



MIDS Capstone Project: Request for Proposals

Overview

The Duke University Master in Interdisciplinary Data Science (MIDS) program connects technical learning and expertise with the many domains in need of data insights. The true power of data in the twenty-first century lies in that connection and our program believes that harnessing this power requires both interdisciplinary training and experience with team-based science.

MIDS is a two-year, on-campus, cohort-based program. During their first year in MIDS, students take courses centered on marshaling, analyzing, and visualizing data while also participating in team and leadership workshops. During their second year, students partake in a full-year Capstone Project.

Capstone Projects are one of the most critical components of the MIDS program. The projects integrate students in world-class interdisciplinary research projects that solve real-life problems through data science. Throughout the two semesters of a Capstone, MIDS students participate in a Capstone course dedicated to establishing team expectations, creating work plans, and improving team communication. A trained project manager supports each project to ensure participating entities are engaged and milestones are met. MIDS students work collaboratively in Capstones, and each team must achieve specific outcomes of interest for the participating outside party and give a final presentation with an accompanying white paper about the outcome's implications.

The final deliverables will be evaluated by MIDS core faculty and relevant outside stakeholders on multiple dimensions including students' ability to communicate effectively to a diverse audience, computational strategy, and creativity.

This document is a call-for-proposals for Capstone projects during the 2020-2021 academic school year. We are especially interested in proposals that involve a partner from outside the university. We also encourage proposals that involve previously untested ideas or un-analyzed open source datasets, and we hope that MIDS can make a contribution with important proof-of-principle work that may lead to more substantial faculty work and/or outside connections in the future. We also welcome proposals that might create tools that facilitate classroom or community engagement with data and data-driven questions.

Finally, a few of the Capstones will support doctoral graduate students through an NSF Innovations in Graduate Education (IGE) grant. IGE fellows receive a \$3,000 stipend for research/travel, may take any of the MIDS core courses, and will be invited (but not required) to participate in professional development activities provided by the MIDS program (such as job fairs, interview preparation sessions, and seminars with non-academic parties who use data science). IGE fellows are expected to be active members in a Capstones team, and to attend the MIDS capstone course, held throughout the project's academic year. Graduate students are encouraged to apply for these fellowships in concert with a faculty member, such as their advisor, and (optionally) an outside partner.

How to Apply

To apply, please prepare a document (three pages maximum) that responds to the following prompts, ideally in this order. If you would like help in developing your proposal, please contact Gregory Herschlag (gjh@math.duke.edu).

Name of Project: Name of Project: Please use a short name that succinctly describes the nature of the project and is not overly technical. If your project is selected for a MIDS Capstone Project, then this title will be used for the project web page and project listings.

Summary: Please write a project summary, including the basic ideas behind the proposal and the question you are seeking to answer.

Contacts: Please list your name(s), affiliation(s), and email address(es). MIDS is especially interested in projects that connect students and faculty to outside companies/institutions. Please describe the expected benefits from your participation. In successful projects, contacts tend to meet with the students roughly once per week.

Mentoring: Day-to-day involvement in MIDS Capstone Project is not expected. Instead, each MIDS Capstone Project has a mentor, usually a post-doc or qualified graduate student, who is on hand to give the student team more focused guidance. Funding is generally available to cover this person's time. If you have a mentor in mind, please indicate who this is and why they are well-suited. If you do not, please describe the skills you would like this person to have (we are generally able to find good matches).

Goals: Describe the intended goals and products of the project, in the following manner:

1. Describe entirely reachable goals that you fully expect the students to achieve: these could be answers to a question, explorations of a hypothesis, and things of that nature.
2. Describe a tangible product the students will create in the course of their research, which ideally will be of use both to further your own research and to the students as something they can show off to future employers. This could be, for example, a good piece of well-commented software, or a visualization device, or a detailed curation of previously raw data.
3. Describe a more outrageous goal that you would be quite (pleasantly!) surprised to see the students achieve, along with a plan for them to build a potential roadmap towards that goal. For example, this goal might only be reachable if you had data that you currently do not have, and the students might build a speculative roadmap towards acquiring that data.

Data: Most Capstone Projects involve analysis of datasets. Some of these are publicly available, and some are not. **As it is essential that students actually be able to analyze the needed data for the project, we are very interested in plans to ensure that this will happen.** Please address this in the following manner:

1. For each dataset that will be analyzed by the student team, please give a high-level description of the dataset (what's in it, how was it collected, and for which purpose, how large is it, etc. . . .).

2. For each dataset, indicate whether you anticipate IRB approval will be needed for student access, and if not, why not. If IRB approval will be needed, indicate whether a protocol already exists and your plan for incorporating the student involvement. If it does not already exist, please describe your plan (including a timeline) for obtaining one.

3. For each dataset, indicate whether it is owned and/or is being provided by an outside party. If so, please describe the intended path towards ensuring that students will be granted the ability to access the dataset (we are often able to assist in crafting Data Use Agreements with outside parties, for example).

Graduate students and IGE fellowships: If you would like your capstone to support a doctoral graduate with an IGE fellowship, please answer the following questions.

- i. Please include the prospective IGE fellow's name, expertise, and what they might gain by working on a capstones team.
- ii. Describe the relationship between the potential IGE fellow, the interested faculty member and/or outside partner including past working relationships (if any).

Deadline and Contact

Applications and inquires may be submitted on a rolling basis, **please note that MIDS Capstone Projects require a full academic year (September – April).**

Please submit your application to Gregory Herschlag (gjh@math.duke.edu).