Noah Z Rothenberger

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Citizenship: Swiss & US

Currently located in New York City

Date of Birth: November 26 1997

SUMMARY

ETH Zurich graduate with 3+ years of experience as a Robotics Engineer at NASA JPL, specializing in the intersection of computer vision, remote sensing, and robotics. Passionate about research and driven to further develop expertise in this area through pursuing a PhD.

WORK EXPERIENCE

04/2022 - Present

NASA Jet Propulsion Laboratory

Senior Robotics Engineer

• Computer Vision & Mapping Researcher: Developing advanced algorithms to enhance the robustness of vision-based applications for planetary exploration, addressing challenges such as large illumination variances caused by sun position, terrain morphology, and lack of atmospheric scattering; Working on improving landing vision systems & hazard avoidance map generation;
• Mars Rover Robotic Operator: Responsible for commanding the Perseverance rover to collect and store rock and soil samples for future return to Earth.
• Mars Ingenuity Helicopter Operator: Performed tactical & strategic Mars helicopter operations which involved sequencing Ingenuity's activities, coordinating strategic goals with the broader Mars 2020 team & performing system health assessments. Led the planning & execution of a majority of the record-setting first-ever helicopter flights on Mars.

09/2019 - 09/2020

NASA Jet Propulsion Laboratory

Intern / Visiting Student Researcher

• Supported ground simulation of the Mars 2020 rover autonomy, informing autonomous navigation planning using image & terrain analysis tools. Created a framework for generating synthetic terrains with realistic features from orbital imagery for Monte Carlo testing of the rover surface mobility software. Developed & implemented a rock detection algorithm for Mars rover traverse analysis, which was adopted by the wider NASA community and used for future strategic path planning.

08/2017 - 02/2018

"Introduction to Coding for Kids" Programming Course Zurich Fluntern

Founder & Tutor

• Initiated and ran a programming workshop for children aged 10-14; Introduced basic programming skills and built different robot toys

EDUCATION

09/2020 - 02/2022

ETH Zurich

MSc. Mechanical Engineering

• Focus: Robotics, Systems, and Control
• Master Thesis: "Bringing Multi-View Photometric Stereo and Mobile Robotics Together" at ETH's Computer Vision Lab (CVL); Designed a novel mobile robotics system & algorithm for the 3D reconstruction of texture-less smooth surfaces of unknown generic reflectance; Awarded 5.75/6.0

09/2016 - 09/2019

ETH Zurich

BSc. Mechanical Engineering

• Focus: Mechatronics (Robotics and Control)
• Bachelor Thesis: "Embolization of Wide-Necked Unruptured Intracranial Aneurysms Using Iron Emboli" at ETH's Multi-Scale Robotics Lab; Developed a high-fidelity 3D model of brain arteries from medical imaging data and performed the initial experimental trials, which entailed remotely navigating untethered iron emboli through the physical model of brain arteries via an external magnetic field; Awarded with the highest possible grade 6.0/6.0

08/2012 - 07/2016

Kantonsschule Stadelhofen

High School

• Major in modern languages (Italian & French) with bilingual Matura in English; Final project: Wrote a mathematics book for high school students

SKILLS AND INTERESTS

Languages

Swiss German / German (mother tongue)
Englisch (proficient)
Italian (good/basic)
French (good/basic)

Computer Skills

Python, Matlab, FPrime, C++, Linux, Command Line Tools, Version Control, PyTorch, Pix4D, QGis, Blender, Open3D

Hobbies and Interests

Running, Skiing, Playing Violin, Classical Music, Travel, Design, Architecture, Knitting (Handcrafts)

PUBLICATIONS AND PATENTS

J. L. Anderson et al., "Lessons From Ingenuity's Climb Up Jezero Crater Delta", 2024 IEEE Aerospace Conference. DOI: 10.1109/AERO58975.2024.10521181.
Paper under review - N. Rothenberger et al., "Illumination Invariant Image Matching for Lunar TRN"
Paper under review - V. Vandi et al., "Robotic Operations During Perseverance's First Extended Mission"
Pending Patent – "Lighting Invariant Matching Algorithm (LIMA)" JPL & NASA Case No: NPO 52982-CP

AWARDS

JPL Award 2024: For exceptional implementation of the Ingenuity Mars Helicopter campaign, commanding 72 flights through the skies of Mars.
National Aviation Hall of Fame – Milton Caniff Spirit of Flight Award (Washington D.C. September 2023)
Total of 3 NASA Honors Awards 2023 Team Awards: (1) Mars 2020 Robotic Operations Team: For the development and delivery of the Mars 2020 robotic operations processes, culminating in successful commissioning and record setting robotic surface operations. (2) Mars 2020 Sampling and Caching Team: For exceptional group performance in collecting and sealing 23 scientifically valuable Martian samples and creating the first Sample Depot cache on another planet. (3) Ingenuity Robotic Operations Uplink Team: For outstanding group achievement for coordinated Ingenuity Helicopter and Perseverance Rover operations, maintaining efficiency despite low-power winter conditions.
National Aeronautic Association (NAA) Robert J Collier Trophy: The greatest achievement in aeronautics or astronautics in America, with respect to improving performance, efficiency, and safety of air or space vehicles.

ACADEMIC REFERENCES

● Prof. Dr. Bradley Nelson	**Title:** Professor and Head of Robotics and Intelligent Systems, ETH Zurich. **Relationship:** Master's studies advisor and Bachelor's thesis supervisor. Has continued to act as a professional advisor post-graduation. **Contact Information:** bnelson@ethz.ch
● Dr. Simone Gervasoni	**Title**: R&D Lead at MagnebotiX, former Researcher at ETH Zurich, Multi-Scale Robotics Lab. **Relationship**: Bachelor's studies and thesis advisor. Has continued to act as a professional advisor and mentor post-graduation. **Contact Information**: gesimone@ethz.ch
● Prof. Dr. Suryansh Kumar	**Title**: Assistan Professor of Visual Computing and Computational Media at Texas A&M University College Station. **Relationship**: Master's thesis advisor and mentor. **Contact Information**: suryanshkumar@tamu.edu
● Dr. Felix Seidel	**Title**: NASA JPL Manager of the Science Research & Concept Development Office and ETH Alumnus. **Relationship**: Colleague and mentor throughout my time at JPL. **Contact Information**: felix.seidel@jpl.nasa.gov
● Prof. Dr. Thomas Zurbuchen	**Title**: Professor at ETH and former Associate Administrator for the Science Mission Directorate at NASA. **Relationship**: Met through outreach events during my time at JPL and collaborated on a joint talk at the University of Colorado Boulder. **Contact Information**: thomas.zurbuchen@eaps.ethz.ch
● Prof. Dr. Gioele Zardini	**Title**: Assistant Professor at MIT, Laboratory for Information and Decision Systems, and ETH Alumnus. **Relationship**: Former Teaching Assistant during ETH Zurich Bachelor's studies and has continued to act as a professional contact. **Contact Information**: gzardini@mit.edu