Imperfections: using defects to program designer matter

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Propositions

accompanying the dissertation
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1 Mechanical structures, built up out of soft building blocks, can generally support topological defects.
Chapter 2 of this dissertation

2 Topological defects in mechanical structures produce deformation- and stress-steering functionality, due to symmetry-breaking in their low-energy normal modes.
Chapter 3 of this dissertation

3 The physics underlying the stress-steering effects of topological defects can be easily understood with minimal models.
Chapter 4 of this dissertation

4 Geometry-driven snap-through instabilities are ideally suited to design shape-shifting structures with many different target shapes.
Chapter 5 of this dissertation

5 The gap between metamaterials design and actual applications is wide, and should be bridged by making the results of scientific research more easily available to non-academic institutions.

6 The small-world character of scientific networks leads to productive fads, such as the exponential rise in popularity of auxetic structures since early 2000.
Web of science: citation report for 'auxetic' in Web of Science Core Collection via webofknowledge.com (2020).

7 Mesoscale mechanical explanations of natural phenomena provide an important complement to microscale chemical and biological approaches.
Kuhl, E.: Unfolding the brain. Nat. Phys. **12**, *533–534 (2016).*

8 Discrete, linearized models are much better at modelling nonlinear, continuum physics than they have a right to be.
Pellegrino, S.: Structural computations with the singular value decomposition of the equilibrium matrix. Int. J. Solids Struct. **30**, *3025-3035 (1993).*

9 Feeling well-rested is essential. Napping in an office setting should therefore be encouraged.

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