Nano-Inkjet Printer Updates

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 group develops a lot of custom software to control our instruments, often with the help of CSM computer science students. The objective of this project is to update our Nano-Inkjet Printer software (Fifi, https://github.com/HildrethResearchGroup/Fifi) to expand its capabilities.

   Update Fifi with the following Required features:
   - Fix bug with the Print Array and Print Lines Commands
   - Enable “Burst” capabilities from the Waveform Generator
     - Pulse Duration [ms]
     - Pulse Voltage [V]
     - Pulse Frequency [1/sec]
     - Offset Voltage [V]
     - Waveform Type (square, sin)
     - Number of Pulses [-]
   - Create dedicated Burst Command
   - Update Print Array and Lines to include Burst as an option
   - Update Print Lines to be able to set velocity [mm/s]
   - Develop UI for updated Burst Commands
   - Develop UI for manual Bursts
   - Print from Image
     - Grayscale to dots
       - Logic + UI
     - Darkness set by number of Pulses or Print Time
       - Logic + UI

   This project is an excellent opportunity for students to get experience with Swift, SwiftUI, and application design.
2.1 **Deliverables**
1. Final design report (mandatory for all teams)
2. Working application
3. Clearly documented and marked up code that also leverages Swift’s DocC to create the Application and API documentation

2.2 **Summary**
Develop an application to control the mass flow controllers and furnace

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.