




Ellen Kuhl

Catherine Holman Johnson Director of Stanford Bio-X, Walter B Reinhold Professor in the School of Engineering, Professor of Mechanical Engineering and, by courtesy, of Bioengineering

 NIH Biosketch available Online

 Curriculum Vitae available Online

CONTACT INFORMATION

• Administrative Contact

Hong Clark - Executive Assistant

Email hongma@stanford.edu

Tel 650-723-4023 (office)

Bio

BIO

Ellen is the Catherine Holman Johnson Director of Stanford Bio-X and the Walter B. Reinhold Professor in the School of Engineering. She is a Professor of Mechanical Engineering and, by courtesy, Bioengineering. Her area of expertise is Living Matter Physics, the design of theoretical and computational models to simulate and predict the behavior of living systems. Ellen has published more than 200 peer-reviewed journal articles and edited two books; she is an active reviewer for more than 30 journals at the interface of engineering and medicine and an editorial board member of seven international journals in her field. Ellen is a founding member of the Living Heart Project, a translational research initiative to revolutionize cardiovascular science through realistic simulation with 400 participants from research, industry, and medicine from 24 countries. Ellen was the Robert Bosch Chair of Mechanical Engineering from 2019-2024. She is the current Chair of the US National Committee on Biomechanics and a Member-Elect of the World Council of Biomechanics. She is a Fellow of the American Society of Mechanical Engineers and of the American Institute for Mechanical and Biological Engineering. She received the National Science Foundation Career Award in 2010, was selected as Midwest Mechanics Seminar Speaker in 2014, and received the Humboldt Research Award in 2016, the ASME Ted Belytschko Applied Mechanics Award in 2021, and the ERC Advanced Grant in 2024. Ellen is a three-time All American triathlete, a multiple Berlin, Boston, Chicago, and New York marathon runner, and a three-time Kona Ironman World Championship participant.

ACADEMIC APPOINTMENTS

- Professor, Mechanical Engineering
- Professor (By courtesy), Bioengineering
- Member, Bio-X
- Member, Cardiovascular Institute
- Member, Wu Tsai Human Performance Alliance
- Member, Institute for Computational and Mathematical Engineering (ICME)
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Director, Stanford Bio-X, (2024- present)
- Chair, Stanford Mechanical Engineering, (2019-2024)

- Chair, US National Committee on Biomechanics, (2018- present)
- Member, Stanford Bio-X Leadership Council, (2022- present)
- Member, Wu Tsai Human Performance Alliance Executive Committee, (2021- present)
- Member-Elect, World Council of Biomechanics, (2018- present)
- Chair, Stanford Mechanical Engineering Graduate Admission Committee, (2018-2019)
- Member, Stanford Mechanical Engineering Faculty Search Committee, (2018-2019)
- Chair, Stanford Mechanical Engineering Graduate Curriculum Committee, (2017-2018)
- Member, Stanford Long-Range Planning Steering Group Research, (2017-2018)
- Member, Stanford Neurosciences Institute Faculty Search Committee, (2017-2018)
- Member-at-Large, US Association for Computational Mechanics, (2016-2020)
- Vice Chair, US National Committee on Biomechanics, (2016-2018)
- Member, NIH IMAG Interagency Modeling Analysis Group Steering Committee, (2016-2018)
- Member, Stanford Mechanical Engineering Appointment & Promotion Committee, (2016-2018)
- Member, Stanford Leading the Biomedical Revolution, (2016-2017)
- Chair, US Association for Computational Mechanics Biological Systems, (2015-2019)
- Fellow, Stanford University, (2015-2017)
- Chair, Stanford Mechanical Engineering Faculty Search Committee, (2015-2016)
- Member, Stanford Mechanical Engineering, Advisory Committee AdCom, (2014-2024)
- Member, NIH Modeling and Analysis of Biological Systems MABS Study Section, (2014-2018)
- Secretary, US National Committee on Biomechanics, (2014-2016)
- Member, Stanford Faculty Voice & Influence Program, (2013-2014)
- Chair, Stanford Mechanical Engineering Graduate Admission Committee, (2012-2014)
- Member, Stanford Bioengineering Faculty Search Committee, (2010-2011)
- Member, Stanford Mechanical Engineering Faculty Search Committee, (2009-2010)
- Member, Stanford Mechanical Engineering Graduate Admission Committee, (2008-2012)
- Member, Stanford Mechanical Engineering Faculty Search Committee, (2008-2009)
- Member, Stanford Mechanical Engineering ABET Committee, (2008-2009)

HONORS AND AWARDS

- ERC Advanced Grant, European Research Council (2024)
- ASME Ted Belytschko Applied Mechanics Award, American Society of Mechanical Engineers (2021)
- ASME Fellow, American Society of Mechanical Engineers (2017)
- Humboldt Research Award, Alexander von Humboldt Stiftung (2016)
- AIMBE Fellow, American Institute for Medical and Biological Engineering (2014)
- NSF CAREER Award, National Science Foundation (2010-2014)
- Hellman Faculty Scholar, Hellman Faculty Scholar (2009)
- Habilitation Research Fellowship, German National Science Foundation (DFG) (2001-2004)
- Graduate Research Fellowship, German National Science Foundation (DFG) (1996-1999)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Editorial Advisory Board, Computer Methods in Applied Mechanics and Engineering (2022 - present)
- Editorial Advisory Board, Computational Mechanics (2022 - present)
- Editorial Board Member, Brain Multiphysics (2019 - present)
- Associate Editor, Annals of Biomedical Engineering (2015 - present)
- Associate Editor, Journal of the Mechanics and Physics of Solids (2015 - present)
- Editorial Board Member, Biomechanics and Modeling in Mechanobiology (2015 - present)
- Editorial Adviser, Journal of the Mechanics and Physics of Solids (2013 - 2015)
- Editorial Board Member, Journal of Computational Surgery (2012 - present)
- Associate Editor, ASME Applied Mechanics Reviews (2012 - 2016)
- Editorial Board Member, Acta Mechanica Sinica (2011 - present)
- Editorial Board Member, Comp Methods Biomechanics and Biomed Engineering (2011 - present)
- Editorial Board Member, Int J Numerical Methods in Biomedical Engineering (2011 - present)

PROFESSIONAL EDUCATION

- habil., TU Kaiserslautern (2004)
- Ph.D., University of Stuttgart (2000)
- M.S., Leibniz University of Hanover (1995)
- B.S., Leibniz University of Hanover (1993)

LINKS

- Lab Website: <https://livingmatter.stanford.edu/>
- Google Scholar: <https://scholar.google.com/citations?user=jjQDKYYAAAAJ&hl=en>

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

I am a Professor of Mechanical Engineering, Bioengineering (courtesy), and Cardiothoracic Surgery (courtesy). My area of professional expertise is living matter physics, the creation of theoretical and computational models to predict the acute and chronic response of living structures to environmental changes during development and disease progression. My specific interest is the multiscale modeling of growth and remodeling, the study of how living matter adapts its form and function to changes in mechanical loading, and how this adaptation could be traced back to structural alterations on the cellular or molecular levels. Growth and remodeling might be induced naturally, e.g., through elevated pressure, stress, or strain, or interventionally, e.g., through prostheses, stents, tissue grafts, or stem cell injection. Combining theories of electrophysiology, photoelectrochemistry, biophysics, and continuum mechanics, my lab has specialized in predicting the chronic loss of form and function in growing and remodeling cardiac tissue using patient-specific custom-designed finite element models.

Teaching

COURSES

2024-25

- Automated Model Discovery: ME 233 (Win)

2023-24

- Automated Model Discovery: ME 233 (Win)

2022-23

- Introduction to Neuromechanics: ME 234 (Aut)

2021-22

- Data-driven modeling of COVID-19: ME 233 (Aut)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Faisal As'ad, Shuai Wu

Postdoctoral Faculty Sponsor

Jennifer Maier

Doctoral Dissertation Advisor (AC)

Bartek Kaczmarski, Jeremy McCulloch, Skyler St. Pierre

Doctoral Dissertation Co-Advisor (AC)

Ryan McAvoy, Divya Rajasekharan, Devin Seyler

Master's Program Advisor

Capalina Melentyev, Zoe Moskowitz, Alvin So

Doctoral (Program)

Ryan McAvoy, Delaney Miller, Xinhao Quan, Kristen Steudel

Publications

PUBLICATIONS

- **Democratizing biomedical simulation through automated model discovery and a universal material subroutine** *COMPUTATIONAL MECHANICS*
Peirlinck, M., Linka, K., Hurtado, J. A., Holzapfel, G. A., Kuhl, E.
2024
- **On automated model discovery and a universal material subroutine for hyperelastic materials** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Peirlinck, M., Linka, K., Hurtado, J. A., Kuhl, E.
2024; 418
- **Discovering the mechanics of artificial and real meat** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
St Pierre, S. R., Rajasekharan, D., Darwin, E. C., Linka, K., Levenston, M. E., Kuhl, E.
2023; 415
- **Automated model discovery for skin: Discovering the best model, data, and experiment** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Linka, K., Tepole, A., Holzapfel, G. A., Kuhl, E.
2023; 410
- **Automated model discovery for human brain using Constitutive Artificial Neural Networks.** *Acta biomaterialia*
Linka, K., Pierre, S. R., Kuhl, E.
2023
- **A new family of Constitutive Artificial Neural Networks towards automated model discovery** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Linka, K., Kuhl, E.
2023; 403

- **Bayesian Physics Informed Neural Networks for real-world nonlinear dynamical systems** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Linka, K., Schafer, A., Meng, X., Zou, Z., Karniadakis, G., Kuhl, E.
2022; 402
- **Bayesian Physics-Based Modeling of Tau Propagation in Alzheimer's Disease.** *Frontiers in physiology*
Schafer, A., Peirlinck, M., Linka, K., Kuhl, E., Alzheimer's Disease Neuroimaging Initiative (ADNI)
2021; 12: 702975
- **Data-driven continuum damage mechanics with built-in physics** *EXTREME MECHANICS LETTERS*
Tac, V., Kuhl, E., Tepole, A.
2024; 71
- **Theory and implementation of inelastic Constitutive Artificial Neural Networks** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Holthusen, H., Lamm, L., Brepols, T., Reese, S., Kuhl, E.
2024; 428
- **Automated model discovery for human cardiac tissue: Discovering the best model and parameters** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Martonova, D., Peirlinck, M., Linka, K., Holzapfel, G. A., Leyendecker, S., Kuhl, E.
2024; 428
- **Best-in-class modeling: A novel strategy to discover constitutive models for soft matter systems** *EXTREME MECHANICS LETTERS*
Linka, K., Kuhl, E.
2024; 70
- **Minimal activation with maximal reach: Reachability clouds of bio-inspired slender** *EXTREME MECHANICS LETTERS*
Kaczmariski, B., Moulton, D. E., Goriely, A., Kuhl, E.
2024; 71
- **I too I 2: A new class of hyperelastic isotropic incompressible models based solely on the second invariant** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
Kuhl, E., Goriely, A.
2024; 188
- **Panel stacking is a threat to consensus statement validity.** *Journal of clinical epidemiology*
Kepp, K. P., Aavitsland, P., Ballin, M., Balloux, F., Baral, S., Bardosh, K., Bauchner, H., Bendavid, E., Bhopal, R., Blumstein, D. T., Boffetta, P., Bourgeois, F., Brufsky, et al
2024: 111428
- **Minimal Design of the Elephant Trunk as an Active Filament.** *Physical review letters*
Kaczmariski, B., Leanza, S., Zhao, R., Kuhl, E., Moulton, D. E., Goriely, A.
2024; 132 (24): 248402
- **Sex-specific cardiovascular risk factors in the UK Biobank.** *Frontiers in physiology*
St Pierre, S. R., Kaczmariski, B., Peirlinck, M., Kuhl, E.
2024; 15: 1339866
- **On sparse regression, L_1 -regularization, and automated model discovery** *INTERNATIONAL JOURNAL FOR NUMERICAL METHODS IN ENGINEERING*
McCulloch, J. A., St Pierre, S. R., Linka, K., Kuhl, E.
2024
- **Elephant Trunk Inspired Multimodal Deformations and Movements of Soft Robotic Arms** *ADVANCED FUNCTIONAL MATERIALS*
Leanza, S., Lu-Yang, J., Kaczmariski, B., Wu, S., Kuhl, E., Zhao, R.
2024
- **Benchmarking physics-informed frameworks for data-driven hyperelasticity.** *Computational mechanics*
Taç, V., Linka, K., Sahli-Costabal, F., Kuhl, E., Tepole, A. B.
2024; 73 (1): 49-65

- **Data-driven hyperelasticity, Part II: A canonical framework for anisotropic soft biological tissues** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
Tikenogullari, O., Acan, A., Kuhl, E., Dal, H.
2023; 181
- **Discovering a reaction-diffusion model for Alzheimer's disease by combining PINNs with symbolic regression** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Zhang, Z., Zou, Z., Kuhl, E., Karniadakis, G.
2024; 419
- **Automated model discovery for muscle using constitutive recurrent neural networks.** *Journal of the mechanical behavior of biomedical materials*
Wang, L. M., Linka, K., Kuhl, E.
2023; 145: 106021
- **Effects of cardiac growth on electrical dyssynchrony in the single ventricle patient.** *Computer methods in biomechanics and biomedical engineering*
Tikenogullari, O. Z., Peirlinck, M., Chubb, H., Dubin, A. M., Kuhl, E., Marsden, A. L.
2023: 1-17
- **Benchmarking physics-informed frameworks for data-driven hyperelasticity** *COMPUTATIONAL MECHANICS*
Tac, V., Linka, K., Sahli-Costabal, F., Kuhl, E., Tepole, A.
2023
- **Validating MRI-Derived Myocardial Stiffness Estimates Using In Vitro Synthetic Heart Models.** *Annals of biomedical engineering*
Kolawole, F. O., Peirlinck, M., Cork, T. E., Levenston, M., Kuhl, E., Ennis, D. B.
2023
- **Bayesian design optimization of biomimetic soft actuators** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Kaczmariski, B., Moulton, D. E., Goriely, A., Kuhl, E.
2023; 408
- **A Simulation Tool for Physics-Informed Control of Biomimetic Soft Robotic Arms** *IEEE ROBOTICS AND AUTOMATION LETTERS*
Kaczmariski, B., Goriely, A., Kuhl, E., Moulton, D. E.
2023; 8 (2): 936-943
- **Image-based axon model highlights heterogeneity in initiation of damage.** *Biophysical journal*
Wang, L. M., Goodman, M. B., Kuhl, E.
2022
- **How viscous is the beating heart?: Insights from a computational study.** *Computational mechanics*
Tikenogullari, O. Z., Costabal, F. S., Yao, J., Marsden, A., Kuhl, E.
2022; 70 (3): 565-579
- **Correlating the microstructural architecture and macrostructural behaviour of the brain.** *Acta biomaterialia*
Hoppstädter, M., Püßmann, D., Seydewitz, R., Kuhl, E., Böl, M.
2022
- **Rheology of growing axons** *PHYSICAL REVIEW RESEARCH*
Oliveri, H., de Rooij, R., Kuhl, E., Goriely, A.
2022; 4 (3)
- **Active filaments I: Curvature and torsion generation** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
Kaczmariski, B., Moulton, D. E., Kuhl, E., Goriely, A.
2022; 164
- **Correlating tau pathology to brain atrophy using a physics-based Bayesian model** *ENGINEERING WITH COMPUTERS*
Schafer, A., Chaggar, P., Goriely, A., Kuhl, E.
2022
- **How viscous is the beating heart? Insights from a computational study** *COMPUTATIONAL MECHANICS*
Tikenogullari, O., Costabal, F., Yao, J., Marsden, A., Kuhl, E.

2022

- **Mechanics of axon growth and damage: A systematic review of computational models.** *Seminars in cell & developmental biology*
Wang, L. M., Kuhl, E.
2022
- **How drugs modulate the performance of the human heart** *COMPUTATIONAL MECHANICS*
Peirlinck, M., Yao, J., Sahli Costabal, F., Kuhl, E.
2022
- **Sex Matters: A Comprehensive Comparison of Female and Male Hearts.** *Frontiers in physiology*
St Pierre, S. R., Peirlinck, M., Kuhl, E.
2022; 13: 831179
- **Growth and remodeling in the pulmonary autograft: computational evaluation using kinematic growth models and constrained mixture theory.** *International journal for numerical methods in biomedical engineering*
Vastmans, J., Maes, L., Peirlinck, M., Vanderveken, E., Rega, F., Kuhl, E., Famaey, N.
2021: e3549
- **Effects of B.1.1.7 and B.1.351 on COVID-19 Dynamics: A Campus Reopening Study.** *Archives of computational methods in engineering : state of the art reviews*
Linka, K., Peirlinck, M., Schäfer, A., Tikenogullari, O. Z., Goriely, A., Kuhl, E.
2021: 1-12
- **Effects of B.1.1.7 and B.1.351 on COVID-19 Dynamics: A Campus Reopening Study** *ARCHIVES OF COMPUTATIONAL METHODS IN ENGINEERING*
Linka, K., Peirlinck, M., Schaefer, A., Tikenogullari, O., Goriely, A., Kuhl, E.
2021
- **COVID-19 dynamics across the US: A deep learning study of human mobility and social behavior** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Bhouri, M., Costabal, F., Wang, H., Linka, K., Peirlinck, M., Kuhl, E., Perdikaris, P.
2021; 382
- **Multiscale modeling meets machine learning: What can we learn?** *Archives of computational methods in engineering : state of the art reviews*
Peng, G. C., Alber, M., Tepole, A. B., Cannon, W. R., De, S., Dura-Bernal, S., Garikipati, K., Karniadakis, G., Lytton, W. W., Perdikaris, P., Petzold, L., Kuhl, E.
2021; 28 (3): 1017-1037
- **Are college campuses superspreaders? A data-driven modeling study.** *Computer methods in biomechanics and biomedical engineering*
Lu, H., Weintz, C., Pace, J., Indana, D., Linka, K., Kuhl, E.
2021: 1–11
- **Global and local mobility as a barometer for COVID-19 dynamics.** *Biomechanics and modeling in mechanobiology*
Linka, K. n., Goriely, A. n., Kuhl, E. n.
2021
- **Sex Differences in Drug-Induced Arrhythmogenesis.** *Frontiers in physiology*
Peirlinck, M., Sahli Costabal, F., Kuhl, E.
2021; 12: 708435
- **Visualizing the invisible: The effect of asymptomatic transmission on the outbreak dynamics of COVID-19.** *Computer methods in applied mechanics and engineering*
Peirlinck, M., Linka, K., Sahli Costabal, F., Bhattacharya, J., Bendavid, E., Ioannidis, J. P., Kuhl, E.
2020; 372: 113410
- **Folding drives cortical thickness variations** *EUROPEAN PHYSICAL JOURNAL-SPECIAL TOPICS*
Holland, M. A., Budday, S., Li, G., Shen, D., Goriely, A., Kuhl, E.
2020; 229 (17-18): 2757–78
- **Folding drives cortical thickness variations.** *The European physical journal. Special topics*
Holland, M. A., Budday, S., Li, G., Shen, D., Goriely, A., Kuhl, E.
2020; 229 (17-18): 2757-2778

- **Protein-protein interactions in neurodegenerative diseases: A conspiracy theory.** *PLoS computational biology*
Thompson, T. B., Chaggar, P., Kuhl, E., Goriely, A., Alzheimers Disease Neuroimaging Initiative
2020; 16 (10): e1008267
- **Neuronal Oscillations on Evolving Networks: Dynamics, Damage, Degradation, Decline, Dementia, and Death.** *Physical review letters*
Goriely, A., Kuhl, E., Bick, C.
2020; 125 (12): 128102
- **Fifty Shades of Brain: A Review on the Mechanical Testing and Modeling of Brain Tissue** *ARCHIVES OF COMPUTATIONAL METHODS IN ENGINEERING*
Budday, S., Ovaert, T. C., Holzapfel, G. A., Steinmann, P., Kuhl, E.
2020; 27 (4): 1187–1230
- **Editorial overview: Biomechanics and mechanobiology of tissue growth and remodeling: Current opinions** *CURRENT OPINION IN BIOMEDICAL ENGINEERING*
Kuhl, E., Humphrey, J. D.
2020; 15: A1-A2
- **Is it safe to lift COVID-19 travel bans? The Newfoundland story** *COMPUTATIONAL MECHANICS*
Linka, K., Rahman, P., Goriely, A., Kuhl, E.
2020
- **The reproduction number of COVID-19 and its correlation with public health interventions.** *Computational mechanics*
Linka, K., Peirlinck, M., Kuhl, E.
2020: 1-16
- **Special Issue on Uncertainty Quantification, Machine Learning, and Data-Driven Modeling of Biological Systems** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Tepole, A., Nordsletten, D., Garikipati, K., Kuhl, E.
2020; 362
- **Towards microstructure-informed material models for human brain tissue** *ACTA BIOMATERIALIA*
Budday, S., Sarem, M., Starck, L., Sommer, G., Pfefferle, J., Phunchago, N., Kuhl, E., Paulsen, F., Steinmann, P., Shastri, V. P., Holzapfel, G. A.
2020; 104: 53–65
- **Physics-Informed Neural Networks for Cardiac Activation Mapping** *FRONTIERS IN PHYSICS*
Costabal, F., Yang, Y., Perdikaris, P., Hurtado, D. E., Kuhl, E.
2020; 8
- **Multiscale Modeling Meets Machine Learning: What Can We Learn?** *ARCHIVES OF COMPUTATIONAL METHODS IN ENGINEERING*
Peng, G. Y., Alber, M., Tepole, A., Cannon, W., De, S., Dura-Bernal, S., Garikipati, K., Karniadakis, G., Lytton, W. W., Perdikaris, P., Petzold, L., Kuhl, E.
2020
- **Classifying Drugs by their Arrhythmogenic Risk Using Machine Learning.** *Biophysical journal*
Sahli-Costabal, F., Seo, K., Ashley, E., Kuhl, E.
2020
- **Nervous Tissue Stiffens Postinjury.** *Biophysical journal*
Kuhl, E.
2020; 118 (2): 276–78
- **Outbreak dynamics of COVID-19 in Europe and the effect of travel restrictions** *Comp Meth Biomech Biomed Eng*
Linka, K., Peirlinck, M., Sahli Costabal, F., Kuhl, E.
2020; 23: 710-717
- **Modeling the life cycle of the human brain** *Current Opinion in Biomedical Engineering*
Budday, S., Kuhl, E.
2020; 15: 16-25
- **Outbreak dynamics of COVID-19 in China and the United States.** *Biomechanics and modeling in mechanobiology*

- Peirlinck, M. n., Linka, K. n., Sahli Costabal, F. n., Kuhl, E. n.
2020
- **Network Diffusion Modeling Explains Longitudinal Tau PET Data.** *Frontiers in neuroscience*
Schafer, A., Mormino, E. C., Kuhl, E.
2020; 14: 566876
 - **Modeling and simulation of infectious diseases.** *Computational mechanics*
Zohdi, T. I., Kuhl, E. n.
2020: 1
 - **Data-driven modeling of COVID-19-Lessons learned.** *Extreme Mechanics Letters*
Kuhl, E. n.
2020: 100921
 - **Multi-fidelity classification using Gaussian processes: Accelerating the prediction of large-scale computational models** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Costabal, F., Perdikaris, P., Kuhl, E., Hurtado, D. E.
2019; 357
 - **Viscoelasticity of the axon limits stretch-mediated growth** *COMPUTATIONAL MECHANICS*
Wang, L. M., Kuhl, E.
2019
 - **Do annuloplasty rings designed to treat ischemic/functional mitral regurgitation alter left-ventricular dimensions in the acutely ischemic ovine heart?** *JOURNAL OF THORACIC AND CARDIOVASCULAR SURGERY*
Bothe, W., Kvitting, J., Rausch, M. K., Timek, T. A., Swanson, J. C., Liang, D. H., Walther, M., Kuhl, E., Ingels, N. B., Miller, D.
2019; 158 (4): 1058–68
 - **On the implementation of finite deformation gradient-enhanced damage models** *COMPUTATIONAL MECHANICS*
Ostwald, R., Kuhl, E., Menzel, A.
2019; 64 (3): 847–77
 - **The Shrinking Brain: Cerebral Atrophy Following Traumatic Brain Injury** *ANNALS OF BIOMEDICAL ENGINEERING*
Harris, T. C., de Rooij, R., Kuhl, E.
2019; 47 (9): 1941–59
 - **Growth and remodelling of living tissues: perspectives, challenges and opportunities.** *Journal of the Royal Society, Interface*
Ambrosi, D., Ben Amar, M., Cyron, C. J., DeSimone, A., Goriely, A., Humphrey, J. D., Kuhl, E.
2019; 16 (157): 20190233
 - **Predicting critical drug concentrations and torsadogenic risk using a multiscale exposure-response simulator** *PROGRESS IN BIOPHYSICS & MOLECULAR BIOLOGY*
Costabal, F., Yao, J., Sher, A., Kuhl, E.
2019; 144: 61–76
 - **Revisiting the wrinkling of elastic bilayers I: linear analysis** *PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOCIETY A-MATHEMATICAL PHYSICAL AND ENGINEERING SCIENCES*
Alawiye, H., Kuhl, E., Goriely, A.
2019; 377 (2144)
 - **Revisiting the wrinkling of elastic bilayersI: linear analysis.** *Philosophical transactions. Series A, Mathematical, physical, and engineering sciences*
Alawiye, H., Kuhl, E., Goriely, A.
2019; 377 (2144): 20180076
 - **Machine learning in drug development: Characterizing the effect of 30 drugs on the QT interval using Gaussian process regression, sensitivity analysis, and uncertainty quantification** *COMPUTER METHODS IN APPLIED MECHANICS AND ENGINEERING*
Costabal, F., Matsuno, K., Yao, J., Perdikaris, P., Kuhl, E.
2019; 348: 313–33

- **Machine learning in drug development: Characterizing the effect of 30 drugs on the QT interval using Gaussian process regression, sensitivity analysis, and uncertainty quantification.** *Computer methods in applied mechanics and engineering*
Costabal, F. S., Matsuno, K., Yao, J., Perdikaris, P., Kuhl, E.
2019; 348: 313-333
- **A physics-based model explains the prion-like features of neurodegeneration in Alzheimer's disease, Parkinson's disease, and amyotrophic lateral sclerosis** *JOURNAL OF THE MECHANICS AND PHYSICS OF SOLIDS*
Weickenmeier, J., Jucker, M., Goriely, A., Kuhl, E.
2019; 124: 264-81
- **Understanding the mechanical link between oriented cell division and cerebellar morphogenesis.** *Soft matter*
Lejeune, E., Dortdivanlioglu, B., Kuhl, E., Linder, C.
2019
- **Do annuloplasty rings designed to treat ischemic/functional mitral regurgitation alter left-ventricular dimensions in the acutely ischemic ovine heart?** *The Journal of thoracic and cardiovascular surgery*
Bothe, W., Escobar Kvitting, J., Rausch, M. K., Timek, T. A., Swanson, J. C., Liang, D. H., Walther, M., Kuhl, E., Ingels, N. B., Miller, D. C.
2019
- **Integrating machine learning and multiscale modeling-perspectives, challenges, and opportunities in the biological, biomedical, and behavioral sciences.** *NPJ digital medicine*
Alber, M. n., Buganza Tepole, A. n., Cannon, W. R., De, S. n., Dura-Bernal, S. n., Garikipati, K. n., Karniadakis, G. n., Lytton, W. W., Perdikaris, P. n., Petzold, L. n., Kuhl, E. n.
2019; 2: 115
- **Spatially-extended nucleation-aggregation-fragmentation models for the dynamics of prion-like neurodegenerative protein-spreading in the brain and its connectome.** *Journal of theoretical biology*
Fornari, S. n., Schäfer, A. n., Kuhl, E. n., Goriely, A. n.
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