

# Juliana C. Taube

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## Education

### Bowdoin College

A.B. *summa cum laude* WITH HONORS IN MATHEMATICS, MINOR IN BIOLOGY

Brunswick, ME

2017 - 2021

*Undergraduate thesis:* Modeling coupled disease-behavior dynamics of SARS-CoV-2 using influence networks

*Advisors:* Mary Lou Zeeman, PhD (Mathematics) and Mohammad Irfan, PhD (Computer Science, Digital & Computational Studies)

*Relevant coursework:* Linear Algebra, Probability, Statistics, Bayesian Statistics, ODEs, PDEs, Data Structures, Social & Economic Networks, Evolution, Ecology, Microbiology, Genetics & Molecular Biology, Science Communication

## Research Experience

### Georgetown University

RESEARCH ASSOCIATE, ADVISOR: SHWETA BANSAL, PHD

Washington, D.C.

Aug. 2021 - present

- Analyzed spatiotemporal trends in self-reported mask-wearing behavior during the U.S. COVID-19 pandemic
- Mapped the immune landscape of orthopoxviruses at a fine spatial resolution using demographic and vaccination data
- Identifying spatiotemporal trends in self-reported non-household contacts (using GAMs)
- Characterizing network structure differences in human contact patterns using proximity sensor data
- Reviewing gender, race, and ethnicity bias in citation practices within the field of infectious disease dynamics

### Bowdoin College

STUDENT RESEARCHER, ADVISORS: MARY LOU ZEEMAN, PHD; MOHAMMAD IRFAN, PHD

Remote

May 2021 - present

- Continued honors thesis work in preparation for publication, specifically:
  - Adapted model to account for both global and local risk perception
  - Modified underlying network structure to better resemble real-world contact networks
  - Analyzed the role and interaction of risk perception and social influence terms in our model

### Centers for Disease Control and Prevention, Division of Global Migration & Quarantine, Office of Innovation, Development, Evaluation, and Analytics

INTERN, ADVISORS: ARDATH GRILLS, PHD; SARAH BOWDEN, PHD; MICHAEL JOHANSSON, PHD

Remote

May - Aug. 2020

- Gathered, cleaned, and wrangled census and meat-packing location data for boosted regression tree machine learning model to predict and characterize COVID-19 county hotspots
- Collected data (attendance, venue size, event duration) for large gatherings considered COVID-19 superspreader events & investigated correlations between event aspects and disease transmission, in an effort to estimate dispersion parameter
- Contributed to model implementation and assessment of interventions to mitigate COVID-19 spread on cruise ships

### University of Georgia, Odum School of Ecology

STUDENT RESEARCHER (REU), ADVISORS: JOHN M. DRAKE, PHD; PAIGE B. MILLER, PHD

Athens, GA

May - July 2019

- Compiled and standardized infectious disease transmission trees from the literature into an R database
- Analyzed predictors of outbreak size & quantified the contribution of superspreading to onward transmission
- Tested theory relating frequency of superspreading events and the dispersion parameter

STUDENT RESEARCHER (REMOTE), ADVISORS: JOHN M. DRAKE, PHD; PAIGE B. MILLER, PHD

June - Dec. 2020

- Expanded database to include COVID-19 transmission trees and released data online at [outbreaktrees.ecology.uga.edu](https://outbreaktrees.ecology.uga.edu) 🔗
- Further explored frequency, timing, and generation of superspreaders for COVID-19 relative to other diseases using database

### Dartmouth Hitchcock Medical Center

INTERN, ADVISOR: PETER F. WRIGHT, MD



Lebanon, NH

June - Aug. 2017

- Assisted with development of Gates Foundation funding proposal: Applying the Lessons Learned from Polio Eradication
- Compiled and summarized literature on smallpox and polio eradication efforts, highlighting similarities and differences
- Organized data on bronchiolitis and RSV hospitalizations in New England



## Preprints

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2. **Taube JC\***, Rest EC\*, Lloyd-Smith JO, Bansal S (2022) The global landscape of susceptibility to orthopoxviruses: The legacy of smallpox vaccination. (\*These authors contributed equally) 
1. **Taube JC**, Susswein Z, Bansal S (2022) Characterizing spatiotemporal trends in self-reported mask-wearing behavior in the United States. 

## Peer-reviewed Publications

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2. **Taube JC**, Miller PB, Drake JM (2022) An open-access database of infectious disease transmission trees to explore superspreader epidemiology. *PLoS Biology* 20(6): e3001685. 
1. Wright PF, Hoen AG, ..., **Taube JC**, Brickley EB (2022) Bronchiolitis hospitalizations in northern New England: Clues to disease prevention. *Therapeutic Advances in Infectious Disease* 9: 1-11. 

## Presentations

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### Characterizing spatiotemporal trends in self-reported mask-wearing behavior in the U.S.

Talk at MIDAS Meeting 2022, 10 minutes + 25 minute breakout discussion

Sept. 2022

Bethesda, MD

### Characterizing spatiotemporal trends in self-reported mask-wearing behavior in the U.S.

Talk at Delphi's COVID-19 Trends and Impacts Survey Monthly Collaboration Meeting, 15 minutes

May 2022

Virtual

### Modeling coupled disease-behavior dynamics of SARS-CoV-2 using influence networks

Invited talk for Prof. Mohammad Irfan's Research Group at Bowdoin College, 30 minutes

Oct. 2021

Virtual

### An open-access database of infectious disease transmission trees to explore superspreader epidemiology

Rapid Fire Talk at MIDAS Meeting 2021

May 2021

Virtual

### Who infected whom? Creating a database of transmission trees for comparative outbreak analysis

Poster at Epidemics 7, also presented at University of Georgia's Final Summer REU Poster Session (July 2019) and Bowdoin College's President's Summer Research Symposium (October 2019)

Dec. 2019

Charleston, SC

## Awards & Honors

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- 2021 **Student Faculty Research Grant Fellowship**, summer research funding, Prof. Zeeman's NSF grant (\$1920)
- 2020 **Almon Goodwin Prize**, awarded to exemplary members of Phi Beta Kappa
- 2020 **Phi Beta Kappa**
- 2020 **Sarah and James Bowdoin Scholar & Book Award Winner (4x)**, Book Award is for students with 4.0 GPA
- 2020 **Bowdoin Funded Internship Grant**, for internship with CDC (\$5000)
- 2019 **REU Travel Grant for Epidemics 7**, from Rocky Mountain Biological Laboratory (\$2000)
- 2019 **Bowdoin College Goldwater Scholarship Nominee**
- 2018 **First Year Chemistry Award**, recognizes outstanding promise and achievement in chemistry
- 2017 **Bowdoin Faculty Scholar**, recognizes students who achieved excellence in their high school courses (\$3000)
- 2017 **Bowdoin National Merit Scholarship** (\$1000/yr)

## Teaching Experience

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### Bowdoin College

MATHEMATICS TEACHING ASSISTANT

Brunswick, ME

Feb. - May 2021

- Partial Differential Equations (MATH 3209): created videos to explain homework solutions or review confusing concepts

## DIGITAL AND COMPUTATIONAL STUDIES TEACHING ASSISTANT

Jan. - May 2021

- Contagion (DCS 3350): curated resources and assisted students
- Searched for flight, mobility, population, and contact tracing data sources, summarized findings for student project
- Collected and organized news articles on racism, economic impacts, and misinformation during the COVID-19 pandemic
- Led weekly study group to help students with their coursework using networkx

## COMPUTER SCIENCE TEACHING ASSISTANT

Jan. 2019 - Dec. 2020

- Led weekly two-hour study groups to assist students with their assignments, including asking probing questions, finding the bugs in their code, and explaining concepts from class
  - Introduction to Computer Science (CSCI 1101): Jan. 2019 – Dec. 2020
  - Social and Economic Networks (CSCI/DCS 2350): Sept. – Dec. 2020

## Service

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### Friends of the Mount Vernon Trail Volunteer

Feb. 2022 - present

Arlington, VA

- Participate about once a month in events to improve the Mount Vernon Trail for biking/walking/running, including trash pick-up, culvert digging, invasive honeysuckle removal, and trail widening

### Bowdoin Curriculum Implementation Committee Alternate Member

Aug. 2020 - May 2021

Brunswick, ME

- Attended committee meetings to provide student perspective on course proposals, including how they fit into the Bowdoin curriculum, and whether they satisfied distribution requirements

### Bowdoin Student-Athlete Advisory Committee Member

Aug. 2020 - May 2021

Brunswick, ME

- Representative from Bowdoin's Women's Varsity Ice Hockey Team, advocated for team needs and worked with college administration to implement NCAA and NESCAC initiatives

## Training

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### Teaching, Learning & Innovation Summer Institute

Washington, DC

GEORGETOWN UNIVERSITY

May 2022

Workshops on universal design, assessments in STEM courses, use of office hours, and science communication

### Summer Institute in Biostatistics

Minneapolis, MN

UNIVERSITY OF MINNESOTA

June - July 2018

*Coursework:* 6 weeks of classes in biostatistics, epidemiology, and statistical computing using R and SAS

*Final project:* Outlined clinical trial protocol of canakinumab in HIV+ patients

## Skills

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**Programming** R, Python, Mathematica

**Software** LaTeX, Git, MacOS, Microsoft Office