

# 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 exams to 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](#) ([Legato Team](#) Luxembourg) and [Pierre-Yves Rohan](#) (IBHGC France) and [Giuseppe Sciume](#) (I2M France)

Collaborations: LBTI (France), FEMTO-ST (France), Euler Institute (Switzerland), LMPS (France)

### <sup>1</sup> Surrogate Modelling of the Breast tissue deformation —September 2021- September 2022

Research Internship — supervisor: [Stéphane Bordas](#) ([Legato Team](#) Luxembourg) and [François Hild](#) (LMT France)

### <sup>2</sup> Experimental investigation of the mechanical response of skeletal muscle tissue to compressive loads using consolidation theory for Pressure Ulcer Prevention—September 2020- present

Research Internship — supervisor: [Pierre-Yves Rohan](#), [IBHGC](#) (France)

### <sup>3</sup> Development & Modelling of the impact on the rugby player professional—April 2020- July 2020

Research Internship — supervisor: Sébastien Laporte, [IBHGC](#) (France)

### <sup>4</sup> 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](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: <sup>1</sup>, <https://dx.doi.org/10.1016/j.jmbbm.2022.105490>

Identification of material parameters and traction field for soft bodies in contact: <sup>1</sup>, <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: <sup>2</sup>, [10.1016/j.clinbiomech.2022.105592](https://doi.org/10.1016/j.clinbiomech.2022.105592)

Poynting effects in pantographic metamaterial captured via multiscale DVC: <sup>4</sup>, [10.1177/0309324720976625](https://doi.org/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): <sup>1</sup>

[Journées thématiques de la F2M](#) (oral communications): February 2023 – April 2024

[46th congress of the biomechanical society](#) (oral communication and abstract): <sup>2</sup>, doi: [10.1080/10255842.2021.1978758](https://doi.org/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 (3<sup>rd</sup> 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.