EXPERIENCE

Perciv AI Perception Software Engineer Delft, NL

Aug 2025 - Present

- Lead the C++ design and implementation of an automatic, multi-sensor calibration system
- Derive and implement the core optimization backend using Factor Graphs (GTSAM)
- Fuse data from LiDARs, RGB/Thermal cameras, Radars, IMUs, and GNSS

Nuwa Pen 🖸 🔗

Groningen, NL

Nov 2023 – Jun 2025

Sensor Fusion Engineer

• Designed real-time sensor fusion pipeline to estimate pen motion from IMU, 3 cameras, and force sensor

- Derived and implemented nonlinear Kalman filters (EKF/UKF), improving orientation accuracy 3x and reducing velocity error 4x
- Developed offline and online algorithms for IMU calibration, reducing inclination error by over 2x and heading error by **over 3x**
- Built tool to collect, annotate, and calibrate camera intrinsics/extrinsics, reducing reprojection error over 7x (implemented overnight)

Software Engineer

Mar 2022 - Nov 2023

- Designed and implemented the firmware architecture for a Cortex-M4-based embedded system
- Developed camera and IMU drivers (SPI/I²C) for real-time sensor data streaming
- Integrated and programmed FPGA in Verilog, achieving a 15x increase in image capture rate

EDUCATION

University of Groningen – AI/CS Exchange Program

Feb 2022 - Feb 2023

Exchange Scholarship Recipient

Groningen, NL

University of São Paulo – BSc in Computer Science

Feb 2019 - Feb 2024

Specialization in Robotics. GPA 3.8/4.0. Awarded Academic Excellence (Top 3%)

São Carlos, BR

Projects

ImPlot – Lead Maintainer 😯

The most popular 2D plotting library for Dear ImGui (★5K+ GitHub stars)

- Manage community contributions, issues, and release cycles for a widely-used C++ library
- Lead development of new features and **performance optimizations**

ImPlot3D – Interactive 3D Plotting (7)

A high-performance C++/Python 3D plotting library for visualizing 3D data interactively ($\bigstar 1K+$ GitHub stars)

- Real-time GPU-accelerated rendering of 3D lines, surfaces, meshes, and point clouds
- Intuitive controls for camera rotation, pan, zoom, and interactive legends
- Live WebGL demo: §

Atta – Multi-Robot Simulator &

A fast and modular C++ simulator for large-scale multi-robot systems (40k+ LOC)

- Built cross-platform simulation engine with modular physics, rendering, and sensor stacks
- Enabled real-time GPU/CPU simulation with dynamic switching and CUDA acceleration
- Designed custom scripting engine with hot-reload and shared library support
- Developed high-fidelity sensor simulation and physically based rendering for realistic environments
- Added web support via Emscripten; see live demos at §

PATENTS

Handwriting detecting pen (WO2024072219A1)

Mar 2023 **§**

A ballpoint pen equipped with a wide-angle camera system and IMU to capture handwriting in real time and transmit it digitally; patented as part of the Nuwa Pen product.

Publications

B.C. Queiroz, D. MacRae, "Occlusion-based object transportation around obstacles with a swarm of miniature robots," Swarm Intelligence, 2024. •

B.C. Queiroz, F. Ferreira, "Soccer Robots Modeling Project Based on RoboCupJunior: Simulation Environment for Physical Robot Improvement," RoboCup 2021: Robot World Cup XXIV, 2022. &

TECHNICAL SKILLS

Programming: C/C++, Python, CMake, Verilog, GLSL, CUDA, TypeScript, JavaScript, SQL

Robotics: Kalman Filter, EKF/UKF, Factor Graphs, Visual Odometry, SLAM, Nonlinear Optimization, Sensor Fusion, Monte Carlo Simulation, ROS

Embedded Systems: Embedded C++, STM32, ESP32, FPGA, SPI/I²C, UART, USB, BLE, RTOS, J-Link Hardware & Prototyping: PCB Design (Altium Designer, KiCad), CAD (SolidWorks, FreeCAD), Oscilloscope, Logic Analyzer, OptiTrack, Soldering, 3D Printing

Tools & Frameworks: Git, GitHub Actions, GDB, Docker, Wireshark, RenderDoc, Blender, ImGui