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

Research Intern
June 2014 - August 2014

APPLIED RESEARCH IN ACOUSTICS - CULPEPER, VA

- Generated parametric underwater noise models for a real-time passive sonar simulation & justified the models in a government report

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*