

*Curriculum vitae:*

**JAMES D. CRALL**

Organismic and Evolutionary Biology • Harvard University • Cambridge, MA 02138

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**EDUCATION AND TRAINING**

Current	<b>HARVARD UNIVERSITY</b> USDA-NIFA Postdoctoral Fellow <i>Affiliations:</i> Planetary Health Alliance, Center for Brain Science, Dept of Organismic and Evolutionary Biology <i>Mentor:</i> Dr. Benjamin de Bivort	Cambridge, MA
PhD (2017)	<b>HARVARD UNIVERSITY</b> PhD in Organismic and Evolutionary Biology <i>Advisors:</i> Dr. Stacey Combes, Dr. Naomi Pierce	Cambridge, MA
BA (2007)	<b>SWARTHMORE COLLEGE</b> BA in Biology BA in Sociology and Anthropology	Swarthmore, PA

**PUBLICATIONS**

(17 total, 10 first or co-first authored, Google Scholar total citations: 445, h-index: 11)

<sup>+</sup>Undergraduate collaborators

\*Equal author contribution

17. **Crall JD**, Brokaw J, Gagliardi SF, Mendenhall CD, Pierce NE, Combes SA. (*in review*). Wind drives temporal variation in pollinator visitation in a fragmented tropical forest. *Available on bioRxiv*, in revision at *Biology Letters*.
16. Salzman S, Crook D, **Crall JD**, Hopkins R, Pierce NE, Dey B (*in revision*). An ancient obligate pollination mutualism in cycads. *In revision at Science Advances*.
15. **Crall JD**, de Bivort BL, Dey B, Ford Versypt A. (2019). Social buffering of pesticides in bumblebees: agent-based modeling of the effects of colony size and neonicotinoid exposure on nest behavior. *Frontiers in Ecology and Evolution* 7:51.
14. **Crall JD**, Switzer CM, Oppenheimer RL<sup>+</sup>, Ford-Versypt A, Dey B, Brown A<sup>+</sup>, Eyster M<sup>+</sup>, Guérin C, Pierce NE, Combes SA, de Bivort BL (2018). Neonicotinoid exposure disrupts bumblebee nest behavior, social networks, and thermoregulation. *Science* 362 (6415): 683-686.
13. Ford Versypt A, Dey B, **Crall JD** (2018). BeeNestABM: An open-source agent-based model of spatiotemporal distribution of bumblebees in nests. *Journal of open source software* 3, 718.
12. Alisch T, **Crall JD**, Zucker D, de Bivort BL (2018). MAPLE: a Modular Automated Platform for Large-scale Experiments, a low-cost robot for integrated animal-handling and phenotyping. *eLife*. 7:e37166.
11. **Crall JD**, Gravish N, Mountcastle AM, Kocher SD, Oppenheimer RO<sup>+</sup>, Pierce NE, Combes SA (2018). Spatial fidelity of workers predicts collective response to disturbance in a social insect. *Nature Communications*. 9(1) 1201.

10. **Crall JD**, Chang JJ<sup>+</sup>, Oppenheimer RL<sup>+</sup>, Combes SA (2017). Foraging in an unsteady world: bumblebee flight performance in field-realistic turbulence. *Interface Focus* 7(1) 20160086.  
<sup>+</sup>Undergraduate collaborator
9. Chang JJ\*<sup>+</sup>, **Crall JD\***, Combes SA (2016). Wind alters landing dynamics in bumblebees. *Journal of Experimental Biology*. 219(18):2819-2822.
8. **Crall JD\***, Akandwanaho D\*<sup>+</sup>, Souffrant AD\*<sup>+</sup>, Hescoek SD\*<sup>+</sup>, Callan SE, Coronado WM, Baldwin MW, de Bivort BL (2016). Social context modulates idiosyncrasy of behavior in the gregarious cockroach *Blaberus discoidalis*. *Animal Behaviour* 111: 297-305.
7. **Crall JD**, Mountcastle AM, Ravi S, Combes SA (2015). Bumblebee flight performance in cluttered environments: Effects of obstacle orientation, body size, and acceleration. *Journal of Experimental Biology*. 218: 2728-2737.
6. **Crall JD**, Gravish N, Mountcastle AM, Combes SA. (2015). BEEtag: a low-cost, image-based tracking system for the study of animal behavior and locomotion. *PLOS One* 10(9): e0136487.
5. Ravi S, **Crall JD**, McNeilly L, Gagliardi SF, Biewener AA, Combes SA. Hummingbird flight stability and control in freestream turbulence. (2015). *Journal of Experimental Biology* 218 (9): 1444-1452
4. Ravi S, **Crall JD**, Fisher A, Combes SA, (2013). Rolling with the flow: Bumblebees flying in unsteady wakes. *Journal of Experimental Biology* 216: 4299-4309
3. Combes SA, Rundle D, Iwasaki J, **Crall JD** (2012). Linking biomechanics and ecology through predator-prey interactions: Flight performance of dragonflies and their prey. *Journal of Experimental Biology*. 215: 903-913
2. Donoughe, S\*, **Crall JD\***, Combes SA, Merz RA (2011). Resilin in dragonfly and damselfly wings and its implications for wing flexibility. *Journal of Morphology* 272(12): 1409-1421
1. Combes SA, **Crall JD**, Mukherjee S (2010). Dynamics of animal movement in an ecological context: Dragonfly wing damage reduces flight performance and predation success. *Biology Letters* 6(3): 426-429.

## **RESEARCH FUNDING (\$950,188 TOTAL - \$584,485 EXTERNAL, \$365,503 INTERNAL)**

### *Current*

- STAR-FRIEDMAN CHALLENGE FOR PROMISING SCIENTIFIC RESEARCH [**\$269,017**, 2019-2021], *Impacts of elevated CO<sub>2</sub> on bees and pollination services via alterations in pollen nutrition*
- USDA-NIFA POSTDOCTORAL FELLOWSHIP [**\$164,985**, 2019-2021], *Synergistic Impacts Of Pesticide Exposure And Temperature Stress In Bumblebees*
- CAMPUS SUSTAINABILITY INNOVATION FUND [**\$30,786**, 2019-2021], *Sustaining pollinator populations in a changing world*
- WINSLOW FOUNDATION RESEARCH GRANT [**\$107,000**, 2018-2021], *Effects of elevated atmospheric CO<sub>2</sub> on pollen nutrition and bee health*
- BRIDGE FUNDING GRANT [**\$50,000**, 2018-2019], *Pesticides and pollinators: automated tools for understanding the impacts of neonicotinoids and climate change on bees*

### *Previous*

- ROCKEFELLER FOUNDATION PLANETARY HEALTH ALLIANCE POSTDOCTORAL FELLOWSHIP [**\$122,000**], *Planetary Health Alliance*
- GRADUATE RESEARCH FELLOWSHIP, *National Science Foundation* [**\$125,000**]
- WINSLOW FOUNDATION RESEARCH GRANT [**\$60,000**, 2016-2018]:
- MIND, BRAIN, AND BEHAVIOR STUDENT AWARD, *MBB Initiative* [**\$5,000**]
- JOURNAL OF EXPERIMENTAL BIOLOGY TRAVEL GRANT, *Company of Biologists* [**\$3,500**]
- PUTNAM EXPEDITION GRANT, *Harvard University Museum of Comparative Zoology* [**\$5,700**]
- PILOT RESEARCH FELLOWSHIP, *Organization for Tropical Studies* [**\$2,200**]
- PUTNAM EXPEDITION GRANT, *Harvard University Museum of Comparative Zoology* [**\$2,300**]
- DAVID ROCKEFELLER CENTER FOR LATIN AMERICAN STUDIES, *Summer Research Grant* [**\$1,900**]
- ROWE FAMILY FELLOWSHIP, *Organization for Tropical Studies* [**\$800**]

### **AWARDS AND HONORS**

- LSRF Fellowship FINALIST, *Life Science Research Foundation Fellowship*
- BEST STUDENT PRESENTATION, ANIMAL BEHAVIOR, *SICB*
- FINALIST, BEST STUDENT PRESENTATION, COMPARATIVE BIOMECHANICS, *SICB*
- JAMES MILLS PEIRCE FELLOWSHIP, *Harvard University* [\$18,000]
- GRADUATION WITH HIGH HONORS, *Swarthmore College*
- SUSAN W. ALMY '68 SCHOLARSHIP, *Swarthmore College*

### **INVITED PRESENTATIONS (selected)**

Society for Integrative and Comparative Biology. *Symposium: Automating ethology: Integrating technology integrative biology*. Jan 2021.

\*Entomological Society of America. \*Co-organizer, with S. Hollis Woodard, of symposium, "Social Resilience: Understanding How Environmental Stressors Impact Social Insects, from the Individual to the Collective Scales". Nov 2019

Duke University, University Program in Environmental Health seminar series. November 2019.

BOMBUSS 2.0 Conference, University of York. October 2019.

Arnold Arboretum, September 2019.

International Conference on Pollinator Biology, Health, and Policy. July 2019.

College of William and Mary. April 2019.

Brown University, Fly Club. October 2018.

Planetary Health Alliance Annual Conference, May 2018.

Planetary Health Retreat, Sustainability and Health Student Forum, May 2018.

Swarthmore College, Biology Department, Oct. 2017

Princeton University (Evolution of Social Behavior group), Dec. 2016.

Max Planck Institute for Ornithology, Apr. 2016.

Brown University, Morphology Group Seminar, Nov 2013.

### **CONTRIBUTED PRESENTATIONS (selected)**

Ecological Society of America Conference, 2018.  
Society for Integrative and Comparative Biology Meeting, 2012-2018.  
Biological Distributed Algorithms Workshop, 2015  
First International Orchid Bee Symposium, 2014

### **WORKSHOPS, COURSES, AND SYMPOSIA**

Collective Behavior and Emergent Phenomena in Biology (Group co-leader, Columbus, OH 2018)  
Data-Driven Modeling in Biological Systems (Raleigh, NC 2017)  
1<sup>st</sup> BOMBUSS bumblebee conference (Logan, UT 2017)  
AMNH Bee Course (Portal, Arizona, 2012)  
OTS Fundamentals of Tropical Ecology (Costa Rica, 2011)  
Bodega Bay Phylogenetics Workshop (Bodega Bay CA, 2011)

### **PUBLIC LECTURES AND SCIENCE COMMUNICATION**

Barnstable County Beekeepers Association: *Lecturer in evening public seminar series*  
Guest, Naked Scientists Podcast  
Guest, Learning with Lowell podcast (*forthcoming*)  
Interviews and media outreach with: Popular Mechanics (*forthcoming feature article*), USA Today, NPR, Wired, Associated Press, Science News, New Scientist, Nature Video, Chemical and Engineering News  
Dorchester YMCA: *Participant in Science Week at this YMCA in a low-income community in Boston*  
Harvard Museum of Comparative Zoology. *Contributed to development of a public exhibit on bees and pollination, including effects of pesticides.*  
Waltham Fields Community Farm: *Organized “Bugs on the Farm” day, built solar kitchen for learning garden*  
Gradwagon: *Participant in science outreach service providing hands-on experience to high school students and teachers*

### **MENTORING EXPERIENCE**

#### ***Graduate students***

Jialu Bao (*PhD, Rotation adviser, Harvard University*), Glenn Cockburn (*PhD, Max Planck Institute for Ornithology, DAC member*), Claire Guérin (*Master’s student, Erasmus Mundus Visiting, primary mentor*):

#### ***Undergraduate students and post-bac researchers***

Anita Murrell, Ifedayo Kuye, Jessie Thuma, Joseph Winters, Robert Oppenheimer, August Easton-Calabria, Daniel Rundle, Jay Iwasaki, Jeremy Chang, Dominic Akandwanaho, Sawyer Hescocock, André Souffrant, Andrea Brown, Mackay Eyster, Julia Brokaw, Mariah Slone, Emily Mistick, Kelsey McKenna

#### ***High school students and graduates***

Lettie Cabot, Annie Dobroth, Kayleigh Cronin, Simon Risman

## **TEACHING EXPERIENCE**

Guest Lecturer, Harvard University, Entomology Course. November 2018.  
Lecturer, Life in motion, *Tufts University* (2015)  
Teaching Fellow, *Harvard University*, Neuroethology (2015)  
Guest Lecturer, University of New Hampshire, Behavioral Ecology Seminar. Feb 2015.  
Teaching Fellow, *Harvard University*, Evolution (2013)  
Guest Lecturer, University of New Hampshire, Behavioral Ecology Seminar. Feb 2013.  
Teaching Fellow, *Harvard University*, Animal Behavior (2012)  
High School Biology Teacher, *Colegio Menor San Francisco de Quito* (2007-2008).  
Teaching Assistant, Ecology, *Swarthmore College* (2006).

## **DEPARTMENTAL AND INSTITUTIONAL SERVICE (selected)**

Coordinator, OEB departmental seminar series: *As both a graduate student and postdoctoral fellow, I have helped invite, coordinate, and host multiple visitors for departmental seminar speakers.*  
OEB Graduate Student Seminar Series: *Founder and organizer of weekly departmental seminar series*  
Planetary Health Alliance Global Scholars Program: *Organized and hosted seminar and workshops for a visiting international scholar on pollinator health and agricultural productivity.*

## **PEER REVIEW**

*Ad-hoc reviewer for:*

Science, Nature Communications, eLife, PLOS Biology, Evolution, Proceedings of the Royal Society B, Behavioral Ecology, Journal of Experimental Biology, Animal Behavior, Biology Letters, Communications Biology, Apidologie, PLOS One, Scientific Reports, Biological Journal of the Linnaean Society, Journal of Anatomy, Planetary Health Alliance, George Weston Foundation, Seeding Food Innovation program, National Geographic Society, Air Force OSR