SOTIRIOS KAKALETSIS

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Research Interests: Nonlinear Solid Mechanics, Biomechanics, Computational Mechanics

EDUCATION

PhD, Engineering Mechanics 8/2018 - 12/2023
The University of Texas at Austin. GPA 4.0/4.0
Research Area: Soft Tissue Biomechanics, Nonlinear Solid Mechanics.
Advisor: prof. Manuel Rausch

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

RESEARCH EXPERIENCE

Soft Tissue Biomechanics Lab, UT Austin 8/2018 - Present
Graduate Research Assistant

- 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

Ansys, Inc 5/2023 - 12/2023
Computational-Structural Mechanics Intern

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

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

- Analytical formulation & implementation of coupler constraints in multibody dynamics
- Created a library with multibody showcase models for MotionSolve & MotionView, Altair Engineering

TECHNICAL SKILLS

Languages	Python (Scikit-learn, PyTorch), C++, Fortran, Matlab
Finite Element Analysis	Abaqus, FEBio, Ansa & META
Multibody Dynamics	MSC Adams, Altair Motionsolve
Tools	ParaView, LATEX, Autodesk Autocad & Inventor, Adobe Illustrator

PUBLICATIONS

J8. **Kakaletsis S,** Lejeune E, Rausch MK. *The mechanics of embedded fiber networks.* Journal of the Mechanics and Physics of Solids, 2023

J7. **Kakaletsis S,** Malinowski M, Mathur M, GSugerman 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

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

CONFERENCE PRESENTATIONS

C8. 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, 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, 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, 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 2022-2023
Cockrell School of Engineering, UT Austin.

George J. Heuer, Jr. Ph.D. Endowed Graduate Fellowship 2021-2022
Cockrell School of Engineering, UT Austin.

Graduate Continuing Fellowship 2020-2021
Graduate School, UT Austin.

Scholarship 2021
Hellenic Professional Society of Texas.

John and Mary Wheeler Endowed Graduate Fellowship 2019-2020
Cockrell School of Engineering, UT Austin.

Award and Scholarship 2011-2012
Greek State Scholarships Foundation (IKY)

TEACHING

Teaching assistant for the undergraduate classes:

EM306 Statics	Spring 2022
ASE324L Aerospace Materials Laboratory	Spring 2020, Spring 2023
EM311 Dynamics	Fall 2018, Spring 2019, Fall 2019