RAY W. HERRICK LABORATORIES

# Input-Independent Wave Propagation in Bistable Lattices with Elastic Interactions

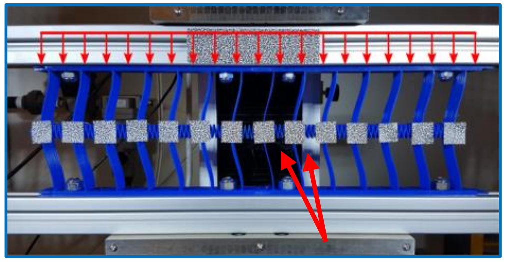
Myungwon Hwang (hwang125@purdue.edu)
Principal Investigator: Prof. Andres F. Arrieta

## Project Description

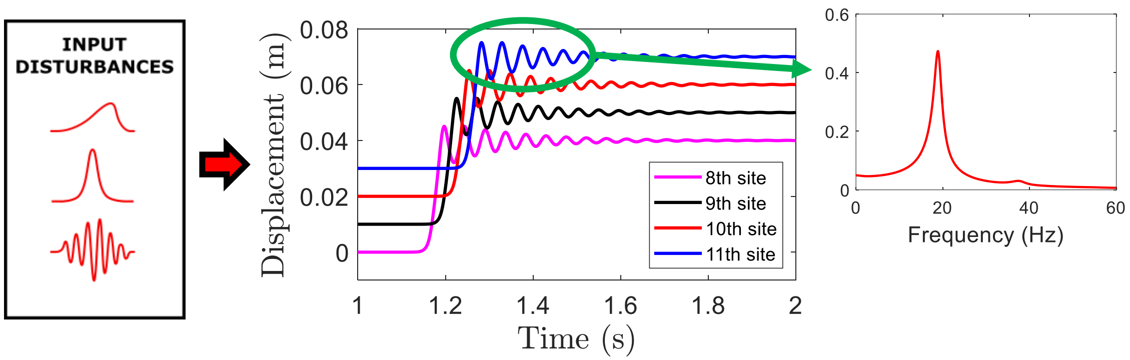
- Numerical and experimental demonstration of transition waves in bistable lattices with elastic interactions.
- Characterization of their metamaterial behaviors and application to energy harvesting.

## Approach

- Develop lattice model composed of bistable unit cells which are connected by spring elements.
- Perform numerical simulations whose behaviors are further confirmed by experiments.



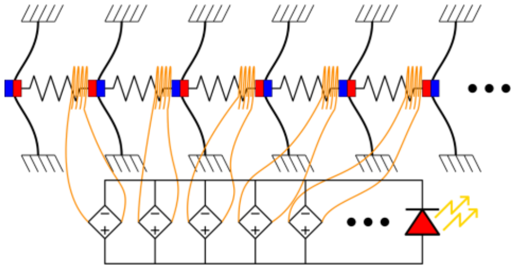

## Results




- Identical response as long as transition wave is triggered.
- Induced oscillatory tails at unit-cell resonant frequency.

## Discussion

- The oscillatory tails ensure resonant transduction
- With integrated power conversion mechanism, energy harvesting becomes metamaterial property of lattice.



**Input-independent dynamics of bistable lattices enables ideal implementation for broadband energy harvesting**

PURDUE UNIVERSITY