NUMERICAL METHODS, MATHEMATICAL MODELING AND ANALYSIS IN MATERIAL SCIENCE

Yangshuai Wang*[1] and Lidong Fang[2] and Lei Zhang[3]

[1]University of British Columbia
[2]The Fileds Institute for Research in Mathematical Sciences
[3]Shanghai Jiao Tong University

MINISYMPOSIUM

Materials modelling and simulation serve as essential pillars, driving the exploration and creation of groundbreaking materials and chemicals, especially in critical sectors such as energy and biomedicine. The landscape of materials science presents a diverse array of challenges intricately intertwined with complexities that demand the meticulous scrutiny and exactitude of computational mathematics. Alongside these complexities, mathematicians play an indispensable role, harnessing their analytical prowess to establish solid theoretical underpinnings, propelling the advancement of this multidisciplinary arena.

The proposed minisymposium is firmly rooted in a visionary pursuit: fostering a vibrant platform for scholarly discourse and cooperative cross-fertilization among researchers profoundly engaged in the dynamic and swiftly progressing realm of mathematics in materials science. This symposium aspires to transcend traditional disciplinary boundaries, bringing together a diverse array of perspectives to engage in thoughtful deliberation on the intricate tapestry of mathematical exploration within the context of materials science. At its core, this dialogue is centred on the investigation of numerical methodologies and mathematical modelling, serving as pivotal tools for unveiling the intricate dynamics governing material behaviour, thus offering insights into their macroscopic manifestations emerging from the quantum

realm. Moreover, the symposium is dedicated to illuminating the crucial role played by state-of-the-art machine-learning techniques in this domain. As the frontiers of materials science extend to embrace innovative artificial intelligence and data-driven approaches, the symposium aims to provide a platform for the convergence of these innovative methodologies with a solid foundation of mathematical understanding.