PORTFOLIO 2024

Will Brown

R&D Engineer

About Me

My name is Will Brown and I'm a Mechanical Engineer with experience in both medical devices (Class 2 and Class 3) and the telecom industries (wireless internet service provider). I have experience in a wide array of engineering tasks including but not limited to:

- Designing parts and assemblies in SolidWORKs, creating and approving drawings, and prototyping assemblies using a variety of methods (machining, 3D printing FDM and Resin, laminates for microfluidic testing)
- CFD and Thermal analysis (OpenFOAM, Flotherm XT, and ANSYS Fluent),
- Programming in Python, C++, and mobile development with Flutter (Dart)
- Mentoring young engineers and Co-ops/interns.

In this portfolio I've gathered a few projects that I think best exemplify my skills as an engineer along with the method I've developed for tackling complex and time sensitive tasks. Thanks in advance for taking the time to look through it and I look forward to collaborating on something great soon!

Hardware

Software

Prototyping

Will Brown

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Experience

2023-Now **R&D Engineer** Consonant Systems LLC

- Designed and fabricated prototype medical devices for clients
- Wrote various prototype apps and other software to support startup clients

2021-2023 **Engineer** Chip Diagnostics

- Designed and prototyped and next generation microfluidic system
- Brought production in house saving roughly 50% of the original advertised sale price.

2019-2021 **Mechanical Engineer** Starry Inc.

- Designed and assembled state of the art system level tester for the company's flagship product
- Ran thermal analysis for all of the major product lines

Education

2014-2019 **B.S. Mechanical Engineering**

2023 **NSF I-Corp Regional**

Fluorescence based microfluidic diagnostics platform

Domus Diagnostics

- Purpose
  - Design and fabricate a fluorescence based reader for the Domus Diagnostics at home test
- Challenges
  - Low resources: both financial and limited chemistry team support due to the small nature of the company
- Results
  - a “looks like” prototype (pictured to the right) with a demo app that shows potential users the workflow of the device.
  - Extensive data using a fluorescence development board from Analog Devices along with a test plan to begin work on the next round of optimization with the real device chemistry.
- Lessons Learned
  - Dividing the problem early allowed our team to focus and deliver on two very different aspects of the design successfully (“looks like” and functional prototypes)

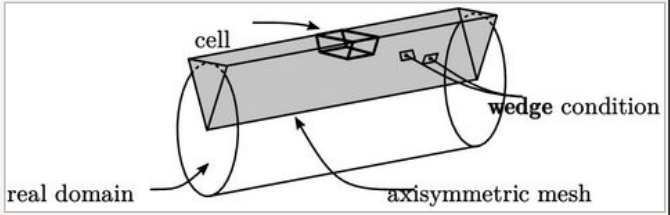
The Domus Test for Clinics

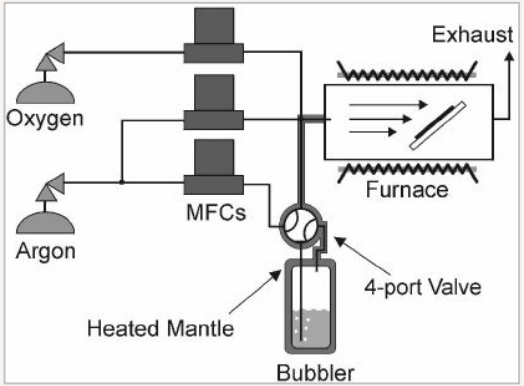
- Prototype-stage
- Co-development opportunity
- Low-cost, no-service instrument
- Under 10mins TAT (workflow, billing relevant)

Flutter

OpenFOAM CFD Analysis

- Purpose
  - Create an OpenFOAM model of a MOCVD furnace based on prior work on a similar design published by a collaborator group out of MIT.
- Challenges
  - Lack of familiarity with the system and the OpenFOAM simulation software.
  - Experimental issues in the program led to several re-designs of the furnace during the course of the project.
- Results
  - A parametric model of the proposed furnace that provides data to inform further experiments and development of a MOCVD furnace.
- Lessons Learned
  - Extensive learning related to OpenFOAM. I was completely unfamiliar with the software when the project started and by the end I had both recreated the model from the reference paper and improved on it both in accuracy and usability

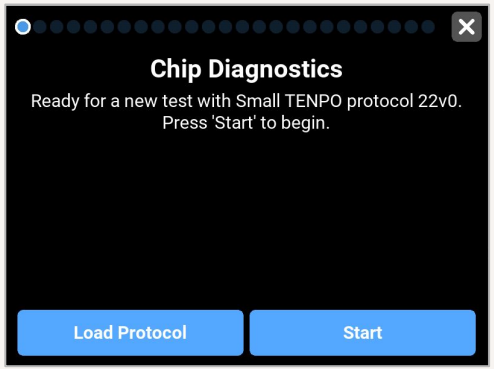




Simplified examples of the furnace technology and modeling approach

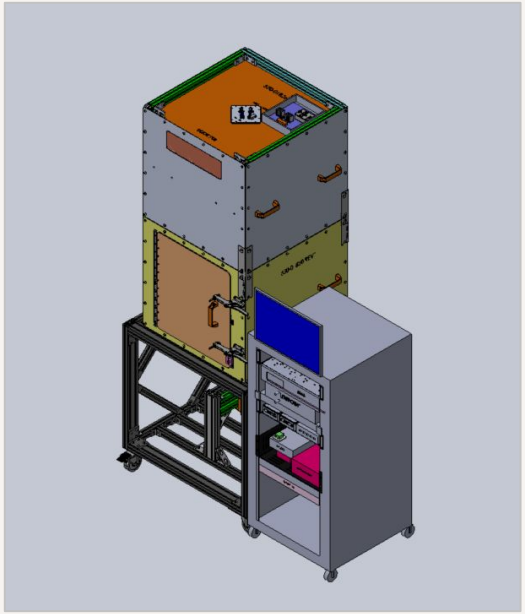
Syringe Pump and Pressure driven microfluidic system

- Purpose
  - Design a new version of the microfluidic system to be driven with a vacuum pump instead of syringe pumps
- Challenges
  - Split resources. Project was considered a backburner project and needed to be balanced with production of the current design of the system.
- Results
  - Successful prototype version of the vacuum driven system. Tested on the current format of the company's device along with a new higher throughput version (96 well plate) of the device that was only possible using a vacuum driven system. A provisional patent filing on the IP created in the high throughput design
- Lessons Learned
  - More hands on experience with Arduino (specifically hardware interrupts) and the value of a "1 day build" to get a stuck project moving.



Comet 24 Ghz Anechoic Test Chamber

- Purpose
  - Design a system level radiated tester for the company's newest radio. Test RF transmission, GPS lock, Bluetooth communication, EIRP, and data rate.
- Challenges
  - Very abridged timeline (previous version was developed in ~1 year, v2 was given about a third of that time)
  - Cost (3rd party chamber with in house modifications was quickly scrapped due to high upfront and shipping costs)
  - Inherit and update a design made by another engineer on my team for the previous version of the product
- Results
  - Produced four system testers that successfully tested and calibrated production units. My tester reduced reflections (echoes) in the chamber by 100%
- Lessons learned
  - Developed my skills managing a project all the way from the design stages through prototype and eventually into production.
    - Worked with several vendors and manufacturing techniques including cnc machining, sheet metal, extruded aluminum, laser cutting, and 3D printing.



SolidWORKs Assembly of the tester I designed and assembled

THANK YOU

Do you have any questions?

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Contact Links

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