Juliana C. Taube

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Education

Bowdoin College

Brunswick, ME

A.B. *summa cum laude* with Honors in Mathematics, minor in Biology, GPA: 4.0/4.0 *2017 - 2021*

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

Advisors: Professors Mary Lou Zeeman (Mathematics) and Mohammad Irfan (Computer Science & Digital and 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, D.C.

Research Associate, Advisor: Shweta Bansal, PhD *Aug. 2021 - present*

- Analyzing spatiotemporal trends between three nationwide masking surveys
- Implementing Bayesian partial pooling/mixed effects model to estimate masking at the county-level based on survey responses

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 COVID-19 hotspot model
- Used 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
- Looked for correlations between event aspects and disease transmission, in 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
- Findings were submitted for publication in PLoS Biology

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

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

Taube JC, Miller PB, Drake JM. *Under revision for resubmission to PLoS Biology*

https://www.medrxiv.org/content/10.1101/2021.01.11.21249622v1

Presentations

Invited talk for Prof. Mohammad Irfan's Research Group at Bowdoin College — *Online*

Modeling coupled disease-behavior dynamics of SARS-CoV-2 using influence networks — *Oct. 2021*

Rapid Fire Talk at MIDAS Meeting 2021 — *Online*

An open-access database of infectious disease transmission trees to explore superspreader epidemiology — *May 2021*

Poster at Epidemics 7 — *Charleston, SC*

Who Infected Whom? Creating a Database of Transmission Trees for Comparative Outbreak Analysis — *Dec. 2019*

- Poster additionally presented at University of Georgia's Final Summer REU Poster Session (July 2019) and Bowdoin College's President's Summer Research Symposium (October 2019)

Awards & Honors

2021 **Student Faculty Research Grant Fellowship**, summer funding from Prof. Zeeman's NSF grant for continued research ($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 coursework ($3000)
2017 **Bowdoin National Merit Scholarship** ($1000/yr)

Teaching Experience

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
- Found and summarized data sources for student disease modeling project, including flight, mobility, population, and contact tracing data
- Collected and organized news articles on other aspects of the COVID-19 pandemic, including racism, economic impacts, and misinformation
- 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

Bowdoin Curriculum Implementation Committee — *Brunswick, ME*

Alternate member — *Aug. 2020 - May 2021*

- Attended committee meetings to provide student perspective
- Reviewed course proposals and considered how they fit into the Bowdoin curriculum and whether they satisfied distribution requirements
- Suggested revisions to course descriptions for the course catalogue

Bowdoin Student-Athlete Advisory Committee — *Brunswick, ME*

Member — *Aug. 2020 - May 2021*

- 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

Bowdoin Women's Ice Hockey Community Service Representative

Brunswick, ME

Leader

Aug. 2019 - May 2020

- Organized team community service activities including participation in school-wide Common Good Day
- Explored volunteering opportunities with local food pantry & hockey leagues, suspended due to COVID-19

Parkview Medical Center

Brunswick, ME

Volunteer

Sept. - Dec. 2018

- Guided patients to the waiting room and procedure area
- Interacted with and comforted patients in the Pain Procedure Suite
- Organized billing materials, stocked medical supplies, and disinfected procedure furniture

Training

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

Programming R, Python, Java, Mathematica

Software LaTeX, Git, MacOS, Microsoft Office