

Short Biography

Prof. Catherine Marque

Catherine Marque is presently Professor at Compiègne University, Compiègne, France, in the UMR 7338 Biomechanics and Bioengineering (BMBl) lab. After a graduation in mechanical engineering from ENSAM (Paris, France), and a Master degree in Biomedical Engineering from the Ecole Polytechnique de Montréal (Canada), she received the Ph.D. degree and the "Habilitation à diriger des recherches" (HDR) from Compiègne University. Her research focuses on biomedical signal processing and modeling. She is interested in the study of uterine contractility, by processing the uterine electrical activity recorded on the mother's abdomen (electrohysterogram, EHG) in order to detect preterm labor. Since she integrated the BMBl research lab, she has been developing an international team that works on processing and modeling the EHG. Her aim is to understand the links existing between EHG characteristics and the physiological phenomena controlling uterine contraction efficiency (cell excitability, uterine synchronization) for clinical diagnosis purpose. She has recently developed a multi-scale electrical (cell, tissue, organ, abdomen) and multi-physics (electrical, mechanical) model that permits to link EHG characteristics to the uterine muscle behavior (channel dynamics, electrical diffusion, sensitivity to stretching, mechano-transduction), as well as specific processing tools to investigate the EHG connectivity. These recent results permit to evidence that the uterine synchronization is the consequence not only from a simple electrical diffusion process, but also from an electromechanical coupling related to tissue stretching, a new hypothesis recently presented by physiologists. She has been coordinator of many national and international research projects that permitted her to develop various collaborations and to supervise 22 PhD and about 30 Masters Thesis. She has taken the responsibility for administrative tasks, related either to teaching (engineer, Master, Doctoral education) or to research management (research unit, Regional research group...).