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FAILURE MECHANICS OF SOFT MATERIALS: MODELING AND EXPERIMENTAL APPROACHES

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ABSTRACT

Research efforts focusing on soft materials such as polymers and hydrogels, to name a few, have witnessed an upsurge in the recent times. Such materials can undergo extremely large deformations prior to failure, hence their ubiquitous use in current technologies. Their application in the bioengineering field allows for synthetic structures mimicking biological tissues and functional structures, e.g., soft robots. The rapid growth in this research field has motivated detailed investigations on their failure mechanisms. Applications such as soft skin patches, meshes for wound closure, and bioadhesive skin sensors require an in depth understanding of failure mechanisms in soft matter to design materials with improved fracture behaviour. To this end, *in silico* strategies constitute a cutting-edge approach to explore physical mechanisms that govern the propagation of cracks and pre-existing flaws. Among other approaches, phase-field models are especially attractive, primarily due to their flexibility and ease of implementation [1]. The combination of experimental insights and computational approaches allows for a greater understanding of the intricacies in the design of soft materials, eventually fostering technological progress [2,3]. The goal of this mini-symposium is to bring together researchers from experimental and modeling communities to discuss recent advancements and new directions in the field of soft fracture. Topics of interest include, but are not limited to: modeling of fracture in soft materials using discrete or/and diffuse approaches, analytical approaches, and experimental investigations on failure mechanisms in soft materials, composites in particular.

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