# 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

**Cana Diamond Technology,** *Engineer* 2015 - 2017

- 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

**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

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**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 - 2020

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

**Mentoring,** *Volunteer Mentor* 2017 - 2020

- 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

**Granted Patents**

Catheter Sensing and Irrigation - *US15/584,904, EP17722967.1A, PCT/US2017/030575, CN201780041499.2A, JP2018558328A*

**Pending Patents**

Lesion Formation - *US15/584,323*

Pulsed RF Ablation - *US15/584,533, US15/584,549, PCT/US2017/030535*

System comprising a catheter and an expandable electrode and a method of forming a lesion - *EP17733199.8A, PCT/US2017/030518*

Catheter Insertion - *US15/584,080*, *EP17723204.8A, PCT/US2017/030492*

Multiple Zone Pad Conditioning Disk - *US16/582,452, TW108134870, KN10-2019-0119170, CN201910917992.7*

**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