

# John Sterrett

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## Research topics

Gut-brain axis, stress physiology, microbial ecology, ecophysiology

## Methods interests

Bioinformatics, multivariate statistics, causal inference, machine learning

## 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, Matthew Olm

### 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
- EBIO 6100 Causal Inference in Ecological Data
- CSCI 6118 Software Engineering for Scientists
- 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

SymbNET Host-Microbe Symbiosis Scholar	2023
Undergraduate Research Opportunities Program Team Grant (CUB)	2023
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

### **Poly-omic risk scores predict inflammatory bowel disease diagnosis**

**Sterrett JD\***, Arehart CH\*, Garriss RL, Quispe-Pilco RE, Gignoux CR, Evans LM, Stanislawski MA.  
*mSystems*, in press.

### **Gut microbiome and lipidome signatures in irritable bowel syndrome patients from a low-income, food desert area - a pilot study**

**Sterrett JD\***, Paripatia N\*, Nesi L\*, Dawud LM, Kessler LR, Lowry CA, Perez LJ, DeSipio J, Phadtare S.  
*Microorganisms*, 2023.

### **An Integrative Model for Endophenotypes Relevant to Posttraumatic Stress Disorder (PTSD): Detailed Methodology for Inescapable Tail Shock Stress (IS) and Juvenile Social Exploration (JSE)**

Andersen ND, **Sterrett JD**, Costanza-Chavez GW, Zambrano CA, Baratta MV, Frank MG, Maier SF, Lowry CA.  
*Translational Methods for PTSD Research*. Pinna, G. (eds), 2023.

### **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.

\* Authors contributed equally

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.
- Analyzed untargeted metabolomics and lipidomics data from multiple *Mycobacterium vaccae* strains and plasma of animals inoculated 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 and Mentorship

### **Undergraduate Research Mentor**

Logan P. - Wild vs Laboratory Rat Microbiome

May 2023 – Present

Biba S. - Effects of High Fat Diet on Gut Microbiome

August 2023 – Present

### **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

### **Eavesdropping on Tiny Stomach Friends (Assessing the Gut-Brain Axis with Host-Microbiome Dual Transcriptomics)**

November 2023

CU Boulder BioFrontiers Institute UpGoer 5 Lightning Talks (**1st place**)

### **Detangling the Host-Microbiome Dual Transcriptome Enables Profiling of Transcriptional Crosstalk at Mucosal Surfaces**

SymbNET PhD Summer School on Host-Microbe Symbiosis

July 2023

### **Strain-level Metagenomic Investigation of HIV-Associated *Prevotella*-Rich Gut Microbiomes**

Front Range Microbiome Symposium

April 2023

**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 Bioinformatics (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, reproducible analysis using Snakemake, and software packaging.

#### R

Data wrangling, scripting, statistical modeling, plotting, and software packaging.

#### Julia

Data wrangling, statistics, and plotting.

#### C++

Implementation of low-level data structures and algorithms.

### Computational Skills

Proficient with **Unix** command line, **bash** scripting, and **high performance compute** cluster use.

Proficient with Git/Github, Jupyter Notebooks, Google CoLaboratory, and Rmarkdown/Quarto for project management.

### Bioinformatics Programs

Quantitative Insights into Microbial Ecology 2 (QIIME2), BioBakery tools (HUMAnN, MetaPhlAn, PhyloPhlAn), genome assembly (SPAdes), binning, dereplication, and quality control (CheckM, metaBAT, dRep, QUAST), sequence quality control (fastQC/MultiQC, Trimmomatic, SeqTK), read mapping (HISAT2, BBmap, Bowtie) and counting (featureCounts)

### General Programs

Microsoft Office, Google Suite

Service and outreach	<b>Organizer, Neurodiverse Food Safety &amp; Cooking Class</b>	
	ETSU	April 2020
	<b>Organizer, Multicultural Nutrition &amp; Cooking Class</b>	
	ETSU	February 2020
	<b>Organizer/Instructor, Summer Bridge Program Nutrition &amp; Cooking Seminars</b>	
	ETSU	June 2019
Professional memberships	<b>Volunteer, Adult Continued Learning</b>	
	Johnson City Food City	September 2018 – November 2018
	<b>Volunteer, Appalachian Resource Conservation and Development Council</b>	
	Johnson City Farmers' Market	September 2018 – October 2018
	<b>Alpha Eta Society</b>	May 2020 – Present
	<b>American Society for Nutrition</b>	January 2020 – Present
	<b>ETSU Student Dietetic Association</b>	January 2019 – May 2020
	(Vice President)	March 2019 – May 2020
	<b>Allied Health Student Association</b>	January 2017 – October 2018
	(President)	August 2017 – May 2018
	(Secretary)	January 2017 – August 2017