

BENJAMIN KRAMER

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EDUCATION

Case Western Reserve University

Cleveland, OH • 2022 – 2025

- B.A. in Computer Science & Economics with a Minor in Mathematics, GPA: 3.8/4
- Focus on **computational biology** in coursework and research, **President of Systems Biology Society**
- Relevant Coursework: Algorithms, AI, Cells & Proteins, Data Science, Econometrics, Genetics + Evolution + Ecology, Linear Algebra

University of Oxford

Oxford, UK • 2024 – 2025

- Visiting Student in Computer Science, Economics
- Coursework: Computer Security, Databases, Game Theory, International Economics, Models of Computation

RESEARCH

Massachusetts Institute of Technology, Research Assistant

Cambridge, MA • Jan. 2025 – Present

- *Advisor*: Dr. Bryan Bryson, Department of Biological Engineering
- Built a comprehensive human skin sc-RNA-seq atlas integrating data spanning 35+ datasets (500,000+ cells) across disease conditions
- Applied CellTypist models trained on tuberculosis granuloma cells to analyze T-cell depletion perturbations
- Implemented a *de novo* protein design pipeline using RFDiffusion and ProteinMPNN to design therapeutic binders
- Trained BiLSTM models on mutations grammaticality and binding affinity to predict antibacterial & viral escape

University of Chicago, Research Assistant

Chicago, IL • May 2024 – Present

- *Advisor*: Drs. Andrey Rzhetsky & Megan Huisinigh-Scheetz, Department of Medicine
- Analyzed 200M+ claims records with sibling-based designs to characterize familial and cross-trait correlations in complex disease
- Implemented deep learning models for frailty prediction; delivered a pipeline spanning feature ingestion and benchmark evaluation

University of California, Berkeley, STEER Summer Intern

Berkeley, CA • May 2024 – Aug. 2024

- *Advisor*: Dr. Misbath Daouda, Department of Public Health
- Transformed satellite data to particulate matter concentration using regression models and on-the-ground data
- Analyzed geographic and temporal pollution trends in Benin and Ghana using frequentist inference

Case Western School of Medicine, Research Assistant

Cleveland, OH • Nov. 2022 – May 2024

- *Advisor*: Drs. Jeffrey Garvin & Agustin Gonzalez-Vicente, Department of Physiology and Biophysics
- Designed experiments to investigate fructose-induced salt-sensitive hypertension using tissue bioassays, and biochemical extractions
- Performed animal care and surgeries on rodent models, microdissection for sequencing, and measurement assays
- Analyzed transcriptomic and proteomic datasets to spatially map nephron segments to fructose transporter expression

PUBLICATIONS, PREPRINTS, & ABSTRACTS

RESEARCH ARTICLES

- [1] Zhang, R., Jadhav, D.A., Kim, N., **Kramer, B.**, Gonzalez-Vicente, A. (2024) Profiling cell heterogeneity and fructose transporter expression in the rat nephron by integrating single-cell and microdissected tubule segment transcriptomes. *Int. J. Mol. Sci.*, 25(5), 3071. <https://doi.org/10.3390/ijms25053071>

ARTICLES UNDER REVISION

- [1] Zhang, R., Shi, S., Jadhav, D.A., Kim, N., Brostek, A., Forester, B.R., Shukla, R., Qu, C., **Kramer B.**, Garvin, J.L., Kleyman, T. R., Gonzalez-Vicente, A. (2024) Abnormal activation of the mineralocorticoid receptor in the aldosterone-sensitive distal nephron contributes to fructose-induced salt-sensitive hypertension. *In Revision* <https://doi.org/10.1101/2024.08.19.608663>
- [2] Peters, J.M., Gideon, H.P., Hughes, T.K., **Kramer, B.K.**, Gunnarson, C., Maiello, P., Mugahid, D., Nyquist, S.K., Bromley, J.D., Blainey, P.C., Junecko, B.F., Lauffenburger, D.A., Lin, P.L., Flynn, J.L., Shalek, A.K., Fortune, S.M., Mattila, J.T., Bryson, B.D. (2025) Systematic deconstruction of myeloid cell signaling in tuberculosis granulomas reveals IFN- γ , TGF- β , and time are associated with conserved myeloid diversity. *In Revision, Authorship Offered After Preprint* <https://doi.org/10.1101/2024.05.24.595747>

PREPRINTS

- [1] **Kramer B.**, Long, Y., Pagan, M., Brown, S., Rzhetsky, A., Huisinigh-Scheetz, M. (2025) Free-living hip accelerometry predicts frailty status and 12-month frailty decline in older adults. *medRxiv* <https://doi.org/10.1101/2025.07.09.25330372>

CONFERENCE ABSTRACTS

- [1] Kim, N. **Kramer, B. K.**, and Gonzalez-Vicente, A. (2024) Sexually dimorphic gene expression in rat proximal tubules suggests activation of the intrarenal renin angiotensin system and elevated transport rates in males. *Physiology*, 39, 831. <https://doi.org/10.1152/physiol.2024.39.S1.771>
- [2] Jadhav, D. A., Zhang, R., **Kramer, B. K.**, and Gonzalez-Vicente, A. (2024) Transcript deconvolution reveals heterogeneous cell populations in microdissected nephron segments of the rat kidney. *Physiology*, 39, 831. <https://doi.org/10.1152/physiol.2024.39.S1.831>
- [3] **Kramer, B. K.**, Zhang, R., and Gonzalez-Vicente, A. (2023) Sexually dimorphic transcriptional phenotypes in tubular epithelial cells of the rat kidney. *Hypertension*, 80(1S). <https://doi.org/10.1161/hyp.80.suppl.1.097>

PRESENTATIONS

TALKS

- “Accelerometry Surrogates of Lower Extremity Function in an Exercise Trial in Older Adults” 2026 (Expected)
at *Abstract Accepted to International Conference of Frailty and Sarcopenia 2026*
- “Free-living hip and wrist accelerometry predicts frailty status and 12-month decline” 2025
at *Gerontological Society of America 2025*
- “Analyzing PM2.5 concentrations through satellite data in Benin” 2024
at *STEER Research Symposium, UC Berkeley Department of Public Health*
- “Sexually dimorphic transcriptional phenotypes in tubular epithelial cells of the rat kidney” 2024
at *Hypertension Scientific Sessions, Accepted (Cancelled due to Weather)*

POSTER PRESENTATIONS

- “Sexually dimorphic expression of the angiotensinogen gene (Agt) in the S3 subsegment of rat proximal tubules” 2024
at *CWRU Department of Medicine Physiology and Biophysics Retreat*
- “Addition of fructose to a high-salt diet increases the expression of aldosterone-response genes in the kidney” 2023
at *CWRU SOURCE Intersections*

SKILLS

Experimental. Rodent care and surgery, microdissection, bioassays

Genomics. NGS processing, variant calling, QC, single-cell, eQTL/coloc, polygenic risk scoring

Programming. Python, R, Java, Bash, C/C++, MatLab, SQL

ML/Stats. Machine learning models, regressions, inference, cross-validation, experiment design

Systems. Linux, Git, Docker, Apptainer, Conda, Mamba, Nextflow, Snakemake, SLURM

TEACHING EXPERIENCE

Cells & Proteins (BIOL 215), Teaching Assistant	Case Western Reserve University • Spring, 2024
Chemistry of Materials (ENGR 145), Teaching Assistant	CWRU • Spring, 2024
Thermodynamics (ENGR 225), Teaching Assistant	CWRU • Spring, 2024
Electricity & Magnetism (PHYS 122), Teaching Assistant	CWRU • Spring, 2025
Data Science (CSDS 133), Teaching Assistant	CWRU • Spring, 2024
Discrete Mathematics (CSDS 302), Teaching Assistant	CWRU • Spring, 2024
Micro & Macroeconomics (ECON 102 & 103), Teaching Assistant	CWRU • Fall, 2025

LEADERSHIP & EXTRACURRICULARS

CWRU Systems Biology Society, President	Cleveland, OH • Jan. 2024 – Present
CWRU Quizbowl, Treasurer	Cleveland, OH • May 2024 – May 2025
HackCWRU, Treasurer	Cleveland, OH • Nov. 2022 – May 2023
CWRU Undergraduate Student Government, Engineering Rep.	Cleveland, OH • Aug. 2023 – May 2024
Worcester College, Oxford Boat Club, Coxswain + Rower	Oxford, UK • August 2024 – May 2025

AWARDS & HONORS

- ACF Fall UK Quizbowl Champion, Top Undergraduate Scorer *by University of Oxford* Fall 2024
- Economics Service Award *by Case Western Reserve University* Spring 2023
- Dean’s High Honors *by Case Western Reserve University* 2022-2025
- Eagle Scout & Senior Patrol Leader *by Boy Scouts of America* Fall 2022