# 1. Company Background

Dr. Owen Hildreth is an Assistant Professor in the Department of Mechanical Engineering at the Colorado School of Mines. His primary research is on nanometer to centimeter-scale additive manufacturing technologies. He has written numerous MacOS applications for custom data-collection and visualization as part of his research.

2. Project Description

My favorite, outlining application (Trees2) was been abandoned by its maker (topoftrees.jp). It is a shame because it is awesome, lightweight outlining program that I use almost every week. Unfortunately, it is starting to break down as some of the macOS API's it depends on become deprecated or outdated. I want to replicate Trees2 and use Apple's latest language features and APIs, such as Swift (4.4), SwiftUI, Combine, Codable, etc.
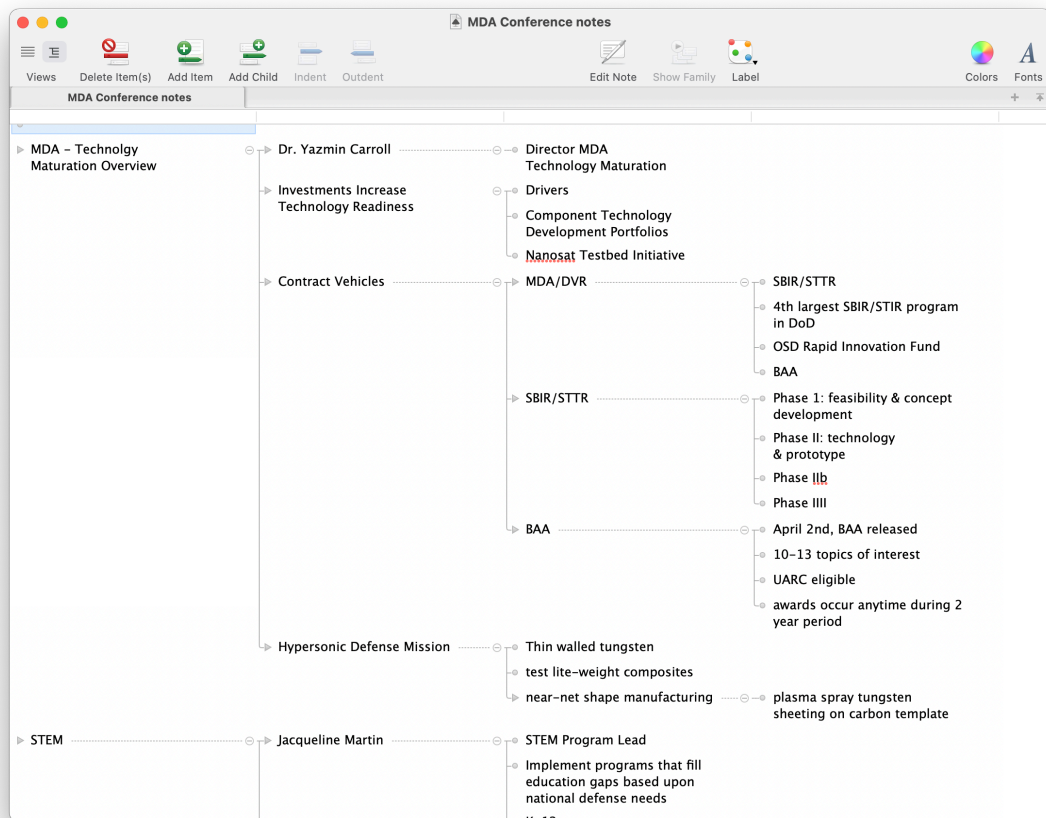
This is an opportunity for a group of 3-5 C.S. students to get experience with Swift, writing dynamic and scalable GUI-based applications using Apple's latest API's (e.g. Combine and SwiftUI), and practice with MVVM or similar organization schemes.

Required features:
- Replicate the outline structure of Trees2
  - textfield
  - connecting lines
  - aligned indenting
  - different types of hiding

- shallow indent
- completely hiddent
- Replicate the keyboard shorts
  - enter to create a new textfield
  - tab, shift-tab to move textfields around
- Replicate drag-and-drop behavior
  - on top of
  - underneath – left side
  - underneath – anywhere else
- Replicate text options
  - font selection
  - font color
- Add feature for background color of a textfield
  - could this be incorporated into the lines?
- Be able to export the data to a .txt file with some formatting
  - outline information (e.g. A.1.a with indents)

This project is an excellent opportunity for students to create a graphics-based application with immediate real-world applications. Students will get experience with Swift, macOS API, GUI design, and application design.

2.1 Deliverables

1. Final design report (mandatory for all teams)
2. Working application that includes the feature upgrades listed above
3. Clearly documented and marked up code that also leverages jazzy to create the API documentation

2.2 Summary

Develop a clone/replica of Trees2 outlining application

3. Desired Skill Set

Curious, self-motivated, students interested in making useful applications. Experience writing applications for macOS, iOS, or the Swift programming language is a plus.

4. Preferred Team Size

3-5 students

5. Internship Opportunity

Lab research opportunities continuing application within Hildreth's lab.

6. Location for Work

Off-site and on-site at Colorado School of Mines.