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

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 permaclture 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*.

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As my main project, I designed and built a vertical-axis Savonius wind turbine. I conducted two site assessments with anemometer data and by obersvation. 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.

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*"

Many people wear their shirts once before they launder them. Therefore, the environmental impact of clothing is particularly high during the use phase. We conducted a study with 90 participants to investigate the effect of a small, abacus-like counter to increase the wear-count before laundering. We reviewed many behavior modification techniques, and designed the counter accordingly. Self-reported wearings of denim jeans and similar pants increased from 5.6 to 8.2 wearings per wash cycle on average.

Interactive Audio-Visual Art Installation for Children **Dec. 2019**

This private project was displayed at the campus-wide exposition at Olin College of Engineering in December 2019. The project aimed to create a magical experience for children with the means of an Arduino state machine, Max/MSP, ultrasonic sensors, PA-system, LEDs, and UV-lights.
The art installation included a big jellyfish that was floating in the middle of the room, and a human sized fish that could be entered. Wave-sounds were playing in the room. When someone entered the fish, the jellyfish turned on its UV-light, changed its internal light to a glowing orange. The UV-light made patterns on the jellyfish visible that were drawn by visitors. We provided UV-paint. As the fish was entered, soothing piano sounds were added to the soundscape. Small groups of children and visitors lay down and 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*

Adding human characteristics to interfaces improves the interaction between the human and this object. 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. These tasks included the coordination of subteams, state machine programming (ruby), CAN bus integration, and study design.

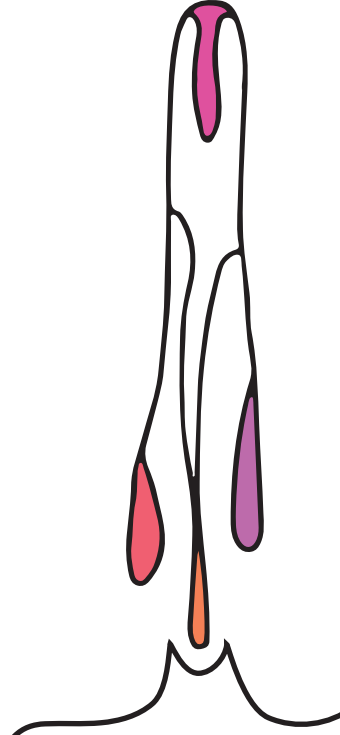
Additionally I constructed a modular dynamic driving simulator for future studies.
Tasks included CAD, buildup, sub-team and shop coordination.

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.



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LinkedIn
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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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