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Dear Recruiting Manager,

Hi!

Factors which **decrease** my suitability for the position of *Equipment Technician, Epitaxy*:

- No experience with semiconductor process-specific chemistry and safety beyond inert gases
- No experience maintaining vacuum cleanliness below  $1\text{e-}6$  mbar.


Well-suited because:

- Hands-on experience fabricating and maintaining high-vacuum equipment (turbo and diff. pumps, ion gauges) and adhering to appropriate standards,
- A BSc in Science,
- Experience independently managing and conducting work,
- Extensive experience with electronics design, prototyping and repair; instrumentation; software development and simulation; and literature review.

Thanks very much for your time!

# Hi, I'm Daniel.

*Science rules!*

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## Education:

B.Sc. in Science from York University, with some focus on Physics. Graduated January 2021 with B+ GPA.

## SafeSump Inc.

Founder/CTO of four-year project to design and produce a failure-resistant water pump system.

Funded by:

- \$37,500 Ontario Centres of Excellence grant (2017-2020)
- \$75,000 government contract (2018-2020).

Broad overview of skills gained:

- **Electronics:** Hardware development from in-house prototyping to volume production; design of ultrasonic and capacitive sensors
- **Software and firmware:** Writing and maintaining a 20k SLOC codebase of Python and embedded C and C++ on STM32 and SAM devices. Version control, frontend and backend programming; Linux administration.
- **Soft skills:** Pair programming, management, conducting presentations, collaboration

## 0.1 Personal research projects

### *Musings on an inexpensive 1500°C silicon carbide furnace*

An attempt to make various high-performance ceramic techniques available to a broader audience. Built on the work of more than 200 scientific papers.

A short report on some parts can be found at [0xdbfb7.com/furnace.html](https://0xdbfb7.com/furnace.html).

## R&D in vacuum systems

A multi-year attempt to develop a high-current ion beam lithography system, involving vacuum chamber design and fabrication and several custom GPU-accelerated simulation tools written in CUDA/C++.

This codebase can be inspected at [github.com/0xDBFB7/ionprinter/](https://github.com/0xDBFB7/ionprinter/)

### *Some notes and experiments on the electroporabilization of viral membranes*

Working paper at doi:[10.5281/zenodo.4568507](https://doi.org/10.5281/zenodo.4568507)

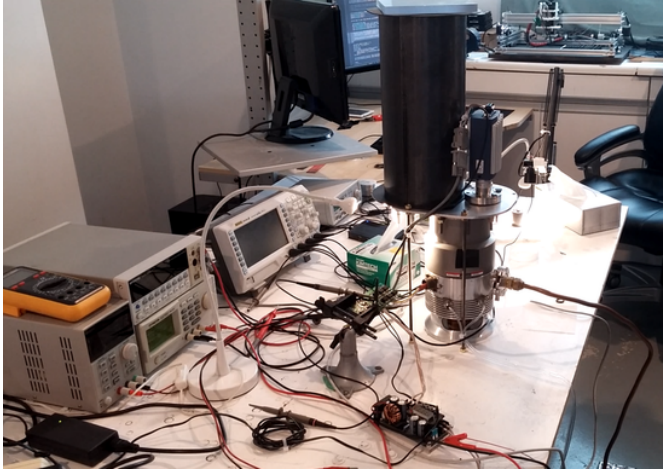
## 0.2 Broad overview of skills gained from these projects

- **Documentation:** LaTeX, Jupyter notebooks, Reference management
- **Software:** Data analysis and automation; Python, C++, Mathematica, with a smattering of Julia and MATLAB.
- **Simulation:** Several dozen toolchains were in use, ranging from modified open-source electromagnetic simulation systems to molecular dynamics with GROMACS.
- **Electronics:** Microwave electronics design, PCB design with KiCAD
- **Fabrication:** Electronics prototyping, CNC mill and lathe operation, micromachining, microfluidics

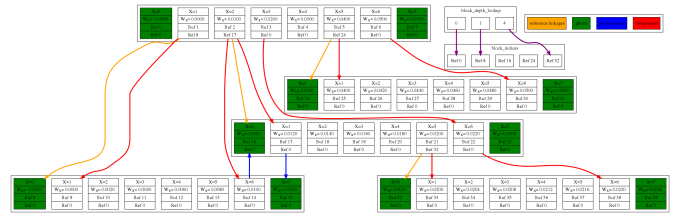
## Personal:

Member of SimCoLab Barrie (now BRiX) hackerspace for 7 years. Canadian and German citizenship.

# 1 Gallery

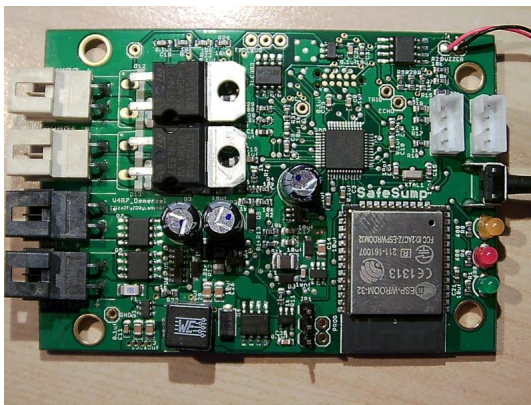


(a)

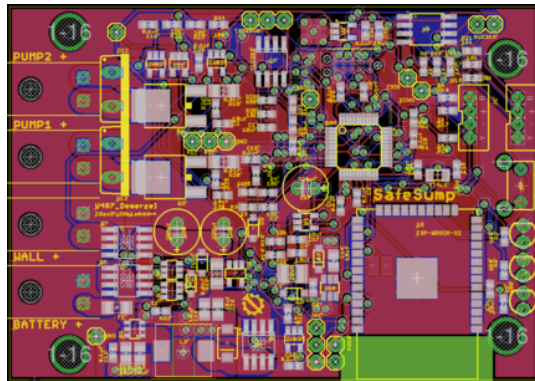


(b)

Bespoke high vacuum system. GPU-accelerated multigrid data structure and electrostatics solver for particle-in-cell ion beam simulation.

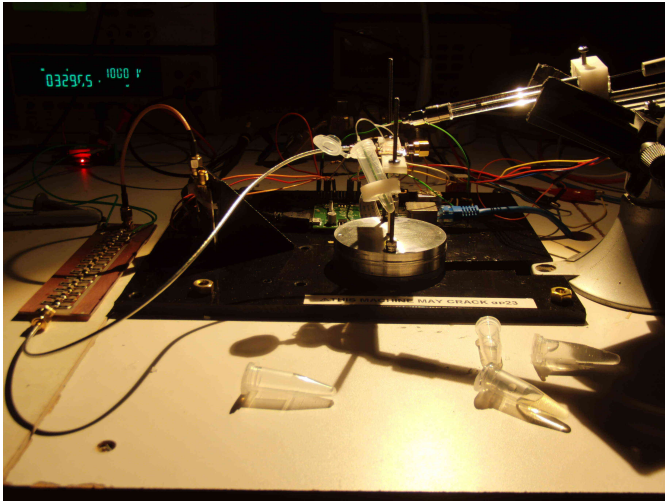


(c)

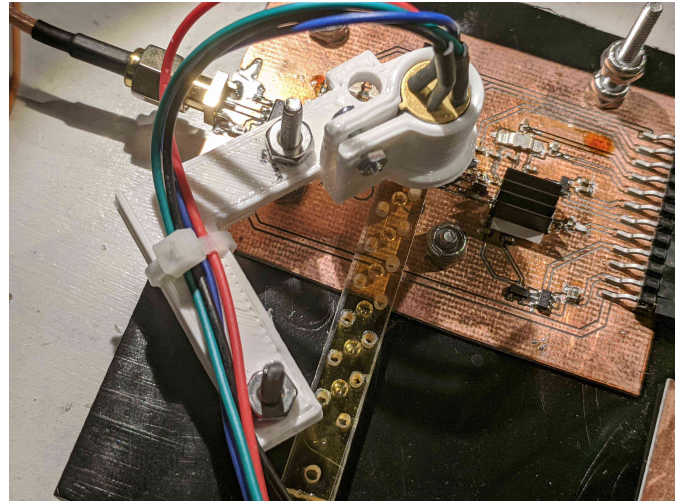


(d)

Redundant controller I designed for SafeSump Inc. with a 120 Mhz Atmel ARM processor, running ~10k lines of firmware.



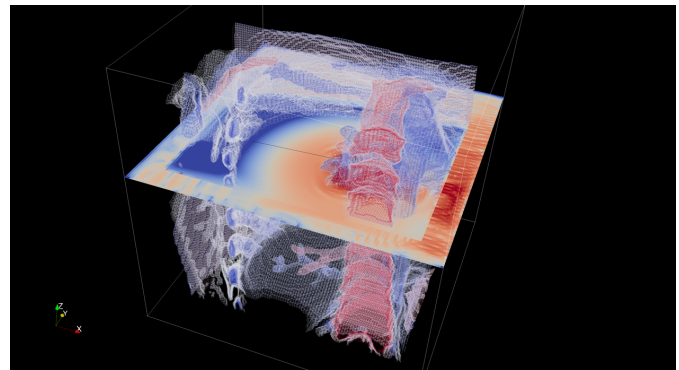
(e)



(f)



(g)



(h)

- (a) A sub-nanosecond kilovolt pulse exposure cell (based on an off-the-shelf avalanche transistor pulser design).
- (b) A 12 GHz microwave absorption spectrometer.
- (c) The very pretty opalescent blue culture caused by *E. coli* B trying to metabolize lactose in an indicator for the enzyme  $\beta$ -galactosidase.
- (d) An FDTD simulation of electromagnetic interaction with tissue.