

Susan (Suzie) L. Hoops

Ph.D. Candidate, Graduate Researcher
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EDUCATION

Doctor of Philosophy, Computer Science (GPA 4.0)

Expected 2024

Master of Science, Computer Science (GPA 4.0)

Feb 2023

University of Minnesota-Twin Cities

Minneapolis, MN

Bachelor of Arts, Mathematics (GPA 3.57)

May 2017

St. Olaf College

Northfield, MN

RESEARCH EXPERIENCE

Graduate Researcher

Sep 2020 - Present

University of Minnesota-Twin Cities | Advised by Dan Knights

Minneapolis, MN

- Directed metagenomic analysis (Python, R) and data management (SQL) for clinical studies totaling 6,000+ samples.
- Created a machine learning pipeline with 12% improved performance tracking bacteria in microbial transfer therapy.
- Diagnosed dimensionality reduction anomalies in multivariate datasets, improving model accuracy by 28%.
- Advised 7 researchers and assisted in teaching courses covering machine learning, genomics, and Python.

Data Scientist / Researcher 2

Sep 2018 - Aug 2020

University of Minnesota-Twin Cities | Computer Science & Engineering

Minneapolis, MN

- Developed statistical workflows in R and Python for disseminating gut microbiome findings in longitudinal studies.
- Collaborating with interdisciplinary teams of physicians, clinical researchers, community members, and scientists.
- Selected presenter at a Stanford University conference, introducing my work in dimensionality reduction approaches.

Fulbright Student

Sep 2017 - June 2018

Fulbright U.S. Program | Johannes Kepler Universität | Advised by Marc Streit

Linz, Austria

- Visualized GitHub version control system as a graph in Python and D3.js to represent computational optimization.
- Taught English in a local secondary school and completed courses for the Technical Mathematics M.S. at JKU Linz.

Data Science Intern

May 2017 - Aug 2017

CoreBiome | Diversigen

Saint Paul, MN

- Automated custom microbiome analysis software on AWS using EC2 cloud computing and S3 storage.
- Constructed the company website using Wix, developed interactive visualizations for clients in Python and D3.js.

SKILLS

Programming: Python, R, SQL, C++, GitHub, Linux, MATLAB, LaTeX, D3.js, HTML, CSS

Data Handling: AWS storage (S3), AWS computing (EC2), Relational databases (RedCAP), HPC cluster computing

Data Analysis: Hypothesis testing, Machine Learning, Bayesian statistics, Deep Learning (PyTorch, TensorFlow, SciKit)

Languages: English (native), German (conversational), American Sign Language (beginner)

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TEACHING EXPERIENCE

- Graduate Teaching Assistant**, Introduction to Computing and Programming Concepts (CS 1133) **Jan 2024-May 2024**
Graduate Teaching Assistant, Machine Learning Fundamentals (CS 5521) **Jan 2022-May 2022**
Graduate Teaching Assistant, Computational Techniques for Genomics (CS 5481) **Sep 2022-Dec 2023**
University of Minnesota-Twin Cities *Minneapolis, MN*
- Teaching debugging strategies for student code and writing pseudocode to introduce challenging assignments.
 - Providing constructive feedback on assignments and diagnosing origins of mistakes in student code submissions.
 - Directing undergraduate TAs (CS 1133) in fair grading practices and helpful conversation approaches.
- Teaching Assistant**, Computer Science for Scientists and Mathematicians (CS 125) **Feb 2016-May 2016**
St. Olaf College *Northfield, MN*
- Creating an interdisciplinary project in collaboration with a microbiology course, providing students with practical experience in communicating with domain experts and conducting research-based statistics.

LEADERSHIP & OUTREACH

- Board Member**, *Fulbright Association of Minnesota* **July 2019-July 2022**
- Organizing chapter-wide events, bringing together Fulbright alumni and international students/scholars.
- Director of Finance**, *Council of Graduate Students, University of Minnesota-Twin Cities* **July 2020-July 2021**
- Budgeting funds (\$150k+ annually) which supported student travel grants, activities, and advocacy efforts.
- President**, *Habitat for Humanity, St. Olaf College* **Sep 2015-May 2017**
- Planning volunteer builder and fundraising opportunities, facilitating student-led trips to sites around the USA.
- Captain**, *Women's Cross Country and Track & Field, St. Olaf College* **Sep 2015-May 2017**
- Leading team activities, mentoring teammates, and opening communication between coaches and athletes.

AWARDS & GRANTS

NSF Travel Fellowship, *GLBIO* (2023)
Honorable Mention, *NSF Graduate Research Fellowship Program* (2021)
Fulbright Combined Award, *Fulbright Association* (2017)
MIAC Sportsmanship Award, *Minnesota Intercollegiate Athletic Conference* (2017)
Program Director of the Year, *St. Olaf College Leadership Awards* (2016)

PUBLICATIONS

Hoops, S. L. and Knights, D. (2023). LMdist: Local Manifold distance accurately measures beta diversity in ecological gradients. *Bioinformatics*, Volume 39, Issue 12. <https://doi.org/10.1093/bioinformatics/btad727>

Vangay, P., ... **Hoops, S. L.**, ... & Knights, D. (2023). Industrialized human gut microbiota increases CD8+ T cells and mucus thickness in humanized mouse gut. *Gut Microbes*, 15(2). <https://doi.org/10.1080/19490976.2023.2266627>

Samara, J., ... **Hoops, S.**, ... and Arrieta, M. (2022). Supplementation with a probiotic mixture accelerates gut microbiome maturation and reduces intestinal inflammation in extremely preterm infants. *Cell Host & Microbe*, 30(5), 696-711. doi: 10.1016/j.chom.2022.04.005. PMID: 35550672.

Choi, Y., **Hoops, S. L.**, Thoma, C. J., & Johnson, A. J. (2022). A Guide to Dietary Pattern–Microbiome Data Integration. *The Journal of Nutrition*, 152(5), 1187-1199. doi: 10.1093/jn/nxac033. PMID: 35348723; PMCID: PMC9071309.

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- Ross, K. F., ... **Hoops, S. L.**, ... and Herzberg, M. C. (2021). Calprotectin (S100A8/A9) is an Innate Immune Effector in Experimental Periodontitis. *Infection and Immunity*. IAI-00122. <https://doi.org/10.1128/IAI.00122-21>
- Benny, P. A., ... **Hoops, S.**, Knights, D., and Garmire L. (2021). Placentas delivered by pre-pregnant obese women have reduced abundance and diversity in the microbiome. *The FASEB Journal*, 35.4, 0892-6638. <https://doi.org/10.1096/fj.202002184RR>
- Johnson, A. J., Zhou, S., **Hoops, S. L.**, ... and Nelson, A. C. (2021). Saliva testing is accurate for early-stage and presymptomatic COVID-19. *medRxiv*. <https://doi.org/10.1101/2021.03.03.21252830>
- Joseph, N., Clayton, J. B., **Hoops, S. L.**, ... and Nordin, S. A. (2020). Alteration of the Gut Microbiome in Normal and Overweight School Children from Selangor with Lactobacillus Fermented Milk Administration. *Evolutionary Bioinformatics*, 16, 1176934320965943. <https://doi.org/10.1177/1176934320965943>
- Clayton, J. B., Shields-Cutler, R. R., **Hoops, S. L.**, ... and Knights, D. (2019). Bacterial community structure and function distinguish gut sites in captive red-shanked doucs, *Pygathrix nemaeus*. *American journal of primatology*, 81(10-11), e22977. <https://doi.org/10.1002/ajp.22977>

POSTERS, PRESENTATIONS, LECTURES

- 2023 **Hoops S.** LMDist: Local Manifold distance accurately measures beta diversity in ecological gradients. **Seminar Speaker**, BioFilm Club, University of Minnesota Twin Cities. Minneapolis, MN. Oct 2023.
- 2023 **Hoops S.** LMDist: uncovering gradients in beta diversity. **Guest Lecture**, MICE 5035, University of Minnesota Twin Cities. Minneapolis, MN. Sep 2023.
- 2023 **Hoops S.**, Knights D. Identifying patterns and addressing pitfalls in beta diversity analyses. **Abstract Talk**, GLBIO 2023. Montreal, Canada. May 2023.
- 2022 **Hoops S.** Microbiome beta diversity measures, visuals, and anomalies. **Guest Lecture**, MICE 5035, University of Minnesota Twin Cities. Minneapolis, MN. Oct 19 2022.
- Hoops S.** Uncovering gradients in microbiome arch effects. **Guest Lecture**, MICE 5035, University of Minnesota Twin Cities. Minneapolis, MN. Mar 2 2022.
- 2021 **Hoops S.** Recovering hidden gradients in microbiome diversity analyses. **Abstract Talk**, Microbiome Panel, Great Lakes Bioinformatics Conference 2021. Virtual. May 12 2021.
- 2020 **Hoops S.** The impact of Group B Streptococcus intrapartum antibiotic prophylaxis on the neonatal microbiome at 1-month age. **Panel Presenter**, Pediatric Academic Society Meeting 2020. Virtual. Aug 4, 2020.
- Hoops S.** Characterizing microbiome variation in longitudinal studies. **Invited Speaker**, BioFilm Club, University of Minnesota. Minneapolis, MN. Feb 21 2020.
- 2019 **Hoops S.**, Houtti M. Data visualization with ggplot2. **Guest Lecture**, BIOC 5361, University of Minnesota. St. Paul, MN. Oct 31 2019.
- Hoops S.** Interpreting gradients in microbiome visualizations. **Selected Poster Talk**, Bioinformatics for the Microbiome Symposium 2019, Stanford University. Palo Alto, CA. Oct 28 2019.
- 2018 **Hoops S.**, Streit M. Provenance tracking in JupyterLab. **Poster**, American Studies Conference 2018. Strobl, Austria. April 2018.
- 2017 Norberg Z, **Hoops S.**, Pearce M, Dmytrenko S, Sanchez-Gonzalez R, Richey M. Analysis of high-speed gaseous flows using molecular tagging velocimetry and the Hough transform. **Poster**, National Conference on Undergraduate Research 2017. Memphis, TN. April 2017.
- 2016 Rives H, **Hoops S.**, Richey M, Freedberg S. Identifying non-monophylogeny in phylogenetic trees. **Poster**, National Conference on Undergraduate Research 2016. Asheville, NC. April 2016.
- 2014 **Hoops S.**, Purin M. Reversing directed graph edges yields inverse determinants. **Poster**, Honors Day, St. Olaf College. Northfield, MN. May 2014.

PEER REVIEWS

- mSystems, 2024, 1 article
- mSystems, 2023, 1 article
- mSystems, 2022, 1 article
- PLOS Computational Biology, 2022, 1 article