



Suzanne Weekes
Worcester Polytechnic Institute
Spatio-temporal Composite Materials
sweekes@wpi.edu

Dynamic materials are formations assembled from materials that are distributed on a microscale in space and in time. This material concept takes into consideration inertial, elastic, electromagnetic and other material properties that affect the dynamic behavior of various mechanical, electrical and environmental systems. When it comes to dynamic applications, one needs temporal variability in the material properties in order to adequately match the changing environment. Mathematically, we formulate the problem for linear, hyperbolic equations with spatio-temporally varying senior coefficients.

A dynamic disturbance on a scale much greater than the scale of a spatio-temporal microstructure will perceive this formation as a new material with its own effective properties. With spatio-temporal variability in the material constituents, one is able to effectively control the dynamic processes by creating effects that are unachievable through purely spatial material design. In this talk, we present some results obtained from our ongoing analytical and numerical study of dynamic materials in one spatial dimension and time.