

**Rivers Ingersoll**  
RobertRiversIngersoll@gmail.com  
RiversIngersoll.com

## EDUCATION

### Stanford University

Ph.D., Mechanical Engineering, 2018.

Qualifying exam subjects: Robotics and Kinematics; Automatic Controls; Fluid Mechanics.

### Stanford University Graduate School of Business

Stanford Ignite, Certificate Program in Innovation and Entrepreneurship, 2017.

### Stanford University

M.S., Mechanical Engineering, 2014.

### Georgia Institute of Technology

B.S., Mechanical Engineering, 2012. Highest Honors.

### Georgia Tech Lorraine

Two semesters of studying abroad in Metz, France.

## PROFESSIONAL EXPERIENCE

### Apple, Inc.

Haptics Mechanical Design Engineer.

April 2018-Present

## SPECIAL SKILLS

### Product Design

Tech lead for haptic LRA (Taptic Engine) in some of Apple's most popular products including the iPhone and Watch. Experience with 3D CAD, 2D drafting, GD&T, tolerance analysis, scientific method, root cause analysis, and DOE creation. Performed acoustics failure analysis to identify noise sources and led qualification of recycled Tungsten and rare earth magnets. Traveled to component vendors, module integrators and FATP to provide on-site build support up to five times each year. Thrive in collaborative environment balancing stakeholders teams across Industrial Design, System PD, Firmware, Acoustics, Quality, Tooling, Process, Automation, Functional Testing, Reliability, Operations, and Global Supply Management.

### Manufacturing

Mill, Lathe, Drill Press, band saw, 3D printer, carbon fiber composite layups, laser cutter, 80/20 assembly, CNC machine. Operated a Haas OM-2a office mill CNC machine to manufacture flexural springs and sensor mounts for research projects.

### Software

Proficiency in MATLAB (data acquisition, data analysis, modeling, figure design, custom GUIs, automated image processing), JMP (data analysis, scripting), ANSYS Maxwell (electromagnetic parametric optimization and magnetic field analysis), ANSYS Mechanical (optimization of stress and modal response) and NX/Teamcenter (3D modeling and 2D drawing). Past experience in C++, HTML, Inventor, ANSYS Fluent, LabVIEW, Final Cut Pro, Adobe Premiere Pro, Solidworks, HSMWorks, Photoshop, Illustrator, InDesign and Phantom Camera Control.

### Leadership

Organized the 2017 Stanford Mechanical Engineering Research Conference designed to foster inter lab collaborations. Mentored visiting international students and Stanford undergrads assisting my research project over multiple years. Identified, negotiated and purchased relevant machine shop tools and hardware to outfit newly started research lab.

### Entrepreneurial

Participated in the Stanford Graduate School of Business Ignite program during the summer of 2017. Exposed to core business skills such as marketing, operations, strategy, accounting, finance, and economics, and applied skills such as design thinking, negotiation, teamwork, public speaking, leadership, and pitching.

## SELECTED PUBLICATIONS, PRESENTATIONS and AWARDS

**eLife 2021.** Paper: How oscillating aerodynamic forces explain the timbre of the hummingbirds hum and other animals in flapping flight. ([Paper](#))

**Science Advances 2018.** Paper: Biomechanics of hover performance in Neotropical hummingbirds versus bats. ([Paper](#))

**Journal of Experimental Biology 2018.** Paper: How the hummingbird wingbeat is tuned for efficient hovering. ([Paper](#))

**Society for Integrative and Comparative Biology 2018.** Presentation: How neotropical hummingbird versus bat species generate lift to hover. Honorable Mention for best student talk. ([Abstract](#))

**American Physical Society Division of Fluid Dynamics 2017.** Presentation: How neotropical hummingbird versus bat species generate lift to hover. ([Abstract](#))

**Bioinspiration & Biomimetics 2017.** Paper: Design and analysis of aerodynamic force platforms for free flight studies. ([Paper](#))

**Gordon Research Conference: Movement Ecology of Animals 2017.** Poster: How Hummingbirds Lift Bodyweight During Hovering Flight.

**Jasper Ridge Biological Preserve: Invited Lecture 2015.** Presentation: *In vivo* measurements of lift force in hovering hummingbirds.

**Journal of The Royal Society, Interface 2015.** Paper: *In vivo* recording of aerodynamic force with an aerodynamic force platform: from drones to birds. ([Paper](#))

**The Thermal & Fluid Sciences Affiliates and Sponsors Conference 2013.** Presentation: Uncertainty analysis in thermal simulations of turbine blades.

**Henry Ford II Scholar Award 2011.** Georgia Tech recognition of the Mechanical Engineer with the best academic record after their third year of study.

## MEDIA COVERAGE

**BioGraphic and California Academy of Sciences 2016.** [Lens of Time: How Hummingbirds Hover](#)

**National Geographic Magazine July 2017.** [Unlocking the Secrets Behind the Hummingbird's Frenzy](#)

**Stanford News 2018.** [Stanford engineers study hovering bats and hummingbirds in Costa Rica](#)

**Science News 2018.** [How nectar bats fly nowhere](#)

**Jasper Ridge Biological Preserve 2016.** [How hummingbirds hover](#)

**Reuters 2013.** [Aerial engineers seek inspiration from slo-mo hummingbirds](#)

**CNN 2013.** [Unlocking secrets of bird flight to build flying robots](#)

**Stanford News 2013.** [Stanford students capture the flight of birds on very high-speed video](#)

**Stanford News 2015.** [Stanford engineers develop a device for measuring how birds take flight](#)

**BBC 2015.** [Riddle of flying bird's weight solved by scientists](#)

**Economist 2015.** [Flight details](#)

**New York Times 2015.** [Training Birds to Aid a Scientific Breakthrough](#)