

Trevor Q. Hudson, PhD

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AT A GLANCE

- Engineer & scientist with 6+ years experience designing new biomedical sensors
 - Hands-on problem solver who thrives on challenging technical work
 - T-shaped skill set with fundamental understanding of transduction physics
 - MEMS device designer
 - Experimental design and data analysis expert
 - Experienced PCB and firmware maker
 - Clear written and oral communicator
 - Passionate about medical devices
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EDUCATION

University of Southern California (USC)

Ph.D. Biomedical Engineering

Thesis Advisor: Ellis Meng, Ph.D.

Los Angeles, CA

August 2021

Rice University

B.S. Bioengineering

Houston, TX

May 2014

SELECT RESEARCH EXPERIENCE

Senseer LLC

R&D Consultant

Pasadena, CA

June 2021–Present

- Grant writing (SBIR) based on graduate research
- Advising startup leadership as subject matter expert on sensor development

USC

Graduate Researcher

Los Angeles, CA

September 2015–August 2021

- Led the design and microfabrication of two implantable flow sensor projects and their low power, battery operated readout electronics from ideation to functional prototype
- Collaborated with neurosurgeons in device design and clinical testing
- Managed and mentored 3 graduate & 4 undergraduate students, presented work at 8 international conferences
- Built automated benchtop physiological models incorporating custom LabVIEW/Python scripts
- Analyzed and visualized >100 MB datasets
- Translated novel impedimetric thermal flow sensor from benchtop to clinic. Decreased error by 6.6× and enabled in-hospital data collection
- Creatively improved and optimized lab microfabrication processes, improving device yield and efficiency
- Innovated mathematical and numerical analysis models (MATLAB and COMSOL) incorporating concepts from transport phenomena and physical chemistry to describe sensor. Achieved <4% error versus experimental data

U.S. Naval Research Lab

NREIP Intern Fellow

Washington, D.C.

Summer 2013

- Wrote custom MATLAB scripts for image-based particle tracking
- Enabled successful arbitrary particle addressing and focusing (paper in *Biomicrofluidics*)

- Designed and drove semester project to investigate how polymer composition affects stent-mounted heart valve performance

SKILLS

Software:	<u>Modeling/Schematic:</u> Solidworks, NI Eagle, COMSOL, LabVIEW, LTSpice, AutoCAD, Layout Editor, KLayout, Kic, CorelDRAW <u>Data Analysis:</u> MATLAB, OriginPro, Excel, ImageJ <u>Programming Languages:</u> C++, Python, VBA <u>Other:</u> Arduino IDE, Notepad++, Zotero
Device Fabrication:	<u>Electronic:</u> PCB design, breadboarding, analog & digital signal processing, passive and active filtering, op amps, in amps, precision measurement circuits, Digikey/Mouser parts sourcing <u>Mechanical:</u> Soldering, milling, 3D printing, laser cutting, custom packaging, microfluidic flow circuits, soak testing
Device Testing:	LCR meter, potentiostat (electrochemical impedance spectroscopy/cyclic voltammetry), oscilloscope, power supply, digital multimeter, DAQ, statistical analyses
Microfabrication:	Thin-film deposition (PVD/CVD), e-beam metal deposition, sputtering, UV photolithography, dry etching (DRIE/RIE), mask design, wafer bonding, profilometry

SELECT PUBLICATIONS AND CONFERENCES

TQ Hudson, E Meng. "A Continuous, Impedimetric Parylene Flow Sensor." *J. of Microelectromechanical Systems (JMEMS)*. 2021.

TQ Hudson, A Baldwin, A Samiei, P Lee, JG McComb, E Meng. "A Portable Multi-Sensor Module for Monitoring External Ventricular Drains." *Biomedical Microsystems*. In press, 2021.

TQ Hudson, A Baldwin, and E Meng. Testing A Multi-Sensor System For Hydrocephalus Monitoring In External Ventricular Drains, Transducers 2019, Berlin, Germany. [Talk]

TQ Hudson, A Baldwin, and E Meng. A Continuous, Drift-Compensated Impedimetric Thermal Flow Sensor For In Vivo Applications, IEEE MEMS 2019, Seoul, South Korea. [Poster]

TQ Hudson, E Yoon, and A Baldwin. Senseer: a "self-aware" hydrocephalus shunt, National Academy of Inventors Student Innovation Showcase, Washington D.C., April 4-6, 2018. [Poster]

J Ortigoza-Diaz, K Scholten, C Larson, A Cobo, TQ Hudson, J Yoo, A Baldwin, A Weltman Hirschberg, and E Meng, "Techniques And Considerations In The Microfabrication Of Parylene C Microelectromechanical Systems," *Micromachines*, 2018.

AWARDS AND HONORS

- Stevens Innovation Award – Best Commercial Potential (Spring 2018)
- 2nd place team in Maseeh Entrepreneurship Competition (Spring 2018)
- Finalist team at National Academy of Inventors Student Showcase 2018
- Andrew and Erna Viterbi Graduate Student Fellowship awardee (2015 – 2019)
- OAI Travel Grant Recipient (Spring 2019)