# Andrew Randell

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## Professional Experience

**The Boring Company** *July 2021 – Present*

***Electrical Engineer*** *Austin, TX*

- One of three Electrical Engineers responsible for all aspects of the Tunnel Boring Machines in Texas
- Lead electrical engineer and system architect for the second-generation Liner Truck, a battery powered mining vehicle designed to carry 40,000lbs of tunnel segments to the tunnel heading. Vastly improved system reliability, and scalability by migrating the system to a modular and robust hardware architecture from the first generation vehicle. Responsible for every aspect of the electrical system: Design, Integration, Bring-up, Troubleshooting, Maintenance
- Lead engineer for a wireless cutting tool ware detector system. The project wirelessly transmits tool measurements periodically through water and earth in the cutterhead chamber. Prototyping, integration, assembly, and bring-up of every aspect of this project. Prototyped with Python scripts running on off-the-shelf feather microcontrollers on custom hardware
- Electrical design and integration of the Prufrock 2 and Prufrock 3 Tunnel Boring Machines. Designed electrical panels, managed system bring-up and troubleshooting, preliminary PLC programming

**Intel Corporation** *May 2019 – August 2020*

***Graphics Platform Architect and PCB Designer (Internship)*** *Toronto, ON*

- Lead architecture and design for a high-speed silicon validation platform to be scaled across Intel validation teams
- Designed and laid-out prototype PCBs to aid platform bring-up and validation efficiency in a laboratory setting
- Incorporated CPLD devices for system housekeeping tasks resulting in PCB layout area and cost reduction by 40%
- Spearheaded new CAD processes, workflows, and tools to increase team design efficiency with large projects
- Managed Intel's relationship with third-party vendors for specific platform subsystems and exploratory projects

## Education

**University of Western Ontario** *London, ON*

*Bachelor of Engineering Science, Mechatronics, Dean's Honour List, 3.8GPA, Graduated with Distinction*

## Extracurricular Experience

**Western Formula Racing, Formula-SAE** *September 2017 - Present*

***Electrical Director 2021***

- One of three team leaders responsible for 50+ team members and 10 subsection leads who design, build, and race a 504-volt, $160,000 electric vehicle at international SAE competitions
- Lead vehicle propulsion system design from the ground up. Increased the system efficiency by 30% with accumulator cell arrangement optimizations, and integrating an all-new motor controller
- Designed a bespoke Battery Management System with hardware and control algorithms to manage 720 Lithium-ion battery cells arranged in a 6P120S configuration
- Managed cross-functional meetings and workgroups for team members. Mentored junior team members
- Four years of electronics design, system integration, and rapid troubleshooting experience

***Energy Accumulator Lead 2020***

- Lead electrical system design and assembly for a 400-volt energy accumulator. Incorporated all discrete control components onto a modular PCB assembly, resulting in stellar accumulator reliability and serviceability allowing the vehicle to complete the season with no serious faults
- Assembled and tuned a Cascadia PM100DXR inverter and an Emrax 228MV motor used in the propulsion system
- Designed a 400V to 12V DCDC converter board based on Vicor DCM modules to power low-voltage systems
- Acted as the Certified High Voltage Electrical Safety Officer for the $150,000 vehicle and 55+ member team
- Lead low-voltage harness design and assembly utilizing a bespoke Power Distribution Module with telemetry, an Android-based dashboard display with OBDII, and a Motec M150 engine controller and DAQ

## Engineering Projects

**Linear Projectile Accelerator** | *FPGA, MOSFETs, hand-made electronics*

- Designed and manufactured a four-stage linear accelerator based on magnetic coils controlled by an FPGA
- For more information, please visit my YouTube video

## Technical Skills and Interests

**Design Tools**: OrCAD / Allegro, Eagle PCB, MATLAB, Excel, LTSpice, Python, C++, Solidworks
**Prototyping**: Oscilloscope, Spectrum Analyzer, SMD Soldering, Arduino, CANBUS, High-voltage wiring, 3D Printing
**Interests**: Alpine Skiing, Rock Climbing, Backpacking, Motorcycles