

# Ethan Wold

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## EDUCATION

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2020-2025	PhD, Quantitative Biosciences, Georgia Institute of Technology Thesis title: “Elasticity, actuation, and energy flow in insect flight” Minor in Mechanical Engineering	Advisor: Simon Sponberg
2020	ScB, Ecology & Evolutionary Biology, Geophysics, Brown University <i>Magna cum laude</i> . Honors thesis: “Osmotic engine drives shape change in passive skeletal muscle”	Advisor: Thomas Roberts

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## HONORS, AWARDS, AND FELLOWSHIPS

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2023	Jungle Biomechanics Lab inaugural cohort member
2020-2024	President’s Fellowship, Georgia Institute of Technology (\$5,500, renewable for three additional years)
2020	BrownConnect SPRINT Award, Brown University (\$2,000)
2020	Morris L. Povar Prize in Zoology, Brown University (\$1,500)
2020-2025	NSF Graduate Research Fellowship, National Science Foundation
2019	Japan-US E.S. Morse Scholar Program Recipient
2019	Sigma-Xi Grant-in-aid of Research, Sigma-Xi (\$1,000)
2019	Karen T. Romer Undergraduate Teaching and Research Award, Brown University (\$3,750)
2018	Integrative Organismal Systems Physiology Fellowship, American Physiological Society (\$6,000)
2017	Research Experience for Undergraduates Fellowship, National Science Foundation

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## REFEREED PUBLICATIONS

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\*denotes equal contribution

1. Gau, J.\*, Lynch, J.\*, Aiello, B.\*, **Wold, E.**, Gravish, N., Sponberg, S. 2023. Bridging two insect flight modes in evolution, physiology, and robophysics. *Nature*.
2. **Wold, E.**, Lynch, J., Gravish, N., Sponberg, S. 2023. Structural damping renders the hawkmoth exoskeleton mechanically insensitive to non-sinusoidal deformations. *J. R. Soc. Int.*
3. Gau, J., **Wold, E.**, Lynch, J., Gravish, N., Sponberg, S. 2022. The hawkmoth wing beat is not at resonance. *Biology Letters*.
4. **Wold, E.**, Sleboda, D., Roberts, T. 2021. Passive skeletal muscle can function as an osmotic engine. *Biology Letters*.
5. Sleboda, D., **Wold, E.**, Roberts, T. 2019. Passive muscle tension increases in proportion to intramuscular fluid volume. *Journal of Experimental Biology*.

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## INVITED AND SYMPOSIUM TALKS

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1. SICB 2024 Symposium: Biomechanics, physiology, and evolution of insect flight. Society for Integrative and Comparative Biology annual meeting in Seattle WA.
2. Control theory for understanding animal sensorimotor systems. Georgia State University Neuroscience Institute Data Analysis seminar.

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## CONFERENCE PRESENTATIONS

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\*denotes mentee

1. **Wold, E.**, Gau, J., Lynch, J., Aiello, B., Gravish, N., Sponberg, S. The diversity of resonance in insects. Society for Integrative and Comparative Biology 2024 Annual Meeting.

2. **Wold, E.,** Lynch, J., Gravish, N., Sponberg, S. Modeling the emergent dynamics of self-excited insect wingbeats. International Physics of Living Systems 2023 Annual Meeting.
3. **Wold, E.,** Lynch, J., Gravish, N., Sponberg, S. A model of asynchronous flight muscle explains emergent dynamics of flapping insects. 5<sup>th</sup> Rocky Mountain Muscle Symposium 2023.
4. Lynch, J., **Wold, E.,** Mountcastle, A., Sponberg, S., Gravish, N. Wing collision mitigation through stretch-activated muscle dynamics in flying insects. Society for Integrative and Comparative Biology 2023 Annual Meeting.
5. **Wold, E.,** Harris, M.\*, Aiello, B., Sikandar, U., Lynch, J., Gravish, N., Sponberg, S. What drives interspecific variation in moth wingbeat frequency? Society for Integrative and Comparative Biology 2023 Annual Meeting.
6. **Wold, E.,** Gau, J., Aiello, B., Lynch, J., Gravish, N., Sponberg, S. Latent stretch-activation in synchronous flight muscle. Comparative Physiology: From Organism to Omics in an Uncertain World 2022.
7. **Wold, E.,** Lynch, J., Gravish, N., Sponberg, S. What determines the wingbeat frequency of a bumblebee? Fast Movements: Nature, Robotics, Materials Symposium 2022.
8. **Wold, E.,** Lynch, J., Gau, J., Gravish, N., Sponberg, S. Consequences of structural damping for insect flight dynamics. International Physics of Living Systems 2022 Annual Meeting.
9. **Wold, E.,** Lynch, J., Gau, J., Gravish, N., Sponberg, S. Structural damping makes insect exoskeleton insensitive to non-sinusoidal deformations. Society for Integrative and Comparative Biology 2022 Annual Meeting.
10. Sponberg, S., Gau, J., **Wold, E.,** Lynch, J., Gravish, N., Sponberg, S. Revisiting resonance in insect flight 1: Synchronous hawkmoth wingstrokes have resonant mechanics but operate off of the resonant peak. Society for Integrative and Comparative Biology 2022 Annual Meeting.
11. Gravish, N., Lynch, J., Gau, J., **Wold, E.,** Sponberg, S. Revisiting Resonance in Insect Flight 2: A dynamical systems perspective on asynchronous flight. Society for Integrative and Comparative Biology 2022 Annual Meeting.
12. Lynch, J., Gau, J., **Wold, E.,** Sponberg, S., Gravish, N. Revisiting Resonance in Insect Flight 3: A robophysical system for asynchronous flight. Society for Integrative and Comparative Biology 2022 Annual Meeting.
13. Curameng, K\*, **Wold, E.,** Sponberg, S., Nishikawa, K., Venkadesan, M. Using small-amplitude oscillations in *Manduca sexta* to create dynamic models for predicting complex workloops. Society for Integrative and Comparative Biology 2022 Annual Meeting.
14. **Wold, E.,** Sleboda, D., Roberts, T. Osmotic engine drives shortening in passive skeletal muscle. Society for Integrative and Comparative Biology 2020 Annual Meeting.
15. Sleboda, D., **Wold, E.,** Roberts, T. The Hydrostatic Skeleton of Muscle. Society for Integrative and Comparative Biology 2020 Annual Meeting.
16. **Wold, E.,** Bomphrey, R., Daley, M. Fluid dynamics simulation of balance sensation in the avian lumbosacral organ. Experimental Biology 2019 Annual Meeting.
17. **Wold, E.,** Kelley, C., Cram, E. Mitochondrial physiology and connectivity in the *C. elegans* spermatheca. WPI Next-in-Bio Conference, 2017.
18. **Wold, E.,** Rincon, Y., Kelley, C., Cram, E. Mitochondrial physiology, motility, and connectivity in the calcium-regulated contraction of the *C. elegans* spermatheca. National REU Symposium, 2017.

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## TEACHING AND MENTORSHIP

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### Teaching Positions

Term	School	Course Title	Course Code	Role	Enrollment	Mean Evaluation
F 2023	Georgia Institute of Technology	Vertically Integrated Project: Living Dynamical Systems	VIP 3601	Sub-team instructor	13	N/A

F 2020	Georgia Institute of Technology	Biology of Sex and Death Laboratory	BIOS 1220	Laboratory TA	67	4.9/5
S 2020	Brown University	Comparative Biology of the Vertebrates	BIOL 1880	Head TA	23	4.8/5
F 2019	Brown University	Physical Processes in Geology	GEOL 0220	TA	55	—
S 2017, F 2017	Brown University	Principles of Physiology	BIOL 0800	Group Tutor	~120 per term	—

### Curriculum Development

- 2020            Developed lab exercises for Biology of Sex and Death (GT BIOS 1220)
- 2020            Developed lab exercises for Comparative Biology of the Vertebrates course (Brown BIOL 1880)

### Other

- 2021-2023    Graduate Student Peer Mentor, GT Quantitative Biosciences
- 2017-2020    Meiklejohn Peer Advisor, Brown University
- 2017-2018    STEMS Instructor, Hope High School, Providence RI

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## **SERVICE**

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### To the Profession

SICB = Society for Integrative and Comparative Biology;

- 2022-2023    NSF GRFP Application-writing Panel
- 2021           Session Chair, SICB Annual Meeting
- 2020-2022    Student Volunteer (Charlotte Mangum Student Support Program), SICB Annual Meeting

Peer Reviewer for *Integrative Organismal Biology*, *Bioinsp.* & *Biomim.*, *J. Exp. Biol.*

### To the Institution

- 2018-2020    Biology Department Undergraduate Group Leader, Brown University
- 2017-2020    Physical and Life Sciences Tour Guide, Brown University

### To the Community

- 2023           Laboratorio Amazónico outreach presenter for Peruvian students aged elementary-undergrad
- 2023           Atlanta Zoo Biomechanics Day Workshop Co-Organizer and Presenter
- 2021           QBioS Epidemic Modeling Hands-on Workshop Co-Organizer and Instructor
- 2017-2021    Brown University Science Olympiad Invitational Tournament Coordinator, Brown University
- 2017-2021    State Science Olympiad Tournament Event Coordinator, Providence, RI
- 2018-2019    Rhode Island Science and Engineering Fair Judge, Providence, RI

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## **AFFILIATIONS**

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- 2020 -           Society for Integrative and Comparative Biology
- 2019 -           Sigma Xi Scientific Honors Society
- 2018 -           American Physiological Society