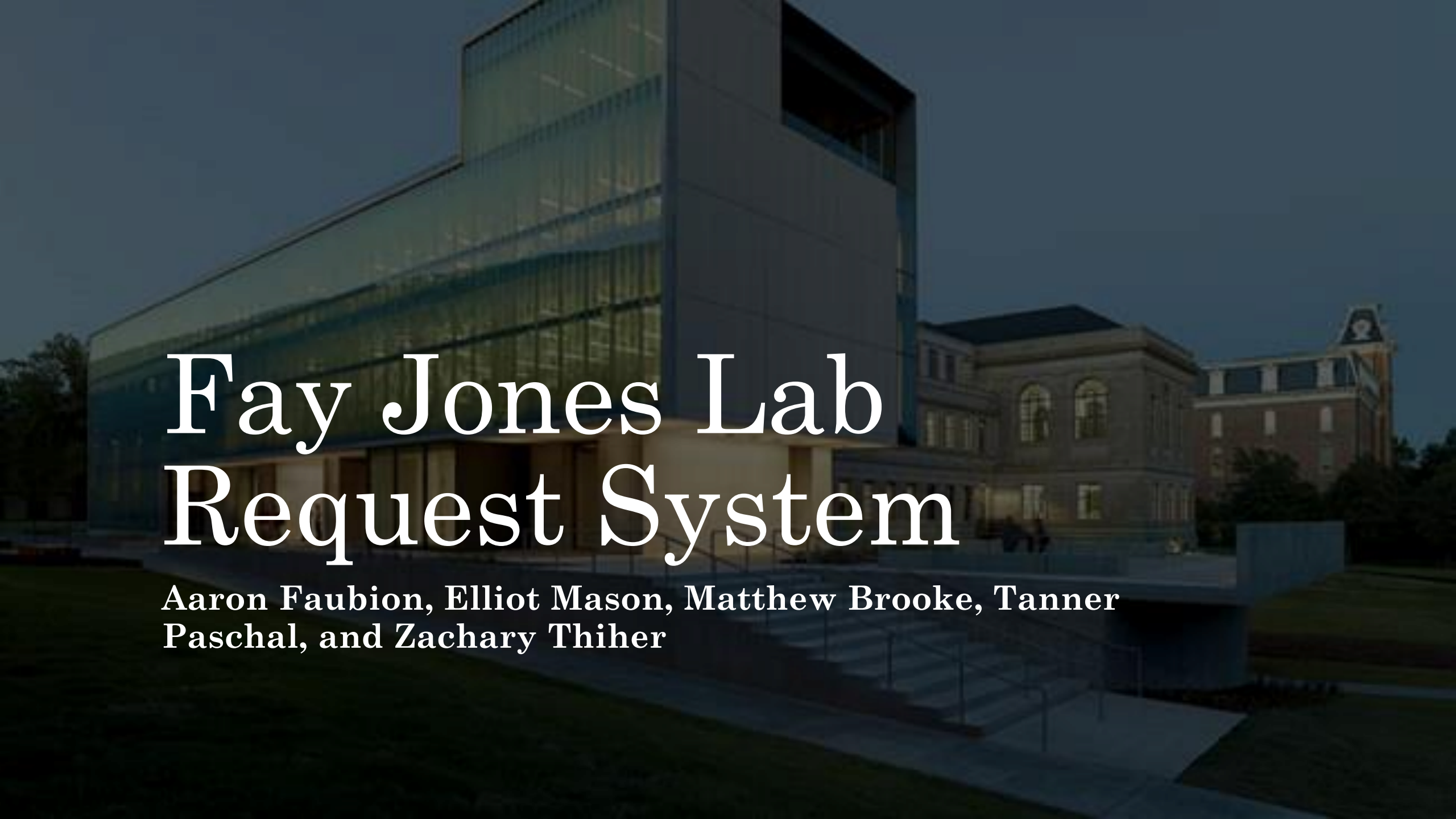
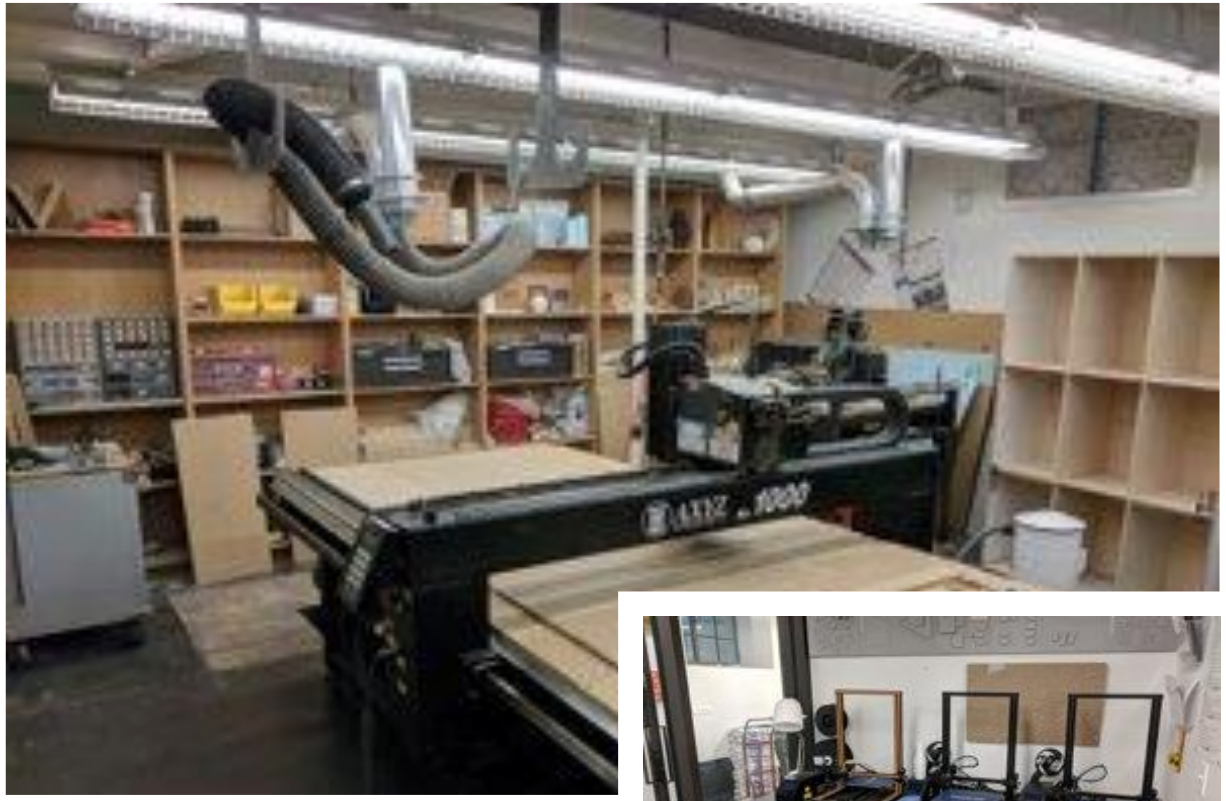


Fay Jones Lab Request System

Aaron Faubion, Elliot Mason, Matthew Brooke, Tanner Paschal, and Zachary Thiher

The Problem

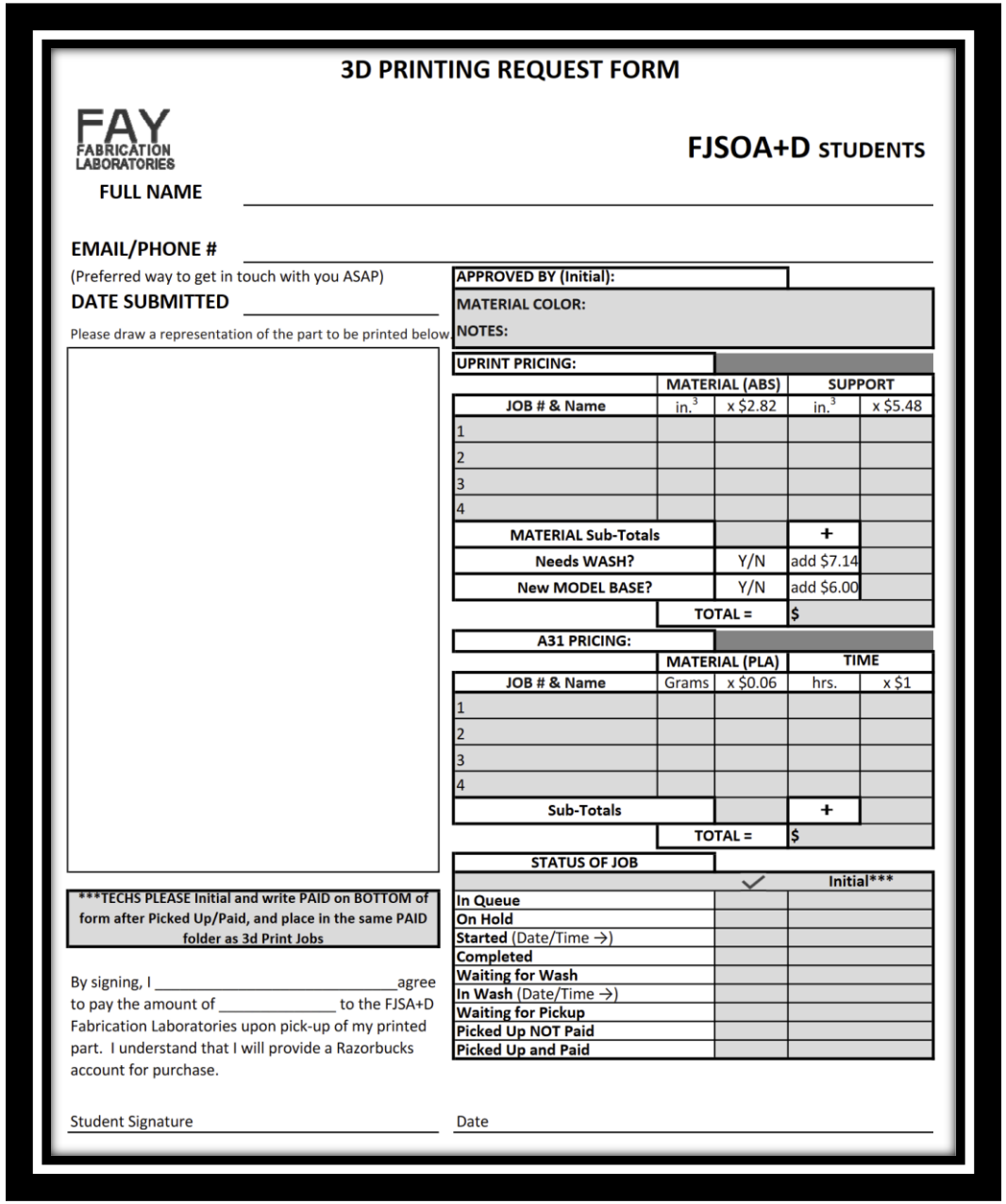
- Fay Jones has a build lab in the basement containing CNC routers, laser routers, a wood shop, and a fleet of 3D printers
- Currently with remote operation students submit jobs (CNC, Laser, 3D Print) via email.
- Student technicians then must record and track jobs as they are cut on lasers or 3D printed, and then alert the job owner when their materials are ready to pick up.
- Even before COVID, the 3D print job submission and tracking process was convoluted and let to a lot of confusion and miscommunication between staff



The Lab Space

Pre-implementation Process

1. Students email their STL files and then the student tech reviews and suggest any changes.
2. Print request form is filled out.
3. Online Excel sheet is updated with details.
4. STL files are 'sliced' and code generated for the 3D printers
5. Files are put into queue and printed when printer is available.
6. Excel sheet updated when jobs are finished



3D PRINTING REQUEST FORM

FAY FABRICATION LABORATORIES

FJSOA+D STUDENTS

FULL NAME _____

EMAIL/PHONE # _____

(Preferred way to get in touch with you ASAP)

DATE SUBMITTED _____

Please draw a representation of the part to be printed below.

APPROVED BY (Initial):

MATERIAL COLOR:

NOTES:

UPRINT PRICING:

JOB # & Name	MATERIAL (ABS) in.³	x $2.82	SUPPORT in.³	x $5.48
1				
2				
3				
4				
MATERIAL Sub-Totals			+	
Needs WASH?		Y/N	add $7.14	
New MODEL BASE?		Y/N	add $6.00	
		TOTAL =	$	

A31 PRICING:

JOB # & Name	MATERIAL (PLA) Grams	x $0.06	TIME hrs.	x $1
1				
2				
3				
4				
Sub-Totals			+	
		TOTAL =	$	

STATUS OF JOB

	✓	Initial***
In Queue		
On Hold		
Started (Date/Time →)		
Completed		
Waiting for Wash		
In Wash (Date/Time →)		
Waiting for Pickup		
Picked Up NOT Paid		
Picked Up and Paid		

***TECHS PLEASE Initial and write PAID on BOTTOM of form after Picked Up/Paid, and place in the same PAID folder as 3d Print Jobs

By signing, I _____ agree to pay the amount of _____ to the FJSA+D Fabrication Laboratories upon pick-up of my printed part. I understand that I will provide a Razorbucks account for purchase.

Student Signature _____ Date _____

Our Solution

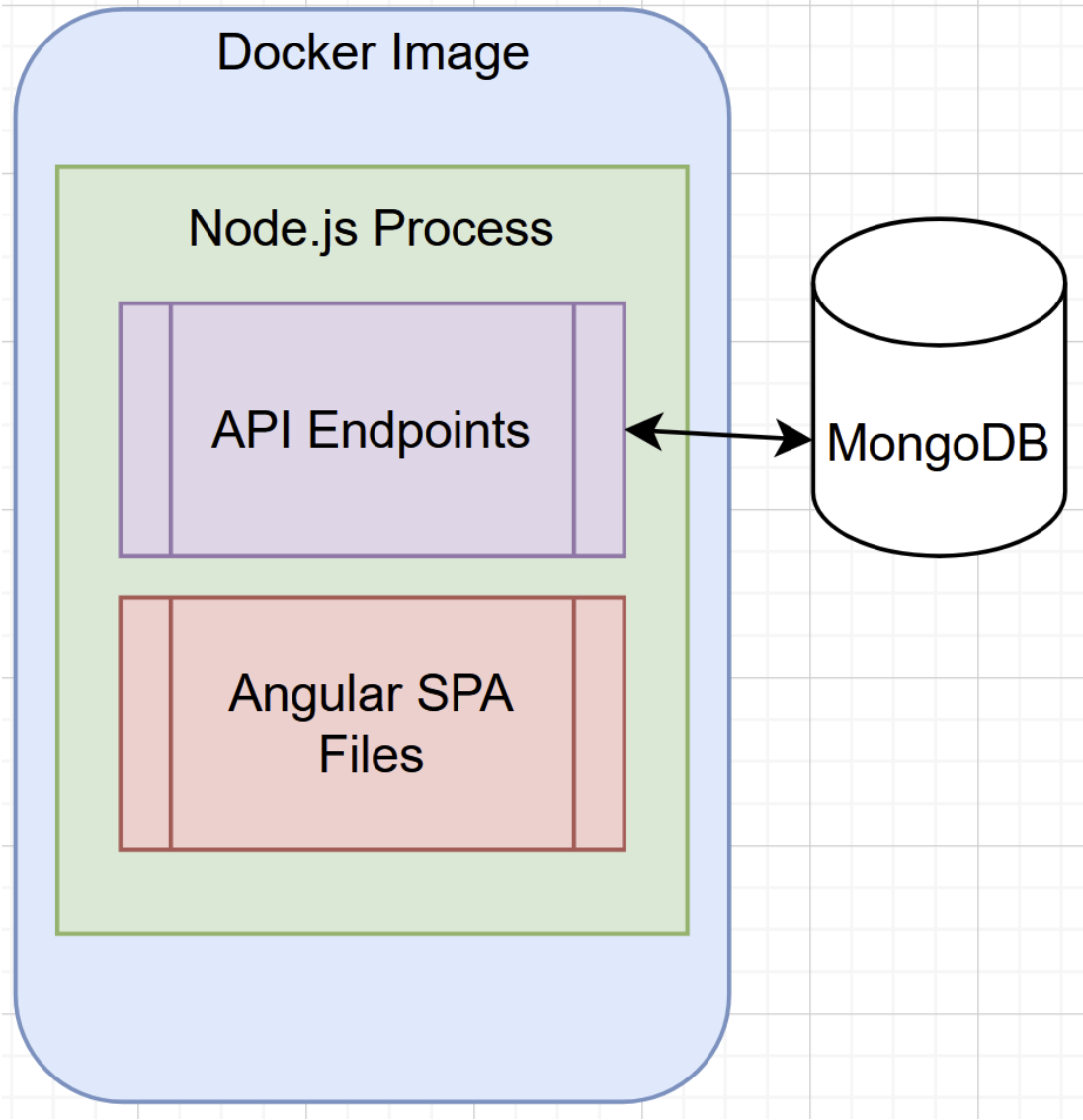
- Aims to create a unified student portal for the lab space.
- Allow for remote job submission and tracking.
- Integration with the 3D printers via OctoPrint running on Raspberry Pi that drive the printers.
- Ticketing system allowing for notes, communication with job owner, and progress tracking on a single interface.
- Stretch goal to create a resource scheduler to replace Design Reserve, originally a library management software that is used to schedule time slots on the laser routers. Potential to save the lab space licensing costs.

Technologies Used

- MEAN (MongoDB, Express.js, Angular, Node.js)
- Google Cloud Engine
- MongoDB Atlas hosting
- GitLab CI/CD pipelines for efficient development releases

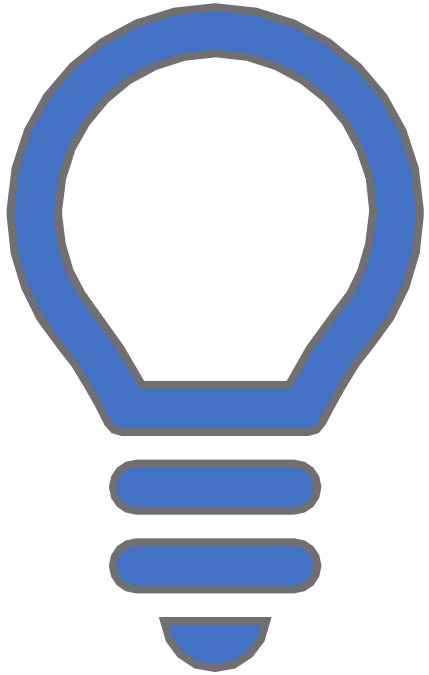
Design Architecture

- Express.js routes API requests. If no API path matches, the request will serve the Angular SPA files
- API uses mongoose connector to the MongoDB instance hosted on Atlas
- Using docker image to host the application. In the future we can create two docker images, where one is only the API, and the other only serves the Angular webapp.

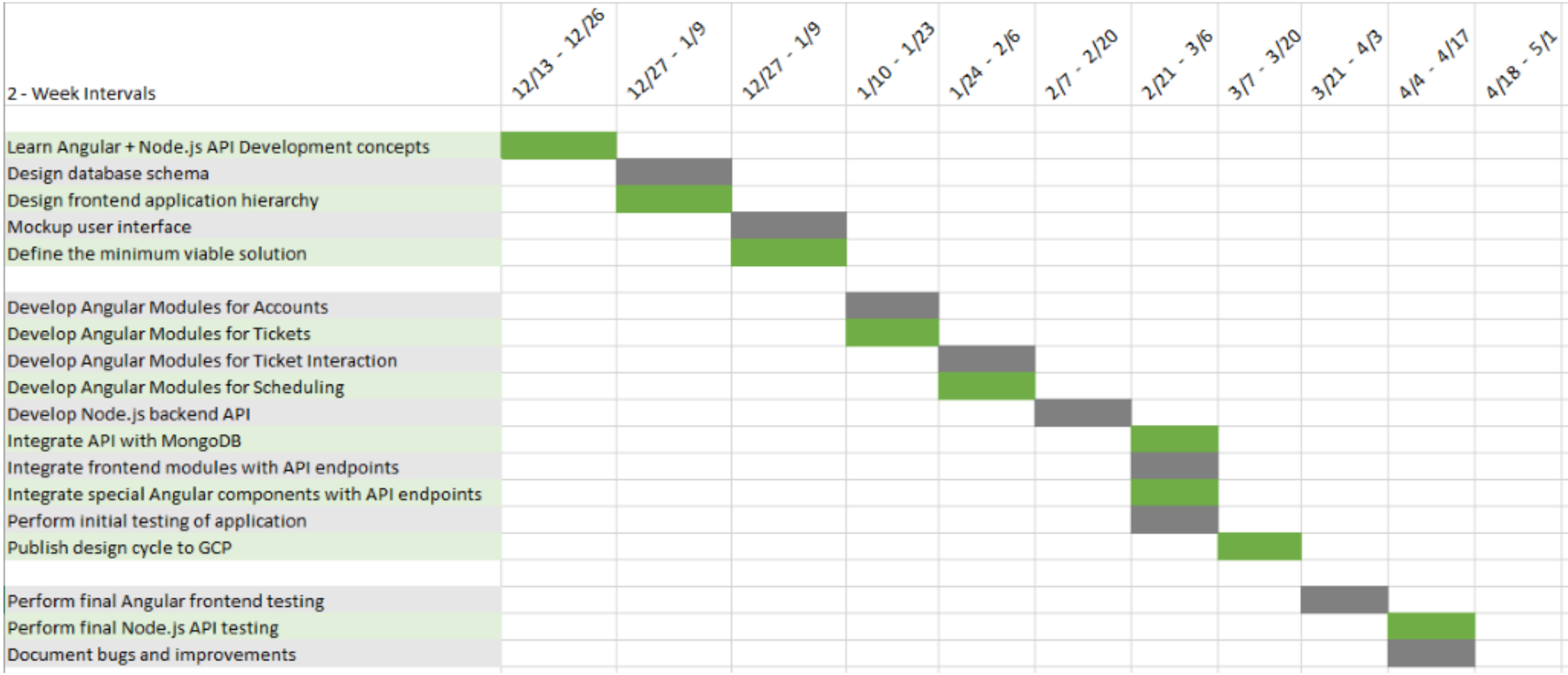


The Benefits of Our Solution

- Centralized lab management system
- Process for submitting and tracking jobs online
- Reduces paper clutter and disorganization within the lab space



Development Timeline



Project Champion

Randall Dickinson

Lead Digital Lab Fabrication Specialist