Alexander **Millane**

Senior Robotics Engineer

NVIDIA Zürich, Europaallee 39, 8004 Zürich, Switzerland

(+41) 788738230 | alex.millane@gmail.com | https://alexmillane.github.io/ | alexmillane

Summary

Hey, I'm Alex. I work at NVIDIA on real-time 3D reconstruction and deep-learning-based robotic manipulation systems. I finished my Ph.D. in the Autonomous Systems Lab at ETH Zürich, where I worked on 3D mapping for rotary-wing UAVs. I love working with passionate people on hard problems that lie in the intersection of mathematics, software, and physical systems.

Education

ETH Zürich - Ph.D

Zurich, Switzerland

Dissertation: Scalable Dense Mapping Using Signed Distance Function Submaps. *2016 - 2021*

- My Ph.D. focused on 3D map-building and localization for rotary-wing UAVs.
- Research on representations for mapping large-scale environments on computationally constrained platforms.
- I spent the final part of my Ph.D. as a visiting scientist in the Microsoft Mixed Reality & AI Zurich Lab.

ETH Zürich - Master in Robotics, Systems and Control

Zurich, Switzerland

Dissertation: State Estimation for a Tethered Aircraft. GPA: 5.55/6.0. *2012 - 2015*

- Sensor fusion for estimating the pose of a tethered, power-generating aircraft.

University of Canterbury

Christchurch, New Zealand

B.S in Mechatronics (with Honors), GPA: 8.5/9.0. *2007–2010*

Work Experience

NVIDIA

Zürich, Switzerland

Senior Robotics Engineer *2021-present*

- Research on **deep learned** end-to-end learned manipulation policies for humanoid robots.
- Developed *nvblox*, a **GPU-accelerated 3D reconstruction framework** from scratch in a small team.
- **High performance GPU programming** for a mixed CPU/GPU algorithms.
- Integrated the core reconstruction library into three robotics projects, a **vision-based navigation** system for ground robots, a **robot manipulation** framework, and into **PyTorch for machine learning**. Check out our video
- Released part of our code open source (homepage, nvblox and nvblox_ros)
- Several well-known robotics companies use *nvblox*.

Sauber Motorsport AG.

Hinwil, Switzerland

Research and Development Intern *2013*

- An eight-month internship as a member of the estimation team for Sauber's 2014 Formula 1 race car.
- Creation of a **simulation model** of an electro-hydraulic brake-by-wire system. Model-based **controller design**.
- Implementation of real-time, safety and performance-critical **control code** which was **deployed to a Formula 1 car** during the 2014 season.

Infact Limited, Engineering Design Consultancy

Christchurch, New Zealand

Research and Development Engineer *2010-2012*

- Development of an acoustic wood testing tool and integration into a hydraulic, heavy vehicle.
- **Digital electronics** design, **embedded software** development, **signal processing** and extensive prototyping and testing.
- Running **operational trials** at forestry sites located in New Zealand, Australia and the United States.

Research Projects

Mixed Reality & AI Lab Zurich

Zürich, Switzerland

Visiting Researcher *2020*

- 6 month visiting researcher position.
- Research on **geometry-based global localization** in distance-function-based maps.
- Led to a Robotics and Automation Letters submission. Check out our video.

Autonomous Fire-Fighting at MBZIRC *Zürich, Switzerland, Abu Dhabi, UAE*

Sub-Team Lead *2019 - 2020*

- Designed a system for autonomously finding fires in multi-story buildings as part of the MBZIRC 2020 international robotics competition.
- The mission is completed by a **collaborating robotic team**, consisting of a hexacopter and a tricopter. The approach exploits the **mapping** and **precise control** capabilities of each of the vehicles respectively.
- **Led a team** of masters students to design the hardware-software system.
- Check out our video_1 video_2.

Selected Publications

A full list of publications may be found my google scholar page or is available upon request.

Deep-Learning For Robotics

2025 **Alexander Millane***, Remo Steiner*, David Tingdahl*, Clemens Volk*, Vikram Ramasamy*, Xinjie Yao*, Peter Du, Peter Du, and Soha Pouya. **mindmap: Spatial Memory in Deep Feature Maps for 3D Action Policies**. CoRL 2025 Workshop: RemembeRL: What can past experience tell us about our current action? paper. *code coming soon*.

Localization

2020 **Alexander Millane**, Helen Oleynikova, Christian Lanegger, Jeff Delmerico, Juan Nieto, Roland Siegwart, Marc Pollefeys, and César Cadena. **Freetures: Localization in Signed Distance Function Maps**. IEEE Robotics and Automation Letters, 2020. paper. video.

2019 **Alexander Millane**, Helen Oleynikova, Juan Nieto, Roland Siegwart, and César Cadena. **Free-Space Features: Global Localization in 2D Laser SLAM Using Distance Function Maps**. International Conference on Intelligent Robots and Systems (IROS), 2019. paper.

Dense Mapping

2023 **Alexander Millane***, Helen Oleynikova*, Emilie Wirbel, Remo Steiner, Vikram Ramasamy, David Tingdahl, Roland Siegwart, **nvblox: GPU-Accelerated Incremental Signed Distance Field Mapping**. arxiv preprint, 2023. paper. video. code (ros). code (lib).

2019 **Alexander Millane***, Victor Reijgwart*, Helen Oleynikova, Roland Siegwart, Cesar Cadena, and Juan Nieto, **Voxgraph: Globally Consistent, Volumetric Mapping using Signed Distance Function Submaps**. IEEE Robotics and Automation Letters, 2019. paper. video. code.

Honors & Awards

2014 **European semi-finalists**, OneStart Startup Competition. *London, UK*

2014 **Impact Hub Prize**, Hack Zurich. *Zürich, Switzerland*

2010 **First in class placing**, Bachelor of Engineering in Mechatronics. *Christchurch, NZ*

2008 **CS McCully Scholarship**, Performance in first year Bachelor of Engineering. *Christchurch, NZ*

2008 **Madam Tiong Guok Hua Prize**, Highest GPA first year of Bachelor of Engineering. *Christchurch, NZ*

2006 **NCEA Physics Scholarship**, Final high-school exams. *Christchurch, NZ*

Skills

Programming C++, CUDA, Python, Pytorch, Matlab/Simulink

Tooling Git, Linux, CI/CD, Robot Operating System (ROS), ARM, CMake, Bazel.

Electronics Electronic Prototyping. PCB design and manufacture. Altium Designer.

Mechanical Mechanical Prototyping. 3D Printing. CAD.

Languages English (native). German (Intermediate/B1).

Leadership & Teaching

Supervisor **18** Masters projects/theses, **6** Bachelor theses.

Teaching Assistant **2 ETH Master's courses:** Perception and Learning for Robotics, and Autonomous Mobile robotics.

Reviewer Various **journals/conferences**, including IROS, ICRA and RAL. **Finalist for Best Review Award** of MFI 2020. **Outstanding Reviewer Award** IROS 2021.