Jessie Sheflin

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EDUCATION

- **M.S. in Computer Science, Northwestern University**, Expected June 2025;
  - 4.0 GPA
  - Courses: Machine Learning, Operating Systems, Ubiquitous Computing
  - Thesis: Analysis Techniques for Electrical Impedance Tomography
- **B.S. in Biomedical Engineering, Northwestern University**, Expected June 2025;
  - 3.9 Major GPA
  - Courses: Signals and Circuits sequence, Computational Genomics, Medical Imaging

RESEARCH EXPERIENCE

Masters Researcher with SPICE Lab, Northwestern University
Sep 2024-Present

- Engineered a new signal processing method to account for electrode malfunction
- Created a diffusion model to upgrade image quality for a novel modality
- Wrote firmware and software for a device that monitors hand pose live using electrical impedance tomography
- Designed GUIs for finite element analysis and anatomical display in PyQT

Undergraduate Researcher with Grayson Lab, Northwestern University
Sep 2023-Present

- Created new mathematical methods to characterize the resolution of electrical impedance tomography at different points in space in finite element methods
- Designed algorithms to accurately invert a small number of data points
- Implemented three live demos for the IEEE BSN conference involving writing firmware, data analysis, and GUI code
- Two patent applications - one for resolution characterization, the other for prosthetic sensor design

Summer Undergraduate Research Grant, Northwestern University
Jun 2024-Sep 2024

- Wrote and was awarded novel research grant proposal that funded research for three months
- Learned PyTorch and use of high performance computing clusters
- Developed distinguishability metric for electrical impedance tomography using conformal mapping, complex analysis, and multivariate calculus, as well as plotting in MATLAB

Laboratory Technician for Pinkett Lab, Northwestern University
Sep 2021-Present

- Completed data entry, statistical analysis, and data visualization independently
- Executed protein purification, cell competency, and gel electrophoresis
- Trained and supervised other work-study and volunteer students joining the lab

PUBLICATIONS

Sheflin, J., Onsager, C., Grayson, M., Resolution Maps: A Novel Metric for Electrical Impedance Tomography, *International Conference on Body Sensor Networks (BSN)*, Chicago, IL, USA, 2024
Sheflin, J. (2024). PODPose: Integrating Proper Orthogonal Decomposition and EITPose (Version 1). arXiv. https://doi.org/10.48550/ARXIV.2412.08036

PRESENTATIONS & DEMONSTRATIONS

Bah, A., Onsager, C., **Sheflin, J.**, Ganeshan, S., Bamba, A., Bulst, M., Major, M., Grayson, M., Data-Driven 3D Electrical Impedance Tomography for Continuous Monitoring Prosthetics, *Chicago BioEngineering Conference*, Chicago, IL, USA, 2024
Aygen, C., **Sheflin, J.**, Ganeshan, S., Onsager, C., Bulst, M., Grayson, M., Demo: Data-driven Electrical Impedance Tomography for Case-by-Case Inverse Problems, *International Conference on Body Sensor Networks (BSN)*, Chicago, IL, USA, 2024
Ganeshan, S., **Sheflin, J.**, Onsager, C., Considine, K., Bamba, A., Grayson, M., Demo: Data-driven Electrical Impedance Tomography for Parameterizable Inverse Problems, *International Conference on Body Sensor Networks (BSN)*, Chicago, IL, USA, 2024
Bah, A., Onsager, C., **Sheflin, J.**, Ganeshan, S., Bulst, M., Grayson, Major, M., M., Demo: Data-Driven 3D Electrical Impedance Tomography for Continuous Monitoring Prosthetics, *International Conference on Body Sensor Networks (BSN)*, Chicago, IL, USA, 2024

LEADERSHIP & OUTREACH

Peer Mentor for BMD_ENG 325, Medical Imaging, Northwestern University
Sep 2024-Dec 2024

- Tutored students in technical concepts related to my area of research
- Held office hours where I taught students medical imaging principles

Executive Board, Slivka Residential College, Northwestern University
Sep 2024-Dec 2024

- Provided technical support for Slivka, including website administration
- Updated constitution to expand gender-neutral dorms

TECHNICAL SKILLS

- Technologies: Python, MATLAB, R, C, Racket, GIMP, Solidworks, PyTorch, NumPy, PyQT
- Languages: Spanish (intermediate), French (beginner)

HONORS & AWARDS

- Fletcher Prize Finalist awarded for proposal and result of summer undergraduate research grant - top ten from 251 eligible students
- Tau Beta Pi awarded for high GPA in the engineering college