Juliana C. Taube

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Education

Bowdoin College *Brunswick, ME*

A.B. *summa cum laude* with Honors in Mathematics, minor in Biology *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 *Washington, DC*

Research Associate, Advisor: Shweta Bansal, PhD *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
- Describing spatiotemporal trends in self-reported non-household contacts (using GAMs)
- Identifying gender and race/ethnicity imbalances in publications and citation practices within the field of infectious disease dynamics

Bowdoin College *Remote*

Student Researcher, Advisors: Mary Lou Zeeman, PhD; Mohammad Irfan, PhD *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 *Remote*

Intern, Advisors: Ardath Grills, PhD; Sarah Bowden, PhD; Michael Johansson, PhD *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 *Athens, GA*

Student Researcher (REU), Advisors: John M. Drake, PhD; Paige B. Miller, PhD *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
- Further explored frequency, timing, and generation of superspreaders for COVID-19 relative to other diseases using database

Dartmouth Hitchcock Medical Center *Lebanon, NH*

Intern, Advisor: Peter F. Wright, MD *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

Publications

4. **Taube JC**, Susswein Z, Bansal S (2023) Spatiotemporal trends in self-reported mask-wearing behavior in the United States: Analysis of a large cross-sectional survey. *JMIR Public Health and Surveillance* 9: e42128. doi: 10.2196/42128
3. **Taube JC***, Rest EC*, Lloyd-Smith JO, Bansal S (2022) The global landscape of smallpox vaccination history and implications for current and future orthopoxvirus susceptibility: a modelling study. *The Lancet Infectious Diseases*. In press. doi: 10.1016/S1473-3099(22)00664-8.
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. doi: 10.1371/journal.pbio.3001685.
1. Wright PF, Hoen AG, Jarvis JD, Zens MS, Dade EF, Karagas MR, **Taube JC**, Brickley EB (2022) Bronchiolitis hospitalizations in northern New England: Clues to disease prevention. *Therapeutic Advances in Infectious Disease* 9: 1-11. doi: 10.1177/ 20499361221099447

* Authors contributed equally

Preprints & In Prep

2. **Taube JC**, Susswein Z, Bansal S (2023) Characterizing spatiotemporal trends in self-reported non-household contacts during the COVID-19 pandemic in the United States. *In preparation*.
1. **Taube JC**, Irfan MT, Zeeman ML (2023) Modeling coupled disease-behavior dynamics using influence networks and varying risk perception. *In preparation*.

Presentations

Characterizing spatiotemporal trends in self-reported mask-wearing behavior in the U.S. — *Sept. 2022*
Talk at MIDAS Meeting 2022, 10 minutes + 25 minute breakout discussion
Talk also given virtually at Delphi's COVID-19 Trends and Impacts Survey Monthly Collaboration Meeting — *Bethesda, MD*

Modeling coupled disease-behavior dynamics of SARS-CoV-2 using influence networks — *Oct. 2021*
Invited talk for Prof. Mohammad Irfan's Research Group at Bowdoin College, 30 minutes — *Virtual*

An open-access database of infectious disease transmission trees to explore superspreader epidemiology — *May 2021*
Rapid Fire Talk at MIDAS Meeting 2021 — *Virtual*

Who infected whom? Creating a database of transmission trees for comparative outbreak analysis — *Dec. 2019*
Poster at Epidemics 7 — *Charleston, SC*

Awards & Honors

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

Georgetown University *Washington, DC*

Biology Teaching Fellow *Aug. - Dec. 2022*

- Modeling Populations and Diseases (BIOL 422/GLID 522): attend lecture, lead lab section, hold weekly office hours, grade student labs, homeworks, & papers

Bowdoin College *Brunswick, ME*

Mathematics Teaching Assistant *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

MIDAS Student Committee *Jan. 2023 - present*

virtual

- Plan and facilitate student events for the MIDAS (Models of Infectious Disease Agent Study) Network, including lightning talks and panels on PhD work/life balance

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

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

Exploring Racial Justice: An Intragroup Dialogue for White Identified Students *Virtual*

Bowdoin College *April - May 2021*

Six-week workshop exploring social justice issues and white privilege without burdening students of marginalized identities

Summer Institute in Biostatistics *Minneapolis, MN*

University of Minnesota *June - July 2018*

Coursework: Six 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

Programming R, Python, Mathematica

Software LaTeX, Git, MacOS, Microsoft Office