

Samantha A. Alger, PhD

Assistant Research Professor



Education

PhD, Biology (Ecology and Evolution), University of Vermont, 2018

BS, General Business, University of Rhode Island, Kingston, RI, 2009

BA, Biology, University of Rhode Island, Kingston, RI 2009

Affiliations

Immediate Past President
Honey Bee Veterinary Consortium 2023

Scientific Advisor, Vermont
Beekeepers Association,
2017-present

Gund Apis Fund Advisory
Committee, 2019-Present

Selected Experience

Assistant Research Professor, Plant and Soil Science Department, University of Vermont, Burlington, VT, 9/2019-Present

- Managing the Vermont Bee Lab: a research group that investigates the stressors to wild and native bee populations, works to improve resources for pest and disease monitoring, diagnosis, and education for Vermont beekeepers.
- Instruct UVM courses “Bees and Beekeeping”, “Hands-on Beekeeping”, and “Introduction to Beekeeping”.

Environmental Scientist/Pollinator Specialist, VHB, South Burlington, VT, 3/2019-10/2022

- Managed projects related to pollinator research and conservation including bee and butterfly surveys, navigating Monarch CCAA enrollment for utility and transportation sectors, and developing and trialing of pollinator seed mixes.
- Designed and conducted surveys to document presence/absence of wildlife and habitat including Rusty-patched bumble bees, grassland bird species, Karner blue butterflies and frosted elfin, rare and threatened bat species, Bicknell’s thrush.
- Co-authored and provided technical review of natural resource reports for state and federal agencies.
- Served as task manager for solar development clients navigating the Section 248 review process.

NSF Graduate Research Fellow, University of Vermont, Burlington, VT, 9/2013-9/2018

- Designed, developed, and conducted novel scientific studies and research programs to fill knowledge gaps about pollinator conservation, the spillover of emerging infectious disease among bees, and effects of pesticide exposure on bee physiology and virus replication.
- Led community outreach initiatives to improve pollinator health in Vermont, including workshops and presentations to beekeeping communities (over 200 beekeepers).
- Developed open-source tools and technology to aid state apiary inspection programs to control spread of bee diseases.

Publications

Lurie, C., Alger, S., LePore, S., McCandless, C., National Academies of Sciences, Engineering, and Medicine. 2022. Considerations for Establishing and Maintaining Successful Pollinator Programs on Airports. Washington, DC: The National Academies Press. <https://doi.org/10.17226/26680>.

S. Alger, D. Snyder, R. Scott, J. Disorda.; 2022. Joining the Monarch Candidate Conservation Agreement with Assurance: A Case Study with Vermont Electric Power Company. 13th International Symposium on Environmental Concerns in Rights-of-Way Proceedings, In Press.

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- P. Alexander Burnham, **Alger, S.A.**, Case, B., Boncristiani, H., Herbert-Dufresne, L., Brody, A.K.; 2021. Flowers as dirty doorknobs: Deformed wing virus transmitted between *Apis mellifera* and *Bombus impatiens* through shared flowers. *Journal of Applied Ecology*.
- Alger, S.A.**, Burnham, P.A., Brody, A.K., 2019. Flowers as viral hot spots: Honey bees (*Apis mellifera*) unevenly deposit viruses across plant species, *PLOS ONE*.
- Alger, S.A.**, Burnham, P.A., Boncristiani, H.F., Brody, A.K., 2019. RNA virus spillover from managed honey bees (*Apis mellifera*) to wild bumble bees (*Bombus* spp.). *PLOS ONE*.
- Alger, S.A.**, Burnham, P.A., 2019. Commercially grown milkweed as habitat and forage for monarch butterflies and other pollinators, 2018 Milkweed Production Trials-Combined Report, University of Vermont Extension Northwest Crops and Soils Program.
- Alger, S.A.**, Burnham, P.A., Lamas, Z.S, Brody, A.K., Richardson, L.R.; 2018. Homesick: Impacts of migratory beekeeping on honey bee pests, pathogens, and colony size. *PeerJ*.
- Alger, S.A.**, Burnham, P.A., Report of Vermont's National Honey Bee Survey (APHIS USDA), (2017). Pollinator Protection Committee Report to the VT Legislature as required by Act 83 of 2016 Session.
- Burnham P.A., **Alger, S.A.**; Lamas, Z.S., 2018. RNA viruses and Varroa mites: Temporal variation in honeybee pathogens influences patterns of coinfection. *American Beekeeping Federation Conference & Tradeshow 2018 Proceedings*.
- Perrotti, L. & **Alger, S.** 2010. American burying beetle (Silphidae: *Nicrophorus americanus*) survey on Naushon Island, Massachusetts. *Invertebrates in Education and Conservation: Sonoran Arthropod Studies Institute Conference Proceedings*.
- Alger, S.** 2009. *Eciton burchellii*: polymorphism of submajor caste and foraging efficiency. *Invertebrates in Captivity: Sonoran Arthropod Studies Institute Conference Proceedings*.

Manuscripts

- Burnham, P.A., **S.A. Alger**, A.K. Brody, Gotelli, N., Seasonal variation influences coinfection and disease transmission dynamics in bumblebee diseases. *Ecology*, **in review**.
- Alger, S.A.**, Miller, S., Burnham, Wagoner, K., Unhealthy Brood Odor (UBO) Assays predict low chalkbrood, nosema, and virus loads in honey bees., **in prep**.
- Burnham, P.A., **Alger, S.A.**, Richardson, L., Sleeping Beauty: An examination of the effects of hibernation on diseases of the Common Eastern Bumblebee, *Bombus impatiens*, **in prep**.

Teaching and Mentoring Experience

Adjunct Lecturer, University of Vermont, Burlington, VT, 2019-Present

- PSS 196: Bees and Beekeeping, Springs 2020, 2021
- PSS 195: Introduction to Beekeeping, Summers 2019, 2020, 2021, 2022, 2023

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- PSS 195: Hands on Beekeeping, Summers 2021, 2022, 2023

Honor's Thesis Advisor. 2020. Teighan Shore: Honor's Thesis Project: "Characterization of Monarch Butterfly (*Danaus plexippus*) and Milkweed Pest Populations in Milkweed Grown at the Commercial Scale"

Undergraduate Research Projects:

- Brianna Borch, "Identifying key pollen and nectar resources for Vermont honey bees". 2021-2022
- Colin McKay, "Developing a pipeline for pesticide residue data". 2022-Present
- Paloma Salmeron O'Brien, "UVM Beekeeping club hive monitoring program" 2022-Present

Graduate Teaching Assistant, University of Vermont, Burlington, VT, 9/2013-8/2015
Prepared and instructed labs for three undergraduate biology courses: Ecology and Evolution, Biology I and II.

Invited Guest Lecturer, University of Vermont, Burlington VT
Ecology and Evolution (BCOR 102): "Virus Ecology in Bumble Bees and Evidence for Disease Spillover", October 2018

Invited Guest Lecturer, University of Vermont, Burlington VT

Environmental Science (ENSC095), "Bee-Plant-Pathogen Interactions", March 2017

EcoWorker, Ocean View Foundation, Block Island, RI, 5/2013-8/2013

Instructed environmental public education programs. Independently developed and delivered a weekly 'Native Pollinator' program, including citizen science bee survey program.

Environmental Educator, Audubon Society of Rhode Island, Bristol, RI, 1/2013-5/2013
Instructed 'Urban Naturalist' after school program in Providence middle schools to increase environmental literacy for inner city youth

Legislative Service and Expert Testimony

Provided expert testimony on Bill H.626: An act related to the sale, use, or application of neonicotinoid pesticides, February 2022, Vermont House Agriculture and Forestry Committee.

Provided expert testimony on Bill H.205: An act relating to the regulation of neonicotinoid pesticides; April, Vermont Senate Committee on Agriculture.

Provided expert testimony on Bill H.205: An act relating to the regulation of neonicotinoid pesticides; February, Vermont House Committee on Agriculture.

Provided expert testimony on Bill H.236: Bill proposes to ban the use, sale, or application of neonicotinoid pesticides; January 2016, Vermont House Committee on Agriculture.

Provided expert testimony on Bill H.539: Bill proposes to establish a Pollinator Protection Committee January 2016, Vermont Senate Committee on Agriculture,

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Vermont Pollinator Protection Committee meeting, Invited speaker, "Results from National Honey Bee Survey and Bumble bee virus survey," October 2016, Vermont Statehouse.

Peer Review Service

Invited reviewer of manuscripts for academic journals: Ecological Applications, Ecology, Nature Scientific Reports

Invited reviewer of grant proposals for the National Fellowship Committee for Graduate Women in Science

Invited reviewer for Saint Louis Zoo Field Research for Conservation Grant (FRC)

Invited Speaking Engagements

October 2022: "RNA Virus Spillover in Wild and Managed Bees" Rhode Island Natural History Survey Bee Symposium. Kingston, RI.

September 2022: "Identifying Key Pollen and Nectar Resources for Vermont Honey Bees". Vermont Beekeepers Association Meeting, Brandon, Vermont

October 2021: "RNA virus spillover from honey bees to wild bumble bees through flowers". Entomological Society of America Conference, Denver, Colorado.

May 2019: "Are viruses spilling over from honey bees to wild bumble bees through flowers?", Southern Adirondack Beekeepers Association, Saratoga Springs, New York

March 2019: "Threats to Pollinators and Efforts to Improve Pollinator Health," UVM Extension Northwest Crops & Soils Program and Northern Grain Growers Association Grain Growers Conference, Essex, VT

January 2019: "On the Status and Challenges of State Apiary Inspection Programs," American Honey Producers Association, Tempe, AZ

January 2019: "Tools to Improve Apiary Inspection Programs," Apiary Inspectors of America, Tempe, AZ

November 2018: "Virus Ecology in Bumble Bees and Evidence for Disease Spillover," Vermont Society of Engineers, Waterbury, VT

October 2018: "Shared Honey Bee and Bumble Bee Viruses: Demonstrating the Floral Transmission Route," North American Pollinator Protection Campaign Conference, Washington DC

July 2018: "An Analysis of Vermont Beekeepers' Practices, Colony Health and Loss," Addison County Beekeepers Association Club Meeting, Middlebury, VT

June 2018: "An Analysis of Vermont Beekeepers' Practices, Colony Health and Loss," Vermont Beekeepers Association Summer Meeting, Swanton, VT

April 2018: "RNA Viruses in Bumble Bees and the Role of Flowers in Virus Transmission," Plant Soil Science Seminar, University of Vermont, Burlington VT

January 2018: "National Honey Bee Survey Update," Vermont Beekeepers Association Winter Meeting, Essex, VT

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January 2018: "Bee Virus Ecology," keynote speaker, Addison County Beekeepers Association Club Meeting, Middlebury, VT

July 2017: "Homesick- The Role of Migratory Beekeeping on Disease Spread," Vermont Beekeepers Association Summer Meeting, Middlebury, VT

January 2017: "Bee Virus Ecology," Vermont Beekeepers Association Winter Meeting, Essex, VT

January 2017: "Ecology of Bee Viruses," keynote speaker, Southern Adirondack Beekeepers Association, Saratoga, VT

September 2016: "RNA Viruses in Vermont Bumble Bees," Garden Club of America Bee Involved Business Meeting, Lenox, Massachusetts

June 2016: "Bee Pathogen Workshop," Hands-on workshop for beekeepers to identify and quantify honey bee pests using laboratory methods, Bennington Beekeeping Club meeting, Bennington, Vermont.

January 2016: "Vermont's National Honey Bee Survey Results", Bennington Beekeeping Club meeting, Bennington, Vermont

Participating Speaking Engagements

September 2019 "RNA virus spillover from honey bees to wild bumble bees," Apimondia, Montreal, Canada

January 2019: "Spillover of RNA Viruses from Managed Honey Bees to Wild Bumble Bees," American Bee Research Conference, Tempe, AZ

April 2018: "Evidence for RNA Virus Spillover from Managed Honeybees to Wild Bumble Bees," The Northeast Natural History Conference, Burlington VT

March 2018: "Homesick- The Role of Migratory Beekeeping on Disease Spread," BioLunch Presentation, University of Vermont, Department of Biology, Burlington, VT

July 2016: "RNA Viruses in Vermont Bumble Bees," Poster Presentation at the International Pollinator Conference, Penn State University.

April 2016: "RNA Viruses in Vermont Bumble Bees", Bumble Bee Working Group Meeting, University of Sussex, UK

February 2016: "'Honey Bee Viruses' in Vermont's Bumble Bees" BioLunch Presentation, University of Vermont, Department of Biology

January 2016: "Bee Health in Vermont", Annual Vermont Grazing and Livestock Conference, Fairlee Vermont

January 2016: "Vermont's National Honey Bee Survey Results", Vermont Beekeeping Association, VT Farm Show, Essex, Vermont

January 2015: "RNA viruses in Bumble bees" EEEB Presentation, University of Vermont Departments of Ecology, Evolution, and Environmental Biology.

April 2015: "Prevalence, transmission, and effect of RNA viruses on Bumble bees" BioLunch Presentation, University of Vermont Department of Biology

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April 2014: "RNA viruses in Vermont's Bumble bees" EcoLunch Presentation, University of Vermont Department of Biology.

October 2014: "RNA viruses: prevalence, transmission, and effect on native bumble bees in Vermont" EEEB Presentation, University of Vermont Departments of Ecology, Evolution, and Environmental Biology.

July 2010: "Eciton burchellii: polymorphism of submajor caste and foraging efficiency". Sonoran Arthropod Studies Institute, 2010 Invertebrates in Education and Conservation Conference, Rico Rico, Arizona

Appointments

Immediate Past President, Honey Bee Veterinary Consortium, 2023- present

President, Honey Bee Veterinary Consortium, 2022

President-Elect, Honey Bee Veterinary Consortium, 2021

Scientific Advisor, Vermont Beekeepers Association, 2017-present

NESARE Bee School Committee, 2021-Present

Gund Apis Fund Advisory Committee, 2019-present

Bumble Bee Conservation Task Force; North American Pollinator Protection Campaign, 2018- 2020

Funded Projects and Awards (\$664,190)

2023

UVM Gund Apis Fund, Vermont Pollinator Working Group, \$40,000 (Principal Investigator)

2022

Specialty Crop Block Grant, Supporting Bee Producers in Developing Disease & Pest Resistant Bee Stock, \$49,345 (Principal Investigator)

Food Systems Research Center Sustainability Metrics Planning Grant, Pollinators and pollinator-dependent crops- key to measuring food systems sustainability, \$49,940 (Co-PI)

National Honey Bee Survey in Vermont, USDA-APHIS, \$13,800, (Principal Investigator)

2021

National Honey Bee Survey in Vermont, USDA-APHIS, \$13,800, (Principal Investigator)

2020

National Honey Bee Survey in Vermont, USDA-APHIS, \$13,800, (Principal Investigator)

SARE Partnership Grant, Improving NE Bee Stock, \$30,000 (Principal Investigator)

2019

National Honey Bee Survey in Vermont, USDA-APHIS, \$13,800, (Principal Investigator)

UVM Bee Diagnostic Lab: Protecting Vermont's honey and pollination services through pest and disease monitoring, \$88,500, (Principal Investigator)

2018

Developing milkweed as a commercial crop to enhance farm viability and biological diversity, Gund Catalyst Award, \$40,000, (key personnel)

National Honey Bee Survey in Vermont, USDA-APHIS, \$13,800, (Principal Investigator)

Shared honey bee and bumble bee viruses: Demonstrating the floral transmission route, North American Pollinator Protection Campaign, \$9,980, (Co-PI)

2017

National Honey Bee Survey in Vermont, USDA-APHIS, \$13,800, (PI)

American Beekeeping Federation Conference Travel Grant, VT beekeepers, \$1,300, (PI)

Switzer Environmental Fellowship, Robert and Patricia Switzer Foundation, \$15,000, (PI)

2016

National Honey Bee Survey in Vermont, USDA-APHIS, \$12,000 (PI)

Homesick: effects of migratory beekeeping on honey bee disease, Experiment.com, \$5,970, (PI)

Travel grant for USDA lab, UVM College of Arts and Sciences, \$300, (PI)

Managing locally sourced native bees as alternative pollinators for Vermont specialty crops, USDA Specialty Crop Block Grant, \$61,455, (key personnel)

2015

National Honey Bee Survey in Vermont, USDA-APHIS, \$12,000, (PI)

Graduate Research Fellowship, National Science Foundation, \$138,000, (PI)

Bee viruses: the evaluation of hedgerow plants in horizontal transmission and pesticide effects on virus replication, Sustainable Agriculture Research and Education, \$14,600, (PI)

2014

Travel grant to USDA Lab, Ronald Suiter Prize, UVM College of Arts and Sciences, \$1,000, (PI)

RNA viruses: prevalence, transmission, and effect on native bumble bees in Vermont, Sophie Danforth Conservation Biology Fund, Roger Williams Park Zoo, \$1,000, (PI)

RNA viruses: prevalence, transmission, and effect on native bumble bees in Vermont, Theodore Roosevelt Memorial Fund, American Museum of Natural History, \$2,500, (PI)

Assessing floral transmission routes for RNA viruses, Garden Club of America, \$4,000, (PI)

RNA viruses: prevalence, transmission, and effect on native bumble bees in Vermont, Roberto Fabri Fiahlo, Michael D. Upton, \$1,500, (PI)

2013

Travel grant for USDA Lab, Ronald Suiter Prize, UVM College of Arts and Sciences, \$1,000, (PI)

2009

Costa Rica Documentary, Undergraduate Research Grant, University of Rhode Island, \$1000

Costa Rica Documentary, Award for Environmental Research, Joan Smith & Athalie Clark, \$500

Costa Rica Documentary, Memorial Humanities Honors Student Endowment, Eric F. Kumpf, \$500

Media Appearances

New Vermont 'Bee Team' to study pollinator threats. WCAX. 2/14/2023.

<https://www.wcax.com/video/2023/02/14/new-vermont-bee-team-study-pollinator-threats/>

New law targets honey mislabeling in Vermont; testing has begun. VTDigger, 1/18/2021.

The plight of the humble bee. BBC Science Focus, 10/1/2019.

If you don't control Varroa, you're probably making wild bees sick and reducing overall pollinator health in your community. Notes from the lab. American Bee Journal, 9/2/2019, <https://americanbeejournal.com/category/columns/notes-from-the-lab/>

Domestic honeybees are driving wild populations of bumblebees to extinction by infecting shared plants with killer diseases. Daily Mail, 6/27/2019, <https://www.dailymail.co.uk/sciencetech/article-7184277/War-bees-Honeybees-infecting-bumblees-driving-extinction.html>

Those honeybees you're so worried about? They're killing off wild bee species. Grist, 6/27/2019, <https://grist.org/article/those-honeybees-youre-so-worried-about-theyre-killing-off-wild-bee-species/>

Honeybees infect wild bumblebees through shared flowers. Domestic beehives linked to spike in viral infections in nearby bumblebee populations. ScienceDaily, 6/26/2019, <https://www.sciencedaily.com/releases/2019/06/190626160339.htm>

Are commercial honeybees making wild bees sick? PBS News Hour, 6/26/2019, <https://www.pbs.org/newshour/science/are-commercial-honeybees-making-wild-bees-sick>

Diseased honeybees are spreading infections to wild bumblebees, Earth.com, 6/26/2019, <https://www.earth.com/news/diseased-honeybees-wild-bumblebees/>

Commercial honeybee apiaries may transmit viral infections to wild bumblebees through flowers. IFLScience!, 6/26/2019, <https://www.iflscience.com/plants-and-animals/commercial-honeybee-apiaries-may-transmit-viral-infections-to-wild-bumblebees-through-flowers/>

Why flowers may be partially to blame for the deaths of wild bumblebees. Inverse. 6/26/2019, <https://www.inverse.com/article/57080-are-honeybees-getting-bumblebees-sick-by-drinking-from-their-flowers>

How honeybees may infect bumblebees, UVM Today.

6/26/2019, https://www.uvm.edu/uvmnews/news/how-honeybees-may-infect-bumblebees?utm_source=Twitter.com&utm_medium=post&utm_term=&utm_content=&utm_campaign=UVM_Twitter_general

Honeybees infect wild bumblebees-through shared flowers. Phys.org.

6/26/2019, <https://phys.org/news/2019-06-honeybees-infect-wild-bumblebeesthrough.html>

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Bees kept for honey are killing wild species by spreading disease, study suggests. Independent. 6/26/2019, <https://www.independent.co.uk/environment/beekeepers-honeybees-wild-bumblebees-pollinator-decline-a8976101.html>

Bee declines a concern for U.S. food supply. The Saratogian. 5/23/2019. https://www.saratogian.com/news/bee-declines-a-concern-for-u-s-food-supply/article_e89a9f0e-7be0-11e9-b086-5341ea6335e9.html

Senate Oks bee-harming pesticide restriction. Vermont Digger. 5/7/2019. <https://vtdigger.org/2019/05/07/senate-oks-bee-harming-pesticide-restriction/>

Nicholson et al.: Pass Bill H.205 to save Vermont's bees. Vermont Digger. 4/28/2019. <https://vtdigger.org/2019/04/28/nicholson-et-al-pass-bill-h-205-save-vermonts-bees/>

Save Vermont bees: Senators should pass Bill H.205. Times Argus. 4/27/2019. https://www.timesargus.com/opinion/perspective/save-vermont-bees-senators-should-pass-bill-h/article_e904dbbd-5609-50f8-9f5e-3bfa1fcfb127.html

House approves bill that restricts use of bee-harming pesticide. Vermont Digger. 3/26/2019. <https://vtdigger.org/2019/03/26/house-approves-bill-restricts-use-bee-harming-pesticide/>

Northeast SARE Graduate Student Snapshot. Northeast SARE. 7/13/2018. <https://www.youtube.com/watch?v=6dowG7ZEK&feature=youtu.be>

The National Honey Bee Survey in Vermont. Bee Culture. 3/21/2017. <http://www.bee-culture.com/national-honey-bee-survey-vermont/>

Bees under siege. WCAX TV News. 7/29/15. <http://www.wcax.com/story/29660551/bees-under-siege>

UVM researchers buzzing about the declining bee populations. My Champlain Valley.com. <http://www.mychamplainvalley.com/news/symposium-on-vt-bee-population-held>

Highgate field becomes bee research site. The St. Albans Messenger. 7/30/2015.