JACOB SAGE VIETORISZ

Cambridge, MA | Email: jacobvietorisz@gmail.com | Phone: (203) 914-4508

RESEARCH AND PROFESSIONAL EXPERIENCE

Delsys Inc., Altec Research Natick, MA

Research Scientist June 2024 - Present

- Lead technical research developing and deploying machine learning and signal processing algorithms on optical sensors and embedded systems in scientific research instruments
- Pioneered a long-range signal processing framework consisting of a deep neural source separation network and a time-evolving Bayesian Inference process, which enabled high-level understanding of the physical processes underlying noisy measurement data
- Translated high-level Python algorithm prototypes into optimized, cross-compiled C++ code to run in a low-latency, multi-threaded embedded system
- Managed a cross-functional team of 5 researchers and engineers in the design and implementation of a software system architecture for a wearable sensor prototype; conducted design meetings, code review, testing, version control, profiling, debugging, and documentation
- Communicated findings to senior research personnel and funding partners through monthly written reports and presentations; currently writing research paper as first author for greater scientific community

Research Engineer September 2023 - June 2024

- Executed Monte Carlo simulations of light propagation in tissue and used results to design a multi-axis optical sensor that resolved anisotropic lensing effects in human tissue; this sensor became a cornerstone technology used across two separately funded research projects in my group
- Built symbolic regression and feature clustering pipelines to process sensor data from experiments
- Built and tested acoustic communications protocol for a multi-nodal sensor communication network

rStream Recycling*, R&D Intern, Machine Learning* Sommerville, MA | Summer 2023

- Developed a graph-based clustering algorithm for hierarchizing image masks generated by DNN segmentation models that did not rely on semantic prompts to enhance object classification and localization
- Prepared a custom data set of images and their hierarchized segmentation masks for model fine-tuning

Adept Materials, *R&D Test Engineering Intern* Providence, RI | Summer 2023

- Developed quantitative models to predict passive moisture and temperature regulation in novel sustainable materials
- Designed and constructed hardware prototypes to evaluate materials on their performance and durability

Stein Lab, Brown University Department of Physics, *Undergraduate Researcher* Providence, RI | May 2020 - May 2023

- Developed theoretical models of laser light interactions with peptides for single-molecule sequencing
- Spearheaded the design, assembly, and programming of an automated laser alignment system for imaging a nanometer-scale target
- Optimized beam alignment using classical- and deep-learning-based non-linear regression to analyze laser-scan images
- Acquired University-backed patent for methods and technology for photofragmenting peptides

EDUCATION

Brown University – Cumulative GPA**:** 3.9/4.0 Providence, RI | September 2019-May 2023

Sc.B. with Honors – Physics

- Honors Thesis, Department of Physics: *Applications of Laser Light in Single-Molecule Protein Sequencing: An Analysis of Peptide Photofragmentation and Nanostructure Imaging and Localization by Laser Scanning*

A.B. – English Literature

JACOB SAGE VIETORISZ

Cambridge, MA | Email: jacobvietorisz@gmail.com | Phone: (203) 914-4508

SKILLS, LANGUAGES, AND INTERESTS

- Python, C++, Git/Github, Machine Learning/AI for Science, command line tooling and development in Windows/Linux/MacOS, familiarity with LLVM and Static Single Assignment intermediate representations
- Technical writing and presentation (LaTex, Microsoft Office suite)
- Quantum Physics, AMO Physics, laser optics, analog and digital circuit design
- Fluent in English and proficient in Spanish (reading, writing, speaking)
- Avid rock climber, hiker, skier, cyclist, and environmentally-conscious outdoor recreation enthusiast

PUBLICATIONS

- **Vietorisz, J.S.**, Chiodini, J., Iyer, A., DeLuca, G., Kline, J.C. *Physiological Sparse Inference from Multi-Axis Photoplethysmography: A time-evolving sparse Bayesian inference framework for motion-robust vital sign estimation* [research paper], currently writing (2025).
- Drachman, N., **Vietorisz, J.S.**, Winchester, A., Vest, R., Cooksey, G., Pookpanratana, S., Stein, D. *Photolysis of the peptide bond at 193 nm and 222 nm* [research paper], accepted by Journal of Chemical Physics (2025).
- Stein, D. M., **Vietorisz, J. S.**, and Drachman, N. *Systems and methods for analysis of peptide photodissociation for single-molecule protein sequencing*. U.S. Patent US-20240361331-A1. (2024).
- Drachman, N., **Vietorisz, J.S.**, and Stein, D.M. *UV photofragmentation of peptides for single molecule protein sequencing by mass spectrometry* [conference session], Conference on Single-Molecule Protein Sequencing (SMPS3), Delft University of Technology, Delft, Netherlands (2022).
- **Vietorisz, J.S.**, Drachman, Nicholas, and Stein, D. M. *An Analysis of Peptide Photofragmentation for Single-Molecule Protein Sequencing* [poster presentation]. (2022, August 4-5). Summer Research Symposium, Brown Digital Repository, Brown University Library, Providence, RI. https://doi.org/10.26300/m7pz-9050
- **Vietorisz, J.S.**, Drachman, N., and Stein, D.M., *Analysis of peptide photofragmentation for single-molecule protein sequencing* [research paper]. Submitted to iScience (2021).