

# Andrea Leonard



**Graduate Institution:** California Institute of Technology

**Location:** Pasadena, CA

**Graduate Discipline:** Applied Mechanics

**Hometown:** Rapid City, SD

## Research Interests:

*As an undergraduate in civil engineering, my previous research interests were in the field of structural dynamics. However, as a graduate student, my focus has shifted to experimental solid mechanics. My current research is focused on the nonlinear dynamic response of ordered granular composite structures (granular crystals). Granular crystals are systems composed of geometrically arranged particles of different shapes (including spheres, cylinders, etc.). The understanding of their mechanical response will help to design new materials with unprecedented properties. Previous studies of uniform one-dimensional chains of spheres have shown these systems to support the formation and propagation of solitary waves with unique properties stemming from their nonlinear contact interactions. Continued research has shown these granular crystals to present various interesting physical phenomena suggesting their use in a wide range of applications, such as: mechanical systems with tunable acoustic/elastic properties, energy trapping and stress redirecting materials, and as new acoustic devices for vibration control and energy localization and harvesting. While all applications of these granular crystals are interesting, I am primarily focused on the experimental testing of two-dimensional systems regarding their ability to redirect, trap, and mitigate energy from dynamic impulses and shocks.*

## About me:

*I enjoy the hands on aspect of experimental work, and my personal career goal includes pursuing a research-based position in industry or academia where I can continue to work in the field of experimental solid mechanics. I am currently on the organizing committee for an annual solid mechanics workshop held at Caltech. I am also an active member of our department's social organization (SOPS) composed of civil engineering, mechanical engineering, and applied mechanics graduate students. When I'm not in the lab, I also enjoy many of the outdoor activities that Southern California has to offer, such as hiking, snow boarding, and surfing.*



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