PERSONAL INFORMATION

Jeremy D Harris

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Personal Website

GitHub

WORK EXPERIENCE

August 2024 – May 2025

Instructor

Mathematics, Spelman College

- Teaching 4 classes in Fall Semester: Applied Calc 1, Gen Stats 1, Contemporary Math
- Will teach 4 classes in Spring Semester: Applied Calc 1, Diff Eq 1, Contemporary Math

August 2023 – May 2024

Visiting Assistant Professor

Mathematics, Rose-Hulman Institute

- Taught 8 classes over 3 quarters: Biomath (continuous models), Diff Eq 1, Calc 2

June 2020 – July 2023

Postdoctoral Fellow Researcher in Weitz Group

Biological Sciences, Georgia Tech

- Mentor: Joshua Weitz, PhD, Professor and Tom and Marie Patton Chair
- Math models of virus-host dynamics: asymptomatic transmission; heterogeneity in susceptibility and transmissibility; modeling virus-microbe dynamics (e.g., latent period distributions); coalition formation between lysogens and their phages

August 2017 – May 2020

Postdoctoral Fellow Researcher in Koelle Research Group

Biology, Emory University

- Mentor: Katia Koelle, PhD, Professor
- Math models of virus-host dynamics: effects of multiplicity of infection (MOI) on influenza viral infection outcomes in cell culture; cell coinfection experiments with varying MOIs wild-type (WT) and defective interfering (DI) particles; bottleneck estimation using de novo viral genetic variation

EDUCATION

2017

Ph.D. in Mathematics

University of Pittsburgh, Pittsburgh, PA
Advisor: Bard Ermentrout, PhD, Distinguished University Professor

- Thesis: “Analysis of a spatially-distributed Wilson-Cowan model of cortex”

2011

B.S. in Mathematics, minor in Bioengineering

University of Pittsburgh, Pittsburgh, PA

- Honors College, Graduated Summa Cum Laude

PUBLICATIONS

Preprint.

- Harris JD, Gallmeier E, Dushoff J, Beckett SJ, Weitz JS (2024). “Infections are not alike: the effects of covariation between individual susceptibility and transmissibility on epidemic dynamics.” MedRxiv (October 2024) [Submitted to JTB].

Published.

- Dominguez-Mirazo M, Harris JD, Demory D, Weitz JS (2024). "Accounting for cellular-level variation in lysis: implications for virus–host dynamics." mBio15:e01376-24..
- Shi, Teresa, Harris, JD, Martin MA, Koelle, KV (2024). "Transmission bottleneck size estimation from de novo viral genetic variation." MBE (2024) msad286.
- Harris, JD*, Park, SW*, Dushoff, J, Weitz JS (2023). "How time-scale differences in asymptomatic and symptomatic transmission shape SARS-CoV-2 outbreak dynamics." Epidemics (2023): 100664. *authors contributed equally
- Martin, BE*, Harris, JD* et al. (2020). "Cellular co-infection can modulate the efficiency of influenza A virus production and shape the interferon response." PLoS pathogens 16.10: e1008974. *authors contributed equally
- Harris, JD and Ermentrout, GB (2018). "Traveling waves in a spatially-distributed Wilson-Cowan model of cortex: From fronts to pulses." Physica D: Nonlinear Phenomena , 369, 30-46.
- Ali, R, Harris, JD*, and Ermentrout, GB (2016). "Pattern formation in oscillatory media without lateral inhibition." Physical Review E, 94(1), 012412. *corresponding author
- Harris, JD and Ermentrout, GB (2015). "Bifurcations in the Wilson–Cowan equations with nonsmooth firing rate." SIAM Journal on Applied Dynamical Systems, 14(1), 43-72.

In Preparation.

- Harris, JD, Goel, T, Weitz, JS. "Temperate phages form coalitions with their lysogenized hosts constrained by a growth-induction trade off." (In preparation, anticipated date of submission: Spring 2025)
- Harris, J.D.*, Martin, B.E*., Koelle, K.V., and Brooke, C.B. "Influenza virus population cycles emerge from collections of variably responding cells." *authors contributed equally. (Anticipated date of submission: Summer 2025)
- Demory, D., Harris, J.D., Weitz, J.S. "Mechanisms of viral coexistence under a single fluctuating limiting resource." (Anticipated date of submission: Summer 2025)

TEACHING EXPERIENCE

August 2023 – May 2024

Visiting Assistant, Math, Rose-Hulman

- Spring Quarter Teaching: Biomath 301: continuous models; 2 sections of Matrix Algebra & Differential Equations 1
- Winter Quarter Teaching: 2 sections Calculus 2; 1 section of Matrix Algebra & Differential Equations 1
- Fall Quarter Teaching: 2 sections of Matrix Algebra & Differential Equations 1

Affiliate Status, Biological Sciences, GA Tech

- Fall semester: 3 modules of Foundations in Quantitative Biology (remotely)

2021 – July 2023 Teaching & Mentoring – GA Tech

- Serrapilheira ICTP-SAIFR - taught two modules (over 2 weeks in July 2022) in organismal behavior (as part of the training program in quantitative biology and ecology) to ∼30 graduate-level students from México, Colombia, Argentina, Brasil.
- Foundations in Quantitative Biology (Fall 2021, Fall 2022) – a course for first-year QBioS program PhD students, the small class sizes (10-12 students) allow for close interactions and fast growth over the semester. With two lectures, a computational lab, and a homework assignment each week, the class is intense for both students and instructors. I had the opportunity to lecture for four of the weeks on organismal behavior, excitability in neural & cardiac systems, and movement, helping several students to do final projects on these topics.
- Undergraduate Mentoring (Fall & Spring 2021) I mentored a senior undergraduate student (Esther Gallmeier) on a research project modeling variation in susceptibility and transmissibility in epidemic models MedRxiv (October 2024) [Submitted to JTB].
- Journal Club (Fall 2022) - alternating between the topics: phage-microbe interactions and methods in modeling and model fitting; once a month we read a short review paper and have a casual conversation over coffee.
- KITP Quantitative biology summer research course – Hands-on labs (using Matlab, R, and Python) to go though the exercises on eco-evolutionary models of viral dynamics (August 9-13, 2021)
- Quantitative Biosciences Workshop 2021: Epidemics – Hands-on breakout session using Matlab to go though the exercises; see material (May 17-18, 2021)
- Undergraduate Research Symposium – volunteered to serve as a judge of 5-minute talks (April 22, 2021)
- Seminars & Workshops
  - Entering Mentoring training – (Fall 2021) offered by Offices of Undergraduate Education and Graduate Education & Faculty Development
  - Instructional Strategies to Enhance Student Motivation; Inclusive Learning (offered by the Center for Teaching & Learning)

2015 – 2017 Teaching – Pitt

- Graduate Linear Algebra – Teaching Assistant
- Intro to Finite and Discrete Mathematics – Instructor
- Intro to Real Analysis – Teaching Assistant
- Intro to College Algebra – Instructor
- Calculus I (2 sections) – Instructor
- Intro to College Algebra (2 sections) – Instructor
- Intro to College Algebra – Instructor
- Calculus III – Teaching Assistant

2015 – 2016 Teaching Assistant Workshops – Pitt

- Topics include: developing a teaching philosophy, syllabus construction, encouraging participation, teaching with Powerpoint, navigating difficult situations

PRESENTATIONS

2014 – present

Talks & Posters (external)

– In the Weitz Group –

- 11th Aquatic Virus Workshop – " Population Dynamics of Temperate Phage and the Potential Emergence of Phage-Host Coalitions" (poster, July 2023)
- AMS SouthEastern Sectional Meeting – " Population Dynamics of Temperate Phage and the Potential Emergence of Phage-Host Coalitions" (20-minute talk, Special Session: Multiscale Approaches to Modeling Ecological and Evolutionary Dynamics IV, March 19, 2023)
- EEID 2022 conference – " Time-scale differences between asymptomatic vs. symptomatic infections lead to changes in the relevance of asymptomatic carriers over the course of an epidemic." (poster, July 2022)
- Invited speaker – "Individual-level differences in symptomatic and asymptomatic transmission shape population-level dynamics of SARS-CoV-2 outbreaks." Virtual talk, University of Pennsylvania, Math Bio seminar (Feb. 1, 2022)
- Poster presentation – "Modeling asymptomatic transmission in COVID-19." Student Conference on COVID-19 modeling (May 28-29, 2021)
- 2-minute Rapid Talk (poster) – "Modeling asymptomatic transmission in COVID-19." MIDAS 2021 (May 10-13, 2021)
- Invited speaker – "Modeling asymptomatic transmission in COVID-19." Virtual talk, University of Florida, Math Bio seminar (Feb. 4, 2021)
- Invited speaker – "Modeling asymptomatic transmission in COVID-19." Virtual talk, University of Pittsburgh, Math Bio seminar (Nov. 19, 2020)

– In the Koelle Lab –

- Conference talk – "Estimating transmission bottleneck sizes from viral variants unique to recipient hosts." Epidemics Conference 2019 (Dec. 3-6, 2019)
- Invited speaker – "Cellular co-infection increases viral production but the constituents of the output depend on frequencies of the input." Kennesaw State University, Applied Math seminar (Nov. 15, 2019)
- Invited speaker – "How do defective interfering particles impact influenza virus dynamics?" University of Pittsburgh, Center for Vaccine Research (April 16, 2019)
- Discussion moderator – summarized conference talks/posters and facilitated "Big picture" discussion on the future of quantitative biology. A TMLS-sponsored conference at Emory (Jan. 16-18, 2019)
- Invited speaker – "How do defective interfering particles impact influenza virus dynamics?" University of Pittsburgh, Center for Vaccine Research (April 16, 2019)
- Discussion moderator – summarized conference talks/posters and facilitated "Big picture" discussion on the future of quantitative biology. A TMLS-sponsored conference at Emory (Jan. 16-18, 2019)

- Poster presentation – “Complex viral dynamics emerge in vitro from collections of heterogeneously-responding infected cells.” Evolution of Complex Life, GA Tech (May 15-17, 2019)

– In Graduate School –

- Conference talk – “Traveling waves in a (nonsmooth) neural firing rate model.” SIAM 2017 Annual Meeting (Pittsburgh, PA, July 10-14, 2017)
- Conference talk – “Patterns and waves in a spatially-extended neural field model.” SIAM 2017 Conference on Applications of Dynamical Systems (Snowbird, Utah, May 21-25, 2017)
- Conference talk – “Travelling fronts and pulses in a nonsmooth neural mass model.” SIAM 2015 Conference on Applications of Dynamical Systems (Snowbird, Utah, May 17-21, 2015)
- Conference talk – “The Wilson-Cowan equations with nonsmooth firing rate.” (George Mason University, March 20-21, 2015)
- Conference talk – “Bifurcation analysis of the Wilson-Cowan equations with nonsmooth firing rate function.” IEEE International Meeting on Analysis and Applications of Nonsmooth Systems (Como, Italy, August 10-12, 2014)

SERVICE

August 2023 - May 2024

Rose-Hulman Institute of Technology

- Sonia Math Day for Girls (March 2024)
- Biomath Day (February 2024)
- High school math competition (November 2024)

Spring 2021 - July 2023

GA Tech

- CoS Research Faculty Advisory Council (member since Feb. 1, 2022) - the mission of the council is to support and advocate for postdocs and research scientists; initiatives and activities include:
  - Townhall meetings to build community and share information
  - Spring 2021-2022 surveys to inform the council about issues and needs
  - Postdoc & Research Scientist Awards
  - Establishing Liaison positions to help with difficult situations between researchers and faculty
- GT^2 Symposium (Jan. 21, 2023) volunteered to judge research posters and presentations; hosted by the Black Graduate Student Association (BGSA) and the Latino Organization of Graduate Students (LOGRAS).
- MLK Day of Service (Jan. 16, 2023) volunteered in a team to serve the Oakland Cemetery by completing several landscaping projects.

2018 – Spring 2020 **Emory**

- Data Literacy Academic Learning Community – six 1.5 hour discussions on data literacy, with a focus on interdisciplinary educational approaches and skill-building in data literacy for lessons and curriculum to support undergraduate education
- Data Science for Scientists ATL – monthly meetings and special sessions on all things data (e.g. Jupyter notebook demos, version control with git, visualization with R)
- Software carpentry workshop – hosted by Data Science for Scientists ATL (Nov. 23-24, 2019) – to learn basic shell commands, version control with git, and to use jupyter notebooks and some basic python code
- Datafest at Emory – undergraduates analyze a large dataset as part of the quantitative theory and methods initiative (April 2019)
- Graduate Research Symposium – helped judge research talks/posters (2018-2020)
- Volunteer for Atlanta Bike Emory: participating in Emory Cares International Service Day (Saturday Nov. 9, 2019)
- Committee on Environment – the committee discusses, reviews, and makes recommendations on campus projects and initiatives that have an environmental impact on campus (committee website) (2019-2020)

2014 – Spring 2017 **Pitt**

- Representative from the math department in general body meetings; planned and organized graduate student events, including socials and the new student teaching orientation (2013 – 2017)
- Organized for graduate students as an opportunity to practice presenting their work (2014 – 2015)
- Volunteer at Pitt's Integration Bees – Helped with the undergraduate bee (2014 & 2015); high school bee (2015 & 2016)

April 2020 – August 2020 **Hearts to Nourish Hope Food Bank**

- Volunteer through Hands on Atlanta – monthly, from April-August 2020

2018 – 2019 **Human Rights Campaign (HRC)**

- Volunteer for HRC Atlanta Pride Brunch (Oct. 13, 2019)

2013 – 2014 **Volunteer for Neighborhood Learning Alliance (NLA)**

- Helped high school students complete online coursework to obtain equivalent credit for a failed or incomplete course-requirement, Pittsburgh, PA (July and August of 2013 & 2014).

GROUPS & ORGANIZATIONS

Spring – Fall 2020 **SARS-CoV-2 Journal Club**

- (Emory-UGA-GATech) Collaborative Journal Club (co-organizer) – to collect, organize, and read papers on topics ranging from epidemiological data analysis to vaccine efficacy studies. Weekly meetings – April 20 - August 14, 2020.

2017 – Spring 2020 **Emory University**

- Postdoctoral Science Magazine (editor) – to highlight research at Emory University and other research institutions in Atlanta; develop skills in communicating science; blog post (Emory PDA) on working remotely – March 25, 2020
- Biology Postdoctoral Cohort – created to build social and professional connections amongst postdocs in biology and related areas
- Theory and Modeling of Living Systems (TMLS) Initiative
- EmoRy R & coding club – to learn Rstudio, Rmarkdown, version control with git, etc.
- Data Science for Scientists ATL – to engage with the data science community at Emory, both learning and helping with events (meetings, workshops, etc.)

CURRENT PROFESSIONAL MEMBERSHIPS

National/international Organizations

- Society for Industrial and Applied Mathematics (SIAM)
- Society for Mathematical Biology (SMB)
- Models of infectious disease agent study (MIDAS)

AWARDS & FELLOWSHIPS

2011 – 2013 **NSF-RTG, Complex Biological Systems Group**

- Complex biological systems across multiple space and time scales
  Award number 0739261
- Funding for the first two years of graduate school

April 2011 **Culver Award for undergraduate research, Department of Mathematics**

- For work on modeling antigenic variation in Trypanosome infections

2010 – 2011 **NSF-RTG, Complex Biological Systems Group**

- Complex biological systems across multiple space and time scales
  Award number 0739261
- Undergraduate research experience: summer (2010) & spring/summer (2011)

2007 – 2011 **University of Pittsburgh scholarships**

- University of Pittsburgh, 2007-2011
- Swanson School of Engineering, 2007-2009

FUNDING ACKNOWLEDGMENTS

June 2020 – July 2023 **AWD-001014 - Simons Grant #722153**

Principal Investigator: Joshua S. Weitz, PhD, Professor and Tom and Marie Patton Chair in Biological Science

- Funding source of my postdoctoral fellowship
- Our aim is to establish a multidisciplinary collaboration to explore how virus-microbe entanglement shapes the physiology of cells and impact the ecology, evolution, and ecosystem of larger microbial communities.

August 2017 – May 2020 **DARPA INTERCEPT W911NF-17-2-0034**

Principal Investigator: Chris B. Brooke, PhD, Assistant Professor

- Funding source of my postdoctoral fellowship
- As part of the INTERCEPT program, our research team has aimed to investigate the potential for defective interfering particles to be used as a novel therapeutic against viral infections by understanding their basic evolutionary consequences within- and between-hosts.

2013 – 2014 **NSF DMS 1219753**

Principal Investigator: G. Bard Ermentrout, PhD, Distinguished University Professor

- Interactions between Stimuli and Spatiotemporal Activity
- Mentored an undergraduate REU student (summer 2014); we published our results in PRE (2016). (see publications section)

REFERENCES

Joshua S. Weitz
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College Park, MD 20742
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