

Position: Associate Professor of Biological Sciences, Vanderbilt University

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## Professional Appointment

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Jan. 2017 – present     **Vanderbilt University**, Nashville, TN  
Department of Biological Sciences  
Department of Pathology, Microbiology, and Immunology (Secondary)  
Associate Professor (2024-present)  
Assistant Professor (2017-2024)

2014 – 2016     **University of Houston**, Houston, TX  
Department of Biology and Biochemistry  
USDA NIFA Postdoctoral Fellow and Research Assistant Professor  
Mentor: Dr. Tim Cooper

## Education

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2009 – 2014     **Princeton University**, Princeton, NJ  
Ph.D., Ecology and Evolutionary Biology (Awarded Oct. 2014)  
Dissertation: *Invertebrate immune priming: An integration of mechanism, life history, and disease dynamics*  
Advisor: Dr. Andrea Graham

2005 – 2009     **Rice University**, Houston, TX  
B.S., *magna cum laude*, Ecology and Evolutionary Biology & Biochemistry and Cell Biology  
Thesis: *Challenges of metamorphosis in infected invertebrate hosts*  
Advisor: Dr. Volker Rudolf

2007 – 2008     **University of Texas – Houston Medical School**  
Department of Pathology and Laboratory Medicine  
Undergraduate Research Fellow  
Advisor: Dr. Jeffrey Actor

## Selected Honors and Fellowships

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2021 - 2023     **SC Family Dean's Faculty Fellowship** in Biological Sciences, Vanderbilt University

2020 - 2022     **Sloan Research Fellowship** in Computational and Evolutionary Molecular Biology, Alfred P. Sloan Foundation

2014 – 2016     **USDA NIFA Postdoctoral Fellowship (PI)**  
Award number 2014-67012-22278

2015	Title: <i>The impact of stored grain pest immunological dynamics on the evolution of pathogen virulence</i> <b>NSF- sponsored NESCent Evolutionary Catalysis Meeting (Co-PI)</b> , Durham, NC Title: <i>Forgotten Memories: immune memory beyond the adaptive immune system</i>
2012 – 2014	<b>USDA NIFA Pre-doctoral Fellowship (PI)</b> Award number 2012-67011-19893 Title: <i>Elucidating the mechanistic basis and population consequences of immune priming in Tribolium beetles</i>
2011 – 2012	<b>Princeton Health Grand Challenges Graduate Research Funding</b> <i>Internally competitive award that funded dissertation research costs and conference travel</i>
2012	<b>NSF Eco-Immunology RCN travel grant</b> to ETH Zurich <i>Supported a research exchange to Paul Schmid-Hempel's lab to develop methods for insect assays</i>
2011, 2012	<b>NSF GRFP Honorable Mentions</b>
2009	<b>Clark P. Read Award for Excellence in Evolutionary Biology</b> , Rice University <i>Awarded to an exceptional research-active senior in the Dept. of Ecology and Evolutionary Biology</i>
2005 – 2009	<b>National Merit Scholar</b> , Rice University

## Research

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### Publications

\*indicates corresponding author <sup>1</sup>Maiden name <sup>2</sup>Undergraduate co-author

#### *Preprinted Manuscripts Under Evaluation or in Post-Review Revision*

38. Schulz, N.K.E, Asgari, D., Liu, S., Birnbaum, S.S.L, Williams, A.M., Prakash, A., and **Tate, A.T.\***. 2024. Resources modulate developmental shifts but not infection tolerance upon coinfection in an insect system. *BioRxiv*. DOI: <https://doi.org/10.1101/2024.08.01.606236>.
37. Asgari, Danial, and **Tate, A.T.\*** Positioning of negative feedback loops within immune signaling pathways influences host fitness through noise in AMP expression. *BioRxiv*. DOI: <https://doi.org/10.1101/2024.02.22.581613>
36. Birnbaum, S., Schulz, N., Garrett, D., and **Tate, A.T.\***. 2022. The experimental evolution of resistance to two distinct pesticide classes reveals context-dependent costs, benefits, and mechanisms. *BioRxiv* 9/2/21. DOI: <https://doi.org/10.1101/2021.09.03.458899>.
35. Birnbaum, S., Schulz, N., and **Tate, A.T.\***. 2022. Interactions among evolved pesticide resistance and pesticide exposure influence immunity against pathogens. *BioRxiv*. DOI: <https://doi.org/10.1101/2022.02.04.479151>.

#### *Published Peer-Reviewed Manuscripts*

34. Barr, J., Martin, L., **Tate, A.T.**, and Hillyer, J. 2024. Warmer environmental temperature accelerates aging in mosquitoes, decreasing longevity and worsening infection outcomes. *Immunity and Ageing*. 21:61.
33. Martin, R.A. and **Tate, A.T.\***. 2024. Pleiotropy alleviates the fitness costs associated with resource allocation trade-offs in immune signaling networks. *Proceedings of the Royal Society B*. 291: 20240446
32. Critchlow, J., Prakash, A., Zhong, K.Y<sup>2</sup>., **Tate, A.T.\*** 2024. Mapping the functional form of the trade-off between infection resistance and reproductive fitness under dysregulated immune signaling. *PLoS Pathogens*. 20(2): e1012049
31. Schulz, N.K.E.\*, Stewart, C. and **Tate, A.T.\***. 2023. The impact of infection dose on reproductive investment and offspring quality in flour beetles. *Ecological Entomology*. 48(6): 714-724.

30. Williams, A., Ngo, Thi Minh, Figueroa, V.<sup>2</sup> and **Tate, A.T.\*** 2023. The effect of developmental pleiotropy on the evolution of insect immune genes. *Genome Biology and Evolution*. 15(3): evad044.
29. Martin, R. and **Tate, A.T.\***. 2023. The coevolution of immune signaling networks under pleiotropic constraint. *PLoS Computational Biology*. 19(4): e1010445.
28. Chora, F.A., Goncalves, J., Marques, S., Fernandez-Ruiz, D., Lima, P., Marreiros, I.M., Ruivo, P., Carvalho, T., Serre, K., Heath, W.R., **Tate, A.T.**, Mota, M.M. 2023. Interplay between liver and blood stages of Plasmodium infection dictates malaria severity via  $\gamma\delta$  T cells and IL-17-promoted stress erythropoiesis. *Immunity*. 56(3):592-605.
27. **Tate, A.T.\*** and Van Cleve, J. 2022. Bet-hedging in innate and adaptive immune systems. *Evolution, Medicine, and Public Health*. eoac021.
26. Lazzaro, B. and **Tate, A.T.** 2022. Balancing sensitivity, risk, and immunopathology in immune regulation. *Current Opinion in Insect Science*. 50:100874.
25. **Tate, A.T.\*** and Schulz, Nora. 2022. The within-host ecology of insects and their parasites: Integrating experiments and models. *Current Opinion in Insect Science*. 49: 37-41.
24. Rovenolt, F. H.<sup>2</sup> and **Tate, A.T.\***. 2022. The impact of coinfection dynamics on host competition and coexistence. *The American Naturalist*. 199(1):91-107.
23. **Tate, A.T.\***, Perry, A.<sup>2</sup>, and Jent, D.G. 2021. Larvae and adults exhibit contrasting patterns of immune gene expression and infection resistance in wild flour beetle populations. *Ecological Entomology*. 46(5):1230-1235.
22. Gitschlag, B.L., **Tate, A.T.** & Patel, M.R. 2020. Nutrient status shapes selfish mitochondrial genome dynamics across different levels of selection. Accepted at *eLife* 8/17/20. Biorxiv DOI:10.1101/2020.01.30.927202.
21. Greischar, M.A.\*, Alexander, H.K., Bashey, F., Bento, A.I., Bhattacharya, A., Bushman, M., Childs, L.M., Daversa, D.R., Day, T., Faust, C.L., Gallagher, M.E., Gandon, S., Glidden, C.K., Halliday, F.W., Hanley, K.A., Kamiya, T., Read, A.F., Schwabl, P., Sweeny, A.R., **Tate, A.T.**, Thompson, R.N., Wale, N., Wearing, H.J., Yeh, P., and Mideo, N. 2020. Evolutionary consequences of feedbacks between within-host competition and disease control. *Evolution, Medicine, & Public Health*. 1(2020):30-34.
20. Jent, D.G., Perry, A.<sup>2</sup>, Critchlow, J.T., **Tate, A.T.\*** 2019. Natural variation in the contribution of microbial density to inducible immune dynamics. *Molecular Ecology*. 28(24): 5360-5372. DOI: 10.1111/mec.15293
19. Critchlow, J., Norris, A., **Tate, A.T.\*** 2019. The legacy of larval infection on immunological dynamics over metamorphosis. *Philosophical Transactions of the Royal Society B*. 374(1783): 20190066. DOI: 10.1098/rstb.2019.0066.
18. **Tate, A.T.\*** The role of multiple infections on immunological variation in wild populations. 2019. *mSystems*. 4(3): e00099-19.
17. Shaw, D.K.\*, **Tate, A.T.\***, Schneider, D.S., Levashina, E.A., Kagan, J.C., Pal, U., Fikrig, E., Pedra, J.H.F\*. 2018. Vector immunity and evolutionary ecology: The Harmonious Dissonance. *Trends in Immunology*. 39(11): 862-873.
16. Graham, A.L., and **Tate, A.T.** 2017. Insight Article: Are we immune by chance? *eLife* 6, e32783.
15. Metcalf, C.J.E., **Tate, A.T.**, Graham, A.L. 2017. Demographically framing tradeoffs between sensitivity and specificity illuminates selection on immunity. *Nature Ecology and Evolution*, 1: 1766-1772.
14. **Tate, A.T.\*** and Graham, A.L. 2017. Dissecting the contributions of time and microbe density to variation in immune gene expression. *Proceedings of the Royal Society B*. 284(1859): 20170727.
13. Luu, H.<sup>2</sup>, and **Tate, A.T.\*** 2017. Recovery and immune priming modulate the evolutionary trajectory of infection-induced reproductive strategies. *Journal of Evolutionary Biology*. 30(9): 1748-1762.

12. **Tate, A.T.\***, Andolfatto, P., Demuth, J., and Graham, A.L. 2017. The within-host dynamics of trans-generational immune priming in flour beetles. *Molecular Ecology*. 26(14): 3794–3807.
11. Kennedy<sup>2</sup>, M., Graham, A.L., and **Tate, A.T.\*** 2017. Relative contributions of environmental and maternal factors to trans-generational immune priming in *T. castaneum*. *Ecological Entomology*. 42(1):100-104.
10. **Tate, A.T.\*** 2017. A general model for the influence of immune priming on disease prevalence. *Oikos*. 126(3): 350-60
9. **Tate, A.T.\*** 2016. The interaction of immune priming with different modes of disease transmission. *Frontiers in Microbiology*. 7:1102.
8. Schneider, D.S. and **Tate, A.T.** 2016. Innate Immune Memory: Activation of Macrophage Killing Ability by Developmental Duties. *Current Biology*. 26(12), R503-505.
7. Louie, A., Song, K.H., Hotson, A., **Tate, A.T.**, and Schneider, D.S. 2016. How many parameters does it take to describe disease tolerance? *PLoS Biology* 14(4), e1002435.
6. Torres, B.Y., Oliveira, J.H.M., **Tate, A.T.**, Rath, P. Cumnock, K, and Schneider, D.S. 2016. Tracking resilience to infections by mapping disease space. *PLoS Biology* 14(4), e1002436.
5. **Tate, A.T.\*** and Graham, A.L. 2015. Dynamic patterns of parasitism and immunity across host development influence optimal strategies of resource allocation. *The American Naturalist*. 186(4): 495-512.
4. **Tate, A.T.\*** and Graham, A.L. 2015. Trans-generational priming of resistance in wild flour beetles reflects the primed phenotypes of laboratory populations and is inhibited by co-infection with a common parasite. *Functional Ecology*. 29(8), 1059-1069
3. **Tate, A.T.\*** and Rudolf, V.H.W. 2012. Impact of life stage - specific immune priming on invertebrate disease dynamics. *Oikos* 121(7): 1083-1092.
2. **Thomas, A.M.<sup>1</sup>** and Rudolf, V.H.W. 2010. Challenges of metamorphosis in invertebrate hosts: Maintaining parasite resistance across life-history stages. *Ecological Entomology*. 35(2): 200-205.
1. Abbott, A.N., Guidry, T.V., Welsh, K.J., **Thomas, A.M.<sup>1</sup>**, Kling, M.A., Hunter, R.L., Actor, J.K. 2009. 11-Hydroxysteroid Dehydrogenases are regulated during the pulmonary granulomatous response to the Mycobacterial glycolipid Trehalose-6,6-dimycolate. *Neuroimmunomodulation*. 16(3):147-154.

### **Extramural Grants awarded**

2023 – 2027	<b>NSF Integrative Biology</b> Award number 2316467 Title: <i>IntBIO: The evolution of immune investment strategies across amphibian ontogeny</i> Role: Co-PI	<b>\$274,769</b>
2022 – 2024	<b>NIH NIAID R21</b> Award number R21AI170977 Title: <i>The temporal dynamics of translation efficiency during an innate immune response</i> Role: Principal Investigator	<b>\$449,379</b>
2020 – 2025	<b>NIH NIGMS R35 MIRA</b>	<b>\$1,970,444</b>

Award number 1R35GM138007

Title: *The coevolutionary dynamics of pleiotropic genetic architecture*

Role: Principal Investigator

2020 – 2022     **Alfred P. Sloan Research Fellowship**     **\$75,000**

Computational and Evolutionary Molecular Biology

Role: Fellow/Principal Investigator

2018 – 2022     **NSF DEB/IOS**     **\$648,477**

Award number 1753982

Title: *The impact of co-infection on host and parasite population dynamics*

Role: Principal Investigator

### **Intramural Grants awarded**

2022 – 2022     **Evolutionary Studies Initiative Pilot Project Award**     **\$5,000**

Title: *The modulation of immune dynamics and fitness costs by negative regulators*

Role: Principal Investigator

2017 – 2018     **Vanderbilt Microbiome Initiative Award**     **\$3,000**

Title: *Resident gut protozoa as modulators of gut immunity and susceptibility to bacterial infection*

Role: Principal Investigator

### **Trainee Extramural Grants and Fellowships Awarded**

2024 – 2027     **NSF Postdoctoral Research Fellowship (Biology)**     **\$240,000**

Allyson Ray (PD)

Ann Tate (primary mentor)

2021 – 2023     **NSF Postdoctoral Research Fellowship (Biology)**     **\$138,000**

Jessica Hernandez (PD)

Ann Tate (primary mentor)

2019 – 2021     **USDA NIFA Postdoctoral Fellowship**     **\$165,000**

Stephanie Birnbaum (PD)

Ann Tate (primary mentor)

2019 – 2021     **USDA NIFA Postdoctoral Fellowship**     **\$165,000**

Justin Buchanan (PD)

Ann Tate (primary mentor)

### **Selected invited seminars**

2024     Invited seminar: Immune system optimization in a variable world.  
Dept. of Biology, University of Virginia.

2024     Invited seminar: Immune system optimization in a variable world.  
Dept. of Ecology and Evolution, University of Central Florida.

2023     Invited seminar: *Immune system optimization in a variable world.*  
Dept. of Ecology and Evolution, University of Michigan.

2023     Invited seminar: *Immune system optimization in a variable world.*  
Ecology and Evolution series, CNRS, Montpellier, France.

- 2023 Invited seminar: *Immune system optimization in a variable world*.  
Cramer seminar series, Dept. Biological Sciences, Dartmouth University.
- 2023 Invited seminar: *Immune system optimization in a variable world*.  
Quantitative Systems Biology series (QSBC), Vanderbilt University.
- 2022 Invited seminar: *Immune system optimization in a variable world*.  
Department of Biological Sciences, University of Toronto-Scarborough.  
Support: All expenses
- 2022 Invited seminar: *Immune system optimization in a variable world*.  
Department of Genetics, Rutgers University.  
Support: Travel expenses and honorarium
- 2022 Invited Seminar: *Immune system optimization in a variable world*.  
PBEE seminar, Dept. of Biology. Emory University.  
Support: All travel expenses
- 2021 Invited Seminar: *Immune system optimization in a variable world*.  
Gertrude Flora Ribble Endowed Seminar, Dept. of Biology. University of Kentucky.  
Support: All travel expenses + honorarium
- 2021 Invited Seminar: *Immune system optimization in a variable world*.  
Ecology and Evolutionary Biology Dept., Cornell University.  
Support: All travel expenses
- 2021 Invited Seminar: *Immune system optimization in a variable world*.  
Integrated Evolutionary Biology Dept., University of Münster. Münster, Germany.  
Support: Domestic travel expenses
- 2021 Invited Seminar: *Immune system optimization in a variable world*.  
Biology Dept., Freie Universität Berlin. Berlin, Germany.
- 2021 Invited Seminar (virtual): *Immune system optimization in a variable world*.  
Biology Department, Bucknell University.  
Support: \$150 honorarium
- 2021 Invited Seminar (virtual): *Immune system optimization in a variable world*.  
Biology Department, University of Memphis.
- 2020 Invited Seminar (virtual): *Immune system optimization in a variable world*.  
Carnegie Institution for Science. Baltimore, MD.  
Support: \$200 honorarium
- 2020 Invited Seminar (virtual): *Immune system optimization in a variable world*.  
Max Planck Institute for Infection Biology – Berlin.
- 2020 Invited Seminar (virtual): *Immune system optimization in a variable world*.  
Department of Biology, University of Florida.
- 2019 Invited Seminar: *The evolution of innate immune systems*.  
Biology Department, Tennessee State University.  
*Support:* All expenses; \$200 honorarium.
- 2019 Invited Seminar: *Immune system optimization in a variable world*.

Center for Evolutionary Studies, Vanderbilt University.

- 2019 Invited Seminar: *Host-microbe interactions: Dynamic feedbacks across biological scales.*  
Endowed Prather Lecture (Graduate student-invited)  
School of Biological Sciences, University of Nebraska – Lincoln.  
*Support:* All expenses + \$500 honorarium
- 2019 Invited Seminar: *The evolution of innate immune systems.*  
Center for Infectious Disease Dynamics, Penn State University.  
*Support:* All expenses
- 2019 Invited Seminar: *The ecology and evolution of immune systems.*  
Biology Department. Middle Tennessee State University.  
*Support:* All expenses
- 2018 Invited Seminar: *The evolution of innate immune systems.*  
Ecology and Evolutionary Biology Department seminar, Indiana University.  
*Support:* All expenses
- 2018 Invited Seminar: *The evolution of plasticity in inducible defenses.*  
Biology Department seminar, University of Louisville.  
*Support:* All expenses + \$100 honorarium
- 2018 Invited Seminar: *The evolutionary ecology of host-microbe interactions.*  
Microbiology Department, University of Tennessee – Knoxville  
*Support:* All expenses
- 2017 Invited Seminar: *The ecological drivers of natural variation in host-microbe interactions.*  
Dept. of Pathology, Microbiology, and Immunology. Vanderbilt University.
- 2017 Invited Seminar: *The ecological drivers of variation in host susceptibility and transmission.*  
Department of Biology, Virginia Tech, VA.  
*Support:* All expenses
- 2016 Invited Seminar (virtual): *The ecological drivers of natural variation in host immune defenses.*  
Evolutionary Ecology Program, UNIM, Morelia, MX.
- 2016 Invited Seminar: *The contribution of host and microbe life history to disease transmission.*  
Theoretical Ecology Group, ETH Zurich, Zurich Switzerland.
- 2016 Invited Seminar: *The drivers of natural variation in host immune defenses.*  
Department of Ecology and Evolutionary Biology, Yale University  
*Support:* All expenses
- 2016 Invited Seminar: *The drivers of natural variation in host-microbe interactions.*  
Entomology Department, Purdue University  
*Support:* All expenses
- 2016 Invited Seminar: *The drivers of natural variation in host-microbe interactions.*  
Department of Biology, Washington University at St. Louis  
*Support:* All expenses
- 2016 Invited Seminar: *The drivers of natural variation in host-microbe interactions.*  
Department of Biological Sciences, Vanderbilt University

- Support:* All expenses
- 2016 Invited Seminar: *The ecological drivers of natural variation in host immune defenses.*  
Department of Biology, Emory University  
*Support:* All expenses
- 2016 Invited Seminar: *The drivers of natural variation in host-microbe interactions.*  
Department of Biology, University of Alabama  
*Support:* All expenses
- 2015 Invited Seminar: *Understanding feedbacks between infection and immunity across biological scales.*  
School of Biological Sciences, Illinois State University  
*Support:* All expenses
- 2015 Invited Seminar: *Reconciling ecological and molecular perspectives on mechanism in within-host infection models.*  
Networks Seminar Series, University of Houston.

### **Selected published abstracts and invited conference presentations**

- 2024 Symposium Speaker: Evolution-ESEB Joint Conference, Montreal, Canada.
- 2023 Invited Plenary Lecture: American Society for Rickettsiology. Snowbird, Utah.  
*Support:* All expenses
- 2023 Contributed presentation: Society for Molecular Biology and Evolution, Ferrara, Italy.
- 2023 Contributed presentation: Jacques Monod Conference on Host-Parasite Co-evolution, Roscoff, France.
- 2022 Invited Speaker: *Ecological interactions among coinfecting parasites shape within-host and between-host competition outcomes.* Gordon Research Conference: Unifying ecology across scales. Southern New Hampshire University, NH. (Originally scheduled for July 2020 but delayed two years).  
*Support:* Partial registration and lodging expenses (\$500).
- 2022 Selected Talk: *The evolution and maintenance of developmental pleiotropy in insect immune systems.* Ecological Immunology Workshop, Blossin Germany.
- 2022 Contributed Talk: *The experimental evolution of pesticide resistance trades off with insect immune responses.* Evolution. Cleveland, Ohio.
- 2022 Selected Talk: *Ecological interactions among coinfecting parasites shape within-host and between-host competition outcomes.* Ecology and Evolution of Infectious Diseases Meeting. Atlanta, GA, USA
- 2020 Symposium Speaker: *Reciprocal interactions between nutrition and immunity influence coinfection dynamics in flour beetles.* International Congress of Entomology. Helsinki, Finland. (canceled due to COVID)
- 2020 Symposium Speaker: *Evolutionary adaptation and constraint shapes variation in flour beetle (*Tribolium spp*) immune responses to their natural parasites.* Entomological Society of America Meeting (virtual).
- 2020 Invited Speaker: *The evolutionary ecology of coinfection in flour beetles.* Insect-Pathogen Workshop, University of Exeter, UK (canceled due to COVID).
- 2019 Contributed Talk: *The impact of within-host competition on coinfection dynamics.* The Ecological Society of America Annual Meeting, Louisville, KY.
- 2019 Invited Workshop Participant: *Evolutionary feedbacks between within-host competition and disease control.*



NSF RCN: Infectious Disease Evolution across Scales. Princeton, NJ

*Support:* All expenses

- 2018 Symposium Speaker: *Disentangling microbe dependent and independent inducible immune dynamics*.  
Joint Meeting of Evolution and the European Society of Evolutionary Biology, Montpellier, France.
- 2018 Contributed Talk: *The impact of top-down vs. bottom-up regulation on co-infection dynamics*.  
The Ecological Society of America Annual Meeting, New Orleans, LA.
- 2018 Invited Keynote Speaker: *The dynamics of immunological plasticity under the threat of multiple infections*.  
Ecology and Evolution of Infectious Diseases Conference. Glasgow, Scotland.  
*Support:* All expenses
- 2017 Selected Talk: *The impact of natural variation in immune dynamics on functional disease resistance*.  
Jacques Monod “Open Questions in Disease Ecology” Meeting. Roscoff, France.
- 2017 Invited Keynote Speaker: *The dynamics of infection and immunity in flour beetles*.  
Frontiers in Insect Genomics Symposium. UNAM, Morelia, MX.  
*Support:* All expenses
- 2017 Invited Keynote Speaker: *The dynamics of infection and immunity in wild flour beetles*.  
Ecological Immunology Workshop 2017. Blossin, Germany.  
*Support:* All expenses
- 2016 Symposium Speaker: *Connecting within- and between-host disease dynamics in primed insect populations*.  
International Congress of Entomology. Orlando, FL.
- 2016 Contributed Talk. *Connecting within- and between-host disease dynamics in primed insect populations*.  
Evolution Meeting, Austin, TX.
- 2014 Selected Talk. *Insights into resistance, tolerance, and virulence in trans-generationally primed flour beetles*.  
Jacques Mounod Conference on Host-Parasite Coevolution, Roscoff, France.
- 2014 Contributed Talk: *Roles of immunological and life history dynamics in trans-generational immune priming*.  
The Society for Integrative and Comparative Biology Meeting, Austin, TX.

## Teaching

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### Courses Taught (Vanderbilt)

- 2024 Fall BSCI 4268/5268: The Ecology and Evolution of Infectious Diseases  
3 hour course (Instructor)  
10 enrolled students (3 undergrads, 7 grads), 28 sessions
- 2024 Spring BSCI 3226/5226: Immunology  
3 hour course (Instructor)  
21 enrolled students (12 undergrads, 9 grads), 42 sessions
- 2023 Fall BSCI 3860/5860: Special Topics: The Ecology and Evolution of Infectious Diseases  
3 hour course (Instructor)  
19 enrolled students (7 undergrads, 12 grads), 28 sessions
- BSCI 3850: Independent Reading

1 hour course (Instructor)  
1 student enrolled

2023 Spring BSCI 3226/5226: Immunology  
3 hour course (Instructor)  
17 enrolled students (14 undergrads, 3 grads), 42 sessions

BSCI 3850: Independent Reading  
1 hour course (Instructor)  
1 student enrolled

2022 Fall BSCI 3860/5860: Special Topics: The Ecology and Evolution of Infectious Diseases  
3 hour course (Instructor)  
9 enrolled students (6 undergrads, 3 grads), 28 sessions

2021 Spring BSCI 3965: Undergraduate Seminar: The Ecology and Evolution of Infectious Diseases  
2 hour course (Instructor)  
17 students, 14 sessions

2020 Fall BSCI 3226/5226: Immunology  
3 hour course (Instructor)  
33 enrolled students (21 undergrads, 12 grads), 42 sessions

BSCI 3850: Independent Reading  
1 hour course (Instructor)  
1 student enrolled

2020 Spring Undergraduate Seminar: The Ecology and Evolution of Infectious Diseases (BSCI 3965)  
2 hour course (Instructor)  
18 students, 15 sessions

Guest Lecture: Journey into a beetle and the evolution of virulence (MHI 300)

2019 Fall Immunology (BSCI 3226/5226)  
3 hour course (Instructor)  
23 enrolled students (18 undergrads, 5 grads), 42 sessions

2019 Spring Undergraduate Seminar: The Ecology and Evolution of Infectious Diseases (BSCI 3965)  
2 hour course (Instructor)  
16 students, 15 sessions

Independent Reading (BSCI 3850)  
1 hour course (Instructor)  
1 student enrolled

Guest Lecture: Journey into a beetle and the evolution of virulence (MHI 300)

2018 Fall Immunology (BSCI 3226/5226)  
3 hour course (Instructor)  
19 enrolled students, 42 sessions

Independent Reading (BSCI 3850)

1 hour course (Instructor)  
1 student enrolled

2018 Spring Undergraduate Seminar: The Ecology and Evolution of Infectious Diseases (BSCI 3965)  
2 hour course (Instructor)  
18 students, 15 sessions

2017 Fall Graduate Seminar in Biological Sciences (BSCI 6320)  
1 hour course (Instructor)  
16 students, 15 sessions

## **Mentoring**

### Postdoctoral Fellows

2023 – present: Danial Asgari  
2022 – present: Allison Ray (NSF PRFB fellow)  
2022 – present: Arun Prakash  
2021 – 2023: Alissa Williams  
2021 – 2021: Jessica Hernandez (NSF PRFB fellow)  
2019 – 2022: Stephanie Birnbaum (USDA NIFA fellow)  
2019 – 2021: Nora Schulz  
2019 – 2021: Justin Buchanan (USDA NIFA fellow)

### Ph.D. students

2023 – present: Rayshaun Petitt (BioSci)  
2022 – present: Louise Perrier (BioSci; Ph.D. candidate 2023)  
2021 – present: Reese Martin (QCB; Ph.D. candidate 2022)  
2017 – 2023: Justin Critchlow (BioSci; Ph.D. candidate 2019, defended 2023)

### Masters students

2021 – 2024: Md Sadequr Rahman (BioSci)  
2019 – 2021: Destane Garrett (BioSci)  
2020 – 2021: Thi Ngo (BioSci)  
2019 – 2020: William Galardi (MBS)

### Rotation students

2024 (Fall) Edith Simpson (BioSci)  
2024 (Fall) Jocelyne Dates (BioSci)  
2023 (Fall) Rayshaun Petit (BioSci)  
2023 (Fall) Camren Branch (BioSci)  
2023 (Spring) Shabbir Ahmed (BioSci)  
2021 (Spring) Louise Perrier (BioSci)  
2021 (Fall) Pi'ilani Noguchi (QCB)  
2020 (Fall) Md Sadequr Rahman (BioSci)  
2020 (Fall) Reese Martin (QCB)  
2020 (Fall) Zachary Sanchez (IGP)  
2020 (Fall) Lindsay Martin (BioSci)  
2020 (Spring) Emily Overway (IGP)  
2019 (Fall) Marie-Claire Harrison (BioSci)

2019(Fall) Thi Ngo (BioSci)  
2019(Fall) Oyku Sensoy (IGP)  
2019(Spring) Jason Hughes (QCB)  
2019(Spring) Kaitlyn Bunn (IGP)  
2019 (Spring) Hannah Nelson (BioSci)  
2018 (Fall) Catie Shelton (IGP)  
2018 (Fall) Adriana Norris (BioSci)  
2018 (Fall) Destane Garrett (BioSci)  
2018 (Fall) Kerri-Ann Anderson (Lab Transfer, BioSci)  
2018 (Spring) James Held (IGP)  
2017(Fall) Justin Critchlow (BioSci)

#### Undergraduate research students

2024-present Phoebe Lin (SyBBURE)  
2024-present Sowmya Senthilkumar (VUSRP, NSC)  
2023-2024 Jakob Heiser (VUSRP)  
2022-2023 Veronica Figueroa  
2021-2022 Anthony Hassell (Fisk student; summer REU)  
2020-present Katherine Zhong (Honors Thesis; Littlejohn Scholar; VUSRP)  
2020-present Carly Stewart (Honors Thesis)  
2018-2021 Ana Torres (Honors Thesis, VUSRP)  
2019-2020 Anna Borchers (REU)  
2017–2020 Yongjia “James” Deng (VUSRP)  
2017–2020 Faith Rovenolt (Honors Thesis, VUSRP)  
2017–2020 Abby Perry (McMinn Scholar)  
2017–2018 Kelsey Auman  
2017, 2018 Emma Blackford (summer research only)

#### Other mentees

2022-present Layne P. (High School student, SSMV)  
2017 Elizabeth Greer (High School Teacher, summer research)

### **Service**

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#### **Service to the Department and University**

2020-present Associate Director of Graduate Studies, Department of Biological Sciences  
2020-2023 Vanderbilt Institute for Infection, Immunity, and Inflammation Diversity and Inclusion Committee  
2020-2022 Provost’s Sexual Misconduct Prevention Committee (PSMPC)  
2019-present Departmental Graduate Admissions Committee  
2019-present DGS Advisory Committee  
2018-2019 Departmental faculty search committee (Microbial Biology)  
2017-2019 Departmental faculty seminar committee (with Nicole Creanza)

- 2017-2018 Departmental faculty search committee (Microbiome)
- 2017-present Faculty mentor, Student Chapter of the American Society for Microbiology
- 2017-present Departmental graduate student recruitment – one-on-one interviews and dinner with candidates
- 2017-present IGP/QCB graduate student recruitment – one-on-one interviews and lunches/dinners with candidates
- 2017-present PhD Committees (17, +6 of my own students)
- 2017-present External Ph.D. committees/external examiner (6): University of Montpellier, France, Cornell University, University of Exeter, U.K., Illinois State University, USA, University of South Carolina, USA, Ashoka University, India.
- 2017-present Undergraduate Honors Thesis Committees (6, + 4 of my own students)
- 2017-present Undergraduate research co-mentor (14)
- 2017-present Undergraduate Advisor (14)

### **Professional Service and Activities**

- 2021-present Editorial Board: *Philosophical Transactions of the Royal Society B* (The Royal Society)
- 2020-present Associate Editor: *The American Naturalist* (American Society of Naturalists)
- 2017-2020 Associate Editor: *Journal of Animal Ecology* (British Ecological Society)
- 2020 NSF DEB review panelist
- 2017-present *Ad hoc* peer review for NSF DEB and IOS proposals and international research agencies (ANR France, FWF Austria)
- 2018 Guest editor, *PLoS Pathogens*
- 2018, 2019 Faculty mentor to graduate students at annual *Ecological Society of America* meetings

**Peer review referee** for 27 journals including: *The American Naturalist*, *Biology Letters*, *BMC Biology*, *Ecology*, *Ecology Letters*, *Ecological Entomology*, *eLife*, *Functional Ecology*, *Frontiers in Microbiology*, *G3: Genes, Genomes, Genetics*, *Immunobiology*, *The ISME Journal*, *Journal of Animal Ecology*, *Journal of Experimental Biology*, *Journal of Insect Science*, *Methods in Ecology and Evolution*, *Molecular Ecology*, *Oikos*, *Physiological Entomology*, *PLoS Biology*, *PLoS Computational Biology*, *PLoS Neglected Tropical Diseases*, *PLoS Pathogens*, *Proceedings of the National Academy of Sciences*, *Proceedings of the Royal Society B*, *Phil. Trans. Royal Soc. B*, and *Royal Society Open Science*.

**Member:** Society for Molecular Biology and Evolution (SMBE), The International Society for Evolution, Medicine, and Public Health (ISEMPH), The American Society of Naturalists (ASN), The Entomological Society of America (ESA), The Ecological Society of America (ESA), The American Society for Microbiology (ASM).

### **Service to the Community**

- 2019 MegaMicrobe Booth: “It’s a Bug’s Life.” Oct. 2019. Nashville TN.
- 2019 TWISTER (Tennessee Women in Science, Technology, Engineering, and Research) module organizer and presenter, Adventure Science Center, Nashville, TN

- 2019 High School Outreach Presentation. Ravenwood High School. *Parasites: The Struggle Within*.
- 2018 TWISTER (Tennessee Women in Science, Technology, Engineering, and Research) module organizer and presenter, Adventure Science Center, Nashville, TN
- 2017 TWISTER (Tennessee Women in Science, Technology, Engineering, and Research) module organizer and presenter, Adventure Science Center, Nashville, TN
- 2017 Hosted Ravenwood High School teacher Elizabeth Greer in the lab to experience research (summer)