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Darren Biskup

EDUCATION

Columbia University GPA: 4.17/4.33
M.S./PhD Mechanical Engineering, Robotics and Rehabilitation *August 2024 - Present*

University of Illinois, Urbana-Champaign GPA: 3.95
B.S. Mechanical Engineering, Computer Science Minor *May 2024*

- *High Honors, James Scholar Honors Program, Dean's List, ASME*

SKILLS

Computer Aided Design: CATIA 3DEXPERIENCE, Autodesk Fusion360, SolidWorks
Computer Programming: C, C++, Python (PyTorch, OpenCV, scikit-image). HTML and CSS
Technical: Control Systems Design and Analysis, Data-Driven Science and Engineering, Injection Molding, Battery Pack Design

EXPERIENCE

Robotics And Rehabilitation (RoAR) Lab, Columbia University August 2024 - Present
Graduate Research Assistant

- Developed control architecture for a cable-driven robotic stand trainer integrating VICON motion capture and force plate sensing, enabling coordinated pelvic-thoracic force application to expand reachable workspace for spinal cord injury patients
- Currently designing force guidance protocols for dynamic yoga pose training based on comparative analysis of experimentally collected expert-novice movement data, leveraging motion capture and force sensing for automated movement assessment

Mehta Research Group/GazzolaLab, UIUC Jan 2023 - May 2024
Undergraduate Research Assistant - Soft Robotics

- Connected fiber-reinforced soft actuators in parallel and implemented joystick control for the robotic soft arm using a Raspberry Pi to control pneumatic solenoid valves. Implemented a recursive low-pass-filter to enhance joystick input in real-time.
- Designed and built a 3D calibration grid using laser-cut acrylic and green paint; developed Python code utilizing OpenCV and scikit-image to detect colored blobs and extract marker coordinates.
- Developed scripts to input arm pose maneuver instructions to allow rigorous comparison between simulation and real-world.

Skydio May 2022 - August 2022
Product Design Engineering Intern

- Design for Injection Molding: Utilized CATIA 3DEXPERIENCE to redesign the Navigation Camera mounting mechanism for the company's next generation performance quadcopter drone.
- Communicated with overseas vendors in China to implement design change, ensuring injection moldability and minimal lead time. Kicked off injection mold retooling for newly redesigned Navigation Cameras.
- Designed and prototyped the mobile tablet adapter for the next generation drone controller using FDM and SLS 3D-Printing. Received DFM feedback from injection molding vendor.
- Worked with Manufacturing Engineers to design wire routing layout for drone RF cables, board to board connections, 3-phase motor power cables, LED cables.

Lucid Motors May 2021 - August 2021
Mechanical Engineering Intern, High Voltage

- Battery Pack Development: Improved design for the high voltage chain halving the number of bolts required to join busbars. Conducted thermal analysis on busbar joints with new design to evaluate the new design's effect on car's horsepower, range, efficiency, and thermal endurance.
- Devised an improved method of measuring resistance of busbar joints up to 50% more accurate than the HIOKI low ohmmeter.
- Collected and analyzed data on heat generation from bolted busbars joints, and used this data to calculate theoretical horsepower and efficiency loss of specific joints.

PROJECTS

Senior Capstone Project - Neurosurgical Balloon Tunnelling Device

- Developed an innovative shunt passage method using expandable balloons for ventriculoperitoneal operations which minimizes tissue damage and backtracking leading to improved patient and surgeon comfort.
- Built a pump controller to test both pneumatic and hydraulic balloons, integrating an Arduino microcontroller, I2C pressure sensors, and motor control circuitry (H-bridge, flyback diodes, solenoid exhaust valves)