Ashley Q. Kemper (née Swartz)

Leader. Engineer. Researcher.

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PROFILE

As a researcher and designer with start-up experience, I have a proven track record of taking products from ideation through prototyping, testing, manufacturing, and launch. I am energized by fast paced environments with opportunities to stretch, grow, and collaborate cross-functionally. I value work that aims to remove barriers to innovation, increases accessibility and sustainability, and leaves a lasting positive impact in the world. I am pursuing a mechanical engineering design opportunity where I can utilize my diversity of experience and passionate curiosity to solve complex problems.

EXPERIENCE

2022 - Present Google (X, The Moonshot Factory)

Hardware lead for an early stage wearable robotics project utilizing machine learning and AI to unlock the detection and actuation of complex human movement. Staff researcher tasked with ideation for new projects and rapid evaluation of novel technology.

Staff Research Engineer, Early Pipeline

- Executed high-throughput parameterization of electrochemical cells for green steel investigation (200+ experiments/3 mo).
- Researched, developed, and de-risked technology and market strategy for early pipeline moonshot ideas in sustainable energy and healthcare.

Tech Lead (L6), Wearable Robotics

- Created a two year strategy, engineering roadmap, product requirements, and engineering requirements in order to generate clarity and buy in on overall team vision.
- Led multi-disciplinary hardware/soft-goods team (7 reports) to develop a 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 via semi-rigid material layups.
- Supported X-wide initiatives as a team mentor for a high school outreach program, 20% projects with ops and culture teams, and supported sensor integration for an early stage project.

2018 - 2022 Roam Robotics

Roam Robotics is a wearable robotics start-up 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.

Sr. Director of Engineering (Leadership Impact)

- Foundational in growing Roam from a 12 to 55+ person organization.
- 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 indirect reports).
- Led indirect reports on the software, manufacturing, and quality engineering, soft goods design and clinical teams in order to coordinate timelines, satisfy the PRD/ERD, maintain prototypes and release features into production.
- Generated evidence for knee osteoarthritis use case and secured the designation of the Roam Health product in the Healthcare Common Procedure Coding System (HCPCS) as L1844 for partial reimbursement.
- Authored the development roadmap, engineering requirements document (ERD), 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% average pain reduction + 70% experienced improved outcomes)
- Led Health product from early prototype to pilot studies, product development, DFM, verification/validation, and IEC/EMC (60601-1) testing.

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(Roam Robotics, continued)

Sr. Mechanical Engineer & Project Manager (IC Impact)

- Designed and owned master models for ski and health knee systems and managed the bill of materials.
- Performed DFM and coordinated with vendors for fabrication, first articles and quality inspection of parts and assemblies for launch of ~200 ski devices. (injection, compression, and overmolding, machining, casting, 3D printing, and soft goods)
- Designed and executed cycle and stress verification tests of pneumatic actuator and structural components to improve overall device life from one ski season (4-5 months) to 3 years.
- Pneumatic system optimization, valve selection, and design of mounting and reinforcing components of soft actuator for 2019 and 2020 ski season (200 unit production run, 3-5 rental locations).
- Designed fabrication processes for orthosis with a novel ankle suspension method for improved comfort, suspension and user range of motion by removing coupling to hip belt or backpack.
- Accelerated user testing via modular joint design and collaboration with controls engineers ensuring prototype readiness for external testing participants.

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, comfort, and force transfer.
- 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). The reduced bulk, weight, and anatomical size match shown to increase 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.

2011 – 2013 Klein Brein, LLC – Aerospace Contractor

Contractor & Business Owner (Klein Brein, LLC)

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

2007 – 2011 Delta Air Lines

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

EDUCATION

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

2007-2011 Bachelors of Science Mechanical Engineering, Kettering University Flint, MI

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SKILLS

- Solidworks, UG-NX, Abaqus
- DFM, DFA, GD&T
- Matlab, SimMechanics, & Simulink
- Arduino & Raspberry Pi
- C++ & Python (*novice*)
- Injection molding, machining, casting, 3D printing, EDM
- Authoring grants, white papers, research protocols and IRBs
- User centered design, product innovation, and strategy
- Leading multidisciplinary teams
- Verification + Validation

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
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 – *mentorship program for young girls learning to climb*
Go-Baby-Go Workshop – *building ride on cars for children with mobility challenges*
Adler After Dark – *disseminating science to adults with cocktails @ Chicago planetarium*
Chicago Hopes for Kids – *reading tutor for children in Chicago women's shelters*

Interests | Making pottery, photography, & riding motorcycles
Rock climbing and building climbing walls
Expanding my C++ & embedded systems skills
Top 10 (age group) finish at Chicago Triathlon!