Kirsten S. Traynor

Research Associate

Global Biosocial Complexity Initiative at Arizona State University

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BACKGROUND & RESEARCH INTERESTS

I am a biologist trained in animal behavior, genetics and neuroscience using the honey bee as a model system. My research interests include the evolution of social behavior, the division of labor, pheromone communication and ecosystem services. I span basic and applied research, investigating how pesticides disrupt colony dynamics, how the parasitic varroa mite has adapted to its new host, how social insects communicate via pheromones, and how to improve honey bee queen breeding through selection and instrumental insemination. I am a strong advocate of educational outreach and building a bridge between science and practice as evidenced by my roles as former editor of the monthly publication *American Bee Journal* and the quarterly publication *Bee World*. Public speaking is something I enjoy, easily adapting content for other scientists or a lay audience. My grant writing skills have brought in over $700,000 in funding.

WHAT I HAVE DISCOVERED

- A hazard quotient model for estimating risk from multiple pesticide residues to honey bee health (2016).
- The epidemiological trends of honey bee parasites (varroa & nosema) and viruses for the National Honey Bee Disease Survey (2016).
- Sublethal pesticides in pollen drive abnormal queen replacement events (current project).
- The pheromone signals given off by young and old larvae impact the foraging choices (releaser effect) (2015) and the physiology (primer effect) of their caregivers (2017).
- Young larvae are more effective at suppressing worker reproduction than queen pheromones (2014).

EDUCATION

PhD in biology, Arizona State University, Tempe, Arizona, Robert E. Page 2014
Decoding Brood Pheromone:
The Releaser and Primer Effects of Young and Old Larvae
on Honey Bee (Apis mellifera) Workers

MS in biology, Arizona State University, Tempe, Arizona, Robert E. Page 2011

BA in English with creative writing, *magna cum laude*, Kenyon College, Gambier, Ohio 2001

ACADEMIC APPOINTMENTS

Research Associate: Arizona State University & The Santa Fe Institute 2019-present
Fellow, College of Life Sciences: Wissenschaftskolleg zu Berlin, Germany Sept 2018-Mar 2019
Research Associate: University of Maryland, College Park 2014-2019
Research Assistant: Arizona State University, Tempe 2012-2014
Teaching Assistant: Arizona State University, Tempe 2009-2011
General Genetics
Ask A Biologist, Question & Answer Coordinator: https://askabiologist.asu.edu

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HONORS, GRANTS & FELLOWSHIPS

NE Sustainable Agricultural Research & Education, "Improve crop visitation via odor training, while reducing honey bee colony losses through protective feeding and pollen trapping." **$149,000**

April 2019-March 2021

Wissenschaftskolleg zu Berlin, College of Life Sciences Fellowship, 6-month fellowship in Berlin. "Varroa Biology & Control: A Worldwide Perspective." **€30,000** approximately.
September 2018-March 2019

National Honey Board "Increasing Colony Survival through Innovative Queen Nutrition" **$34,300**

January 2016-December 2017

USDA NIFA ELI Postdoctoral Fellowship, "Nutritional Deficits: The Impacts of Fungicides and Larval Queen Nutrition on Honey Bee Colony Health." **$150,000**
November 2015-October 2018

USDA NIFA WAMS, "Remote Tech Transfer Teams Enabling Rural Beekeepers to Maximize Honey Bee Colony Health." **$285,000**

September 2015 – present

USDA NIFA Predoctoral Fellowship, "Decoding a Pheromone Signal." **$75,000**
August 2012-July 2014

P.E.O. Scholar Award for Female Doctoral Students, **$15,000**

August 2012-August 2013

Fulbright Advanced Student Fellowship to France to study the effects of brood pheromone on honey bee behavior. **€14,400** France,

November 2011-July 2012

"Forward to Professorship." Baluch, Debra *et al*. **$10,000** NSF grant to host a conference and workshop for women in science.

June 2010

Director's Fellowship. **$24,700.** Arizona State University. Tempe, AZ

August 2008-July 2009

German Chancellor Fellowship (BuKa) from the Alexander von Humboldt Foundation for an independent research project comparing European and American Apicultural Practices and Research. **€48,000** Germany

May 2006-October 2007

HONORS & AWARDS LESS THAN $2,000

Jack Reid Scholarship from the Society for Children's Book Writers & Illustrators for Leaving Home: How Honey Bees Swarm" best unpublished manuscript. January 1st, 2017.

Jack Myers Scholarship from Highlights Foundation to attend Writing About Nature Retreat. $1,500. May 12 to 17, 2014

ASU SoLS Travel Grant. $300. American Bee Research Conference. San Antonio, TX, 2014.

International Union for the Study of Social Insects Travel Award. $500. Entomological Society Association annual meeting. Austin, TX, November 13-16, 2013.

Initiation into Phi Kappa Phi. Arizona State University, Spring, 2013.

National Association of Science Writers Graduate Travel Fellowship. $900. Yale University, New Haven, CT, November 5-9, 2010.

Graduate Scholarship from the Foundation for the Preservation of Honey Bees. $2000. 2010.

International Conference Travel Grant. $400. Arizona State University, 2010.

CROWDFUNDING PROJECTS

Sentinel Hives: Guardians of Honey Bees
A crowdfunding projecting for a state-wide monitoring system, so we can issue alerts to all beekeepers of escalating health problems and they can intervene to save their colonies.
Goal: $8,000, Raised: $24,105 from 156 donors, https://www.launch.umd.edu/honeybees

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PUBLICATIONS

Peer-Reviewed Journal in prep:

Traynor, K. S. et al (submitted) Pesticides in Honey Bee Colonies: real world exposure and associated morbidity over seven years in the USA.

Wild, B., Dormagen, Zachariae, A., Smith, M., Traynor, K, Brockmann, D., Couzin, I., Landgraf, T. (submitted) Social networks predict the life and death of honey bees.

El Agrebi, N., Traynor,K.S., Wilmart, O., Tosi, S., Leinartz, L., Danneels, E., de Graaf, D., Saegerman,C. (submitted) Pesticide and veterinary drug use in Belgian beeswax: occurrence, toxicity, and risk to honey bees.

Traynor, K.S., Lamas, Z.S., Hawthorn, D. vanEnglesdorp, D. Social Disruption: Sublethal pesticides in pollen lead to queen replacement, nutritional stress, and brood cannibalism.

Lamas, Z.S., Hawthorn, D. vanEnglesdorp, D., Traynor, K.S. Sublethal pesticide exposure increases false swarms and queen attendance.

Peer-Reviewed Journal Articles:

Traynor, K.; Mondet, F.; R. de Miranda, J.; Techer, M.; Kowallik, V.; Oddie, M.; Chantawannakul, P.; McAfee, A. (in press) *Varroa destructor*: A Complex Parasite, Crippling Honeybees Worldwide. *Trends in Parasitology.* doi: 10.20944/preprints202002.0374.v2

Traynor, K. S., Wang, Y., Brent, C. S., Amdam, G. V., & Page, R. E. (2017). Young and old honeybee (*Apis mellifera*) larvae differentially prime the developmental maturation of their caregivers. *Animal Behaviour*, *124*, 193-202.

vanEngelsdorp, D., Traynor, K. S., Andree, M., Lichtenberg, E. M., Chen, Y., Saegerman, C., & Cox-Foster, D. L. (2017). Colony Collapse Disorder (CCD) and bee age impact honey bee pathophysiology. *PloS one*, *12*(7), e0179535.

Traynor, K. S., Pettis, J. S., Tarpy, D. R., Mullin, C. A., Frazier, J. L., & Frazier, M. (2016). In-hive Pesticide Exposome: Assessing risks to migratory honey bees from in-hive pesticide contamination in the Eastern United States. *Scientific Reports, 6*(33207). doi: 10.1038/srep33207

Traynor, K. S., Rennich, K., Forsgren, E., Rose, R., Pettis, J., Kunkel, G., . . . vanEngelsdorp, D. (2016). Multiyear survey targeting disease incidence in US honey bees. *Apidologie*, 1-23. doi: 10.1007/s13592-016-0431-0

Seitz, N., Traynor, K. S. (co first author), Steinhauer, N., Rennich, K., Wilson, M. E., Ellis, J. D., . . . Caron, D. M. (2016). A national survey of managed honey bee 2014–2015 annual colony losses in the USA. *Journal of Apicultural Research*, 1-12.

Traynor, K. S., Le Conte, Y., & Page, R. E., Jr. (2015). Age matters: pheromone profiles of larvae differentially influence foraging behaviour in the honeybee, Apis mellifera. *Animal Behaviour, 99*, 1-8. doi: 10.1016/j.anbehav.2014.10.009

Traynor, K. S., Le Conte, Y., & Page, R., Jr. (2014). Queen and young larval pheromones impact nursing and reproductive physiology of honey bee (Apis mellifera) workers. *Behavioral Ecology and Sociobiology, 68*(12), 2059-2073. doi: 10.1007/s00265-014-1811-y

Simon, A., Traynor, K., Santos, K., Blaser, G., Bode, U., & Molan, P. (2009). Medical honey for wound care—still the 'latest resort'? *Evidence-based complementary and alternative medicine, 6*(2), 165-173.

Books:

Traynor, K. & M. Traynor. (2015) *Simple, Smart Beekeeping.* Maryland, Image Design.

Traynor, K. (2011) *Two Million Blossoms: Discovering the Medicinal Benefits of Honey.* Maryland, Image Design.

Book Chapters:

Traynor, K. (2015). Honey. The Hive and the Honey Bee. J. Graham. Hamilton, Illinois, Dadant.

Dolezal, A., K. Traynor, F. Flores, G. Amdam (2014). The Evolution and Development of Eusocial Insect Behavior. " Advances in Evolution and Development. Wiley & Sons.

PRESENTATIONS

"Building your Brand: The Importance of Integrity" Apimondia, Montreal, Canada, September 9-14, 2019.

Keynote: "2 Million Blossoms: Protecting our Pollinators" Eastern Apicultural Society Annual Meeting, Greenville, SC, July 17-20, 2019.

Keynote: "Intensive Hive Management" 66th Annual Beaverlodge Field Day, Beaverlodge, Alberta, Canada June 21, 2019.

"What's in that pollen? Pesticides in honey bee hives in America" British Beekeepers Association Convention, Harper Adams, UK, April 12-14, 2019

"Two million blossoms: Honey for your health." British Beekeepers Association Convention, Harper Adams, UK, April 12-14, 2019

"Pesticide residues in bee bread from the National Honey Bee Disease Survey" EurBee 8, Ghent, Belgium, Sept 18-20, 2018.

"Simple, Smart Beekeeping" Eastern Apicultural Society, Hampton, VA, Aug 22-26, 2018.

"Easy Queen Introduction" Eastern Apicultural Society, Hampton, VA, Aug 22-26, 2018.

"Over the Atlantic: European Intensive Hive Management." Loudon County Beekeepers Association, Hamilton, VA, Aug 6, 2018.

"Healing with Honey" Heartland Apicultural Society, St Louis, MO, June 11-14, 2018.

"Hive Rotation System: Intensive German Hive Management" Heartland Apicultural Society, St Louis, MO, June 11-14, 2018

"Swarm Prevention." Heartland Apicultural Society, St Louis, MO, June 11-14, 2018

"Varroa: Biology, Control and Virus Transmission" Garfield Park Conservatory Alliance, Chicago, IL, July 9, 2018.

"Halting the Unstoppable Swarm" Betterbee Field Day, Greenwich, NY, June 26th, 2018.

"Manage your Mites" Betterbee Field Day, Greenwich, NY, June 26th, 2018.

"Simple, Smart Beekeeping" Virginia State Beekeepers Association, Salem, VA, June 13-15, 2018.

"Two Million Blossoms: Honey for your Health" Virginia State Beekeepers Association, Salem, VA, June 13-15, 2018.

"The Complex Web of Colony Decline: What's Killing the Bees" Virginia State Beekeepers Association, Salem, VA, June 13-15, 2018.

Irish Spring Speaking Tour: 6 talks on bee health in 4 days, Federation of Irish Beekeepers, Ireland March 22-25, 2018.

Keynote "Winter Losses Below 5%: What we can learn from German Beekeepers" Massachusetts Beekeepers Association Boston, MA, March 17, 2018.

"Over the Atlantic: Intensive European Beekeeping" Frederick County Beekeepers Association, Frederick, MD March 8, 2018

"The impacts of commonly applied insecticides and fungicides on Apis mellifera nutrition and colony development" Entomological Society Annual Conference, Denver, CO, Nov 7, 2017.

"Pesticides in Pollen: Results from the National Survey of Honey Bee Disease." Louisiana State Beekeepers Conference, Alexandria, LA, Nov 30, 2017.

"Stopping the Unhaltable Swarm" Keynote speaker, Vermont State Beekeepers Association, July 8th, 2017

"The Importance of Pollinators" Hood College, Frederick, MD, Feb 14, 2017

"Pesticides and Pollinator Health", Maryland Organic Food & Farming Association, Annapolis, MD, Feb 11th, 2017

"Re-evaluating pesticide risk by mode of action" American Bee Research Conference, Galveston, Texas Jan 12-13, 2017

"Pesticides & Pollinators" VA State Beekeepers Conference. Weyers Cave, VA. 5 November, 2016.

"Over the Atlantic: European Intensive Hive Management" Long Island Beekeepers Conference, keynote speaker, Farmingdale, NY 9 October, 2016.

"Why bees are disappearing" World Bee Day at The Delegation of the European Union to the United States, Washington, DC. 20 May, 2016

"Pesticides in pollen: In-hive residues in migratory colonies." USDA North Eastern Regional Association. Washington, DC. 11-12 February, 2016.

"Pesticides in pollen: A national survey of in-hive residues" Entomological Society of America. Minneapolis, MN. 15-18 November, 2015.

"Tech Team Added Value Analysis." Bee Informed Partnership Conference, Anaheim, CA. 5-6 January, 2015.

"Results from the APHIS Multi-year analysis." Bee Informed Partnership Conference, Anaheim, CA. 5-6 January, 2015.

"Age Matters: The primer and releaser effects of young and old larvae on honey bee (Apis mellifera) foraging." Pacific Branch Entomological Society of America. Tucson, AZ. 6-9 April, 2014.

"The priming influence of honey bee larvae on age of first foraging and foraging bias." American Bee Research Conference. San Antonio, TX. Jan 10, 2014.

"Division of labor shifts in response to brood age in *Apis Mellifera*" Entomological Society of America. Austin, TX. 9-14 November, 2013

"Division of labor shifts in response to age of brood in *Apis Mellifera*" American Bee Research Conference. Hershey, PA. 10-11 January, 2013

"Early Environment Influences the Behavioral Response of *Apis mellifera* to Brood Pheromone" American Bee Research Conference. Orlando, FL. 14-15 January 14-15, 2010

"Brood pheromone: how a hive communicates." New Zealand Annual Beekeeping Conference, keynote speaker, Nelson, New Zealand. 27-29 July 2010.

"European Queen Breeding." New Zealand Annual Beekeeping Conference, keynote speaker, Nelson, New Zealand. 27-29 July 2010.

"Varroa Management for Beginners." New Zealand Annual Beekeeping Conference, keynote speaker, Nelson, New Zealand. 27-29 July 2010.

"Hive Rotation System: an easy management technique to minimize varroa and maximize honey." New Zealand Annual Beekeeping Conference, keynote speaker, Nelson, New Zealand. 27-29 July 2010.

"German Hive Rotation." North Carolina State Beekeeping Association Summer Meeting. Carson High School. China Grove, NC. 8-10 July 2010.

"Bee Breeding in Europe." Carolina State Beekeeping Association Summer Meeting. Carson High School. China Grove, NC. 8-10 July 2010.

"Early environment influences the behavioral response of *Apis mellifera* to brood pheromone." Kirsten Traynor and Rob Page, Arizona State University. American Bee Research Conference. Orlando, Florida. 14-15 January, 2010.

"The History of Honey and its Role in Human Health." 1st International Symposium on Honey and Human Health, Sacramento, CA. 8 July 2008.
"How European and American Beekeeping Differ." Buckfast Breeders of Europe's Annual Convention, Neuenstein/Aua, Germany. 7 November, 2007.
"Bee Losses in the USA -- Colony Collapse Disorder." Annual Conference of Bee Health, Auweiler, Germany. 24 August 2007.

OUTREACH PUBLICATIONS & GENERAL AUDIENCE

American Bee Journal

Traynor, K. (2018) "Bee Brief – Editorial" **158**(1-12):7, 131, 247, 259, 483, 611, 723, 843, 963, 1079, 1183, 1295.
Traynor, K. (2018) "Beekeeping Basics" **158**(6-12):635-6, 756-7, 868-9, 994-5, 1098-9, 1219, 1315.
Traynor, K. (2018) "U.S. Honey Crops and Market" **158**(1-3, 5,7, 9, 12):106-8, 147-9, 263-5, 507-9, 735-7, 983-4, 1307-8.
Traynor, K. (2018) "Beekeepers—The Next Generation" **158**(2-10):224-5, 328-9, 454-5, 580-1, 698-9, 816-7, 934-5, 1060-1, 1162-3.
Traynor, K. (2017) "U.S. Honey Crops and Market" **158**(10-11):1039-41, 1169-71.
Traynor, K. (2017) "Beekeepers—The Next Generation" **157**(11-12):1234-5, 1310-11.
Traynor, K. (2016) "Peter Molan: The Research Giant Who Brought Us Medical Grade Manuka." **156**(3):327-332 and (4): 1165-68.
Traynor, K. (2016) "Colony Collapse Disorder Eight Years Later—Part I & II" **156**(3):327-332 and (4): 425-430.
Traynor, K. (2015) "The Complicated Story of Colony Losses and Pesticides" **155**(6):669-71.
Traynor, K. (2015) "American Beekeeping Federation at Disneyland" **155**(4):453-56.
Traynor, K. (2014) "Beekeeping Synergy: The American Honey Producers Association's 45th Annual Convention." **154**(3): 309-311.
Traynor, K. (2014) "Science & Bees: Notes from the American Bee Research Conference." **154**(3): 313-316.
Traynor, K. (2013) "Plants for Pollinators: Turning Roadsides and Gardens into Bee Havens." **153**(9): 957-959.
Traynor, K. (2013) "The Passionate Beekeeper." **153**(8): 861-63.
Traynor, K. (2013) "Halting the Unstoppable Swarm." **153**(7): 713-16.
Traynor, K. (2013) "Easy Queen Introduction for the Hobbyist." **153**(6): 597-599.
Traynor, K. (2013) "Symphony of the Senses: The Markets of Provence." **153**(5): 507-510.
Traynor, K. (2013) "The Beekeeper's Alphabet." **153**(4): 363-367.
Traynor, K. (2013) "Smart Short Course: A Guide to Teaching Beekeeping." **153**(3): 229-232.
Traynor, K. (2013) "In Plain English: The American Bee Research Conference." **153**(3): 301-303.
Traynor, K. (2011) "Pollen and Purity." **151**(3): 279-281.
Traynor, K. (2011) "Beehaven on the Golden Bay in New Zealand." **151**(2): 177-181.
Traynor, K. (2011) "Mossop's Honey Shoppe: A New Zealand Family Business" **151**(1): 81-85.
Traynor, K. (2010) "New Zealand Beekeeping at the Firth of Thames and the Bay of Plenty." **150**(12):1173-6.
Traynor, K. (2010) "New Zealand Beekeeping Conference." **150**(11):1057-60.

Traynor, K. (2010) "North Carolina - A Successful State Meeting." **150**(10):937-940.
Traynor, K. (2010) "The Savvy Sideliner's Guide to Selling Honey." **150**(2):143-6.
Traynor, K. (2010) "Smart Marketing on a Shoestring: The Small-Scale Beekeeper's Guide to Selling Honey." **150**(1): 47-51.
Traynor, K. (2009). "Beekeeping for Beginners." **149**(5-12): 427-431, 537-541, 637-640, 735-739, 839-843, 941-945, 1045-1048, 1139-1143.
Traynor, K. (2009). "Bee Club Queen Rearing." **149**(4): 302-7.
Traynor, K. (2009). "Road Trip through Europe: Processing and Packing Honey." **149**(3): 262-6.
Traynor, K. (2008). "American Foulbrood: How to Discover AFB Before Clinical Symptoms—Part I-III." **148**(10,11,12): 913-916, 1013-1017, and 1103-1108.
Traynor, K. (2008). "Bee breeding around the world." **148**(2-7 & 9): 135-139, 237-240,341-345,445-449, 545-548,646-650, 813-816.
Traynor, K. (2008). "Sweet solutions for good health." **148**(3): 205-208.
Boecking, O. and K. Traynor (2007). "Varroa biology and methods of control - Part I-III - Soft chemical methods of control." **147**(10-12): 873-878, 955-961, 1059-1064.
Traynor, K. (2007). "A closer look at deformed wing virus." **147**(11): 962-964.
Traynor, K. (2007). "Does the US need a honey standard." **147**(3): 221-229.
Traynor, K. (2007). "German Beekeeping Institute Open House—A Glance into German Beekeeping" **147**(1):37-41.
Traynor, K. (2006). "The Honey Bee's Contribution to Medicine." **146**(10): 859-62.

International Bee Journals:
Traynor, K. (2019) "From English major to honey bee biologist." Bee Culture **150**(4).
Traynor, K. (2017) "The Bee-friendly Garden." Bee World **94**(2): 63-64.
Traynor, K. (2016) "The Tears of Re: Beekeeping in Ancient Egypt." American Entomologist **62**(3): 194-196.
Traynor, K. (2016) "Greg Hunt Bites Back Against Mites." Bee World **93**(2): 45-48.
Traynor, K. (2016) "What Do Beeple Do All Day?" Bee World **93**(2): 37-39.
Traynor, K. (2015) "Meet the Scientist Behind the Science: Peter Molan: The Man of Manuka." Bee World **92**(4): 109-112.
Traynor, K. (2015) "The Healing Touch of Honey." Bee World **92**(4): 100-104.
Traynor, K. (2015) "Emergence: How Insect Illustrations Evolve under Carim Nahaboo' Artistic Hand." Bee World **92**(4): 121-124.
Traynor, K. (2015) "On the Shelf: Manuka: the biography of an extraordinary honey." Bee World **92**(4): 105-106.
Traynor, K. (2015) "Alison Mercer: The Queen's Pheromones." Bee World **92**(2): 46-48.
Traynor, K. (2015) "On the Shelf: Bees Up-Close." Bee World **92**(2): 40-42.
Traynor, K. (2015) "Meet the Scientist Behind the Science: Tom Seeley." Bee World **92**(1): 18-20.
Traynor, K. (2015) "Sketch Notes: Art that Engages Online." Bee World **92**(1): 23-25.
Traynor, K. (2012) "Bee Breeding Around the World." The Australasian Beekeeper **113**(9): 371-**379.**
Traynor, K. (2010) "2010 North American Beekeeping Conference." Bee World **87**(1): 5-6.
Traynor, K. (2009) "Browsing the Eva Crane Collection: A Captivating Immersion in the History of Beekeeping" Buzz Extra **6**(3): 1-2.
Traynor, K. (2009) "American Foulbrood: How to Discover AFB Before Clinical Signs Appear Part 1" The Australasian Beekeeper **111**(3): 110-115.

Traynor, K. (2008) "Breeding for Varroa Tolerance in Germany" The Australasian Beekeeper **110**(5): 158-162.
Traynor, K. (2007) "Toleranzzüchter auf Rügen (Varroa Tolerance Breeders Annual Meeting in Rügen)" Deutsches Bienen Journal **11**: 507.
Traynor, K. (2007) "CCD: wie geht es weiter (CCD: how will we muster on)" Deutsches Bienen Journal **9**: 395.
Traynor, K. (2007) "Völkerzusammenbrüche in den USA (Colony Collapses in the USA)" Deutsches Bienen Journal **5**: 220-221.
Traynor, K. (2007) "100 Jahre Bienenzucht in Hilden (100 Years of Bee Breeding in Hilden)" Deutsches Bienen Journal **2**: 89.

Publications for the General Public:
Traynor, K. (2019). "Two Million Blossoms in a Jar." Newsletter of the Fellows' Club. March 2019.
Traynor, K. (2012). "Field Studies: On Foot and On Wing." School of Life Sciences Magazine. 8 (1): 17-19.
Traynor, K. (2011). "Green Energy: Mini-biofactories for carbon friendly fuel." School of Life Sciences Magazine. **7** (1): 3-4.
Traynor, K. (2011). "Green Challenges: Sun solutions from ancient systems." School of Life Sciences Magazine. **7** (1): 12-13.
Traynor, K. (2011). "Marla Spivak: Bee Queen." Wired. **19**(03):117. http://www.wired.com/magazine/2011/02/ff_madscientist_profiles/3/
Traynor, K. (2011). "Darwin & Mendel's Afternoon Tea." Ask A Biologist. http://askabiologist.asu.edu/explore/darwin_mendel
Traynor, K. (2011). "Building Blocks of Science." Ask A Biologist. http://askabiologist.asu.edu/scientific-minds-slowly-build-mountain-molehill
Traynor, K. (2011). "Sonoran CSI." Ask A Biologist. http://askabiologist.asu.edu/explore/desert-microbes
Traynor, K. (2011). "Tracking the Invisible." Ask A Biologist. http://askabiologist.asu.edu/tracking-invisible
Traynor, K. (2010). "Old and Wise." Scientific American Mind. **21**(5):11. http://www.scientificamerican.com/article/old-and-wise/
Traynor, K. (2010). "Behind the Veil: Advanced Beekeeping." School of Life Sciences Magazine. **6** (1): 14-15.
Traynor, K. (2008) "Staying Healthy in Frederick County: Quality Care at Frederick Memorial Hospital and Beyond." Frederick Magazine.

MEMBER OF PROFESSIONAL SOCIETIES

- Entomological Society of America
- International Union for the Study of Social Insects
- Honors Society of Phi Kappa Phi
- National Association of Science Writers

OUTREACH TEACHING EXPERIENCE

All Day Intensive Beekeeping Classes

Starting out Right: An Introduction to Simple, Smart Beekeeping

Beekeeping should be easy, fun, and enjoyable. Figuring out what's right, what's necessary, and how to keep your bees alive is often difficult when starting out and sifting through contradictory information. This intensive course starts you off on the right foot providing the crucial information you need to succeed as a new beekeeper.

Organic Beekeeping Class

An overview of organic honey bee hive management that includes how to keep hives healthy, read the brood nest, monitor for varroa mites, reduce the swarm drive, manage varroa organically, prepare colonies for winter, and be reading for the spring honey flow.

Hive Inspection: What am I really seeing?

You have a hive, you've opened the box, but making sense of the jumble of bees inside isn't easy. This is one of the hardest things for beekeepers to learn. How do you recognize if your hive is healthy or needs some help? What do you actually do during a hive inspection? How do you work an apiary?

Winter Ready: Prepare your Colonies for Survival

The best time to prepare your colonies for winter is late summer. Don't lose colonies through beekeeper error. Learn how to make sure your colony enters the winter strong and healthy, so it winters well and builds up rapidly in the spring.

OUTREACH & BROADER IMPACTS IN FIELD

Editor of 2 Million Blossoms June, 2019- present

a quarterly magazine dedicated to protecting all pollinators.

- Launched a new magazine in January 2020
- Contributors include Marla Spivak, Dave Goulson, Mark Winston, and Chris Childs
- Raised $20,000+ in funding for the initial printing
- Articles are scientifically accurate and written for a lay audience

Editor of American Bee Journal Sept, 2017 – Oct, 2018

a monthly beekeeping trade magazine, published since 1861

- Introduced an editorial to highlight scientific concepts and themes in the magazine
- Wrote the column "Beekeeping Basics" to help new beekeepers understand bee biology.
- Edited submissions and worked with contributors to improve clarity and scientific accuracy of content
- Revamped and redesigned the magazine, emphasizing strong visuals
- Engaged in a speaking tour to promote good beekeeping practices

Editor of Bee World Jan 2015-Dec 2017

a quarterly magazine linking bee science and practice, published by the International Bee Research Association.

- Introduced the column "The Scientist Behind the Science" with interviews of well-known bee researchers.
- Redesigned magazine layout
- Worked with international authors to edit and polish submissions
- Created special issues on "Bee Breeding" and "The Superorganism" with additional ones planned on "Pollination" and "Genetics"
- Assembled a tribute issue for Peter Molan on the medicinal benefits of honey
- Design attention-grabbing covers so the magazine has visual appeal to draw in new subscribers
- Write book reviews of new bee titles
- Network with writers and scientists to bring in article submissions

Bimonthly Newsletter 2016-present

Bi-monthly email newsletter entitled ***FreeBee***. Includes a research news round-up, current interest articles, and upcoming events. Currently sent to over 1,000 subscribers.

Flickerwood Apiary 2001-2019

Owner of an organic beekeeping business that supplies top quality nucs and Maryland reared open-mated Carniolan queens to the industry. I focus on education and outreach, teaching new and experienced beekeepers how to keep their colonies healthy

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PUBLIC SPEAKER

Popular speaker, frequently give talks to rotary clubs, beekeeping organizations, gardening clubs, and other civic organizations. Available topics include:

Pesticides & Pollinators: Honey bee colony losses remain high, despite beekeeper's best efforts to keep colonies healthy. While neonicotinoids are often highlighted by the press, many other pesticides end up in honey bee colonies. Learn what we're finding in hives and how the panic over the Zika virus may impact the health of your hives.

The Complex Web of Colony Decline: What's killing the bees: Every third bite we eat is due to pollination, but honey bees and native bees are disappearing. Changing landscapes, modern agriculture, climate change and globalization all play a role in pollinator decline. Learn what steps we can take to ensure our food security and help bees thrive in today's challenging environment.

Over the Atlantic: European Intensive Hive Management: Commercial beekeepers in Europe often manage only 200 to 500 hives, yet make a comfortable living. I worked at the Professional Bee Institute in Celle, Germany, learning how to manage hives. The institute loses just 4% of their colonies annually. Discover how they intensely manage their hives to keep them healthy and productive.

Varroa: Biology, Control and Virus Transmission: Varroa continues to be one of the biggest drivers of colony losses. It's easy to think you don't have varroa, as 70-80% of the mites are hidden beneath wax cappings in the brood nest. Hidden out of sight, the varroa feed on developing bees when they are at their most vulnerable. This talk shows detailed photos of varroa. It highlights how varroa spread viruses, and how your colony can pick up mites from the neighborhood. To help stay on top of varroa, I highlight simple methods of monitoring varroa levels and how to control escalating infestations.

Simple, Smart Beekeeping: In German, there is a popular saying "Wieso einfach, wenn auch umstandig", which means *why take the simple route, when there is a complicated one*. As humans, we gravitate toward complicated answers. Maybe we're drawn to complex solutions, because if it's difficult and we fail, it's understandable and we don't feel bad. But beekeeping need not be complicated, difficult or complex. Learn to keep healthy hives in an easy, carefree way so you enjoy your hives and feel confident working your bees.

Bee Breeding Around the Globe: I have met with bee breeders in many parts of the world to learn unique techniques to improve the qualities of our bees. See how a club in Denmark teaches all new beekeepers how to rear their own queen, so they can start their first hive. Visit Buckfast Abbey, where Brother Adam bred the unique Buckfast bee. This talk highlights some of the best aspects of bee breeding encountered in my world travels.

Honey: from ancient civilizations to modern delicacy: Cave paintings attest that our ancestor's risked their lives for a taste of honey. Ancient Egyptian papyri described honey for battle wounds. While megastores now peddle cheap, saccharine honey blends, nature's first sweetener comes in a range of colors and flavors, infused with the *terroir* of the landscape where the bees turned nectar into liquid gold. Discover how bees turn nectar into honey and good plant resources for your bees.

Plants for Pollinators: Our landscape has been transformed into a food desert for the pollinators that work so hard to feed us. Learn simple techniques to improve the bee forage in your own yard, plus tips for encouraging your neighbors to join in. By providing nectar and pollen sources throughout the active bee season, our colonies can better withstand pressures from disease and pesticides.

Halting the Unstoppable Swarm: Good swarm management is one of the hardest things to learn. Despite a beekeeper's best efforts, some colonies just insist on getting ready to go. Learn how to stop the unstoppable swarm and turn all that natural energy of the bees into beautiful, new comb.

Easy Queen Introduction for the Hobbyist: You open the hive and discover the colony is queenless. Either she was accidentally crushed or the colony swarmed and the virgin queen didn't make it back. Or maybe your old queen is still there, but her brood pattern is terrible. Replacement queens are expensive and you don't want the hive to reject her. Learn how to give her the best chance of success, so your hive is back up and running as fast as possible.

American Foulbrood: Beekeepers often feel ashamed when their hives come down with AFB, mistakenly believing they are bad beekeepers. But it is the strongest, healthiest colonies that bring back contagious spores after robbing out sick colonies in the neighborhood. Learn to identify this disease and the steps you need to take to mitigate its impact in your apiary.

Two Million Blossoms: Honey for your Health: Long before the advent of antibiotics, our ancestors used honey to treat myriad health issues. While doctors have known that honey inhibits bacterial growth since the early 1930s, it was only in the 1970s that its antibacterial nature was revealed to be due to an enzyme bees add during the nectar ripening process. Superbugs continue to evolve resistance to modern antibiotics, making normal wounds difficult to heal. In search for effective alternatives, doctors are rediscovering the benefits of honey.

OTHER SKILLS

Beekeeping:
Advanced level beekeeper, skilled in queen rearing and instrumental insemination of virgin queens.

Graphics:
Adobe Photoshop & InDesign

Microsoft:
Office Suite

Statistical analysis:
Proficient in JMP and Statistica, learning R programming

Social Media:
Facebook: http://www.facebook.com/2millionblossoms

Twitter: https://twitter.com/FlowersLoveBees

YouTube: Video on pollen foraging and how pesticides find their way into a honey bee colony
https://www.youtube.com/watch?v=GK86wq16mQc

Video on the impacts of the parasite varroa on honey bee health and how the University of Maryland analyzes samples
https://www.youtube.com/watch?v=fjLV8YMBb2E

Video from our Sentinel Hive crowdfunding project:
https://www.youtube.com/watch?v=XW0XKuyxVnw

FOREIGN LANGUAGES

German: bilingual, as I attended German school as a young child, and then the Frankfurt International School from 1992-1996; returned to Germany for 18 months as a German Chancellor Fellow of the Alexander von Humboldt Foundation in 2006-2007.

French: participated in city sister exchange programs in the Provence; then spent 9 months near Avignon on a Fulbright. Thus fluent in speaking, advanced level reader, and intermediate writing