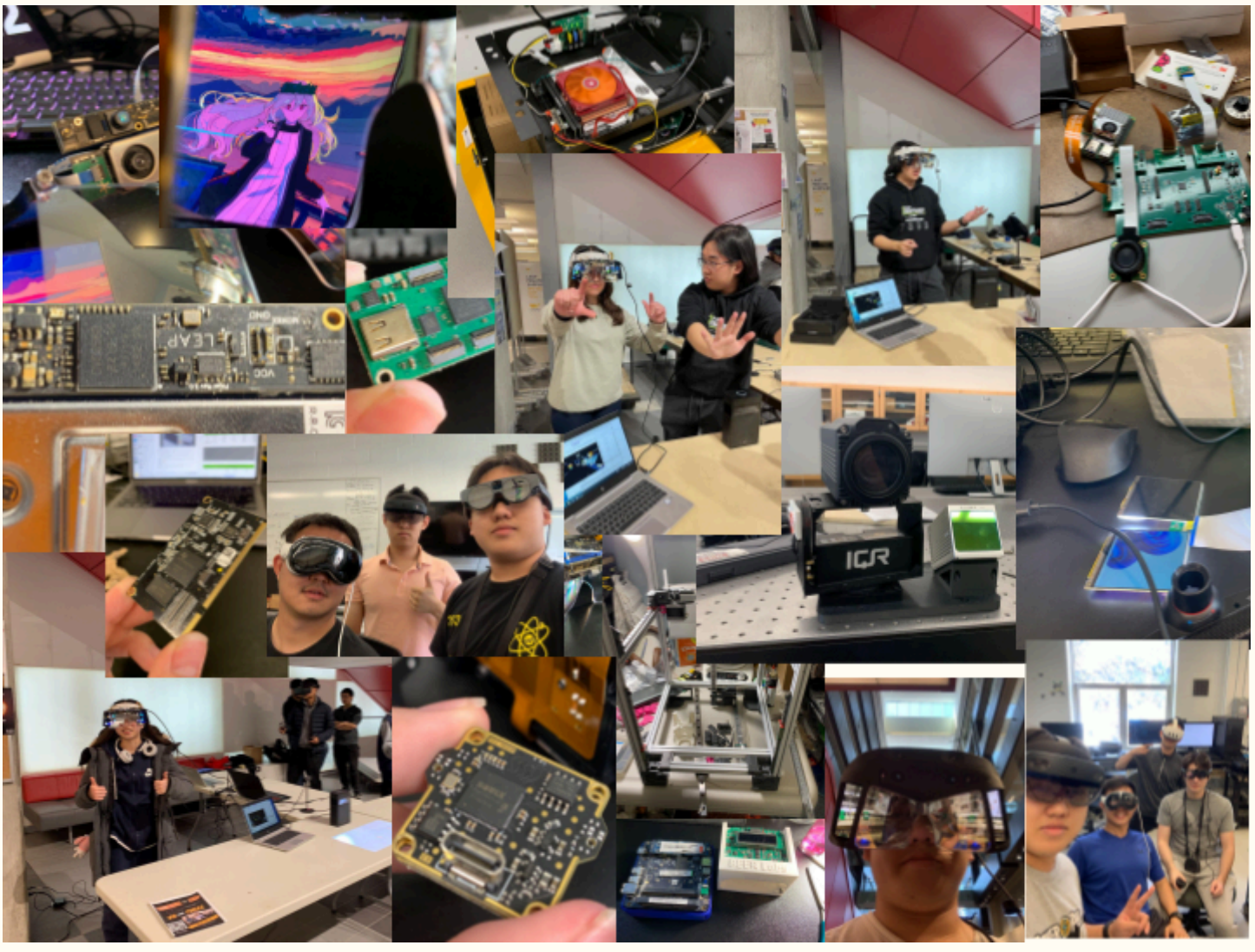
Vincent Xie

Portfolio

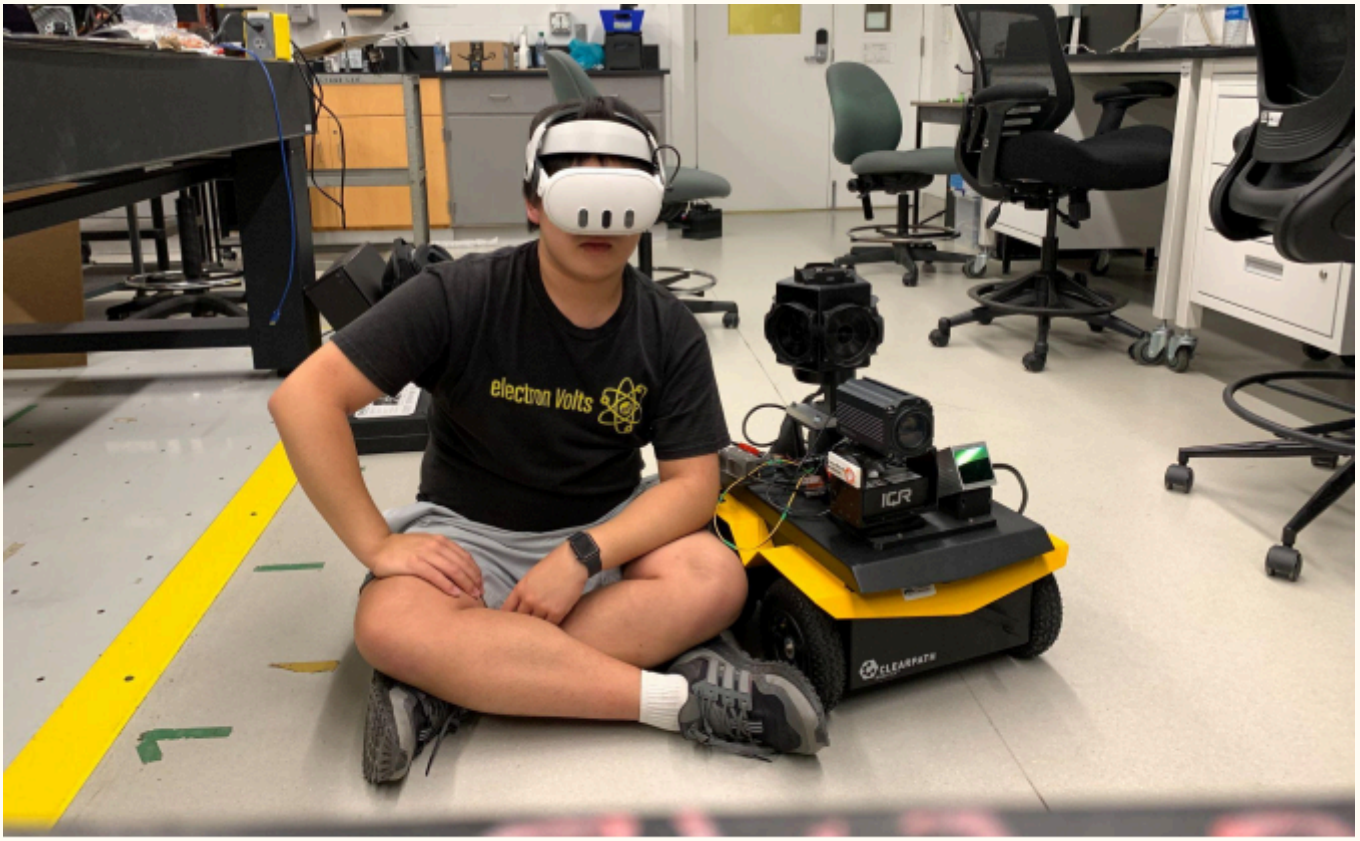
Note: Currently portfolio only contains finished projects from April - Sept 2024



Work/Personal Projects

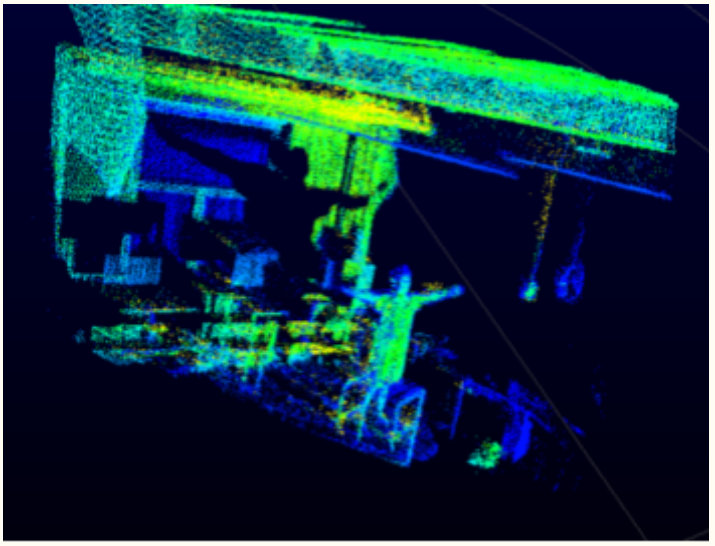
1. Immersive Outdoor Inspection Robot

CViSS Lab | Python, C#, C/C++, Swift, Python, Shell, Android, Linux



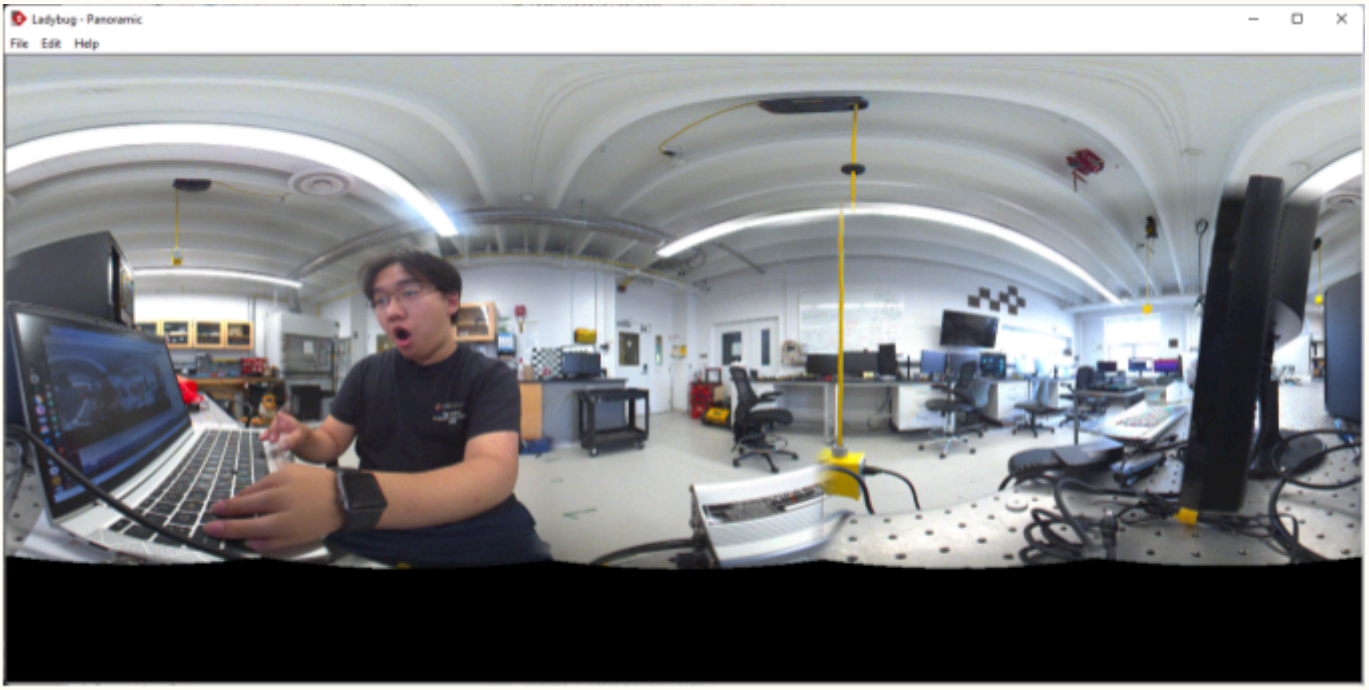
Me, Quest 3 and the Clearpath Jackal.

- **Single-handedly (the other person on the team is my supervisor) architectured the entire solution from scratch to fit client needs. (Rogers)**
- **Repurposed an unused Ladybug 5 camera by wrapping it under a Windows VM, saving 34k CAD in development costs.**
- **Implemented a lidar-inertia-based (FAST-LIO) calibration system, allowing precise mapping when inspecting close-up objects.**
- **Modeled & 3D printed custom mounts for all necessary devices.**
- **Hand-tracked & joystick-based (Quest 3) controls for zoom camera, pan-tilt, and robot movement.**



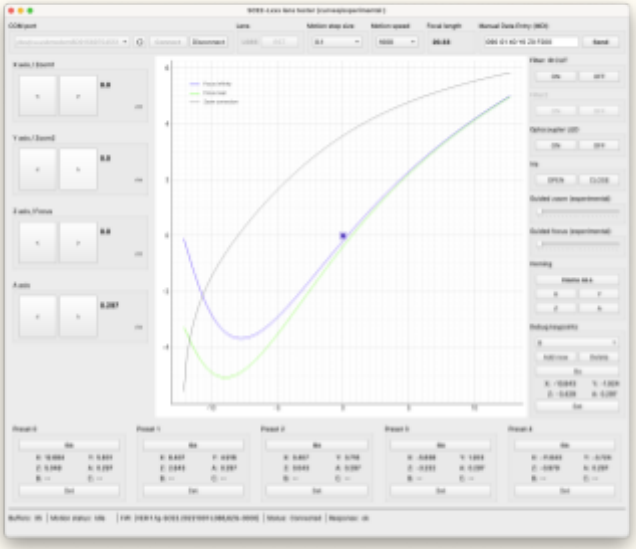
You can't stop me from T-posing

- **Implemented a Win32 app based on 10-year-old SDKs and incomplete documentation.**



My Win32 app that took forever to implement

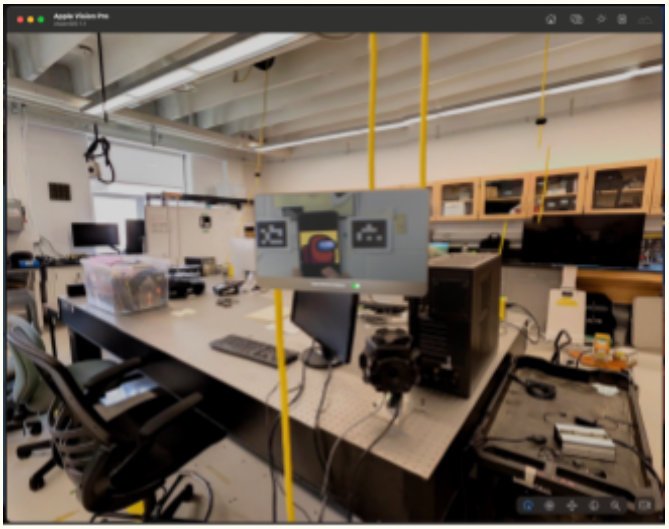
- **Implemented OpenCV-based autofocus algorithm to directly pinpoint lens position for a certain flange distance.**



Wrote a script to generate our custom curve for the custom zoom camera

Original design diagram before the necessary overhaul

- **Configured graphics/video acceleration in each VM through SR-IOV**
- **Implemented a simple bash script to define and make changes to the network table.**
- **Implemented a streaming demo for 4k 360° videos using low latency HLS. Tested on the Vision Pro.**

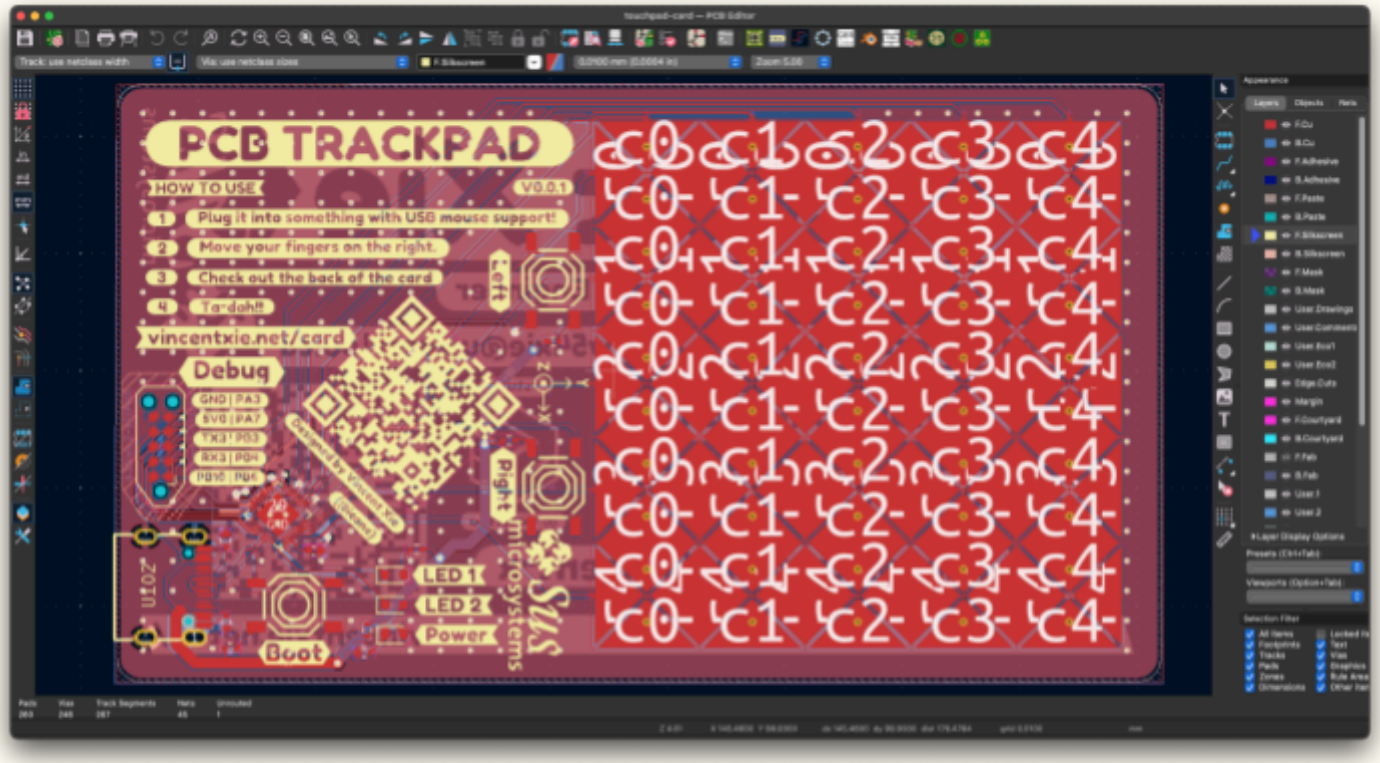


Static image test + zoom camera streaming on the Vision Pro

2. Trackpad Explorer Business Card

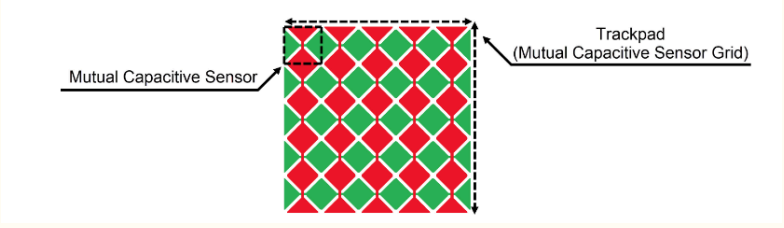
Personal | Python, KiCad, C/C++, RISC-V

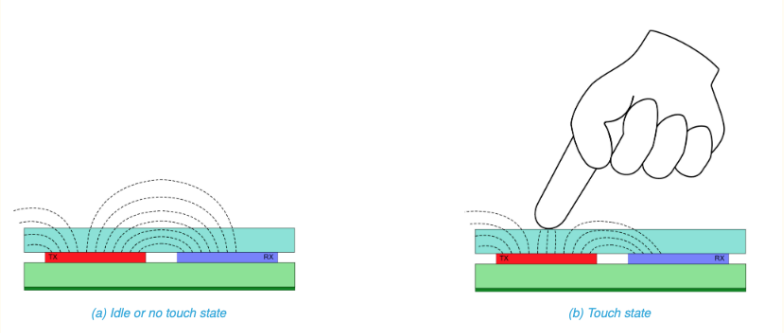
- **Built a business card that also acts as a hackable HID trackpad.**

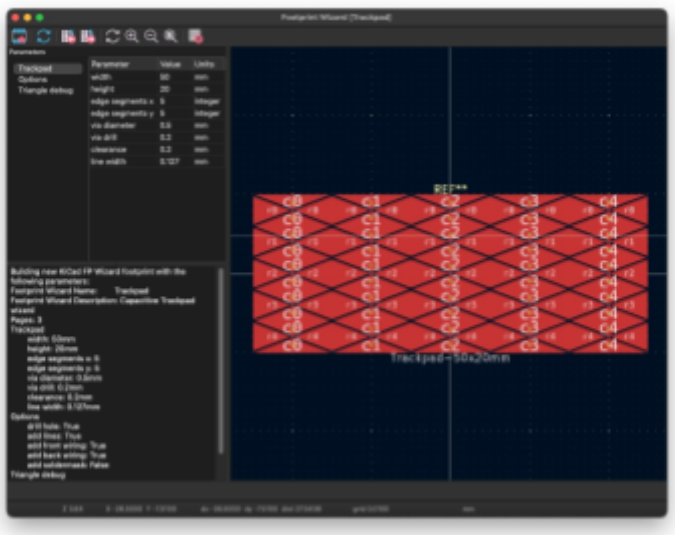


First fabricated board designed in KiCad, I was insanely triggered by EAGLE pricings.

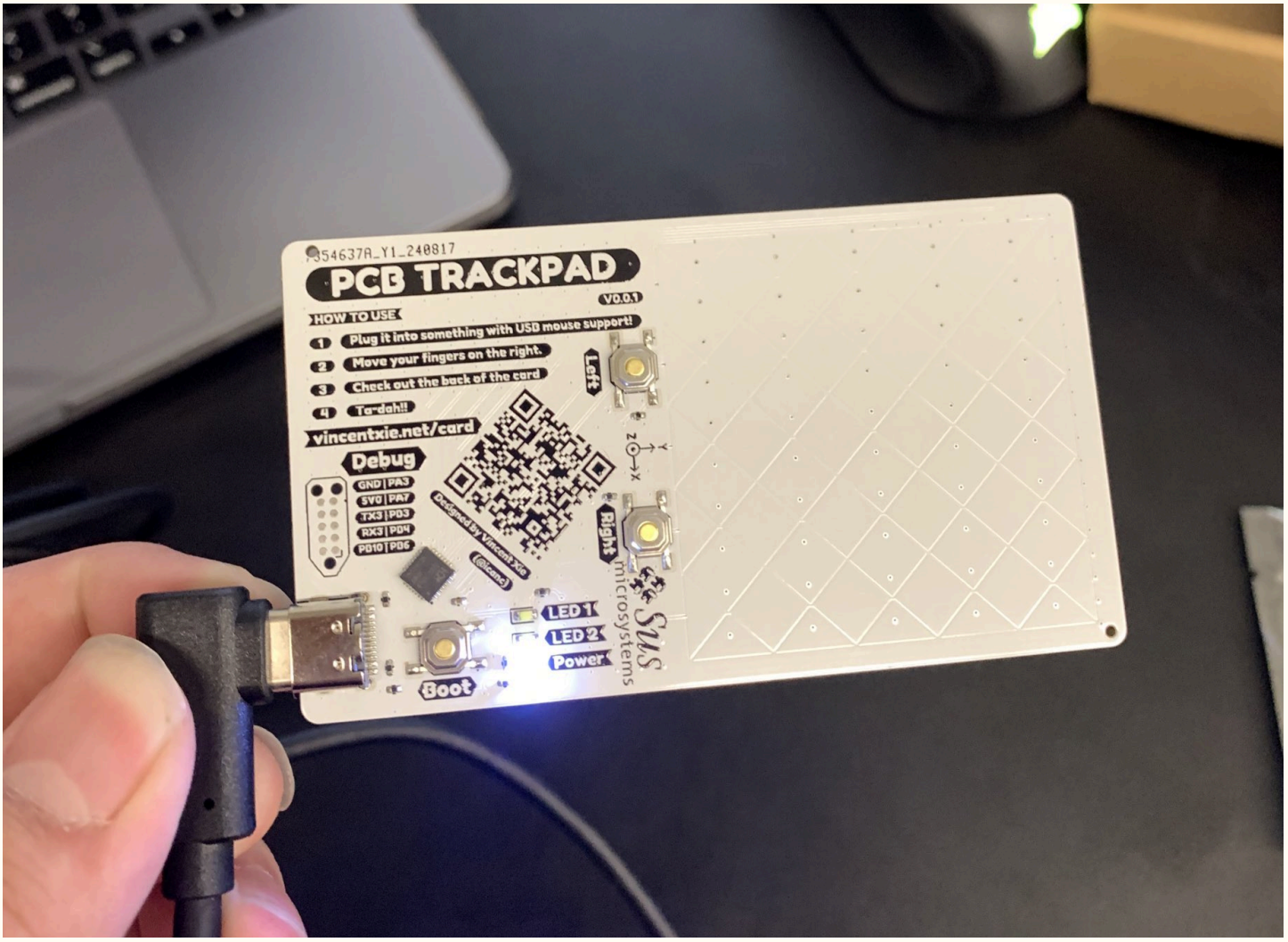
- **Optimized to sub $1 USD per card @ 30pc.**
- **Implemented a PCB footprint wizard (generator) after a week of reading KiCad source code.**
- **Extended CH32X035 HAL to include more documented registers regarding ADC capacitance sensing.**
- **Implemented USB HID with RTOS and C.**







Wrote a python script to generate arbitrary trackpads


PCB TRACKPAD
V0.0.1
HOW TO USE
1 Plug it into something with USB mouse support!
2 Move your fingers on the right.
3 Check out the back of the card
4 Ta-dah!!
vincentxie.net/card
Debug
GND | PA3
5V0 | PA7
TX3 | PD3
RX3 | PD4
PB10 | PB6
Designed by Vincent Xie
(@icanc)
Left
Right
Boot
LED 1
LED 2
Power
microsystems


PCB TRA
HOW TO USE
1 Plug it into something with
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PCB TRACKPAD
HOW TO USE
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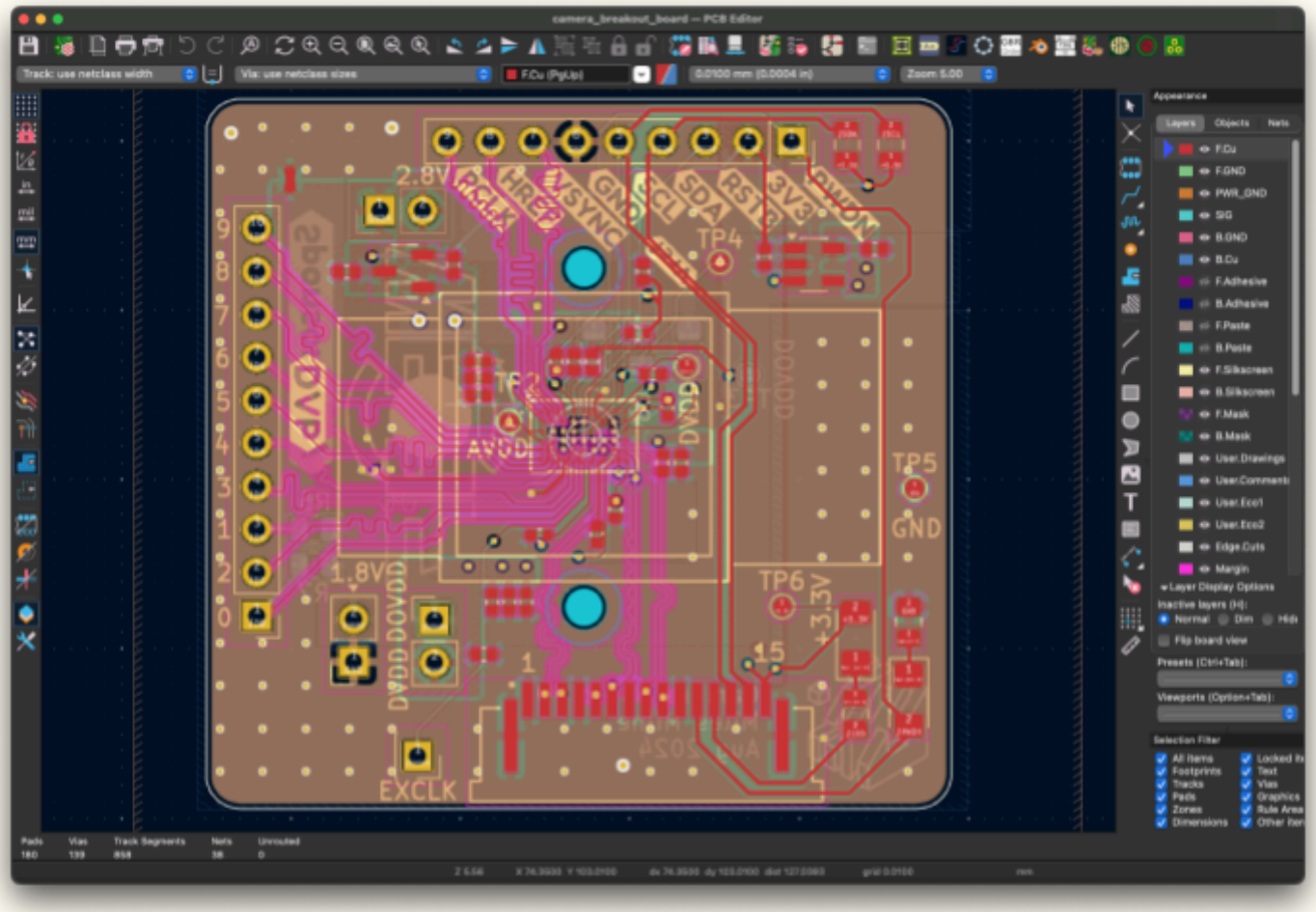
Design team/club Projects

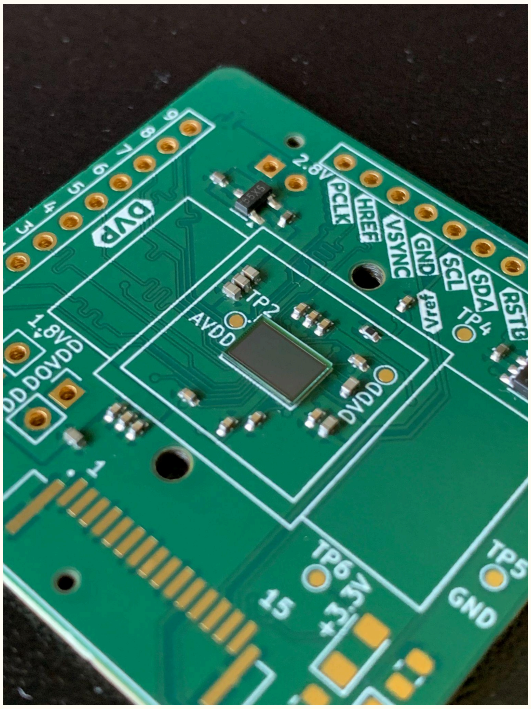
1. Sub $5 Raspberry Pi Camera

Waterloo Reality Labs | KiCad, Python, C, Linux



6 Layer camera board designed in KiCad

- **Designed by a co-op student who began with zero electrical design experience.**
- **Provided each co-op student with 6 hours of 1 to 1, hands-on work sessions every week.**
- **Spent 20+ hours with co-op students for board bring-up.**
- **Implemented basic communication drivers (for SCCB) for basic testing patterns.**
- **Received approval from the “God of design teams” for future hires.**



Also, as you did a great job of supervising the co-op students you hired in the Spring term, I don't need to be part of the supervision plan for the fall term.

Thanks

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Faculty of Engineering, University of Waterloo
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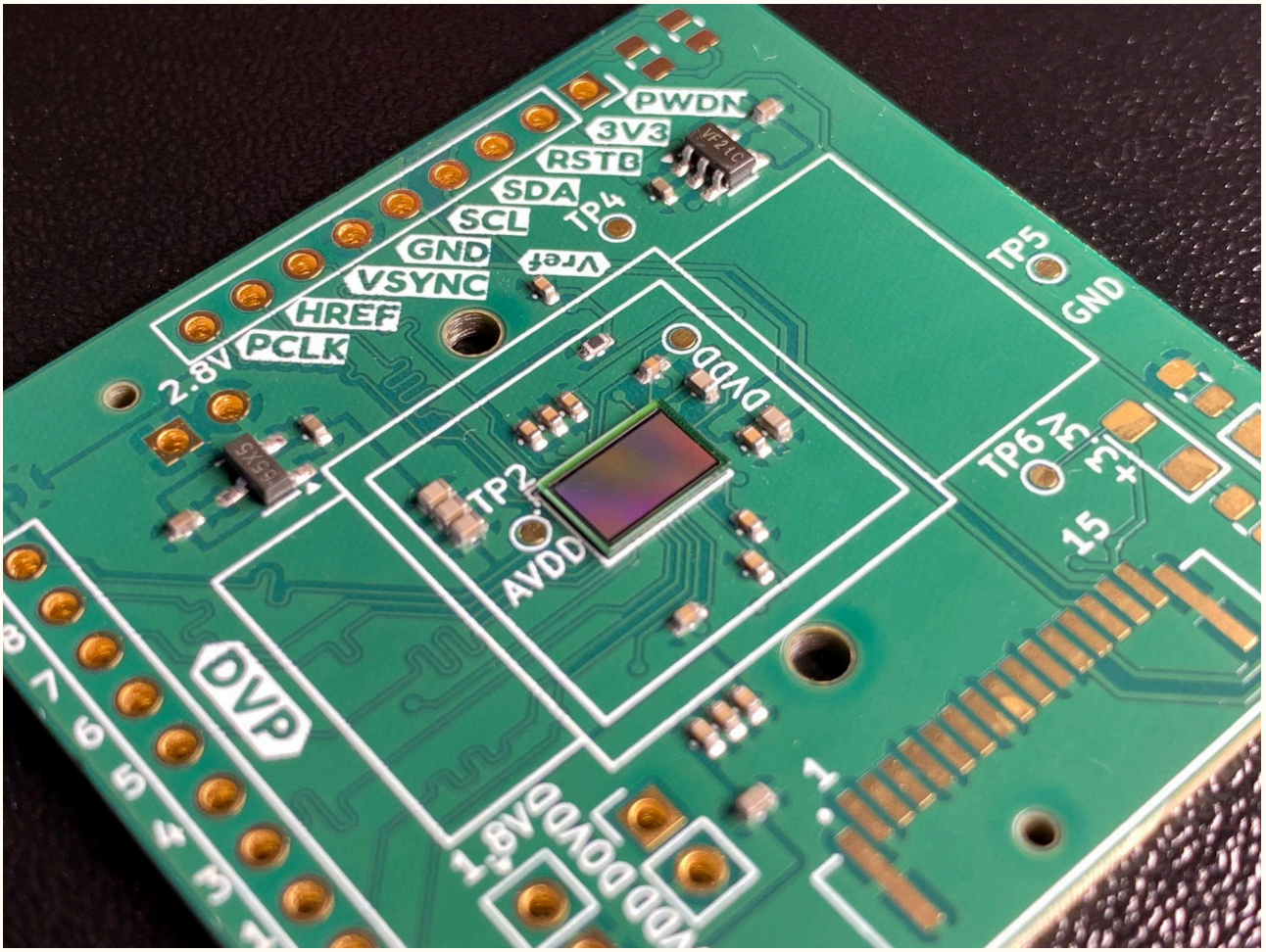
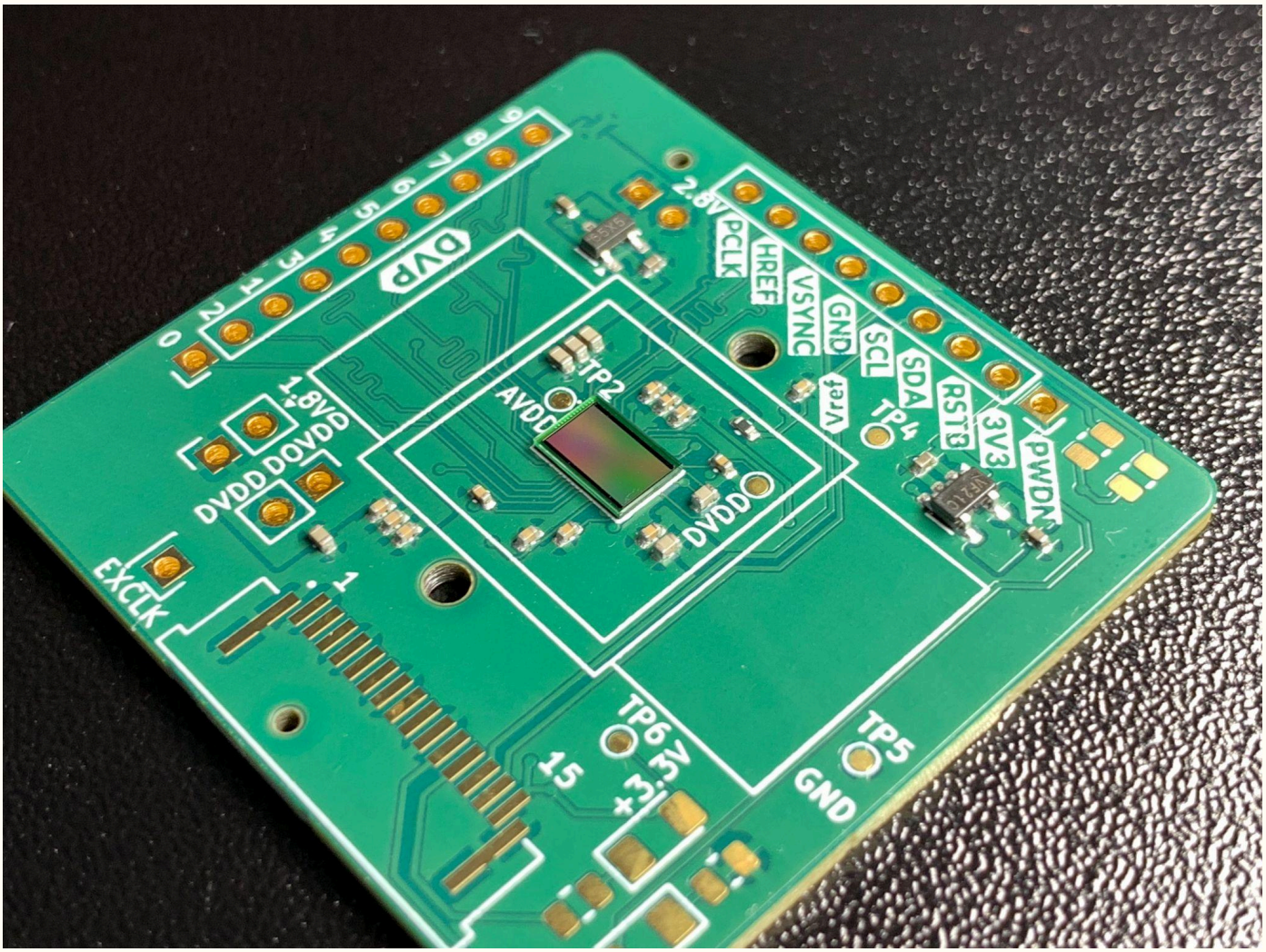
Office: E5 - 2105

UNIVERSITY OF WATERLOO


PWDN
3V3
RSTB
SDA
SCL
GND
VSYNC
HREF
PCLK
2.8V
Vref
TP4
TP5
GND
TP6
+3.3V
15
DVDD
TP2
AVDD
DVP
1.8V
DOVDD
DVDD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