CHRISTINA M. GROZINGER
Publius Vergilius Maro Professor of Entomology
Director, Center for Pollinator Research, Director, Insect Biodiversity Center
Associate Director of Research, Institute for Sustainable Agriculture, Food and Environmental Sciences
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Cognition; Center for Infection Disease Dynamics
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EDUCATION

B.Sc. McGill University, Dept. of Chemistry, Dept of Biology, 1997

M.A. Harvard University, Chemistry and Chemical Biology, 1999

Ph.D. Harvard University, Chemistry and Chemical Biology, 2001

PROFESSIONAL HISTORY

2020-present **Publius Vergilius Maro Professor of Entomology**

Director, Insect Biodiversity Center

Associate Director of Research, Institute for Sustainable Agriculture, Food and Environmental Science

2015-2020 **Distinguished Professor** of Entomology

Huck Institutes for Life Sciences, Pennsylvania State University

2013-2015 **Professor,** Department of Entomology

Huck Institutes for Life Sciences, Pennsylvania State University

2009-present **Director, Center for Pollinator Research**

The Center consists of 34 faculty members from across the University. Responsibilities include

- Collaborating with the College of Agricultural Sciences' Development Office to raise funds for Center activities
- Annually coordinating distribution of an endowed undergraduate scholarship, undergraduate research fellowships, an endowed graduate fellowship, and seed research funds
- Promoting the activities of the Center and Center members by developing content for Center website (which receives >60,000 views/year)
- Fostering collaborations among Center members and the international community by organizing Center seminars, conferences and symposia - since 2010, Grozinger has organized 3 conferences and 3 workshops/short courses/symposia (with >800 participants from over 15 countries)
- Coordinating and facilitating Center-associated outreach activities, which reach >5,000 individuals in Centre Country annually

2008-2013 **Associate Professor,** Department of Entomology

Huck Institutes for Life Sciences, Pennsylvania State University

2004-2008 **Assistant Professor, Insect Genomics**

Departments of Entomology and Genetics

Genomic Sciences and Biotechnology Programs

W.M. Keck Center for Behavioral Biology

North Carolina State University

2001-2004 **Fellow, Beckman Institute for Advanced Science and Technology**

Neuroscience Program and Department of Entomology

University of Illinois, Urbana-Champaign

Mentor: Gene Robinson

AWARDS AND HONORS

2021 National Academy of Sciences Prize in Food and Agriculture Science
Senior Fellowship in the Freiburg Research Collaboration Program (FRESCO) at the Freiburg Institute for Advanced Studies (2021-2025)

2020 Scholar-in-Residence, Sustainability Institute, Penn State

2019 Eastern Branch Entomological Society of America's L.O. Howard Award
Fellow, American Association for the Advancement of Science
Keynote speaker, International Conference on Pollinator Biology, Health and Policy. University of California, Davis, July 2019

2018 Fellow of the Entomological Society of America
Keynote speaker, Biology and Genomics of Social Insects, Cold Spring Harbor Laboratory
Evolutionary Think Tank Fellow, University of Muenster, Germany
Penn State Outstanding Postdoc Mentor Award

2017 Penn State University Division of Development and Alumni Relations Outstanding Support Award
Patton Lecture in Insect Physiology. Cornell University. Department of Entomology.

2016 Alex and Jessie C. Black Award for Excellence in Research in the College of Agricultural Sciences, Penn State
Plenary Speaker, The 7th European Congress of Apidology, CLUJ-NAPOCA, Romania

2013 James I. Hambleton Award, Eastern Apicultural Society of North America

2012 Distinguished Alumni Speaker. Department of Entomology, University of Illinois, Urbana-Champaign.

2011 Keynote Speaker. International Society for Chemical Ecology Annual Meeting. Burnaby, BC, Canada
Honorary Member, Golden Key International Honor Society

2010 Plenary Speaker. 16th Congress of the International Society for the Study of Social Insects. Copenhagen, DK

2009 Harbaugh Faculty Scholars Program Award for Excellence in Teaching & Learning

2008 NSF Faculty Early Career Development (CAREER) Award

2005 NCSU Faculty Research and Professional Development Award

2001-2004 Beckman Institute Fellowship

2001 Thomas T. Hoopes Prize in Teaching

1998, 2000 Harvard University Certificate of Distinction in Teaching

1997-2000	National Science Foundation (NSF) Graduate Research Fellowship
1997	Natural Sciences and Engineering Research Counsel of Canada (NSERC) Postgraduate Scholarship *(declined)*
	Fonds pour la formation de chercheurs et l'aide a la recherche (Fonds FCAR) *(declined)*
	First-Class Honours in Bio-organic Chemistry
	Major in Biology with Great Distinction
	Certificate of Proficiency in German
	Anne Molson Prize in Chemistry
1996	Logan Scholarship in Biology
1995	Frederic J. Lemaistre Award in Chemistry
1993-1997	Canada Scholarship
	Hugh Brock McGill University Entrance Scholarship
	Boehringer Ingelheim Pharmaceuticals Scholarship
	Dean's Honour List
1993	Science Horizons Scholarship
	Boehringer Ingelheim Scientific Scholars Scholarship
	Schlumberger-Doll Science Award
	National Science Foundation Biology Olympics Award
	Sobel Microscopes Award

PUBLICATIONS

Peer-reviewed Publications (133 total, 46 from 2017-2021; Google Scholar Citation Index in May 2021 was 13938 citations, h-index of 47, and i10 index of 110.)

Mathis, C.L., McNeil, D.J., Lee, M.R., **Grozinger, C.M.,** King, D.I., Otto, C.R.V., and J. L. Larkin. "Pollinator communities vary with vegetation structure and time since management within regenerating timber harvests of the Central Appalachian Mountains" *Forest Ecology and Management* (in press).

Crone, M.K. and **C.M. Grozinger**. "Pollen protein and lipid content influence resilience to insecticides in honey bees (*Apis mellifera*)". *Journal of Experimental Biology* 224 (9): jeb242040 https://doi.org/10.1242/jeb.242040 (2021).

Calovi, M., **Grozinger. C.,** Miller, D., Goslee, S. "Summer weather conditions influence winter survival of honey bees (*Apis mellifera*) in the northeastern United States" *Scientific Reports* 11: 1553 https://doi.org/10.1038/s41598-021-81051-8 (2021)

Alzaabi, O., Al-Khaldi, M.M., Ayotte, K., Pealoza, D., Urbina, J., Breakall, J.K., Lanagan, M., Patch, H.M., and **C. M. Grozinger.** "Numerical Modeling and Measurement of *Apis Mellifera* Radar Scattering Properties" *Geoscience and Remote Sensing Letters* DOI: 10.1109/LGRS.2020.3048654 (2021).

Jordan, A., Patch, H.M., **Grozinger, C.M.,** and V. Khanna. "Economic Dependence and Vulnerability of United States Agricultural Sector on Insect-Mediated Pollination Service" *Environmental Science and Technology* 55(4): 2243-2253 https://doi.org/10.1021/acs.est.0c04786 (2021).

Kammerer, M., Goslee, S., Douglas, M.R., Tooker, J.F., **Grozinger, C.M.** "Wild bees as winners and losers: relative impacts of landscape composition, quality, and climate." *Global Change Biology* January 12 https://doi.org/10.1111/gcb.15485 (2021)

Galbraith, D.A., Ma, R. and **C.M. Grozinger.** "Tissue specific transcription patterns support the kinship theory of intragenomic conflict in honey bees (*Apis mellifera*)" *Molecular Ecology* 30 (4), 1029-1041 https://doi.org/10.1111/mec.15778 (2021).

McNeil, D.J., McCormick, E., Heimann, A., Kammerer, M., Douglas, M., Goslee, S.C., **Grozinger, C.M.,** and H. M. Hines. "Bumble Bees in Landscapes with Abundant Floral Resources Have Lower Pathogen Loads". *Scientific Reports* 10(1), 1-12 (2020)

Feliciano-Cardona, S., Döke, M.A., Aleman-Rios, J., Agosto-Rivera, J.L., **Grozinger C.M.,** and T. Giray. "Honey bees in the tropics show winter bee-like longevity in response to seasonal dearth and brood reduction" *Frontiers in Ecology and Evolution* 8:336 (2020).

McNeil, D.J., and **Grozinger. C.M.** "Singing in the Suburbs: Point Count Surveys Efficiently Reveal Habitat Associations for Nocturnal Orthoptera Across an Urban-to-Rural Gradient". *Journal of Insect Conservation* 24(6), 1031-1043 https://doi.org/10.1007/s10841-020-00273-9 (2020).

Wu, X., Galbraith, D.A., Jeong, H, Chatterjee, P., **C.M Grozinger**, and S.V. Yi. "Lineage and parent-of-origin effects in DNA methylation of honey bees (*Apis mellifera*) revealed by reciprocal crosses and whole-genome bisulfite sequencing". *Genome Biology and Evolution*, evaa133, https://doi.org/10.1093/gbe/evaa133. (2020)

Jasper, W.C., Brutscher, L.M., **C.M. Grozinger** and E.L. Nino. "Injection of seminal fluid into the hemocoel of honey bee queens (*Apis mellifera*) can stimulate post-mating changes". *Scientific Reports* **10,** 11990. https://doi.org/10.1038/s41598-020-68437-w (2020)

Kammerer, M., Tooker, J.F. and **C.M. Grozinger**. "A long-term dataset on wild bee abundance in Mid-Atlantic United States" *Scientific Data* **7,** 240. https://doi.org/10.1038/s41597-020-00577-0 (2020)

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Ray, A.M., Lopez, D.L., Martinez, J.F., Galbraith, D.A., Rose, R., vanEngelsdorp, D., Rosa, C., Evans, J.D., and **C.M. Grozinger**. "Distribution of recently identified bee-infecting viruses in managed honey bee (*Apis mellifera*) populations in the United States" *Apidologie* DOI: 10.1007/s13592-020-00757-2 (2020).

Sponsler, D.B., Shump, D., Richardson, R., **Grozinger, C.M.** "Characterizing the floral resources of a North American metropolis using a honey bee foraging assay" *Ecosphere* 11(4): e03102 DOI: 10.1002/ecs2.3102 (2020).

Sponsler, D.B., **Grozinger, C.M.,** Richardson, R., Nurse, A., Brough, D., Patch, H.M., and K. A. Stoner. " A screening-level assessment of the pollinator-attractiveness of ornamental nursery stock using a honey bee foraging assay" *Scientific Reports* 10(1), 1-9. (2020)

Grozinger C.M. and A. Zayed. "Genomics for understanding and improving pollinator health in a world of multiple stressors" *Nature Reviews Genetics* 21: 277–291DOI: 10.1038/s41576-020-0216-1 (2020).

Douglas, M.R., Sponsler, D.B., Lonsdorf, E.V. and **C.M. Grozinger**. "County-level analysis reveals a rapidly shifting landscape of insecticide hazard to honey bees (*Apis mellifera*) on US farmland" *Scientific Reports* 10(1), 1-11. (2020)

Russo, L., Keller, J., Vaudo, A., **Grozinger, C.M**., K. Shea. "Warming increases pollen lipid concentration in an invasive thistle, with minor effects on the associated floral-visitor community" *Insects* 11(1) 20 (2020)

Erickson, E., Adam. S., Russo, L., Wojcik, V., Patch, H.M., and **C.M. Grozinger**. "More than meets the eye: The role of ornamental plants in supporting pollinators" *Environmental Entomology* 49(1) 178-188 (2020).

Villar, G., Hefetz, A., and **C.M. Grozinger**. "Evaluating the Effect of Honey Bee (*Apis mellifera*) Queen Reproductive State on Pheromone-mediated Interactions with Male Drone Bees" *Journal of Chemical Ecology* 45(7): 588-597 (2019).

Treanore, E., Vaudo, A.D., **Grozinger, C.M.,** and S.J. Fleischer. "Examining the nutritional value and effects of different floral resources in pumpkin agroecosystems on *Bombus impatiens* worker physiology" *Apidologie* 50(4), 542-552 (2019).

Ma, R., Rangel, J., and **C.M. Grozinger**. "Honey bee (*Apis mellifera*) larval pheromones may regulate gene expression related to foraging task specialization" *BMC Genomics* 20(1): 592 (2019)

Russo, L, Vaudo, A.D., Fisher, C.J., **Grozinger, C.M.**, and K. Shea. "Bee community preference for an invasive thistle associated with higher pollen protein content" *Oecologia* 190(4): 901-912 (2019)

Annoscia, D., Brown, S.P., Di Prisco, G., De Paoli, E., Del Fabbro, S.D., Frizzera, D., Zanni., V., Galbraith, D.A., Caprio, E., **Grozinger, C.M.**, Pennachio, F. and F. Nazzi., "Haemolymph removal by Varroa mite destabilizes the dynamical interaction between immune effectors and virus in bees, as predicted by Volterra's model" *Proc Roy Soc Bio* 286 (1901), 20190331 (2019).

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Grozinger C.M. and Flenniken, M.L.. "Bee Viruses: Ecology, Pathogenicity, and Impacts". *Annual Review of Entomology* 64: 205-226 (2019).

Doke, M.A., McGrady, C.M., Otieno, M., **Grozinger, C.M.**, and M. Frazier. "Colony size, rather than geographic origin of stocks, predicts overwintering success in honey bees (Hymenoptera: Apidae) in the northeastern United States" *Journal of Economic Entomology* 112(2): 525-533 (2019). (2019 Journal of Economic Entomology Editor's Choice Award)

Amsalem, E. and C.M. Grozinger. "The importance of holistically evaluating data: a comment on Holman". *Behavioral Ecology* 29(6), 1210–1215 (2018).

Galbraith, D. A., Z. L. Fuller, A. Brockman, M. Frazier, M. W. Gikungu, K. M. Kapheim, J. T. Kerby, S. D. Kocher, O. Losyev, E. Muli, H. M. Patch, J. M. Sakamoto, S. Stanley, A. D. Vaudo and **C. M. Grozinger**. "Investigating the viral ecology of global bee communities with high-throughput metagenomics " *Scientific Reports* 8 (1): 8879 (2018).

Vaudo, A.D., Farrell, L.M., Patch, H.M., **Grozinger, C.M**. and J.F. Tooker. "Consistent pollen nutritional intake drives bumble bee (*Bombus impatiens*) colony growth and reproduction across different habitats" *Ecology and Evolution* 8 (11), 5765-5776 (2018).

Holt, H.L., Villar, G. and **C.M. Grozinger**. "Molecular, physiological and behavioral responses of honey bee (*Apis mellifera*) drones to infection with microsporidian parasites" *Journal of Invertebrate Pathology* 155, 14-24 (2018).

Ma, R., Villar, G., **Grozinger, C.M**., and J. Rangel. "Larval pheromones act as colony-wide regulators of collective foraging behavior in honey bees" *Behavioral Ecology* 29(5): 1132–1141(2018).

Mu, J., Wu, Q., Yang, Y., Huang, M. and **C. M. Grozinger.** "Plant reproductive strategies vary under low and high pollinator densities" *Oikos* 127: 1081-1094, 10.1111/oik.04711 (2018).

Villar, G., Wolfson, M.D., Hefetz, A.H. and **C.M. Grozinger**. "Evaluating the role of drone-produced chemical signals in mediating social interactions in honey bees (*Apis mellifera*)" *J Chemical Ecology* 44(1): 1-8 (2018).

Levin, S., Galbraith, D., Sela, N., Erez, T., **Grozinger, C.M.,** and N. Chejanovsky. "Presence of Apis rhabdovirus-1 in populations of pollinators and their parasites from two continents" *Frontiers in Microbiology* 8:2482 (2017) https://doi.org/10.3389/fmicb.2017.02482.

Rivera Vega, L., Galbraith, D.A., **C.M. Grozinger** and G. W. Felton. "Host plant driven transcriptome plasticity in the salivary glands of the cabbage looper (*Trichoplusia ni*)" *PLoS ONE* 12(1): e018636 (2017).

Amsalem, E. and **C. M. Grozinger.** "Evaluating the molecular, physiological and behavioral impacts of CO_2 narcosis in bumble bees (*Bombus impatiens*)". *Journal of Insect Physiology* 101:57-65 (2017).

Annoscia, D., Zanni., V., Galbraith, D., Quirici, A., **Grozinger, C.**, Bortolomeazzi, R., Nazzi, F. "Elucidating the mechanisms underlying the beneficial health effects of dietary pollen on honey bees (Apis mellifera) infested by Varroa mite ectoparasites." *Scientific Reports* 7: 6258(2017).

Amsalem, E.*, Padilla, M.*, Schreiber, P.M.[#], Altman, N., Hefetz, A., and **C.M. Grozinger**. "Do bumble bee (*Bombus impatiens*) queens signal their reproductive and mating status to their workers?" *Journal of Chemical Ecology* 43(6): 563-572 (2017), * indicates equal contribution, [#] denotes undergraduate researcher

Zanni., V., Galbraith, D., Annoscia, D., **Grozinger, C.M.**, Nazzi, F. "Transcriptional signatures of parasitization and markers of colony decline in *Varroa*-infested honey bees (*Apis mellifera*)." *Insect Biochemistry and Molecular Biology* 87: 1-13. (2017)

McMenamin, A.*, Mumoki, F.*, Frazier, M., Kilonso, J., Mweu, B., Baumgarten, T., Patch, H., Torto, B., Masiga, D., Tumlinson, J., **Grozinger, C.M.**, and E. Muli. "The impact of hive type on the behavior and health of honey bee colonies (*Apis mellifera scutellata*) in Kenya" *Apidologie* 48(5): 703-715(2017).

Geffre, A.C., Liu, R., Manfredini, F., Beani, L., Kathirithamby, J., **Grozinger, C.M.,** and A. L. Toth. "Transcriptomics of an extended phenotype: parasite manipulation of wasp social behaviour shifts expression of caste-related genes". *Proc Roy Soc B* 284(1852):20170029 (2017).

Villar, G. and **C. M. Grozinger**. "Primer Effects of the Honey Bee Queen Pheromone 9-ODA on Drones (*Apis mellifera*)" *Animal Behavior* 127: 271-279 (2017).

Doublet, V.*, Poeschl, Y.*, Gogol-Döring, A., Alaux, C., Annoscia, D., Aurori, C., Barribeau, S.M., Bedoya-Reina, O., Brown, M.J.F., Bull, J.C., Flenniken, M.L., Galbraith, D.A.,Genersch, E., Gisder, S., Grosse, I., Holt, H.L., Hultmark, D., Lattorff, H.M.G., Le Conte, Y., Manfredini, F., McMahon, D.P., Moritz, R.F.A., Nazzi, F., Niño, E.L., Nowak, K., van Rij, R.P., Paxton, R.J.*, and **C. M. Grozinger*.** "Unity in defence: honeybee workers exhibit conserved molecular responses to diverse pathogens" *BMC Genomics* 18(1): 207 (2017). *indicates co-first authors and co-senior authors.

Vaudo, A.D., Stabler D., Patch, H.M., Tooker, J.F., **Grozinger, C.M.**, Wright, G.A. "Bumble bees regulate their intake of the essential protein and lipid pollen macronutrients" *Journal of Experimental Biology* 219: 3962-3970 (2016).

Padilla, M.*, Amsalem, E.*, Altman, N., Hefetz, A., and **C.M. Grozinger**. "Chemical communication is not sufficient to explain reproductive inhibition in the bumble bee *Bombus impatiens*" *Royal Society Open Science* 3(10): 160576 (2016). * indicates equal contribution.

Li, W., Evans, J.D., Huang, Q., Rodriguez-Garcia, C., Liu, J., Hamilton, M., **Grozinger, C.M.,** Webster, T.C., Su, S., and Y-P Chen. "Silencing honey bee (Apis mellifera) naked cuticle (nkd) improves host immune function and reduces Nosema ceranae infections" *Applied and Environmental Microbiology* 82(22): 6779-6787 (2016).

Galbraith, D.A., Yi, S.V., and **C.M. Grozinger**. "Evaluation of possible proximate mechanisms underlying the kinship theory of intragenomic conflict in social insects" *Integrative and Comparative Biology* 56 (6): 1206-1214 (2016).

Vaudo, A.D., Patch, H.M., Mortensen, D.A., Tooker, J.F., and **C.M. Grozinger**. "Macronutrient ratios in pollen shape bumble bee (*Bombus impatiens*) foraging strategies and floral preferences." *Proceedings of the National Academy of Sciences* 113(28): E4035–E4042 (2016).

Galbraith, D.A., Kocher, S.D., Glenn, T., Albert, I., Hunt, G.J., Strassmann, J.E., Queller, D.C., and **C.M. Grozinger.** "Testing the kinship theory of intragenomic conflict in honey bees (*Apis mellifera*)." *Proceedings of the National Academy of Sciences* 113(4):1020-1025 (2016).

Holt, H.L, and **C.M. Grozinger**. "Towards an Integrated Pest Management (IPM) approach for Nosema (Microsporidia: Nosematidae) parasites in honey bee (Hymenoptera: Apidae) colonies" *Journal of Economic Entomology* 109(4): 1487-1503 (2016).

Manfredini, F., Shoemaker, D., and **C.M. Grozinger**. "Dynamic changes in host-virus interactions associated with colony founding and social environment in fire ant queens (*Solenopsis invicta*)" *Ecology and Evolution* 6(1): 233-244 (2016).

Amsalem, E., Galbraith, D., Cnaani, J., Teal, P. and **C.M. Grozinger**. "Conservation and modification of genetic and physiological toolkits underpinning diapause in bumble bee queens" *Molecular Ecology* 24(22): 5596-5615 (2015).

Rittschof, C.C., Coombs, C.B., Frazier, M., **Grozinger, C.M.**, and G.E. Robinson. "Early-life experience affects honey bee aggression and resilience to immune challenge" *Scientific Reports* 5: 15572 (2015).

Amsalem, E., Orlova, M., and **C.M. Grozinger**. "A conserved class of queen pheromones? Re-evaluating the evidence in bumble bees (Bombus impatiens)" *Proceedings of the Royal Society B* 282: 20151800 (2015).

Rittschof, C.C., **Grozinger, C.M.**, and G.E. Robinson. "The energetic basis of behavior: bridging behavioral ecology and neuroscience" *Current Opinion in Behavioral Sciences* 6, 19-27 (2015).

Galbraith, G.A., Wang, Y., Page, R.E., Amdam, G. and **C. M. Grozinger**. "Reproductive physiology mediates honey bee (*Apis mellifera*) worker responses to social cues" *Behavioral Ecology and Sociobiology* 69 (9): 1511-1518 (2015).

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Kocher, S.D.*, Tsuruda, J.M.*, Gibson, J,D., Emore, C., Arechavaleta-Velasco, M.E., Queller, D.C., Strassmann, J.E., **Grozinger, C.M.**, Gribskov, M.R., San Miguel, P., Westerman R. and G.J. Hunt. "A search for parent-of-origin effects on honey bee gene expression". *Genes, Genomes, Genetics* 5(8) 1657-1662 (2015)

Richards, J., Carr-Markell, M., Hefetz, A., **Grozinger, C.M.** and H. R. Mattila. "Queen-produced volatiles change dynamically during reproductive swarming and are associated with changes in honey bee (Apis mellifera) worker behavior". *Apidologie* 46(6): 679–690 (2015).

Grozinger, C.M. and J.D Evans. "From the lab to the landscape: translational approaches to pollinator health". *Current Opinion in Insect Science* 10: vii-ix (2015).

Vaudo, A. D, Tooker, J.F., **Grozinger, C.M**. and H.M. Patch. "Bee nutrition and floral resource restoration." *Current Opinion in Insect Science* 10:133-141 (2015).

Doke, M.A., Frazier, M. and **C.M. Grozinger**. "Overwintering Honey Bees: Biology and Management" *Current Opinion in Insect Science* 10: 185-193 (2015).

Grozinger, C.M. and G. E. Robinson. "The power and promise of applying genomics to honey bee health". *Current Opinion in Insect Science* 10: 124-132 (2015).

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Amsalem, E., **Grozinger, C.M**., Padilla, M., and A. Hefetz. "Bumble bee sociobiology: The physiological and genomic bases of bumble bee social behavior" *Advances in Insect Physiology: Genomics, Physiology and Behavior of Social Insects*. Editors A. Zayed and C. Kent. Vol 48. p37-94 (2015)

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Cappa, F., Beani, L., Cervo, R., **Grozinger, C.** and F. Manfredini. "Testing male immunocompetence in two hymenopterans with different levels of social organization: live hard, die young?" *Biological Journal of the Linnean Society* 114(2): 274-278 (2015).

Schmehl, D. R., Teal, P.E.A., Frazier, J.F. and **C. M. Grozinger**. "Genomic analysis of the interaction between pesticide exposure and nutrition in honey bees (*Apis mellifera*)". *Journal of Insect Physiology* 71: 177-190 (2014).

LeBoeuf, A. and **C. M. Grozinger**. "Me and we: the interplay between individual and group behavioral variation in social collectives." *Current Opinion in Insect Science* 5: 16-24 (2014).

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Vaudo, A.D., Patch, H.M., Mortensen, D.A., **Grozinger, C. M.**, and J. F. Tooker. "Bumble bees exhibit daily behavioral patterns in pollen foraging". *Arthropod-Plant Interactions* 8(4): 273-283 (2014).

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<u>Book Chapter, Invited</u>

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Anton, K. and **C.M. Grozinger**. "Beekeeping: Cell Builder Basics". Penn State Extension. 2020. https://extension.psu.edu/beekeeping-cell-builder-basics

Frazier, M., Nino, E., and **C. Grozinger**. "Grafting" *Bee Culture*. February 2015. P1-2.

Lutz, C. C., **Grozinger, C.M.** and G. E. Robinson. "Combatting the Global Pollinator Crisis with Genomic Biology" *Feed the World in 2050, CSA News/Resource Magazine Special Issue* November/December (2014)**.**

Book reviews

Grozinger, C.M. "Review of 'Instrumental insemination of honeybee queens with Sue Cobey' DVD" *American Bee Journal* (December 2007)

Review of "Bees on the Roof", a book for young audiences by Robbie Snell. Publisher: Tumblehome Learning, Inc. Boston, MA (August 2016)

Review of "The Solitary Bees", by Bryan Danforth. Publisher: Princeton University Press (August 2019)

Submitted Peer-reviewed Publications

Erickson, E., Patch, H.M. and **C.M. Grozinger.** "Perennial ornamental plants can support complex pollinator communities" *Scientific Reports* (in review).

Robinson, A.C., Peeler, J.L., Prestby, T., Goslee, S.C., Anton, K., and C. M. Grozinger. "Beescape: Characterizing User Needs for Environmental Decision Support in Beekeeping" *Agricultural Systems* (in review).

Mathis, C.L., McNeil, D.J., Lee, M.R., **Grozinger, C.M.**, Otto, C.R.V., and J. L. Larkin. " Factors influencing flowering plant communities within regenerating timber harvests of the central Appalachian Mountains" (in prep)

Lee, M.R., McNeil, D.J., Mathis, C.L., **Grozinger, C.M.**, and J.L. Larkin, "Microhabitats created by log landings support abundant flowers and insect pollinators within regenerating mixed-oak stands in the Central Appalachian Mountains". (in review).

Jordan, A., Patch, H.M., **Grozinger, C.M.**, and V. Khanna. "Economic dependence of U.S. industry sectors on insect-mediated pollination using an input-output framework: A case study of apple and almond production" *Journal of Economic Entomology* (in review)

Bresnahan, S.T., Doke, M.A., Giray, T. and **C.M. Grozinger**. "Tissue-specific transcriptional patterns underlie the winter phenotype in honey bees (*Apis mellifera*)" (in prep)

GRANTS AND FUNDING

Grants In Progress ***(Current grants total: 9,148,998 total to Grozinger: $3,980,564)***

Dates	PI	Title	Funding Agency	Total Amount	Amount to Grozinger Lab
2021-2025	PI: Grozinger coPIs: Robinson, Khanna, Lonsdorf Senior personnel: Goslee	Beescape NexGen: Creating Decision Support Tools to Manage Bee Health and Ecosystems through Transdisciplinary Action	USDA-NIFA-FACT	949,400	700,000
2021-2024	PI Sicard (Swedish University of Ag Sciences) coPI Grozinger, Risse (U Muenster)	Friends with benefits? A holistic approach to diffuse mutualism in plant-pollinator	Human Science Frontiers	1,095,000	365,000

		interactions			
2021-2024	PI: Hill coPIs: Boyle, Cesare, Grozinger, Patch	AGricultural Science in Elementary EDucation – Learning IN Gardens at School (AG SEED-LINGS)	USDA-EWD-Professional Development for Agricultural Literacy	300,000	20,000
2021-2023	Allyson Ray (PI, student) Mentor: Grozinger, Rasgon	Confronting bee disease through multilevel analysis of honey bee immunity	USDA NIFA AFRI Predoctoral Fellowship	119,854	119,854
2020-2022	PI Boyle coPI Grozinger, Straw (Freiburg), Klein Freiburg	Bringing International Experts in Integrated Pest and Pollinator Management to the Classroom	PA Department of Agriculture	$25,000	$12,500
2020-2021	PI Grozinger coPI dePamphilis	Developing a Honey and Pollen Diagnostics Lab at Penn State	PA Department of Agriculture	$47,797	$25,000
2019-2012	PI: Hoover CoPI: Grozinger, Choi	Relationship between pollination deficiency and decline of black cherry regeneration in the Allegheny National Forest	USDA, McIntire Stennis	$319,283	$50,000
2019-2020	PI: Ray (student) Mentor: Grozinger	Defining Mechanisms Underlying Mite Tolerance and Honey Bee Survival	USDA NE SARE Graduate Student Award	$14,998	$14,998
2019-2020	PI Grozinger coPI Lopez-Uribe (PSU) Butzler (PSU), Dolezal (UIUC), Harpur (Purdue)	Context is Key: Partnering with beekeepers to generate digital geospatial tools to support bee health	Penn State College of Ag - Multistate Research and Extension Program	25,000	20,000

2019-2020	PI: Hoover CoPI: Grozinger, Leites, Patch, Skvarla	Role of pollination deficiency in decline of black cherry regeneration in the Allegheny National Forest	PA Department of Conservation and Natural Resources	$42,000	$10,000
2018-2020	PI: Grozinger, CoPIs: Hines, Lopez-Uribe, Patch, Williams, Nino, Ward, Lonsdorf, Cariveau, Douglas	Location, location, location: developing tools for selection and management of landscapes to promote healthy bee populations	Foundation for Food and Agriculture Research	$1,177,137	$300,000
2018-2020	PI Grozinger coPIs: Douglas, Lonsdorf, Miller, Patch	Context is key: tools for adapting beekeeping practices to diverse landscapes	USDA-AFRI	$901,176	$800,000
2018-2020	PI: Kammerer Allen Co-Mentors Grozinger and Mortensen	Designing farms that support wild bees	USDA-AFRI-ELI Predoctoral Fellowship	$95,000	$95,000
2017-2020	PI: Rasgon, J. coPIs: Douglas, Grozinger, Sakamoto	IOS EDGE: Accelerating arthropod genetic manipulation through ReMOT Control	NSF-IOS-EDGE	$2,500,000	$400,000
2017-2022	PI Grozinger coPIs: Biddinger, Fleischer, Hines, Lopez-Uribe, Miller, Patch, Tooker	Graduate training in applied integrative pollinator ecology: managing pollinators and landscapes for sustainable ecosystems services	USDA-NIFA-NNF	$262,500 (with additional support from Penn State Strategic Networking Initiative of ~$300,000)	~$150,000
2016-2020	PI:Ward coPIs: Grozinger, Hill, Patch	Authentic Plant Pollinator Landscape Research for Educators (APPL-RED)	USDA-PD-STEP	$144,141	~50,000

2016-2021	PI: Palmer PSU coPIs: Patch and Grozinger	Protecting Pollinators with Economically Feasible and Environmentally Sound Ornamental Horticulture	USDA-NIFA-SCRI	488,250 (to PSU)	488,250
2016-2020	PI: Grozinger Collaborative PI: S. Yi	Collaborative Research: Molecular Mechanisms Underpinning The Kin Selection Theory Of Intragenomic Conflict	NSF-MCB, NSF-IOS	389,462 (to PSU)	389,462

Completed Grants ***(Completed grants total to Grozinger $4,296,528; total to all participants $11,061,457)***

Dates	PI	Title	Funding Agency	Total Amount	Amount to Grozinger Lab
2019	PI: Crone (student) CoPIs: Grozinger, Biddinger	Manipulating pollen macronutrient ratios to improve honey bee resilience to pesticide stress	North American Pollinator Protection Campaign (NAPPC) Honey Bee Health Improvement Project	$9,825	$9,825
2018-2020	PI: Sponsler Co-Mentors Grozinger and Lonsdorf	Strengthening urban apiculture, crop production, and biodiversity by understanding the habitat needs of wild and managed bees	USDA-AFRI-ELI Postdoctoral Fellowship	$163,230	$163,230
2018-2019	PI: Kammerer Allen Mentor: Grozinger	Designing farms that support wild bees	USDA NE SARE Graduate Student Award	$15,000	$15,000

2017-2019	PI Douglas CoPIs: Grozinger, Lonsdorf, Thogmartin, Sponsler	Putting pesticides on the map to guide conservation of pollinators and their ecosystem services	National Socio-Environmental Synthesis Center (SESYNC) Pursuit	~$130,000 (estimated, non-traditional budget)	$70,000
2017-2018	PI: Grozinger	Evaluating the distribution of newly identified bee viruses in US honey bee stocks	USDA-APHIS	$84,000	$84,000
2017-2018	PI Sponsler (postdoc mentee) Mentor: Grozinger	Evaluating the impact of urban landscapes on honey bee nutritional resources: a pilot study	Penn State Apes Valentes Program	$6037	$6037
2017-2018	PI Jones (graduate mentee) coPIs Lonsdorf, Douglas, Grozinger, Patch, Sponsler	Location, location, location: developing tools for selection and management of landscapes to promote healthy bee populations	North American Pollinator Protection Campaign	$9777 (and additional funding of $4285 from Penn State Apes Valentes program)	$14,062
2017-2019	PI Grozinger coPIs: Biddinger, Fleischer, Hines, Lopez-Uribe, Miller, Patch, Tooker	Graduate training in applied integrative pollinator ecology: managing pollinators and landscapes for sustainable ecosystems services	Penn State College of Agricultural Sciences Strategic Networking Initiative	$109,380	~$36,469
2017-2020	PI: Lopez-Uribe, M coPI: Grozinger, CM	Tracking Feral Honey Bee Health: Using Citizen Science and Next Generation Sequencing to Improve Honey Bee Resistance to Disease	USDA Animal Health	$103,000	$0
2016-2019	PI: Grozinger Collaborative PI: V. Khanna	Collaborative Research: Quantifying the Critical Importance of Insect-mediated Pollination Service for the U.S. Economy	NSF-CBET	80,000 (to PSU)	80,000

2015-2018	PI: V. Wojcik coPI: C. Grozinger, H. Patch	Understanding the opportunities present for bees from commercial plant material	USDA-APHIS and Horticultural Research Institute	246,000	246,000
2014-2018	A. Hefetz, **C. Grozinger,** N. Altman	The chemical and genomic basis of bumblebee sociobiology	US-Israel Binational Science Foundation	200,000	105,964
2015-2017	PI: Grozinger	Metagenomic analyses and development of molecular based rapid screening tools of exotic honey bee pathogens	USDA-APHIS	131,967	131,967
2015-2016	PI:J. Rasgon coPI: C. Grozinger	Tools for rapid genetic transformation of bees	USDA-AFRI	100,000	30,000
2016-2018	PI: M. Doke Mentor: C. Grozinger	Winter is coming: Improving overwintering survival of honey bee colonies in Pennsylvania	NE SARE Graduate Student Awards	14,940	14,940
2014-2016	PI: A. Vaudo Mentors: **C. Grozinger** and J. Tooker	Elucidating the Role of Nutrition in Pollinator Foraging Behavior and Health	USDA-AFRI Predoctoral Fellowship	79,000	79,000
2014-2016	PI: G. Villar Mentors: **C. Grozinger**	Development of pheromonal tools for honey bee breeding	USDA-AFRI Predoctoral Fellowship	79,000	79,000
2015-2016	PI Grozinger coPI J Lerach	Mapping the spatial distribution of key behavioral neuromodulators in social insect brains using ToF-SIMS	PSU Huck Small Grants Program	9300	9300

2015	PI: Grozinger Host: L. Keller	Effect of viral infection and virulence on social interactions and viral transmission in honey bee colonies	Swiss National Science Foundation	10,000CHF	10,000CHF
2014-2015	PI: A. Vaudo Co-PI: **C. Grozinger**, J. Tooker	The Effects of Pollen Diversity on Bumble Bee Health in an Agricultural Environment	NAPPC Honey Bee Health Improvement Project	10,000	10,000
2014-2015	PI: G. Villar Mentor: **C. Grozinger**	Development of pheromonal tools for honey bee breeding.	USDA NE SARE Graduate Student Award	14,999	14,999
2014-2015	PI: C. Grozinger coPI: K. Kapheim	Forging Connections in the Study of Pollinator Behavior, Biology and Health at the 17th Internat'l Congress of the IUSSI	USDA-AFRI (conference grant)	10,000	0
2013-2015	E. Amsalem (postdoc); **C. Grozinger** is mentor	Genomic, physiological and behavioral analysis of life history traits underpinning performance and productivity in bumblebees	BARD Postdoctoral Fellowship	86,000	86,000
2012-2015	E.L. Nino (postdoc); **C. Grozinger**, C. Silverman, and M. Wolfner are mentors	Breeding Honey Bees: From Evolutionary and Functional Genomics to Sociology	USDA-AFRI Postdoctoral Research Fellowship Program	122,838	122,838
2010-2015	**C. Grozinger** (PI); CoPIs: S. Yi, M. Goodisman	Collaborative Research: Epigenetic gene regulation in the social bee, Apis mellifera	NSF-MCB	260,779	260,779

2013-2014	**C. Grozinger** (PI); R. Paxton (coPI)	Synthesizing transcriptome data to explore interspecies bee-pathogen molecular interactions that many underpin pollinator decline	Workshop proposal to Synthesis Centre of Biodiversity Sciences	23,544€	0
2013-2014	Frazier, M (PI), **C. Grozinger** (coPI)	Sustainable approaches to improving honey bee survival in the Northern US	North American Pollinator Protection Campaign	7,708	2,000
2013	A. McMenamin (student); **C. Grozinger** is mentor	Impacts of season and management practices on pathogen load in Kenyan honey bees	Penn State Summer Discovery Grant	3,000	3,000
2011-2014	H.L. Holt (student); **C. Grozinger** is mentor	Molecular and behavioral studies of host-parasite interactions in honey bees	NSF Predoctoral Fellowship Program	121,500	121,500
2010-2014	J. Tumlinson (PI); CoPIs: M. Frazier, J. Frazier, **C. Grozinger**, D. Masiga, E. Muli, H. Patch.	BREAD: Sustainable Solutions for Preserving Pollinator Health in East Africa.	NSF-BREAD; includes 2012 CREATIV extension supplement	599,598	175,000
2010-2013	**C. Grozinger** (PI); J. Tumlinson (coPI)	Behavioral, physiological and molecular effects of multiple factors impacting honey bee health.	USDA-AFRI	398,871	220,000
2009-2013	D. Shoemaker (PI); coPIs: **C. Grozinger** and J. Wang	Fire Ant Functional Genomics	USDA-AFRI	719,279	245,050
2009-2010	S. Kocher (student coPI); **C. Grozinger** (mentor, PI)	Sociogenomics of pheromone response and reproductive traits in worker honey bees	NSF-Doctoral Dissertation Improvement Grant	15,000	15,000
2008-2009	J. Hunt (PI); **C. Grozinger** (coPI)	Microarray analysis of caste ontogeny in a social insect	NSF-SGER	28,717	0

2008-2014	**C. Grozinger** (PI)	CAREER: Genomic analysis of pheromone-mediated behavior	NSF-IOS-CAREER	667,807	667,807
2008-2013	K. Delaplane (PI); subcontract to **Grozinger**	Sustainable Solutions to Problems Affecting Health of Managed Bees	USDA-CAPS	4,000,000	101,550
2008	**C. Grozinger** (PI)	Effect of honey bee queen insemination quantity on supersedure rates in Florida	Florida Department of Agriculture and Consumer Services	21,995	21,995
2008-2010	A. Toth (PI); **C. Grozinger** is mentor	Uncovering conserved molecular pathways for insect reproduction and social behavior using comparative genomics	USDA-NIFA Postdoctoral Research Fellowship Program	125,000	125,000
2007-2010	M. Roe (PI); coPIs: **C. Apperson,** C. Grozinger, D. Sonenshine	Endocrinology of Tick Reproduction: A New Perspective.	NSF-IOS	540,265	0
2007-2012	**C. Grozinger** (PI); FJ Richard (coPI)	Modulation of social interactions by disease in honey bees	USDA-NIFA	337,232	337,232
2004-2009	T. Mackay (PI); **C. Grozinger,** member of training faculty	The genetic architecture of quantitative traits	Nat'l Institutes of Health Inst'nal Training Grant	665,100	0
2007-2008	**C. Grozinger** (PI), A. Hefetz (coPI)	Genomic Characterization of Biosynthetic Pathways Underlying Pheromone Production in Honey Bees	NCSU International Programs (CIP) Seed Grant Program	3,000	3,000
2005-2010	**C. Grozinger** (PI); D. Tarpy (coPI)	Molecular mechanisms of honey bee mating	USDA-NIFA	++++++	354,500
2005-2008	R. Anholt (PI); **C. Grozinger** member of training faculty	Behavioral genomics training grant	UNC Office of the President grant to W.M. Keck Center for	450,000	0

			Behavioral Biology.		
2004-2009	**C. Grozinger** (PI)	Pheromone regulation of gene expression	Subcontract from NIH-NIDCD grant to G. Robinson (UIUC)	158,484	158,484
2006	FJ Richard (PI); coPIs: **C. Grozinger** and D. Tarpy	Effect of queen mating number on supersedure rates in honey bee colonies	Eastern Apiculture Society Award	5000	5,000
2005	PI: **C. Grozinger**; 18 co-PIs from 3 departments	Infrastructure Grant for Applied Biosystems 7900HT quantitative real-time PCR machine	NCSU Infrastructure Program	67,000	67,000
2005	D. Tarpy (PI), coPIs: **C. Grozinger**, B. Wiegmann, E. Vargo	Gel documentation system in North Gardner	NCSU Equipment Program	10,000	0
2005	**C. Grozinger** (PI)	Molecular mechanisms underlying physiological and behavioral changes associated with reproduction in the honey bee	NCSU Faculty Research and Professional Development Award	4000	4,000

PRESENTATIONS

Plenary/Keynote Lectures

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

2018 **Biology and Genomics of Social Insects**, Cold Spring Harbor Laboratory

2017 **Association for Chemoreception Sciences (AChemS)** annual meeting, Bonita Springs, FL

2016 **The 7th European Congress of Apidology**, Cluj-Napoca, Romania

2011 **International Society for Chemical Ecology Annual Meeting**. Burnaby, BC, Canada

2010 **16th Congress of the International Society for the Study of Social Insects**. Copenhagen, DK

Invited Talks at Conferences (9 since 2017, 42 total)
Date, Symposium Title, Conference Title, Location

2021 **Biology and Genomics of Social Insects**, Cold Spring Harbor Laboratory (April 2021)
National Academy of Sciences Prize in Food and Agriculture Science Lecture **National Academy of Sciences Annual Meeting**. Online. (April 2021)
"The Larry Larson Symposium: Scientific Advances on Insect Species Adaptation to the Impact of Climate Change and Habitat Transformation" **Entomological Society of America Annual Meeting.** Denver, CO (October 2021).

2020 "Functional Genomics of Complex Traits in Diverse Organisms: The Next Leading EDGE" **International Plant & Animal Genome (PAG) meeting.** San Diego, CA (January 2020).
"Advances in Bee Health" **National Academy of Sciences Annual Meeting**. Online. (April 2020)
"Highlighting Women's Research: Sustaining Biodiversity and Conservation" **Entomological Society of America Annual Meeting.** Online (November 2020).

2019 "Recent Advances in Honey Bee Biology" **Apimondia**, Montreal, Quebec, CA (Sept 2019)
"Recent Trends in Pollinator Research – Understanding and Mitigating Current Stressors". **Entomological Society of America Annual Meeting, St. Louis, MO** (November 2019).

2018 "Social Insects and Apidology". **European Congress of Entomology.** Naples, Italy (June 2018)

"From genes to communities: Quantifying diverse responses of pollinators to multiple anthropogenic stressors" **Entomological Society of America, Entomological Society of Canada, Entomological Society of British Columbia International Meeting.** Vancouver, BC, Canada (November 2018)

2017 **Insect Chemical Ecology Short Course.** Penn State University, University Park, PA (June 2017).

Future of Bee Health in Africa. International Centre for Insect Physiology and Ecology (September 2018).

2016 "New Frontiers in the Integrative Study of Animal Behavior: Nothing in Neuroscience Makes Sense Except in the Light of Behavior" **Society for Integrative and Comparative Biology Annual Meeting.** Portland, OR. (January 2016)

"Behavioral Genomics" **Animal Behavior Society Annual Meeting.** Columbia, MO. (August 2016)

Penn State Molecular Cellular and Integrative Biosciences Annual Retreat. Penn State University, Boalsburg, PA (August 2016).

"Evolution of insect sociality: From theory to genomes and back again" **2016 International Congress of Entomology.** Orlando, FL (September 2016)

2015 **Joint Meeting of the Sociogenomics Research Coordination Network and the Center for Brain, Behavior and Evolution.** University of Texas, Austin

"Physiological and developmental basis of social insect phenotypes" **Biology and Genomics of Social Insects.** Cold Spring Harbor Laboratory, NY

Bioinformatics and Genomics Retreat. Penn State University. University Park, PA

2014 "Proximate and Ultimate Causes of Cooperation" Workshop. **Proximate and Ultimate Causes of Cooperation ProDoc Program**. Trogen, Switzerland

Seminar titled: "Honey Bee Health: From Genes to Landscapes" and "Pheromonal Mediation of Cooperation and Conflict in Social Insects". **International Short Course in Chemical Ecology**. Penn State, PA

"Genetic and Behavioral Mechanisms of Social Complexity: Current Challenges and Future Horizons". **Entomological Society of America Annual Meeting**. Portland, Oregon

2013 "Maximizing and Stabilizing Pollination Services in the 21st Century" **Entomological Society of America Eastern Branch Meeting**. Lancaster, PA.

"Using New Tools to Solve Old Problems" **Eastern Apicultural Society Annual Meeting.** West Chester, PA.

2012 "Chemical Biology and Ecology" **Gordon Research Conference on Bioorganic Chemistry**. Andover, NH.

"Social insects and emergence: From local rules to global behavior" **Entomological Society of America Annual Meeting**. Knoxville, TN

2011 "Tools of the Trade: Technology in Entomology" Student sponsored symposium. **Entomological Society of America Eastern Branch Meeting,** Harrisburg, PA.

"Sensory Integration of Social Cues" **Gordon Research Conference on Neuroethology**. Stonehill College, MA

"Communicating sociality: evolutionary developments in social insect communication systems" **Entomological Society of America Annual Meeting**. Reno, NV.

International Symposium on Functional Genomic Tools in Honey Bees. Penn State University.

2010 "Behavioral Ecology" **First International Conference on Pollinator Biology, Health and Policy**. Penn State, PA.

USDA-Project Director Annual Meeting. San Diego, CA.

2009 "Insect Genomics" **Society of Molecular Biology and Evolution Annual Meeting**. Iowa City, IA.

"Colleagues, Science and Ideas: Investigating Chemicals, Signals, and Interactions"

Entomological Society of America Annual Meeting. Indianapolis, IN.

2008 International Society of Hymenopterists Symposium. **Entomological Society of America Annual Meeting**. Reno, NV

2007 "Neurobiology and behavior" **Honey Bee Genome Workshop**. CSHL, NY.

North American Pollinator Protection Campaign International Summit. Washington, DC.

"Connecting the Colony – Building Social Complexity through Pheromones". **Entomological Society of America Annual Meeting.** San Diego, CA.

2006 "Advances in apiculture and honey bee biology". **Annual Meeting of the Southeastern Branch of the Entomological Society of America.** Wilmington, NC.

"Genomics". **Fifth International Symposium on Molecular Insect Science**. Tucson, AZ.

"Sixth Annual Joint Bioinformatics Symposium". **Computational Molecular Biology Training Program**, Iowa State University and New Mexico State University. Ames, Iowa.

"5th International honey bee molecular biology workshop". **International Congress of the International Union for the Study of Social Insects.** Washington, DC.

"Pheromonal mediation of honey bee social behavior". **International Congress of the International Union for the Study of Social Insects.** Washington, DC.

"Genomic Advances in Understanding Insect Sociality" **Entomological Society of America Annual Meeting**. Indianapolis, IN

2005 "Genomic technologies workshop". **Entomological Society of America Annual Meeting**. Ft. Lauderdale, FL

"Molecular Basis of Social Behavior." **European Congress of the International Union for the Study of Social Insects**. St Petersburg, Russia.

"Symposium on Comparative Genomics." **National Center for Evolutionary Synthesis**. Raleigh, NC.

2004 "Neurogenomics of Behavior." **Society for Neuroscience Annual Meeting**. San Diego, CA.

Invited Departmental Seminars (9 since 2017, 57 total)

2020 **Indian Pollinator Initiative,** hosted by IISER Thiruvananthapuram, National Centre for Biological Sciences – TIFR, Centre for Pollination Studies, University of Calcutta, University of Agricultural Sciences GKVK, University of Hyderabad, Remote.

2018 **University of Muenster,** Muenster Graduate School for Evolution, Germany
University of Ulm, Institute of Evolutionary Ecology and Conservation Genomics, Germany
Max Plank Institute for Chemical Ecology, Jena, Germany
R.W. Moriarty Science Seminar Series, **Carnegie Museum of Natural History**, Pittsburgh, PA

2017 **Penn State University.** Center for Infectious Disease Dynamics.
Cornell University. Patton Lecture in Insect Physiology. Department of Entomology.
West Virginia University. Davis College of Agriculture, Natural Resources and Design.
Georgia Tech University. Department of Biology.

2016 **Ohio State University**. Department of Entomology
Swarthmore University. Department of Biology
Tel Aviv University. Department of Zoology.
Pennsylvania State University. Intercollege Graduate Degree Program in Ecology.

2015 **University of Illinois.** Department of Entomology
University of California, Davis. Department of Entomology.
University of Texas, Austin. Department of Biology
University of Udine, Italy. Department of Biology
University of Bern, Switzerland, Institute of Bee Heath

2014 **Texas A & M University.** Department of Biology.
University of Lausanne. Department of Biology.
Penn State University. Mechanisms of the Mind Discussion Group.

2013 **University of Pennsylvania**. Department of Biology
University of Arizona. Center for Insect Science/PERT program
Washington University in St. Louis. Department of Biology
University of California, San Diego. Division of Biology

2012 **University of Illinois, Urbana-Champaign**. Department of Entomology. *Distinguished Alumnus Speaker*.
Pennsylvania State University. Third Annual Bioinformatics and Genomics Retreat.
Pennsylvania State University. Intercollege Graduate Degree Program in Ecology.
Pennsylvania State University. Center for Infection Disease Dynamics.
Pennsylvania State University. Biomedical Sciences Club.

2011 **Rutgers University.** Department of Entomology.
Tel Aviv University. Department of Zoology.
Hebrew University of Jerusalem. Department of Evolution, Systematics and Ecology.

2010 **University of Cincinnati.** Department of Biological Sciences.
Pennsylvania State University. School of Forest Resources.

2009 **Bucknell University.** Department of Biology.

Pennsylvania State University. Institute for Molecular Evolution.

2008 **University of Florida, Gainesville.** Department of Entomology and Nematology *(Student-invited Speaker)*

Purdue University. Department of Entomology.

Pennsylvania State University. Department of Entomology.

Kansas State University. Arthropod Genomics Program and Department of Biology.

Cornell University. Department of Entomology.

2007 **University of Illinois, Urbana-Champaign.** Neuroscience Program.

Rice University. Department of Ecology and Evolution.

University of California, Davis. Department of Entomology.

2006 **Clemson University.** Department of Entomology.

University of Nevada, Las Vegas. Department of Biological Sciences.

Alabama State University. Office of Research Development Fall Semester Seminar Series

2005 **North Carolina State University.** Genetics Undergraduate Minor Pizza and Presentation.

Pennsylvania State University. Department of Entomology.

University of North Carolina, Charlotte. Department of Biology.

University of North Carolina, Greenboro. Department of Entomology.

University of Illinois, Urbana-Champaign. Department of Entomology.

North Carolina State University. Department of Genetics.

2004 **Western Illinois State University.** Department of Biology.

North Carolina State University. Department of Entomology.

Cornell University. Department of Neurobiology and Behavior

Contributed Talk and Poster Presentations (Grozinger is primary presenter)

2012 **American Bee Research Conference**. Greenbelt, MD (oral presentation)

USDA Project Director Annual Meeting. Knoxville, TN (poster presentation)

2008 **USDA PD Annual Meeting.** Reno, NV (two poster presentations)

Genes and Behavior Gordon Conference. Lucca, Italy (poster presentation).

2007 USDA Project Director Annual Meeting. San Diego, CA (poster presentation)

2006 Genes and Behavior Gordon Conference. Ventura, CA (poster presentation).

2005 Entomological Society of America Annual Meeting. Fort Lauderdale, FL (oral presentation).

Talk and Poster Presentations by Group Members

Presentation type and primary presenter noted; Grozinger is co-author on all presentations (>70 since 2004)

2019 Entomological Society of America, Eastern Branch Meeting; Blacksburg, Va (invited symposium presentation with Tyler Jones)

2018 Entomological Society of America; Vancouver, BC, Canada (invited symposium presentation with D. Sponsler, contributed talks by E. Erickson, M. Crone)

2017 Entomological Society of America; Denver, CO (invited symposium presentation with D. Sponsler, E. Erickson, contributed posters by T. Jones, R. Reynolds)

2016 International Congress of Entomology; Orlando, Florida (invited symposium presentation with D. Galbraith, A, E. Amsalem, contributed oral presenyations with Vaudo, C. Rittschoff, Ma, R)

2016 International Conference on Pollinator Biology, Health and Policy; Penn State, PA (invited symposium presentation with D. Galbraith, contributed poster presentations with A. Vaudo, M. Doke, D. Galbraith, E. Erickson, T. Jones, G. Villar)

2015 Entomological Society of America Annual Meeting; Portland, Oregon (invited symposium presentation with D. Galbraith, A, Vaudo, M. Doke, C. Rittschoff, E. Amsalem)

2014 Entomological Society of America Annual Meeting; Portland, Oregon (invited symposium presentation with H. Holt, contributed oral presentation from A. Vaudo)

Animal Behavior Society Annual Meeting; Princeton, NJ (oral presentation from G. Villar)

International Congress of the International Union for the Study of Social Insects; Cairns, Australia. (oral presentations from E. Amsalem and D. Galbraith).

2013 International Conference on Pollinator Biology, Health and Policy; Penn State, PA (contributed oral presentation from A. Vaudo, contributed poster presentations with E. Amsalem, M. Doke, D. Galbraith, H. Holt, A. McMenamin, E. Niño, M. Padilla)

Entomological Society of America Annual Meeting; Austin, TX (invited symposium presentation with D. Galbraith, contributed oral presentation from A. Vaudo and E. Niño, contributed poster presentations with M. Doke, M. Padilla, G. Villar)

American Bee Research Conference; Hershey, PA (invited oral presentation with H. Holt, contributed oral presentation from G. Villar)

2012 **International Congress of Entomology**; Dagau, Korea (invited oral presentations with F. Manfredini)

Meeting of the European Section of IUSSI; Italy (contributed oral and poster presentations with F. Manfredini)

Entomological Society of America Annual Meeting, Knoxville, TN (three invited oral presentations with H. Holt, F. Manfredini, E. Niño, and contributed oral presentation by D. Schmehl)

Center for Pollinator Research Symposium; Penn State, PA (two contributed oral presentations by H. Holt and D. Schmehl)

American Society for Microbiology; San Francisco, CA (contributed poster presentation with T. Baumgarten)

2011 **Honey Bee Biology and Genomics Workshop**, CSHL, NY (two contributed poster presentations with D. Galbraith and H. Holt)

Eastern Apiculture Society Annual Conference, Warwick, RI (invited oral presentation with E. L. Niño)

Entomological Society of America Annual Meeting, Reno, NV (invited oral presentation with E. L. Niño)

2010 **16th Congress of the International Society for the Study of Social Insects**. Copenhagen, DK (four poster presentations with S. Kocher, H. Holt, F. Manfredini, and H. Patch; oral presentation with E.L. Niño).

First International Conference on Pollinator Biology, Health and Policy. Penn State, PA (two poster presentations with H. Holt and E.L. Niño).

Genes and Behavior Gordon Conference. Ventura, CA (poster presentation with A. Toth)

USDA PD Workshop, Washington, DC (two poster presentations with A. Toth and E.L. Niño)

Entomological Society of America Annual Meeting. San Diego, CA (contributed oral presentations with E.L. Niño)

2009 **Society for the Study of Evolution Annual Meeting**. Moscow, Idaho (contributed oral presentation with S.D. Kocher)

Evolution: The Molecular Landscape. CSHL, NY (poster presentation with A. Toth)

Entomological Society of America Annual Meeting. Indianapolis, IN (two contributed oral presentations with A. Toth and E.L. Niño)

2008 **International Congress of Entomology**. Durban, South Africa (two invited oral presentations with S. Kocher and FJ Richard)

American Beekeeping Federation Meeting. Sacremento, CA (invited oral presentation with E.L.

Niño)

NCSU Keck Center Student and Post-doc Symposium. Raleigh, NC (four contributed oral presentations with S. Kocher, FJ Richard, B. Fussnecker, and E.L. Niño)

2007 **Honey Bee Biology and Genomics Workshop**. CSHL, NY (three contributed poster presentations with S. Kocher, FJ Richard, B. Fussnecker)

Ecological Genomics Symposium. Kansas City, Kansas (poster presentation, S.D. Kocher)

Eastern Apiculture Society Annual Meeting. Newark, DE (invited oral presentation with FJ Richard)

Meeting of the French Section of the International Union for the Study of Social Insects. Toulouse, France (invited oral presentation with FJ Richard

NCSU Keck Center Student and Post-doc Symposium. Raleigh, NC (three oral presentations with S. Kocher, FJ Richard, B. Fussnecker)

North Carolina Honey Bee Research Consortium Annual Symposium. Raleigh, NC (three oral presentations with S. Kocher, FJ Richard, B.Fussnecker)

NCSU Undergraduate Research Symposium. Raleigh, NC (three poster presenations with T. Crowgey, D. Overman, C. Rouf)

NC Regional Science Fair. Raleigh, NC (poster presentation, 1st place Biology, with E. Hornstein)

NC State Science Fair. Raleigh, NC (poster presentation with E. Hornstein)

2006 **Society for the Study of Evolution Annual Meeting**. Stony Brook, NY (poster presentation with S. Kocher).

American Beekeeping Federation Meeting. Louisville, KY (invited oral presentation with B. Fussnecker).

15th International Congress of the International Union for the Study of Social Insects. Washington, DC. (poster presentation with B. Fussnecker, contributed oral presentation with FJ Richard).

Southeastern Branch of the Entomological Society of America Annual Meeting. Wilmington, NC (contributed oral presentation with FJ Richard).

NCSU Keck Center Student and Post-doc Symposium. Raleigh, NC (three oral presentations with B. Fussnecker, S. Kocher, and FJ Richard).

NCSU Undergraduate Summer Research Symposium. Raleigh, NC (three poster presentations with T. Crowgey, P. Fischer, and K. Hutcherson).

2005 **NCSU Undergraduate Research Symposium.** Raleigh, NC (poster presentation with P. Fischer).

NCSU Undergraduate Summer Research Symposium. Raleigh, NC (two poster presentations with P. Fischer and J. Hampton).

UNDERGRADUATE AND GRADUATE COURSES TAUGHT

2021
Co-Instructor, ENT 597, **Global Perspectives in Integrated Pest and Pollinator Management** (with Natalie Boyle, cross-listed with University of Freiburg)
Instructor, ENT 496H, **Undergraduate Research, Honors Thesis** (Ashley Moak, 3 credits)

2020
Co-Instructor**, ENT 222, Honey Bees and Humans** (with H. Patch, general ed course for undergraduates)
Instructor, ENT 530, **Colloquium in Integrative Pollinator Ecology**
Guest Lecture, ENT 530, **Seminar in Insect Biodiversity Declines**
Guest Lecture, ECOL 515, **Advances in Ecology**
Instructor, ENT 496H, **Undergraduate Research, Honors Thesis** (Ashley Moak, 3 credits)
Instructor, BIO 496, **Undergraduate Research** (Brock Molloy, 3 credits)

2019
Co-Instructor, ENT 222, **Honey Bees and Humans** (with H. Patch, general ed course for undergraduates)
Co-Instructor, ENT 522, **Critical Thinking and Professional Development** (with H. Patch, E. Amsalem)
Instructor, ENT 530, **Colloquium in Integrative Pollinator Ecology**
Guest Lecture, Micrb 415, **General Virology**

2018
Co-Instructor, ENT 222, **Honey Bees and Humans** (with H. Patch, general ed course for undergraduates)
Co-Instructor, ENT 522, **Critical Thinking and Professional Development** (with H. Patch, E. Amsalem)
Instructor, ENT 530, **Colloquium in Integrative Pollinator Ecology**
Lecturer, AEE 597, **NSF-GRFP Fellowship Preparation** (1 workshop)
Lecturer, ECLGY 515, **Advances in Ecology** (4 lectures)

2017
Co-Instructor, ENT 222, **Honey Bees and Humans** (with H. Patch, general ed course for undergraduates)
Co-Instructor, ENT 522, **Critical Thinking and Professional Development** (with H. Patch, J. Rasgon)
Instructor, ENT 530, **Colloquium in Integrative Pollinator Ecology**
Guest Lecturer, AEE 597, **NSF-GRFP Fellowship Preparation**
Instructor, ENT 496, **Undergraduate Research** (student: Mengyu Liu, 3 credit)
Instructor, ENT 496, **Undergraduate Research** (student: Simon Pope, 1 credit)

2016
Co-Instructor, ENT 522, **Critical Thinking and Professional Development** (with H. Patch, J. Rasgon)
Co-Instructor, ENT 222, **Honey Bees and Humans** (with H. Patch, general ed course for undergraduates)
Instructor, ENT 530, **Seminar in Insect Molecular Ecology**
Guest Lecturer, BIOL497-00, **Science Outreach and Communication**
Guest Lccturer, AEE 597, **NSF-GRFP Fellowship Preparation**

2015
Co-Instructor, ENT 522, **Critical Thinking and Professional Development** (with H. Patch, J. Rasgon)
Co-Instructor, ENT 222, **Honey Bees and Humans** (with M. Frazier and H. Patch, general ed course for undergraduates)
Instructor, ENT 496, **Undergraduate Research** (student: P. Schreiber)

2014
Co-Instructor, ENT 522, **Critical Thinking and Professional Development** (with H. Patch, J. Rasgon, and J. Frazier)
Co-Instructor, ENT 222, **Honey Bees and Humans** (with M. Frazier and H. Patch, general ed course for undergraduates)
Instructor, ENT 496, **Undergraduate Research** (student: V. Bolden, P. Schreiber)

2013
Co-Instructor, ENT 597B, **Concepts and Techniques in Molecular Ecology** (with H. Patch)
Co-Instructor, ENT 296A, **Honey Bees and Humans** (with M. Frazier and H. Patch)
Co-Instructor, ENT 530, **Diversity in Science Seminar** (with M. Barbercheck)
Guest lecturer, ENT 522, **Critical Thinking and Professional Development**

2012
Co-Instructor, ENT 495, **Evolution and Insect Societies** (with M. Mescher)
Guest lecturer, ENT 522, **Critical Thinking and Professional Development**
Instructor, ENT 496, **Undergraduate Research** (student: M. Synder)

2011
Co-Instructor, ENT 597B, **Concepts and Techniques in Molecular Ecology** (with H. Patch)
Instructor, ENT 497, **Undergraduate Research** (student: J. Malloy)
Guest lecturer, ENT 520, **Frontiers in Insect Science** (team-taught)
Co-Instructor, **International Short Course on RNA-mediated Functional Genomics in Honey Bees** (organized with G. Amdam, team taught)

2010
Co-Instructor, ENT 597K, **Evolution and Insect Societies** (with M. Mescher)
Guest lecturer, ENT 597A, **Frontiers in Insect Science** (team-taught)
Lecturer, ICE 10, **Insect Chemical Ecology** (team-taught)
Instructor, ENT 497, **Undergraduate Research** (student: D. Galbraith)
Instructor, ENT 497H, **Undergraduate Honours Research** (student: J. Preston)

2009
Co-Instructor, ENT 597, **Genes and Behavior Seminar** (H. Patch)
Guest lecturer, ENT 597A, **Frontiers in Insect Science** (team-taught)

2008
Instructor, ENT 527, **Insect Neurogenomics**

Guest lecturer, ENT 604/804; **Insect Natural History and Field Ecology**

Guest lecturer, ENT 791, **Professional Ethics for Entomologists**

2007 Co-Instructor, ENT 791, **Techniques in Molecular Ecology and Evolution** (with E.Vargo, F. Gould and B. Wiegmann)

Co-Instructor, GN 810C, **Colloquium on Chromatin Structure and Gene Regulation** (with S. Spiker)

Developed "**Women in Entomology Reading Group**", a monthly discussion group. Feb 2007- Nov 2007

Guest lecturer, ENT 591/791, **Molecular Entomology: Lab to the Field**

Participant, ENT 601/801, **Genetic Pest Management Seminar**

2006 Guest lecturer, ENT 791, **Professional Ethics for Entomologists**

Instructor, ENT 591/791, **Insect Neurogenomics** (new course developed by CMG)

2005, 2006 Guest lecturer, HON 297U, **Environment, Genes, Brain and Behavior**

MENTORING ACTIVITIES

Postgraduate-Scholar Sponsor

Freddie-Jeanne Richard, PhD (2005-2008)

- Post-doctoral fellowship through the W.M. Keck Center for Behavioral Biology Genomics Training Grant (on which C.M.G. is a co-PI) in 2006-2007
- Currently an Associate Professor at University of Poitiers, France.

Kevin Donohue, PhD (2008-2009)

- Senior Team Leader, Syngenta.

Amy Toth, PhD (2008-2010)

- Awarded a USDA-AFRI Post-Doctoral Fellowship
- Assistant Professor (2010-2016) and now Associate Professor at Iowa State University.

Sarah Kocher, PhD (2008-2009)

- 2009-2015, postdoctoral research fellow at Harvard University, where she is supported by a Foundational Questions in Evolutionary Biology Fellowship and USDA-AFRI Post-doctoral Fellowship.
- 2015-2018 Lewis Sigler Genomic Institute Fellow at Princeton University
- 2018, Assistant Professor, Princeton University

Fabio Manfredini, PhD (2009-2013)

- Awarded Penn State Post-doctoral Society Travel Award, 2012
- Awarded Marie Curie Research Fellow with Mark Brown at Royal Holloway, University of London
- Currently, Lecturer in Functional Genomics, University of Aberdeen (2020-)

Elina Lastro-Niño, PhD (2012-2014)

- Awarded a USDA-AFRI Post-doctoral Fellowship (2012-2014).
- Currently Extension Apiculturist, Department of Entomology and Nematology, UC Davis

Etya Amsalem (2012-2016)

- Currently (2016-present) Assistant Professor, Department of Entomology, Penn State University
- Awarded a Binational Agricultural Research & Development Fund Post-doctoral Fellowship (2013-2014).
- Awarded 2020 NSF CAREER grant

Clare Rittschof (2014-2015, co-mentored with G.E. Robinson)

- Currently (2015-present) Assistant Professor, Department of Entomology, University of Kentucky
- Named Entomological Society of America Science Policy Fellow, 2015-2017
- Received the 2018 Outstanding Young Investigator Award from the Animal Behavior Society.
- Received 2020 Entomological Society of America Early Career Innovation Award
- Awarded 2021 NSF CAREER grant

David Galbraith (2015-2018)

- Research Scientist, Bristol Myers Squibb (January 2018-present)

Maggie Douglas (2016-2017)

- Assistant Professor, Dickinson College (January 2018-present)

Doug Sponsler (2017- 2020)

- Awarded a USDA-AFRI Post-doctoral Fellowship (2018-2020)
- Currently postdoctoral research fellow, University of Wuerzburg

Rong Ma (2017-2019)

- Awarded a Travel Fellowship from the NAS-IUSSI for travel to Congress of the International Union for the Study of Social Insects (2018)
- Currently Data Scientist, CVS

Colin Wright (2018-2020)

- Eberly Research Fellow (Penn State)

- Co-Mentored with Heather Hines
- Currently Science Editor at Quillette

DJ McNeil (2019-2021)

- Assistant Professor, Department of Environmental Sciences, University of North Carolina, Wilmington (2021-present)

Gabriela Quinlan (2020-)

Thesis advisor

Brendon Fussnecker (2005-2009)

- PhD program, NCSU Department of Genetics.
- 2005 Foundation for the Preservation of Honey Bees Graduate Student Award.
- Senior Director at Flywheel Partners.

Sarah Kocher (2005-2009)

- PhD Program, NCSU Department of Genetics
- Supported by an NIH Training Grant to the Genetics Department (on which C.M.G. is a co-PI).
- Sigma Xi Grants-in-Aid of Research Award, 2008
- NSF-Doctoral Dissertation Improvement Grant, 2009
- Kenneth R. Keller Award for Excellence in Doctoral Dissertation Research, 2010
- Currently (2017-) an Assistant Professor at Princeton University

Elina Lastro-Niño (2007- 2012)

- PhD program, PSU Department of Entomology
- 2007 Foundation for the Preservation of Honey Bees Graduate Student Award
- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2010
- Yendol Travel Award, Department of Entomology, PSU, 2010
- WISE Travel Award, PSU, 2010
- Lillian & Alex Feir Graduate Student Travel Award in Insect Physiology, Biochemistry or Molecular Biology, Entomological Foundation, 2011
- Yendol Travel Award, Department of Entomology, PSU, 2011
- Eastern Apicultural Society Student Award, 2011
- Lorenzo Langstroth Fellowship, Center for Pollinator Research, PSU, 2011-2012
- Michael E. Duke Memorial Scholarship, Department of Entomology, PSU, 2011
- Alumni Association Dissertation Award, PSU, 2012
- International Congress on Insect Neurochemistry and Neurophysiology (ICINN) Student Recognition Award in Insect Physiology, Biochemistry, Toxicology, & Molecular Biology, Entomological Society of America, 2012

- John H. Comstock Graduate Student Award, Eastern Branch of the Entomological Society of America, 2012
- Currently Extension Apiculturist, Department of Entomology and Nematology, UC Davis

Holly Holt (2009-2015)

- PhD program, PSU Department of Entomology
- Crouch Distinguished University Fellowship, PSU, 2009
- Häagan Dazs Fellowship in Honey Bee Research, Center for Pollinator Research, PSU, 2009
- Sigma Xi Grant-In-Aid of Research, 2010
- NSF Predoctoral Fellowship, 2011
- 2013 Foundation for the Preservation of Honey Bees Graduate Student Award
- Michael E. Duke Memorial Scholarship, Department of Entomology, PSU, 2013
- Yendol Travel Award, Department of Entomology, PSU, 2014
- Lillian & Alex Feir Graduate Student Travel Award in Insect Physiology, Biochemistry, or Molecular Biology from the Entomological Society of America, 2014
- Science Coordinator at Monarch Joint Ventures (non profit group in Minnesota), 2016-2017
- Currently (2019-) Research Associate in the Peer Review Services program at Oak Ridge Associated Universities (ORAU)

- **Daliris Ramírez** (2009-2010)
  - PhD program, PSU Department of Entomology
  - Submitted an application to the NSF Predoctoral Fellowship Program, not awarded, 2009
  - Decided to leave science.

Dennis vanEngelsdorp (2008-2010)

- PhD program, PSU Department of Entomology, co-advised with D. Cox-Foster
- Currently an Associate Professor at in the Department of Entomology at the University of Maryland.

David Galbraith (2010-2015)

- PhD program, PSU Department of Entomology
- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2013
- NAS-IUSSI Travel Awards, 2013, 2014
- Penn State University Office of Global Programs Graduate Travel Grant, 2014
- Michael E. Duke Memorial Scholarship, Department of Entomology, PSU, 2014
- Research Scientist, Bristol Myers Squibb (January 2018-present)

Jessica Richards (2010-2013)

- MSc program, Department of Entomology
- Travel grant from North American Chapter of the International Union for the Study of Social Insects, 2012
- Currently a research technician at the USDA Forest Service

Gabriel Villar (2010-2016)

- PhD program, PSU Department of Entomology

- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2013
- Sloan University Center for Exemplary Mentor Match Scholar Award, 2014-2015
- NE SARE Graduate Research Award, 2014
- USDA-AFRI Pre-doctoral Fellowship, 2014-2016
- Postdoctoral Research Associate, Amsalem lab, Penn State University, 2016-2018
- Scientist, Becton Dickinson, Life Science Pre-analytical Systems R&D Team, 2018-2019
- Head of R&D and Quality Assurance, U.S. Pollination, Koppert Biological Systems, 2019-present

Anthony Vaudo (2011-2016)

- PhD program, PSU Department of Entomology. Co-advised with John Tooker and Harland Patch
- 2012 Sigma Xi Grant-In-Aid of Research
- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2013
- William Yendol Memorial Research Award, 2013
- BBSRC US-UK Honey Bee Health Exchange. ($3,450), 2013.
- PI on North American Pollinator Protection Campaign (NAPPC) Bee Health Improvement Project Grant. ($9,700), 2014
- USDA AFRI Student Travel Grant from the Entomological Society of America, 2014
- USDA-AFRI Pre-doctoral Fellowship, 2014-2016
- First prize, Student Talk Competition, Entomological Society of America, 2014
- Ralph O. Mumma Graduate Award, PSU Department of Entomology, 2016
- Selected participant for 2016 Bee Course, AMNH- Division of Invert. Zoology
- Fulbright Fellow, South Africa (2018-2019)
- Currently Postdoctoral Research Associate, University of Nevada, Reno

Mario Padilla (2013-2014)

- MSc program, PSU Department of Entomology.
- Bunton-Waller Scholarship
- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2013
- Currently Curatorial Entomologist at Butterfly Pavilion, Colorado.

Mehmet Doke (2013-2017)

- PhD program, PSU Department of Entomology.
- Lorenzo Langstroth Fellowship, Center for Pollinator Research, PSU, 2013
- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2013
- USDA AFRI Student Travel Grant from the Entomological Society of America, 2015
- NE SARE Graduate Student Research Award, 2015
- Lloyd E. Adams Grant-In-Aid, Department of Entomology, Pennsylvania State University, PA, 2015
- Apes Valentes Graduate Award, Center for Pollinator Research, Pennsylvania State University, PA, 2015
- 2017 Foundation for the Preservation of Honey Bees Scholarship.

- Currently Postdoctoral Research Associate, Department of Biology, University of Puerto Rico
- 2019 Journal of Economic Entomology Editor's Choice Award

Alex McMenamin (2013-2015)

- BSc-MSc program, PSU Department of Entomology.
- Penn State Summer Undergraduate Discovery Grant, 2013
- Dutch Gold Undergraduate Scholarship in Honey Bee Health, 2013
- Barry Goldwater Scholarship, 2014
- Penn State College of Agricultural Sciences Undergraduate Research Scholarship, 2014
- Currently PhD graduate student at Montana State University

Aine O'Sullivan (2014-2016)

- PhD Program, PSU Department of Entomology.
- Crouch Distinguished University Fellowship, PSU, 2014
- Lorenzo Langstroth Fellowship, Center for Pollinator Research, PSU, 2015
- Transferred to MSc in Biotechnology Program in May 2016

Emily Erickson (2016- present)

- PhD Program, PSU Department of Entomology
- Selected participant for 2017 Bee Course, AMNH- Division of Invert. Zoology
- William Yendol Memorial Research Award, 2017
- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2017
- 2017 Sigma Xi Grant-In-Aid of Research
- Michael E. Duke Memorial Scholarship, Department of Entomology, PSU, 2018

Ryan Reynolds (2016- 2018)

- MSc Program, PSU Department of Entomology
- William Yendol Memorial Research Award, 2017
- Selected for "Highlighted Poster" (one of 8) at the 2017 Entomological Society of America annual conference

Tyler Jones (2016-2020)

- MSc Program, PSU Department of Entomology.
- Bunton-Waller Graduate Fellowship, Penn State University, 2016
- Selected for "Highlighted Poster" (one of 8) at the 2017 Entomological Society of America annual conference
- Selected to attend the 2020 AAAS-Catalyzing Advocacy in Science and Engineering Workshop
- Received 2020 Graduate Student William Henson Diversity Achievement Award from the College of Agricultural Science Diversity Coordinating Council

Melanie Kammerer Allen (2015 – 2020, co-advised with John Tooker)

- PhD Program, PSU Ecology Intercollege Graduate Program.
- College of Agricultural Sciences Graduate Student Competitive Grants Research Award, 2017
- NE SARE Graduate Research Award (2018-2019)
- Selected for Apes Valentes Graduate Research Award (2017)
- USDA-AFRI Pre-doctoral Fellowship, 2018-2020
- Ralph O. Mumma Graduate Award, PSU Department of Entomology, 2018
- Penn State Alumni Association Scholarship for Penn State Alumni in the Graduate School, 2019
- Penn State Frank A. Andersen Award; travel award for Ecology students, 2019
- Current position: Oak Ridge Institute for Science and Education (ORISE) Fellow in "High Performance Computing, Cloud Computing and AI Technologies in Agriculture" funded by SCINet

Allyson Ray (2017 – present, co-advised with Jason Rasgon)

- PhD Program, PSU Molecular, Cellular and Integrative Biosciences Intercollege Graduate Program
- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2018
- 2018 Sigma Xi Grant-In-Aid of Research
- "Best Poster" award at the 2018 MCIBS & Pathobiology Retreat (Penn State)
- NE SARE Graduate Student Research Award (2019-2020)
- Apes Valentes Graduate Award, Center for Pollinator Research, Pennsylvania State University, PA, (2019)
- USDA NIFA Predoctoral Fellowship (2021-2023)

Makaylee Crone (2018 – present, co-advised with David Biddinger)

- PhD Program, PSU Ecology Intercollege Graduate Program.
- Penn State Bunton Waller Fellowship
- Penn State Huck Institutes of the Life Sciences Award
- NSF Graduate Research Fellowship (2019-2022)
- PI on North American Pollinator Protection Campaign (NAPPC) Bee Health Improvement Project Grant
- Penn State Ecology Program Andersen Travel Grant, 2019, 2020, 2021
- Penn State Center for Pollinator Research Apes Valentes Award, 2021 “Do diverse diets impede social distancing? How foraging together may affect host-pathogen dynamics.” $4,868.

Rachel McLaughlin (2018 – present, co-advised with Kelli Hoover)

- MSc Program, PSU Entomology
- Penn State Integrative Pollinator Ecology Fellowship (USDA NNF award)
- Second place, oral student presentation, Northeastern Pest Council Meeting, March 2019
- Ralph Doyle Scholarship ($10,000, 2019, $11,000, 2020)

- Sahakian Family Fund for Agriculture Research Travel Award, PSU, 2019
- Entomological Society of America Best Student Speaker Award, 2019, 2020

Sean Bresnahan (fall 2019, co-advised with Michael Axtell)

- PhD Program, PSU Molecular, Cellular and Integrative Biosciences Intercollege Graduate Program
- University Graduate Fellowship (2019-2020)
- NSF Graduate Research Fellowship (2020-2022)

Sarah Kania (fall 2019, co-advised with Harland Patch)

- MSc Program, PSU Entomology

Codey Mathis (fall 2020, co-advised with Harland Patch and Vijay Narayanan)

- PhD Program, PSU Entomology
- Insect Biodiversity Center Graduate Fellow

Thesis committee member

Current: Katie Barie (MSc, Entomology), **Hannah Stewart** (PhD, Entomology), **Xin Wu** (PhD, Georgia Tech), **Sarah Aamidor** (PhD, University of Sydney, thesis examiner), **Coline Monchanin** (PhD student, University of Toulouse, thesis examiner), **Sarah Barnsley** (University of Cambridge, external examiner)

Former:

- **Alex Jordan** (PhD), Department of Civil and Environmental Engineering, University of Pittsburgh
- **Natalie Imirzian** (PhD) PSU Entomology, 2020
- **Sarthok Rasique Rahman** (PhD) PSU Biology, 2020
- **Codey Mathis** (MSc) Biology, Indiana University of Pennsylvania, 2020
- **Yael Arien** (PhD), Hebrew University of Jerusalem, 2020 (thesis examiner)
- **Kaixi Zhao** (PhD) PSU Plant Pathology and Environmental Microbiology, 2019
- **Viridiana Avila Magana** (PhD) PSU Biology), 2019
- **Theotime Colin** (PhD, Biology), Macquarie University, 2019 (thesis examiner)
- **Jesse Starkey** (MSc), PSU Entomology, 2019
- **Briana Ezray** (PhD). PSU Entomology, 2019
- **Beatrice Tchuidjang Nganso**, PhD, University of Pretoria, 2018 (thesis examiner)
- **Duverney Chaverra-Rodriguez,** PhD, PSU Entomology, 2018
- **Taylor Reams,** MSc, Biology, University of North Carolina, Greenboro, 2018
- **Erin Treanore,** MSc, PSU Entomology, 2017
- **Rong Ma,** PhD, Integrative Biology, UT Austin, 2017
- **Loren Rivera,** PhD, PSU Entomology, 2017

- **Zachary Fuller,** PhD, PSU Biology, 2017
- **Maridel Frederickson,** MSc, PSU Entomology, 2016
- **Raquel Loreto,** PhD, PSU Entomology, 2016
- **Ana Cabrera**, PhD, NCSU Entomology, 2009
- **Deepa Sambandan**, PhD, NCSU Genetics 2008
- **Kevin Donohue**, PhD, NCSU Entomology 2008
- **Erica Marsh**, PhD, NCSU Zoology, 2008
- **Ping Wang**, PhD, NCSU Genetics, 2008
- **Michael Ward**, MSc, NCSU Entomology, 2009
- **Brooke Wittig**, PhD, NCSU Entomology, 2009
- **J. Cris Vera**, PhD, PSU Biology, 2012
- **Tracy Conklin**, PhD, PSU Entomology, 2012
- **Michael Freiberg**, MSc, PSU Entomology, 2012
- **Abby Levitt**, PhD, PSU Genetics, 2012
- **Dan Schmehl**, PhD Program, PSU Entomology, 2013

Undergraduate Student Researchers

The years the students were in the group are shown in parentheses.

North Carolina State University

Sandhya Advani, NCSU, Psychology, 2012 (2008-2010)

- NCSU HHMI Rise Scholar

Theresa Crowgey, NCSU Biological Sciences 2010 (2006-2007)

- NCSU HHMI Rise Scholar
- NCSU Park Scholar

Philip Durham, NCSU Biochemistry 2007 (2006- 2007)

Patrick Fischer, NCSU Biochemistry 2006 (2004-2006)

- Co-author on two peer-reviewed manuscript
- Poster at 2005 and 2006 NCSU Undergraduate Summer Research Symposium

Jacob Hampton, NCSU Biochemistry 2006 (2005-2006)

- Co-author on one peer-reviewed manuscript
- Poster at 2005 NCSU Undergraduate Summer Research Symposium

Eli Hornstein, Enloe High School/North Carolina School of Science and Math (2007)

- 1st place Biology poster, NC Regional Science Fair. Raleigh, NC
- Presented poster at NC State Science Fair. Raleigh, NC

Kelly Hutcherson, NCSU Biochemistry 2007 (2005-2006)

- NCSU Undergraduate Research Award

- Poster at 2006 NCSU Undergraduate Summer Research Symposium

Sarah Jones, NCSU Zoology 2010 (2007-2008)

- NCSU Undergraduate Research Award

Lillian King, Entering freshman at Wake Forest University (2007)

David Overman, NCSU Biological Sciences 2011 (2007)

- Poster at 2007 NCSU Undergraduate Summer Research Symposium

Matt Mayer, NCSU Biological Sciences 2008 (2005)

Alex McKenzie, NCSU Biological Sciences 2008 (2008)

- Co-authored one peer-reviewed manuscript

Jennifer Pettite, NCSU Zoology 2008 (2007)

Nabila Rouf, NCSU Zoology 2008 (2006-2008)

- NCSU Undergraduate Research Award
- NCSU Park Scholar
- Poster at 2007 NCSU Undergraduate Summer Research Symposium
- Co-authored one peer-reviewed manuscript

Haru Yamamoto, Duke University, Biology 2009 (2007)

Penn State University

Dionisio Acosta. PSU SROP Program (2010)

Dustin Betz. Biology 2014 (2012)

Victoria Bolden. Horticulture 2015 (2014)

- 2014 Dutch Gold Undergraduate Scholarship for Research on Honey Bees.
- ENT496 project, co-advised with graduate student A. Vaudo: Honey bees Foraging on Native and Non-native Plants in the *Lamiaceae* (Mint) Family

David Galbraith. PSU Biology 2010 (2009-2010)

- ENT 497 Project: DNA methylation levels differ across species, castes and developmental stages of eusocial bees and wasps.

Alexandra Herestofa. PSU Animal Science 2014 (2011).

- 2011 Dutch Gold Undergraduate Scholarship for Research on Honey Bees.

Caroline Hozza. Biology(Vertebrate Physiology); Psychology, 2014 (2012-present)

Justin Malloy. PSU Biology 2011 (2010-2011)

- ENT 497 Project: Survey of honey bee colonies in East Africa for parasitization with Nosema microsporidia

Mariam Khraibani. Toxicology 2013 (2012)

Alex McMenamin. Immunology and Infectious Disease, 2015 (2012-2013)

- 2013 Dutch Gold Undergraduate Scholarship for Research on Honey Bees
- 2014 Penn State College of Agricultural Sciences Undergraduate Research Award

Stephanie Damaris Narvaez. PSU Animal Science and Business Management 2011 (2009)

Jessica Preston. PSU Schreyer Honors College, Biology 2013 (2010)

- ENT 497H Project: Host-parasite interactions between *Nosema* and honey bees

Megan Snyder. Immunology and Infectious Disease 2015 (2012).

- 2012 Penn State College of Agricultural Sciences Undergraduate Research Award
- 2012 Dutch Gold Undergraduate Scholarship for Research on Honey Bees
- ENT 486 Project: Nutritional Deprivation in *Nosema* Infected Drones

Janet Teeple. PSU Anthropology 2011 (2010)

Bekki Waskovich. Wildlife and Fisheries Science 2014 (2012)

Marin McArthur. PSU Wildlife Science 2014 (2014)

Henry Klesper. Animal Science/Pre-Vet 2016 (2014)

Edwin Hochstedt. General Science 2015 (2014)

Paul Schreiber. Biology 2015 (2014)

Megan Wolfson. Psychology 2015 (2015)

- Apes Valentes Undergraduate Research Award (2015)

Liam Farrell. Plant Science 2016 (2015)

- Apes Valentes Undergraduate Research Award (2015)
- Dutch Gold Undergraduate Scholarship in Honey Bee Health (2015)

Sid Curralo. University of Delaware (2016)

- Supported by funds from Institute of International Education (IIE)

Grace Billy (2016)

- Ecosystem Science and Management 2019
- Apes Valentes Undergraduate Research Award 2016
- Penn State Student Leadership Scholarship, for role as President of the PSU Beekeepers Club 2016

Tim Groh (2016)

- Psychology 2017
- Apes Valentes Undergraduate Research Award 2016

Sarah McTish (2015-2016)

- Agriculture Sciences 2017

- Dutch Gold Undergraduate Scholarship in Honey Bee Health 2016

Max Glines (2016)

- Environmental Science Engineering 2019

Zach Schumber (2016)

- Wildlife and Fisheries Science 2019

Simone Pope (2016-2017)

- Biology 2020

Rachel Kaneshiki (2017-2018)

Katelin Quanbeck (2017)

Bryce Buck (2017-present)

- Apes Valentes Undergraduate Research Award (2018)

Dalton Brough (2017-2019)

- Dutch Gold Award (2017)

Sheldon Davis (2018 – 2020)

- Penn State University Student Engagement Network Grant (2020)
- Penn State McNair Scholars Program (2020)
- Selected for LSU Health New Orleans Postbaccalaureate Research Education Program in Biomedical Sciences (PREP)

Rachel Duke (2018 - 2019)

Ashley Moak (2019-present)

- 2020 Apes Valentes Undergraduate Research Award
- Schreyers Honor College thesis

Brock Molloy (2019-present)

- 2020 Erickson Summer Discovery Grant for the project "Using honey bee collected pollen as an early indicator for viral plant diseases impacting crops in Pennsylvania".
- 2020 Apes Valentes Undergraduate Research Award

Alyssa Curry (2020-present)

- 2021 College of Agricultural Sciences Undergraduate Research Award
- 2021 Erickson Summer Discovery Grant for the project "Impacts of Spring Brood Manipulation on Varroa Mite Populations in Honey Bee Colonies"
- 2021 Dutch Gold Undergraduate Honey Scholarship

<u>Technicians</u>

Yongliang Fan, PhD. Molecular technician and lab manager. 2005-2008.

Joseph Flowers. Field technician. 2006-2008.

Bernardo Niño. Lab manager and field technician. 2008-2014. Current: Head of Research and

Development at UBEES.

Tracey Baumgarten. Molecular technician. 2010-2013.

Jeremy Fitzgerald. Field technician and assistant for Center for Pollinator Research. 2011-2012.

Mario Padilla. Lab manager and field technician. 2014 - 2015.

Sarah Ashcraft. Lab manager and field technician. 2015 - 2016.

Philip Moore. Lab manager, field technician, outreach coordinator. 2016.

Katy Ciola Evans. Lab manager, field technician, outreach coordinator (shared with Margarita Lopez-Uribe). 2017.

Kate Anton. Lab manager, field technician, outreach coordinator 2017-present

- 2020 Scott Smiles Staff Award from Penn State Department of Entomology

Darian Kraft. Research assistant. 2018-present.

Exchange students and visiting scholars

Andrew Ammons, PhD. Postdoctoral Associate with Michelle Elekonich, University of Nevada, Las Vegas (June 2007)

Ying Wang, PhD. Postdoctoral Assocate with Gro Amdam and Rob Page, Arizona State University (July 2008)

Navdeep Mutti, PhD. Postdoctoral Associate with Gro Amdam and Rob Page, Arizona State University (July 2008)

Fiona Nelima. Technician with Dan Masiga, icipe, Kenya. (March 2011)

Aline Silva. PhD student with Zilá L.P. Simões. University of São Paolo, Brazil (May-October 2010; Sandwich Program)

Osnat Malka, PhD. Postdoctoral Associate with Abraham Hefetz. University of Tel Aviv, Israel (April 2011)

Etya Amsalem. PhD student with Abraham Hefetz. University of Tel Aviv, Israel (Nov 2010)

Livia Moda, PhD. Postdoctoral Associate with Zilá L.P. Simões. University of São Paolo, Brazil (August – October 2011)

Federico Cappa. PhD student with Laura Beani. University of Florence, Italy (May-July 2012)

Dino McMahon. Postdoctoral Associate with Robert Paxton. Martin-Luther-Universität Halle-Wittenberg, Germany (March 2013)

Rong Ma. Graduate student with Ulrich Mueller, University of Austin, Texas. (September-December 2015)

Virginia Zanni. Graduate student with Francesco Nazzi, University of Udine (January-April 2016).

Junpeng Mu. Associate Professor, Mianyang Normal University (June 2016-May 2017).

Davide Frizzera. Graduate student with Francesco Nazzi, University of Udine (January-March 2018).

Pamelo Ochungo. Graduate student with Elluid Muli, International Center for Insect Physiology and Ecology, Nairobi, Kenya (January-February 2019).'

Taylor Steele, Brad Ohlinger, Mary Silliman. Graduate students with Margaret Couvillon, Virginia Tech University. (November 2020)

PROFESSIONAL SERVICE

Service to University

- **Director, Center for Pollinator Research**. The CPR includes 34 faculty members from across the university, who are involved in pollinator research, teaching, outreach and extension. Grozinger's roles and responsibilities include:
    - Provided documentation and justification to establish Center in fall of 2009
    - Co-organizing conferences and symposia hosted by the Center (see below for descriptions)
    - Coordinating outreach activities with the Arboretum at Penn State, beekeeper groups, and other stakeholders
    - Overseeing development and maintenance of website (has >30,000 views/year)
    - Coordinating and disseminates funding for endowed student scholarships and seed research grants; helped secure 600K endowment for research program
    - Directed the writing of the Pennsylvania Pollinator Protection Plan (P4). The P4 was developed with input from 36 individuals represented 28 state- and national organizations and stakeholder groups. It summarizes the current state of pollinators in Pennsylvania, and provides recommendations for best practices and resources to support and expand pollinator populations. http://ento.psu.edu/pollinators/research/the-pennsylvania-pollinator-protection-plan-p4

- **University committees**:
    - Social Science Research Institute Steering Committee (2011)
    - Graduate Council (2012-2014)
    - Graduate Council Committee on Programs and Courses (2012-2014)
        - Chair, 2013-2014
        - Reviewed ~15 proposals/month
    - Graduate Council Committee on Committees and Procedures (2013-2015)
    - Huck Kitchen Cabinet Advisory Committee (2019- present)
    - Ecology Institute Steering Committee (2019-present)
        - Review Ecology Flower Grants, Strategic Planning, Website Content Development
    - SIRO Faculty Advisory Committee (2020 – present)

- Scholar in Residence, Sustainability Institute, 2021
    - Organized "Mainstreaming Biodiversity in a Decade of Action" symposium series, Jan 13, 2020 to March 24, 2021. 25 speakers, ~400 participants. Associated with seed grant program to support transdisciplinary research ($70,000 in total funding for 7 grants).
- Faculty Senate, 2021-2024

- **College committees**:
    - Associate Director for Research, Institute for Sustainable Agricultural, Food and Environmental Science
        - Strategic planning and design of new Institute, including identifying core research themes
        - Organized "Catalyzing your Research" webinar series (March to April 2021)
        - Organized seed grant program to support data and computational science projects with ICDS-RISE
    - Search Committee for Research Initiatives Associate for Institute for SAFES (2020)
    - Search Committee for Research and Financial Administrator for Institute for SAFES (2020)
    - Distinguished Professorship Review Panel (2018-2020)
    - Alex and Jessie C. Black Excellence in Research Award Review Committee (2017, 2019)
    - Search Committee for Director of the Penn State College of Agriculture Science Development Office (2017)
    - Strategic Networks and Initiatives Program Interdisciplinary Graduate Assistantships Program Reviewer (2017)

- **Departmental committees:**
    - Strategic Planning Committee (2010, 2013)
    - Graduate Program and Recruiting Committee (2009-2012, 2016-2019, chair 2018-2019)
    - Development Committee (2011-)
    - Department Head Advisory Committee (2012-)
    - Space Planning Committee (2012- 2015)
    - Awards Committee (2013 - 2016, chair 2015-2016; 2019-2021)
    - P&T Committee (2013-2016, 2017-20, chair in 2018-2019)
    - Search Committee for Assistant Professor in Managed Pollinators (chair, 2015)
    - Penn State PI of HATCH project, Sustainable Solutions to Problems Affecting Bee Health (2017-present). Requires compiling and submitting annual reports from 5 coPIs and supporting paperwork needed for renewal in 2019.

- Advisor for **Penn State Student Beekeeping Club** (2016)
- Founded and organized the **Next Gen Sequencing Discussion Group**, Spring 2012.
- Since 2008, hosted **34 departmental seminar speakers**: Andrew Barron (Macquarie University), Amy Toth (PSU), Kevin Donohue (PSU), Joan Strassmann (Rice University), David Queller (Rice University), Abraham Hefetz (Tel Aviv University), Heather Mattila (Wellesley University), Heather Hines (NCSU), Andrew Deans (NCSU), Laurent Keller (University of Lausanne), Farooq Ahmad (ICIMOD, Nepal), Tracy Langkilde (PSU), Julien Ayroles (Harvard University), Stephanie Rollman (University of Cincinnati), John Wenzel (Carnegie Museum), Rachael Winfree (Rutgers University), Deborah Delaney (University of Delaware), Michelle Elekonich (University of Nevada, Las Vegas/NSF), Michael Goodisman (Georgia Tech University), Yasmin Cardoza (NCSU), Etya Amsalem (PSU), Brian Danforth (Cornell), , David Denlinger (Ohio State), Noa Pinter-Wollman (UCLA), Clare Rittschoff (University of Kentucky), Olav Rueppell (University of North Carolina, Greensboro), Alexandra Harmon-Threatt (UIUC), Adam Dolezol (UIUC), Ryan Gott (Phipps Conservatory), Annie Leonard (University of Nevada), T'ai Roulston (University of Virginia), Sharoni Shafir (Hebrew University), Natalie Boyle (Penn State), Brock Harpur (Purdue), Hongmei Li-Byarlay (Central State)
- From 2014-2016, organized the "**Pollinator Health and Policy Seminar Series**". Hosted the following speakers for this program (additional speakers hosted by other faculty): Judy Chen (USDA-ARS, 2014), Nigel Raine (University of Guelph, 2015), David Mortensen and Melanie Kammerer (Penn State, 2015), Seth Barribeau (East Carolina University, 2015), Mary Purcell (USDA-AFRI, 2015), Sarah Kocher (Princeton, 2015), Eugene Ryabov (University of Warwick, 2015), Vicki Wojcik (NAPPC, 2015), Neal Williams (UC Davis, 2015), Michele Colopy (Pollinator Stewardship Council, 2016).
- **Host for Huck Distinguished Lecture Series speaker**, Mariana Wolfner (Cornell, March 2012), Joan Strassmann and David Queller (Washington University, St Louis, April 2015), Tristram Wyatt (Oxford University, April 2018), Taylor Ricketts (University of Vermont, November 2019)
- Interviewed for Penn State Graduate Women in Science's "**Inside the Scientists Studio**" Series (March 2010)
- Organized and reviewed grants for College of Agricultural Sciences' Graduate Fellowship Workshop (September 2013, October 2014)
- Interviewed for Penn State's University Relations "Faces of Penn State" video series (April 2013)
- Presented at Penn State Ag Council Research Tour (September 2013)
- Interviewed for College of Agricultural Science's "Diversity" video series (November 2013)
- Interviewed for Penn State's Development Office "Campaign for the Future" video series (December 2013)
- Served on Huck Institutes for the Life Sciences Graduate Student Panel (August 2013, 2014)
- Interviewed for Penn State's University Relations "Penn State Lives Here" video series (August 2015)
- Panel member for PSU Postdoctoral Society's workshop on interview and negotiation strategies (January 2019)

- Interviewed for Penn State's Strategic Communications "Impact" video series (December 2018-April 2019)
- Presented at University Research Council, April 2020

Short Course Development

- "**Queen Rearing Workshop**" for beekeepers. University Park, PA. May 2011, June 2012, June 2013, June 2014.
    - Developed and taught by C. Grozinger, W. Miller. M. Frazier, E. Lastro Niño and Bernardo Niño, Stephen Repasky. 12-16 participants/year.
- "**Honey Bee Functional Genetics Tools Short Course**." University Park, PA. August 2011.
    - Co-organized by C. Grozinger and G. Amdam. Course included 13 participants, 8 countries

Conferences and Workshops Organized

- Symposium co-organizer for "**International Conference on Pollinator Biology, Health and Policy**." University Park, PA. July 2019.
    - Co-organized and moderated session, with Maj Rundlof and Maggie Douglas, on "Pollinators and pesticides".
- **46th Apimondia International Apicultural Congress**. Served on Local Organizing Committee. September 2019.
    - Suggested symposia topics and invited speakers; eviewed and ranks 350+ oral and poster abstracts
- Workshop at University of Muenster Graduate School of Education, ""It's not my fault: how the social environment shapes individual behavior and vice versa". Co-organized with Juergen Gadau and Michael Hennessey. June 2018.
- Section Convener for Apidology, Sericulture, and Social Insects (with L de Guzman and K. Kimura) for **International Congress of Entomology**, Orlando, FL, September 2016.
- "**International Conference on Pollinator Biology, Health and Policy**." University Park, PA. August 2016.
    - Co-organized by C. Grozinger, N. Williams, S. Fleischer, and R. Isaacs.
    - Co-organized and moderated session, with D. vanEngelsdorp, on "Epidemiology and modeling of global pollinator populations".
- **"Living with our Virome: 35th Annual Summer Symposium in Molecular Biology"** University Park, PA, May 2016
    - Organized by Moriah Szpara, C. Grozinger on Steering Committee
- "**Pollinators and Ornamentals Workshop**." University Park, PA. November 2015.
    - Co-organized by C. Grozinger and H. Patch.

- Included representatives of university, government and stakeholder groups (5 from outside PSU)

- Steering committee member. 2014 National Academy of Sciences - Keck Futures Initiative Conference on "**Collective Behavior, From Cells to Societies**", Irvine, CA, November 2014
    - Duties include writing concept papers, selecting participants from pool of applicants, facilitating discussions at conference, reviewing and selecting grant applications

- **"Synthesizing transcriptome data to explore interspecies bee-pathogen molecular interactions that may underpin pollinator decline."** German Center for Integrative Biodiversity (sDIV). Leipzig, Germany. October 2013 and April 2014.
    - Co-organized by C. Grozinger, R. Paxton and V. Doublet.

- "**International Conference on Pollinator Biology, Health and Policy**." University Park, PA. August 2013.
    - Co-organized by C. Grozinger, C. Mullin and N. Williams.
    - Approximately 230 registrants from 15 countries.

- "**Center for Pollinator Research Symposium**." University Park, PA. May 2012.
    - Co-organized by C. Grozinger and N. Ostiguy.
    - 58 registrants from Penn State and several neighboring states.

- "**International Symposium on Functional Genetics Tools In Honey Bees**." University Park, PA. August 2011.
    - Co-organized by C. Grozinger and G. Amdam.
    - 22 speakers and approximately 25 additional attendees, representing 8 countries

- "**Honey Bee Biology and Genomics Workshop**." Cold Spring Harbor Laboratory, NY. May 2011.
    - Co-organized by C. Grozinger, U. Mueller and R. Page.
    - Over 100 registrants from 15 countries.

- "**Functional Genomic Tools in Honey Bees Workshop**." Cold Spring Harbor Laboratory, NY. May 2011.
    - Co-organized by C. Grozinger and G. Amdam.

- "**International Conference on Pollinator Biology, Health and Policy**." University Park, PA. July 2010.
    - Co-organized by C. Grozinger, D. Cox-Foster and E. Rajotte.
    - Over 200 registrants from 14 countries.

Symposia in Conferences Organized

- "How to Speak for the Pollinators: Using Big Data to Manage and Conserve Pollinator Communities" **Entomological Society of America Annual Meeting**. PIE Section Symposium. St Louis, MO. November 2019. Co-organized by M. Allen Kammerer and C. Grozinger

- "Harnessing the Power of Genomics Tools: Monitoring Stressors in Pollinator Populations" and "Harnessing the Power of Genomics Tools: Functional Genomics of Pollinator Health" Symposia. **International Congress of Entomology**. Orlando, Florida. September 2016. Co-organized by R. Paxton and C. Grozinger.
- "Buzz-kills: The Genomics and Ecology of Stress in Pollinators". PBT Section Symposium. **Entomological Society of America Annual Meeting**. Austin, TX. November 2014. *Co-organized by:*
- "Epigenetic Mechanisms Connecting Physiology, Behavior Ecology, and Evolution in the Insect World". **Entomological Society of America Annual Meeting**. Austin, TX. November 2013. *Co-organized by: H. Li-Byarlay, C. Grozinger, S. Weiner, B. Hunt*
- "A Global Perspective of Bee Decline: Situation, Strategies and Successes". **Entomological Society of America Annual Meeting**. Knoxville, TN. November 2012. *Co-organized by C. Grozinger and J. Skinner*.
- "Evolutionary genomics of social behavior". **International Congress on Entomology**. Daegu, South Korea. August 2012. *Co-organized by C. Grozinger and J. Gadau*.
- "Molecular and genomic approaches to comparative neuroethology" **International Congress of the International Union for the Study of Social Insects**. August 2010. Copenhagan, Denmark. *Co-organized by C. Grozinger and A. Barron*.
- "Pheromonal mediation of honey bee social behavior, a symposium in honor of Mark Winston" **International Congress of the International Union for the Study of Social Insects**. Washington, DC. August 2006. *Organized by C. Grozinger*.
- "Advances in apiculture and honey bee biology" **Southeastern Branch of the Entomological Society of America Annual Meeting**. Wilmington, NC. (2006). *Organized by C. Grozinger and D. Tarpy*.

Editorial Related Activities

- Guest editor with Jay Evans for "Translational Approaches to Bee Health" special issue of **Current Opinion in Insect Science** (2015)
- Guest editor for the "Honey Bee" special issue of the open-access journal "**Insects**" (2012)
- Editorial Board: **Journal of Chemical Ecology** (2009-2012), **Journal of Insect Physiology** (2012-present), **Behavioral Ecology and Sociobiology** (2013-2019), **Insect Biochemistry and Molecular Biology** (2015-2019), **Annual Review of Entomology** (guest: 2018, board member: 2019-2020, co-editor: 2021-2023)
- Guest editor for **Proceedings of the National Academy of Sciences** (2019, 2021)

Reviewer Related Activities

- **Research grant review panel manager:**
    - USDA Pollinator Health (September 2019, August 2020)
- **Research grant review panel member:**

- USDA *(September 2007, April 2008, December 2016)*
- NSF *(November 2006, March 2009, February 2013)*
- AAAS King Abdulaziz City for Science and Technology proposals *(February 2010, February 2012, August 2012, September 2013, October 2014, January 2018)*
- Romanian Research Council (*July 2011*)
- Coordinated NAPPC Honey Bee Health Research Grant Program (2008, 2009, 2010, 2011, 2012, 2013, 2014)
- NIH Modeling of Social Behavior (2015)
- US-Israel Binational Science Foundation (2016, 2020)
- USDA-AFRI Pest and Beneficial Species (2016)
- NAKFI Challenge Program, National Academies Keck Futures Initiative (2018)

- **Adhoc research grant reviewer** for
  - NSF *(2011, 2014)*
  - USDA SBIR *(2012)*
  - UK Biotechnology and Biological Sciences Research Council *(2012. 2017)*
  - French Agence Nationale de la Research *(2012)*
  - Austrian Science Fund *(2013)*
  - University of Leuven, Belgium *(2014)*
  - German Research Foundation *(2014)*
  - Research Councils UK *(2015)*
  - Swiss National Science Foundation *(2016)*
  - UK Natural Environmental Research Council *(2016, 2018)*
  - NSF IOS Symbiosis Def & Self Recognition *(2016)*
  - French National Research Agency (ANR) (2016)
  - Marsden Fund Council, Royal Society Te Apārangi, New Zealand (2018)
  - Natural Environment Research Council, UK (2018)
  - NSF IOS Symbiosis, Defense, and Self-Recognition (2019, 2020)
  - Deutsche Forschungsgemeinshaft Grant Program (2020)
  - NSF, Cross-Bio Activities (2021)

- **Reviewer for tenure and promotion packets** at
  - University of Las Vegas *(2008)*
  - University of Florida, Gainesville *(2011*)

- Reed College *(2011)*
- University of Cincinnati *(2012)*
- York University *(2013, 2014)*
- University of Western Ontario *(2013)*
- University of Washington, St. Louis *(2014)*
- University of Pretoria (2015)
- University of Texas, Austin (2016)
- Worcester Polytechnic Institute (2016)
- Hebrew University of Jerusalem (2016)
- Texas A&M University (2016)
- Massachusetts Institute of Technology (2016)
- Rockefeller University (2017)
- University of California, Berkeley (2017)
- University of Cincinnati (2018)
- York University (2019)
- Macquarie University (2019)
- University of California, Riverside (2019)
- Washington University, St. Louis (2019)
- Barnard College (2020)
- MIT (2020)

- **Reviewer for peer-reviewed journal articles in**
  - Science, Proceedings of the National Academy of Sciences; Genome Biology; PLoS Genetics; PLoS Computational Biology; PLoS Pathogens; Biology Letters; Scientific Reports; PLoS ONE; Journal of Experimental Biology; BMC Biology; BMC Physiology; BMC Genomics; FEBS Letters; Insect Molecular Biology; Insect Biochemistry and Molecular Biology; Genes Brain and Behavior; Molecular Ecology; Journal of Insect Physiology; Journal of Invertebrate Pathology; Journal of Chemical Ecology; Comparative Biochemistry and Physiology; Naturwissenschaften; Behavioral Ecology and Sociobiology; Journal of Apicultural Research; Entomologia generalis; Ethology; Journal of Hymenopteran Research; Apidologie; Hormones and Behavior; Journal of Insect Behavior; Biology of Reproduction; Gene; Animal Behavior; Arthropod-Plant Interactions; Hormones and Behavior; Genetics; Ethology, Ecology and Evolution; Reproduction, Fertility and Development; Behavioral Ecology; Journal of General Virology; eLife
  - Review an average of 3 manuscripts/month
- **Miscellaneous reviewer activities**
  - Reviewed program proposal for USDA-ARS Imported Fire Ant and Household Insects unit (2014)

- Factual reviewer for Smithsonian Channel program on "Wild Bees" (2014)
- Served as search committee member for Insect Physiology Research Entomologist position at USDA-ARS (2015)
- Reviewed program proposal for National Centre for Biological Sciences, Bangalore, India (2016)

Service to Professional Societies

- P-IE Wildly Important Goals: Amplifying the Buzz: Establishing the Entomological Society of America as a leader in developing and disseminating information on pollinators, 2021. Co-chair with Kim Stoner, Victor Gonzalez.
- Entomological Society of America Science Policy Committee, member, 2019-2021.
- P-IE Pollinator Committee, Entomological Society of America, 2016-2020.
- Co-Chair, Pollinator Position Statement Writing Group, Entomological Society of America. 2015, 2019
- President, 2013, North American Section of the International Union for the Study of Social Insects (NAS-IUSSI)
    - Duties include writing proposals to support travel grants for junior scientists, reviewing applications and nominations for awards, developing nomination packet for 2014 Hamilton Award nominee, coordinate donors.
- Steering committee member, North American Pollinator Protection Campaign (NAPPC) (2008-2010)
- Co-chair, North American Pollinator Protection Campaign (NAPPC) Honey Bee Health Improvement Task Force (2007-2010, 2012, 2013, 2014)
- Coordinated NAPPC Honey Bee Health Research Grant Program (2008, 2009, 2010, 2011, 2012, 2013, 2014)
- Member, Haagan Dazs' Ice Cream Bee Board, 2011-present
- Moderator for student oral presentations, Annual Meeting for the Entomological Society of America (2012)
- Judge for student oral presentations, Annual Meeting for the Entomological Society of America (2005, 2006)
- Judge for poster presentations for the NC Entomological Society (2005)
- Article for the newsletter of the North American Section of the International Union for the Study of Social Insects (IUSSI) summarizing the 2005 European Congress of the IUSSI (2005)

Participation in Working Groups/Advisory Boards

- Invited participant, **USDA/EPA Pollinator State of the Science Workshop**. Remote. September 8-10, 2020.
- Invited participant on workshop on **Historical Societal Collapse**. Princeton University. April 2019, December 2020.

- Research Oversight Committee member for **Genome Canada/Genome BC project**, "Sustaining and Securing Canada's Honey Bees Using 'Omic Tools", 2015-2018, and 2019-2022, "BeeCSI: 'Omic tools for assessing bee health"

- Organized working group on "Putting pesticides on the map to guide conservation of pollinators and their ecosystem services." **National Socio-Environmental Synthesis Center**, Annapolis, MD. Workshop 1: November 13-15, 2017. Workshop 2: May 30-June 1, 2018. Workshop 3: Jan 8-10, 2019. Co-organized with Maggie Douglas (Dickinson College) and Doug Sponsler (Penn State).

- Invited participant in **National Science Foundation "Animal Behavior Workshop"**, NYC, NY, August 5-9, 2014
- Organized **Trans-Bee Workshop**; Synthesis Centre of Biodiversity Sciences, Leipzig, Germany, October 10-11, 2013 and April 28-29, 2014
- Invited participant in **US-UK Honey Bee Health Workshop**, York, UK, October 17-18, 2012
- Invited participant in **National Science Foundation "Animal Behavior Workshop"**, Warrenton, VA, April 27-May 1, 2012
- Invited participant in **Colony Collapse Disorder Workshop**; Beltsville, MD, 2007
- Invited participant in **BeeSpace Workshop**; University of Illinois, Urbana-Champaign, 2007

OUTREACH ACTIVITIES

Service to the Public

- Led the development of Beescape (https://beescape.org/) an online tool which helps beekeepers and others assess the quality of their landscapes for supporting bee health. The tool is integrated with a survey, which will allow us to collect information on honey bee and wild bee health in diverse landscapes and develop predictive models of bee health in specific regions, which will be incorporated into future versions. Beescape was developed as a multi-institutional partnership, with Penn State as the lead.

- Lead writer and organizer of Pennsylvania Pollinator Protection Plan (2017). Grozinger led a team of 36 individuals, represented 28 national and international organizations, in developing and writing the P4. The P4 is a living document that contains information on the current status and economic value of pollinator in Pennsylvania, best practices for developing foraging and habit, using pesticides, and managing bees in urban, agricultural, and natural landscapes as well as roadsides and rights of way, and recommendations for research, communication, and policy. In total, the document is ~80 pages in length and is extensively hyperlinked. It is available at http://ento.psu.edu/pollinators/research/the-pennsylvania-pollinator-protection-plan-p4.
- Advisory Committee member for the Powdermill Nature Reserve, Carnegie Natural History Museum (2018-)
- Consulted with Highlights Magazine on feature on pollinators (January 2020).

Outreach Related Speaking Engagements *(Grozinger is invited presenter)*

- **Radio Park Elementary School.** Remote presentation and demonstration on making hotels for solitary bees. April 2021. With Natalie Boyle.
- **Metro Atlanta Beekeepers Association.** Remote presentation, March 2021.
- **Engineering Edge Podcast.** Aired April 2021. https://theengineeringedge.podbean.com/e/the-everyday-tech-that-could-take-us-to-the-moon/
- **STEM Professionals Panel for Chief Science Officers Program.** January 2021 (panelist). Middle/High school leadership program.
- **PA STEM Coalition Year in Review.** December 2020. (panelist) STEM teachers and government officials in PA.
- **VT State Beekeepers Annual Meeting.** October 2020. (1 presentation, keynote)
- **PolliNation Podcast.** July 2020. (podcast produced by Oregon State University).
- **Penn State Pollinator Health Webinar Series.** July 2020.
    - **https://ento.psu.edu/news/2020/penn-state-pollinator-webinar-series-bee-nutritional-ecology-from-flowers-to-landscapes-christina-grozinger**
- **Northern Virginia Beekeepers Association.** June 2020.
- **Penn State Alumni Association, May 2020.**
    - **https://www.youtube.com/watch?v=CyyKzS0JkMI&feature=youtu.be**
- **NJ State Beekeepers Annual Meeting**, November 2019 (1 presentation, keynote)
- **STEM Pillars presentation on "Pollinators and Plants"**, Shaver's Creek, Tyrone Public Library, Philipsburg Public Library, April, July, October 2019. With Makaylee Crone, Rong Ma, and Heather Zimmerman. Supported by a IMLS grant to Heather Zimmerman.
- **Radio Interview, 1160 WCCS Pennsylvania**, September 2019
- **Montgomery County PA Beekeepers,** August 2019
- **APPL-RED** (Authentic Plant Pollinator Landscape for Educators) workshop from June 24-July 28, 2019 at University Park. Instructors: Christina Grozinger, Harland Patch, Kathy Hill, Emily Erickson, Melanie Kammerer, Tyler Jones and Doug Sponsler.
- **Pollinator In-Service Short-Course,** July 2019
- **Centre County Leadership Council,** May 2019
- **2019 Forest Landowner Conference,** State College, PA, March 2019
- **Worcester MA Beekeepers**, 2 presentations, March 2019
- **Pennsylvania State Beekeepers Association Annual Meeting**, State College, PA, 2 presentations, November 2018

- **Asbury Woods, "What the Buzz About Bees?"**, Erie, PA, September 2018
- **Marcellus Shale Coalition,** August 2018
- **PA Forest Products Association,** August 2018
- **Maryland State Beekeepers Association Annual Meeting**, 2 presentations, Annadale, MD, February 2018
- **American Honey Producers Association Annual Meeting,** San Diego, CA, January 2018.
- **Pennsylvania State Beekeepers Association Annual Meeting**, State College, PA, November 2017
- **Ag Progress Days**, Pine Grove Mills, PA, August 17, 2017
- **AdkAction.org and Wild Center Buzz Fest**, at Tupper Lake, NY and Old Forge, NY, July 19-20, 2017
- **APPL-RED** (Authentic Plant Pollinator Landscape for Educators) workshop from July 24-July 28, 2017 and April 13, 2018 at University Park. Instructors: Annmarie Ward, Christina Grozinger, Harland Patch, Kathy Hill, Emily Erickson, Tyler Jones and Doug Sponsler.
- **Penn State Millennium Cafe**, University Park, PA, June 20, 2017
- **Weston Backyard Beekeepers Association**, Weston, CT, May 23, 2017
- **Pennsylvania Hardwoods Development Council Meeting.** State College, PA, May 10, 2017
- **Penn State Science Policy Society - Science on Tap Series**, University Park, PA, April 18, 2017 (and associated radio interview on WFREQ)
- **Centre County Master Gardeners Conference**, University Park, PA, March 20, 2017
- Invited presentation, **2017 Southeast PA Green Industry Conference**, Doylestown, PA January 2017
- Invited presentation, **2C's And A Bee Beekeepers Association**, November 2016
- Invited presentation, **Pennsylvania State Beekeepers Association Annual Meeting**, November 2016
- Invited presentation, **Penn State Master Gardeners Leadership In-Service Conference**, October 2016
- Invited presentation, **Penn State Huck Institutes of the Life Sciences VIP symposium**, October 2016
- Invited presentation, **Liberty Hill Community**, July 2016
- Invited presentation, **The Village at Penn State**, June 2016
- Invited presentation, **Penn State Smeal College of Business**, June 2016
- Invited presentation (2), **Western PA Beekeepers Seminar**, February 2016
- Invited presentations (2), **Connecticut State Beekeepers Association**, October 2015
- Invited presentation, **Marin County (CA) Beekeepers**, March 2015
- Invited presentation, **Weston Backyard Beekeepers**, September 2014
- Podcast interview on pollinator decline and Penn State Research with Ray Bowman, **Farm and Food, Farmstead Media Group**, April 2014.

- Invited presentation on pollinator decline, **Juniata Valley Audubon Society**, May 2013
- Presentation on "The Global Pollinator Crisis", in Frontiers in Science Lecture Series: Food: Strategies for Growing Enough for Everyone. **Penn State University**, January 2012.
- Discussion panel member, "**Burt's Talks To Bees**", New York City, June 2012.
- Invited research presentation to **York County Beekeepers Association**, June 2011
- Invited presentation to the **Mid Atlantic Apiculture & Extension Consortium**, March 2011
- Invited research presentation and workshop on honey bee breeding at **Western PA Beekeepers Seminar**, February 2011
- Invited research presentation and workshop on honey bee breeding at **Southeastern PA Honey Bee Symposium**, October 2010
- Invited research presentation and workshop on honey bee breeding at **PA State Beekeeper Annual Meeting**, November 2009
- Invited presentation. **LabCorp**. Burlington, NC. (2006)
- Invited presentation. **NC Coastal Plains Beekeepers Meeting**. Tarboro, NC. (2006)
- Invited presentation. **NCSU Advanced Horticulture Extension Agent Training**. Raleigh, NC. (2006)

<u>Outreach Related Interactive Activities</u>

- **Unitarian Universalist Fellowship of Centre County.** Presentation to K-5 group on "Night Singing Insects". October 2020. *Presented by Grozinger*.
- **Radio Park Elementary School Pollinator Garden Installation.** Installed garden with ~175 annual and perennial plants, engaged 350 students and 50 adults. Organized by Penn State Master Gardeners. June 2017. *Presented by Grozinger*.
- **Penn State College of Agricultural Sciences Staff Retreat.** May 2017. *Presented by members of Grozinger lab*.
- **Great Insect Fair**. Event sponsored by the Department of Entomology at Penn State. University Park, PA. 2012-2019. *Presented by Grozinger and members of Grozinger lab*.
- "**Wings in the Park**". Event sponsored by Centre County Master Gardeners. State College, PA. June 2012, June 2013, July 2014, July 2015, July 2016, July 2017. *Presented by Grozinger and members of Grozinger lab*.
- **Arbor and Earth Days Celebration**. Event sponsored by The Arboretum at Penn State. University Park, PA. April 2010, 2011, 2012, 2013, 2014, 2015, 2016. *Presented by members of Grozinger lab*.
- **Radio Park Elementary School.** Presentations and activities related to pollinators and other insects for multiple K-5 classes. State College, PA. May 2016. June 2017. May 2018. *Presented by Grozinger and Patch*.

- "**Spring Creek Festival**". Event sponsored by Clearwater Conservancy. State College, PA. June 2013. *Presented by Grozinger and members of Grozinger lab*.
- **Daybridge Child Care Center and Hort Woods Child Care Center**. Presentations and activities related to pollinators and other insects for 2-5 year olds. State College, PA. May 2011, May 2012, May 2013, May 2014. *Presented by Grozinger and Patch*.
- **The Eberly College of Science Exploration Days**. University Park, PA. April 2011, 2012. *Presented by members of Grozinger lab*.
- Presentation and activities related to honey bee biology to students in the **Delta Program, State College Area School System**. University Park, PA. February 2009. *Presented by Grozinger and members of Grozinger lab*.
- Presentation and activities related to honey bee biology to middle school students in **Imhotep Academy**. Event sponsored by the Science House, North Carolina State University. Raleigh, NC. 2005. *Presented by Grozinger and members of Grozinger lab*.
- Outreach program with junior high school biology students at **North Carolina School of Science and Math**; helped students design and run experiments of honey bee behavior. 2005-2008. *Presented by Grozinger and members of Grozinger lab*.