

Jennifer S. Sun, PhD

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Research Interests & Expertise

My research explores the microbiome of insects, with a focus on how they shape the host's olfactory circuits. By studying the mechanisms with which microbes change the insect's sense of smell and their resulting behavior (*i.e.*, host-seeking), we will be able to identify novel mechanisms for keeping biting insects at bay. The discoveries I make will be particularly impactful in developing cost-effective interventions for mitigating insect-borne diseases in low-resource settings. My work involves the use of genetic and behavioral approaches, electrophysiology, field sampling, metagenomics, and transcriptomics to reveal the significance of this insect-microbe inter-kingdom engagement.

Education & Research Experience

Rutgers University, New Brunswick, NJ

2025 – pres. Assistant Professor of Biochemistry and Microbiology

2022 – 2024 Presidential Postdoctoral Research Fellow

In the group of Prof. Jeffrey M. Boyd

Research Project: Uncovering the role of endosymbionts in olfactory-guided host-seeking behavior in insect vectors of disease

2009 – 2013 BA in Molecular Biology and Biochemistry

Independent research project supervised by Prof. Randy R. Gaugler

Research Project: Relationship between mosquito larvae and parasitic mermithid nematodes

Independent research project and honors thesis supervised by Prof. G. Charles Dismukes

Thesis Project: Photoassembly efficiencies of natural isoforms of Photosystem II D1 subunit

Research Project: Protein and lipid biosynthesis in the diatom *Phaeodactylum tricorutum*

New York Genome Center & New York University, New York, NY

2021 – 2022 Staff Scientist and Grant Writer

In the group of Prof. Neville E. Sanjana

Research Focus: Improving CAR T-cell efficacy with direct fusions of signaling domains

Princeton University, Princeton, NJ

2019 – 2021 Postdoctoral Research Fellow

In the group of Prof. Bonnie L. Bassler

Research Project: Phage manipulation of bacterial quorum-sensing-mediated communication

Yale University, New Haven, CT

2013 – 2019 PhD in Molecular, Cellular, and Developmental Biology

Supervised by Prof. John R. Carlson

Thesis Project: Humidity response depends on the small soluble protein Obp59a in *Drosophila*

Fellowships & Awards

- 2025 **Mutual Mentoring Grant**, Rutgers University Faculty Diversity Collaborative
- 2024 **Peggy Cotter Travel Award for Early Career Branch Members**, Theobald Smith Society ASM Microbe 2024, Atlanta, GA
- 2024 **Abstract Competition Prize**, Rutgers University Microbiome Program 2nd Annual Retreat
- 2023 **Faculty Fellowship**, Rutgers University Teaching Excellence Networks (TEN) Course Transformation Summer 2023 Institute
- 2022 – pres. **Presidential Postdoctoral Research Fellowship**, Rutgers University
- 2021 & 2022 **Part-Time Lecturers Professional Development Fund Award**, Rutgers University
- 2021 – 2022 **BioBus Community Science Fellowship**, BioBus
- 2020 – 2021 **National Institutes of Health Ruth L. Kirschstein Postdoctoral Individual National Research Service Award (NIH Kirschstein-NRSA, Parent F32), F32GM139233**
- 2019 **John Spangler Nicholas Prize for Outstanding Doctoral Student in Experimental Zoology**, Yale University
- 2018 **Don Tucker Memorial Award for Graduate Student Research**, AChemS XL Annual Meeting, Bonita Springs, FL
- 2017 – 2018 **P.E.O. Scholar Award**, International Chapter of the P.E.O. Sisterhood
- 2015 & 2018 **MCDB Departmental Retreat Poster Presentation Award**, Yale University
- 2015 – 2016 **Clark Fellowship**, Dwight N. and Noyes D. Clark Scholarship Fund
- 2014 – 2019 **National Science Foundation Graduate Research Fellowship (NSF GRFP)**
- 2014 – 2016 **NIH T32 – Predoctoral Training Program in Genetics**, T32GM007499
- 2013 **Henry Rutgers Scholars Award**, Rutgers University
- 2013 **John A. Van Der Poel Scholarship**, Rutgers University
- 2012 **SAS Paul Robeson Scholar Award**, Rutgers University
- 2012 **Waksman Undergraduate Research Fellowship**, Rutgers University
- 2010 – 2013 **Aresty Undergraduate Research Fellowship**, Rutgers University
- 2010 – 2013 **Delta Epsilon Iota Honor Society**

Research Articles

1. HA Darwish, T Hart, D Patel, S Russo, S Salama, M Tariq, AT Ananda, & **JS Sun**. (2025) "Evidence of *Escherichia coli* Regulating *Drosophila melanogaster* Behavior." *Insects*. *Under Review*.
2. **JS Sun**, A Mashruwala, C Fei, & BL Bassler. (2022) "Bacterial LomR Induces the Vibriophage VP882 VqmA-Directed Quorum-Sensing Lysogeny-Lysis Transition." *bioRxiv*. doi: 10.1101/2021.11.15.468771
3. **JS Sun**. (2019) "Desiccation survival." *Bio-protocol*. bio-protocol.org/prep22
4. S Xiao, **JS Sun**, & JR Carlson. (2019) "Robust olfactory responses in the absence of odorant binding proteins." *eLife*. 8 (e51040).
5. Z He, Y Luo, X Shang, **JS Sun**, & JR Carlson. (2019) "Chemosensory sensilla of the *Drosophila* wing express a candidate pheromone receptor required for sexual behavior." *PLOS Biology*. 17 (e2006619).
6. JS Chahda, N Soni, **JS Sun**, SAM Ebrahim, BL Weiss, & JR Carlson. (2019) "The molecular and cellular basis of olfactory response to tsetse fly attractants." *PLOS Genetics*. 15 (e1008005).
7. **JS Sun**, NK Larter, JS Chahda, D Rioux, A Gumaste, & JR Carlson. (2018) "Humidity response depends on the small soluble protein Obp59a in *Drosophila*." *eLife*. 7 (e39249).
8. **JS Sun**, NK Larter, JS Chahda, D Rioux, A Gumaste, & JR Carlson. (2018) "Humidity response depends on the small soluble protein Obp59a in *Drosophila*." *Chemical Senses*. 43 (7).
9. M Sanad, **JS Sun**, MSM Shamseldean, Y Wang, & R Gaugler. (2017) "Superparasitism and Population Regulation of the Mosquito-Parasitic Mermithid Nematodes *Romanomermis iyengari* and *Strelkovimermis spiculatus*." *The Journal of Nematology*. 49 (3).
10. RM Joseph, **JS Sun**, E Tam, & JR Carlson. (2017) "A receptor and neuron that activate a circuit limiting sucrose consumption." *eLife*. 6 (e24992).
11. R Delventhal, K Menuz, R Joseph, J Park, **JS Sun**, & JR Carlson. (2017) "The taste response to ammonia in *Drosophila*." *Scientific Reports*. 7 (43754).

12. JB Benoit, A Vigneron, NA Broderick, Y Wu, **JS Sun**, JR Carlson, S Aksoy, & BL Weiss. (2017) "Symbiont-induced odorant binding proteins mediate insect host hematopoiesis." *eLife*. 6 (e19535).
13. NK Larter, **JS Sun**, & JR Carlson. (2016) "Organization and function of *Drosophila* Odorant Binding Proteins." *eLife*. 5 (e20242).
14. DJ Vinyard, **JS Sun**, J Gimpel, GM Ananyev, SP Mayfield, & GC Dismukes. (2016) "Natural isoforms of the Photosystem II D1 subunit differ in photoassembly efficiency of the water-oxidizing complex." *Photosynthesis Research*. 128 (2), pp 141-150.
15. S Khan, **JS Sun**, & GW Brudvig. (2015) "Cation effects on the electron-acceptor side of Photosystem II." *The Journal of Physical Chemistry B*. 119 (24), pp 7722-7728.
16. LT Guerra, O Levitan, MJ Frada, **JS Sun**, PG Falkowski, & GC Dismukes. (2013) "Regulatory branch points affecting protein and lipid biosynthesis in the diatom *Phaeodactylum tricornutum*." *Biomass and Bioenergy*. 59, pp 306-315.
17. **JS Sun** & M Sanad. (2011) "Relationship between mosquito larvae and parasitic mermithid nematodes." *Rutgers Science Review*. 1 (1), pp 15-17.
18. **JS Sun** & M Sanad. (2011) "Relationship between mosquito larvae and parasitic mermithid nematodes." *Proceedings of the 98th Annual Meeting of the New Jersey Mosquito Control Association, Inc.* 98, pp 60-65.

Review Articles

1. HA Darwish, M Tariq, S Salama, T Hart, & **JS Sun**. (2025) "The Microbiome as a Driver of Insect Physiology, Behavior, and Control Strategies." *Applied Microbiology* 5 (3), 90.
2. L Lumkong, B Nyiro, S Russo, I Westervelt, RF Sullivan, JM Boyd, VJ Carabetta, SS Yadavalli, & **JS Sun**. (2025) "Challenges and Innovations in Resistance, Remediation, and Regulation: Key Findings from the Spring 2025 ASM Theobald Smith Society Meeting." *mSphere* 10 (8), e00374-25.
3. D Sant, AI Mateen, RF Sullivan, JM Boyd, VJ Carabetta, SS Yadavalli, & **JS Sun**. (2025) "Emerging themes in microbial stress response and mechanistic insights: Key findings from the Fall 2024 ASM Theobald Smith Society meeting." *mSphere* 10 (2), e01008-24.
4. JA Morris, **JS Sun**, & NE Sanjana. (2023) "Next-Generation Forward Genetic Screens: Uniting High-Throughput Perturbations with Single-Cell Analysis." *Trends in Genetics* 40 (2), pp 118-133.
5. **JS Sun**. (2023) "Complement inhibition in myasthenia gravis." *NeurologyLive* 6 (3), pp 20-21.
6. **JS Sun**. (2023) "Therapeutic potential of IGF1 and MECP2 in Rett syndrome." *NeurologyLive* 6 (2), pp 18-19.
7. **JS Sun**. (2023) "Activation of both NRF2 and FXN in Friedreich Ataxia." *NeurologyLive* 6 (1), pp 14-15.
8. **JS Sun**. (2022) "A β Protofil Elimination in Alzheimer Disease." *NeurologyLive* 5 (7), pp 14-15.
9. **JS Sun**. (2022) "Use of nanoparticles to combat neurodegenerative disease." *NeurologyLive* 5 (5), pp 20-21.
10. **JS Sun**. (2022) "Potential therapeutic role of the endocannabinoid system for migraine." *NeurologyLive* 5 (4), pp 16-17.
11. **JS Sun**. (2022) "Endoplasmic reticulum and/or mitochondrial-dependent neuronal degeneration in ALS." *NeurologyLive* 5 (3), pp 24-25.
12. **JS Sun**. (2022) "PDE10A inhibition in Tourette syndrome." *NeurologyLive* 5 (2), pp 24-25.
13. **JS Sun**. (2022) "Stimulation Approaches to Epilepsy." *NeurologyLive* 5 (1), pp 21-23.
14. **JS Sun**. (2021) "Petri dish hygrotaxis arena." *Bio-protocol*. bio-protocol.org/prep916
15. **JS Sun**. (2021) "Serotonin Receptor Agonism in Dravet Syndrome." *NeurologyLive* 4 (6), pp 38-39.
16. **JS Sun**. (2021) "S1P Receptor Modulation in Multiple Sclerosis." *NeurologyLive* 4 (5), pp 36-38.
17. **JS Sun**. (2021) "GHB as a GABA Receptor Agonist for Narcolepsy Therapy." *NeurologyLive* 4 (4), pp 30-31.
18. **JS Sun**. (2021) "Myostatin inhibition in amyotrophic lateral sclerosis." *NeurologyLive* 4 (3), pp 33-34.
19. **JS Sun**. (2021) "Interleukin-6 (IL-6) receptors in the treatment of neuromyelitis optica spectrum disorder (NMOSD)." *NeurologyLive* 4 (2), pp 34-35.
20. **JS Sun**. (2021) "PACAP pathway and its role in migraine." *NeurologyLive* 4 (1), pp 35-36.
21. **JS Sun**. (2020) "Repulsive Guidance Molecule A (RGMA) inhibition for repair and protection in Multiple Sclerosis." *NeurologyLive* 3 (7), pp 34-35.

22. **JS Sun.** (2020) "Inhibiting cholesterol 24-hydroxylase for Epilepsy treatment." *NeurologyLive* 3 (5), pp 40-41.
23. **JS Sun.** (2020) "Selective inverse agonists of the histamine 3 receptor as non-habit-forming treatments for narcolepsy." *NeurologyLive* 3 (4), pp 40-41.
24. **JS Sun.** (2020) "Targeting Bruton Tyrosine Kinase for multiple sclerosis treatment." *NeurologyLive.* 3 (3), pp 40-41.
25. **JS Sun.** (2020, March 27). "Can we beat SARS-CoV-2? Lessons from other coronaviruses." *Contagion Live.* contagionlive.com/news/can-we-beat-sarscov2-lessons-from-other-coronaviruses
26. **JS Sun,** S Xiao, & JR Carlson. (2018) "The diverse small proteins called Odorant Binding Proteins." *Open Biology.* 8 (180208).

Oral Presentations

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| 2025 | Microbiology at Rutgers University Symposium, New Brunswick, NJ |
| 2025 | Rutgers University Microbiome Program 3rd Annual Retreat, New Brunswick, NJ |
| 2025 | Rutgers University Microbiome Program Work in Progress, New Brunswick, NJ |
| 2024 | Rutgers University Microbiome Program 2nd Annual Retreat, New Brunswick, NJ |
| 2023 | Theobald Smith Society Spring 2023 Symposium, New Brunswick, NJ |
| 2023 | New Jersey Academy of Science (NJAS) 68th Annual Meeting, Union, NJ |
| 2021 | P.E.O. NJ State Chapter Fall 2021 Reciprocity, Trenton, NJ |
| 2021 | Rutgers Department of Biochemistry and Microbiology Fermentation Seminar, Virtual |
| 2021 | Princeton Department of Molecular Biology Colloquium, Princeton, NJ |
| 2019 | NYU Critical Metabolisms Symposium, New York, NY |
| 2017 & 2018 | Yale Training Program in Genetics Annual Symposium, New Haven, CT |
| 2017 | Yale Epidemiology of Microbial Diseases Research Forum, New Haven, CT |
| 2016 & 2018 | Yale Molecular, Cellular, and Developmental Biology Annual Departmental Retreat, Woods Hole, MA |
| 2016 | The Allied Genetics Conference, Orlando, FL |
| 2011 & 2013 | Rutgers Aresty Undergraduate Research Symposium, New Brunswick, NJ |
| 2011 | 98th NJMCA Annual Meeting, Atlantic City, NJ |

Poster Presentations

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| 2023 | Microbiology at Rutgers University Symposium, New Brunswick, NJ |
| 2023 | Rutgers University Microbiome Program 1st Annual Retreat, New Brunswick, NJ |
| 2023 | Science Forward: Towards Inclusive Excellence in Academia, Associated Medical Schools of New York (AMSNY), Cold Spring Harbor, NY |

Teaching Experience

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|--------------|---|
| 2025 – pres. | Guest Lecturer, Rutgers University, Molecular Toxicology Laboratory (11:115:436) |
| 2022 – pres. | Course Coordinator, Rutgers University, Microbial Biochemistry (16:682:502) |
| 2022 – pres. | Lab Instructor, Rutgers University, Experimental Biochemistry (11:115:414) |
| 2021 – 2024 | Visiting Lecturer, Matheny Medical and Educational Center, Environmental Science |
| 2020 – 2022 | Lecturer, Rutgers University, General Microbiology (11:680:390) |
| 2020 – 2022 | Lecturer, Rutgers University, Introduction to Microbiology Laboratory (11:680:202) |
| 2020 – 2022 | Instructor, Primoris Academy, Scientific Writing |
| 2020 – 2021 | Instructor, Princeton University, Molecular Biology Junior Tutorials (MOL 350) |
| 2018 – 2019 | Lecturer, CT State Community College Gateway, Introduction to Biology (BIO 105) |
| 2018 | Course Developer, Yale Pre-College Summer Program, Environmental Science |
| 2018 | Course Developer, New Harvest Inc., Cellular Agriculture |
| 2018 | Guest Lecturer, Yale University, Fly Behavior (MCDB 105a) |
| 2015 | Teaching Assistant, Yale University, Model Organisms in Biology Lab (MCDB 303Lb) |

- 2015 **Teaching Assistant**, Yale University, Molecular Biology (MCDB 200b)
 2012 – 2013 **Lecturer**, Rutgers University, Careers in the Sciences (01:090:120)
 2011 – 2012 **Teaching Assistant**, Rutgers University, Molecular Biology and Biochemistry (01:694:407/408)
 2011 **Teaching Assistant**, Rutgers University, Introductory Biochemistry and Molecular Biology (01:694:301)

Mentoring Experience

- 2025 – pres. **Deep Patel**, Undergraduate researcher, Rutgers University (Aresty Research Scholar Program)
 2025 – pres. **Mia Cacao**, Undergraduate researcher, Rutgers University (Molecular Biology and Biochemistry Research)
 2025 – pres. **Shreya Gokul**, Undergraduate researcher, Rutgers University (Molecular Biology and Biochemistry Research)
 2025 – pres. **Hunter Ernstberger**, Undergraduate researcher & M.S. trainee, Rutgers University (Research in Microbiology & 4+1 B.S. & M.S. Program)
 2025 **Joselyn Lee**, Undergraduate researcher, Rutgers University (SUPER)
 2024 – 2025 **Sammi Russo**, Undergraduate researcher, Rutgers University (Research in Microbiology)
 2024 **Nicholas Johnson**, Undergraduate researcher, Rutgers University (Research in Microbiology)
 2023 – pres. **Tia Hart**, Undergraduate researcher, Rutgers University (Aresty Research Scholar Program, Research in Microbiology, & George H. Cook Scholars Program)
 2023 – 2024 **Hazem Al Darwish**, Undergraduate researcher, Rutgers University (George H. Cook Scholars Program)
 2023 – 2024 **Safiyah Salama**, Undergraduate researcher, Rutgers University (George H. Cook Scholars Program & Research in Microbiology)
 2023 – 2024 **Muqaddasa Tariq**, Undergraduate researcher, Rutgers University (George H. Cook Scholars Program & Research in Microbiology)
 2020 – 2021 **Isaac Nii Lantei Lamptey**, PhD student, Cientifico Latino
 2020 – 2021 **Dorian Pousont**, Undergraduate researcher, Princeton University
 2018 **Wanyue Wang**, PhD rotation student, Yale University
 2018 **Xueying Shang**, PhD rotation student, Yale University
 2017 **Shuke Xiao**, PhD rotation student, Yale University
 2017 **Yichen Luo**, PhD rotation student, Yale University
 2014 – 2016 **Sonia Wang**, Undergraduate researcher, Yale University
 2011 – 2012 **Amanda Williams**, Undergraduate researcher, Rutgers University
 2010 – 2011 **Suhyun Kim**, Undergraduate researcher, Rutgers University

Certificates

- 2025 **Completion of Technology Transfer Trainee Program**, Rutgers Office for Research
 2024 **Working with International Students Workshop**, Rutgers Global
 2024 **Completion of Professional Career Development**, Rutgers Office of Postdoctoral Advancement
 2023 **Implementation of Inclusive & Equitable Teaching Practices**, Rutgers University
 2023 **The Business of Science for Scientists: Core Professional Skills that Make You Competitive for a Professional Career**, SciPhD
 2018 **Interdepartmental Neuroscience Program Laboratory Teaching**, Yale University

Selected Service & Outreach

- 2025 – pres. **Member**, Rutgers Department of Biochemistry and Microbiology Seminar Organizing Committee
 2025 – pres. **Member**, Rutgers Department of Biochemistry and Microbiology Web Development Committee
 2025 – pres. **Member**, Rutgers University Microbiome Program (RUMP) Seminar Organizing Committee

2025 **Member**, Rutgers Microbial Biology Interview Ad hoc Committee
2025 **Judge**, Northern NJ Junior Science and Humanities Symposium (JSHS)
2024 – pres. **Faculty Advisory Board Member**, Aresty Research Center
2024 – 2025 **International Climate Technical Advisor**, Development Initiatives and Sustainable Opportunities Association (DIASOA) of Madagascar
2024 – 2025 **Technology Transfer Trainee**, Rutgers Office for Research
2024 – 2025 **President**, Theobald Smith Society
2023 – 2025 **Consultant**, TruEdit
2023 – 2024 **Vice President**, Theobald Smith Society
2023 – 2024 **Co-Chair**, Intersections Science Fellows Symposium (ISFS) Outreach Steering Committee
2023 **Judge**, New Jersey Academy of Science (NJAS) 68th Annual Meeting
2022 – pres. **Consultant**, New York Genome Center
2022 – 2024 **Consultant**, The Rockefeller Foundation
2022 & 2023 **Reviewer**, National Science Foundation (NSF)
2017 – 2018 **Co-Chair**, Yale Graduate Student Quantitative Biology Faculty Search Committee
2013 – 2018 **Judge**, New Haven Science Fair
2012 – 2013 **Judge**, North Jersey Regional Science Fair – Rutgers University Representative