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10:30 (Tunis time – GMT+1, UTC+1)



*To Carthage then I came*

T. S. Eliot, *The Waste Land*

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### *Optimal design of responsive structure*

This talk describes mathematical problems motivated by recent advances in 3D printing for responsive (active) materials like liquid crystal elastomers. These advances make it possible to synthesize responsive structures that combines active and passive (structural) materials with significant geometric complexity. Further, it is possible to control, to some degree, the orientation (anisotropy) of the responsive materials. However, there are still constraints on structures and orientations that can be printed. Further, the large (finite) deformation that these materials can undergo, and the trade-off between force and stroke make the design of such structures challenging. We formulate the problem in the framework of topology optimization where the objective not only takes into account the performance of the responsive structure but also ability to print such structures. We discuss the mathematical issues they raise, and demonstrate the approach through selected examples. This is based on joint work with Andrew Akerson.