Valerie Rennoll

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Professional Profile

- Detail-oriented & methodical engineer with diverse background spanning physics, acoustics, materials science, & signal processing that has culminated in patented sensor technology
- Motivated collaborator & leader that has introduced statistically grounded experimental designs within the laboratory & secured $200,000 in funding by forming partnerships
- Critical thinker that integrates rigorous data analysis & high-quality visualizations as demonstrated by 7 published articles & 7 presentations at national conferences

Relevant Experiences

Doctoral Researcher

July 2016 - Present

Johns Hopkins University - Baltimore, MD

- Developed acoustic sensor with optimized polymers for improved signal pickup from water, skin, & wood without airborne noise corruption at sound levels up to 90 dB
- Reduced acoustic sensor size by a factor of 10 while improving manufacturing process for use in a wearable device that monitors body sounds with comparable accuracy to commercially available stethoscopes
- Generated statistical model via optimal design of experiments (DoE) for predicting polymer fabrication conditions to match a specific acoustic impedance with 1.4% accuracy
- Integrated various equipment (simulator, shaker, vibrometer, oscilloscope) with accompanying code (Matlab, LabView) to measure the frequency response, reliability, & power output of electret materials & sensors
- Compiled & analyzed 4 datasets to highlight accuracy & real-world deployability challenges of an acoustic-based COVID-19 algorithm developed using machine learning
- Applied signal processing methods to control the perceptual characteristics of electronic stethoscopes & demonstrated filtering effectiveness with panel of 50 medical professionals
- Managed day-to-day laboratory activities by purchasing supplies, supervising 1 graduate & 4 undergraduate students, & contributing to grants
- Communicated technical results to wide audiences via written documents & oral presentations as demonstrated by 8 conference presentations, 3 grants, 2 patents, & 7 publications

Research Intern

May 2022 - August 2022

Sonavi Labs - Baltimore, MD

- Compiled case of support for new wearable body sound monitoring device by investigating competing technologies & preparing a technical development plan to submit for NIH grant proposal
- Collected & analyzed pulse oximeter, electrocardiogram, & stethoscope data that provided proof-of-concept for inclusion of these sensors in wearable device being commercially developed

Lab Technician

April 2020 - May 2020

Dipole Materials - Baltimore, MD

- Developed preliminary material & solvent formulation for robust fiber formation that led to the production of electrospun nanofiber face mask filters for distribution to local hospitals & online retailers during the COVID-19 pandemic

Acoustic Consultant Intern

September 2015 - December 2015

Shen Milsom & Wilke - Washington, DC

- Conducted site visits at the NIH & National Museum of African American History & Culture to collect acoustic data & provide written report detailing recommendations for optimal acoustic conditions

Research Intern

May 2015 - August 2015

NOAA Office of Coast Survey - Silver Spring, MD

- Analyzed approximately 2 terabytes of acoustical depth data to create a new data ingest workflow for improved ocean floor mapping

Skills

Programming languages	Matlab, Mathematica, Python, R, Arduino, LaTeX, Java
Software	JMP, Minitab, SolidWorks, Pro Tools, Logic Pro, Microsoft Office
Material fabrication & characterization	Electrospinning, corona charging, SEM, XRD, FTIR, electrostatic voltmeter
Graphics	Illustrator, Procreate
Other	Design of experiments, product & resource management, technical writing & communication

Education

Johns Hopkins University (JHU) - Baltimore, MD *2016 - Present*

Ph.D. Electrical and Computer Engineering (Dr. James West laboratory), expected graduation April 2023

Thesis: Acoustic impedance-matched sensor developed towards wearable body sound monitoring

American University (AU) - Washington, DC *2012 - 2016*

Bachelor of Science in Audio Technology and Physics with Honors

Audio technology thesis: Delay-sum beamforming with Playstation Kinect

Physics thesis: Visualizing sound: demonstrations to teach acoustic concepts

Patents

Grant, D., McLane, I., **Rennoll, V.**, West, J. Systems and methods for acoustic-based diagnosis. Provisional patent 63/416,298.

Rennoll, V., McLane, I., Eisape, A., Elhilali, M., West, J. Impedance-matched acoustic transducer, PCT/US2021/054088.

Grants

Johns Hopkins University Discovery Award (2 x $100,000) *July 2019 & 2022*

IEEE Dielectrics & Electrical Insulation Society Graduate Student Fellowship ($5,000) *December 2019*

Leadership

Revision, Editor - JHU *May 2021 - Present*

Edited 1 document every 2 months, including manuscripts, grant applications, & personal statements, for clarity, grammar, & content

Electrical & Computer Engineering Graduate Student Association, President - JHU *September 2021 - July 2022*

Led & organized 3 lunch & learns, 2 outreach opportunities, & 4 study breaks to build graduate community

Adjunct Lecturer - Peabody Institute *August 2021 - December 2021*

Directed graduate-level acoustics course for 12 students with project characterizing impedance-matched sensor for musical applications

Womxn Mentoring Whiting, Mentor - JHU *January 2021 - June 2022*

Mentored 2 undergraduate engineering students to provide support with internship & graduate school applications

Course Instructor - JHU *August 2020 - December 2020*

Developed & taught electret material course for 6 undergraduates with demonstrations on energy harvesting & microphone design

Expanding Your Horizons: STEM Discovery Day, Volunteer - Stevenson University *September 2017 - 2019*

Designed & led workshops introducing roughly 100 participants to the science of sound & construction of a speaker

Southern Elementary School Science Friday, Organizer - Glen Rock, PA *April 2018*

Co-organized event & coordinated over 20 volunteers to introduce elementary students to STEM fields

Girl Scout GENIUS Day, Organizer - New Freedom, PA *April 2017*

Co-organized event to introduce 130 girls to a variety of STEM fields through hands-on workshops

Women in Science, President - AU *June 2015*

Coordinated & led Girl Scout outreach day, Professor Potluck, Alumni Panel, & luncheon with Associate Director for Science at the White House

Sound Foundation, Intern - Culpeper, VA *June 2014 - August 2014*

Documented case of support for nonprofit introducing high school students to STEM & business fields through real-world acoustics projects

Publications

7 peer-reviewed conference & journal publications. Available via Google Scholar Profile.

Awards

Johns Hopkins University Electrical and Computer Engineering, Community Builder Award *May 2022*

Acoustical Society of America, DC Chapter, Oral Presentation Award *May 2015 & 2021*

Collegiate Inventors Competition, Runner Up Award *October 2020*

Maryland State Three Minute Thesis Competition, Audience's Choice *May 2019*

Johns Hopkins University Three Minute Thesis Competition, 2nd Place *April 2019*

Barry Goldwater Scholarship, Honorable Mention *May 2015*

NOAA Hollings Scholar *2014 - 2016*

American University, Dean's List *2012 - 2016*