

Katja Della Libera

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OBJECTIVE

PhD student studying ecological community dynamics and their significance in human health and disease. Specific interests in the metabolic modeling of the gut microbiome in IBD and colorectal cancer.

CORE SKILLS

Ecological modeling (5 years of experience), Software Development & Data Analysis (7 years of experience), Teaching (9 years of experience)

EDUCATION

The University of Chicago

PhD Candidate

Department of Ecology & Evolution

Blekhman Lab

Chicago, IL
expected 2027

Minerva University

Bachelor of Science

Competitive and applied degree at a liberal arts college.

Double major in Data Science & AI and Earth's Systems.

GPA: 3.8/4.0

San Francisco, CA
May 2021

UWC Robert Bosch College

Bilingual IB Diploma

Higher-level courses in French, physics, and mathematics

Thesis essay in physics on solar panel efficiency optimization

Points: 39/45

Freiburg im Breisgau, Germany
May 2017

RESEARCH EXPERIENCE

Department of Medicine, Section of Genetic Medicine, University of Chicago

PhD researcher

Advisors: Dr. Ran Blekhman

- Working on an integrative approach to modeling gut microbiome ecology and host interactions. Analyzing metagenomics and host transcriptomics data to build networks of gene-microbial metabolic interaction
- Methods: Python, MICOM, COBRA, Gurobi

Chicago, IL
September, 2022 – current

Department of Medicine, Section of Gastroenterology, University of Chicago

Bioinformatician

Advisors: Dr. Ariel Halper Stromberg, Dr. Ran Blekhman

- Developing and executing a bioinformatics pipeline for data collected by Dr. Halper Stromberg investigating the role of antibody-binding microbes in Primary Sclerosing Cholangitis (PSC).
- Methods: differential abundance analysis in R, bracken, kraken

Chicago, IL
October, 2022 – current

Department of Ecology & Evolution, University of Chicago

Laboratory Rotation

Advisors: Stefano Allesina

- Working on the Tilman 1984 model for coexistence in a competition-colonization trade-off dominated community. Special focus on invasions of assembled communities.
- Methods: simulations in R, mathematics

Chicago, IL
January, 2022 – September 2022

Mansueto Institute for Urban Innovation, University of Chicago

Laboratory Rotation

Advisors: Luis Bettencourt

- Used information theory to quantify the influence of biological sex on segregation and income statistics from the US Census American Community Survey.
- Methods: data analysis in Python and the census API, Information Theory

Chicago, IL
March, 2022 – June 2022

Max Planck Institute of Animal Behavior

Visiting Undergraduate Researcher

Advisors: Dr. Ariana Strandburg-Peshkin, Dr. Stephan Leu, Dr. Suzanne Kern

- Working on a thesis project on collective movement and animal personalities in sheep in cooperation with the CoCoMo (communication and collective movement) group at the Max Planck Institute of Animal Behavior and researchers from the University of Adelaide, Australia.
- Methods: agent-based modeling, data analysis, spatial dataset analysis.

Konstanz, Germany
August, 2020 – December 2021

Santa Fe Institute

Undergraduate Complexity Research

Advisor: Dr. Christopher Kempes

- Worked with a faculty mentor on an independent research project on nutritional state-structured models of ecological dynamics and foraging behavior.
- Methods: ODEs, modeling, data analysis

Santa Fe, NM
June, 2020 – August, 2020

Minerva Schools at KGI

Ecology Summer Incubator – Team Citizen Science

Advisor: Dr. Suzanne Kern

- Working with a small group of students and a professor to evaluate and quantify the impact of COVID-19 on citizen science projects in Ecology.

San Francisco, CA
May, 2020 – August 2021

TEACHING AND OTHER RELEVANT WORK EXPERIENCE

University of Chicago

Teaching Assistant, Quantitative Biology Bootcamp

Supervisor: Dr. John Novembre, Dr. David Kovar

- Taught R, statistics, and other quantitative skills during an intensive course for students incoming to the Biological Science Division PhD programs

Chicago, IL
September, 2023

University of Chicago Marine Biological Laboratory

Teaching Assistant, Microbiomes Across Environment

Supervisor: Dr. Elena L. Peredo, Dr. David Mark Welch

- Mentored an intensive 3-week course for 13 UChicago Undergraduates at the MBL
- Collected, sequenced, and analyzed samples using 16S and Qiime2
- Gave a lecture on PCoA, and PCA and their use in the analysis of microbiome data

Woods Hole, MA
August, 2022 – September, 2022

Wolfram Research

Intern, Deployed Products and Services

Supervisor: Bradley Ashby

- Reviewed submissions to the Wolfram Function Repository and the Wolfram Notebook Archive developing content for to the function repository (e.g. BootstrapStatistics, NFAPlot, RegressionListPlot)
- Directly mentored two student projects at the Wolfram Summer Camp 2019
- Taught Mathematica and assisted other instructors at the Wolfram Summer School and Wolfram Summer Camp 2019

Champaign, IL
May, 2019 – May, 2020

Minerva Project

Computational Sciences Intern

Supervisor: Dean Richard Holman

- Designed material to teach data analysis, modeling, and mathematics using Mathematica to undergraduate students.

San Francisco, CA
September, 2018 – May 2021

Ewha Women's University

Volunteer programmer

Supervisor: Dr. Hortense Serret

- Worked with researchers at Ewha Women's University on a citizen science bird watching project, by contributing to the software development.

Seoul, South Korea
June, 2018 – March, 2019

Ökostation Freiburg

Environmental Education Intern

Supervisor: Jutta Schumacher

Freiburg im Breisgau, Germany

August, 2016 – May, 2017

- Assisted the environmental education center with courses covering various topics, such as ecosystem function, water quality, renewable energy, and lab techniques.

PUBLICATIONS

- [IN PRESS] Miller, Z.R., Clenet, M., **Della Libera, K.**, Massol, F., Allesina, S. (2023) "Coexistence of many species under a random competition-colonization trade-off". *bioRxiv* . <https://doi.org/10.1101/2023.03.23.533867>
- **Della Libera, K.**, Strandburg-Peshkin, A., Griffith, S. C., & Leu, S. T. (2023). "Fission-fusion dynamics in sheep: the influence of resource distribution and temporal activity patterns." *Royal Society open science*, 10(7), 230402. <https://doi.org/10.1098/rsos.230402>
- **Della Libera, K.**, Ratsathanuwati, R and Vermaat, E (2016) "Bridging the Gap: United World College Students' Initiatives in Work with Refugees." *Scottish Journal of Residential Child Care*, vol. 15, no. 1, p.62-69

AWARDS AND SCHOLARSHIPS

- Recipient of a partial scholarships at Minerva Schools at KGI and UWC Robert Bosch College
- Recipient of the *Congress Bundestag Youth Exchange Scholarship* (US-Congress and German Bundestag)
- Honor Roll at Middle Park High School, CO (given to top 10 students)
- Various classical guitar solo and group awards through "Jugend Musiziert" Germany (national youth music competition)

Note: neither Minerva nor UWC rank students or give out academic awards.

OTHER SKILLS

Programming Languages: Python, R, Mathematica/Wolfram Language

Languages: native/fluent: German and English, advanced: French (B2 certified) and Italian, basic: Spanish

MEMBERSHIP IN PROFESSIONAL SOCIETIES

Ecological Society of America (ESA)

REFEREE CONTACTS

- Dr. Ran Blekhman (University of Chicago): blekhman@uchicago.edu
- Dr. Christopher Kempes (Santa Fe Institute): ckempes@santafe.edu