

Department of Mechanical and Process Engineering

# Distinguished Lecture

6 December 2018, 5.15 p.m.

ETH Main Building HG E 3

**Structural magnetostrictive alloys: From flexible sensors to energy harvesters and magnetically controlled auxetics**

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Novel sensors and energy harvesting transducers take advantage of the significantly expanded design space made possible by recent advances in structural magnetostrictive alloys. (e.g. Alfenol, Galfenol). These alloys can be machined and welded, have high fracture toughness, and can actuate, sense, and carry load while subjected to tension, compression, and bending. The talk introduces magnetostrictive materials and transduction, and discusses some alloy Poisson ratios being not only negative, but as low as -2.0 and the use of low-cost rolling and annealing methods in lieu of more costly crystal growth methods for making alloys. Examples of magnetostrictive devices include prototypes ranging in size from nanowire-based pressure sensors to huge wave energy harvesters being deployed in the ocean.

An aperitif will be offered after the lecture.