John Sterrett

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Email: John.Sterrett@colorado.edu **GitHub**: github.com/sterrettJD **Phone**: (731) 819-7433

Research interests

Gut microbiota, gut-brain axis, multi-omics integration, multivariate statistics, causal inference

Education

University of Colorado at Boulder (CUB) Boulder, CO
PhD in Integrative Physiology, August 2020 – Present
Interdisciplinary Quantitative Biology (IQ Bio) Certificate Program
Mentors: Catherine Lozupone and Christopher Lowry *GPA: 4.0.*
Rotations: Catherine Lozupone, Noah Fierer, Nichole Reisdorph, Luke Evans, and Maggie Stanislawski
Committee: Marissa Ehringer (chair), Christopher Lowry, Catherine Lozupone, Maggie Stanislawski, Tanya Alderete

East Tennessee State University (ETSU) Johnson City, TN
BS in Nutrition August 2016 – May 2020
Mentor: Dr. William A Clark *GPA: 4.0*

Selected coursework (Graduate)

- EBIO 5460 Applications of Shotgun Metagenomics in Microbial Ecology
- CSCI 6118 Software Engineering for Scientists
- CSCI 5423 Biologically-Inspired Multi-Agent Systems
- IPHY 5800 Advanced Statistics and Research Methods in Integrative Physiology

Selected coursework (Undergraduate)

- CSCI 2700 Data Structures
- NTFD 3465 Human Nutrition and Metabolism
- NTFD 4447 Nutritional Biochemistry
- NTFD 4425 & 4435 Clinical Nutrition I & II

Honors, awards, scholarships, and fellowships

William J. Freytag Fellow (CUB)	2021
Integrated Data Science Fellow (National Science Foundation)	2021
Summa Cum Laude (ETSU)	2020
1911 Society Inaugural Member (ETSU)	2020
College of Clinical and Rehabilitative Health Sciences Outstanding Undergraduate Student (ETSU)	2020
Undergraduate Summer Research Fellowship	2019
Nutrition Honors-in-Discipline (ETSU)	2018

Stanton Honors Scholar (ETSU 2017
University Honors Scholar (ETSU) 2016

Publications

A pilot study exploring temporal development of the gut microbiome and metabolome in breastfed neonates during the first week of life
Awan I, Schultz E, **Sterrett JD**, Dawud LM, Kessler LR, Schoch D, Lowry CA, Feldman-Winter L, Phadtare S.
Pediatric Gastroenterology Hepatology and Nutrition, 2023.

SCNIC: Sparse correlation network investigation for compositional data
Shaffer M, Thurimella K, **Sterrett JD**, Lozupone CA.
Molecular Ecology Resources, 2023.

Impacts of breast cancer and chemotherapy on gut microbiome, cognitive functioning, and mood relative to healthy controls
Bilenduke E, **Sterrett JD**, Ranby KW, Borges VF, Grigsby J, Carr AL, Kilbourn K, Lowry CA.
Scientific Reports, 2022.

A metagenomic investigation of spatial and temporal changes in sewage microbiomes across a university campus
Fierer N, Holland-Moritz H, Alexiev A, Batther H, Dragone NB, Friar L, Gebert MJ, Gering S, Henley JB, Jech S, Kibby EM, Melie T, Patterson WB, Peterson E, Schutz K, Stallard-Olivera E, **Sterrett JD**, Walsh C, Mansfeldt C.
mSystems, 2022.

The Influence of the Microbiota on Brain Structure and Function: Implications for Stress-Related Neuropsychiatric Disorders
Sterrett JD, Andersen NA, Lowry CA
Evolution, Biodiversity and a Reassessment of the Hygiene Hypothesis, Rook GAW, Lowry CA (eds.), 2022.

Characterization of gut microbiome and metabolome in Helicobacter pylori patients in an underprivileged community in the United States
Sterrett JD, White B, Grigoryan Z, Lally L, Heinze JD, Alikhan H, Lowry CA, Perez LJ, DeSipio J, Phadtare S
World J Gastroenterol, 2021.

Microbiome Diversity and Differential Abundances Associated with Gastrointestinal Symptoms, BMI, Immune Markers, and Fecal Short Chain Volatile Fatty Acid Profiles
Sterrett JD, Clark WA Chandley MJ
Undergraduate Honors Theses, 2020.

Research experience

Lozupone Lab

Mentor: Catherine Lozupone (CU Anschutz) May 2022 – Present

- Developed a reproducible pipeline for analysis of host-microbiome dual transcriptome data from gut mucosal samples, while profiling the efficacy of novel wet-lab protocols.
- Reconstructed genomes from deep shotgun metagenomic sequencing data to compare *Prevotella* strains across the globe in health and disease, using a reproducible research workflow.
- Maintained open-source software developed by the lab including SCNIC, AMON, and KEGG_Parser.
- Organized and moderated code review sessions to increase code quality and literacy within the lab.

Behavioral Neuroendocrinology Lab

Mentor: Christopher A Lowry (CUB) July 2020 – Present

- Led 16S microbiome analysis for multiple projects within the lab and collaborations with other labs.
- Mentored lab members and collaborators on microbiome analysis techniques and statistics.
- Wrote review chapter of "The influence of microbiota on brain structure and functioning affecting neuropsychiatric outcomes".
- Analyzed untargeted metabolomics and lipidomics data from multiple *Mycobacterium vaccae* strains and plasma of animals innoculated with the strains.

Rotating Research Assistant

Interdisciplinary Quantitative Biology Program (CUB) August 2021 – May 2022

- Evaluated module creation in sparse and compositional co-occurrence networks under varying conditions from real and simulated datasets. Benchmarked new software for microbiome-specific co-occurrence network module identification (SCNIC). Rotation with Catherine Lozupone.
- Developed a custom database of microbial nicotine-degrading genes and a workflow to mine shotgun metagenomic data for such genes. Applied workflow to study the prevalence of nicotine-degrading genes in the oral metagenomes of e-cigarette users, smokers, and non-users. Rotation with Noah Fierer.

- Integrated untargeted metabolomics, lipidomics, and microbiome data to assess how microbiome composition modulates green tea-derived compounds emerging in plasma after tea consumption in germ-free and humanized mice. Rotation with Nichole Reisdorph.
- In a team setting, developed a framework for linear modeling of multi-omic microbiome data to identify relative contributions of each -omic datatype to predicting phenotype. Team rotation with Luke Evans and Maggie Stanislawski, bioRxiv.

Nutritional Biochemistry Lab
Mentor: William A Clark (ETSU) August 2017 – May 2020

- Collaborated with research faculty at ETSU, Quillen College of Medicine, and Bill Gatton College of Pharmacy for research regarding the gut-brain axis, metabolic syndrome, vitamin levels, and supplement bioavailability.
- Instructed undergraduate experimental foods classes in performing proximate analysis on experimental foods.
- Designed and implemented a study to analyze the properties of the ETEE brand beeswax wrap.

Zahner Electrophysiology Lab
Mentor: Matthew Zahner (ETSU) April 2018 – May 2018

- Assisted in rat autopsy and surgery in preparation for locating blood pressure regulatory centers of the brain and sympathetic denervation of the spleen in sepsis

Teaching experience

Teaching assistant, Department of Integrative Physiology (CUB)
IPHY 4440: Endocrinology Summer 2021
IPHY 2420: Introduction to Nutrition Fall 2020 – Spring 2021
IPHY 4420: Nutrition for Human Performance Fall 2020

Teaching assistant, Department of Chemistry (CUB)
CHEM 1133: General Chemistry II Spring 2021

Supplemental Instructor, Department of Health Sciences (ETSU)
HSCI 2010: Anatomy & Physiology II Spring 2020

Lead Tutor, TRIO-Student Support Services (ETSU)
Introductory, General, and Organic Chemistry Fall 2018 – Spring 2020
Biology, Microbiology, and Anatomy & Physiology Fall 2018 – Spring 2020
Paper Writing Fall 2019

Instructor, Unaka High School Band (Unaka, TN)
Low Brass Music and Marching Fundamentals Summer 2019

Private Tutor (Johnson City, TN)
Grades 3-12 Math and Science Spring 2019 – Summer 2020

Posters and talks

Studying Disruptions to the Microbiome and Gut-Brain Axis from Chemotherapy March 2023
CU Boulder Department of Integrative Physiology - Microbiome Gut-Brain Axis: Implications for Disease (invited course guest lecture)

Understanding Microbiome Analysis January 2023
CU Boulder Department of Integrative Physiology - Microbiome Gut-Brain Axis: Implications for Disease (invited course guest lecture)

Impacts of the Gut Microbiome on Green Tea Metabolism
CU Anschutz Microbiome Research in Progress Meeting November 2022

Our Tiny Stomach Friends Know When We're Sad (Microbial Phenotype Shifting During Host Stress) October 2022
CU Boulder BioFrontiers Institute UpGoer 5 Lightning Talks (1st place)

Techniques for Microbiome Analysis September 2022
CU Boulder Department of Integrative Physiology - Applications of Bionformatics (invited course guest lecture)

Gut Microbiome and Short Chain Fatty Acid Profiles of Individuals with Human Immunodeficiency Virus in Rural Appalachia
Front Range Microbiome Symposium April 2022

Differences in Cognitive Functioning, Mood, and Gut Microbiome in Women Receiving Chemotherapy for Breast Cancer and Healthy Controls
American Psychosomatic Society Annual Meeting March 2022

How Does Chemotherapy Impact Gut Microbiome, Cognitive Functioning, and Mood? A Comparison of Women With and Without Breast Cancer May 2021
CU Anschutz Microbiome Research in Progress Meeting

Stress and the Gut Microbiota in Athletes October 2020

CU Boulder Nutrition for Human Performance Guest Lecture Series

Microbiome Diversity and Differential Abundances Associated with Gastrointestinal Symptoms, BMI, Immune Markers, and Fecal Short Chain Volatile Fatty Acid Profiles May 2020
American Society for Nutrition Conference (presented virtually)

Properties of the ETEE Compostable Plastic Wrap Substitute May 2020
American Society for Nutrition Conference (presented virtually)

The Fecal Fermentation Profile of Patients with HIV April 2020
Appalachian Student Research Forum (cancelled due to COVID-19)

Short and Long Chain Fatty Acid Levels as Indicators of Health in HIV-infected vs Non-infected Individuals February 2020
Tennessee Posters at the Capitol

Properties of the ETEE Wrap Biodegradable Plastic Wrap Substitute
SoCon Undergraduate Research Forum November 2019

Short-Chain Fatty Acid Profiles for Mouse Models of Autism Spectrum Disorder April 2019
Appalachian Student Research Forum

Skills

Programming Languages

Python
Data wrangling, scripting, statistical modeling, machine learning, plotting, and reproducible analysis using Snakemake

R
Data wrangling, statistical modeling, and plotting

Julia
Data wrangling, statistics and plotting

C++
Implementation of low-level data structures

Computational Skills
Comfortable with **Unix** command line navigation, basic **bash** scripting, and high performance compute cluster use
Git/Github, Jupyter Notebooks, Google CoLaboratory, and Rmarkdown

Analysis Programs
Proficient in: Quantitative Insights into Microbial Ecology 2 (QIIME2), Shimadzu Gas Chromatography LabSolutions

General Programs
Proficient in: Microsoft Office, Google Suite

Lab Skills
Proficient in: Gas Chromatography, Proximate Analysis (Bomb Calorimetry, Ferric Reducing Ability in Plasma, Soxhlet, Kjeldahl, Fiber Analysis, Ashing)

Service and outreach

Organizer, Neurodiverse Food Safety & Cooking Class
ETSU April 2020

Organizer, Multicultural Nutrition & Cooking Class
ETSU February 2020

Organizer/Instructor, Summer Bridge Program Nutrition & Cooking Seminars
ETSU June 2019

Volunteer, Adult Continued Learning
Johnson City Food City September 2018 — November 2018

Volunteer, Appalachian Resource Conservation and Development Council
Johnson City Farmers' Market September 2018 — October 2018

Professional memberships

Alpha Eta Society May 2020 – Present
American Society for Nutrition January 2020 – Present
ETSU Student Dietetic Association January 2019 – May 2020
(Vice President) March 2019 – May 2020
Allied Health Student Association January 2017 – October 2018
(President) August 2017 – May 2018
(Secretary) January 2017 – August 2017