

FRANCK J. VERNEREY

PERSONAL DATA

Department of Mechanical Engineering
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PROFESSIONAL EXPERIENCE & RESEARCH INTERESTS

Professor, University of Colorado, Boulder, CO
Mechanical Engineering, August 2018-present
Affiliate faculty in Material Science and Engineering, Civil Engineering and Applied Mathematics

Associate Professor, University of Colorado, Boulder, CO
Mechanical Engineering, August 2014-2018
Affiliate faculty in Material Science and Engineering, Civil Engineering and Applied Mathematics

Assistant Professor, University of Colorado, Boulder, CO
Civil, Environmental, and Architectural Engineering, August 2007- July 2014
Fellow in Material Science and Engineering and Affiliate faculty in applied Mathematics

Postdoctoral researcher, Northwestern University, Evanston, IL
Program of Theoretical and Applied Mechanics, June 2006 – June 2007
Advisor: B. Moran

Research expertise and interests: Mechanics of Dynamic Soft Matter

- **Statistical Mechanics of dynamic networks.** Such networks include supramolecular polymers and hydrogels, a majority of bio-polymers as well as insect aggregates. We use statistical mechanics to understand the link between microscopic physics and the emerging mechanical behavior of the network, such as its elasto-rheology, adaptation to loads, damage and self-healing.
- **Micromechanics of biological growth.** We use analytical and computational method to understand the fundamental mechanisms of growth in animal tissues. More specifically, my group investigates (a) the in-vitro growth of cartilage from cell-laden hydrogel for personalized tissue engineering, (b) The role of mechanics in confined tumor growth.
- **Collective motion and morphogenesis in biological networks.** We study systems of connected active agents whose mechanical interactions lead to collective motion and morphogenesis. We are exploring (a) the growth and directed motion of fungi cells wall, made of an active network of macromolecules (b) the morphogenesis of fire-ant networks (raft) and (c) the growth and morphogenesis of confluent cell aggregates (spheroids, plant tissue).

EDUCATION AND TRAINING

Ph.D., Theoretical and Applied Mechanics

Northwestern University, Evanston, IL, June 2002 – June 2006

- Thesis research: “Multi-scale Continuum Theory for Microstructured Materials”
- Reading Committee: B. Moran (chair), W.K. Liu and G.B. Olson

M.S., Theoretical and Applied Mechanics

Northwestern University, Evanston, IL, August 2000 – June 2002

- Thesis research: “Assessment of Interface Debonding via Arc Length Method and Lagrange Multipliers”
- Reading Committee: B. Moran (advisor), W. K. Liu (co-advisor)

B.S., M.S. and diplome d’ingenieur, Civil Engineering

Ecole Speciale des Travaux Publics (ESTP), Paris, France, August 1998 – June 2000

Preparatory School for Scientific “Grandes Ecoles”

Lycee Victor Hugo, Besancon, France

First two years of undergraduate education, August 1996 – June 1998

INVITED POSITIONS

- **Visiting Professor, Laboratoire de Mecanique des Solides, Ecole Polytechnique, France**
September 2022- June 2023
- **Visiting Professor, ESPCI, France**
Sciences et Ingénierie de la Matière Molle (SIMM), January 2022
- **Visiting Researcher, Ecole Polytechnique, France**
Solid Mechanics Laboratory (LMS), May-June 2018
- **Visiting Professor, Ecole Nationale Supérieure de Mécanique et des Microtechniques, France**
FEMTO ST Laboratory, January 2018
- **Visiting Professor, Università degli Studi di Parma, Italy**
Department of Structural Engineering, Summer 2017
- **Visiting Professor, Université de Reims - Champagne-Ardenne, France**
Medical School, March 2016

HONORS AND AWARDS

- **2018:** Outstanding Researcher Award, Mechanical Engineering, CU-Boulder

- **2017: PECASE:** Presidential Early Career Awards for Scientists and Engineers (Highest U.S. government honor awarded to the 100 most promising U.S. scientists and researchers in all fields of science)
- **2017:** Outstanding Graduate Educator Award, Mechanical Engineering, CU-Boulder
- **2014: CAREER:** National Science Foundation career award
- **2013:** Dean's Faculty fellowship, College of Applied Science and Engineering, CU-Boulder
- **2013:** Young Researcher Award, Civil, Environmental and Architectural Engineering, CU-Boulder
- **2008:** Junior Faculty Development Award, CU-Boulder
- **2001-2006:** Office of Naval Research Grant for research assistantship

FUNDED RESEARCH PROJECTS

- **3M Corporation,** Development of adhesives and polymers through modeling polymer network inhomogeneity and cavitation with informatics-centric approach (10/01/21 — 09/30/23). Award Amount: **\$225,000**. Role: Principal investigator
- **National Science Foundation** RECODE: Organoid model of growth plate development (12/01/21 — 11/30/25) Award Amount: **\$755,266 (FY2021)**. Role: Co-Principal investigator, with Stephanie Bryant and Karin Payne as PI.
- **National Science Foundation, CBET Engineering of Biomedical Systems program,** The Role of Percolation in the Hydrogel-to-Tissue Transition for Cartilage Growth, (04/01/21 — 03/31/24) Award Amount: **\$547,515**. Role: Co-Principal investigator, with Stephanie Bryant as PI.
- **National Science Foundation, Mechanics of Materials program,** Mechanics of Active Slide-Ring Networks: from Molecular Motors to Molecular Machine, (01/01/20 — 12/31/23) Award Amount: **\$477,000**. Role: Principal investigator, with Carson Bruns as co-PI.
- **CU-Boulder AB-Nexus,** Biophysical Cues Governing Growth Plate Organization: A Computational and Experimental Approach, (01/01/20 — 12/31/20) Award Amount: **\$125,000**. Role: co-PI with Stephanie Bryant (chemical engineering) and Karin Payne (Medical school).
- **Department of Energy and National Nuclear Security Administration,** Center for Micromorphic Multiphysics Porous and Particulate Materials Simulations with Exascale Computing Workflows, (09/01/20 — 09/31/25) Award Amount: **\$13,000,000**. Role: co-PI. This is a large scale proposal involving multiple universities and 16 research teams.
- **Membrane Science, Engineering and Technology center,** Membrane pore connectivity, tortuosity, and soft particle, (01/01/2020 — 12/31/2020), Award Amount: **\$53,000**. Role: co-Principal Investigator, with John Pellegrino (CU Boulder)

- **National Science Foundation, Mechanics of Materials program**, Kinetic theory of Dynamic Polymers: From molecular mechanisms to elasto-rheology, (09/01/18 — 08/31/21) Award Amount: **\$400,000**. Role: Principal investigator.
- **National Science Foundation, Biomechanics and Mechanobiology program**, Tenocyte Mechanobiology in a Fiber Composite Mimetic (09/01/18 — 08/31/21), Award Amount: **\$499,979**. Role: Co-Principal investigator, with Stephanie Bryant (PI).
- **3M Corporation**, Eulerian Approach to Model Extreme Deformations in visco-elastic Adhesives (03/01/18 — 02/28/20). Award Amount: **\$225,000**. Role: Principal investigator
- **National Science Foundation, Div. Materials Research**, Ultrathin Deformable Materials and Protective Coatings Bio-inspired by Scaled Skins, Biomaterials Program (07/15/14 — 07/14/17). Award Amount: **\$420,000**. Role: Principal investigator, with Mark Stoykovich, CU Boulder
- **National Science Foundation, CAREER**, In-Silico Tissue Engineering: An Active-Learning Computational Methodology to Guide the Design of Tissue Scaffolds, (02/01/14 — 12/31/19), Award Amount: **\$400,000**, Role: Principal investigator
- **National Institute of Health**, Personalizing Matrix Assisted Autologous Chondrocyte Implantation, R01 AR065441-01, (09-12-13 – 08-31-18), Award Amount: **\$1,460,286**, Role: Co-principal investigator, with Stephanie Bryant (CU Boulder)
- **Membrane Science, Engineering and Technology center**, Interaction between soft particles and membranes, (01/01/14 — 05/31/18), Award Amount: **\$150,000**. Role: Principal Investigator, with John Pellegrino (CU Boulder)
- **National Institute of Health**, Engineering Bimodal Degrading Hydrogels, (04-01-11 – 03-31-13), Award Amount: **\$353,331**. Role: Multiple Principal investigator, with Stephanie Bryant (CU Boulder).
- **Seed Grant, CRCW, University of Colorado**, An innovative look at fibroblast evolution through multi-physics modeling, (09-01-10 – 08-31-12), Award Amount: **\$43,750**, Role: Multiple Principal investigator
- **National Science Foundation, Nano and Bio Mechanics program**, Multiscale Biomimetic Study of the Mechanics of Fish Scales, (02-01-10 – 01-31-13), Award Amount: **\$228,131**. Role: Principal Investigator, with Francois Barthelat (McGill University)
- **National Science Foundation, Structural Materials and Mechanics**, Experimental Study and Theoretical Modeling of High Performance Recycled Aggregate Concrete. (05-01-09 – 05-31-12), Award Amount: **\$249,998**. Role: Principal investigator, with Yunping Xi (CU Boulder)
- **CRCW, University of Colorado, Young Faculty Award**, Biomimetics Study of Fish Scale Structures (07-01-08 – 06-03-09), Award Amount: **\$5,000**. Role: Principal investigator

TEACHING

- Dynamics (MCEN2043), undergraduate class, University of Colorado, Spring 2021, Spring 2024.
- Mechanics of snow and avalanches (MCEN 4228/5228), Upper-level graduate class, University of Colorado, Spring 2022
- Bio-Inspired Active Matter (MCEN 6228-002), Upper-level graduate class, University of Colorado, Spring 2018
- Mechanics of Soft Matter (MCEN4228/5228), Graduate level class, University of Colorado, Spring 2015, spring 2017, spring 2018, fall 2018, fall 2019, fall 2020, fall 2021, fall 2023.
- Mechanics of Solids (MCEN2063), Undergraduate class, University of Colorado, Fall 2018.
- Methods of Engineering Analysis (MCEN5020), Graduate level class, University of Colorado, fall 2016, 2017
- Introduction to Finite Elements (CVEN4511-5511 and MCEN 4173/5173), graduate level class, University of Colorado, Fall 2009, Fall 2011, Fall 2012, Fall 2014.
- Finite Element for Structural Analysis (CVEN6525), graduate level class, University of Colorado, Spring 2008.
- Advanced Mechanics of Materials I (CVEN5161), graduate level class, University of Colorado, Fall 2010.
- Advanced Mechanics of Materials II (CVEN6161), graduate level class, University of Colorado, Spring 2009.
- Mechanics of Materials I (CVEN3161), undergraduate class, University of Colorado, Fall 2010, Spring 2011, Fall 2013.
- Analytical Mechanics, Dynamics (CVEN3111), undergraduate class, University of Colorado, Spring 2012, Spring 2013.
- Analytical Mechanics, Statics (CVEN2121), undergraduate class, University of Colorado, Fall 2008, Spring 2010.

ADVISOR FOR PH.D, M.S, UNDERGRADUATE AND INTERN STUDENTS

Ph.D. students

- Ari Geisler (Current): Collective Behavior of Active Cellular Networks: Interactions and Emerging behavior.
- Aidan Smith (Current): Non-equilibrium mechanics of active nematic networks and their role on morphogenesis.
- Behnam Rezaei (Current): Statistical Mechanics of active cell walls, from cell cortex to fungi mechanics.
- Saleh Assadi (Current): Damage and cavitation in entangled polymer networks.

- Zachary White (Current): Discrete Mechanics of Active Networks: Role of Bond Dynamics.
- Prakhar Bandil (Current): Statistical Mechanics of Active Confluent Cell Aggregations.
- Samuel Lamont (Graduated Summer 2024): Statistical Micromechanics and Damage in Materials and Dynamic Networks, Reading committee: F. Vernerey, A. Constantinescu (Ecole Polytechnique, France), R. Long, F. Barthelat, R. Reigueiro
- Robert Wagner (Graduated Summer 2022): Mechanics of active matter aggregates: from fire-ant aggregations to active synthetic materials. , Reading committee: F. Vernerey, R. Long, F. Barthelat, Nikolaus Correll, Loren Hough
- Tong Chen (Graduated Summer 2020): Computational Mechanics of the elasto-rheology of polymers under extreme deformation. Reading committee: F. Vernerey, R. Long, V. Ferguson, C. Bruns and F. Lopez Jimenez.
- Shankar Lalitha Sridhar (Graduated Summer 2020): The role of dynamic networks in growth: from fungal growth to tissue engineering. Reading committee: F. Vernerey, T. White, J. Ortega, C. Bruns and R. Long.
- Kanghyeon Koo (Graduated Fall 2020): Multiscale modeling of the soft particle transport in random porous media. Reading committee: F. Vernerey, R. Regueiro, Y. Xi, J. Pellegrino and L. Hough
- Eduard Benet (Graduated fall 2018): Shell theory in soft matter: viscoelasticity, adhesion, and transport phenomena
Reading committee: F. Vernerey, R. Long, F. Lopez-Jimenez, J. Pellegrino, JH. Song
- Umut Akalp (Graduated fall 2016): Multiscale modeling of matrix production and degradation in bio-degradable scaffolds.
Reading committee: F. Vernerey, S. Bryant, A. Doostan, R. Pak
- Louis Foucard (Graduated Summer 2014): Bio-physical modeling of the role of cell membrane on fibril formation and mechano-sensing.
Reading committee: F. Vernerey, R. Pak, R. Regueiro, D. Bortz and A. Rajaram.
- Kamtornkiat Musiket (Graduated Fall 2014): Mechanical Properties of Concrete Structures under Different Loading Rates.
Reading committee: F. Vernerey, Y.P. Xi, A. Liel, W. Srubar.
- Mohammadreza Kabiri (Graduated Fall 2013): Adaptive Concurrent Multiscale Modeling of localization and fracture in heterogeneous media.
Reading committee: F. Vernerey, R. Regueiro, Y. Xi, A. Doostan and M. Stoykovich
- Mehdi Farsad (Graduated Fall 2011): Chemo-Mechanical Approach to Model Cell Contraction and Spreading on Elastic Substrates
Reading committee: F. Vernerey, R. Pak, R. Regueiro, Y. Xi, A. Rajaram and S. Bryant.

M.S. students (with thesis)

- Revanth Gollapudi (M.S., Mechanical Engineering, current) Research thesis: Discrete modeling of transient entangled networks.

- Revathi Priyanka Mohan (M.S., Mechanical Engineering, 2019) Research thesis: The role of dynamic networks on the growth of fungal cells: study of the phycomyces
- Jian Kan (M.S., Mechanical Engineering, 2018) Research thesis: Fabrication and Mechanics of Active Hydrogel Crawlers in porous Media
- Hongtian Zhu (M.S., Mechanical Engineering, 2018) Research thesis: Competition between Adhesion and Elastic instabilities during blister inflation.
- Zachary White (M.S., Mechanical Engineering, 2018) Research thesis: Mechanics of bio-inspired 3D printed fish-scale structures during ballistic impact.
- Nate Nargolis (M.S., Material Science and Engineering, 2017) Research thesis: Hygromorphic scales for use in water from morning dew and elementary model of hydrogel expansion properties.
- Marti Garriga Font (M.S., Civil, Environmental and Architectural Engineering, 2016) Research thesis: Micro-Crawlers in Confined Space: Volume Oscillating Hydrogels.
- Gaspard De Roucy (M.S., Civil, Environmental and Architectural Engineering, 2015): Computational study of the role of hydrolytic degradation in PEG-based cartilage engineering
- Natasha Funk (Graduated Spring 2014): Mechanics and design of synthetic fish-skin
Reading committee: F. Vernerey, m. Stoykovich and V. Saouma
- Valentin Dhote (M.S., Civil, Environmental and Architectural Engineering, 2012): Enzyme mediated degradation and matrix production of chondrocytes in hydrogels.
Reading committee: F. Vernerey, S. Bryant and R. Regueiro
- Jonathan Figueroa (M.S., Civil, Environmental and Architectural Engineering, 2012): Beam theory for modeling the light and gravity sensitive motion of plant stems.
Reading committee: F. Vernerey, R. Pak and M. Stoykovich
- Gregg Flores (M.S., Civil, Environmental and Architectural Engineering, 2011): The use of optimization theory as an indirect way of determining of material properties.
Reading committee: F. Vernerey, Y. Xi and R. Regueiro
- Spencer Hallowell (M.S., Civil, Environmental and Architectural Engineering, 2011): Damage and fracture of fiber-reinforced composites
Reading committee: F. Vernerey, R. Regueiro and C. Fellippa
- Mohamed Abdelrahman (M.S., Civil, Environmental and Architectural Engineering, 2011): Multiscale adaptive Finite elements modeling of fracture in heterogeneous media.
Reading committee: F. Vernerey, Y. Xi and R. Regueiro
- Eric Greenwald (M.S., Chemical and Biological Engineering, 2010): A theoretical investigation of cell mediated hydrogel degradation.
Reading committee: F. Vernerey, S. Bryant and M. Stoykovich
- Ross Foster (M.S., Mechanical Engineering, 2009): Micro-Porosity of the Intervertebral Disc and Its Effects on Fluid Transport: A Scanning Electron Microscopy and Histological Study
Reading committee: F. Vernerey and V. Fergusson.

Undergraduate students

Nile Brown (Academic year 2023-2024): Design of Bio-inspired dynamic networks, **Brice Parot** (Academic year 2023-2024): Design of Bio-inspired dynamic networks, **Aidan Roux** (Academic years 2022-2024): Image analysis of fire-ant rafts, **Amene Abdulla** (Summer 2023): Morphing of fire-ant rafts. **Abhishek Das** (Academic year 2018-2019): Imaging and characterization of growing fungi, **Madison Davis** (Academic year 2018-2019): Fabrication of active solids inspired by insect aggregations, **Emily Volk** (Academic year 2017-2018): Biomimetic actuation of soft mag-bots, **Kelly Gazarik** (Academic year 2017-2018): Experimental study of phycomyces growth. **Millicent Gabriel** (Academic year 2016-2017): Exploration of the anisotropic friction properties of fish-scale structures, **Devin Sakamoto** (fall 2015): Monte-Carlo network model for the study of particle diffusion in crowded environments. **Eliot Kersgaard** (2014-2015): Mechanics of bio-inspired self-motile gel particles, **Aly Badran** (2014-2015): Computational modeling of porous networks, **Christina Jones** (NSF REU student 2012): Mechanics of fish-scale structures, **Ralph Kassouf** (NSF REU student 2011-2012): Mechanics of fish-scale structures, **Lauren Gardenshwarz** (Discovery and learning apprentice 2010-2011 and NSF REU student 2011-2012): Experimental and modeling studies of the active behavior of adherent cells, **Krista Donahue** (Discovery and learning apprentice 2009-2010): Experimental investigation of fibroblast evolution due to substratum stiffness and tonicity of external solution, **Yevgeniy Kaufmann** (Undergraduate Research Opportunities Program 2008-2009): Analysis of the multiscale structure of fish-skin.

Student interns

Guillaume Lostec (summer 2017) from Ecole Normale Supérieure de Cachan, France, **Marie Dubus** (fall 2016): Université de Reims Champagne Ardenne (France) in the laboratory EA 4691 BIOS, France, **Raghuveer Lalitha Sridhar** (summer 2016): Sri Sivasubramaniya Nadar College of Engineering, Kalavakkam, Tamil Nadu, India, **Xavier Espinet** (spring-summer 2012): Universitat Politècnica de Catalunya (Spain), **Eduard Benet** (spring-summer 2012): Universitat Politècnica de Catalunya (Spain), **Paul Hauseux** (spring-summer 2010): Ecole Normale Supérieure de Cachan (France), **Thibaud Chevalier** (spring-summer 2008): Ecole Normale Supérieure de Cachan (France)

PROFESSIONAL SERVICE ACTIVITIES

• Leadership

- Director, Advanced Mechanics and Failure Analysis Graduate Certificate, Mechanical Engineering, University of Colorado Boulder
- Leading the academic partnership between CU-Boulder and Ecole Polytechnique France. This program aims at promoting the exchange of ideas, faculty and student between the two institutions. It also allows graduate student to obtain a dual PhD degree between the two institutions.
- Organizer of the **Rocky Mountain Soft and Active Matter workshop** (2018, 2020, 2021). two-day symposium that gathers research groups working on the topic of active matter in the Colorado region. The workshop features presentations from research groups in physics, chemistry, mechanics, robotics and material science from various US and international universities.

- **Department, College and University:**

- Member of the graduate committee 2024-25
- Member of faculty search committee 2024-25

- **Professional societies and technical committies:**

ASCE national technical committee on Modeling Inelasticity and Multiscale Behavior, ASME Tissue and Cellular Engineering committe, ASME national technical committee of Mechanics in Biology and Medicine, ASCE EMI (Engineering Mechanics Institute) technical committee Biomechanics, ASCE EMI (Engineering Mechanics Institute) technical committee on Computational Mechanics

- **Service to technical journal**

- **Associate editor** for Frontiers in Materials - Computational Materials Science.
- **Associate editor** for the ” Smart and Functional Polymer” section, Polymers, MDPI publishing.
- **Associate editor** for Computer Modeling in Engineering and Science, Frontiers in materials, Mathematical Problems in Engineering
- **Guest editor** of the special issue in Polymers, MDPI (2018), Computational Modeling in Engineering and Science (2010), International Journal for Multiscale Computational Engineering (2008).
- **Peer reviewer for:** Advanced Materials, Journal of the Royal Society Interface, Soft Matter, Philosophical Transactions, Journal of the Mechanics and Physics of Solids, Nature Scientific Report, Macromolecules, Biomechanics and Modeling in Mechanobiology, Biophysical Journal, International Journal of Solids and Structures, International Journal of Numerical Methods in Engineering, Computer Methods in Applied Mechanics and Engineering, BionanoScience, Computational Mechanics, Engineering Fracture Mechanics, Journal of Engineering Mechanics, Computational Materials Science, Mechanics of Materials, Mechanics of Advanced Materials and Structures, Mechanics Research Communications, Archive of Applied Mechanics, International Journal of Multiscale Computational Engineering, Computational Modeling in Engineering and Science

- **Service to national agencies**

- Panel reviewer for the National Science Foundation, program of Biomechanics and Mechanobiology, program of Mechanics of Materials, program of Structural Materials and Mechanics, Program of Materials Engineering and Processing
- Panel reviewer for the Interagency Arctic Science, Engineering, and Education for Sustainability (ArcSEES)
- Panel reviewer for the NIH/NSF program on “ Predictive Multiscale Models for Biomedical, Biological, Behavioral, Environmental and Clinical Research (Interagency U01)

- **Service to Scholarly or Professional Organizations: symposia organization**

World Congress of Computational Mechanics, World Congress of Biomechanics, Society of Engineering Science, Pan-American Congress of Applied Mechanics, International Conference on Coupled Problems in Science and Engineering, USACM Thematic Conference on Multiscale

Methods and Validation in Medicine and Biology, Engineering Mechanics Institute, National Congress of Computational Mechanics, European Conference on Computational Mechanics, U.S. National Congress of Theoretical and Applied Mechanics, ASME International mechanical engineering congress and exposition

SCHOLARLY PUBLICATIONS

Peer Reviewed Research Papers (The superscript * denotes corresponding author)

121. Assadi, S., Lamont, S., Hansoge N., Liu Z., Crespo V., Salmon F. and **Vernerey F.J.***, Nonaffine Motion and Network Reorganization in Entangled Polymer Networks, *Soft Matter*, 2025, in press.
120. Barbier L., Bulteau R., Rezaei B., Panier T., Labrune E., Verlhac M.H., **Vernerey F.J.**, Campillo C. and Terret M.E., Non-invasive characterization of oocyte deformability in micro-constrictions, *Science Advances*, 2025, in press.
119. Lamont S., Bouklas N. and **Vernerey, F.J.***, Cohesive instability in elastomers: Insights from a crosslinked Van der Waals fluid model, *International Journal of Fracture*, 2025, in press.
118. Bandil P. and **Vernerey, F.J.***, A morpho-viscoelasticity theory for growth in proliferating aggregates, *Biomechanics and Modeling in Mechanobiology*, 1-22, 2024
117. **Vernerey, F.J.***, Rezaei B. and Lamont S.C., A kinetic theory for the mechanics and remodeling of transient anisotropic networks, *Journal of the Mechanics and Physics of Solids* 190, 105713, 2024
116. Pan W., Xu L., Lamont S.C., Zhang Y., Ding J., **Vernerey, F.J.***, Thermosensitive MXene-Based Flexible Wearable Sensors for Multifunctional Human Signals Monitoring, *ACS Applied Polymer Materials*, 2024
115. Song Z., Dong G., **Vernerey F.J.** and Cai S., Temperature-and Rate-Dependent Fracture in Disulfide Vitrimers, *ACS Macro Letters* 13 (8), 994-999, 2024
114. Lamont S.C, **Vernerey, F.J.***, Generalized continuum theory for nematic elastomers: Non-affine motion and characteristic behavior, *Journal of the Mechanics and Physics of Solids*, 105718, 2024
113. Wagner, R, Lamont S.C., White, Z. and **Vernerey, F.J.*** (2024) Catch bond kinetics are instrumental to cohesion of fire ant rafts under load, *PNAS*, 121 (17), e2314772121
112. Xu L, Zhu C, Lamont S, Zou X, Yang Y, Chen S, Ding J and **Vernerey, F.J.***(2024) Programming Motion into Materials Using Electricity-Driven Liquid Crystal Elastomer Actuators, *Soft Robotics*, <https://doi.org/10.1089/soro.2023.0063>
111. Abdelrahman M.K., Wagner R.J., Kalairaj M., Zadan M., Kim M.H., Jang L., Wang S., Javed M., Dana A., Singh K.A., Hargett S., Gaharwar A.K, Majidi C., **Vernerey F.J** and Ware T.H. (2024), Material assembly from collective action of shape-changing polymers, *Nature Materials*, 1-9
110. Bandil P. and **Vernerey, F.J.*** (2023), Continuum theory for confluent cell monolayers: Interplay between cell growth, division, and intercalation, *Journal of the Mechanics and Physics of Solids* 181, 105443

109. Lamont S.C., Weishaar K., Bruns C.J and **Vernerey, F.J.*** (2023), Micromechanics and damage in slide-ring networks, *Physical Review E* 107 (4), 044501
108. Xu L., Lamont S.C., Li T., Zhang Y., Pan W., Gao C., Zhu C., Chen S., Hu H., Ding J. and **Vernerey, F.J.*** (2023) Nonlinear Viscoelasticity and Toughening Mechanisms in Nanoclay-PNIPAAm Double Network Hydrogels, *ACS Macro Letters* 12 (5), 549-554
107. Wagner, R.J. and **Vernerey, F.J.*** (2023). Coupled bond dynamics alters relaxation in polymers with multiple intrinsic dissociation rates. *Soft Matter*, 19 (15), 2716-2725
106. Lamont, S., Fropier, J., Abadie, J., Piat, E., Constantinescu, A., Roux, C. and **Vernerey, F.J.*** (2023). Profiling oocytes with neural networks from images and mechanical data. *Journal of the Mechanical Behavior of Biomedical Materials*, 138, 105640.
105. Crespo-Cuevas, V., Ferguson V.L., and **Vernerey, F.J.***(2023) "Poroviscoelasto-plasticity of agarose-based hydrogels." *Soft Matter* 19 (4), 790-806
104. Mwaffo, V. and **Vernerey, F.J.** (2022). Analysis of Group of Fish Response to Startle Reaction. *Journal of Nonlinear Science*, 32(6), 96.
103. Xu L, Fu Y, Wagner RJ, Zou X, He Q, Li T, Pan W, Ding J, **Vernerey F.J.*** (2022) Thermosensitive P (AAc-co-NIPAm) Hydrogels Display Enhanced Toughness and Self-Healing via Ion–Ligand Interactions. *Macromolecular Rapid Communications*. 43(19):2200320.
102. Wagner, R. J., Dai, J., Su, X. and **Vernerey, F. J.*** (2022). A mesoscale model for the micromechanical study of gels. *Journal of the Mechanics and Physics of Solids*, 167, 104982.
101. Xu, L., Wagner, R. J., Liu, S., He, Q., Li, T., Pan, W., ... and **Vernerey, F. J.*** (2022). Locomotion of an untethered, worm-inspired soft robot driven by a shape-memory alloy skeleton. *Scientific Reports*, 12(1), 12392.
100. Wagner, R. J. and **Vernerey, F. J.*** (2022). Computational exploration of treadmilling and protrusion growth observed in fire ant rafts. *PLoS Computational Biology*, 18(2), e1009869.
99. **Vernerey F.J.*** Mechanics of transient semi-flexible networks: soft-elasticity, stress relaxation and remodeling (2022), *Journal of the Mechanics and Physics of Solids*, 160, 104776
98. Lamont S.C, Mulderrig J., Bouklas N., and **Vernerey F.J.***, Rate-Dependent Damage Mechanics of Polymer Networks with Reversible Bond (2021), *Macromolecules*, 54, 23, 10801–10813
97. Hui C.Y.*, Cui F., Zehnder A. and **Vernerey F.J.***, (2021), Physically-motivated models of polymer networks with dynamic cross-links: comparative study and future outlook, *Proceedings of the Royal Society A*, 477 (2255), 20210608
96. Lamont, S. and **Vernerey F.J.*** (2021), A Transient Microsphere Model for nonlinear viscoelasticity in dynamic polymer networks, *Journal of Applied Mechanics*, <https://doi.org/10.1115/1.4052375>
95. **Vernerey F.J.***, Sridhar S.L., Muralidharan A, and Bryant S.* (2021), Mechanics of 3D cell-hydrogel interactions: Experiments, mechanisms and models, *Chemical Reviews*, <https://doi.org/10.1021/acs.chemrev.1c00046>

94. Wagner R.J., Hobbs E. and **Vernerey F.J.*** (2021). A network model of transient polymers: Exploring the micromechanics of nonlinear viscoelasticity. *Soft Matter*, <https://doi.org/10.1039/D1SM00753J>
93. Shen T., Song Z., Cai S.* and **Vernerey F.J.*** (2021). Nonsteady fracture of transient networks: the case of vitrimer. *PNAS*, 118 (29) e2105974118
92. Wagner R., Such K., Hobbs E. and **Vernerey F.J.*** (2021) Treadmilling and dynamic protrusions in fire ant rafts, *Journal of the Royal Society Interface*, 18(179):20210213
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