CREATING DNA FROM SCRATCH FOR DNA-BASED DATA STORAGE

sddec23-05
Caden Wortman
Anna Hackbarth
Colin Walters
Evan Frank
Rachel San Agustin
Astha Upadhyay

annah2@iastate.edu

Project Overview

- Problem Statement :

  - DNA sequencing is well-developed, but printing requires more work

  - Pressing need for a high-output, cost-effective technique for DNA printing.

  - Wide range of applications in fields such as data storage, biotechnology, medicine, and genomics.

- Current Project Status:

  - GUI: WIP

  - OxyGEN (fluid flow system): starting from scratch

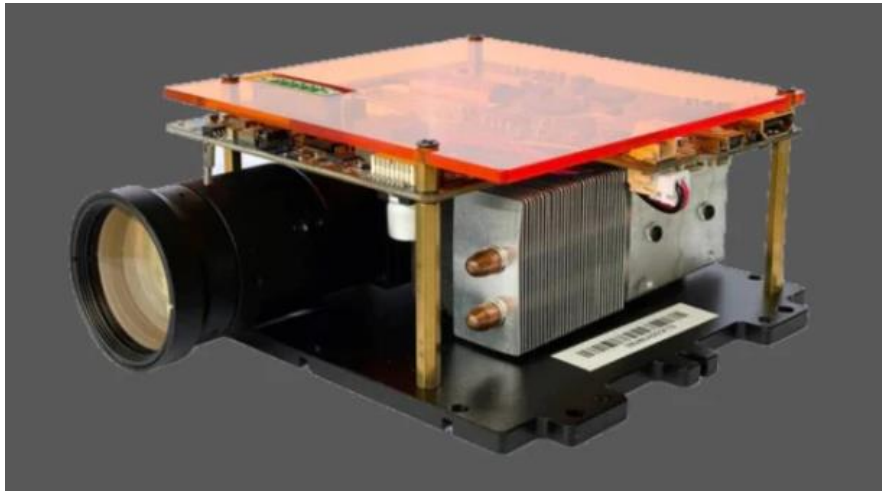 - Projector: Ordering a new one to avoid overheating issue with UV LED

Design

Figures show the current printer, flow control system, and various other components
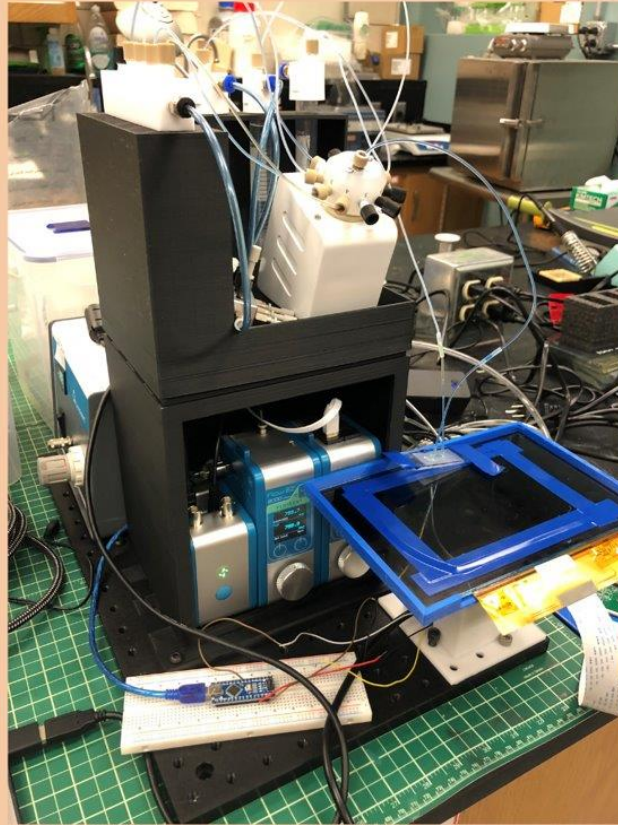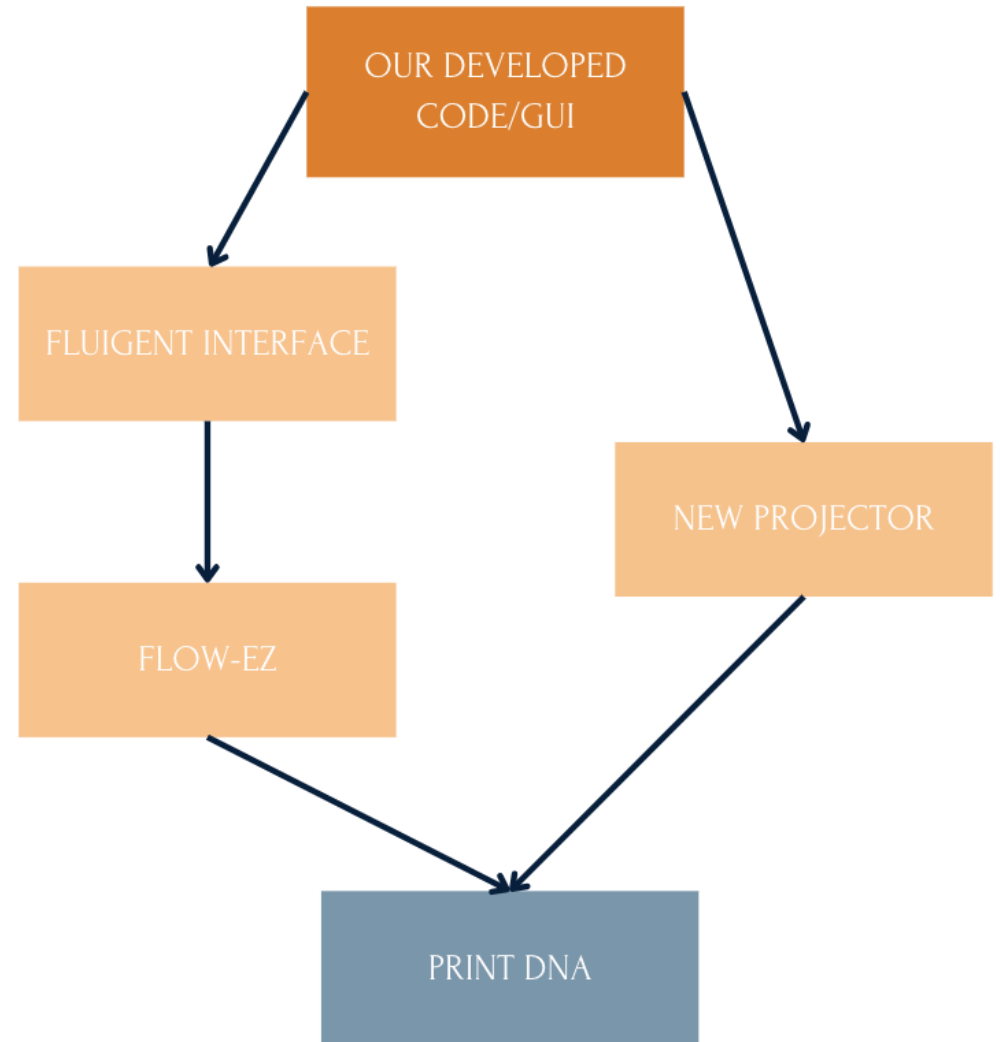
- From what the last team left us with:
  - High-powered LED and LCD
  - A micro-fluidic system (OxyGEN)
  - Control interface
  - 3-D printed housing unit and air compressor

Design Changes

~~$1,899.00~~ $1,199.00 Sale

OUR DEVELOPED CODE/GUI

FLUIGENT INTERFACE

NEW PROJECTOR

FLOW-EZ

PRINT DNA

Project Goals

- Complete GUI

- Customizing OxyGEN software development kit to fit our user case (Fluid Flow System)

- Test Projector / Integrate with GUI

- Integration with OxyGEN (Fluid Flow System)

Challenges

- Integrating the code with the hardware

- Interconnect the microcontroller to the fluid system

- Creating an interface that we can use with software and hardware systems

- Heat dissipation with the custom-made projectors caused overheating

Feedback & Changes

- Last Semester
  - Provide more in-depth technical descriptions for reports and final presentation
  - More concrete timeline and clearer goals
  - Increase utilization hours and time in lab

- Going Forward
  - Update reports, website, and full design document to include clearer scope and create new report sections
  - Set more regular check-ins internally for accountability
  - Coordinate and schedule separate work group times: GUI team, OxyGEN team, and hardware team

Major Checkpoints Timeline

- GUI
  - Finish functionality for ease of use (September 25th)
  - Integrate with Oxygen and projector systems (November 20th)
- Oxygen
  - Begin SDK customization (September 15th)
  - Integration testing with fluidic system (October 23rd)
- Projector
  - Evaluate new projector (1 week after arrival)
  - Integration and framing testing with GUI (October 16th)