JOSHUA S. SODICOFF

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EDUCATION

University of Michigan *Ann Arbor, MI*
B.S.E. in Biomedical Engineering, minor in Computer Science *2018-2022*
GPA: 3.90/4.0
Relevant Courses*: Quantitative Cell Biology, Data Structures and Algorithms, Artificial Intelligence, Environmental Molecular Biology, Biochemistry, Microbial Ecology*

RESEARCH

University of Michigan Department of Computational Medicine and Bioinformatics *Ann Arbor, MI*
Research Lab Specialist under Dr. Joshua Welch *2022 -*
- Plan and execute regulatory and procurement operations and develop protocols for the development of a new wet laboratory space for use in the study of directed differentiation of induced pluripotent stem cells
- Organize and complete computational, analysis tasks associated with the continuing NIH Brain Initiative Cell Census Network
- Manage group operations, including but not limited to onboarding lab members, planning lab meetings, organizing collaborations between students and groups

University of Michigan Department of Biomedical Engineering *Ann Arbor, MI*
Research Assistant under Dr. Joseph Decker in the Shea Lab *2020 - 2021*
- Optimized immunohistochemistry and microscopy protocols of tissue sections for the visualization of chimeric antigen receptor (CAR)-T cell activity in tumors and pre-metastatic microenvironments
- Produced CAR-T cells engineered to detect Her2 and CD19 as a potential immunotherapy for breast cancer and validated through the performance of killing assays and ELISA
- Developed a Shiny application for user-friendly analysis of single cell data from immune cells with tools for cluster annotation with canonical markers, differential expression and transcription factor activity analysis, and network inference with Seurat, CONOS, and VIPER

University of Michigan Department of Computational Medicine and Bioinformatics *Ann Arbor, MI*
Research Assistant under Dr. Joshua Welch *2019- 2022*
- Develop a toolkit for cell type deconvolution of diverse spatial transcriptomic datasets with scRNA-seq data using matrix methods and statistical techniques in R
- Analyze multimodal murine neural single cell data from cortical regions with integrative nonnegative matrix factorization in R to develop a whole brain cell atlas as part of the NIH Brain Initiative Cell Census Network
- Increase accessibility of Liger package for R through the implementation of functionality for processing raw data and interpretation of results, as well as through the authorship of vignettes, documentation, and journal articles

University of Michigan Department of Computational Medicine and Bioinformatics *Ann Arbor, MI*
Research Assistant under Dr. Yang Zhang *2018-2019*
- Studied the properties of ID (inhibitor of DNA binding) proteins and their relationship to cell growth and differentiation through both literature review and visualization in PyMol
- Utilized I-TASSER and QUARK protein structure prediction tools and EvoDesign protein design tools to develop an ID-like protein
- Studied and presented on application of post-translational modification prediction for protein design

EXPERIENCE

University of Michigan Department of Biomedical Engineering *Ann Arbor, MI*
Instructional Aide For BME418: Quantitative Cell Biology *2021*
- Provide instructional support for the course of over 40 students, including answering questions during lecture, hosting office hours and administering a Piazza page
- Wrote additional questions for homeworks and reading quizzes designed to strengthen student model-building skills

University of Michigan Department of Mathematics *Ann Arbor, MI*
Linear Algebra Proof Tutor *2021*
- Worked one-on-one with students to clarify course concepts, develop proof-writing techniques, and develop proofs for weekly homework assignments

University of Michigan Science Learning Center *Ann Arbor, MI*
Study Group Facilitator for MCDB 310: Introductory Biochemistry *2021*
- Facilitated a weekly remote study group for undergraduates by providing instructional support, guiding the direction of discussion, and distributing and reviewing additional practice assignments
- Developed study group agendas, review activities and educational materials to support students in the course

Engineering Research Symposium *Ann Arbor, MI*
Planning Committee Co-chair *2020-2021*
- Oversee a team of over forty students to plan a multi-session, College-wide research symposium while introducing a new research proposal competition and addressing long-standing issues in judging procedure
- Planned a judged research poster presentation session for College of Engineering undergraduates
- Aided in the transition of the event to an online format by developing new abstract and presentation templates and guidelines and evaluating possible methods of running the event

University of Michigan Department of Biomedical Engineering *Ann Arbor, MI*
Instructional Aide for BME499.06: Artificial Intelligence in BME *2020 - 2022*
- Wrote instructional materials including code demonstrations, documentation of relevant packages, and homework keys on the application of machine learning methods to the analysis of biomedical data
- Provided instructional support for the course of over 50 students, including answering questions during lecture, hosting office hours, grading all assignments, and administering a Piazza page
- Modified existing course content to substitute demonstrations in MATLAB with R

Inter-Cooperative Council *Ann Arbor, MI*
Representative of the Board of Directors *2020-2021*
- Engaged in strategic planning and decision-making for a 500+ member nonprofit housing cooperative
- Advocated for member interests and questions on COVID policies, budgetary restrictions, and the financial state of the organization
- Planned and administered network-wide events and initiatives in support of the ICC Diversity Committee

Students Demand Representation *Ann Arbor, MI*
Organizer, core team member *2020-2021*
- Plan and administered rallies, phone and email zaps, and other actions in support of university transparency and democratic governance
- Extensively research university governance structures and politics to write demands and policy proposals

Michigan Synthetic Biology Team *Ann Arbor, MI*
Team member *2019-2020*

- Represented the organization, its interests, and its research at public outreach events, regional IGEM meetups, and department meetings
- Planned and ran experiments for the creation and validation of constructs

PUBLICATIONS

Lê Cao K.A., Abadi A., [...], **Sodicoff J.**, [...], Culhane A., Fertig E. (2021) Community-wide hackathons to identify central themes in single cell multiomics *Genome Biology*

Liu J., Gao C., **Sodicoff J.**, Kozareva V., Macosko E.Z., Welch J.D. (2020) Jointly Defining Cell Types from Multiple Single-Cell Datasets Using LIGER. *Nature Protocols*

PRESENTATIONS AND POSTERS

Sodicoff J., Kriebel A., Welch J.D.(June 2022) Distribution-free deconvolution of spatial transcriptomic data using heterogeneous single-cell datasets. *BRAIN Initiative Investigators Meeting* Bethesda, MD

Sodicoff J., Decker J, Shea L.. (August 2021) Application of immunohistochemistry to the analysis of CAR-T cell therapy in triple negative breast cancer . *UM Summer Undergraduate Research in Engineering Symposium* Ann Arbor, MI

Sodicoff J., Welch J.D. (November 2020) Deconvolving spatial transcriptomic data using heterogeneous single-cell datasets. *UM Data Science Symposium*, Ann Arbor, MI

Sodicoff J., Welch J.D.. (June 2020) Application of LIGER to integration of seqFISH and scRNA-seq. *Mathematical Frameworks for Integrative Analysis of Emerging Biological Data Types*, Banff, AB

Sodicoff J., Coonan J. (June 2020) Blue Bus Logistics in the Age of COVID-19. *COVID Campus Challenge*, Ann Arbor, MI

Sodicoff J., Matsushita Y., Ono W., Welch J.D., Ono N. (July 2019) Integrative Single-Cell Genomic Analysis of Mesenchymal Stem Cells. *Undergraduate Research Opportunities Program Summer Research Symposium*, Ann Arbor, MI

Sodicoff J., Huang X., Zhang Y. (April 2019) Designing an ID-like Protein In Silico. *Undergraduate Research Opportunities Program Spring Research Symposium*, Ann Arbor, MI

HONORS AND AWARDS

Graduate Research Fellowship Program Honorable Mention *2022*
National Science Foundation
Michigan Engineering Alumni Board Endowed Scholarship *2021*
University of Michigan
Astronaut Scholarship Nominee *2021*
University of Michigan
C. and M. Donovan Scholarship *2020*
University of Michigan College of Engineering
University Honors, all semesters *2018 - present*
University of Michigan

SKILLS

Computational: R, C++, MATLAB, Python, bash scripting, Git, high performance computing cluster, time and space complexity analysis, software profiling, Markdown, LaTex
Laboratory: Cell culture, immunohistochemistry, tissue staining, fluorescence and brightfield microscopy, gel electrophoresis, plasmid preparation, transfection, infection, killing assay, ELISA, fixation, cryogenic storage, flow cytometry
Miscellaneous: Technical writing, public speaking, grassroots organizing, group facilitation, audio production, origami, epistemology