

Competences

Robotics, Advanced Mechatronics, System Architecture
Physics/Mathematical Modelling, Dynamics of (Non) Linear Systems
System Identification (Frequency), Model Parameter Estimation (Time)
Forward and Inverse Kinematics, Path Planning, Trajectory Generation, Optimization
(Non) Linear Controller Design, Filter Design, Model Based Control, Stability Analysis
CAD, CAE, Mechanical FEM (Structural & Transient & Modal)
Modal Analysis, Frequency Response Analysis, Mode-Shape Analysis
Experimental Implementation/Integration/Validation, Actuator/Sensor Selection
Matlab, Simulink, xPC Target, dSpace, NYCe 4000, Ethercat, Labview, Visual Studio
Linux, ROS, C++, VB.net, Python, C#, Java, Javascript, PHP, HTML, Git, SVN

Project Portfolio

03/2017 - 10/2020



Autonomous navigation, STIHL Tirol GmbH. Development of a robotic lawn mower.

Role: Software Engineer

Team: 5 Software Engineers

Developed autonomous navigation software in C++ and Python including mapping, path planning and trajectory generation algorithms, integrated various localization sensors (gps, uwb, camera, imu and odometry), physically simulated the robot, implemented embedded software on the platform and experimentally validated the robot software.

11/2016 - 02/2017



Merlin, Blue Sparrow. Development of a consumer drone.

Role: Software Engineer

Team: 3 Software Engineers, 1 System Architect

Developed drone software in Matlab and C++ including mathematical drone models and simulations, digital feedback controllers (filters), model-based nonlinear feedforward controllers and path planning and trajectory generation algorithms, experimentally validated the drone software.

07/2016 - 10/2016



Aurora, Océ. Development of a large format roll media printer.

Role: Mechatronic Engineer

Team: 2 Mechatronic Engineers, 1 System Architect, 1 Mechanical Engineer, 1 Technician

Developed linear feedback controllers (filters), designed model-based nonlinear feedforward controllers, performed system identification using frequency response measurements, performed model parameter estimation using regression techniques, implemented controllers in Simulink/xPC Target, experimentally validated mechanics and controller design, documented requirements, design, test plans and test results.

09/2015 – 10/2016

**Exoskeleton, Project March.** Development of an exoskeleton for rehabilitation.*Role: Mechatronic Architect**Team: 2 Mechatronic Engineers, 1 Mechatronic Architect, >10 BSc. and MSc. Students*

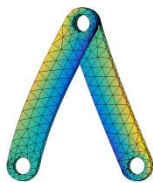
Developed a physical model of an exoskeleton robot in Matlab (Simulink, SimScape and SimMechanics), generated forward and inverse kinematics, generated path planning and trajectory generation algorithms, designed linear feedback controllers and performed time domain parameter estimation and frequency domain system identification, implemented algorithms in Simulink communicating over Ethercat.

05/2016 – 07/2016

**RAAK Aerobics Bin Picking, Fontys.** Development of a robotic bin picking application.*Role: Mechatronic Engineer**Team: 4 Mechatronic Engineers*

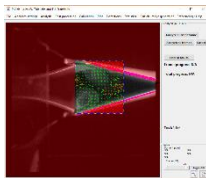
Integration of vendor-independent software (ROS) for product detection and recognition, motion planning and flexible robot control. Developed a demonstrator using an UR5 robot and Pick-it 3D vision sensor.

01/2016 – 07/2016

**Flexible Multibody Simulator, Segula Technologies.** Development of a simulator.*Role: Mechatronic Engineer**Team: 2 Mechatronic Engineers, 1 Mechatronic Architect*

Created software tools to import modal response data of FEM packages (Nastran and Ansys) into Matlab. These data are used for combined simulation of flexible and rigid multibody electro-mechanical systems in SimScape Multibody.

12/2015 – 03/2016

**PIV tool, Océ.** Development of software tool for particle image velocimetry.*Role: Software Engineer**Team: 2 Mechanical Engineers, 1 Analyst*

Integrated a software tool into Matlab for particle image velocimetry. The tool processes high speed images of particle appended airflows in Océ printers to compute spatial flow velocity vector fields.

04/2014 - 11/2015

**Yukon, Océ.** Development of the next generation of an enhanced flatbed printer.*Role: Mechatronic Engineer**Team: 4 Mechatronic Engineers, 1 System Architect, 1 Mechanical Engineer, 1 Analyst*

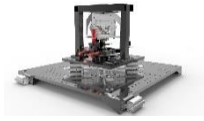
Developed multiple mathematical models of the flatbed printer in Matlab (Simulink, SimScape and SimMechanics), designed linear feedback controllers (filters), designed model-based nonlinear feedforward controllers, performed system identification using frequency response measurements, performed model parameter estimation using regression techniques, performed mode shape measurements and modal analysis, implemented controllers in Simulink/xPC Target/dSpace, integrated hardware components (sensors and actuators), experimentally validated mechanics and controller design, documented requirements, design, test plans and test results.

08/2015

Light Installation, Studio Drift. Development of a moving light art installation.*Role: Mechatronic Engineer**Team: 1 Mechatronic Engineer, 1 System Architect, 1 Mechanical Engineer*

Developed mathematical model in Matlab, documented system architecture.

02/2015 - 03/2015

**Freneza, Smart Equipment Technology.** Development of a die bonding machine.*Role: Mechatronic Engineer**Team: 2 Mechatronic Engineers*

Developed finite element model in NX (Advanced Simulation, Motion Simulation) with link to Matlab (Simulink), integrated hardware on test setup, designed linear feedback and feedforward controllers, implemented controllers in Simulink/dSpace, validated model using experimental frequency response and servo measurements.

03/2015

FAST, Océ. Development of an image scanner.*Role: Mechatronic Engineer**Team: 1 Mechatronic Engineer, 1 System Architect, 1 Mechanical Engineer*

Designed and implemented controllers on Bosch NYCe 4000, performed experimental validation measurements, documented test results.

11/2009 - 04/2014

**Humanoid Robot Research, TU/e.** Research and development of a humanoid robot.*Role: PhD Researcher & Team Leader**Team: 1 PhD. Researcher/Team Leader, 1 Professor, >10 BSc. and MSc. Students*

Developed multiply mathematical models of humanoid robots in Matlab, Gazebo and Simulink (SimScape, SimMechanics), designed nonlinear feedback and feedforward controllers, analysed stability of bipedal locomotion, performed system identification using frequency response measurements, performed model parameter estimation using linear regression techniques, developed forward and inverse kinematics algorithms, developed path planning and trajectory generation algorithms, implemented controllers in C++ and ROS, validated models and controllers using experiments, integrated and tested hardware components (sensors, frames, actuators), documented requirements, system architecture, detailed design, test plans and test results.