

ASHLEY Q. SWARTZ

LEADER. ENGINEER. RESEARCHER.

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PROFILE

I strive to make the world a better place through the work that I do. Endlessly curious, I have deep expertise in robotics, healthcare, and machine design and a breadth of experience in biology, controls, machine learning, product discovery, and user testing, as well as a plethora of prototyping and manufacturing methods. I believe the world's hardest problems will be solved by high functioning teams, not individuals. As a leader, my job is to enable and empower those teams by leading with clarity and empathy.

EXPERIENCE

2022 - 2023 X, The Moonshot Factory

Worked on a wearable robotics project, focused on making movement more joyful and scaling to moonshot scale using machine learning and AI to unlock the detection and actuation of complex human movement.

Hardware Team Lead / Mechanical Engineer

- Created strategy, engineering roadmap, PRD, and ERD as part of the leadership team in order to create clarity and focus on overall team vision for the next two years.
- Led hardware team to develop new generation, multi-DOF robot which reduced don/doff time by 5X, increased torque transfer efficiency, and broadened user testing capability through modular design.
- Supported collaboration with external partners to develop novel garment integrated robotic systems and unique methods for transferring forces to users
- Supported team's focus on reaching users early and often as part of the user experience/product team in order to answer questions about the future product and understand design requirements iteratively in the design cycle.

2018 - 2022 Roam Robotics

Roam Robotics is a wearable robotics company which has developed a knee exoskeleton for downhill skiing, a performance enhancing exoskeleton for military applications, and a custom fabricated smart orthosis for knee osteoarthritis. My contributions are in two sections below in order to highlight my leadership vs. IC impact since as a start-up these roles overlapped.

Sr. Director of Engineering (Leadership Impact)

- Built the Health product team from the ground up as the lead for design, clinical evaluation, quality and new product introduction teams (8 direct reports, 20 total reports).
- Key contributor to Health product strategy and original author of the product and engineering requirements documents.
- Generated evidence for knee osteoarthritis use case and presented to the Center for Medicare and Medicaid (CMS) and the Pricing, Data Analysis, and Coding (PDAC) for the designation of the Roam Health product in the Healthcare Common Procedure Coding System (HCPCS) as L1844.
- Authored and managed the hardware development roadmap, engineering requirements document (ERD), design FMEA, risk management documentation and design history file for ski and health products through several limited product launches (>100's quantities).
- Designed, coordinated, and implemented a pilot study for early user feedback and validation for Health orthosis which collected user data from 81 participants (50% pain reduction from participants with 70% of users improving outcomes)
- Led Health product from early prototype to pilot studies, product development, DFM, verification/validation, and IEC/EMC (60601-1) testing. Health product was 4 months away from limited product launch of 100+ units before the program was shuttered due to failure to fundraise.
- Worked with regulatory agencies (FDA) to get health product Class I listed for sales in the U.S.
- Established a quality management system (QMS) and implemented design and document control.

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(Roam Robotics, continued)

Sr. Mechanical Engineer (IC Impact)

- Designed the master models for ski and health knee systems, performed DFM of injection molded and machined parts, and coordinated with vendors for fabrication, first articles and quality inspection.
- Designed, built, and tested the first stable prototype of the Health product and determined fit profiles to allow for modular joint design and easy to swap fit components, reducing development time by being able to leverage existing hardware and design concepts and BOM by making the system modular for fitting different people. Accelerated our user testing.
- Executed cycle and stress verification tests of pneumatic actuator and structural components of robot knee joint
- Pneumatic system optimization, valve selection, and design of mounting and reinforcing components of soft actuator
- Designed fabrication processes for orthosis with a novel ankle suspension method and custom fabrication tools
- Control system refinement, battery use optimization, and pneumatics system optimization for health products.

2011 – 2018 Shirley Ryan AbilityLab, Center for Bionic Medicine

The Center for Bionic Medicine is the largest translational research group in orthotic and prosthetic devices (non-profit).

Research Engineer III & Project Manager

- PI/Lead Design Engineer on \$400,000 grant for surgical study (porcine model) of custom implants to reduce infection rates and improve wound healing around percutaneous site of direct skeletal attachment of prostheses
- Led engineering development of VO/VC prosthesis which utilizes an optimized linkage system & provides critical, bi-directional functionality over commercially available devices (1st of its kind). Collaboration with clinicians to design and execute in-lab and take home user study (published in JRRD).
- Participated in cadaver study for innovative intramedullary limb lengthening device designed to lengthen residual limbs of those with limb deficiency for improved prosthetic socket fit and comfort.
- Designed a compact, lightweight 5DOF robot arm system to meet/exceed industry standards in efficiency and speed at a fraction of the size (25th percentile female) of similar commercial devices (published in IEEE). Reduced bulk, weight, and more accurate anatomical size to match the user increases adoption and user comfort.
- Engineered standing wheelchair with mechanical hand-driven lift system to provide more accessibility to users in a lightweight and easy to transport design.
- Lead design engineer for novel electrical/mechanical coupler for connecting components of upper limb prosthetic devices, primarily being able to swap different hands, hooks, and end effectors.
- Designed novel electromechanical interface for custom socket liner utilizing conductive fabrics over conventional wiring for myoelectric control.
- Design of compact, lightweight actuators for upper limb prosthetics utilizing cycloid and planetary gearsets and custom DC brushless motors.

2011 – 2013 Klein Brein, LLC – Aerospace Contractor

Klein Brein, LLC is a small company (just me!) I started out of college while I worked supporting contracts for commercial aircraft suppliers. This work stems from my internship with Delta Air Lines in interiors and systems engineering.

Contractor & Business Owner (Klein Brein, LLC)

- Independent contractor with major airline and supplier on an aggressive timeline to complete A330 interiors overhaul
- Led engineering resource for workcard maintenance as the expert in specific data entry software for airline customer

2007 – 2011 Delta Air Lines

Co-Op Engineer, A330 Systems and Structures/Cabin Interiors

- Experience working with regulatory agencies (FAA) to complete engineering projects on aircraft overhauls
- Authored and lead cost/weight savings initiatives which, on average, saved the airline \$700,000/year

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EDUCATION

2015-2017 Masters of Science Mechanical Engineering, University of Illinois at Chicago

Chicago, IL

- Focus on control systems, robotics, and machine learning (Arduino + Raspberry Pi)
- Course projects: machine learning algorithm for myoelectric prostheses, programming for self driving car

2007-2011 Bachelors of Science Mechanical Engineering, Kettering University

Flint, MI

- Degree specialty in bioengineering and pre-med
 - Undergraduate thesis on feasibility of aircraft oxygen alteration and effects of hypoxia
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SKILLS

- Solidworks, UG-NX, Abaqus
 - DFM, DFA, GD&T
 - Matlab, SimMechanics, & Simulink
 - Arduino & Raspberry Pi
 - Injection molding, machining, casting, 3D printing, EDM
 - Authoring grants, white papers, and IRBs
 - User centered design, product innovation, and strategy
 - Leading multidisciplinary teams
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PUBLICATIONS | PATENTS

"Custom, Rapid Prototype Thumb Prosthesis for Partial Hand Amputation: A Case Report"

2017 Prosthetics and Orthotics International

"Design and evaluation of a voluntary-opening/voluntary-closing prosthetic terminal device"

2014 Journal of Rehabilitation Research and Development

Patent [US 20160367383A1](#) – Lockable Finger System and Related Methods, application date June 17, 2016

Patent [US20210370495A1](#) – Powered medical device and methods for improved user mobility and treatment

Patent [US20210177686A1](#) – Powered device to benefit a wearer during skiing

Patent [US20210370494A1](#) – Fit and suspension systems and methods for a mobile robot

Patent [WO2021242975A1](#) – Battery systems and methods for a mobile robot

Patent [WO2021242980A1](#) – User interface and feedback systems and methods for mobile robot

PERSONAL

Volunteer | Girls Climb On, Go-Baby-Go Workshop, Adler After Dark, Chicago Hopes for Kids

Interests | Hiking, rock climbing, eating sushi, and riding motorcycles. Top 25 (age group) finish at Chicago Triathlon! Wine country century bike ride.