Thomas Lavigne

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Education

Co-tutelle PhD – 2022-2025
AFR-FNR Luxembourg Grant. Co-tutelle IBHGC (ENSAM) Paris, Université du Luxembourg and I2M Bordeaux. Biomechanical Response of Human Skin: A Hierarchical Porous Media Framework. Proposed for Prix Bézier (ENSAM) and the Tarrach Price from "Les Amis de l'Université du Luxembourg ". Awarded the 2025 Excellent Thesis Award (University of Luxembourg).

École Normale Supérieure (ENS) Paris-Saclay – 2018-2020

- *10 months internship at Legato Team / Université du Luxembourg– 2021-2022*
- *Master 1 in Mechanical Sciences and Manufacturing. 2019-2020 – (Rank: 1/18)*
- *Bachelor's degree in Engineering Sciences (Mechanical Engineering) Received with honours (Rank: 12/70)*

École Nationale Supérieure des Arts et Métiers (ENSAM) / BME Master's Program – 2020-2021
Second year of research master's degree in BioMechanics. (Rank: 4/27)

Lycée Hoche – (2016-2018) Classes Préparatoires aux Grandes Écoles
Intensive two-year course preparing for highly competitive national entrance examsto the French Grandes Écoles

June 2016, General Baccalauréat (A-level equivalent)
Engineering Sciences major. (High honours)

Professional Experience

Post-Doctoral position (Poromechanical modelling for soft tissues) – *09/***2025-11/2025** – *Université de Bordeaux*

Teaching for engineers (Mathematics, Dynamics, Informatics, Mechanics, Experimental Methods)– 2022-2025
ENSAM Paris

Tutored sessions for students in difficulty 2020 – *École Normale Supérieure Paris-Saclay*

Oral examiner in class preparing for competitive national entrance exams 2018-2020
(Physics, Chemistry and Engineering Science) -- Lycée Hoche, Versailles, France

Projects

[*] **Biomechanical Response of Human Skin: A Hierarchical Porous media Framework —2022- 2025**
PhD Project — supervisors: Stéphane Bordas (Légato Team Luxembourg) and Pierre-Yves Rohan (IBHGC France) and Giuseppe Sciume (I2M France)
Collaborations: LBTI (France), FEMTO-ST (France), Euler Institute (Switzerland), LMPS (France)

[1] **Surrogate Modelling of the Breast tissue deformation —September 2021- September 2022**
Research Internship — supervisor: Stéphane Bordas (Légato Team Luxembourg) and François Hild (LMT France)

[2] **Experimental investigation of the mechanical response of skeletal muscle tissue to compressiveloads using consolidation theory for Pressure Ulcer Prevention—September 2020- present**
Research Internship — supervisor: Pierre-Yves Rohan, IBHGC (France)

[3] **Development & Modelling of the impact on the rugby player professional—April 2020- July 2020**
Research Internship — supervisor: Sébastien Laporte, IBHGC (France)

[4] **Tomographic tracking of a torsion test on a metamaterial structure—September 2019-2020**
Mechanical Engineering Project — supervisor: François Hild, LMT laboratory, Cachan, France

Publications and Conferences

MRI-based computational modeling of human cortical folding, Kerachni et al. 2024 (co-author): https://www.scipedia.com/public/Kerachni_et_al_2024a: *

Hierarchical poromechanical approach to investigate the impact of mechanical loading on human skin micro-circulation: https://doi.org/10.48550/arXiv.2502.17354: *

Poromechanical modelling of the time-dependent response of in vivo human skin during extension: https://doi.org/10.48550/arXiv.2412.07374: *

Single and bi-compartment poro-elastic model of perfused biological soft tissues: FEniCSx implementation and tutorial: https://doi.org/10.1016/j.jmbbm.2023.105902**: ***

Digital Volume Correlation for Large Deformations of Soft Tissues: Pipeline and Proof of Concept for the application to Breast ex vivo Deformations: [1], https://dx.doi.org/10.1016/j.jmbbm.2022.105490

Identification of material parameters and traction field for soft bodies in contact: [1], https://doi.org/10.1016/j.cma.2023.115889
Société de Biomécanique Young Investigator Award 2021: Numerical investigation of the time-dependent stress–strain mechanical behaviour of skeletal muscle tissue in the context of pressure ulcer prevention: [2], 10.1016/j.clinbiomech.2022.105592

Poynting effects in pantographic metamaterial captured via multiscale DVC: [4], 10.1177/0309324720976625

EPUAP 2024, Switzerland (oral communication), September 2024

Interpore BeneLux 2024 (posters), April 2024

BSSM's 17th International Conference on Advances in Experimental Mechanics *(oral communication)*

18th International Symposium on Computer Methods in Biomechanics and Biomedical Engineering *(poster communication):* [1]

Journées thématiques de la F2M *(oral communications):* February 2023 – April 2024

46th congress of the biomechanical society *(oral communication and abstract):* [2], *doi:* 10.1080/10255842.2021.1978758

Technical Skills and Language

Softwares: Python, FEniCSx, Matlab, Basic knowledge of C++, Cast3M, Abaqus, Mathematica (AceFEM, AceGEN), Catia and Solidworks (CAD), Slicer3D, LateX, Microsoft and Adobe packages, Git

Language spoken: French (native), English (CAE: C1), Spanish (Basic knowledge)

Personal interests

Sports*:* Cycling, Scuba-diving (3rd level National Licence) and Skiing.

Hobbies*:* Guitar, Photography

Interests: Good practice in coding and development. Co-organiser of internal seminars about good practice in coding and tutorials for FEniCSx.