Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Tuning with tension: Controlling elasticity in nearly isostatic spring networks BRIAN TIGHE, RENE PECNIK, Delft University of Technology — We show that the shear stiffness of random spring networks can be controlled by exploiting their strong susceptibility to tensile loading. Unstressed networks below the isostatic point are floppy and cannot sustain shear. But floppiness can be "pulled out" with tension, rendering the loaded system rigid. Using scaling arguments and computer simulations, we determine the dependence of stretched networks' shear modulus on tension and show how this effect can be leveraged to generate "smart networks" with tunable stiffness.

Brian Tighe
Delft University of Technology

Date submitted: 09 Nov 2012 Electronic form version 1.4