



Williams Honors College
The University of Akron
Akron, OH 44325-1803

Honors Research Project Proposal

Congratulations! The inception of your Honors Research Project represents the beginning of your last phase as an undergraduate student at The University of Akron. As a member of the Williams Honors College you have maintained an outstanding academic record that has hopefully prepared you for this independent project. Your Honors Research Project Proposal is an important component of your overall project. In particular it provides a guideline and timetable for the work to be accomplished and ensures that the expectations of the project sponsor and readers are clearly defined. When preparing your written description please include the following sections:

1. **Goals and Objectives:** In the initial section of the proposal, describe the specific research questions to be addressed, as well as the goals and objectives of the project. What are the motivations for the work and the benefits if successful? This section should be written at a level that is readily accessible for non-experts in the field of study.
2. **Methodology:** Then, discuss the work to be undertaken including the methodology used. How will the goals and objectives be met and the questions described above be answered? Does this work build significantly on existing research and efforts? This section can be more in-depth than the previous section, but should still be understandable by someone in the field of study. **Please include a tentative timeline for the efforts with projected intermediate project deadlines.** While the timeline is subject to change as the research progresses, it provides an initial guide for the work to be undertaken and is an important part of the proposal. Proposals without a timeline will not be approved.
3. **Outcomes:** Describe the final output of this project, including the written report for the Honors College. If the project is to be performed or presented publicly, what will be the expected event and audience?
4. **Academic Impact:** Finally, please describe how you see your Honors Research Project building on and adding to your undergraduate experience and knowledge. How does this project serve as an enveloping experience for the undergraduate major? What is expected to be applied from the curriculum and learned from the outcomes?

Any references cited can be included in a final section when appropriate. The length of your written description is expected to be 3–5 pages. For projects involving more than one Honors student, please submit a single project description, but with a separate and completed cover sheet for each student. In addition, please include a statement regarding the expected responsibilities for each Honors student.

Provide copies of the completed proposal (cover sheet and project description) to your project sponsor, your readers, and your Honors Advisor for their approval. Once approved your proposal should be [submitted online through IdeaExchange](#). You will be notified by email once your project proposal has been reviewed by the Williams Honors College.

Honors Research Project Proposal

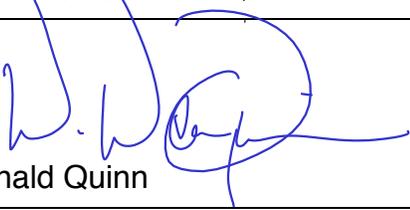
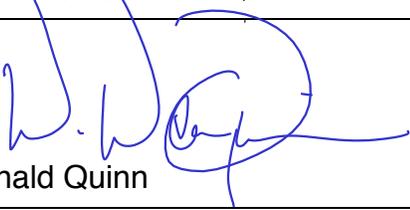
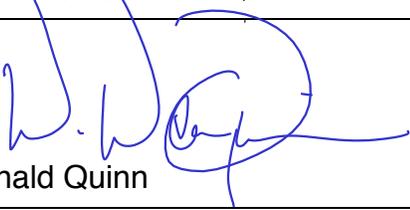
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Name: Noah Riggerbach	Student ID: 4136036
Email (@zips.uakron.edu): ndr21@uakron.edu	
Title of Proposed Project: Oblique Shock Wave Diffuser	
Major: Mechanical Engineering	Graduation (semester/year): Fall/2021

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

In this Honors Research Project, I will investigate the aerodynamic drag over certain defined ramps and cone/cylinder geometries representing oblique shock wave diffusers. The goal is to develop an oblique shock wave diffuser that decelerates supersonic air while maintaining a limited aerodynamic drag profile. The aerodynamic drag will first be obtained by calculating the pressure coefficient and the wall friction coefficient using the fluid simulation software ANSYS Fluent (version 2021R). Limiting drag is important for aircraft flight performance, especially at super sonic speeds. At flight speeds above Mach 1, shock waves form and the air passing through these waves experiences a dramatic increase in pressure, density and temperature. For air-breathing supersonic aircraft engines to function properly, supersonic air must be decelerated to subsonic flow in a diffuser or the shock waves will cause damage to that engine. I hope my research will deepen our understanding of how the design of oblique shock wave diffusers affects drag. Oblique shock waves create less stagnation pressure loss than normal shock waves, which allows for increased flight performance.

Approval:

Honors Course No.:	No. of Project Credits:									
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Your approved cover sheet and proposal must be [submitted to the Williams Honors College through IdeaExchange](#)