

Emil Andre Beauseigneur

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Profile

Electronic Engineering graduate with a BEng (Hons) in Electronic Engineering, specialising in Embedded Systems Design, and a BSc in Applied Physics and Instrumentation. I have practical experience with embedded systems, automation, instrumentation, sensor integration and system testing through engineering internships and project work.

My experience includes a LiDAR based truck positioning prototype for Liebherr crane, robotic telescope automation at Blackrock Castle Observatory, and an underwater optical wireless communication project. These gave me hands on experience across hardware and software debugging, data analysis and real world validation.

I am interested in system design, mechatronics, robotics, automation and embedded systems. I enjoy complex problem solving, and I am looking for engineering opportunities where I can keep learning and contribute to real technical work.

Projects

Underwater Optical Wireless Communication

2025 – 2026

- Designed and built a visible light underwater communication prototype using LEDs, a photodiode receiver, TIA stage, comparator thresholding and UART data transfer.
- Demonstrated digital data transmission through water at 1200 baud over a range of more than 1 m, with further testing at higher baud rates to investigate timing limits and signal distortion.
- Developed C firmware for transmitter and receiver testing, including UART message framing, timing control and adjustable comparator thresholding using a PSoC IDAC reference.
- Used oscilloscope measurements and serial logging to debug signal integrity, receiver noise, alignment sensitivity, comparator triggering and data rate limits.
- Created Python models using Beer Lambert attenuation to compare wavelength performance, estimate receiver voltage and visualise how internal reflections could affect bit rate performance.

LiDAR Truck Positioning System

2025

- Contributed software, testing and validation work to a LiDAR based truck positioning prototype as part of an IMaR and Liebherr research project.
- Led Python data processing tasks for live TCP LiDAR data, including truck position, trailer alignment, cabin location and load state detection.
- Implemented filtering, validation logic and noise rejection to improve measurement stability during static and dynamic scale model testing.
- Built dashboard visualisations and CSV logging tools to support repeatable testing, engineering review and prototype validation.
- Validated the prototype using scale truck models and dynamic testing, achieving approximately ± 2 cm alignment accuracy.

Robotic Telescope Automation

2025

- Supported automation of a robotic 0.3 m telescope platform, including mount control, dome control, camera operation, sensors and weather based safety behaviour.
- Aligned and configured a Losmandy G11 mount and connected supporting observatory hardware for automated operation.
- Scripted ASCOM based control using Python and JavaScript to coordinate dome, mount and camera behaviour.
- Integrated live weather station data into a safety loop to support automatic dome opening, shutdown and equipment protection.
- Completed a technical literature review that contributed to the observatory's future telescope control and automation roadmap.

Education

Atlantic Technological University

BEng (Hons) in Electronic Engineering, (Embedded Systems Design)

2025 – 2026

Donegal, Ireland

Munster Technological University

BSc in Applied Physics & Instrumentation, (Automation and Control)

2021 – 2025

Cork, Ireland

Experience

IMaR Research Centre / Liebherr Container Cranes

Embedded Software Engineer Intern

May 2025 – Aug. 2025

Kerry, Ireland

Completed a 4 month internship with IMaR and Liebherr engineers on an industrial LiDAR positioning prototype for ship to shore crane loading applications. Contributed to Python software development, live TCP LiDAR data processing, sensor testing, scale model trials and validation work. Supported engineering reviews by presenting prototype progress, test results, measurement issues and design updates during weekly meetings.

Blackrock Castle Observatory

Embedded Systems Intern

Apr. 2025 – May 2025

Cork, Ireland

Completed a 2 month internship supporting hardware, sensor and software integration for a robotic telescope automation platform. Wired sensors, set up equipment, developed Python and JavaScript control scripts, and tested weather based safety behaviour for automated observatory operation. Produced a technical literature review to support future telescope control and automation decisions.

Kerry County Council

Beach Lifeguard

May 2022 – Sept. 2024

Kerry, Ireland

Worked across 3 summer seasons in a safety critical public role on a busy beach. Developed strong communication, teamwork, responsibility and decision making skills through public safety work, first aid, sea rescue support and daily beach supervision.

Technical Skills

Embedded & Firmware

Bare metal programming, Microcontrollers, ARM Cortex-M, PSoC, Arduino, RTOS, UART, SPI, I2C, CAN bus, GPIO, ADC, Comparators, PWM, Interrupts, Timers, VHDL, FPGA, Firmware debugging.

Automation & Control

PLC programming, Ladder logic, DeltaV, Siemens TIA Portal, SCADA, HMI, Process control, PID control, Safety logic, Automated test systems, Python test automation, I/O lists, P&ID interpretation, Electrical drawings, Fieldbus, Profibus, HART protocols.

Mechatronics & Robotics

Sensor integration, Motion systems, System design, LiDAR positioning, Actuator control, CAD, System integration, Real time sensing, Hardware and software interaction, Project realisation.

Analogue & Instrumentation

Photodiodes, TIA circuits, LED drivers, Signal conditioning, Sensor interfacing, ADC measurements, Calibration, Noise awareness, Analogue and digital interfacing, PCB schematic reading, PCB design.

Test & Validation

Oscilloscopes, Multimeters, Logic analysers, Function generators, Bench testing, Hardware bring up, Repeatability testing, System validation, Data logging, Signal verification, Troubleshooting, Technical documentation.

Software & Tools

Python, C, JavaScript, LaTeX, TCP/IP data handling, CoppeliaSim, Serial communication, NumPy, Matplotlib, Git, GitHub, Linux, KiCad, LTspice, PSoC Creator, Tera Term, SolidWorks, ASCOM, MATLAB, PyTorch.

Certifications, Training & Awards

- **Harvard CS50** – Introduction to Computer Science, 2025
- **EDUCBA** – Embedded Systems using C, 2025
- **Northwestern University** – Foundations of Robot Motion, 2025
- **Beach Lifeguard Qualification** – RNLI CPR/Defib, 2021 – Present
- **Surf Instructor** – Ballybunion Surf School, 2019 – 2022
- **Solas Safe Pass** – Construction safety, 2019
- **Full EU Driver Licence**
- **Munster Rugby UCC College Senior Team**, 2023 – 2025
- **Listowel RFC Senior Player of the Year**, 2023
- **Tae Kwon Do Black Belt**
- **Tae Kwon Do Student of the Year**, 2018 & 2021
- **Irish Water Safety Certificates**, 2011 – 2018
- **Water Sports Instruction** – surfing, sailing, windsurfing and kayaking
- **Team sports, coaching and public safety experience**