Wednesday, April 28, 2021; 4:00 pm – 4:50 pm

Online: https://hawaii.zoom.us/j/97740170381
Zoom Meeting ID: 977 4017 0381, Password: meseminar

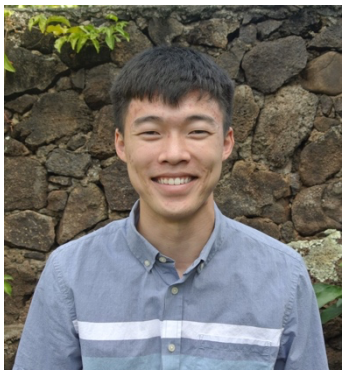
Department of Mechanical Engineering Seminar Series

Mechanical Measurements and Simulations for Nonlinear Interlocking Structures

Kody M. Wakumoto
Master's Student
Department of Mechanical Engineering
University of Hawai'i at Mānoa

Abstract
This research investigates mechanical joining for heterogeneous integration in electronics manufacturing. It expands on previous work using the interaction of interlocking cantilever structures. Design methodology, simulation setup, and analysis along with insights to create converging simulations are discussed. Estimation of designs' contact force and von Mises stress limits were performed on COMSOL Multiphysics 5.3a and 5.6. Physical tests were also designed and performed to provide experimental verification of an elliptic integral analytic model for curved cantilevers. From physical data the chosen design showed the simulations didn't exactly match the theoretical contact forces but followed the modeling curve until the sample deformed plastically. It was concluded that physical testing generally undershot the analytical model while the simulations tended to overshot the model. Additional work on plastic deformation structures were also started but haven't yielded any conclusive data on the push in versus pull out force due to faulty simulations. The inner workings of COMSOL was investigated and outlined in a list of troubleshooting methods to aid future users. Further optimization of the design and verification techniques can greatly improve the integration of micro devices.

About the speaker
Kody Wakumoto received his BS degree in Mechanical Engineering from the University of Hawai'i at Mānoa in May 2019. He is currently a MS candidate and Research Assistant under Dr. Joseph Brown of the Nanosystems Lab in the Department of Mechanical Engineering. In the lab he works on the design and analysis of various testing structures and compliant cantilevers.



Questions? Contact Asst. Prof. Zhuoyuan Song (UHM Mechanical Engineering; zsong@hawaii.edu)