SOTIRIOS KAKALETSIS

Thessaloniki, Greece • sotirios.kakaletsis@gmail.com • ♂ • R⁶ • **in** • Portfolio

Research Interests: Biomechanics, Computational & Nonlinear Solid Mechanics

EDUCATION

Ph.D., Engineering Mechanics   8/2018 - 12/2023
The University of Texas at Austin
Research Area: Soft Tissue Biomechanics, Nonlinear Solid Mechanics
Advisor: prof. Manuel Rausch

M.S., Engineering Mechanics   8/2018 - 12/2023
The University of Texas at Austin   GPA 4.0/4.0

Diploma, Mechanical Engineering   9/2011 - 11/2016
Aristotle University of Thessaloniki, Greece   GPA 8.90/10.0
Advisor: prof. Sotirios Natsiavas

EXPERIENCE

Altair Engineering (Siemens Digital Industries Software)   2/2024 - present
Senior Software Development Engineer   Thessaloniki, Greece

· OptiStruct: Research and development of structural, implicit, finite element solver

Ansys, Inc   5/2023 - 12/2023
Computational & Structural Mechanics Intern   Houston, TX, USA

· Solver evaluation and virtual material testing of reinforced elastomers using embedded elements

Soft Tissue Biomechanics Lab, UT Austin   8/2018 - 12/2023
Graduate Research Assistant   Austin, TX, USA

· Right ventricular myocardium characterization through inverse finite element analysis
· Soft material parameter identification using machine learning
· Mechanics and modeling of embedded, discrete fiber networks under large deformation

Machine Dynamics Laboratory, Aristotle University, Greece   11/2016 - 7/2018
Research Assistant   Thessaloniki, Greece

· Research and development on multibody dynamics modeling (coupler constraints & showcase models)

TEACHING EXPERIENCE

Mechanics Department, National Technical University of Athens   Athens, Greece
Academic Instructor

· Taught two undergraduate classes:
  – Computational Mechanics II   Fall 2025-2026
  – Mechanics III (Strength of Materials)   Fall 2025-2026
· Designed coursework, assignments, and delivered lectures

The University of Texas at Austin   Austin, TX, USA
Teaching Assistant

· Teaching assistant for the undergraduate classes:
  – EM306 Statics   Fall 2023, Spring 2022

- ASE324L Aerospace Materials Laboratory   Spring 2020, Spring 2023
- EM311 Dynamics   Fall 2018, Spring 2019, Fall 2019

· Delivered practice and lab sessions, held office hours, graded coursework

JOURNAL PUBLICATIONS

J11. Lohr MJ, Mane S, **Kakaletsis S,** Bechtel NG, Fuhg JN, Dortdivanlioglu B, Huang R, Rausch MK. *Modeling Semi-Flexible Biopolymer Networks with Discrete Isogeometric Euler-Bernoulli Beams.* Journal of the Mechanics and Physics of Solids, 2025

J10. Lin C-Y, Sugerman GP, **Kakaletsis S,** Meador WD, Buganza AT, Rausch MK. *Sex-and age-dependent skin mechanics—A detailed look in mice.* Acta Biomaterialia, 2024

J9. **Kakaletsis S,** Lejeune E, Rausch MK. *The mechanics of embedded fiber networks.* Journal of the Mechanics and Physics of Solids, 2023

J8. **Kakaletsis S,** Malinowski M, Mathur M, Sugerman GP, Luci LJ, Snider C, Jazwiec T, Bersi MR, Timek TA, Rausch MK. *Untangling the mechanisms of pulmonary hypertension-induced right ventricular stiffening in a large animal model.* Acta Biomaterialia, 2023

J7. Giolando P, **Kakaletsis S,** Zhang X, Weickenmeier J, Castillo E, Dortdivanlioglu B, Rausch MK. *AI-dente: an open machine learning based tool to interpret nano-indentation data of soft tissues and materials.* Soft Matter, 2023

J6. **Kakaletsis S,** Lejeune E, Rausch MK. *Can machine learning accelerate soft material parameter identification from complex mechanical test data?* Biomechanics and Modeling in Mechanobiology, 2022

J5. Meador W, Mathur M, **Kakaletsis S,** Lin C-Y, Bersi M, Rausch MK. *Biomechanical phenotyping of miniscule soft tissues.* Extreme Mechanics Letters, 2022

J4. Lohr M, Sugerman GP, **Kakaletsis S,** Lejeune E, Rausch MK. *An Introduction to the Ogden Model in Biomechanics – Benefits, Implementation Tools, and Limitations.* Philosophical Transaction of the Royal Society A, 2022

J3. Rausch MK, Sugerman GP, **Kakaletsis S,** Dortdivanlioglu D. *Hyper-viscoelastic damage modeling of whole blood clot under large deformation.* Biomechanics and Modeling in Mechanobiology, 2021

J2. **Kakaletsis S,** Meador WD, Mathur M, Sugerman GP, Jazwiec M, Lejeune E, Timek TA, Rausch MK. *Right ventricular myocardial mechanics: Multi-modal deformation, microstructure, modeling, and comparison to the left ventricle.* Acta Biomaterialia, 2021

J1. Sugerman GP, **Kakaletsis S,** Thakkar P, Chokshi A, Parekh SH, Rausch MK. *A whole blood clot thrombus mimic: Constitutive behavior under simple shear.* Journal of the Mechanical Behavior of Biomedical Materials, 2021

CONFERENCES & TALKS

C11. Lohr MJ, Kakaletsis S, Rausch MK. *Fracture Mechanics of Embedded Fiber Networks.* Proceedings of the Summer Biomechanics, Bioengineering, and Biotransport Conference, Santa Ana Pueblo, NM, USA 2025

C10. Kakaletsis S. *Histomechanical characterization and microstructure-based modeling of right ventricular myocardium.* Seminar at the Mechanics Department, NTUA, Athens, Greece, 2024

C9. Kakaletsis S, Lejeune E, Rausch MK. *Microstructure-Based Estimation Of The Effective Stiffness Of Crosslinked, Embedded Fiber Networks.* Proceedings of the Summer Biomechanics, Bioengineering, and Biotransport Conference, Vail, CO, USA, 2023

C8. Lin C-Y, Sugerman GP, Kakaletsis S, Meador WD, Tepole AB, Rausch MK. *Are Mice A Good Model System to Study Sex and Age-dependent Skin Properties?* Proceedings of the Summer Biomechanics, Bioengineering, and Biotransport Conference, Vail, CO, USA 2023

C7. Kakaletsis S, Lejeune E, Rausch MK. *Investigation of the Poynting Effect of Anisotropic Soft Materials using Embedded, Discrete Fiber Networks.* 2022 Society of Engineering Science Annual Techical Meeting, College Station, TX, USA, 2022

C6. Kakaletsis S, Lejeune E, Rausch MK. *How Well Do Constraint Mixture Models Represent Fibrous Soft Tissues? A Comparison Against Embedded, Discrete Fiber Models.* 15th World Congress on Computational Mechanics, Yokohama, Japan (Virtual), 2022

C5. Kakaletsis S, Lejeune E, Rausch MK. *Soft Tissue Parameter Identification using Machine Learning.* 7th International Conference on Computational and Mathematical Biomedical Engineering, Milan, Italy, 2022

C4. Kakaletsis S, Lejeune E, Rausch MK. *Fibrous Soft Tissue Modelling as Embedded, Discrete Fiber Networks.* 19th U.S. National Congress on Theoretical and Applied Mechanics, Austin, TX, USA, 2022

C3. Kakaletsis S, Jazwiec T, Malinowski M, Timek TA, Rausch MK. *Pulmonary hypertension and histomechanics of the right ventricle.* Carnegie Mellon Biomedical Engineering Forum, Virtual, 2021

C2. Kakaletsis S, Sugerman GP, Jazwiec T, Malinowski M, Timek TA, Rausch MK. *Mechanics and microstructurally based modeling of the passive right ventricular myocardium.* 16th U.S. National Congress on Computational Mechanics, Virtual, 2021

C1. Kakaletsis S, Sugerman GP, Jazwiec T, Malinowski M, Timek TA, Rausch MK. *Histo-mechanics of the passive right ventricular myocardium.* Proceedings of the Annual Summer Biomechanics, Bioengineering, and Biotransport Conference, Virtual, 2021

HONORS AND AWARDS

Eric Baker Becker III Memorial Graduate Scholarship Cockrell School of Engineering, UT Austin	2022-2023
George J. Heuer, Jr. Ph.D. Endowed Graduate Fellowship Cockrell School of Engineering, UT Austin	2021-2022
Graduate Continuing Fellowship Graduate School, UT Austin	2020-2021
Scholarship Hellenic Professional Society of Texas	2021
John and Mary Wheeler Endowed Graduate Fellowship Cockrell School of Engineering, UT Austin	2019-2020
Award and Scholarship Greek State Scholarships Foundation (IKY)	2011-2012

TECHNICAL SKILLS

Languages	Fortran, Python, C++, Matlab
Finite Element Analysis	OptiStruct, Abaqus, Ansys, FEBio, Ansa & META
Multibody Dynamics	MSC Adams, Altair MotionView
Tools	ParaView, LATEX, Autodesk Autocad & Inventor, Adobe Illustrator