

Luke Tsai

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SUMMARY

Versatile and detail oriented mechanical engineer with startup experience, bringing a medical device from initial prototypes to successful clinical trials on over 130 patients with the world's first RF|PF system. Responsible for many stages of development, including R&D of safety-critical systems, scaling of production, and design verification of device and accessories.

EDUCATION

Carnegie Mellon University

MS in Mechanical Engineering – May 2016

BS in Mechanical Engineering – May 2016, with *highest University and College Honors*

EXPERIENCE

Affera, Inc., Mechanical Engineer

Watertown, MA 2016-Present

- Early stage startup designing a novel minimally invasive surgical device to treat various heart rhythm disorders; resulted in successful treatment of over 130 patients
- Responsible for research and development of several critical systems in product family, brought projects from initial prototypes through to production; resulted in 5 patent families
- Project lead and for an accessory device and accessory tubing kit

Motorola Mobility, Design Engineer Intern

Chicago, IL Summer 2015

- Designed and sourced PCB shields, display lens, and rear housing for a line of smartphones
- Developed an empirical model that successfully evaluates and predicts the risk of glass shattering based on lens cutouts to inform future designs

PROJECTS

Canva Diamond Technology, Engineer

2019 - Present

- Patented and prototyped a pad conditioning disk, configured to save costs in CMP process, resulting in one patent family

Magnetically Controlled Millirobots, Honors Research, Dr. Metin Sitti

2015 - 2017

- Designed and prototyped millimeter scale robots to be controlled by MRI for noninvasive operations
- Mathematically modeled robot behavior and designed PID controls

Granular Packing Prosthetic Socket, Research Engineer

2015 - 2016

- Prototyped a prosthetic socket designed for mass production that uses granular packing to provide a custom fit, combating patient discomfort

Google XPrize Lunar Rover, Camera Systems Lead, Dr. William "Red" Whittaker

2015 - 2016

- Worked in the lead team in Google's Lunar XPrize, a \$30 million competition to land a robot on the moon
- Assumed leadership of a team of 6 for the design of camera systems to develop and meet imaging, structural, and vision requirements

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Flying Wing Drone, Grant Recipient and Principal Engineer 2015 - 2016

- Authored and won a \$1000 SURG grant to develop a fast and efficient drone, funded by Boeing
- Designed and prototyped a quadcopter that transforms into a flying wing that takes advantage of lift to increase speeds and decrease energy consumption

Praying Mantis Robot, Master's Research 2014 - 2016

- Designed, machined, and programmed robot, achieved functional locomotion and manipulation
- Tested and optimized robot for reliability and efficiency

Formula Society of Automotive Engineers, Suspension Engineer 2014 - 2015

- Designed A-arms using Solidworks and ran FEA analysis
- Manufactured suspension system using both CNC and manual Mills and Lathes

LEADERSHIP & ACTIVITIES

Fair Foods Harvard Square Food Pantry, Volunteer 2018 - Present

- Weekly volunteer rescuing surplus food and distributing them to locals in need of support

Mentoring, Volunteer Mentor 2017 - Present

- Built one-on-one mentor relationships with children in families of need, encouraging them to reach their full potential
- Guided mentees through finishing high school, SAT preparation, and college application process

American Institute of Aeronautics & Astronautics (AIAA), Treasurer and Co-founder 2014 - 2016

- Restarted AIAA CMU chapter after years of inactivity to address a growing campus interest in aerospace
- Earned several grants for research projects on drone delivery systems

Newman Club, President 2012 - 2016

- Significantly enhanced campus presence and student activities, resulting in increase in club membership and club fundraising

Knights of Columbus, Director of Communications 2012 - 2016

- Assumed various responsibilities, including Chancellor and Worthy Warden
- Redesigned communication channels and membership recruitment to increase attendance and activities

PATENTS & PUBLICATIONS

Patents

Catheter Sensing and Irrigation – USPTO #10,507,057, EPO #EP3451962B1; WIPO, CNIPA, JPO Pending
Lesion Formation – USPTO #10,932,850
Pulsed RF Ablation – USPTO #10,869,719, USPTO #10,939,956; WIPO Pending
System comprising a catheter and an expandable electrode and a method of forming a lesion – USPTO, EPO, WIPO Pending
Catheter Insertion – USPTO, EPO, WIPO Pending
Multiple Zone Pad Conditioning Disk – USPTO, TIPO, KIPRIS, CNIPA Pending

Publications

Erin, O., Giltinan, J., **Tsai, L.**, Sitti, Metin. (2017) "Design and actuation of a magnetic millirobot under a constant unidirectional magnetic field." IEEE, ICRA 17058289