

Honors Research Project Proposal

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Title of Proposed Project: Structural Isolation in Extreme Environments	
Major: Mechanical Engineering	Graduation (semester/year): Spring 2021

Please include a brief (maximum 200 words) summary of your proposed project

This project is a collaboration with the University of Akron and Sandia National Labs. One of Sandia National Labs responsibilities is maintaining United States' nuclear weapon systems and components including safe transport of nuclear weapons. This project will revolve around designing a vibration isolation system to protect a payload from extreme conditions during transport including random vibration environments, high-acceleration shock loading, and narrow-band loading environments. For the purposes of this project the payload will be a 3.5 kg cylinder with a radius of 4 cm, and height of 10 cm. This payload and the entire vibration isolation system will fit inside a cylinder of radius 10 cm and height of 24 cm. The system should also be easily manufacturable utilizing additive manufacturing methods. From some conceptual designs we came up with will be able to create a mass-spring-damper model and derive the mathematical model and transfer functions that represent the response of the payload to an external stimulus by experimentally finding the spring and damping coefficients of the system being employed in each design. With these values we can simulate the response of our system, so we have something to compare to during final testing.

Approval:

Honors Course No.: 4600-497	No. of Project Credits: 4
Honors Project Sponsor Signature/Date	04 Dec 2020
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Reader Signature/Date	12/02/2020
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Your approved cover sheet and proposal must be submitted to the Williams Honors College through IdeaExchange