



## Overview

- Computer scientist (with engineering background) seeking to enable scalable and robust multi-agent systems, for instance as self-driving cars in everyday traffic or robot fleets in automated warehouses.
- Full-stack roboticist mastering mechanical, electronic, algorithm, and control design with project experience in collective intelligence, inspection robotics, medical devices, and smart material systems.
- Innovative thinker well-versed in initializing and managing transdisciplinary research projects and collaborations.
- Efficient leader and communicator skilled at defining expectations, distributing workload, and coordinating diverse team members.

## Skills & Interests

- **Areas of Expertise:** artificial intelligence, robotics, systems engineering, software design, product development, project management
- **Programming:** Python, MATLAB, C/C++, HTML/CSS, Git, LaTeX
- **Fabrication:** Computer-Aided Design, PCB design, 3D printing, laser cutting, milling, molding and casting, soldering
- **Languages:** English (fluent), German (mother tongue), French (conversational), Spanish (basic)

## Education

### Harvard University, PhD and MS in Computer Science

Cambridge, USA

- Advisor: Prof. Radhika Nagpal
- Thesis: 3D Vision-Based Collective Behaviors in a Fish-Inspired Robot Swarm

exp Nov 2020

### ETH Zurich, MS in Mechanical Engineering

Zurich, CHE

- Advisor: Prof. Bradley Nelson
- Thesis: A Low-Cost, Highly Maneuverable, Miniature Underwater Robot Intended for Collective Behaviors

2016

### ETH Zurich, BS in Mechanical Engineering

Zurich, CHE

- Advisor: Prof. Roland Siegwart
- Thesis: Obstacle Climbing Control for an Inspection Robot with Magnetic Wheels

2013

## Work & Research

### Harvard University, Self-Organizing Systems Research Group

Cambridge, USA

Prof. Radhika Nagpal

2017 – present

- Designed and fabricated a miniature underwater robot with 3D fin-propelled locomotion and 3D visual perception suitable for collective behaviors
- Developed bio-inspired algorithms for 3D collective behaviors in simulation and with a physical robot swarm
- Contributed to the acquisition of a \$225k Amazon grant

### Harvard University, Microrobotics Laboratory

Cambridge, USA

Prof. Robert Wood

2017 – 2020

- Applied custom-made dielectric elastomer actuators (DEAs) in soft robotics
- Demonstrated an autonomous DEA-driven underwater robot and a bending beam DEA for multi-modal locomotion (crawling, hopping, jumping, rolling)

### Harvard University, Lauder Laboratory

Cambridge, USA

Prof. George Lauder

2018 – 2020

- Designed a biomimetic fish-like underwater robot suitable as an experimental platform for addressing open questions in aquatic locomotion
- Replicated three key characteristics of fish swimming: linear speed-frequency relationship, U-shaped cost of transport, reverse Kármán wakes
- Used the robot to validate a thrust enhancement hypothesis for energy savings in fish schooling
- Developed a novel schooling-inspired propulsor for energy efficient underwater vehicles

**Wyss Institute for Biologically Inspired Engineering, Self-Organizing Systems Research Group**  
 Prof. Radhika Nagpal  
 o Worked as a research fellow and led the conception of novel multi-agent robotics platform for the investigation of collective behaviors in 3D space

**Cambridge, USA**  
 2016 – 2017

**ETH Zurich, Multi-Scale Robotics Lab**  
 Prof. Bradley Nelson

**Zurich, CHE**  
 2014

- o Designed a miniscule force sensing catheter capable of measuring contact forces at its distal end during cardiac ablation
- o Demonstrated tissue sampling (texture and flexibility) for diagnostic purposes

**Bühler Group, Innovation Lab at R&D Food Processing**  
 Calvin Grieder, chairman and former CEO

**Bangalore, IND**  
 2013 – 2014

- o Managed a \$30k budget to conduct industrial research including the conception, design, and validation of food processing machines that are sold for profit
- o Designed the framework and motor suspension for a novel and now commercially available single screw extruder
- o Visited customers in Northern India to test prototypes for controlled and cost-effective oil spraying of pulses on site

**ETH Zurich, Autonomous Systems Lab**  
 Prof. Roland Siegwart

**Zurich, CHE**  
 2012 – 2013

- o Designed Ship Inspection Robot, a robust, cheap, and easy to operate inspection tool for the maritime transport sector intended to reduce costly inspection time in dry docks
- o Contributed to an innovative overlapping wheel configuration (patented!) for overcoming a broad variety of obstacles encountered in cargo ships including I-shaped stiffeners
- o Led the research team of 10 interdisciplinary undergraduate students, oversaw the \$15k budget, negotiated with manufacturers and suppliers, reported to investors and experts

## Leadership & Service

- o **Harvard University**, mentored and supervised several graduate and undergraduate students, taught and lectured in 2 AI/robotics classes (CS189 and CS289) 2018 – present
- o **reach.ch**, member of the reach-team for artificial intelligence, wrote an article on AI 2017 – 2018
- o **ETH Alumni New England Chapter**, board member, organized talks with ETH professors 2016 – present
- o **ETH Zurich**, coached 3 undergraduate engineering teams during their “Innovation Process” course, supported them in conceptualizing and realizing a mechatronic system with several sensors and actuators 2013
- o **Wiler Forum for Sustainability Issues (WIFONA)**, board member and vice president, organized forums with Swiss Federal Councilors for several hundred participants 2010 – 2016

## Selected Publications & Patents (2 of 7)

- o F. Berlinger, J. Dusek, M. Gauci, R. Nagpal, Robust maneuverability of a miniature, low-cost underwater robot using multiple fin actuation. *IEEE Robotics and Automation Letters* 3, 140-147 (2017).
- o F.C.J. Berlinger, C.M. Clausen, Y. Detrekoey, J. Eichenberger, M.A. Eppenberger, M.S. Fisler, A. Mueller, S.M. Schmid, W. Fischer, Carriage cart with obstacle overcoming. *General Electric Technology GmbH*, U.S. Patent Application 15/041,652 (2016).

## Selected Fellowships & Awards (4 of 11)

- o **Fellowship**, Swiss Study Foundation 2011 – present
- o **Best Paper Finalist**, International Conference on Robotics and Automation 2018
- o **Certificate of Distinction in Teaching**, Harvard University Bok Center 2018
- o **Best Innovator Award**, Bühler Group 2013