

Leon Santen

Engineering Student: Robotics and Sustainable Design

Education

Olin College of Engineering, B.S. Engineering: Robotics

May 2021

#1 or #2 most innovative engineering institution worldwide (MIT-study)
Recipient of 4-year, 50% Olin Merit Scholarship, Current GPA: 3.81

Lessing-Gymnasium, Frankfurt am Main, German High School Diploma

May 2016

German Physics Society Award for outstanding students
Among five best students out of 100, Final Exams: 15/15 Points in AP Physics and Mathematics

Experience

Renewable energy systems at an off-grid farm

Aug. 2020 - now

I organized a micro-campus with 15 students at an off-grid permaculture farm during the COVID semester. We built three dwellings with natural materials, maintained a micro-hydro system, installed solar panels, and regulated the fridge energy usage with a wireless Arduino system. See more at olinatwoodlandharvest.com.

As my main project, I designed and built a vertical-axis Savonius wind turbine. I conducted two site assessments with anemometer data and by observation. We further ran a fluidics analysis on our CAD model and built a physical prototype. We built the turbine tower on the roof of a barn that held the electronical equipment. The electronical system included the generator, electronic brake, dynamic resistor, rectifier, and inverter.

Duodenoscope valve redesign at Boston Scientific - Senior Capstone

Aug. 2020 - May 2021

We are redesigning the internal valve system of a medical device used for endoscopy procedures. Flow performance, haptic feedback, and manufacturability are in the center of our design process. Resin-printed prototypes and fluidics analyses will inform our final valve design.

Ground Robotic Autonomous Vehicle Lab - Autonomous Tractor

Aug. 2019 - May 2020

I developed a ROS-integrated, ultrasonic sensor system that senses the amount of accumulated dirt in the tractor's box blade. The system will lift the bucket to prevent the tractor from stalling while it autonomously evens out hills.

Sustainable design - research assistant of Ph.D. Benjamin Linder

Feb. 2018 - Jul. 2020

Publication in June 2020 - *"The Effects of Behavior Prompts on Laundry Habits"*

We conducted a study with 90 participants to investigate the effect of social engagement around one's environmental impact. Self-reported wearings of denim jeans and similar pants increased from 5.6 to 8.2 wearings per wash cycle on average for the group that used abacus-like counters on their clothing.

Interactive audio-visual art installation for children

Dec. 2019

Displayed at the Olin College exposition in 2019, this project aimed to create an immersive, magical experience by integrating an Arduino state machine, Max/MSP, ultrasonic sensors, PA-system, LEDs, and UV-lights. A big jellyfish floated in the middle of the room, and a human sized fish could be entered. Wave-sounds were playing in the dark room. When someone entered the fish, the jellyfish turned on its UV-light and changed its "uvula light" to a glowing orange. The UV-light made patterns on the jellyfish visible that were drawn by visitors. As the fish was entered, soothing piano sounds were added to the soundscape. Small groups of children and visitors lay down, played in the cozy fish, and enjoyed the light and sound.

Research publication - Technical University of Munich - Prof. Dr. Lienkamp

Aug. 2018

Publication in June 2019 - *"Should We Allow Him to Pass?" Increasing Cooperation Between Truck Drivers Using Anthropomorphism*

This study investigated the potential to increase the willingness of truck drivers to cooperate during overtaking scenarios using anthropomorphized interfaces. Drivers were in favor of the human-like agent while the result did not indicate an increase in willingness to cooperate. I coordinated, planned, and executed the study. Tasks included the coordination of subteams, state machine programming, CAN bus integration, and study design. I also built a modular dynamic driving simulator for future studies, CAded extra features, and coordinated with the shop.

Off-road vehicle suspension design - BAJA

May 2018

As a member of a 25 person team, I designed the upper and lower suspension A-arms. My FEA-based design ensured no interference with the shock absorber and worked perfectly during two off-road vehicle competitions. Using fiberglass composites, I designed and fabricated the driver's seat.

Fabrication internship - SCHÜTZ GmbH, Germany

May 2017

As an engineering intern, I went through all manufacturing processes for IBC-containers. In four months, I learned about injection molding, CNC milling/lathing, machine construction, CAD, blow-stretch molding, and welding. Lesson learned: Engineers must be in touch with and take the manufacturing workers seriously.

Personal Info

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Portfolio • Website

leonsanten.info

LinkedIn

linkedin.com/in/leonsanten

Skills

Python, C++, R

SolidWorks, CATIA, Fusion 360

MATLAB, Simulink, Mathematica, ROS

CNC Mill, CNC Lathe, MIG Welding, 3D-Printing, Composites

Qualtrics

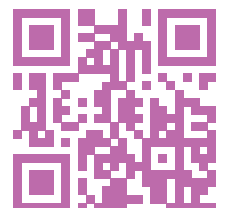
Illustrator, Photoshop

Max/MSP, Serato DJ

Cello, DJing

Languages

English, German



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