



EPUAP CURRICULUM VITAE

Name Pierre-Yves ROHAN

Work Title Associate Professor

Institution IBHGC / ENSAM

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Year of joining EPUAP 2018 (2021 as a trustee)

Relevant publications for the last two years (in English only):

- **2022**

[P29] [In vivo quantification of 3D displacement in sacral soft tissues under compression: Relevance of 2D US-based measurements for pressure ulcer risk assessment](#), Ekaterina Mukhina, Alessio Trebbi, **Pierre-Yves Rohan**, Nathanael Connesson, Yohan Payan, *Journal of Tissue Viability*, Volume 31, Issue 4, November 2022, Pages 593-600 <https://doi.org/10.1016/j.jtv.2022.09.007>

[P28] [MR-based quantitative measurement of human soft tissue internal strains for pressure ulcer prevention](#), Alessio Trebbi, Ekaterina Mukhina, **Pierre-Yves Rohan**, Nathanaël Connesson, Mathieu Baillet, Antoine Perrier, Yohan Payan, *Medical Engineering and Physics*, Volume 108, October 2022, 103888 <https://doi.org/10.1016/j.medengphy.2022.103888>

[P27] [Finite element analysis of the stump-ischial containment socket interaction: a technical note](#), Nolwenn Fougeron, **Pierre-Yves Rohan**, Jean-Loïc Rose, Xavier Bonnet, Hélène Pillet, *Medical Engineering and Physics*, Volume 105, July 2022, 103829, <https://doi.org/10.1016/j.medengphy.2022.103829>

[P26] [Reliability of B-mode Ultrasound and shear wave elastography in evaluating sacral bone and soft tissue characteristics in young adults with clinical feasibility in elderly](#), Maher Abou Karam, Ekaterina Mukhina, Nils Daras, Isabelle Rivals, Helene Pillet, Wafa Skalli, Nathanaël Connesson, Yohan Payan, **Pierre-Yves Rohan**, *Journal of Tissue Viability*, Volume 31, Issue 2, May 2022, Pages 245-254, <https://doi.org/10.1016/j.jtv.2022.02.003>

[P25] [Numerical investigation of the time-dependent stress-strain mechanical behaviour of skeletal muscle tissue in the context of Pressure Ulcer prevention](#), Thomas Lavigne, Giuseppe Sciumè, Sebastien Laporte, Hélène Pillet, Stéphane Urcun, Benjamin Wheatley, **Pierre-Yves Rohan**, *Journal of Clinical Biomechanics*, Volume 93, March 2022, 105592, <https://doi.org/10.1016/j.clinbiomech.2022.105592>

- **2023**

[P32] [Single and bi-compartment poro-elastic model of perfused biological soft tissues: FEniCSx implementation and tutorial](#), Thomas Lavigne, Stéphane Urcun, Pierre-Yves Rohan, Giuseppe Sciumè,



Davide Baroli, Stéphane P.A. Bordas, **in proof** Available online 11 May 2023, 105902
<https://doi.org/10.1016/j.jmbbm.2023.105902>

Please comment on your involvement with pressure ulcers under the following headings:

Clinical

In 2023 I have obtained two Ethical approvals for two Multicenter Clinical Trials

2023 RCB : 2023-A00418-37 Study of the morphological, mechanical and vascular properties of soft tissues in at-risk populations as part of the prevention of pressure ulcers,

- Institut de Biomécanique Humaine Georges Charpak, ENSAM (Paris)
- Hôpital Charles Foix (Ivry-sur-Seine)
- Pôle Saint-Hélier (Rennes)
- Centre J. Calvé, Fondation Hopale (Berck-sur-mer)

2023 RCB : 2023-A01070-45 Assessment and characterisation of stiffness, geometry and tissue perfusion on the plantar surface of the feet of healthy subjects and diabetic subjects with peripheral neuropathy,

- Service de Diabétologie Hôpital Pitié-Salpêtrière (Paris)
- Institut de Biomécanique Humaine Georges Charpak, ENSAM (Paris)

Scientific research

1. Co-supervision of 6 PhD on the topic of Pressure Ulcer Prevention (3 ongoing)

Thomas LAVIGNE (PhD defense : xx 2025), Characterization and modelling of perfusion and soft tissue damage for pressure ulcer prevention *Advisors: Pierre-Yves Rohan, Giuseppe Sciume, Stéphane Bordas*

- *Funding : FNR doctoral grant (Luxembourg National Research Fund)*

Maïalen MATRAY (PhD defense : xx 2025), Individualized Manufacturing from fully digital PProcesses: human/orthopaedic device INTERfaces (IMPRINT) *Advisor: Helene Pillet. Co-advisors: Xavier Bonnet, Pierre-Yves Rohan*

- *Funding : ANR IMPRINT Individualized Manufacturing from fully digital PProcesses : human / orthopaedic device INTERfaces*

Alexandre SEGAIN (PhD defense : xx 2024), Multiscale modelling and tissue characterization to understand the pathways of skin integrity, *Advisors: Pierre-Yves Rohan, Helene Pillet, Giuseppe Sciume*

- *Funding : Doctoral contract with the Ministry of Higher Education, Research and Innovations*
- *Société de Biomécanique Collaborative Grant 2023 : Technion/IBGGC*
- *Co-moderator of the "Biomécanique du handicap et de la réhabilitation" session (with Sonia DUPREY) at the 46ème congrès de la "Société de Biomécanique",*

Ekaterina MUKHINA (PhD defense : November, 25 2022), Mixed experimental and numerical approach for the study of the biomechanical and biological phenomena leading to the loss of skin integrity as a result of exposure to prolonged pressure *Advisor: Yohan Payan. Co-advisors: Nathanaël Connesson, Pierre-Yves Rohan.*

- *Funding : European Integrated Training Network (ITN) project 'Skin Tissue Integrity under Shear – STINTS'*



Nolwenn FOURGERON (PhD defense : December, 15 2020),
Modelling of residual limb/socket interaction in individuals with
trans-femoral prosthesis for subject-specific socket design.
*Advisor: Helene Pillet. Co-advisors: Xavier Bonnet, Pierre-Yves
Rohan*

- *Funding : CIFRE agreement with PROTEOR and the Ministry of Higher Education, Research and Innovations*

Aurelien MACRON (PhD defense : March, 7 2019), Contribution to the assessment of the risk of pressure ulcers during prolonged contact using the Finite Element Method. Application to the study of seating. *Advisor: Helene Pillet. Co-advisor: Pierre-Yves Rohan.*

- *Funding : Fondation des Arts et Métiers and the Fond de dotation Clinattec*
- *Fondation de l'Avenir Grant (grant number AP-RM-2016-030)*
- *Journal of Tissue Viability & Journal of Clinical Biomechanics Award, 20th Annual Meeting of the European Pressure Ulcer Advisory Panel, 2018*

2. Our Institute joined the European Integrated Training Network project STINTS (H2020-EU) consortium as a Partner Organization in 2019 and is currently involved in the co-supervision of the thesis of Ekaterina MUKHINA
3. Grants secured/applied on the topic of Pressure Ulcer Prevention

2024-2027 ANR PRC SORES, using discomfort as a SurrOgate measuRement of the Early stages of tissue Suffering - a model-based predictive monitoring of patients at risk of sitting-acquired pressure ulcer, PI: Pierre-Yves ROHAN - waiting for answer, Funding of 1 PhD student

2023-2024 Fondation de l'Avenir pour la recherche médicale grant, Transfert clinique d'innovations technologiques et numériques pour l'identification et la prévention des risques d'escarre, PI : Pierre-Yves ROHAN, 40 k€, Funding of 1 clinical research assistant (Maher ABOU KARAM), 1 MSc student (CARLA CORNILLON) and face to face meetings

2020-2022 European Pressure Ulcer Advisory Panel Research Project Collaboration Funding, Preliminary evaluation of the clinical relevance of a simplified framework for generating in silico models from freehand Ultrasound for monitoring internal tissue strains for the prevention of PUs - PI : Pierre-Yves ROHAN, 10 k€, renting of CARDIFF MRI platform location, 1 MSc student (Gregoire DESHAIRS) and face to face meetings

2016-2018 Fondation de l'Avenir pour la recherche médicale grant, Development of a monitoring tool of the subdermal soft tissue deformation for the prevention of pressure ulcers in the paraplegic and tetraplegic patient, PI : Hélène PILLET, 40 k€, funding of 2 MSc student (Nolwenn FOUGERON, Jennifer DORIDAM), pressure mattresses and conference funding

2016-2019 Fondation des Arts et Métiers and the Fond de dotation Clinattec, Contribution to the modelling the human-machine mechanical interface in the full-body exoskeleton, EMY (Enhanced Mobility), developed by a French research team from CEA LIST, PI : Hélène PILLET, funding of 1 PhD student (Aurélien MACRON)

Oganisational

I am a trustee of EPUAP since 2021 and have chaired the Research Committee from 2021 to 2023.

Educational

Strengths not utilised



Membership of other organisations

- [InterPore](#) (2022-present)
- [European Society of Biomechanics](#) (2014-2020)
- [Société de Biomécanique](#) (2014-present)
- [Association Française de Mécanique](#) (2022-present)

Pierre-Yves ROHAN

Assistant Professor

Institut de Biomécanique Humaine Georges Charpak

Arts et Métiers – Sciences and Technology

Co-chair of the « Health Science » subtrack of the BME PARIS master's program

Paris, November 30 2023

EPUAP - Call for Co-chair application: Scientific Committee

Dear EPUAP,

I am an Associate Professor at the Institut de Biomécanique Humaine Georges Charpak, ENSAM, Paris, France and immediate past chair of the EPUAP research committee and I would like to apply for the position of EPUAP Co-Chair of the Scientific Committee in order to actively participate in the strategic development and planning of EPUAP and to support the Executive Committee in its tasks.

I have been conducting research activities in the field of Pressure Ulcer prevention since 2016 when my group obtained a research grant from the Fondation Arts et Metiers on the *development of computational methods for the modelling of the human-machine mechanical interface in the full-body exoskeleton EMY (Enhanced Mobility)* developed by a French research team from CEA LIST. As part of that grant, we proposed an original method for the fast generation of patient-specific Finite Element models of the buttock which received the **Journal of Clinical Biomechanics Award during the 2018 EPUAP conference**.

I am currently conducting research to develop a personalized, multi-scale, multiphysics model of the subcutaneous tissue response during interactions with support surfaces. Since 2016, I have co-supervised six PhDs on pressure ulcer prevention, with three ongoing (Thomas Lavigne, Maïalen Matray, and Alexandre Segain). Additionally, as the Principal Investigator, I have secured several grants to further advance these developments. The « Fondation de l'Avenir pour la recherche médicale » awarded a grant of in collaboration with Fondation HOPALE in 2023 for the clinical transfer of tools from bench to bedside. The EPUAP Research Project provided a seed funds in 2020 for collaboration between Yohan PAYAN and Bethany KEENAN. Additionally, I applied for the French National Research Agency ANR PRC grant this year in collaboration with TIMC (Yohan PAYAN, Nathanael CONNESSON) and LBMC (Sonia DUPREY, Laura DUBUIS), with a response pending. My research aligns with the EPUAP community's research themes, and I am confident that I can aid in advancing research on the prevention and management of pressure ulcers at the international level in the scientific committee.

Engaging with clinical partners has enlightened me on the significance of conducting research with the patient as the central point of focus. This motivated the development of research in close collaboration with clinical partners and I am glad that this year two ethical applications have been approved for two clinical trials. One trial will be conducted across three clinical centres in France: Hôpital

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Charles Foix (located in Ivry-sur-Seine), Pôle Saint-Hélier (based in Rennes), and Centre J. Calvé, Fondation Hopale (located in Berck-sur-Mer). The aim is to investigate the morphological, mechanical, and vascular properties of soft tissues in at-risk populations, as part of the prevention of pressure ulcers. The second study conducted by the Service de Diabétologie at Hôpital Pitié-Salpêtrière aimed to assess and characterize stiffness, geometry, and tissue perfusion on the plantar surface of the feet of both healthy participants and those with peripheral neuropathy.

This was a very motivating experience and I am keen to contribute to the development of research frameworks that encompass the crucial elements concerning pressure ulcers, as well as the advancement of global research collaborations and excellent research. I have been the chairperson of the EPUAP Research committee from 2021 to 2023 and would like to continue my efforts as a member of the Research committee.

Thank you in advance for your consideration,

Yours sincerely



Pierre-Yves Rohan