

SEMINAR ANNOUNCEMENT

Elasticity, symmetry breaking and auxeticity in mechanics of growing systems

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Abstract: Mechanics of continua and structures is playing a crucial role for deeply understanding how growth, remodelling and morphogenesis in living matter do all interact with internal stresses and fluid flow at the macro-scale to optimize selected tissues and organs functions. This coupling is often crucial to unveil complex underlying mechanisms originating from cascades of events occurring at lower scales. Cell-cell competitive dynamics incorporating chemo-mechanical feedback can be for instance projected at the continuum level and helpfully coupled with elasticity and mass balance equations in order to obtain faithful outcomes about growth and to predict cells fate as well. Through some selected paradigmatic examples of ad hoc conceived structures and biological systems, we show how auxeticity, elastic instability, hierarchy and even symmetry breaking may all contribute to shed light on some still unclear mechanobiological phenomena, including tissue differentiation, regeneration and tumour growth. We also highlight the reciprocal benefits of integrating mechanics and biology for envisioning new therapeutic strategies for precise medicine and designing new classes of bio-inspired, self-repairing "active" composites.

All interested people, particularly PhD students, are invited to attend the seminar

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