

# Alexander M. Bergendorf

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## EDUCATION

**Case Western Reserve University**, Cleveland, OH May 2027 (expected)  
Doctor of Philosophy, Systems Biology and Bioinformatics  
Cumulative GPA: 3.50/4.00

**Purdue University**, West Lafayette, IN May 2024  
Bachelor of Science in Biomedical Engineering  
Minor in Bioinformatics  
Cumulative GPA: 3.57/4.00

**Relevant Coursework:** Linear Algebra and Differential Equations, Biology of the Living Cell, Statistical Methods, Computational Genomics, R for Molecular Biosciences, Applied Regression Analysis, Molecular Biology, Cellular Biology, Bioinformatics for Systems Biology, Current Proteomics and Bioinformatics

## RESEARCH EXPERIENCE

**Case Western Reserve University**, Cleveland OH December 2024 – Present  
*Graduate Research Student: Dr. Douglas K. Brubaker Lab*

- Leveraged public data to develop an atlas of >800k UC/control colonic cells to reveal disease insights
- Developed metabolite enrichment pipeline to computationally link metabolites with UC cellular states
- Used PyTorch autoencoder model to identify microbial communities associated with IVF outcomes
- Performed analyses on clinical psoriasis data to identify microbiome factors associated with disease states

**Case Western Reserve University**, Cleveland OH July 2024 – December 2024  
*Rotating Research Student: Labs of Douglas Brubaker, William Bush, Mihriban Karaayvaz*

- Trained a PyTorch autoencoder model to integrate drugs and microbiome factors in a shared latent space
- Investigated Alzheimer's disease rare missense variants within the spatial distribution of protein structures
- Created deep learning classifier model to predict breast cancer variant carrier status from imaging modalities

**Regeneron Pharmaceuticals**, Tarrytown, NY August 2022 – May 2023  
*Molecular Profiling and Data Science Co-op*

- Built R and Python pipelines to process/analyze scRNA-seq/CITE-seq/TCR-seq data in HPC environment
- Extracted biomarkers associated with response/non-response to biologic treatment from different tissues
- Delivered three 30-minute technical presentations to the Immuno-Oncology Analytics Group

**Purdue University**, West Lafayette, IN February 2021 – June 2024  
*Undergraduate Research Student: Dr. Douglas K. Brubaker Lab*

- Leveraged CIBERSORTx to predict the cell-type specific proportions and gene expression profiles of bulk clinical inflammatory bowel disease data from single-cell data
- Utilized cross-species translation model TransComp-R to novelly translate information found in single-cell microglia across disease models to enhance therapeutic biomarker discovery for Alzheimer's disease

## PUBLICATIONS

**Bergendorf AM et al.** A Vaginal Microbiome Pharmacology Neural Network Model for Analysis of Combinatorial Patient-Specific Microbiome Signatures for Therapeutic Development and Reproductive Health Insights. *Submitted to Pacific Symposium on Biocomputing*. 2025 Aug 1.

Ball BK, Park JH, **Bergendorf AM**, Proctor EA, Brubaker DK. Translational disease modeling of peripheral blood identifies type 2 diabetes biomarkers predictive of Alzheimer’s disease. *npj Syst Biol Appl*. 2025 May 29. doi: 10.1038/s41540-025-00539-5.

**Bergendorf AM\***, Park JH\*, Ball BK, Brubaker DK. Mouse-to-human modeling of microglia single-nucleus transcriptomics identifies immune signaling pathways and potential therapeutic candidates associated with Alzheimer's disease. *bioRxiv* [Preprint]. 2025 Feb 8. doi: 10.1101/2025.02.07.637100. \*Equal contribution

Suarez-Lopez L, Shui B, Brubaker DK, Hill M, **Bergendorf AM**, Changelian PS, Laguna A, Starchenko A, Lauffenburger DA, Haigis KM. Cross-species transcriptomic signatures predict response to MK2 inhibition in mouse models of chronic inflammation. *iScience*. 2021 Nov 7. doi: 10.1016/j.isci.2021.103406.

**PRESENTATIONS**

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**Bergendorf AM**, Brubaker DK. Leveraging Gut Microbiome-Derived Metabolites for Therapeutic Discovery in Ulcerative Colitis. Oral Presentation: BMES Annual Meeting. Oct 2025

**Bergendorf AM**, Park JH, Ball BK, Brubaker DK. Mouse to Human Modeling of Single-Nuclei RNA-Sequenced Microglia Identifies Pathways and Drug Signatures Associated with Alzheimer’s Disease. Oral Presentation: BMES Annual Meeting. Oct 2024

**Bergendorf AM**, Munoz J, Rahal M, Bohm M, Brubaker DK. In silico cytometry of Crohn’s disease transcriptomics reveal novel cell-type-specific disease biology. Poster presentation: BMES Annual Meeting. Oct 2022

**AWARDS**

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<b>2023 Senior Design: Translational Merit Award</b>	December 2023
<b>Dean’s List and Semester Honors</b>	Fall 2023, Spring 2024

**LEADERSHIP**

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<b>Purdue University BDSBC</b> , West Lafayette, IN	January 2022 – May 2023
<i>Co-founder, President, General Member</i>	

- Co-founded club for undergraduates to learn more about biomedical data science and bioinformatics
- Led monthly meetings for members to develop bioinformatic analysis skills and network with other students

<b>Purdue University Caduceus Club</b> , West Lafayette, IN	January 2021 – May 2022
<i>Marketing Chair, General Member</i>	

- Managed social media presence by creating posts for club meetings and volunteering opportunities
- Created videos through the GOAL program to encourage healthy lifestyles for children through nutrition, behavior, physical activity, and education

**PATENTS**

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<b>Patent Pending.</b> <i>Microbiome Pharmacology NN</i> . US Provisional Patent Application.	November 2024
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**SKILLS**

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**Programming and Applications:** R, Python, Shell Scripting, MATLAB, SLURM, HPC, VS Code, GitHub  
**Bioinformatics Tools:** Seurat, Cell Ranger, SRA Toolkit, PyTorch, scikit-learn, pandas, tidyverse  
**Professional:** leadership, work ethic, communication, teamwork, time management, detail-oriented