanics and Biomedical Engineering*. 2024 Feb 4:1-5.
- 74. Barsimantov Mandel J**, Payne J, de Lucio M, Hakim M, Gomez H, Solorio L, **Tepole AB**. Poro-hyperelastic characterization and modeling of subcutaneous tissue under confined compression. *Annals of Biomedical Engineering*, 2024.
- 73. Barsimantov Mandel J**, Solorio L, **Tepole AB**. Geometry of adipocyte packing in subcutaneous tissue contributes to nonlinear tissue properties captured through a Gaussian process surrogate model. *Soft mater*, 2024.
- 72. Moreno Flores O**, Rausch MK, **Tepole AB**. The Role of Interface Geometry and Appendages on the Mesoscale Mechanics of the Skin. 2023; in print at *Biomechanics and Modeling in Mechanobiology*, Preprint: <https://doi.org/10.21203/rs.3.rs-3182434/v1> , 2024
- 71.** Lin CY, Sugerman GP, Kakaletsis S, Meador WD, **Tepole AB**, Rausch MK. Sex-and Age-dependent Skin Mechanics—A Detailed Look in Mice. 2023; *Acta Biomaterialia*. Preprint: <https://doi.org/10.1101/2023.03.08.531781> , 2024
- 70.** Vanderlaan EL, Sexton J, Evans-Molina C, **Tepole AB**, Voytik-Harbin SL. Islet-on-Chip: Promotion of Islet Health and Function via Encapsulation within a Polymerizable Fibrillar Collagen Scaffold. *Lab on a Chip*. 2023. <https://doi.org/10.1039/D3LC00371J>
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- 68. Toaquiza Tubon J**, **Sree VD**, Payne J, Solorio L, **Tepole AB**. Mechanical damage in porcine dermis: Micro-mechanical model and experimental characterization. *Journal of the Mechanical Behavior of Biomedical Materials*. 2023 Sep 26:106143.
- 67. Harbin ZJ**, **Sohutskay DO**, Vanderlaan E, Fontaine MA, **Mendenhall C**, Fisher CS, Voytik-Harbin SL, **Tepole AB**. Computational Mechanobiology Model Evaluating Healing of Postoperative Cavities Following Breast-Conserving Surgery. Accepted in *Computers in Biology and Medicine*. 2023; <https://doi.org/10.1101/2023.04.26.538467>.
- 66. Diosa Pena JG**, Moreno Sánchez R, Chica Arrieta E, Tepole AB. Impact of Indenter Size and Microrelief Anisotropy On the Tribological Behavior of Human Skin. *Journal of Biomechanical Engineering*. 2023; 145(10):101008.
- 65. Tac V**, Rausch MK, Costabal FS, **Tepole AB**. Data-driven anisotropic finite viscoelasticity using neural ordinary differential equations. *Computer Methods in Applied Mechanics and Engineering*. 2023; 411:116046.
- 64. Tac V**, Linka K, Sahli-Costabal F, Kuhl E, **Tepole AB**. Benchmarking physics-informed frameworks for data-driven hyperelasticity. *Computational Mechanics*. 2023 Jun 3:1-17.

- 63. Sree VD, Toaquiza-Tubon JD**, Payne J, Solorio L, **Tepole AB**. Damage and Fracture Mechanics of Porcine Subcutaneous Tissue Under Tensile Loading. *Annals of Biomedical Engineering*. 2023; 51:2056–2069.
- 62. Ledwon JK**, Applebaum SA, Progrid B, **Han T**, Vignesh O, Gutowski KS, Chang AB, Reddy NK, **Tepole AB**, Gosain AK. Acellular dermal matrix cover improves skin growth during tissue expansion by affecting distribution of mechanical forces. *Plastic and Reconstructive Surgery*. 2023; 23:10-97.
- 61. Linka K, Tepole AB**, Holzapfel GA, Kuhl E. Automated model discovery for skin: Discovering the best model, data, and experiment. *Computer Methods in Applied Mechanics and Engineering*. 2023;410:116007.
- 60. Jimenez JM**, Tuttle TG, **Guo Y**, Miles DT, **Tepole AB***, Calve S*. Multiscale Mechanical Characterization and Computational Modeling of Fibrin Gels. *Acta Biomaterialia*. 2022;162:292-303. *Co-corresponding
- 59. Beck ZP, Alpert B**, Bowman AJ, Watson WR, **Tepole AB**. Elasticity Solver in Minecraft for Learning Mechanics of Materials by Gaming. 2022; in press at Biomedical Engineering Education. Preprint: <https://doi.org/10.48550/arXiv.2212.08124>.
- 58. Sree V**, Zhong X, Billionis I, Ardekani A, **Tepole AB**. Optimizing autoinjector devices using physics-based simulations and Gaussian processes. *Journal of the Mechanical Behavior of Biomedical Materials*. 2023; 140:105695.
- 57. Pensalfini M, Tepole AB**. Mechano-biological and bio-mechanical pathways in cutaneous wound healing, *PLOS Computational Biology*. 2023; 19 (3), e1010902.
- 56. Han D**, Li C, Araimdeh S, **Sree V**, Rahimi E, **Tepole AB**, Ardekani AM. Lymphatic uptake of biotherapeutics through a 3D hybrid discrete-continuum vessel network in the skin tissue. *Journal of Controlled Release: Official Journal of the Controlled Release*. 2023; 354, 869-888
- 55. Ledwon JK**, Applebaum SA, Progrid B, Vignesh O, Gutowski KS, Chang AB, **Tepole AB**, Gosain AK. Biological Cover Mitigates Disruption of the Dermal Structure in Mechanically Expanded Skin in a Porcine Model. *International Journal of Molecular Sciences*. 2022 Oct 28;23(21):13091.
- 54. Toaquiza-Tubon J, Moreno-Flores O, Sree VD, Tepole AB**. Anisotropic damage model for collagenous tissues and its application to model fracture and needle insertion mechanics. *Biomechanics Modeling in Mechanobiology*, 2022; 21 (6), 1-16.
- 53. Li L**, Wang X, Chai J, Wang W, **Tepole AB**, Umulis D. Determining the Role of Advection in Patterning by Bone Morphogenetic Proteins through Neural Network Model-based Acceleration of a 3D Finite Element Model of the Zebrafish Embryo. *Frontiers Systems Biology*. 2022; 2: <https://doi.org/10.3389/fsysb.2022.983372>
- 52. Song G**, An J, **Tepole AB**, Lee T. Bayesian Inference With Gaussian Process Surrogates to Characterize Anisotropic Mechanical Properties of Skin From Suction Tests. *Journal of Biomechanical Engineering*. 2022;144(12):121003.
- 51. Guo**, Mofrad, Tepole AB. On modeling the multiscale mechanobiology of soft tissues: Challenges and progress. *Biophysics Reviews*. 2022, 3(3): 031303.
- 50. Han T**, Ahmed KS, Gosain AK, **Tepole AB**, T Lee. Multi-Fidelity Gaussian Process Surrogate Modeling of Pediatric Tissue Expansion. *Journal of Biomechanical Engineering*. 2022, 144 (12):121005
- 49. Tac V**, Costabal FS, **Tepole AB**. Data-driven tissue mechanics with polyconvex neural ordinary differential equations. *Computer Methods in Applied Mechanics and Engineering*. 2022 Aug 1;398:115248.
- 48. Pawar A**, Li L, Gosain AK, Umulis DM, **Tepole AB**. PDE-constrained shape registration to characterize biological growth and morphogenesis from imaging data. *Engineering with Computers*. 2022;38: 3909–3924.
- 47. Tac V, Sree VD**, Rausch MK, **Tepole AB**. Data-driven modeling of the mechanical behavior of anisotropic soft biological tissue. *Engineering with Computers*. 2002, 38:4167–4182.
- 46. Sree VD**, Ardekani A, Vlachos P, **Tepole AB**. The Biomechanics of Autoinjector - Skin Interactions During Dynamic Needle Insertion. *Journal of Biomechanics*. 2022;134:110995.

- 45. Guo Y**, Jimenez-Corredor J, Calve S, **Tepole AB**. Multiscale mechanobiology: coupling models of adhesion kinetics and nonlinear tissue mechanics. *Biophysical Journal*. 2022; 121 (4), 525-539.
- 44. Sohutskey DO**, **Tepole AB***, Voytik-Harbin SL*. Mechanobiological wound model for improved design and evaluation of collagen dermal replacement scaffolds. *Acta Biomaterialia*. 2021;135:368-82. *Co-corresponding
- 43.** Meador W, Sugerman E, **Tepole AB**, Rausch MK. The biaxial mechanics of thermally denaturing skin - Part I: Experiments. 2021. *Acta Biomaterialia*. 2022 Mar 1;140:412-20.
- 42.** Rausch MK, **Toaquiza Tubon J**, **Moreno Flores O**, **Tepole AB**. The biaxial mechanics of thermally denaturing skin - Part II: Modeling. 2021. *Acta Biomaterialia*. 2022 Mar 1;140:421-33.
- 41. Han T***, **Lee T***, Ledwon J, Vaca E, Turin SY, Kearney A, Gosain AK, **Tepole AB**. Bayesian Calibration of a Computational Model of Tissue Expansion Based on a Porcine Animal Model. *Acta Biomaterialia*. 2022 Jan 1;137:136-46. *Equal contribution.
- 40. Len Y**, **Tac V**, Calve S, **Tepole AB**. Predicting the Mechanical Properties of Fibrin Using Neural Networks Trained on Discrete Fiber Network Data. *Computer Methods in Applied Mechanics Engineering*, 2021, 387, 114160.
- 39. Lee T**, Turin SY, **Stowers C**, Gosain AK, **Tepole AB**. Personalized Computational Models of Tissue-Rearrangement in the Scalp Predict the Mechanical Stress Signature of Rotation Flaps. *Cleft Palate-Craniofacial Journal*. 2021 Apr;58(4):438-45.
- 38. Diosa JG**, Moreno R, Chica EL, Villarraga JA, **Tepole AB**. Changes in the three-dimensional microscale topography of human skin with aging impact its mechanical and tribological behavior. *Plos one*. 2021 Jul 9;16(7):e0241533.
- 37. Lee T**, Holland MA, Weickenmeier J, Gosain AK, **Tepole AB**. The geometry of incompatibility in growing soft tissues: Theory and numerical characterization. *Journal of the Mechanics and Physics of Solids*. 2021, 146: 104177.
- 36.** Enríquez A, Libring S, Field TC, **Jimenez J**, **Lee T**, Park H, Satoski D, Wendt MK, Calve S, **Tepole AB**, Solorio L. High-Throughput Magnetic Actuation Platform for Evaluating the Effect of Mechanical Force on 3D Tumor Microenvironment. *Advanced Functional Materials*. 2020, 31(1): 2005021.
- 35.** Burzawa L, Li L, Wang X, **Tepole AB**, Umulis DM. Acceleration of PDE-based biological simulation through the development of neural network metamodels. *Current Pathobiology Reports*, 2020: 1-11.
- 34. Stowers C**, **Lee T**, Bilonis I, Gosain A, **Tepole AB**. (2020). Improving Reconstructive Surgery Design using Gaussian Process Surrogates to Capture Material Behavior Uncertainty. *Journal of the Mechanical Behavior of Biomedical Materials* 118, 104340.
- 33.** Janes LE, Ledwon JK, Vaca EE, Turin SY, **Lee T**, **Tepole AB**, Bae H, Gosain AK. Modeling Tissue Expansion with Isogeometric Analysis: Skin Growth and Tissue Level Changes in the Porcine Model. *Plastic and Reconstructive Surgery*. 2020;146(4):792-8.
- 32. Sree VD**, **Tepole AB**. Computational Systems Mechanobiology of Growth and Remodeling: Integration of Tissue Mechanics and Cell Regulatory Network Dynamics. *Current Opinion in Biomedical Engineering* 2020 (15): 75-80.
- 31. Lee T**, Bilonis I, **Tepole AB**. Propagation of uncertainty in the mechanical and biological response of growing tissues using multi-fidelity Gaussian process regression. *Computer Methods Applied Mechanics Engineering*. 2020, 359: 112724.
- 30.** Alber M, **Tepole AB**, Cannon W, De S, Dura-Bernal S, Garikipati K, Karniadakis G, Lytton WW, Perdikaris P, Petzold L, Ellen Kuhl. Multiscale modeling meets machine learning: What can we learn? *Archives in Computer Methods in Engineering* 2020; 1-21.

29. Jahani S, Yang LP, **Tepole AB**, Bardin JC, Tang HX, Jacob Z. Probabilistic vortex crossing criterion for superconducting nanowire single-photon detectors. *Journal of Applied Physics*. 2020, 127(14), 143101.
28. Meador WD, Sugerman GP, Story HM, Seifert AW, Bersi MR, **Tepole AB**, Rausch MK. The regional-dependent biaxial behavior of young and aged mouse skin: A detailed histomechanical characterization, residual strain analysis, and constitutive model. *Acta Biomaterialia*. 2019(101): 403-413.
27. Alber M, **Tepole AB**, Cannon W, De S, Dura-Bernal S, Garikipati K, Karniadakis G, Lytton WW, Perdikaris P, Petzold L, Ellen Kuhl. Integrating machine learning and multiscale modeling—perspectives, challenges, and opportunities in the biological, biomedical, and behavioral sciences. *npj Digital Medicine*. 2019; 2: 1-11.
26. **Sree VD**, Rausch MK, **Tepole AB**. Linking microvascular collapse to tissue hypoxia in a multiscale model of pressure ulcer initiation. *Biomechanics Modeling in Mechanobiology*. 2019; 18:1947-1964.
25. **Sree VD**, Rausch MK, **Tepole AB**. Towards understanding pressure ulcer formation: coupling an inflammation regulatory network to a tissue scale finite element model. *Mechanics Research Communications*. 2019;97:80-88.
24. Gliberman AL, Pope BD, Zimmerman JF, Liu Q, Ferrier JP, Kenty JH, Schrell AM, Mukhitov N, Shores KL, **Tepole AB**, Melton DA, Roper MG, Parker KK. Synchronized stimulation and continuous insulin sensing in a microfluidic human Islet on a Chip designed for scalable manufacturing. *Lab on a Chip*. 2019; 19(18), 2993-3010.
23. **Lee T**, Gosain AK, Billionis I, **Tepole AB**. Predicting the effect of aging and defect size on the stress profiles of skin from advancement, rotation and transposition flap surgeries. *Journal of the Mechanics and Physics of Solids*. 2019;125:572-90
22. **Lee T**, Turin SY, Gosain AK, Billionis, I, **Tepole AB**. Propagation of material behavior uncertainty in a nonlinear finite element model of reconstructive surgery. *Biomechanics and Modeling Mechanobiology*. 2018; 17: 1857-73.
21. **Lee T**, Turin SY, Gosain AK, **Tepole AB**. Multi-View Stereo in the Operating Room Allows Prediction of Healing Complications in a Patient-Specific Model of Reconstructive Surgery. *Journal of Biomechanics*. 2018. 74, 202-206.
20. **Lee T**, Vaca EE, Ledwon J, Bae H, Topczewska JM, Turin SY, Kuhl E, Gosain AK, **Tepole AB**. Improving Tissue Expansion through Computational Modeling. *Journal of the Mechanical Behavior of Biomedical Materials*. 2018. 82, 224-234.
19. Chanter CO, Campbell PH, Golecki HM, **Tepole AB**, Capulli AK, Deravi LF, Dauth S, Sheehy SP, Paten JA, Gledhill K, Doucet YS, Abaci HE, Ahn S, Pope BD, Ruberti JW, Hoerstrup SP, Christiano AM, Parker KK. Production-scale fibronectin nanofibers promote wound closure and tissue repair in a dermal mouse model. *Biomaterials*. 2018. 166, 96-108.
18. Turin SY, Ledwon J, Bae H, **Tepole AB**, Topczewska JM, Gosain AK. Digital Analysis Yields More Reliable and Accurate Measures of Dermal and Epidermal Thickness in Histologically Processed Specimens Compared to Traditional Methods. *Experimental Dermatology*. 2018, 27:687-690.
17. **Tepole AB**. Computational systems mechanobiology of wound healing. *Computer Methods in Applied Mechanics and Engineering*. 2017, 314: 46-70.
16. Purnell C, Gart M, **Tepole AB**, Tomaszewski J, Topczewska J, Kuhl E and Gosain AK. Determining the differential effects of stretch and growth in tissue expanded skin: Combining isogeometric analysis and continuum mechanics in a porcine model. *Dermatologic Surgery*. 2018, 44(1):48-52.
15. **Tepole AB**, Purnell CA, Gart M, McGrath J, Kuhl E, Gosain AK. Quantification of strain in a porcine model of skin expansion using multi-view stereo and isogeometric kinematics. *JoVE (Journal of Visual Experiments)*. 2017, 122: e55052-e55052.

14. Srivastava A, **Tepole AB**, Hui CY. Skin stretching by a balloon tissue expander: Interplay between contact mechanics and skin growth. *Extreme Mechanics Letters*. 2016, 9:175-187.
13. Armstrong MH, **Tepole AB**, Kuhl E, Simon BR, and Vande Geest J. A finite element model for mixed porohyperelasticity with transport, swelling, and growth. *PLoS ONE*. 2016, 14; 11(4): e0152806.
12. **Tepole AB**, Gart M, Purnell CA, Gosain AK, Kuhl E. The incompatibility of living systems: Characterizing growth-induced incompatibilities in expanded skin. *Annals Biomedical Engineering*. 2016; 44: 1734-1752.
11. **Tepole AB**, Kabaria H, Bletzinger KU, Kuhl E. Isogeometric Kirchhoff-Love shell formulations for biological membranes. *Computer Methods in Applied Mechanics and Engineering*. 2015; 293:328-347.
10. **Tepole AB**, Gart M, Purnell CA, Gosain AK, Kuhl E. Multi-view stereo analysis reveals anisotropy of prestrain, deformation and growth in living skin. *Biomechanics Modeling in Mechanobiology*. 2015; 14: 1007-1019.
9. **Tepole AB**, Kuhl E. Computational modeling of chemo-bio-mechanical coupling: A systems-biology approach towards wound healing. *Computer Methods in Biomechanics and Biomedical Engineering*. 2016;19:13-30.
8. **Tepole AB**, Gart M, Gosain AK, Kuhl E. Characterization of living skin using multi view stereo and isogeometric analysis. *Acta Biomaterialia*. 2014; 10:4822-4831.
7. **Tepole AB**, Steinberg JP, Kuhl E, Gosain AK. Application of finite element modeling to optimize flap design with tissue expansion. *Plastic and Reconstructive Surgery*. 2014; 134:785-792.
6. **Tepole AB**, Gosain AK, Kuhl E. Computational modeling of skin: Using stress profiles as predictor for tissue necrosis in reconstructive surgery. *Computers and Structures*. 2014;143:32-39.
5. **Tepole AB**, Kuhl E. Systems-based approaches toward wound healing. *Pediatric Research*. 2013; 73: 553-563.
4. **Tepole AB**, Gosain AK, and Kuhl E. Stretching skin: the physiological limit and beyond. *International Journal of Nonlinear Mechanics*. 2012;47(8): 938-949.
3. Zoellner AM, **Tepole AB**, Gosain AK and Kuhl E. Growing skin: tissue expansion in pediatric forehead reconstruction. *Biomechanics Modeling in Mechanobiology*. 2012;11(6): 855-867.
2. Zoellner AM, **Tepole AB**, and Kuhl E. On the biomechanics and mechanobiology of growing skin. *Journal of Theoretical Biology*. 2012; 297:166-175.
1. **Tepole AB**, Ploch CJ, Wong J, Gosain AK, Kuhl E. Growing skin - A computational model for skin expansion in reconstructive surgery. *Journal of the Mechanics and Physics of Solids*. 2011;59:2177-2190.

BOOK CHAPTERS

1. **Tepole AB**. Constitutive Modelling of Wound Healing. In *Skin Biophysics*, pp. 101-133. Springer, Cham, 2019. Editor: Limbert G.
2. **Tepole AB**, Gosain AK. Constitutive Modelling of Skin Growth. In *Skin Biophysics*, pp. 77-100. Springer, Cham, 2019. Editor: Limbert G.

ACADEMIC SERVICE TO THE COMMUNITY

Associate Editor:

ASME Journal of Biomechanical Engineering

Journal of Computational Physics

Editorial Board Member:

Engineering with Computers

Special Issue Editor:

Engineering with Computers: Scientific Machine Learning for Computational Mechanics 2025

ASME Journal of Biomechanical Engineering: Data-driven Methods in Biomechanics. 2022

Engineering with Computers: Image Based Methods in Computational Medicine. 2021

Computer Methods in Applied Mechanics and Engineering: Uncertainty Quantification, Machine Learning, and Data-Driven Modeling of Biological Systems. 2019

Service to US Association of Computational Mechanics (USACM):

Area Chair: Biological Systems Technical Thrust Area (TTA) at the US Association of Computational Mechanics (USACM). 2020-2022

Workshops:

Harrington workshop on Scientific Machine Learning. Oden Institute for Computational Engineering and Sciences, Austin, TX. 2025

Uncertainty quantification and stochastic modelling of materials. Isaac Newton Institute, Cambridge, UK. Workshop co-organizer. 2023

Materials by Design: Projected Scientific Breakthroughs in 2027-2032. US Army Virtual Workshop. 2022

Workshop on Computational Mechanics Vision and Future Challenges. Ann Arbor, MI. Invited participant 2019

Integrating Machine Learning with Multiscale Modeling for Biomedical, Biological, and Behavioral Systems. Bethesda, MD (NIH campus). Session chair. 2019

Minisymposium Organizer:

US National Congress of Computational Mechanics (USNCCM) 2019-2025

ASME IMECE 2020

World Congress of Computational Mechanics (WCCM) 2018-2024

Engineering Mechanics Institute (EMI) 2018

Session Chair and Competition Judge:

Summer Biomechanics Bioengineering and Biotransport Conference (SB3C) 2019, 2020, 2023, 2024

Biomedical Engineering Society (BMES) Conference 2018, 2020-2022

Grant reviewer:

NSF CMMI 2021

NIH MABS 2023

Army Research Office 2023

DoD Congressional Mandated Research Office 2022

Journal Reviewer

J Biomech, Ann Biomed Eng, J Mech Behav Biomed Mat, Comput Methods Appl Mech Eng, J Royal Soc Interface, J Theor Biol, Soft Matter, Biomech Model Mechanobiol, IEEE Transact Biomed Eng, I J

Solid Struct, I J Num Method Eng, Proc Royal Soc London A, I J Num
Method Biomed Eng, J Mech Phys Solid, Acta Biomaterialia, J Appl
Mech, PLOS Comput Biol, Nature Comm

DEI AND OUTREACH

Society of Hispanic Professional Engineers (SHPE) Noche de Ciencias (Volunteer and College Funding Session Co-chair)	02/2021, 05/2021, 11/2021
Biomedical Engineering Society (BMES) Diversity Committee	2019-2022
Purdue Minority Engineering Program (MEP) Symposium Panelist	08/2017, 04/2019
Purdue Pathways to the Faculty Mentor	Summer 2017
Project Motivation Treasurer and Panelist	05/2014-07/2015
Un techo para mi pais Community Coordinator	05/2009-07/2010

CURRENT DOCTORAL STUDENTS

Joel Laudo

Thesis: Digital twins of skin mechanics and mechanobiology
Anticipated year of graduation: 2030

Josue Garcia-Avila

Thesis: Data-driven material discovery
Anticipated year of graduation: 2029

Sourav Das

Co-advised with Pavlos Vlachos
Thesis: Experimental characterization of soft tissue fracture
Anticipated year of graduation: 2026

Aswanth Thani

Thesis: Skin digital twin for drug delivery
Anticipated year of graduation: 2026

Laura Nuñez Alvarez

Thesis: Systems mechanobiology of skin growth
Anticipated year of graduation: 2026

Zackary Harbin

Thesis: Modeling of wound healing and scar formation following lumpectomy
Anticipated year of graduation: 2027

Mark Wilkinson

Co-advised with Ilias Biliadis
Thesis: Data-driven continuum damage mechanics
Anticipated year of graduation: 2028

POSTDOCTORAL FELLOWS

Amir Amiri-Hezaveh, PhD

Project: PDE-constrained registration; inverse problems in elasticity

Chockalingam Senthilnathan, PhD

Project: Embryo morphogenesis; damage and fracture of soft materials

ALUMNI

Omar Moreno Flores

Thesis: Multiscale Mechanics and Mechanobiology of Pressure Ulcers

Norma Perez, PhD

Former postdoctoral scholar

Current position: Scientific Computing Associate at HHMI -Janelia Research Campus

Aishwarya Pawar, PhD

Former postdoctoral scholar

Current position: Assistant Professor at Iowa State University

Taeksang Lee, PhD

Thesis: Reconstructive Surgery Biomechanics

Current position: Assistant Professor at Myongji University

Vahid Tac

Thesis: Computational Mechanics of Soft Tissue aided by Machine Learning

Current position: Postdoctoral scholar at Stanford University, Schmidt Fellow

Tianhong Hang, PhD

Thesis: Multiscale Modeling of Skin Growth

Current position: Mechanical Engineering Lecturer at Purdue University

Yifan Guo, PhD

Thesis: Multiscale Mechanobiology of Wound Healing

Current position: Research engineer at Huawei

Jacques Barsimantov-Mandel, MS

MS Thesis: Poro-elastic modeling of subcutaneous tissue

Current position: Research engineer at Jefferson Labs

Vivek Sree, MS, PhD

PhD Thesis: Fracture and damage in skin during needle insertion

MS Thesis: Multiscale Multiphysics Modeling of Pressure Driven Ischemia and Ulcer Formation in the Skin

Current position: Advisor - Materials Engineer at Eli Lilly and Company

Julian Jimenez Corredor, MS

Thesis: Multiscale Mechanics of Fibrin and Collagen Gels

Current position: PhD student at University California San Diego

Tejas Kulkarni, MS

Thesis: Mechanics of soft epithelial tissue

Current position: PhD student at Purdue University

John Toaquiza Tubon, MS

Thesis: Experimental characterization and modeling of soft tissue damage

Current position: Full-time engineer at Eli-Lilly and Company

Benjamin Lee Hutchins, MS

Thesis: Modular soft robotics

Current position: Full-time engineer at Hyzon motors

Carly Mendenhall, MS

Thesis: Modular Soft Robots

VISITING DOCTORAL STUDENTS

Matt Nagle

Project: Machine learning methods for predicting skin growth from non-invasive measurement
Summer 2023

Juan Gustavo Diosa Peña

Project: Effect of skin microscale topography on its friction response
February 2018 – July 2018

Marco Pensalfini

Project: Understanding the mechanical fingerprint of wound healing through computational models
May 2018 – October 2018

TEACHING

Introduction to the Theory of Elasticity MECEE 6422

Graduate Level, Mechanical Engineering, Columbia University

Nonlinear Finite Element Methods, ME597

Graduate Level, Mechanical Engineering, Purdue University

[Youtube playlist](#) , <https://github.com/abuganza/NonlinearFEA>

Introduction to Finite Element Analysis, ME489

Undergraduate Level, Mechanical Engineering, Purdue University

[Youtube playlist](#) , <https://github.com/abuganza/ME489>

Study Abroad: Finite Element Analysis of Soft and Biological Materials

Study Abroad, Undergraduate Level, Purdue University and Universidad Panamericana

Basic Mechanics II: Dynamics, ME274

Undergraduate Level, Mechanical Engineering, Purdue University

Basic Mechanics I: Statics, ME270

Undergraduate Level, Mechanical Engineering, Purdue University

Basic Mechanics I: Statics, ME 270 Honors

Understanding elasticity with the popular videogame Minecraft

<https://engineering.purdue.edu/tepolelab/minecraft>
