ETH zürich

Focus Specialisation in Mechatronics and Robotics

Prof. Marco Hutter
Robotic Systems Lab

Mechatronics

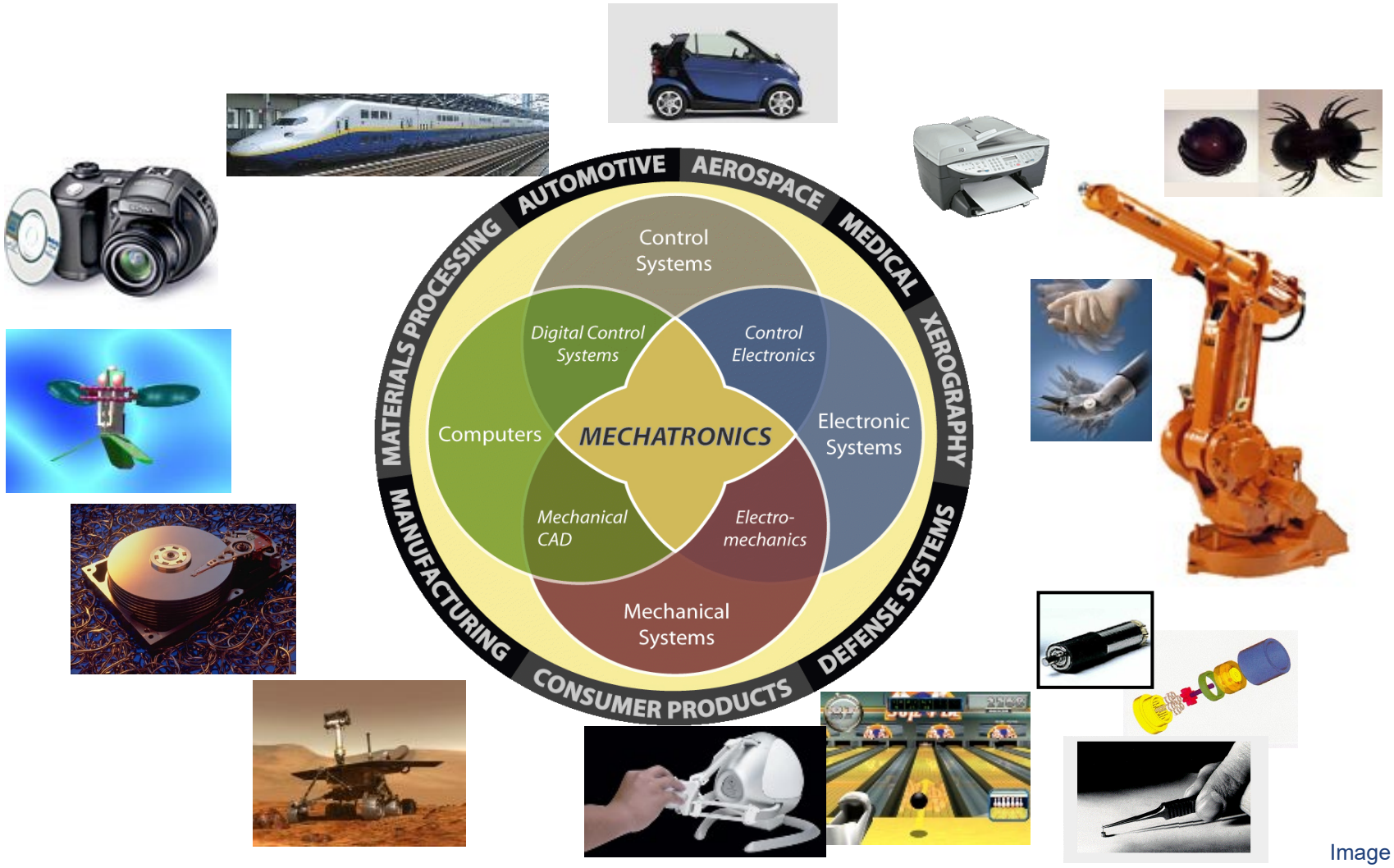
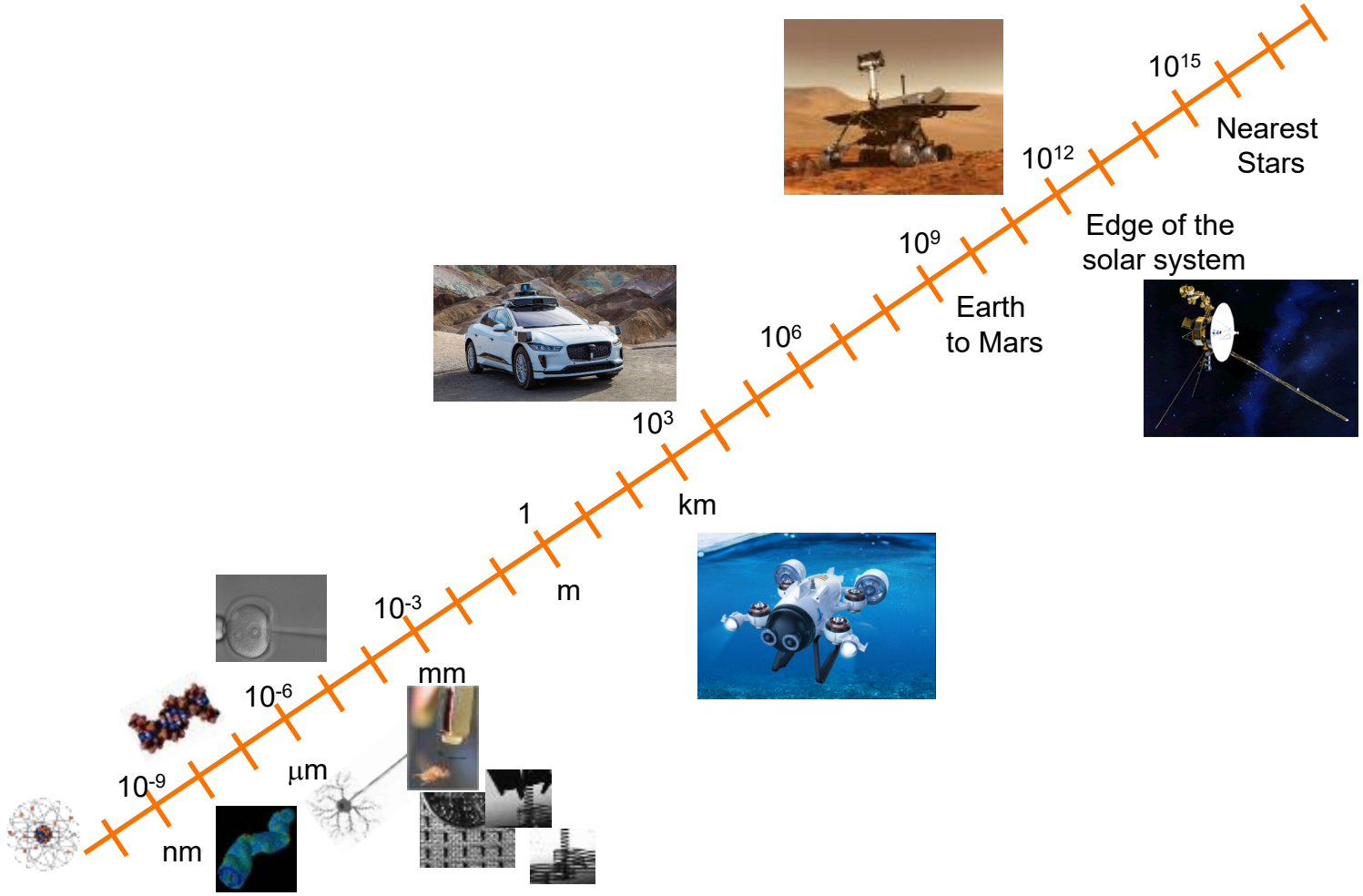


Image courtesy: Kevin C. Craig

The Scale of Robotics and Mechatronics



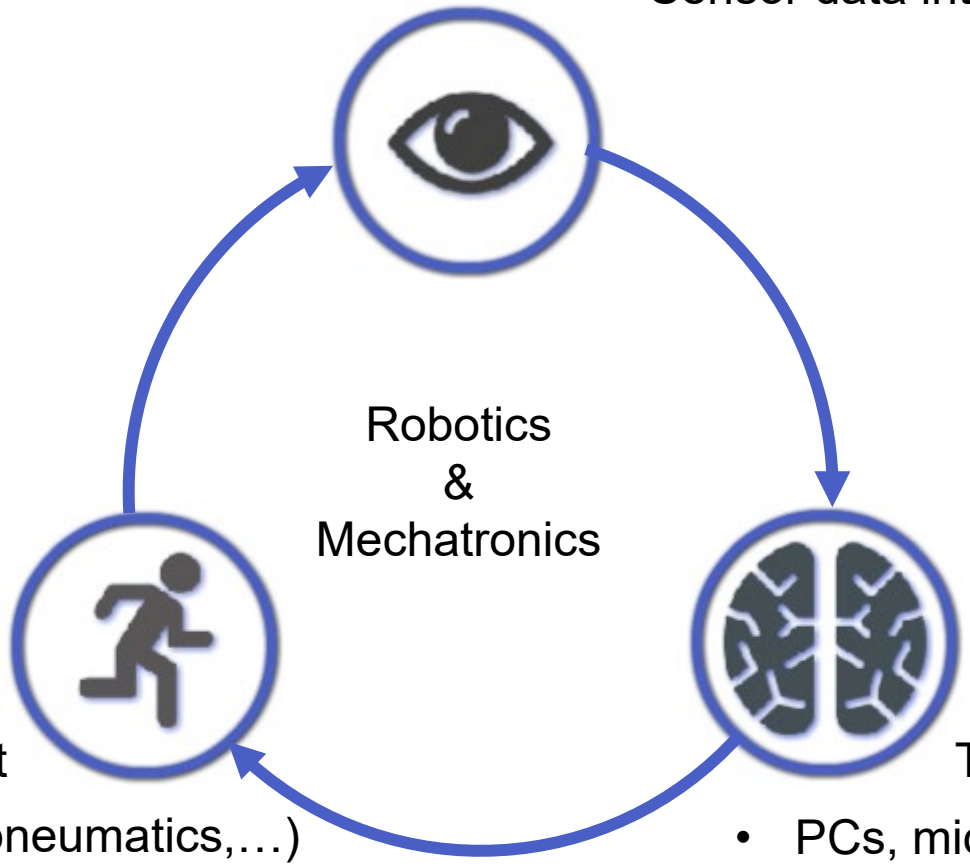
Swiss Automata

Pierre Jacquet-Droz (1721-1790), Musée d'Art et d'Histoire, Neuchâtel

Robotics Today

Sense – Think – Act
Software and Hardware

- Different sensor types (e.g. Cameras, IMU, …)
- Sensor data interpretation (e.g. Computer vision)



- Different actuators (DC motors, pneumatics,…)
- Control

- PCs, microcontrollers,…
- Planning and decision making
- Machine learning

Mechatronics & Robotics Focus Courses (20ECTS)

LE-Nummer	LE-Titel	KP HS	KP FS
151-0640-00L	Studies on Mechatronics	5	5
151-0509-00L	Acoustics in Fluid Media: From Robotics to Additive Manufacturing	4	
151-0575-01L	Signals and Systems	4	
151-0604-00L	Microrobotics	4	
151-0621-00L	Microsystems I: Process Technology and Integration	6	
151-0913-00L	Introduction to Photonics	4	
151-0941-00L	Molecular Health Sensors and Devices	4	
227-0113-00L	Leistungselektronik	6	
227-0124-00L	Embedded Systems	6	
227-0517-10L	Fundamentals of Electric Machines	6	
376-1504-00L	Physical Human Robot Interaction (pHRI)	4	
151-0851-00L	Robot Dynamics	4	
151-0206-00L	Energy Systems and Power Engineering		4
151-0540-00L	Experimental Mechanics		4
151-0630-00L	Nanorobotics		4
151-0641-00L	Introduction to Robotics and Mechatronics		4
151-0854-00L	Autonomous Mobile Robots		5
151-0952-00L	Nanophotonics: from Fundamentals to Applications		4
151-1224-00L	Ölhydraulik und Pneumatik		4
227-0518-10L	Design and Control of Electric Machines		6
252-0220-00L	Introduction to Machine Learning		8

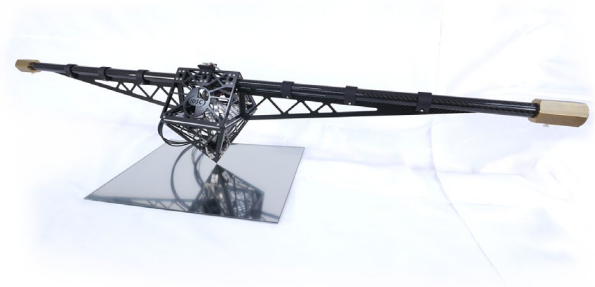
Lectures from
- D-MAVT
- D-ITET
- D-INFK
- D-HEST

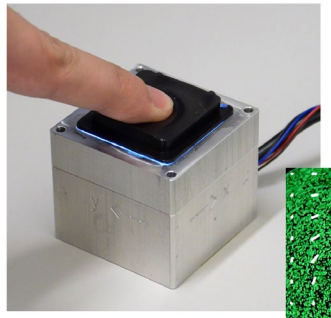
Robotics, Systems and Control | *world-leading faculty @ ETH*

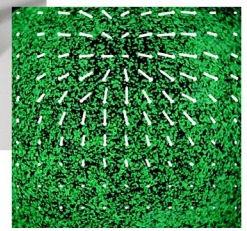
IDSC – Institute for Dynamic Systems and Control

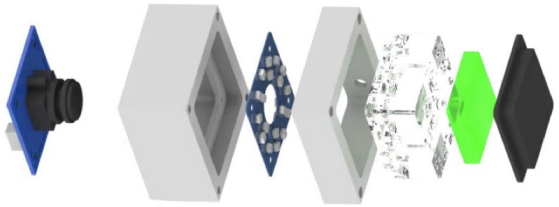
www.idsc.ethz.ch

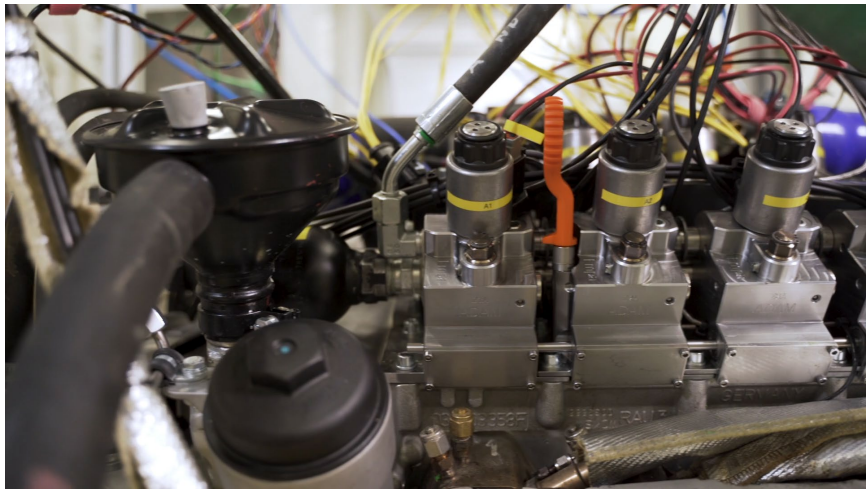
Christopher Onder Melanie Zeilinger Raffaello D'Andrea Emilio Frazzoli

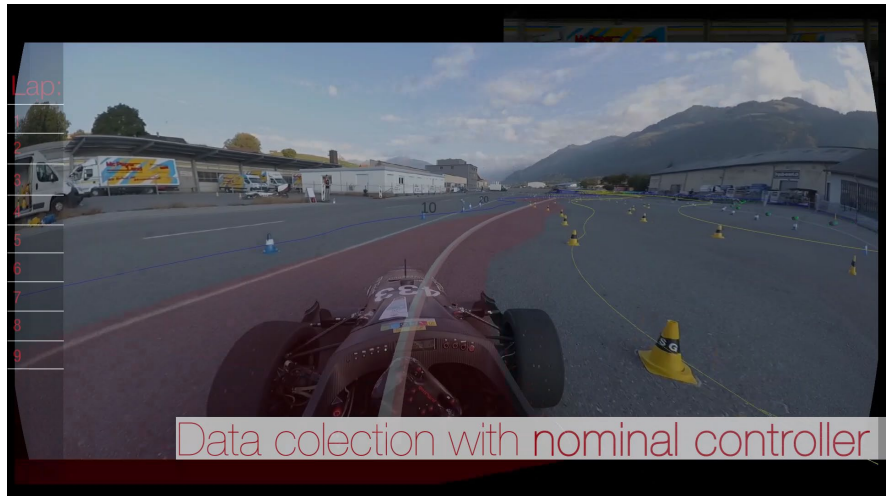










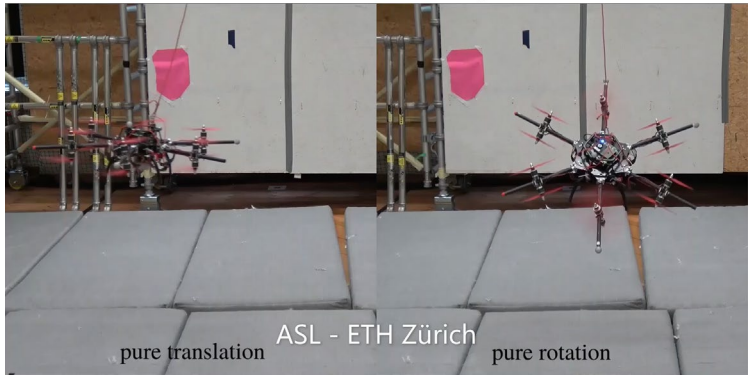


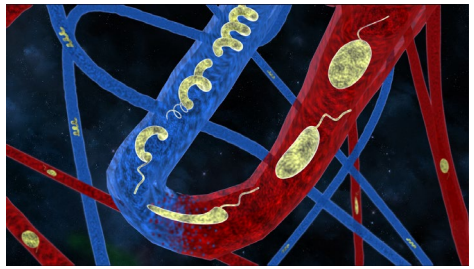
IRIS – Institute for Robotics and Intelligent Systems

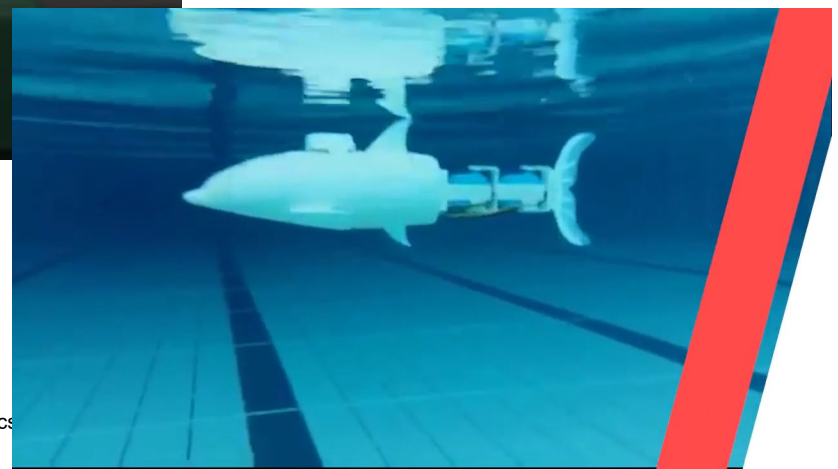
www.iris.ethz.ch

Salvador Pane | Daniel Ahmed | Roland Siegwart | Robert Katzschmann | Bradley Nelson | Marco Hutter

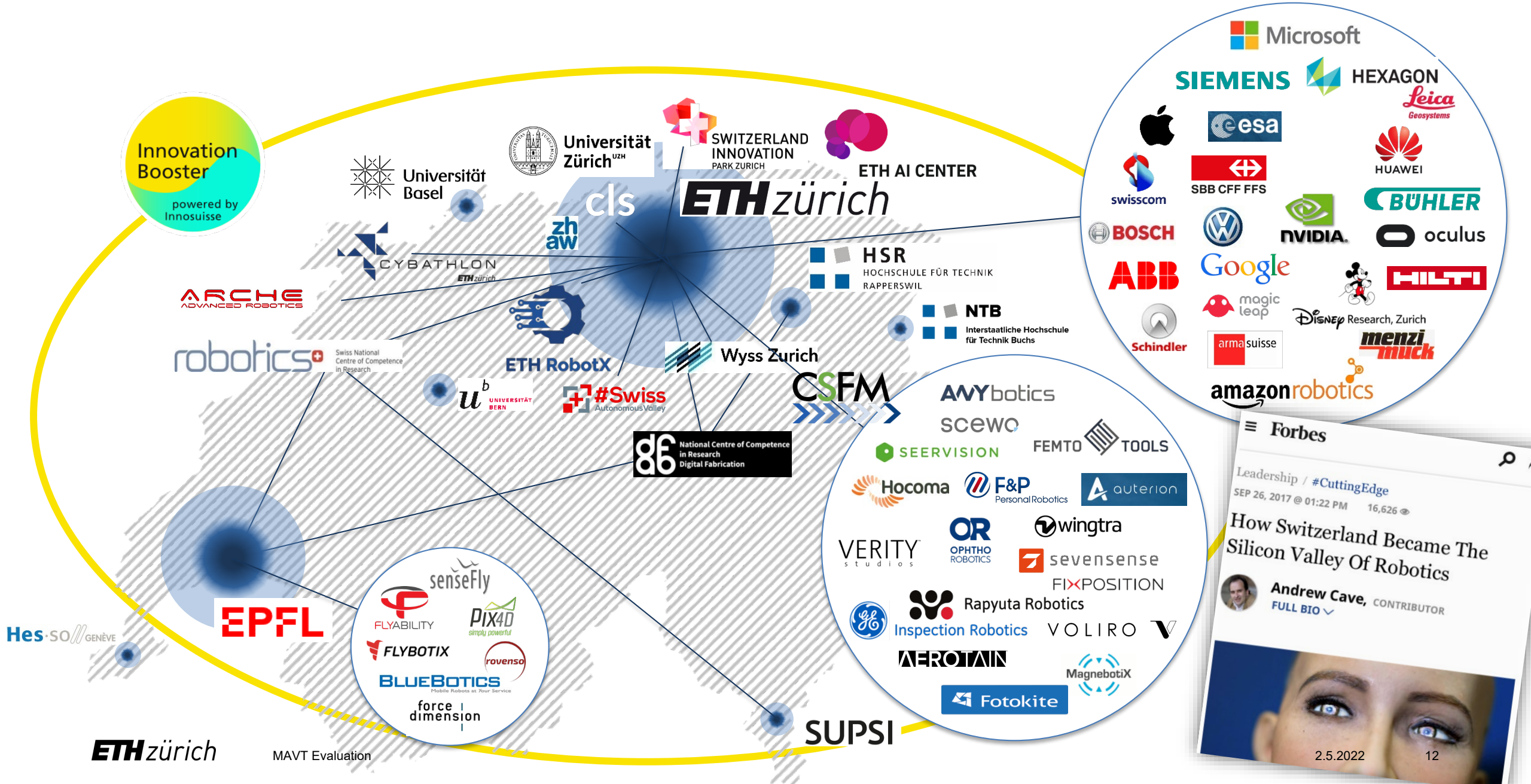
Omnidirectional flight







Switzerland | largest density of start-ups and industry in robotics



Additional Information

- Bachelor thesis can be written in a different focus area
- Choice of the focus has no influence on the choice of Master
- … strong link to Master “Robotic, Systems and Control” …
  but also highly relevant for other areas

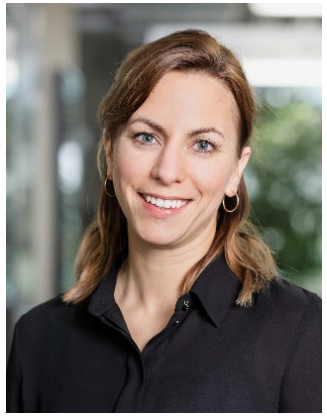
Personal recommendation

- Choose your focus based on your interest and fascination for ongoing research at ETH
- Go and check out the homepages, research projects, and offered student theses

ETH zürich

Department Maschinenbau
und Verfahrenstechnik

D-MAVT Studienadministration



Lorena Luzi

Silvia Häfliger

Danijela Lukic

Dr. Maddalena Velonà

ETH Zentrum
LEE K 208
Leonhardstrasse 21
8092 Zürich
info@mavt.ethz.ch

Schalteröffnungszeiten

Montag und Donnerstag	**13.00 – 16.00 Uhr**
Dienstag, Mittwoch, Freitag	**09.00 – 12.00 Uhr**

D MAVT