LANDON BAKKEN

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Education

University of Wisconsin Madison   **Sept 2024 – Present**
Bachelor's in Computer Engineering, expected July 2028   *Madison, Wisconsin*

Madison Area Technical College   **Sept 2022 – Jul 2023**
College-level coursework completed while in high school   *Madison, Wisconsin*

Experience

UW Wisconsin-Madison Formula SAE   **Sept 2024 – Present**
Control subteam member   *Madison, WI*

Combustion Car

- Used Python to process dyno data and tune engine cylinder phi (air to fuel ratio), resulting in a 13.2% power increase
- Built a dyno-based torque model in Python using linear regression to derive spark delay from the current RPM, throttle position, and desired torque reduction. This allows for precise and immediate torque cuts for traction control, faster and more accurate pneumatic shifting, and a more responsive throttle
- Developed a driver-focused steering wheel with shift lights, a distraction-free display, and a lap timer with real-time estimated lap times and splits
- Created validation plots in Python, such as BSFC comparisons and oiling system performance during high-G cornering to prove changes had a positive effect
- Created virual track to allow for driver training to take place without the need for a physical car

Electric Car

- Developed and refactored custom simulink code for the ECU
- Created system to import data from testing to debug, tune, and develop systems without the need for a physical car, allowing for faster development and testing of control systems and safety features
- Added safety features such as a shutdown circuit, dyno mode, and accumulator relay
- Developed flexable torque control system that combines, driver input, control, and safety systems
- Implemented and tuned traction control with load transfer based feedforward and a slip error based feedback PI controller
- Helped create driver focused torque vectoring with speed and steering angle inputs that is well integrated with traction control by enforcing torque split
- Managed multi-bus CAN communication by forwarding signals and optimizing the database by reducing message count and increasing density, along with creating python scripts to automate updating DBCs for multiple systems
- Added indication for the driver based on charge left and distance left on steering wheel to reduce distractions

UW Makerspace   **Sept 2024 – Present**
Technical Staff   *Madison, WI*

- Assist students with operating tools and equipment at the UW Madison Makerspace
- Tools include 3D printers, laser cutters, soldering equipment, textile tools, waterjet for metal, CNC for wood, other woodworking tools, and other general use items
- Trained students on how to safely use composits room for carbon fiber work

Personal Projects

Machine Learning | *Neural Networks, Gradient Descent, Python*   **Dec 2024 – Jan 2025**

- Built a machine learning model and training system from scratch using gradient descent in Python, relying only on NumPy for optimization and GUI libraries for interface

Multiplayer Networking | *Networking, C#, Unity, Documentation*   **Nov 2023 – Dec 2024**

- Developed a low-latency, peer-to-peer multiplayer system for Unity using UDP, TCP, and HTTP protocols, with comprehensive documentation for users without networking experience

3D Engine on a Calculator | *Low-level programming, Extreme Optimization*   **Oct 2021 – May 2023**

- Created a 3D game engine on a TI-84+ CE using raycasting, the rendering technique used in early DOOM games

Technical Skills

Computer Languages: Simulink, Python, C#, Java, Javascript, C++, Verilog, CSS/HTML
Manufacturing: SLA, FDM, Laser cutting, Soldering
Development Tools: Git, VS Code, Kvaser, Unity
3D Design: Blender, Fusion, Solidworks
Concepts: Traction systems, PID controllers, CAN protocol