FRANCK J. VERNEREY

PERSONAL DATA

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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 Enginering, Civil Engineering and Applied Mathematics

Associate Professor, University of Colorado, Boulder, CO
Mechanical Engineering, August 2014-2018
Affiliate faculty in Material Science and Enginering, 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 Enginerring 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 swarm 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.
- **Bio-inspired active matter and soft machines.** We use theoretical mechanics to identify key concepts responsible for functionality and intelligence in synthetic and biological materials and aim to mimic these mechanisms in simpler synthetic systems. We have explored (a) The mechanics of slide-ring networks and molecular machines and (b) The non-equilibrium behavior of Stimuli-sensitive hydrogels for use as active materials.

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

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

VISITING POSITIONS & INVITED TALKS

- **Visiting Professor, Laboratoire de Mecanique des Solides, Ecole Polytechnique, France**
  September 2022- June 2023
- **Visiting Researcher, Ecole Polytechnique, France**
  Solid Mechanics Laboratory (LMS), May-June 2018
- **Visiting Professor, Ecole Nationale Superieure de Mechanique et des Microtechnique, France**
  FEMTO ST Laboratory, January 2018
- **Visiting Professor, Universita degli Studi di Parma, Italy**
  Department of Structural Engineering, Summer 2017
- **Visiting Professor, Universite de Reims - Champagne-Ardenne, France**
  Medical School, March 2016

Invited Presentations, Talks, Colloquia (Selected from the past 3 years)

20. **Mechanics of Active Networks: Lessons from fire ants**, Princeton University, planned for Spring 2021
19. **Elasticity, flow, and fracture of transient networks: The central role of force-dependent bond dynamics**, Cornell University, NY, Nov 3, 2020
18. **Active Soft Materials: The role of non-equilibrium processes**, Plenary speaker at the on-line symposium of Intelligent flexible Mechatronics, Jiangsu University, Oct 27-Nov 3, 2020

17. **From Dynamic Networks to Molecular Machines**, Rensselaer Polytechnic Institute (RPI), NY, Feb 5, 2020

16. **A short course on the transient network theory**, 3M research seminar on soft materials, Minnesota, July 2, 2020

15. **Mechanics of transient networks: harnessing the dynamic competition between flow and elasticity**, Symposium on mechanics of Smart and Tough Gels, UT-Austin, May 31, 2020

14. **Rate-dependent fracture mechanics of polymers with transient cross-links**, 3M research seminar on soft materials, Minnesota, January, 26, 2019.

13. **Mechanics of Active Solids or How Intelligence Emerges from Dynamic Networks**, Syracuse University, NY, Oct 26, 2018

12. **Statistical mechanics of active networks: from individual to Collective behavior**, ECPCI, Paris, May 29, 2018

11. **Mechanics lessons from active insect aggregations**, Mechanical Engineering, University of Colorado at Colorado Springs, March 22, 2018

10. **Mechanics of Dynamic Networks: From Individual to Collective Behavior** , Solid Mechanics Laboratory (LMS), Ecole Polytechnique, France, December 21, 2017

9. **Mechanics of dynamic networks from polymers to fire-ants**, Physics Department, University of Colorado Boulder, November 26, 2017

8. **Extreme mechanics of soft matter: from soft colloids to dynamic polymers**, 3M Corporation, Minneapolis, November 8, 2017

7. **Statistical Mechanics of Dynamic Networks: From Individual to Collective Behavior**, School of Physics, Georgia Tech, October 3, 2017

6. **Keynote lecture: Soft Mechanics of Scaled Skins From protection to locomotion.**, Society of Engineering Science Meeting, Boston, MA July 27, 2017

5. **Keynote lecture: Tuning hydrogel mechanics for targeted tissue engineering** , Society of Engineering Science Meeting, Boston, MA, July 26, 2017

4. **Keynote lecture: Computational Modeling of Hydrogel-Based Tissue Engineering: En Route to Personalized Regenerative Medicine**, US National Congress of Computational Mechanics, Montreal, Canada, July 17, 2017

3. **Mechanics of Soft Matter: From Structure to Functionality**, Department of Engineering, University of Parma, Italy, May 30, 2017

2. **Programmable hydrogel scaffolds for in-situ tissue engineering: how to tune tissue growth with hydrogel degradation?**, Medical School, Universite de Reims Champagne-Ardennes, Reims, France, January 28, 2016

1. **Computational Tissue Engineering Tuning Tissue Growth with Scaffold Degradation in Enzyme-Sensitive Hydrogels**, Penn Institute for Computational Science (PICS) and Applied Mathematics and Computational Science (AMCS) Colloquium Series, University of Pennsylvania, Philadelphia, USA, January 21, 2016

TEACHING

- 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.
- 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

- Prakhar Bandil (Current): Mechanics of cell-gel interactions.
- Samuel Lamont (Current): Mechanics of topological networks: visco-elasticity, fracture and actuation.
- Kyle Weishaar (Current): Mechanics of slide ring gels and entangled networks.
- Robert Wagner (Current): Mechanics of active matter aggregates: from fire-ant aggregations to active synthetic materials.

- 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 fungel 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

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 phycomyce 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 Superieure 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 Superieure de Cachan (France), **Thibaud Chevalier** (spring-summer 2008): Ecole Normale Superieure de Cachan (France)

PROFESSIONAL SERVICE ACTIVITIES

- **Leadership**

  Organizer of the first **Rocky Mountain Active Matter workshop**, August 10, 2018. Day long symposium that gathered research groups working on the topic of active matter in the Colorado region. The first edition featured presentations from 12 research groups from physics, chemistry, mechanics, robotics and material science from CU Boulder and UCCS.

- **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)

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.*** "Poroviscoelasto-plasticity of agarose-based hydrogels." Soft Matter (2023).

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.*** Thermosensitive P (AAc-co-NIPAm) Hydrogels Display Enhanced Toughness and Self-Healing via Ion–Ligand Interactions. Macromolecular Rapid Communications. 2022 Oct;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, in press

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

91. Barthold J.E., St. Martin B.M., Sridhar S.L., Vernerey F.J., Schneider S.E., Wacquez A., Ferguson V.L., Calve S., and Neu C.P. (2021). Recellularization and Integration of Dense Extracellular Matrix by Percolation of Tissue Microparticles. Advanced Functional Materials, https://doi.org/10.1002/adfm.202103355

90. Song Z., Shen T., **Vernerey F.J.*** and Cai S.* (2021), Force-dependent bond dissociation explains the rate-dependent fracture of vitrimers, Soft Matter, https://doi.org /10.1039/D1SM00518A

89. Ortega, J.K.E., Mohan R., Munoz C., Sridhar S.L. and **Vernerey F.J.*** (2021), Phycomyces: Helical growth during the phototropic and avoidance responses, and in stiff mutants. Scientific Reports, 11, Article number: 3653

88. Sridhar, L.S., Dunagin, J., Koo, K., Hough L. and **Vernerey, F.J.*** (2021). Enhanced diffusion by reversible binding to active polymers, Macromolecules, 54, 4, 1850–1858

87. Koo K., Sridhar, L.S., Clark N., **Vernerey F.J.**, and Loren Hough (2021). Moving while you're stuck: A macroscopic demonstration of an active system inspired by binding-mediated transport in biology, Soft Matter, 17 (10) , 2957-2962

86. **Vernerey, F.J.*** and Lamont, S. (2021). Transient mechanics of slide-ring networks, a continuum model. Journal of the Mechanics and Physics of Solids.,146, 104212

85. Shen, T and **Vernerey, F.J.*** (2020). Rate-dependent Fracture of Transient Networks. Journal of the Mechanics and Physics of Solids.,143, 104028.

84. Brighenti, R., Li, Y., and **Vernerey, F. J.** (2020). Smart polymers for advanced applications: a mechanical perspective review. Frontiers in Materials, DOI:10.3389/fmats.2020.00196

83. Sridhar, S and **Vernerey, F.J.*** (2020). Mechanics of transiently crosslinked nematic networks. Journal of the Mechanics and Physics of Solids, 141, 104021

82. Schneider, M., Sridhar, S.L., **Vernerey, F.J.**, Bryant, S. (2020). Spatiotemporal Neocartilage Growth in Matrix-Metalloproteinase-Sensitive Poly(Ethylene Glycol) Hydrogels Under Dynamic Compressive Loading: An Experimental and Computational Approach. J. Mater. Chem. B, 2020,8, 2775-2791

81. **Vernerey, F.J.*** and Stephanie Bryant (2020), The role of percolation in hydrogel-based tissue engineering and bioprinting, Current Opinion in Biomedical Engineering, 15, 68-74

80. Benet, E. and **Vernerey F.J.*** (2019), Dynamic competition of inflation and delamination in the finite deformation of thin membranes, Soft Matter, 15, 6630-6641

79. Shen, T. and **Vernerey F.J.*** (2019), On the blistering of thermo-sensitive hydrogel: the volume phase transition and mechanical instability, Soft Matter,15, 5842-5853

78. White, Z., Shen, T., Volk, E., **Vernerey F.J.*** (2019), The role of surface properties on the penetration resistance of scaled skins, Mechanics Research Communications, 98, 1-8

77. Benet E., Zhu, H. and **Vernerey, F.J.*** (2019), Interplay of elastic instabilities and viscoelasticity in the finite deformation of thin membranes, Physical Review E, 99, 042502

76. Shen, T, Benet, E., Sridhar S.L, Abadie, J., Piat E. and **Vernerey, F.J.*** (2019), Separating the contributions of zona pellucida and cytoplasm in the viscoelastic response of human oocytes, Acta Biomaterialia, 85, 253-262

75. **Vernerey, F.J.***, Benet E., Blue L., Fajrial A.K., Sridhar S.L, Lum J., Shakya G., Song K.H., Thomas A.N. and Borden M.A. (2019) Biological Active Matter Aggregates: Inspiration for Smart Colloidal materials, Advances in colloid and interface science 263, 38-51

74. Sridhar, S.L., Ortega, J.K and **Vernerey, F.J.*** (2018), A Statistical Model of Expansive Growth in Plant and Fungal Cells: The Case of Phycomyces, Biophysical journal 115 (12), 2428-2442

73. **Vernerey, F.J.***, Shen, T., Sridhar, S.L. and Wagner, R. (2018), How do fire ants control the rheology of their aggregations? -A statistical mechanics approach, Journal of the Royal Society, Interface, 15, 20180642

72. **Vernerey, F.J.***, Brighenti, R. Long, R. and Shen, T. (2018), Statistical Damage Mechanics of Polymer networks, Macromolecules, 51 (17), 6609–6622

71. Sridhar, S.L. and **Vernerey, F.J.*** (2018), The distribution tensor: understanding anisotropy and rheology in dynamic polymers, Polymers 2018, 10, 848.

70. Shen, T. Long, R. and **Vernerey, F.J.*** (2018), Computational modeling of the large deformation and flow of viscoelastic polymers, Computational Mechanics, DOI: 10.1007/s00466-018-1619-0

69. White, Z. and **Vernerey, F.J.*** (2018), Armours for soft bodies: How far can bioinspiration take us?, Bioinspiration and Biomimetics, 13(4), 041004.

68. Benet E., Lostec G., Pellegrino J. and **Vernerey, F.J.*** (2018), Mechanical instability and percolation of deformable particles through porous networks, Physical Review E, 97, 042607.

67. Brighenti, A., Menzel, A and **Vernerey, F.J.** (2018), A physics-based micromechanical model for electroactive viscoelastic polymers, Journal of Intelligent Material Systems and Structures, https://doi.org/10.1177/1045389X18781036.

66. **Vernerey, F.J.*** (2018), Transient Response of Nonlinear Polymer Networks: a Kinetic Theory, Journal of the Mechanics and Physics of Solids, 115, 230-247

65. Sridhar, S. and **Vernerey, F.J.*** (2018), Localized Enzymatic Degradation of Polymers: Physics and Scaling Laws, Physical Review Applied, 9(3), 031001

64. Brighenti R., Artoni F., **Vernerey, F.J.**, Torelli, M., Domenichelli I., Dalcanale E. (2018), Mechanics of polymers cross-linked with switchable molecules, Journal of the Mechanics and Physics of Solids, 113, 65-81.

63. Shen, T.; Font, M, Jung, S.; Gabriel, M.; Stoykovich, M.; **Vernerey, F.J.***; (2017), Remotely Triggered Locomotion of Hydrogel Mag-bots in Confined Spaces, Nature Scientific Reports, 7,16178

62. **Vernerey, F.J.***, Shen, T. (2017), The mechanics of hydrogel crawlers in confined environment, Journal of the Royal Society Interface, 14 (132), 20170242

61. Schneider, M. Chu, S. Sridhar, S.; De Roucy, G.; **Vernerey, F.J.**; Bryant, S. (2017), Local heterogeneities improve matrix connectivity in degradable and photoclickable PEG hydrogels for applications in tissue engineering, ACS Biomaterials Science and Engineering, 3 (10), pp 2480–2492

60. Stefferson, M., Norris S., **Vernerey, F.J.**, Betterton, M.D, Hough, L.E. (2017), Effects of soft interactions and bound mobility on diffusion in crowded environments: a model of sticky and slippery obstacles, Physical Biology, 14(4)

59. Bryant, S. and **Vernerey, F.J.** (2017), Programmable hydrogels for cell encapsulation and neo-tissue growth to enable personalized tissue engineering, Advanced Healthcare Materials,7, (1).

58. **Vernerey, F.J.***, Long, R. and Brighenti, R. (2017), A Statistically-Based Continuum Theory for Polymers with Transient Networks, Journal of the Mechanics and Physics of Solids, 107, pp 1-20

57. Shankar L.S., Schneider, M., Chu, S., DeRoucy G., Bryant, S. **Vernerey, F.J.*** (2017) Heterogeneity is key to hydrogel-based cartilage tissue regeneration, Soft Matter, 13, pp 4841-4855

56. A. C. Sullivan, S. Lalitha Sridhar, A. Resman, D. J. Glugla, M. D. Alim, **F.J Vernerey**, R. R. McLeod (2017) Mechanical response of holographic photopolymers, Proc. SPIE 10233, Holography: Advances and Modern Trends V, 102330O; doi: 10.1117/12.2265878;

55. Brighenti, R., **Vernerey, F.J.**, and Artoni, F. (2017) Rate-dependent failure mechanism of Elastomers, Journal of Mechanical Sciences, 130, pp 448-457

54. Benet, E., Badran, A., Pellegrino, J, and **Vernerey, F.J.*** (2017) The porous media's effect on the permeation of elastic (soft) particles, Journal of Membrane Science, 535, pp 10-19

53. Chu, S., Shankar, L.S., Akalp, U., Skaalure, S., **Vernerey, F.J.** and Bryant, S.J. (2017) Understanding the Spatiotemporal Degradation Behavior of Aggrecanase-Sensitive Poly(ethylene glycol) Hydrogels for use in Cartilage Tissue Engineering, Tissue Engineering, Part A, 23(15-16):795-810

52. Shen, T. and **Vernerey, F.J.*** (2017), Phoretic Motion of Soft Vesicles and Droplets: An XFEM/Particle-based Numerical Solution, Computational mechanics, 60, Issue 1, pp 143–161

51. Akalp, U; Schnatwinkel, C; Stoykovich, M., Bryant, S; and **Vernerey, F.J.***(2017) Structural Modeling of Mechanosensitivity in Non-Muscle Cells: Multiscale approach to understand cell sensing, ACS Biomaterials Science and Engineering, 3 (11), pp 2934–2942

50. Benet, E. and **Vernerey, F.J.*** (2016). "Mechanics and stability of vesicles and droplets in confined spaces", Physical Review E, 94(6), 062613.

49. Brighenti R. and **Vernerey, F. J.*** (2016) "A simple statistical approach to model the time-dependent response of polymers with reversible cross-links", *Composites Part B: Engineering*, 115, pp 257-265

48. Akalp U., Bryant, S. and **Vernerey, F. J.*** (2016) "Tuning Tissue Growth with Scaffold Degradation in Enzyme-Sensitive Hydrogels: a Mathematical Model", *Soft Matter*, 2016,12, pp 7505-7520

47. **Vernerey, F. J.*** and Akalp U. (2016) "Role of catch bonds in actomyosin mechanics and cell mechanosensitivity", *Physical Review E*, 94, 012403.

46. Musiket, K, **Vernerey, F.J.** and Xi Y. (2017) "Numerical Modeling of Fracture Failure of Recycled Aggregate Concrete Beams under High Loading Rates", *International Journal of Fracture*, 203 (1), pp 263-276.

45. Foucard, L. and **Vernerey, F. J.*** (2016) "A Particle-based Moving Interface Method (PMIM) for modeling the large deformation of boundaries in soft matter systems.", *International Journal for Numerical Methods in Engineering*, 107 (11), pp 923–946.

44. Skaalure, S., Akalp, U., **Vernerey, F. J.** and Bryant, S. (2016) "Tuning Reaction and Diffusion Mediated Degradation of Enzyme-Sensitive Hydrogels", *Advanced Healthcare Materials.* 5 (4), pp 432-438

43. **Vernerey, F. J.*** (2016) "A Mixture Approach to Investigate Interstitial Growth in Engineering Scaffolds", *Biomechanics and Modeling in Mechanobiology.* 15(2), pp 259-78.

42. Akalp, U., Chu, S., Skaalure, S., Bryant, S.J., Doostan, A. and **Vernerey, F. J.*** (2015) "Determination of the Polymer-Solvent Interaction Parameter for PEG Hydrogels in Water: Application of a Self Learning Algorithm", *Polymer.*, 66, pp. 135–147

41. Funk, N., Vera, M., Szewciw, L., Barthelat, F., Stoykovich, M., and **Vernerey, F. J.*** (2015) "Bio-inspired fabrication and characterization of a synthetic fish skin for soft materials protection", *ACS Applied Materials and Interfaces*, 24, pp 3040

    Highlight in Science, p1434, vol 347 issue 6229 (March 2015)

40. Foucard, L., Aryal, A., Duddu, R.* and **Vernerey, F.J.*** (2015) "A coupled Eulerian-Lagrangian extended finite element formulation for moving interface problems in hyperelastic media", *Computer Methods in Applied Mechanics and Engineering*, 283, pp 280–302

39. Foucard, L. and **Vernerey, F. J.** * (2014) "An X-FEM based numerical-asymptotic expansion for simulating a Stokes flow near a sharp corner", *Invited paper for the International Journal for Numerical Methods in Engineering.* DOI: 10.1002/nme.4746

38. Foucard, L. and **Vernerey, F. J.** * (2014) "Particle-based Moving Interface Method for the study of the interaction between soft colloid particles and immersed fibrous network", *Invited paper in Computer Modeling in Engineering and Science*, 98(1), 101-127

37. **Vernerey, F. J.** * and Kabiri, M (2014) "Adaptive Concurrent Multiscale Model for Fracture and Crack Propagation in Heterogeneous Media", *Computer Methods in Applied Mechanics and Engineering*, 276, pp. 566-588

36. **Vernerey, F. J.** * and Barthelat, F. (2014) "Skin and scales of teleost fish: simple structure but high performance and multiple functions", *Journal of the Mechanics and Physics of Solids*, 68, pp. 66-76

35. **Vernerey, F. J.** *, Musiket K. and Barthelat, F. (2014) "Mechanics of Fish skin: A computational approach for bio-inspired flexible composites", *International Journal of Solids and Structures*, 51(1), pp 274–283

34. **Vernerey, F. J.*** (2013). "A Microstructure-based Continuum Model for Multiphase Solids", *Mechanics of Advanced Materials and Structures*, 21(6), pp 441-456

33. Liang, Y.C, Ye, Z. **Vernerey, F.J.** and Xi, Y. (2013) "Development of Processing Methods to Improve Strength of Concrete with 100% Recycled Coarse Aggregate", *Journal of the Materials in Civil Engineering*, 27(5)

32. Zhu, D., Szewciw, L. **Vernerey, F.J.** and Barthelat, F. (2013) "Puncture resistance of the scaled skin from striped bass: collective mechanisms and inspiration for new flexible armor designs", *Journal of the Mechanical Behavior of Biomedical Materials*, 24, pp 30–40.

31. Dhote, V. and **Vernerey, F. J.*** (2014). "Mathematical model of the role of degradation on matrix development in hydrogel scaffold", *Biomechanics and Modeling in Mechanobiology*, 13, pp 167-183.

30. **Vernerey, F. J.*** and Farsad, M. (2013). "A mathematical model of the coupled mechanisms of cell adhesion, contraction and spreading", *Journal of Mathematical Biology*, 68(4), 989-1022

29. **Kabiri, M. and Vernerey, F. J.*** (2013). "An XFEM based multiscale approach to fracture of heterogeneous media", *International Journal of Multiscale Computational Engineering*, 11(6), pp 565-580

28. Dhote, V., Skaalure, S. Akalp, U., Robert, J., Bryant, S. and **Vernerey, F. J.*** (2012). On the role of hydrogel structure and degradation in controlling the transport of cell-secreted matrix molecules for engineered cartilage, *Journal of the Mechanical Behavior of Biomedical Materials*, 19, pp 61-74.

27. **Vernerey, F. J.*** and Kabiri, M. (2012). An adaptive concurrent multiscale method for microstructured elastic solids, *Computer Methods in Applied Mechanics and Engineering*, 241-244, pp. 52-64

26. Farsad, M. and **Vernerey, F. J.*** (2012). An XFEM-based numerical strategy to model mechanical interactions between biological cells and a deformable substrate, *International Journal of Numerical Methods in Engineering*, 92,(3), pp 238-267

25. Foucard, L. and **Vernerey, F. J.*** (2012). On the dynamics of Stress Fibers turnover in contractile cells, *Journal of Engineering Mechanics*, v138(10), pp 1282-1287

24. **Vernerey, F. J.*** (2012). The effective permeability of cracks and interfaces in porous media, *Transport in Porous Media*, 93,(3), pp815-829

23. Foucard, L. and **Vernerey, F. J.*** (2012). A thermodynamical model for stress-fiber organization in contractile cells, *Applied Physics Letters*, 100(1), 013702 1-4.

22. **Vernerey, F. J.***, Chevalier, T. (2012). "A multiscale micro-continuum model to capture strain localization in composite materials", *International Journal of Multiscale Computational Engineering*, 10(5), 487-501

21. **Vernerey, F.J.*** (2011). A theoretical treatment on the mechanics of interfaces in deformable porous media, *International Journal of Solids and Structures*, 48(22-23), 3129-3141

20. Zhu, D, Ortega, C, Motamedi, R, Szewciw, L, **Vernerey, F. J.** and Barthelat, F. (2011). Structure and mechanical performance of a "modern" fish scale, *Advanced Biomaterials*, 14(4), B185-B194

19. **Vernerey, F. J.*** , Foucard, L. and Farsad, M. (2011). Bridging the scales to explore cellular adaptation and remodeling, *BionanoScience*, 1(3),110-115

18. **Vernerey, F. J.*** and Farsad, M. (2011). A Constrained Mixture Approach to Mechano-Sensing and Force Generation in Contractile Cells, *Journal of the Mechanical Behavior of Biomedical Materials*, 4(8), 1683-1699

17. **Vernerey, F. J.***, Greenwald, E. and Bryant, S. (2011). Triphasic mixture model of cell-mediated enzymatic degradation of hydrogels, *Computer Methods in Biomechanics and Biomedical Engineering*, 15(11), 1197-1210

16. **Vernerey, F. J.***, Pak, R. (2011). "Analysis of Soft Fibers with Kinematic Constraints and Cross-links by Large Deformation Beam Theory", *Journal of Engineering Mechanics*, 137, pp 527-536.

15. **Vernerey, F. J.*** and Farsad, M. (2011), "An Eulerian/XFEM formulation for the large deformation of cortical cell membrane", *Computer Methods in Biomechanics and Biomedical Engineering*, 14(5),433-45

14. **Vernerey, F. J.*** and Bartelat, F. (2010). "On the Mechanics of Fish-Scale Structures." *International Journal of Solids and Structures*, 47(17), 2268-2275.

13. Farsad, M., **Vernerey, F. J.***, and Park, H. S. (2010). "An Extended Finite Element/Level Set Method to Study Surface effects on the Mechanical Behavior and Properties of Nanomaterials." *International Journal of Numerical Methods in Engineering*, 84(12),1466-1489.

12. **Vernerey, F. J.*** and Moran, B. (2010). "A nonlinear, large deformation finite element beam/column formulation for the study of the human spine: investigation of the role of muscle in spine stability." *Journal of Engineering Mechanics*, 136(11), 1319-1328

11. **Vernerey, F. J.***, Liu, W. K., Moran, B., Olson, G. B. (2009). "Multi-Length Scale Micromorphic Process Zone Model." *Computational Mechanics*, 44, 433-445.

10. **Vernerey, F. J.***, Liu, W. K., Moran, B., and Olson, G. B. (2008). "A Micromorphic Model for the Multiple Scale Failure of Heterogeneous Materials." *Journal of the Mechanics and Physics of Solids*, 56(4), 1320-1347

9. **Vernerey, F. J.***, Liu, W. K., and Moran, B. (2007). "Multi-Scale Micromorphic Theory for Hierarchical Materials". *Journal of the Mechanics and Physics of Solids*, 55(12), 2603-2651.

8. **Vernerey, F. J.***, McVeigh, C., Liu, W. K., Moran, B., Tewari, D., Parks, D., and Olson, G. (2006). "The 3D Computational Modeling of Shear Dominated Ductile Failure of Steel". *JOM, The Journal of The Minerals, Metals and Materials Society*, 58(12), 45-51.

7. McVeigh, C., **Vernerey, F. J.**, Liu, W. K., Moran, B., and Olson, G. B. (2006). "An Interactive Microvoid Shear Localization Mechanism in High Strength Steels". *Journal of the Mechanics and Physics of Solids*, 55(2),225-244

6. McVeigh, C., **Vernerey, F. J.**, Liu, W. K., and Brinson, C. (2006). "Multiresolution Analysis for Material Design". *Computer Methods in Applied Mechanics and Engineering*, 195(37-40), 5053-5076.

5. Hao, S., Liu, W. K., Moran, B., **Vernerey, F. J.**, and Olson, G. B. (2004). "Multi-scale Constitutive Model and Computational Framework for the Design of Ultra-high Strength". *Computer Methods in Applied Mechanics and Engineering*, 193, 1865.

Peer Reviewed Book chapters (The superscript * denotes corresponding author)

4. Zhu, D., Barthelat, F. and **Vernerey, F. J.*** (2013). The intricate multiscale mechanical response of natural fish-scale composites, *Handbook of Micromechanics and Nanomechanics*, Pan Stanford Publishing Co, ISBN-10: 981441123X — ISBN-13: 978-9814411233

3. Foucard, L., Espinet, X. Benet, E. M. and **Vernerey, F. J.** * (2013). "The role of the cortical membrane in cell mechanics: model and simulation", *Multiscale Simulations and Mechanics of Biological Materials*, Wiley, DOI: 10.1002/9781118402955. ch13.

2. **Vernerey, F. J.** * Preface, Multiscale Modeling of inelastic and localization behavior in heterogeneous media, *International Journal for Multiscale Computational Engineering* 10 (5)

1. **Vernerey, F. J.*** (2011), "On the application of multiphasic theories to the problem of cell-substrate mechanical interactions", *Advances in Cell Mechanics*, Springer, Li, Shaofan; Sun, Bohua (Eds.), 27-54