**Project Title:** Green Roof Suitability, Campus Buildings

**Project Description:** Determine the best locations for green roofs on the University of Iowa campus, the types of green roofs available, costs (including maintenance) estimates, and attempt to quantify the benefits gained from your proposal’s implementation.

**Background:** The first green roof at the University of Iowa can be found at the Pappajohn Biomedical Discovery Building. In addition to providing a unique, natural look to buildings, green roofs provide a number of benefits to buildings and the surrounding environment. According to North Carolina State University, green roofs reduce energy costs for buildings by absorbing heat and providing natural insulation. In summer, this can lead to avoided cooling costs and the associated emissions from air conditioning use. Green roofs also help address the urban heat island effect, remove air particulates, provide shade, and can help control stormwater runoff.

Why use roofs for green roof and not solar panels? If interested, you could apply this project’s core framework and questions to solar panels. However, it is worth noting that even if panels were installed on every campus building rooftop, they would only support about 12.8% of energy demand, according to a Facilities Management report issued in 2017. In terms of reducing climate impacts, the school would benefit most from energy efficiency improvements. Green roofs are one such tool to improve energy efficiency and reduce overall energy consumption. Either way, you might be interested in using Google Project Sunroof and plugging in a University address to see which buildings receive the most sunlight. Understanding this may inform your decision of which schools receive the most sunlight and thus would benefit most from the cooling savings in the summer, among other factors.

What makes a building suitable for a green roof? Are there sunlight or climate requirements? Which benefits do you think are most relevant to University decision-making? If making a map, how will you model “suitability”? Should all buildings receive green roofs, and will they differ at all in their design? How will you monitor their performance at providing environmental services? Where do you propose the first roofs go? How much would this cost to install and maintain? How does this fit in with campus planning strategies? What about the Iowa City Climate Action Plan and goals?

Depending on your background, one aspect of this project may be more “central” than the others. For example, GIS students may be concerned with the actual spatial location and suitability of the green roofs. Engineering students may be concerned with the system processes, selection, construction, and performance of the green roofs themselves. Finance, economics, or business students may be most concerned with the cost analysis of the green roofs, as well as financial benefit estimates via energy savings. Ecosystem services students may take a similar approach, quantifying the services provided by the plants on the roofs.

**Helpful Materials:** “4 Reasons Green Roofs Do A Building Good,” NC State University <https://sustainability.ncsu.edu/blog/changeyourstate/4-reasons-green-roofs-do-a-building-good/>

“Overview for Green roofs,” Minnesota Stormwater Manual <https://stormwater.pca.state.mn.us/index.php/Overview_for_green_roofs>

**Desired Outcomes:**

* The final output will vary based upon the class/background of the student. A written report, perhaps supplemented by a visual presentation, of your green roofs proposal which answers the questions above, considers practical limitations to their approach, and exercises some creativity is the end goal across topics. GIS project approaches may emphasize the mapped locations more. Finance, accounting, economics, or business students may be asked to generate complex spreadsheets, charts, and models. Engineering students may be concerned with evaluating different designs, performance, and creating models.

**Potential Collaborators/Stakeholders:**

* **Office of Sustainability and the Environment** (can guide project focus and help acquire data students determine to be important)
* **Facilities/Energy Management**

**Evaluation:** Based upon successful consideration of the questions above and varies based upon the specialization/focus of the project. A thorough attempt at answering most or all the questions in the background to maximize the usefulness of the report to a University official/manager is expected.

**Course Relevance:** GIS, Finance/Business/Economics, Sustainability, and Engineering related courses.