**Objective:** The goal of this project is to classify individual trees to their taxonomic species from hyperspectral imagery. The project is inspired by the 2020 data science competition: IDTReeS, [Integrating Data science with Trees and Remote Sensing](https://idtrees.org/competition/).

**Introduction:** Understanding the number, size, and species of individual trees in forests is crucial to mitigating the effects of climate change, managing invasive species, and monitoring shifting land use on natural systems and human society. However, collecting data on individual trees in the field is expensive and time consuming, which limits the scales at which this crucial data is collected. Remotely sensed imagery from satellites, airplanes, and drones provide the potential to observe ecosystems at much larger scales than is possible using field data collection methods alone. IDTReeS investigates combining large scale survey efforts with remotely sensed imagery to scale and improve long-term forest conversation and climate change mitigation efforts.

**Related Work:**

Why hyperspectral data?

Hyperspectral images contain multiple (typically between 64 and 256) continuous narrow bands, providing significant levels of detail, which allow for the distinction of fine spectral variations among tree species. This has resulted in the extensive use of hyperspectral imagery for tree species classification.

*General Approach from Literature*

1. Reduce Dimensionality of Data (using PCA for example)
2. Run a multi-class object classifier on bounding box info

**Explaining the Data:**

* Training data are bounding boxes with species already identified.
* Output data will be classification of species on bounding boxes of unknown species identity.

Results:

Conclusion