LANDON KNIPP | UC Berkeley

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GitHub • LinkedIn • Blog

Summary

My name is Landon Knipp, and I am currently a 4th year student at UC Berkeley studying Mechanical Engineering, Aerospace Engineering, and Astrophysics. My interests academically and career-wise include environmental sustainability, space and interstellar exploration, and understanding more about how the universe and reality behaves. All of the projects I have done can be viewed through my website on GitHub (linked on the GitHub marker at the top of the resume.

Education

UNIVERSITY OF CALIFORNIA, BERKELEY
8/2019 - NOW
B.S. Mechanical Engineering, Minors: Aerospace Engineering Astrophysics
Berkeley, CA
GPA: 3.511

UNIVERSITY OF MINNESOTA, TWIN CITIES
9/2017 - 6/2019
Dual-Enrollment [College In the Schools (CIS)]
Minneapolis, MN
GPA: 3.848

RICHFIELD HIGH SCHOOL
9/2015 - 6/2019
High School Diploma
Richfield, Minnesota
GPA: 4.4

Skills

PROGRAMMING LANGUAGE **Experienced:** MATLAB **Beginner/Exposed:** LabVIEW | LaTeX | Python | C
MODELLING SolidWorks - 3D Modelling and FEA | AutoDesk - Engineering Drawings | ANSYS - Fluent Simulation
LANGUAGES **Native:** English | **Intermediate:** Spanish

Projects

Links to PDF's and videos of the projects are linked at my GitHub website (link located at the top of the resume)

PLANT MOISTURE DETECTION SYSTEM

I used the ESP32 micro-controller with MicroPython to create my own system that samples the levels of moisture in the soil using a capacitive sensor. The sampled data was then sent to Thingspeak where it was plotted LIVE. Once the hydration levels read the critical value (which was pre-assigned in the main.c code) a stereo was triggered to play a tune and an email is sent using IFTTT connections. This is so whether the user is at home near the plants or out and about, they know it is time to water their plant. The plotting remains on the Thingspeak site for about a month so you can analyze the behavior of the plant and notice what times of the data they begin to dry out.

MODELLING 2D PATHLINES OF PLANAR VORTICES

Using concepts of stream functions, superposition, and Helhmholtz's Law, I constructed a code in MATLAB that simulated velocity fields generated from N number of vortices. Each field can then be superimposed to create a net velocity field that acts on all of the vortices. Using kinematics, the position of each vortex is then determined over a specified time interval. Specific situations modelled include corner vortices and wake turbulence regions.

DETERMINING VELOCITY & PRESSURE VALUES ON SURFACE OF CYLINDER IN A FLOW FIELD

Values for velocity were determined using theories about circulation and velocity vectors at a surface boundary. Linear algebra and matrix calculations were used to solve for the velocity at discrete points along the surface. These velocity values were then computed to pressure values, resulting in values of pressure-forces. From here I was able to determine coefficients of lift and drag, along with the separation points of the fluid from the cylinder.

ANALYZING THE BEHAVIOR OF DIFFERENT NACA PROFILES AT DIFFERENT ANGLES OF ATTACK IN A FLOW FIELD

Similar to the methods used for the cylinder project, I computed pressure-forces for different NACA profiles. I then rotated the discrete points of the surface in order to simulate different angles of attack to calculate coefficients of lift and drag for a variety of different angles. A key point of the project was then to use Thwaites Method for every angle of attack in order to determine the stall angles for the different NACA profiles.

DESIGNING BLADES FOR A HUMAN POWERED QUAD-ROTOR HOVERCRAFT

Incorporating aerodynamic theories such as disk actuator theory, Bernoulli's equation, mass and momentum balance, and energy conservation, I designed the blades of a quad-rotor hovercraft that can maintain a hovering position. The limiting factor was the weight of the craft and the individual powering it. I utilized equations for thrust and torque related to the geometry of the blades and the rotor. Engineering decisions behind the design were to minimize the amount of torque required to maintain a constant angular velocity of the rotors while maximizing the amount of thrust supplied. All of the coding and calculations were done by myself in MATLAB. I then modelled and rendered the geometry of the blade in SolidWorks.

ROBOTIC ARM MIMICKING THE MOTION OF THE USER

As a group, some fellow Mechanical Engineering majors and I designed an embedded system where a robotic arm with a claw gripper mimic the motion of the user. Information about the positioning of the user's arm and hand were obtained using IMU's and a flex sensor. Using Modus Toolbox IDE by Infineon Technologies we created a main.c file and a software environment that was compiled onto a PSOC 6 BLE 63 from Cypress Technologies (coding language used was C). The main aspects of the system is that it was to function as real time and develop multitasking capabilities. In addition to actuating servos for the robotic arm, data was sent via the serial port from the micro-controller to an external computer running LabVIEW to show the positions of each servo motor at any instant. The calibration of the sensors was also done with LabVIEW, communicating directly to the micro-controller

HONORS & AWARDS

LAMP OF KNOWLEDGE
Richfield High School
2016, 2017, 2018, & 2019
Richfield, Minnesota

TOP 5%
Richfield High School
2019
Richfield, Minnesota

'A' HONOR ROLL
Richfield High School
2016, 2017, 2018, & 2019
Richfield, Minnesota

Extracurricular activities

NORDIC SKIING
2016 - 2019
Richfield High School
Richfield, Minnesota

ME TO WE
2016 - 2019
Richfield High School
Richfield, Minnesota
Me to We is an organization that focuses on fundraising resources and money for local and global communities. I participated in the club my last three years of high school, where my senior year I became the co-leader of the club. I organized all of the meetings and set up the fundraisers. I scheduled local fundraisers in the fall, where we sent out flyers and collected canned and packaged foods to donate to food shelters. In the spring we held our global fundraiser: one year we held a donation competition among the different grades to raise money to build wells for communities in Africa.

ENVIRONMENTAL CLUB
2018 - 2019
Richfield High School
Richfield, Minnesota
I acted as the Vice-President of the club, which was created my senior year. Since it was the first of the existence of the club, most of our efforts were put into finding resources for grants and trying to expand the student participation of the club.

CALSOL
2021
University of California, Berkeley
Berkeley, California
I was on the aerospace sub-team during the Fall 2021 semester. I ran simulations in ANSYS, specifically fluent simulations, to calculate coefficients of forces and moments on past vehicles at different angles of flow. This modelled the car travelling at various speeds and turns in order to ensure the safety of the vehicle, and determine its performance (specifically the coefficient of drag for this parameter).

RECYCAL / HELICAL (RESEARCH)
2022 - PRESENT
University of California, Berkeley
Berkeley, California
Beginning in summer of 2022, I conduct research with fellow undergraduate and graduate students under Professor Hayden Taylor using technology developed at UC Berkeley (CAL: Computed Axial Lithography) in order to develop and print plastics that can potentially form a closed-loop economy and prevent any plastic waste. In the near future I am planning on aiding in the developments of a larger system that uses conical beams of light to produce larger parts, which may be able to be used in mass production and later implemented into society.

Work experience

STARBUCKS
5/2020 - 1/2022
Barista
Edina, Minnesota

JAMBA JUICE
4/2017 - 7/2019
Shift Lead
Edina, Minnesota

GREAT WOLF LODGE
4/2018 - 7/2018
Lifeguard
Bloomington, Minnesota

DAVANNI'S HOT HOAGIES & PIZZA
8/2016 - 4/2017
Associate
Richfield, Minnesota