Ann E. **Wells**

PhD · Statistics Masters

600 Main Street, Bar Harbor, ME 04609

(603) 557-5975 | aewellsphd@gmail.com | annwellsphd.com | annwells | annwellsphd

Education

University of Tennessee-Knoxville — *Knoxville, TN*

PH.D. IN GENOME SCIENCE AND TECHNOLOGY — *2010 - 2017*

University of Tennessee-Knoxville — *Knoxville, TN*

M.S. IN STATISTICS — *2010-2017*

University of Tennessee-Knoxville — *Knoxville, TN*

B.S. IN MICROBIOLOGY — *2006-2009*

MINOR IN BUSINESS

Open Science

Postdoctoral Associate (Mentor: Dr. Greg Carter) — *The Jackson Laboratory*

PROJECT TITLE: AN OPEN SCIENCE FRAMEWORK TO DISSEMINATE RESEARCH TRANSPARENTLY AND REPRODUCIBLY — *Apr. 2018-present*

- Developed a novel framework that rethinks the limitations of traditional publishing by publishing all data analysis through a web-based platform
- Each site contains:
  - all data analysis with embedded code, interactive plots, downloadable tables, and more
  - link to data repository containing processed data
  - link to git repository containing all raw code
  - shiny apps
  - contact information
- Outcome: Developed and disseminated a data resource with and for the publication "Transcriptome Analysis Reveals Organ-Specific Effects of 2-Deoxyglucose Treatment in Healthy Mice" (link).

Research Experience

Postdoctoral Associate (Mentor: Dr. Greg Carter) — *The Jackson Laboratory*

PROJECT TITLE: TRANSCRIPTOME ANALYSIS REVEALS ORGAN-SPECIFIC EFFECTS OF 2-DEOXYGLUCOSE TREATMENT IN HEALTHY MICE — *Apr. 2018-present*

- Led the processing and shipment of metabolomics samples, ensuring data integrity and precision
- Conducted RNAseq and metabolomics analysis across 9 tissues, enabling comprehensive data integration
- Innovated a robust filtering strategy to identify pathways altered by 2-deoxy-glucose (2DG), driving significant advance in metabolic research
- Developed data resource (link) using blogdown package and rmarkdown in R to disseminate complete analysis and code, promoting transparency and reproducibility
- Outcome: The research resulted in the publication of "Transcriptome Analysis Reveals Organ-Specific Effects of 2-Deoxyglucose Treatment in Healthy Mice" in PLOS ONE, demonstrating a pioneering exploration of glycolytic inhibition's role in modulating cellular functions across various organ systems

PROJECT TITLE: INHIBITION OF GLYCOLYSIS AND DISRUPTION OF N-LINKED GLYCOSYLATION MODIFY DISTINCTIVE PATHWAYS ACROSS MULTIPLE TISSUE COMPARTMENTS IN A LUPUS-PRONE MOUSE MODEL

- Developed R code for comprehensive analysis of multi-omics datasets, enabling detailed pathway analysis
- Executed RNAseq and metabolomics analysis across 9 tissues from lupus-prone mice, integrating data to uncover tissue-specific pathways
- Devised a filtering strategy to identify pathways altered by 2DG, providing insights into metabolic disruptions in disease
- Constructing a data resource to disseminate complete analysis and code for transparency and reproducibility
- Outcome: This research received multiple invitations to present talks and posters at prestigious national and international scientific conferences

PROJECT TITLE: DIFFERENTIAL RESPONSE TO 2DG TREATMENT ACROSS MULTIPLE LUPUS-PRONE MOUSE MODELS

- Analyzing the effects of 2DG across two lupus-prone mouse models and one healthy mouse population, elucidating differential responses
- Employing advanced statistical techniques to compare transcriptomic similarities and differences, revealing key insights into metabolic and immunological variability

Project title: Rank and prioritize altered biochemical pathways across multiple -omics using Belief models

- Utilizing the Dempster-Shafer Theory and Transferable Belief Model to rank and prioritize experimentally altered biochemical pathways through single or multiple -omics datasets
- Determining the mass functions accounting for the complexity of pathway identification and other biological factors
- Establishing a robust test case to validate the effectiveness of the approach within a biological context
- Testing on previously processed biological datasets to demonstrate the practical utility and reliability of the method

Project title: Combined Analysis of Pleiotropy and Epistasis (CAPE)

- Enhanced the functionality of R package by incorporating a kinship function to facilitate overall and leave-two chromosome out kinship correction
- Performed a series of biological analyses to evaluate the effectiveness of CAPE, focusing on:
  - cardiac function
  - immune function
- Outcome: The research resulted in the major update of the R package cape and two publications, demonstrating the functionality of the package and the potential for inflation of genetic interaction statistics when using a kinship correction

Project title: Natural variation alters Alzheimer's-related gene expression in DO mice

- Conducted a comparative analysis between hippocampal RNA expression data from DO mice and paracliques from human Accelerating Medicines Partnership-Alzheimer's Disease (AMP-AD) modules
- Utilized QTL and mediation analysis to identify loci influencing paracliques and potential mediator genes, shedding light on genetic factors contributing to Alzheimer's-related gene expression changes
- Used Jaccard Index to identify genes shared between mouse and human datasets, facilitating cross-species comparisons and insights into Alzheimer's disease mechanisms
- Outcome: The research garnered multiple invitations to present talks and posters at prestigious national and international scientific conferences

Graduate Research Assistant (Mentor: Dr. Brynn Voy)

University of Tennessee-Knoxville

Mar. 2011 - Dec. 2017

Project title: Untargeted Metabolic Profiling Distinguishes Gene-by-diet "Metabotypes" at the Tissue Level in Mice

- Conducted comprehensive tissue collection from murine models, encompassing adipose, skeletal muscle, and liver tissues, to establish a broad database for metabolomic analysis
- Implemented sophisticated mass spectrometry (MS/MS) techniques for the meticulous extraction of metabolites, ensuring high-fidelity detection of metabolic fluctuations
- Employed advanced peak selection algorithms on MS/MS outputs to accurately identify key metabolites indicative of gene-diet interactions
- Utilized linear models and multivariate statistical frameworks to dissect and interpret the complex datasets, revealing nuanced insights into the metabolite abundance patterns across different tissues
- Outcome: The research was highly acclaimed, leading to three peer-reviewed publication at Genetics, Journal of Proteome Research, and Metabolome

Project title: The Effect of Low Dose Radiation on Macrophage Populations in BXD mice

- Conducted irradiation experiments on murine models to evaluate immunological responses
- Extracted bone marrow from femurs to study hematopoietic and immune cell precursors
- Performed cardiac punctures to obtain blood samples for systemic immune phenotyping
- Dissected vital organs (liver, spleen, thymus, lung, and femur) for comprehensive tissue-specific immune analysis
- Performed macrophage migration assays to measure the chemotactic response post-radiation

Project title: Mechanisms of Population Level Variation in Fatness and Leanness

- Extracted RNA from BXD recombinant inbred strain mice to measure genetic variation related to adiposity
- Quantified genetic variation related to adipogenesis using qPCR
- Identified genes potentially responsible for fatness and leanness through correlation and partial correlation
- Performed quality control analysis
- Outcome: The research was presented at a prestigious international scientific conference

Graduate Research Assistant (Mentor: Dr. John Biggerstaff)

University of Tennessee-Knoxville

Aug. 2010 - Mar. 2011

Project title: Melanoma Tumor Growth and Metastasis in Zebrafish

- Maintained hepatic and melanoma cancer immortal cell lines
- Performed capillary pulls and microinjected GFP labeled melanoma/hepatic cells into zebrafish larvae to measure metastatic growth
- Quantified cell growth and metastasis in zebrafish using deconvolution and time lapse microscopy

Research Alliance in Math and Science Intern (Mentor: Kara Kruse)

Oak Ridge National Laboratory

June 2010 - Aug. 2010

Project title: Modeling the effect of soluble fibrin on the immune-tumor interaction

- Developed a series of differential equations to simulate the effect of soluble fibrin on the interaction between macrophages and melanoma cells using physiologically relevant estimates
- Performed Percoll® density gradients to isolate and extract macrophages from blood
- Performed a macrophage migration assay to collect data for mathematical model
- Identified initial parameters for mathematical model by measuring macrophage movement using deconvolution and time lapse microscopy
- Outcome: This research was highly regarded, receiving 2nd place during poster presentations and was published as an IEEE conference proceeding

Research Alliance in Math and Science and Student Undergraduate Laboratory Internship (Mentor: Kara Kruse)

Oak Ridge National Laboratory

June 2009 - Apr. 2010

Project title: Modeling the effect of melanoma tumor cell growth in the presence of natural killer cells

- Developed a series of differential equations to simulate the effect of soluble fibrin on the interaction between natural killer cells and melanoma cells using physiologically relevant estimates
- Performed sensitivity analysis in Matlab to test robustness of model
- Outcome: This research was highly regarded, receiving 2nd place during poster presentations and was published as an IEEE conference proceeding

Undergraduate Research Assistant (Mentor: Dr. Ted Henry)

University of Tennessee-Knoxville

May 2007 - June 2009

Project title: Detection of oxidative stress in zebrafish when exposed to C60 nanoparticles

- Maintained entire zebrafish colony
  - prepared brine shrimp for feeding
  - set up matings and built cages for optimal breeding and egg recovery
  - built filtration system for colony
- Collaborated with postdoc to expose zebrafish to C60 nanoparticles for toxicity studies

Project title: Effects of *Microcystis aeruginosa* on zebrafish reproduction

- Spearheaded the growth, maintinenance, and production scaling of *Microcystis aeruginosa* cultures
- Lyophilized *Microcystis aeruginosa* for exposure studies
- Dissected liver from zebrafish to assess hepatotoxicity of *Microcystis aeruginosa*
- Led histological analysis performing tissue sectioning using microtome and H and E stained liver tissue
- Longitudinally measured egg production to assess reproduction

Project title: Bioaccumulation of *Microcystis aeruginosa* in channel catfish

- Spearheaded the growth, maintenance, and production scaling of *Microcystis aeruginosa* cultures
- Supervised longitudinal dissections of channel catfish and dissected muscle to measure levels of *Microcystis aeruginosa* accumulation
- Maintained channel catfish colony during experiment

Project title: Detection of estrogenic activity in *Microcystis aeruginosa* using a yeast estrogen bioreporter

- Spearheaded the growth, maintinenance, and production scaling of *Microcystis aeruginosa* cultures
- Assisted in the development of an estrogen bioreporter using yeast
- Measured *Microcystis aeruginosa* estrogenic levels using bioreporter to determine potential levels of estrogen exposure in freshwater fish

Publications

In Preparation/Submitted

Ann E. Wells, John J. Wilson, Sarah E. Heuer, Jian Wei, Colleen Mayberry, Derry C. Roopenian, Gregory W. Carter, Chih-Hao Chang. Glycolysis Inhibitor Maintains Kidney Function and Suppresses Adaptive Immunity in Lupus-Prone Mice

Ann E. Wells, Narayanan Raghupathy, Ray F. Robledo, Daniel M. Gatti, Steven C. Munger, Charles Phillips, Juliet Ndukum, Troy Wilcox, Joel H. Graber, Matthew J. Hibbs, Michael A. Langston, Gary A. Churchill, Gregory W. Carter, and Elissa J. Chesler. Natural Variation Alters Alzheimer's-related Gene Expression in DO Mice.

Ann E. Wells, Chih-Hao Chang, Gregory W. Carter. Using Web-based Data Resources for Transparent and Reproducible Data Analysis.

Published

Ann E. Wells, John J. Wilson, John D. Sears, Jian Wei, Sarah E. Heuer, Raghav Pandey, Mauro W. Costa, Catherine C. Kaczorowski, Derry C. Roopenian, Chih-Hao Chang, Gregory W. Carter. (2024) Transcriptome Analysis Reveals Organ-Specific Effects of 2-Deoxyglucose Treatment in Healthy Mice. PLOS ONE 19(3): e0299595. https://doi.org/10.1371/journal.pone.0299595. paper link

Ann E. Wells, William T. Barrington, Stephen Dearth, Nikhil Milind, Gregory W. Carter, David W. Threadgill, Shawn Campagna, Brynn Voy. Tissue Level Strain and Sex-by-Strain Interactions Reveal Unique Metabolite and Clustering Profiles Using Untargeted Liquid Chromatography-Mass Spectrometry Across Adipose, Skeletal Muscle, and Liver Tissue in Mice Fed a Standard Chow Diet. Metabolites. 2022 Apr 8;12(4):337. doi: 10.3390/metabo12040337. PMID: 35448524; PMCID: PMC9031494. paper link

Tyler AL, Emerson J, El Kassaby B, **Wells AE**, Philip VM, Carter GW. The Combined Analysis of Pleiotropy and Epistasis (CAPE). Methods Mol Biol. 2021;2212:55-67. doi: 10.1007/978-1-0716-0947-7_5. PMID: 33733350. paper link

Tyler AL, El Kassaby B, Kolishovski G, Emerson J, **Wells AE**, Matthew Mahoney J, Carter GW. Effects of kinship correction on inflation of genetic interaction statistics in commonly used mouse populations. G3 (Bethesda). 2021 Jul 14;11(7):jkab131. doi: 10.1093/g3journal/jkab131. PMID: 33892506; PMCID: PMC8496251. paper link

Ann E. Wells, William T. Barrington, Stephen Dearth, Amanda May, David W. Threadgill, Shawn Campagna, Brynn Voy. Tissue Level Diet and Sex-by-Diet Interactions Reveal Unique Metabolite and Clustering Profiles Using Untargeted Liquid Chromatography-Mass Spectrometry on Adipose, Skeletal Muscle, and Liver tissue in C57BL6/J Mice. J Proteome Res. 2018 Mar 2;17(3):1077-1090. doi: 10.1021/acs.jproteome.7b00750. Epub 2018 Feb 2. PMID: 29373032. paper link

William T. Barrington, Phillip Wulfridge, **Ann E. Wells**, Carolina Mantilla Rojas, Selene Y.F. Howe, Amie Perry, Kunjie Hua, Michael Pellizzon, Kasper D. Hansen, Brynn Voy, Brian J. Bennett, Daniel Pomp, Andrew P. Feinberg, David W. Threadgill. (2017) Optimizing Metabolic Health Through Precision Dietetics in Mice. Genetics. 2018 Jan;208(1):399-417. doi: 10.1534/genetics.117.300536. Epub 2017 Nov 20. PMID: 29158425; PMCID: PMC5753872. paper link

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A. E. Wells, S. A. Bewick, K. L. Kruse, R. C. Ward and J. P. Biggerstaff, "Modeling the effect of soluble fibrin on the immune-tumor interaction," Proceedings of the 2011 Biomedical Sciences and Engineering Conference: Image Informatics and Analytics in Biomedicine, Knoxville, TN, USA, 2011, pp. 1-4, doi: 10.1109/BSEC.2011.5872324. paper link

A. E. Wells, S. A. Bewick, K. L. Kruse, R. C. Ward and J. P. Biggerstaff, "Modeling the effect of tumor cell growth when in the presence of natural killer cells," 2010 Biomedical Sciences and Engineering Conference, Oak Ridge, TN, USA, 2010, pp. 1-4, doi: 10.1109/BSEC.2010.5510820. paper link

Data Resources

Complete data analysis investigating the transcriptional effects of 2-deoxyglucose on nine organs in C57BL/6J mice. data resource link

Grants and Fellowships

Awarded

American Association of Immunologists Intersect Fellowship for Computational Scientists and Immunologists — *The Jackson Laboratory*
$53,460 — *Jan. 2021 - Jan. 2022*

NIH funded PEER Fellowship — *University of Tennessee-Knoxville*
$50,000 — *Aug. 2011 - Aug. 2013*

Microbiology Department Summer Research Fellowship — *University of Tennessee-Knoxville*
$3200 stipend — *May 2008 - Aug. 2008*

Academic Honors & Awards

Awards

2023-2025	NIH Loan Repayment Program renewal **($29,308.68)** (ended Sep. 2024, 100% loans repaid)	*The Jackson Laboratory*
2022-2023	NIH Loan Repayment Program renewal **($43,252.36)**	*The Jackson Laboratory*
2022	RStudio Diversity Scholars Program	*Washington, D.C.*
2022	JAX Travel Award	*The Jackson Laboratory*
2021	American Association for Immunologists Trainee Abstract Award	*Virtual*
2020-2022	NIH Loan Repayment Program **($100,000)**	*The Jackson Laboratory*
2019	International Mammalian Genome Conference Travel Award	*Strasbourg, France*
2018-2024	Alfond Leaders program **($60,000)**	*The Jackson Laboratory*
2017	Graduate Student Senate Excellence in Teaching Award	*University of Tennessee-Knoxville*
2016	**2nd Place,** Experimental Biology American Nutrition Society Emerging Leaders Poster Competition	*San Diego, CA*
2016	**1st Place,** Cynthia B. Petersen Poster Competition	*University of Tennessee-Knoxville*
2015	Graduate Student Travel Award	*University of Tennessee-Knoxville*
2011	**2nd Place,** BSEC Poster Competition	*Oak Ridge National Laboratory*
2010	**2nd Place,** BSEC Poster Competition	*Oak Ridge National Laboratory*

Presentations

Oral

Organ-specific Effects of 2-Deoxyglucose Treatment in Lupus-prone Mice
The University of South Carolina (Invited Talk)
Columbia, SC
Oct. 2023

Organ-specific Effects of Short- and Long-term 2-Deoxyglucose Treatment in Lupus-prone Mice
Lupus 21st Century
Naples, FL
Sept. 2023

Unveiling Organ-Specific Effects of 2-Deoxyglucose Treatment in Mice
The Jackson Laboratory Board of Scientific Counselors Meeting
Bar Harbor, ME
Aug. 2023

2-Deoxyglucose Inhibits N-linked glycosylation and Glycolysis Modulating Biochemical Pathways in a Tissue-specific Manner in C57BL6/J Mice
UC Merced (Invited Talk)
Virtual
Dec. 2022

Natural genetic variation alters Alzheimer's-related gene expression modules in mice
Complex Trait Consortium
Virtual
Sept. 2021

Glycolysis Inhibition Modulates Unique Metabolic and Immune Pathways Across Multiple Tissue Compartments
Immunology
- Trainee Abstract Award

Virtual
May 2021

Natural Variation Alters Alzheimer's-related Gene Expression in DO Mice
International Mammalian Genome Conference
Strasbourg, France
Sept. 2019

Gene, Sex, and Diet Interact to Control the Tissue Metabolome
Experimental Biology
San Diego, CA
Apr. 2016

Mechanisms of Population Level Variation in Fatness and Leanness
Comparative and Experimental Medicine and Public Health Research Symposium
Knoxville, TN
June 2010

Modeling Melanoma Tumor Cell Growth in the Presence of Natural Killer Cells
Sigma Xi Student Competition
Knoxville, TN
Feb. 2010

Poster

Inhibition of Glycolysis and Disruption of N-linked Glycosylation Modify Distinctive Pathways Across Multiple Tissue Compartments in a Lupus-prone Mouse Model
JAX Symposium
Farmington, CT
May 2023

Inhibition of Glycolysis Modifies Distinctive Pathways Across Multiple Tissue Compartments Associated in a Time Dependent Manner
Lupus 21st Century
Tucson, AZ
Sept. 2022

Inhibition of Glycolysis Modifies Distinctive Metabolic and Immune Pathways Across Multiple Tissue Compartments Associated with B and T Follicular Helper Cells
GRC Immunometabolism in Health and Disease
Smithfield, RI
June 2022

Inhibition of Glycolysis Modifies Distinctive Metabolic and Immune Pathways Across Multiple Tissue Compartments Associated with B and T Follicular Helper Cells
Immunology
Portland, OR
May 2022

Glycolysis Inhibition Modulates Unique Metabolic and Immune Pathways Across Multiple Tissue Compartments
Immunology
- Trainee Abstract Award

Virtual
May 2021

Natural Genetic Variation Alters Alzheimer's-related Gene Expression Modules in Mice — *Virtual*
Alzheimer's Association International Conference — *July 2020*

Natural variation alters Alzheimer's-related gene expression in DO mice — *Bar Harbor, ME*
JAX Symposium — *May 2019*

Epistatic Networks Influence Phenotypes Related to Cardiac Function in Diversity Outbred Mice — *Bar Harbor, ME*
Human and Mammalian Genetics and Genomics: The 59th McKusick Short Course — *July 2018*

Tissue Level Sex-by-gene-by-diet Interactions Show Unique Metabolite and Clustering Profiles — *Knoxville, TN*
Genome Science and Technology Retreat — *Mar. 2017*

Gene, Sex, and Diet Interact to Control the Tissue Metabolome — *San Diego, CA*
Experimental Biology — *Apr. 2016*
- 2nd Place Emerging Leaders in Nutrition Poster Competition

Tissue Level Sex-by-gene-by-diet Interactions Show Unique Metabolite and Clustering Profiles — *Knoxville, TN*
Genome Science and Technology Retreat — *Mar. 2016*
- 1st Place Cynthia B. Peterson Poster Competition

Untargeted Metabolic Profiling Distinguishes gene-by-diet "Metabotypes" at the tissue level in mice — *St. Louis, MO*
American Society for Mass Spectrometry — *June 2015*

Investigating Tissue Level Gene-by-diet Interactions with Metabolomics — *Boston, MA*
Experimental Biology — *Mar. 2015*

Investigating Tissue Level Gene-by-diet Interactions with Metabolomics — *Knoxville, TN*
Genome Science and Technology Retreat — *Mar. 2015*

Metabolomics Identifies Effects of Dietary Maconutrient Composition on Tissue Metabolism — *Boston, MA*
The Obesity Society — *Nov. 2014*

Metabolism and Diet: Metabolic and Lipid Changes Across Multiple Diets and Genetic Backgrounds — *Knoxville, TN*
Genome Science and Technology Retreat — *Mar. 2014*

Mechanisms of population level variation in fatness and leanness — *Boston, MA*
Experimental Biology — *Apr. 2013*

Modeling the Effect of Soluble Fibrin on the Immune-tumor Interaction — *Oak Ridge, TN*
Biological Science and Engineering Center Conference — *Mar. 2011*
- 2nd Place BSEC Poster Competition

Modeling the Effect of Soluble Fibrin on the Immune-tumor Interaction — *Oak Ridge, TN*
Research Alliance in Math and Science — *Aug. 2010*

Modeling the Effect of Melanoma Tumor Cells when in the Presence of Natural Killer Cells — *Oak Ridge, TN*
Biological Science and Engineering Center Conference — *May 2010*
- 2nd Place BSEC Poster Competition

Modeling the Effect of Melanoma Tumor Cells when in the Presence of Natural Killer Cells — *Oak Ridge, TN*
Women in Science — *May 2010*

Modeling Immunity Against Cancer — *Oak Ridge, TN*
Student Undergraduate Laboratory Internship — *Apr. 2010*

Modeling the Effect of Tumor Cells When in the Presence of Natural Killer Cells — *Oak Ridge, TN*

Student Undergraduate Laboratory Internship — *Dec. 2009*

A Mathematical Models of the Effect of Melanoma Tumor Cell Growth when in the Presence of Natural Killer Cells — *Oak Ridge, TN*

Research Alliance in Math and Science — *Aug. 2009*

Teaching Experience

Instructor and Workshop Creator — *The Roux Institute*

Building Websites for Data Dissemination — *May 22, 2024*

- Taught Carter lab members how to build their own websites for data dissemination
- Aided students with coding
- Answered questions regarding the material
- Workshop link

Instructor — *Colby College*

Data Carpentry with Python — *Jun. 5-6, 2023*

- Taught Data organization in spreadsheets and troubleshooting dates in excel
- Aided students with coding
- Answered questions regarding the material

Assistant — *Virtual*

Software Carpentry with R — *Jan. 20, 22, 27, 29, 2021*

- Aided students with coding
- Answered questions regarding the material

Assistant — *The Jackson Laboratory*

Quantitative Trait Mapping in the DO — *Aug. 22-23, 2019*

- Aided students with coding
- Answered questions about the underlying statistics of the QTL analysis

Graduate Teaching Assistant — *University of Tennessee-Knoxville*

Cellular and Molecular Biology (BIO 160) — *Spring/Fall 2016, Spring/Fall 2017*

- Taught students how to critically analyze scientific articles during discussion
- Prepared weekly presentations and multiple quizzes
- Aided instructor during lecture
- Graded homework, quizzes, and exams

Graduate Teaching Assistant — *University of Tennessee-Knoxville*

Bioinformatics Applications (EPP 622) — *Fall 2015*

- Held weekly office hours to review material
- Guided students through computer labs
- Designed and taught Metabolomics lecture and computer lab
- Taught DNAseq computer lab
- Graded homework

Graduate Teaching Assistant — *University of Tennessee-Knoxville*

Skills of Biological Investigation (BIO 159) — *Spring 2015*

- Independently instructed students through experimentally based labs
- Taught students experimental design
- Prepared weekly presentations and multiple quizzes
- Graded quizzes and lab reports

Graduate Teaching Assistant — *University of Tennessee-Knoxville*

Designed undergraduate biostatistics course for Biology Department — *Fall 2014*

- Aided Genome Science and Technology director in designing Biostatistics course for undergraduates
- Planned bioinformatics topics to cover throughout the semester
- Designed syllabus
- Outlined labs associated with topics

Graduate Teaching Assistant — *University of Tennessee-Knoxville*

Animal Breeding and Genetics (ANSC 340) — *Spring 2014*

- Aided instructor during class
- Guest lecturer
- Proctored exams
- Graded homework and exams

Mentoring

Colby Academic Year Fellow
The Jackson Laboratory

Mentee: Laura Drepanos (current position: Bioinformatist at the Broad Institute)
Sept. 2022 - May 2023

- Trained her in Systemic Lupus Erythematosus
- Provided guidance and instruction on:
  - performing analyses in R
  - developing a quarto website
  - pulling data from dbGap
  - handling human clinical data
  - combining human and mouse analysis
- Provided feedback on final presentation

Colby-JAX Lunder Fellow
The Jackson Laboratory

Mentee: Laura Drepanos
Feb. - May 2022

- Trained her in quantitative genetics and Alzheimer's
- Provided guidance and instruction on performing analyses in the R package qtl2, developing rmarkdown website, motif analysis
- Provided feedback on final presentation

JAX Summer Student Program
The Jackson Laboratory

Mentee: Meredith Mayer (current position: Graduate student at Tulane University School of Medicine)
Jun. - Aug. 2019

- Trained her in R and RStudio
- Provided guidance and instruction on performing analyses in the R packages qtl2 and WGCNA
- Provided feedback on written analyses and final presentation

UTK High School Intern Program
University of Tennessee-Knoxville

Mentee: Helen Boone (current position: Graduate student at Tulane University)
May - Aug. 2013

- Taught her bone marrow extraction, macrophage colony formation assay
- She independently performed bone marrow extractions and subsequent macrophage colony formation assays while I dissected mice

UTK student research assistant
University of Tennessee-Knoxville

Mentee: Kourtney Kousser (Received PhD 2019, current position: science writer)
Fall 2010 - Spring 2012

- Trained her in cell culture, deconvolution microscopy, cell migration assays, percoll density gradients
- Provided guidance and instruction on performing cell migration experiments
- Provided feedback on written analyses

International Student Exchange
University of Tennessee-Knoxville

Mentee: Marija Matvejeva (current position: Veterinarian surgeon)
Summer 2010

- Trained her in cell culture
- Provided guidance and instruction on performing cell culture experiments
- Provided feedback on written analyses

Service

JAX Institutional Animal Care and Use Committee
Bar Harbor, ME

Postdoctoral member
Sept. 2022 - Dec. 2022

Software Carpentry
Bar Harbor, ME

Instructor
Jan. 2020 - present

JAX Postdoc Association
Bar Harbor, ME

Co-Chair
Aug. 2019 - Aug. 2020

Outreach

The Longest Day
Bar Harbor, ME

Raised money and participated in country wide Alzheimer's event to promote awareness
Jun. 2018-Jun. 2023

Maine Science Festival
Bangor, ME

5 minute Genius speaker
2022

JAX Open Tours
Bar Harbor, ME

Tour guide
2019

Dry Lab Skills

Statistics	PLS, PLS-DA, PCA, ANOVA, Linear models, Bayesian methods, Causal models, QTL, mediation analysis, etc.
Bioinformatics	transcriptomics, metabolomics, single cell transcriptomics
Programming	Working knowledge in C++, Matlab, Python, Singularity, slurm, and SQL
Scientific Applications	**R**: DiscriMiner, ggplot2, Hmisc„ caret, qtl2, tidyverse, WGCNA, rmarkdown, shiny, quarto, Seurat, creating functions, etc. **Linux** **Git** **SAS**: PROC GLM, FREQ, UNIVARIATE, MEANS
Other Applications	**LaTeX**

Wet Lab Skills

- **Mouse model**
  - Mouse dissection
  - Mouse Husbandry
  - Cardiac punctures
  - Bone marrow extraction
- **Molecular**
  - RNA extraction
  - qPCR
  - RNA immunoprecipitation
  - BCA assay
  - ELISA
  - Western blot
  - Cell transfection
- **Cellular**
  - Blood separation
  - Tissue culture
  - Cell migration assays
  - Flow Cytometry
- **Histology**
  - H and E stain
  - Cryosectioning
  - Immunostaining
- **Metabolomics**
  - Metabolite extraction
  - Peak Analysis
- **Microbial**
  - Yeast estrogen bioreporter assay
  - Large-scale cyanobacterial culturing
- **Fish models**
  - Zebrafish spawning
  - Maintenance of larval and adult zebrafish
  - Paramecia culturing
  - Brine shrimp culturing
  - Water quality testing and monitoring
  - Microinjection of zebrafish embryos and larvae
  - Zebrafish dissection
  - Channel catfish dissection
- **Other**
  - Chicken dissection
  - Deconvolution microscopy

Courses

Single Cell Analysis — *Cold Spring Harbor, NY*
Cold Spring Harbor Laboratory — *June 2024*
- Taught section on Dimensional Reduction and Clustering

Causal Inference — *Chicago, IL*
Posit::conf(2023) — *Sept. 2023*

Introduction to Quarto (Diversity Scholar workshop) — *Virtual*
RStudio::conf(2022) — *Jul. 2022*

Introduction to Shiny — *Washington, DC*
RStudio::conf(2022) — *Jul. 2022*

Introduction to Immunology — *Los Angeles, CA*
AAI — *Jul. 2022*

Introduction to Tidyverse — *San Francisco, CA*
RStudio::conf(2020) — *Jan. 2020*

What they Forget to Teach You About R — *Austin, TX*
RStudio::conf(2019) — *Jan. 2019*

Plotting and Programming in Python — *Br Harbor, ME*
Software Carpentry — *Jun. 2018*