Meredith Ziliak

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Education

Ph.D in Biological Sciences — Purdue University - Interdisciplinary Life Sciences *(PULSe)*
Focus in integrative neuroscience and computation

B.S. in Neuroscience — Indiana University - Purdue University of Indianapolis *(IUPUI)*
Minor in Spanish; Magna cum laude

Cursos Internacionales — Universidad de Salamanca
Language, grammar, and culture study abroad in Salamanca, Spain

Research Experience

Effects of auditory stressors on peripheral and central auditory systems — Purdue University
Advisor: Edward Bartlett, PhD

- Investigated the acute and longitudinal progression of underlying mechanisms of damage resulting from mild traumatic brain injury (mTBI), aging, acute noise exposure, and continuous noise exposure within the peripheral (cochlear) and central (neural) auditory systems
- Conducted electrophysiological recordings assessing the effects of mTBI on the central auditory system
- Conducted project utilizing d-galactose as a metabolic model of central aging to dissociate contribution of peripheral and central auditory system damage on the age-related hearing loss phenotype
- Conducted project assessing electrophysiological and neuroanatomical changes of the auditory systems in response to small-arms fire-like noise
- Conducted project assessing impact of OSHA-approved sound levels for work-week analogous continuous noise exposure on the auditory systems
- Engineered and constructed sound exposure chamber for controlled delivery of acoustic stimuli
- Produced novel auditory stimuli for auditory evoked potentials to evaluate auditory brainstem responses, middle latency responses, envelope following responses, frequency following responses, and other features indicative of auditory processing capabilities
- Established procedures for perfusion, fixation, immunohistochemical staining, imaging, and analysis of central auditory structures, particularly neurons, glia, neurotransmitters, and cytokines
- Processed electrophysiological biosignals using computational methods and analyzed statistical significance of observed results
- Generated graphical representations of statistical analyses and data forms for posters, theses, and presentations
- Acceded senior position of the lab and took mentor role of all existing and future (until graduated) graduate and undergraduate research assistants

Mental imagery and surgical skill acquisition — IU School of Medicine
Advisor: Dimitrios Stefanidis, MD PhD FACS FASMBS

- Developed multi-pronged experimental procedure assessing cortical activity strength during mental imagery using ranked surveys, robotic surgical skill training, electroencephalography recordings, and brain computer interface tasks
- Recruited, organized contact, and managed over 75 hours of human participant sessions for training on the Da Vinci surgical system
- Consulted Indiana University School of Medicine Department of Surgical Education Board Meetings with knowledge garnered from conducted research to inform surgeon curricula

Pain prediction and perception — IUPUI
Advisor: Kelly Naugle, PhD

- Investigated the use of transcranial direct stimulation as a method of somatosensory pain threshold prediction
- Collected human pain threshold data through use of pressure gun and temperature-controlled water bath

Technical Skills

Software: MatLab, Microsoft Suite, BioRender, Tucker Davis Technologies BioSig RP and SigGen RP,GitHub
Animal Research: Handling, Restraint, Injection, Aseptic technique, Surgical preparation, Suturing, Acclimation, Anesthesia, Euthanasia, Perfusion, Brain extraction, Cochlear extraction, Tissue preservation, Cranial head plate
Wet Lab: Cryostat, Immunohistochemistry, Immunofluorescent imaging
Electrophysiology: Auditory evoked potential, Auditory brainstem response, Middle latency response, Subdermal electrodes, Biosignal processing, Audiometric thresholds, Distortion product otoacoustic emissions

Publications

Rapid and objective assessment of auditory temporal processing using dAM stimuli
2024. bioRxiv. Under review in Communications Biology. Manuscript.

- Parida, S., Yurasits, K., Cancel, V., Zink, M., Mitchell, C., **Ziliak, M.**, Harrison, A., Bartlett, E., and Parthasarathy, A.

Augmenting Mental Imagery for Robotic Surgery Using Neurofeedback
2023. Global Surgical Education - Journal of the Association for Surgical Education. Manuscript.

- Anton, N., **Ziliak, M.**, and Stefanidis, D.

Presentations and Posters

The Effects of Small Arms Fire-Like Noise on Hearing Loss and Thalamocortical Processing
2023. Seminars in Hearing Research at Purdue. Presentation.

- **Ziliak, M.**, Bell, E., Navarro, A., and Bartlett, E.

Examining the Middle Latency Response in the D-galactose Model of Aging
2023. Seminars in Hearing Research at Purdue. Presentation.

- **Ziliak, M.**, Harrison, A., and Bartlett, E.

Relationship Between Cortical Activity During Mental Imagery and Surgical Skill
2022. Association for Surgical Education at Surgical Education Week. Presentation.

- Anton, N., Ziliak, M., Thomas, C., Smith, A., and Stefanidis, D.

Assessing Surgeon Mental Imagery
2020. American College of Surgeons Surgical Simulation Summit. Presentation.

- **Ziliak, M.**, Anton, A., and Stefanidis, D.

Changes in peripheral and subcortical auditory processing in response to SAF noise exposure
2024. Big 10 Neuroscience Annual Meeting. Poster

- **Ziliak, M.**, Bell, E., Navarro, A., Marrone, J., Desai, S., and Bartlett, E.

The Impact of Small Arms Fire on Temporal Processing
2024. Association for Research in Otolaryngology. Poster

- **Ziliak, M.**, Bell, E., Navarro, A. Harrison, A., and Bartlett, E.

Adaptation to Repeated Rapid Onset Stimuli in a Metabolic Model of Aging
2023. Big Ten Neuroscience Annual Meeting. Poster

- **Ziliak, M.**, Harrison, A., and Bartlett, E.

Relationship Between Cortical Activity During Mental Imagery and Surgical Skill
2023. Indiana University School of Medicine Education Day. Poster

- Anton, N., Thomas, C., **Ziliak, M.**, Smith, A., and Stefanidis, D.

Rapid Assessment of Temporal Processing Using Dynamic Amplitude Modulated Stimuli
2023. Association for Research in Otolaryngology. Poster.

- Parida, S., Yurasits, K., Cancel, V., Zink, M., Mitchell, C., **Ziliak, M.**, Harrison, A., Bartlett, E., and Parthasarathy, A.

Auditory Deficits Following Traumatic Brain Injury
2022. Midwest Auditory Research Conference. Poster.

- Fernandez, J., **Ziliak, M.**, Shi, R., and Bartlett, E.

Fellowships, Grants, and Awards

NRSA T32 Training Grant - NIDCD — National Institute of Health
Training Program in Auditory Neuroscience fellowship at Purdue University

Graduate Student Ambassador — Purdue University
Sloan Center for Systemic Change Graduate Student Ambassador

Andrews Fellowship — Purdue University - PULSe
PhD program fellowship

Bepko Scholar and Fellow — IUPUI Honors College
Excellence in community service and personal growth

Foundations of College Teaching Certification — Purdue University
Applying the science of teaching and learning to a learner-centered environment

Ultimate Achievement Award — Toyota Motor Engineering
Recognition of excellence in academic, personal, and community-serving endeavors

Undergraduate Research Opportunity Program — IUPUI
Research grant for the student, project, and mentor of a summer research assistantship

IUPUI Top 100 Student — IUPUI
Top 100 student out of all junior and senior undergraduate students

Indumati Sukhatme RISE Study Abroad Scholarship — IUPUI
Study abroad scholarship for Cursos Internacionales Salamanca, Spain

Leadership Experience

Laboratory Mentorship, Training, and Management | *Central Auditory Processing Laboratory* — ongiong

- Mentor and senior of all undergraduate and graduate students within the central auditory processing (CAP) laboratory
- Responsible for all training on concepts, skills, and procedures within the laboratory.
- Mentor of undergraduate A. Harrison who won Best Presenter at the Summer Undergraduate Research Fellowship Symposium
- First-Year Mentorship Program Mentor for incoming PULSe students

Auditory Neuroscience Association at Purdue | *Interdisciplinary Training Program at Purdue* — ongiong

- Treasurer responsible for the budget, plan, and execution of all financial needs for student meetings, including invited seminars, workshops, social functions, and tabling.
- Attend meetings, functions, and workshops hosted by ANAP and its related groups: Hearing Sciences and PIIN

Grant Review and Allocation Committee | *Purdue Graduate Student Government* — ongiong

- Vice chair of travel grants responsible for annual management and review of over 1,000 student grants, creation of algorithmic budget for distribution of grants, and allocation of over 120,000 USD in available funds
- Conducted distribution of travel grants to grant reviewers for scoring of grants and voting of budget decisions
- Reviewed, scored, and selected awardees for additional graduate grants including symposium, professional, and graduate student organization grants

Whistle Stop Swing Exchange | *Purdue Night Train Swing Club* — ongiong

- Director, creator, and producer of Whistle Stop committee designed to plan and execute 72-hour swing dance exchange for the enjoyment of over 200 attendees from across the nation with a budget over 45,000 USD
- Instructor coordinator responsible for the contact, communication, representation, and holistic well-being of all national and international instructors invited to Whistle Stop

COVID-19 Contact Tracer | *IUPUI Fairbanks School of Public Health*

- Provided compassion and understanding to those afflicted with COVID-19, guiding them through next steps after testing positive and providing necessary resources
- Communicated care and critical information in-person throughout my designated region, as well as remotely through long-distance approaches