

## CURRICULUM VITAE

### JÜRGEN LIEBIG

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### EDUCATION

- 1998            Dr. rer. nat. (Zoology), University of Würzburg  
Dissertation: Eusociality, female caste dimorphism, and regulation of reproduction in the ponerine ant *Harpegnathos saltator* Jerdon (Grade: summa cum laude)
- 1994            Biology Diploma, University of Würzburg

### EMPLOYMENT

- Fall 1998 – Summer 2004      Scientific Assistant (similar to assistant professor without faculty status), Institute of Behavioral Physiology and Sociobiology, University of Würzburg
- Summer 2004 – Fall 2005      Research Group Leader, Institute of Behavioral Physiology and Sociobiology, University of Würzburg
- Fall 2005 – Summer 2011      Assistant Professor, School of Life Sciences, Arizona State University
- Summer 2011                      Associate Professor, School of Life Sciences, Arizona State University

### SPONSORED RESEARCH

#### *Awarded at ASU*

NSF-BSF Exploiting the evolution of odorant discrimination in ants to decipher the olfactory code, awarded 2020, PI Juergen Liebig (75%), co-PI Robin Harris (25%), External contractor Jocelyn Millar (subcontract), co-PI Eyal Privman and co-PI Mickey Kosloff (own budget through Israeli Science Foundation) total amount \$630,927 Award period 8/15/2020 – 7/31/2023

DARPA, awarded 2017 (Co-PI with Spring Berman, Theodore Pavlic, and Stephen Pratt, 25% recognition) (1 year period 2017 to 2018); total amount 175,000 USD

Illumina Mini Grant Award awarded to Christian Rabeling, Tyler Murdock and Juergen Liebig 2017: 8,000 USD

SOLS RTI grant 2017: 5,000 USD

Howard Hughes Medical Institute (HCIA), awarded 2012 (PI (100% recognition/subcontract); (period 2012-2016); Total amount subcontract: 775,638.00 USD, Title: The Role of Epigenetics in the Behavior and Aging of Ants

HHMI CIA, awarded 2008 (PI (100% recognition/subcontract);( period 2008-2012); Total amount subcontract: 1,232,739 USD (Total approximate amount whole project: 6,210,306 USD), Title: The Role of Epigenetics in the Behavior and Aging of Ants

USDA-CSREES, awarded 2007; (period: 2007-2011); co-equal PI (75% recognition, 100% recognition and sole PI after other PI took on a position outside of ASU): Total amount: 349,854 USD, Title: Pheromonal Regulation of Reproduction in Termites

#### *Awarded before ASU*

German Science Foundation, awarded 2003; (period: 2003-2007); PI; Euro 139,500 (only direct costs);  
Title: Reproduktiver Altruismus und Arbeitseffizienz in Ameisenstaaten (Reproductive altruism and efficiency of division of labor in ant societies)

German Science Foundation, awarded 2003; (period: 2003-2007); CO-PI; Euro 145,400 (only direct costs)  
Title: Plastizität in der Lebenslaufstrategie und soziale Konflikte bei einer primitiv eusozialen Biene (Plasticity in the life history strategy and social conflicts in a primitively eusocial bee)

German Science Foundation, awarded 2000; (period: 2000-2003); PI; DM 376,500 (only direct costs)  
Title: Evolution der Verhaltensmechanismen der reproduktiven Arbeitsteilung bei Ameisen (Evolution of the behavioral mechanisms of reproductive division of labor in ants)

German Science Foundation, awarded 2000; (period: 2000-2003); CO-PI; DM 279,500 (only direct costs)  
Title: Evolution der (reproduktiven) Arbeitsteilung bei sozialen Insekten – Untersuchungen mit Multiagenten-Simulationsmodellen (Evolution of the reproductive division of labor in social insects – Studies with multi-agent simulations)

#### **AWARDS**

##### *External*

Howard Hughes Medical Institute Collaborative Innovation Award 2012 (see sponsored research)  
Howard Hughes Medical Institute Collaborative Innovation Award 2008 (see sponsored research)

##### *Internal*

ASU Faculty Mentor Award 2007

## PUBLICATIONS

### *Peer-Reviewed Journal Articles*

**(Lab members are designated as follows: graduate students\*, postdocs#, undergraduates^, technician~)**

Choi T\*, Pyenson B\*, Liebig J, Pavlic TP 2021. Beyond tracking: Using deep learning to discover novel interactions in biological swarms. (Proceedings of DARS 2021 will be published as Distributed Autonomous Robotics Systems in the book series Springer Proceedings in Advanced Robotics)

Choi\* T, Pyenson\* B, Liebig J, Pavlic TP 2021. Identification of abnormal states in videos of ants undergoing social phase change. In: Proceedings of the Thirty-Third Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-21), Virtual conference, February 4–6, pp. XXX-XXX

Penick CA, Ghaninia M, Haight KL, Opachaloemphan C, Yan H, Reinberg D, Liebig J 2021. Reversible plasticity in brain size, behavior and physiology characterizes caste transitions in a socially flexible ant (*Harpegnathos saltator*). Proceedings of the Royal Society of London B: in press

Yan H, Liebig J. Genetic basis of chemical communication in eusocial insects. *Genes and Development* 35: 470-482

Fronhofer EA, **Liebig J**, Mitesser O, Poethke HJ 2018 Eusociality outcompetes egalitarian and solitary strategies when resources are limited and reproduction is costly, *Ecology and Evolution* 8:12953-12964.

Ghaninia M#, Berger SL, Reinberg D, Zwiebel LJ, Ray A, **Liebig J** 2018. Antennal olfactory physiology and behavior of males of the ponerine ant *Harpegnathos saltator*. *Journal of Chemical Ecology* 44:999-1007. doi: 10.1007/s10886-018-1013-6.

Taerum SJ, De Martini F, **Liebig J**, Gile GH 2018 Incomplete co-cladogenesis between *Zootermopsis* termites and their associated protists. *Environmental Entomology* 47: 184-195

Yan H, Opachaloemphan C, Mancini G, Yang H, Gallitto M, Mlejnek J, Leibholz A, Haight K~, Ghaninia M#, Huo L, Perry M, Slone J, Zhou Z, Traficante M, Penick CA\*, Dolezal K~, Gokhale K#, Stevens K, Fetter-Pruneda I, Bonasio R, Zwiebel LJ, Berger SL, **Liebig J**, Reinberg D, Desplan C 2017 An engineered orco mutation produces aberrant social behavior and defective neural development in ants. *Cell* 170: 736-747

Gospocic J, Shields EJ, Glastad KM, Lin Y, Penick CA\*, Yan H, Mikheyev AS, Linksvayer TA, Garcia BA, Berger SL, **Liebig J**, Reinberg D, Bonasio R 2017 The neuropeptide corazonin controls social behavior and caste identity in ants. *Cell* 170: 748-759

Pask GM, Slone JS, Millar JG, Das P, Moreira JA, Zhou Z, Bello J, Berger SL, Bonasio R, Desplan C, Reinberg D, **Liebig J**, Zwiebel LJ, Ray A 2017 Specialized odorant receptors in social insects that detect cuticular hydrocarbon cues and candidate pheromones. *Nature Communications* 8: 297

Slone JD, Pask GM, Ferguson ST, Millar JG, Berger SL, Reinberg D, **Liebig J**, Ray A, Zwiebel LJ 2017 Functional characterization of odorant receptors in the ponerine ant, *Harpegnathos saltator* Proceedings of the National Academy of Sciences USA 114: 8586-8591

Smith AA, **Liebig J** 2017 The evolution of cuticular fertility signals in eusocial insects. Current Opinion in Insect Science 22: 79-84

Ghaninia M<sup>#</sup>, Haight K<sup>~</sup>, Berger SL, Reinberg D, Zwiebel LJ, Ray A, **Liebig J** 2017 Chemosensory sensitivity reflects reproductive status in the ant *Harpegnathos saltator*. Scientific Reports 7: 3732

Penick CA\*, **Liebig J** 2017 A larval 'princess pheromone' identifies future ant queens based on their juvenile hormone content. Animal Behaviour 128: 33-40

Neuvonen MM, Tamarit D, Naslund C, **Liebig J**, Feldhaar H, Moran NA, Guy L, Andersson SGE, 2016. The genome of Rhizobiales bacteria in predatory ants reveals urease gene functions but no genes for nitrogen fixation. Scientific Reports 6:39197.

Brent CS, Penick CA\*, Trobaugh B<sup>^</sup>, Moore D\*, **Liebig J**, 2016. Induction of a reproductive-specific cuticular hydrocarbon profile by a juvenile hormone analog in the termite *Zootermopsis nevadensis*. Chemoecology 26:195-203

Glastad KM, Gokhale K<sup>#</sup>, **Liebig J**, Goodisman MAD, 2016. The caste- and sex-specific DNA methylome of the termite *Zootermopsis nevadensis*. Scientific Reports 6: 37110

Sasaki T, Penick CA\*, Shaffer Z, Haight KL, Pratt SC, **Liebig J** 2016 A simple behavioral model predicts the emergence of complex animal hierarchies. American Naturalist 187:765-775

Simola DF, Graham RJ, Brady CM, Enzmann BL<sup>#</sup>, Desplan C, Ray A, Zwiebel LJ, Bonasio R, Reinberg D, **Liebig J**, Berger SL 2016 Epigenetic (re)programming of caste-specific behavior in the ant *Camponotus floridanus*. Science 351:42-aac6633

Ebie JD\*, Hölldobler B, **Liebig J**, 2015. Larval regulation of worker reproduction in the polydomous ant *Novomessor cockerelli*. The Science of Nature 102: 72

Sharma KR, Enzmann BL<sup>#</sup>, Schmidt Y, Moore D, Jones GR, Parker J, Berger SL, Reinberg D, Zwiebel LJ, Breit B, **Liebig J**, Ray A, 2015. Cuticular hydrocarbon pheromones for social behavior and their coding in the ant antenna. Cell Reports 12: 1261-1271.

Zhou X, Rokas A, Berger SL, **Liebig J**, Ray A, Zwiebel LJ, 2015. Chemoreceptor evolution in Hymenoptera and its implications for the evolution of eusociality. Genome Biology and Evolution 7: 2407-2416.

Yan H, Bonasio R, Simola DF, **Liebig J**, Berger SL, Reinberg D, 2015. DNA methylation in social insects. Annual Review of Entomology 60: 435-452

Korb J, Poulsen M, Hu H, Cai L, Boomsa JJ, Zhang G, **Liebig J**, 2015. A genomic comparison of two termites with different social complexity. Frontiers in Genetics 6: 9

Terrapon N, Li C, Robertson HM, Ji L, Meng XH, Booth W, Chen ZS, Childers CP, Glastad KM, Gokhale K<sup>#</sup>, Gowin J, Gronenberg W, Hermansen RA, Hu HF, Hunt BG, Huylmans AK, Khalil

SMS, Mitchell RD, Munoz-Torres MC, Mustard JA, Pan HL, Reese JT, Scharf ME, Sun FM, Vogel H, Xiao J, Yang W, Yang ZK, Yang ZQ, Zhou JJ, Zhu JW, Brent CS, Elsik CG, Goodisman MAD, Liberles DA, Roe RM, Vargo EL, Vilcinskas A, Wang J, Bornberg-Bauer E, Korb J, Zhang GJ, **Liebig J**, 2014. Molecular traces of alternative social organization in a termite genome. *Nature Communications* 5:3636

Yan H, Simola DF, Bonasio R, **Liebig J**, Berger SL, Reinberg D (2014) Eusocial insects as emerging models for behavioural epigenetics. *Nature Reviews Genetics* 15:677-688

Penick CA\*, Brent CS, Dolezal K, **Liebig J**, 2014. Neurohormonal changes associated with ritualized combat and the formation of a reproductive hierarchy in the ant *Harpegnathos saltator*. *Journal of Experimental Biology* 217:1496-1503

Simola DF, Wissler L, Donahue G, Waterhouse RM, Helmkampf M, Roux J, Nygaard S, Glastad KM, Hagen DE, Viljakainen L, Reese JT, Hunt BG, Graur D, Elhaik E, Kriventseva EV, Wen JY, Parker BJ, Cash E, Privman E, Childers CP, Munoz-Torres MC, Boomsma JJ, Bornberg-Bauer E, Currie CR, Elsik CG, Suen G, Goodisman MAD, Keller L, **Liebig J**, Rawls A, Reinberg D, Smith CD, Smith CR, Tsutsui N, Wurm Y, Zdobnov EM, Berger SL, Gadau J, 2013. Social insect genomes exhibit dramatic evolution in gene composition and regulation while preserving regulatory features linked to sociality. *Genome Research* 23: 1235-1247

Moore D, **Liebig J**, 2013. Reproductive restraint without policing in early stages of a social insect colony. *Animal Behaviour* 85: 1323-1328.

Simola DF, Ye C, Mutti NS#, Dolezal K, Bonasio R, **Liebig J**, Reinberg D, Berger SL, 2013. A chromatin link to caste identity in the carpenter ant *Camponotus floridanus*. *Genome Research* 23: 486-496.

Penick CA\*, Trobaugh B^, Brent CS, **Liebig J**, 2013. Head butting as an early indicator of reproductive disinhibition in the termite *Zootermopsis nevadensis*. *Journal of Insect Behavior* 26: 23-34.

Penick CA\*, Prager S^, Liebig J, 2012. Juvenile hormone induces queen development in late-stage larvae of the ant *Harpegnathos saltator*. *Journal of Insect Physiology* 58: 1643–1649

Bonasio R, Quiye L, Lian J, Mutti NS, Jin L, Zhao H, Zhang P, Wen P, Ziang H, Ding Y, Jin Z, Shen SS, Wang Z, Wang W, Wang J, Berger SL, **Liebig J**, Zhang GJ, Reinberg D, 2012. Genome-wide and caste-specific DNA methylomes of the ants *Camponotus floridanus* and *Harpegnathos saltator*. *Current Biology* 22: 1755-1764

Zhou X, Slone JD, Rokas A, Berger SL, **Liebig J**, Ray A, Reinberg D, Zwiebel L. 2012. Phylogenetic and transcriptomic analysis of chemosensory receptors in a pair of divergent ant species reveals sex-specific signatures of odor coding. *PLoS Genetics* 8: e1002930

Penick CA\*, **Liebig J**, 2012. Regulation of queen development through worker aggression in a predatory ant. *Behavioral Ecology* 23: 992-998

Korb J, Buschmann M, Schafberg S, **Liebig J**, Bagnères AG, 2012. Brood care and social evolution in termites. *Proceedings of the Royal Society of London B* 279: 2662-2671

- Smith AA\*, Overson RP, Hölldobler B, Gadau J, **Liebig J**, 2012. The potential for worker reproduction in the ant *Aphaenogaster cockerelli* and its absence in the field. *Insectes Sociaux* 59:411-416
- Smith A\*, Hölldobler B, **Liebig J**, 2012. Queen-specific signals and worker punishment in the ant *Aphaenogaster cockerelli*: the role of the Dufour's gland. *Animal Behaviour* 83: 587-593
- Penick CA\*, **Liebig J**, Brent CS, 2011. Reproduction, dominance, and caste: endocrine profiles of queens and workers of the ant *Harpegnathos saltator*. *Journal of Comparative Physiology A* 197: 1063–1071
- Eliyahu D#, Ross K G, Haight K L, Keller L, **Liebig J**, 2011. Venom alkaloid and cuticular hydrocarbon profiles are associated with social organization, queen fertility status, and queen genotype in the fire ant *Solenopsis invicta*. *Journal of Chemical Ecology* 37: 1242-1254
- Smith A\*, Hölldobler B, **Liebig J**, 2011. Reclaiming the crown: queen to worker conflict over reproduction in *Aphaenogaster cockerelli*. *Naturwissenschaften* 98: 237-240
- Schneider S, Schrader C, Wagner AE, Boesch-Saadatmandi, C, **Liebig J**, Rimbach G, Roeder T, 2011. Linkage between stress resistance and antioxidant systems in the ponerine ant *Harpegnathos saltator*. *PLoS One* 6: e14601
- Bonasio R, Zhang G, Ye C, Mutti NS#, Fang X, Qin N, Donahue G, Yang P, Li Q, Li C, Zhang P, Huang Z, Berger SL, Reinberg D, Wang J, **Liebig J**, 2010. Genomic comparison of the ants *Camponotus floridanus* and *Harpegnathos saltator*. *Science* 329: 1068-1071.
- Moore D\*, **Liebig J**, 2010. Mechanisms of social regulation change across colony development in an ant. *BMC Evolutionary Biology* 10:328
- Moore D\*, **Liebig J**, 2010. Mixed messages: fertility signaling interferes with nestmate recognition in the monogynous ant *Camponotus floridanus*. *Behavioral Ecology and Sociobiology* 64: 1011-1018
- Smith AA\*, Hölldobler B, **Liebig J**, 2009. Cuticular hydrocarbons reliably identify cheaters and allow enforcement of altruism in a social insect. *Current Biology* 19: 78-81.
- Liebig J**, Eliyahu D#, Brent C, 2009. Cuticular hydrocarbon profiles indicate reproductive status in the termite *Zootermopsis nevadensis*. *Behavioral Ecology and Sociobiology* 63: 1799–1807
- Smith A\*, Hölldobler B, **Liebig J**, 2008. Hydrocarbon signals explain the pattern of worker and egg policing in the ant *Aphaenogaster cockerelli*. *Journal of Chemical Ecology* 34:1275-1282.
- Monnin T, **Liebig J**, 2008. Understanding eusociality requires both proximate and ultimate thinking and due consideration of individual and colony-level interests. *Oikos* 117:1441-1443.
- Poethke HJ, **Liebig J**, 2008. Risk-sensitive foraging and the evolution of cooperative breeding and reproductive skew. *BMC Ecology* 8:2.
- Endler A\*, Hölldobler B, **Liebig J**, 2007 Lack of physical policing and fertility cues in egg-laying workers of the ant *Camponotus floridanus*. *Animal Behaviour* 74: 1171-1180

- Weissel N, Mitesser O, **Liebig J**, Poethke H-J, Strohm E, 2006. The influence of soil temperature on the nesting cycle of the halictid bee *Lasioglossum malachurum*. *Insectes Sociaux* 53: 390-398
- Endler A\*, **Liebig J**, Hölldobler B, 2006. Queen fertility, egg marking and colony size in the ant *Camponotus floridanus*. *Behavioral Ecology and Sociobiology* 59: 490-499
- Dietemann V\*, **Liebig J**, Hölldobler B, Peeters C, 2005. Changes in the cuticular hydrocarbons of incipient reproductives correlate with triggering of worker policing in the bulldog ant *Myrmecia gulosa*. *Behavioral Ecology and Sociobiology* 58: 486-496
- Hoyer SC, **Liebig J**, Rössler W, 2005. Biogenic amines in the ponerine ant *Harpegnathos saltator*: serotonin and dopamine immunoreactivity in the brain. *Arthropod Structure & Development* 34: 429-440
- Liebig J**, Monnin T, Turillazzi S, 2005. Direct assessment of queen quality and lack of worker suppression in a paper wasp. *Proceedings of the Royal Society of London B* 272: 1339-1344
- Endler A\*, **Liebig J**, Schmitt T, Parker J, Jones G, Schreier P, Hölldobler B, 2004. Surface hydrocarbons of queen eggs regulate worker reproduction in a social insect. *Proceedings of the National Academy of Sciences USA* 101:2945-2950
- Falk KH\*, **Liebig J**, Gadau J 2004. Polymorphic microsatellite markers from the formicine ant *Lasius (Dendrolasius) fuliginosus*. *Molecular Ecology Notes* 4: 716-718
- Jarvis AP, **Liebig J**, Hölldobler B, Oldham NJ, 2004. Biosynthesis of the insect pheromone (S)-4-methyl-3-heptanone. *Chemical Communications*: 1196-1197
- Liebig J**, Poethke J, 2004. Queen lifespan and colony longevity in the ant *Harpegnathos saltator* (Jerdon). *Ecological Entomology* 29:203-207
- Hölldobler B, Morgan ED, Oldham NJ, **Liebig J**, Liu Y, 2004. Dufour gland secretion in the harvester ant genus *Pogonomyrmex*. *Chemoecology* 14:101-106
- Dietemann V\*, Peeters C, **Liebig J**, Thivet V, Hölldobler B, 2003. Cuticular hydrocarbons mediate discrimination of reproductives and nonreproductives in the ant *Myrmecia gulosa*. *Proceedings of the National Academy of Sciences USA* 100:10341-10346
- Cahan S, Blumstein DT, Sundström L, **Liebig J**, Griffin A, 2002. Social trajectories and the evolution of social behavior. *OIKOS* 96:206-216
- Hölldobler B, **Liebig J**, Alpert GD, 2002. Gamergates in the myrmicine genus *Metapone* (Hymenoptera:Formicidae). *Naturwissenschaften* 89:305-307
- Hölldobler B, Oldham NJ, Alpert GD, **Liebig J**, 2002. Predatory behavior and chemical communication in two *Metapone* species (Hymenoptera:Formicidae). *Chemoecology* 12:147-151
- Hölldobler B, Morgan ED, Oldham NJ, **Liebig J**, 2001. Recruitment pheromone in the harvester ant genus *Pogonomyrmex*. *Journal of Insect Physiology* 47:369-374

**Liebig J**, Peeters C, Oldham NJ, Markstädter C, Hölldobler B, 2000. Are variations in cuticular hydrocarbons of queens and workers a reliable signal of fertility in the ant *Harpegnathos saltator*? Proceedings of the National Academy of Sciences USA 97:4124-4131

Peeters C, **Liebig J**, Hölldobler B, 2000. Sexual reproduction by both queens and workers in the ponerine ant *Harpegnathos saltator*. Insectes Sociaux 47:325-332

Gronenberg W, **Liebig J**, 1999. Smaller brains and optic lobes in reproductive workers of the ant *Harpegnathos*. Naturwissenschaften 86:343-345

**Liebig J**, Peeters C, Hölldobler B, 1999. Worker policing limits the number of reproductives in a ponerine ant. Proceedings of the Royal Society of London B 266:1865-1870

Wheeler DW, **Liebig J**, Hölldobler B, 1999. Atypical vitellins in ponerine ants (Formicidae: Hymenoptera). Journal of Insect Physiology 45:287-293

**Liebig J**, Hölldobler B, Peeters C, 1998. Are ant workers capable of colony foundation? Naturwissenschaften 85:133-135

**Liebig J**, Heinze J, Hölldobler B, 1997. Trophallaxis and aggression in the ponerine ant, *Ponera coarctata*: Implications for the evolution of liquid food exchange in the Hymenoptera. Ethology 103:707-722

**Liebig J**, Heinze J, Hölldobler B, 1995. Queen size variation in the ponerine ant *Ponera coarctata* (Hymenoptera: Formicidae). Psyche 102:1-12

#### *Commentaries*

Liebig J. 2020. Chemical ecology: A new royal scent in a small insect society. *Current Biology* **30**: R280-R282.

Smith AA, Suarez AV, **Liebig J**, 2018. Queen pheromones out of context: a comment on Holman. Behavioral Ecology 29:1212-1212

#### *Chapters in Books*

**Liebig J**, 2010. The evolution of hydrocarbon profiles as dominance and fertility signals in social insects (eds Blomquist GJ, Bagnères-Urbany AG) in *Insect Hydrocarbons: Biology, Biochemistry, and Chemical Ecology*, Cambridge University Press

Peeters C, **Liebig J**, 2009. Fertility signaling as a general mechanism of regulating reproductive division of labor in the social Hymenoptera (eds Gadau J, Fewell J) in *Organization of Insect Societies*, Harvard University Press

Strohm E, **Liebig J**, 2008. Why are so many bees but so few digger wasps eusocial? The effect of the mode of provisioning and helper efficiency on the distribution of eusociality among the Apoidea, (eds Korb J, Heinze J) in *Ecology of Social Evolution*, Springer, Heidelberg



### *Workshop Reports*

Cahan S, Carloni E, **Liebig J**, Pen I, Wimmer B, 1999. "Causes and consequences of sociality". *Ethology, Ecology & Evolution* 11: 85-87.

### *Invited Talks at Research Institutes and other Organizations*

Liebig J Restricted aging in workers of the ant *Harpegnathos saltator* Gutenberg Workshops on Aging in Social Insects, Mainz, Germany, Nov 25 to 27 2020 (cancelled due to Covid-19)

Liebig J, "How did the basic organization of insect societies evolve? A synthesis of the chemoecology and behavioral regulation of reproductive division of labor" UC Riverside, Research seminar, 03/2017

Liebig J, "Phenotypic Plasticity and Transitions in the Organization of Insect Societies: Behavior, Physiology, and Olfaction" Organismal Seminar at McGill University, 03/2015

Liebig J, "Genes and sociality in ants and termites" ASU - University of Wuerzburg International Symposium and Workshop, 05/2014

Liebig J, "The Game of Thrones in Insect Societies: Genes, Pheromones, and Behavior" Seminar, Zoological Institute, University of Regensburg, Germany, 05/2014

Liebig J, "Correlates of sociality in ant and termite genomes" Seminar, Department of Entomology, University of Kentucky, Lexington, Kentucky, 04/2013

Liebig J, "One mechanism fits all? Cuticular hydrocarbons as fertility signals in eusocial insects" Seminar at the University of Georgia, Athens, 10/2012

Liebig J, "Ants as 'novel' model organisms in genetics, genomics, and epigenetics" invited presentation at the Annual Genetics Department Retreat of the Stanford University, Monterey, USA, 9/2011

Liebig J. "One mechanism fits all? Cuticular hydrocarbons as fertility signals in eusocial insects" North Carolina State University, Raleigh, USA, 9/2011

Liebig J. "One mechanism fits all? Cuticular hydrocarbons as fertility signals in eusocial insects" invited talk at the Smithsonian Tropical Research Institute, Gamboa, Panama, 5/2011

Liebig J. "What makes an insect eusocial? Foundations of reproductive division of labor in ants, wasps, and termites" invited talk in the Neurobiology and Behavior Seminar of the Department of Neurobiology and Behavior/Cornell University/Ithaca 4/2011

Liebig J. "Ehrliche Signale bei der reproduktiven Arbeitsteilung sozialer Insekten - Honest signals in the reproductive division of labor of social insects" Biocenter, University of Würzburg, Germany, 3/2011

Liebig J. “The evolution of a major signaling system? The role of cuticular hydrocarbons in the regulation of reproduction in eusocial insects” invited talk in the Entomology Seminars of the University of California/Riverside 11/2010

Liebig J. “What makes an insect eusocial? Foundations of reproductive division of labor in ants, wasps, and termites” invited seminar talk at the USDA facility in Maricopa, AZ 11/2010

Liebig J. Helfen oder Eierlegen– Kann ein Signal die reproduktive Arbeitsteilung bei "allen" sozialen Insekten erklären? University of Osnabrueck 12/2009

Liebig J. “The social life of ants” Brunei Natural History Society, Brunei Darussalam 06/2009

Liebig J. “Cuticular hydrocarbons as fertility signals in the social insects” invited talk at the Biocenter, University of Würzburg, Germany, 12/2007

Liebig J. “Cuticular hydrocarbons as fertility signals in the social insects” invited talk at the University of Freiburg, Germany, 12/2007

Liebig J. “Social Control” Dynamical Discussions of the Center for Social Dynamics and Complexity, ASU, 10/2007

Liebig J. “Costly aggression, cheap signals, and the regulation of reproduction in insect societies”, invited talk at the Center for Insect Science Hexapodium Meeting, University of Arizona, 11/2006

Liebig J. “Being reproductively altruistic or oppressed: How workers realize their fitness interests in hymenopteran societies“. University of Arizona, Tucson, 2004

Liebig J. “The evolution of helpers in insects: a preliminary simulation approach”. Workshop, University of Regensburg, 2001

Liebig J. “Die Regulation der Reproduktion bei sozialen Insekten: pheromonale Königinnenkontrolle oder Fertilitätssignale?“ University of Essen, Germany, 2001

#### *Conference and Meeting Presentations*

Liebig J (2014) “Fertility signaling with long-chained hydrocarbons in solitary and eusocial insects” Invited presentation at the International congress of the International Union for the Study of Social Insects, Cairns, Australia

Liebig J, Ghaninia M, Moore D, Berger SL, Desplan C, Reinberg D, Zwiebel LJ, Ray A (2014) “Detection and discrimination of cuticular hydrocarbons in social insects” Invited presentation at the Annual Meeting of the International Society of Chemical Ecology, Urbana-Champaign, Illinois

Liebig J, Moore D. (2013) “Matching data to theory – Is egg-eating in the ant *Camponotus floridanus* worker-policing?” Contributed presentation at the 50th Annual Meeting of the Animal Behavior Society, Boulder, CO

Liebig J. (2012) “What drives the evolution of eusociality in insects? Combining the evidence” Invited speaker to the symposium “Social Networks: The Mechanistic Basis and Evolution of Social Traits” at the Annual Meeting of the Entomological Society of America in Knoxville, TN

Liebig J. (2012) “Cuticular hydrocarbons and the evolution of fertility signaling in eusocial insects” Contributed poster at the 49th Annual Meeting of the Animal Behavior Society, Albuquerque, NM

Liebig J. (2012) “Convergent evolution of fertility signaling in eusocial insects? Insights from a termite” Speaker at the Meeting, International Union for the Study of Social Insects/North American Section, Greensboro, NC

Liebig J. (2011) “Genetics and epigenetics of major characteristics of sociality in two ant species, *Camponotus floridanus* and *Harpegnathos saltator*” Invited speaker to the symposium “Epigenetics, Phenotypic Plasticity, and Insect Evolution: First Insights from an Emerging Field” at the Annual Meeting of the Entomological Society of America, Reno, Nevada, USA

Liebig J. (2011) “Cuticular hydrocarbons as fertility signals in social insects: Patterns and predictions” Invited speaker to the symposium “Communicating Sociality: Evolutionary Developments in Social Insect Communication Systems” at the Annual Meeting of the Entomological Society of America, Reno, Nevada, USA

Liebig J. (2010). Fertility signaling in a termite. USDA NIFA awardee workshop in San Diego, CA, contributed talk

Bonasio R, Zhang G, Ye C, Mutti NS, Fang X, Qin N, Donahue G, Yang P, Li Q, Li C, Zhang P, Huang Z, Berger SL, Reinberg D, Wang J, Liebig J (speaker) (2010). Genome sequencing and comparison of the socially distinct ant species *Harpegnathos saltator* and *Camponotus floridanus*. 16th International Congress of the International Union for the Study of Social Insects, Copenhagen, Denmark. Contributed talk

Liebig J, Mutti NS, Ye C, Donahue G, Bonasio R, Reinberg D, Berger S (2010). Fertility signaling, cuticular hydrocarbon synthesis and differential gene expression in the ant *Harpegnathos saltator*. 26<sup>th</sup> Annual Meeting of the International Society of Chemical Ecology, Tours, France. Contributed talk

Liebig J (2009) Cooperation and conflict in ant societies. ASU Center for Social Dynamics and Complexity 1<sup>st</sup> International Conference (Group as individual in social dynamics), Arizona State University, Invited talk

Liebig J, Smith A, Wald-Dickler N, Eliyahu D, Hölldobler B (2008) Direct evidence of the role of alkanes in worker policing and larva recognition in ants. 4<sup>th</sup> European Meeting of the International Union for the Study of Social Insects in La Roche-en-Ardenne, Belgium  
Contributed talk

Liebig J, Kemmling C (2008) Quantifying the costs of aggression triggered by selfish individuals in intracolony conflicts of an ant. 12<sup>th</sup> International Behavioral Ecology Conference in Ithaca, New York, Contributed talk

Liebig J. "Long-chained hydrocarbons as fertility signals in the major groups of social insects: Why it makes sense" 55<sup>th</sup> Annual Meeting of the Entomological Society of America, San Diego, 12/2007. Invited talk

Liebig J, Endler A. "Signal learning in a social insect". 44<sup>th</sup> Annual Meeting of the Animal Behavior Society in Burlington, Vermont, 7/2007 Contributed talk

Liebig J, Diederling S, Herz H. "Limitations to colony size: testing an old idea in the leafcutter ant *Atta colombica*". 15<sup>th</sup> Congress of the International Union for the Study of Social Insects in Washington 8/2006. Invited talk

Liebig J, Poethke HJ (2006) Resource sharing and the evolution of cooperative breeding. 11<sup>th</sup> Congress of the International Society for Behavioral Ecology in Tours, France: 95 Contributed talk

Liebig J. (2004) Indirect assessment of queen fertility and lack of worker suppression in the paper wasp *Polistes dominulus*. 10<sup>th</sup> Jubilee Congress of the International Society for Behavioral Ecology in Jyväskylä, Finland: 130 Contributed talk

Liebig J, Monnin T, Turillazzi S. (2004) Direct assessment of queen quality and lack of worker suppression in a paper wasp. Abstract Book of the Meeting of the American Section of the International Union for the Study of Social Insects, Camp Tanozona, Arizona. Poster

Liebig J, Öchslein C, Klügl-Frohmeyer F, Puppe F (2003) Ecological factors favour eusociality in a multiagent simulation. Abstract book of the 18<sup>th</sup> meeting of the German speaking section of the International Union for the Study of Social Insects in Regensburg: 32. Contributed talk

Liebig J (2002) How infertile workers assess fertility in the ponerine ant *Harpegnathos saltator*. 14<sup>th</sup> International Congress of International Union for the Study of Social Insects, Hokkaido University, Sapporo, Japan: 79. Contributed talk

Liebig, J. (2002) The quality of queens - how ant workers assess the fertility of reproductive individuals. Annual Meeting of the German Zoological Society in Halle, Germany in *Zoology*: 105. Contributed talk

Liebig J (2001) Fertility signals and reproductive dominance in the ant *Harpegnathos saltator*. Graduiertentreffen der Studiengruppe Evolutionsbiologie der Deutschen Zoologischen Gesellschaft in Bielefeld: 20. Contributed talk

Liebig J, Peeters C, Hölldobler B (1999) Reproductive status and characteristic cuticular hydrocarbon profiles in the ant *Harpegnathos saltator*. 16<sup>th</sup> Annual Meeting of the International Society of Chemical Ecology, Marseille. Contributed talk

Liebig J, Peeters C, Hölldobler B, (1999) Cuticular hydrocarbon profiles in the ant *Harpegnathos saltator* as badge of fertility or characteristic of caste? Jahresversammlung der deutschen Zoologischen Gesellschaft, Innsbruck, Austria. Contributed talk

Liebig J, Peeters C, Hölldobler B, (1999) Kontrolle der Arbeiterinnenreproduktion in Kolonien der Ameisenart *Harpegnathos saltator*. Meeting of the German speaking section of the International Union for the Study of Social Insects in Hohenheim, Germany. Contributed talk

Liebig J, Peeters C, Hölldobler B (1997) Are ant workers capable of colony foundation? Abstract book of the meeting of the German Section of the International Society for the Study of Social Insects in Graz, Austria. **Poster received an award as best student poster contribution**

## COURSES TAUGHT

*Arizona State University*

Code	Class	Semester	Max Enrollment	Credits
ANB 602 Seminar	Current Issues in Behavior	Fall 2013	20	1
BIO 189 Part of lecture	Life Sciences Career Path	Fall 2016, 2014	19	1
BIO 182 Lecture	General Biology II	Spring 2011	360	4
BIO 340 Lecture with exercises (co-taught)	Genetics	Spring 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2012, Fall 2011, 2010	245 to 458	4
BIO 331 Lecture	Animal Behavior	Fall 2020, 2019, 2018, 2017, 2016, 2015, 2014, 2013 Spring 2010, 2009, 2007, Fall, 2008, 2007	174 100	3
BIO 331 Honors Seminar	Animal Behavior	Fall 2020, 2019, 2018, 2017, 2016	20	1
BIO 394 Honors Seminar	Discussing BIO 340	Spring (50%) 2x2017, 2016	26	1
BIO 435 Lecture and lab course	Techniques in Animal Behavior	Fall 2009	11	3
BIO 494 Lecture	Sociobiology and Behavioral Ecology	Spring 2008 Fall 2006	20	3
BIO 591 Seminar	Sociobiology of Ants	Fall 2006	8	1

*University of Würzburg*

Laboratory courses:

Animal Physiology  
Behavioral Physiology and Sociobiology

Entomology  
Interdisciplinary Simulation Course (biological part)

Seminars:

Cooperation and Conflict in Insect Societies  
Evolution of Eusociality in Insects and Arachnids  
Principles of Animal Communication

**MENTORING**

*Postdoctoral Researchers*

Kévin Berthelot, Dec. 2017 to Dec 2019  
Majid Ghaninia, Jan. 2012 - 2015  
Brittany Enzmann, Sept. 2011 – Feb 2014  
Kaustubh Gokhale, May 2011 – Feb 2014  
Navdeep Mutti, summer 2009 – Feb. 2011  
Dorit Eliyahu, summer 2007 – summer 2009

*Graduate Students*

Arizona State University:

**Main Adviser and Dissertation Committee Chair:**

Christopher Albin-Brooks PhD., started in fall 2016 (passed comprehensive exam summer 2019)  
Ben Pyenson, PhD., started in fall 2015 (passed comprehensive exam end of Nov 2019)  
Tyler Murdock, PhD., started in fall 2015 (was scheduled for comprehensive exam in Nov 2019, but had to delay 4 weeks before the exam due to personal reasons)  
Bowen Deng, Masters, started in fall 2015 (left in summer 2016 to join PhD program close to his girlfriend)  
Jessie Ebie, Ph. D., started in fall 2011, (co-advised with Bert Hölldobler) (successfully defended end of Nov 2019)  
Dani Moore, Ph. D., started in fall 2006, graduated in fall 2012  
Clint Penick, Ph. D., started in fall 2006, graduated in fall 2012 (now Assistant Professor at Kennesaw State University)  
Adrian Smith, Ph. D., started in fall 2006, graduated in fall 2011 (now assistant professor at North Carolina State and Head, Evolutionary Biology & Behavior Research Lab at North Carolina Museum of Natural Sciences, co-chaired with Bert Hölldobler)

**Committee Member:**

Anastassia Erudaitius, since spring 2021  
Andrew Burchill Ph. D. completed comps in 2018  
Xiaohui Guo, Ph. D., since 2016  
Colin Lynch Ph. D. from spring 2020 to fall 2020 (student changed thesis focus and adjusted committee composition)  
Taeyeong Choi Ph. D (Computer science), since spring 2018, defended in Oct 2020  
Neil Hillis, MS (co-advisor), since summer 2017, left program in 2019  
Ioulia Besspalova, Ph. D., started in fall 2012, defended in Jan 2020  
Yohan Cho, Ph.D., graduated in fall 2019  
Travis Fulton, Masters, graduated in spring 2016  
Elizabeth Cash, Ph. D., graduated in spring 2016  
Kirsten Traynor, Ph. D., graduated in fall 2014  
Zachary Shaffer, Ph. D., graduated in fall 2014  
Kimberly Vann Pegram, Ph.D., graduated in spring 2015  
Taka Sasaki, Ph.D., graduated in spring 2013  
Adam Dolezal, Ph.D., graduated in spring 2012  
Andreas Brandstaetter, Dr. rer. nat. University of Würzburg, Germany (external committee member) graduated in spring 2011  
Rebecca Clark, Ph. D., graduated in spring 2011  
Rick Overson, Ph. D., graduated in spring 2011  
Shade Shutters, Ph. D., graduated in fall 2009

University of Würzburg:

Annett Endler, Dr. rer. nat., advisor, completion 2006  
Vincent Dietemann, Dr. rer. nat., co-advisor, completion 2005  
Claudia Zetlmeisl, Diploma, advisor, completion 2005  
Sebastian Schneider, Diploma, co-advisor, completion 2005  
Frank Wegner, Diploma, advisor, completion 2005  
Cornelia Rüdiger, Diploma, co-advisor, completion 2005  
Claudia Kemmling, Diploma, advisor, completion 2005  
Sebastian Diederling, Diploma, advisor, completion 2005  
Petra Esch, Diploma, co-advisor, completion 2004  
Michael Stiegler, Diploma, advisor, completion 2004  
Ina Heidinger, Diploma, advisor, completion 2004  
Sabine Glaab, Diploma, co-advisor, completion 2003  
Andreas Fath, Diploma, advisor, completion 2002  
Gabriele Wittka, Staatsexamen, advisor, completion 2000

*Undergraduate Students*Honors Thesis:

Sarah Varghese, advisor and committee chair, graduated spring 2021  
Serena Noss, advisor and committee chair, graduated spring 2021  
Benton Spirek, advisor and committee chair, graduated fall 2020  
Cole Davis, advisor and committee chair, graduated spring 2020

Tyler On, advisor and committee chair, completed in spring 2020  
Thomas On, advisor and committee chair, completed in spring 2020  
Clayton Andersen, advisor and committee chair, graduated spring 2019  
Rishika Virdee, advisor and committee chair, graduated spring 2018  
Jeffrey Chien, coadvisor (with Yun Kang), reader, submitted spring 2018  
Fatima Barat Ali, coadvisor (with Yun Kang), reader, submitted spring 2018  
Alejandra Mayoral, reader, advised the analysis of behavioral data 2017  
Ellen Brooks, reader, advised the analysis of the content of bird preen gland, graduated spring 2015  
Taylor McGlone, advisor and committee chair, started fall 2014, graduated spring 2015  
Rafael Tula, reader, graduated spring 2014  
Lucas Talken, reader, graduated spring 2014  
Ben Damari, advisor and committee chair, started spring 2013, graduated spring 2014  
Katie Lundy, advisor and committee chair, started spring 2011, graduated spring 2012  
Victoria Frazier-Gonzales, advisor and committee chair, started summer 2010, graduated spring 2012  
Noah Wald-Dickler, advisor and committee chair, graduated spring 2008

#### BIO 492

Serena Noss, fall 2020, 3 credits  
Sarah Varghese, fall 2020, 3 credits  
Benton Spirek, spring 2020, 3 credits  
Cole Davis, fall 2019, 2 credits  
Thomas On, fall 2019, 3 credits  
Tyler On, fall 2019, 3 credits  
Clayton Anderson, fall 2018, 3 credits

#### BIO 499

Alexander Crawley, fall 2017, 3 credits

#### BIO 495

Annabelle Dagostino, fall 2020, 3 credits  
Spencer Kirkham, fall 2020, 3 credits  
Monica Lam, fall 2020, 3 credits  
Ruben Matell, fall 2020, 3 credits  
Victoria Olivas, fall 2020, 3 credits  
Rose Tufts, fall 2020, 3 credits  
Lindsey Furman, spring 2020, 2 credits  
Serena Noss, spring 2020, 2 credits  
Deyanira, Ramos De La Torre, 3 credits  
Lindsey Furman, fall 2019, 3 credits  
Serena Noss, fall 2019, 3 credits  
Thomas On, spring 2019, 2 credits  
Serena Noss, spring 2019, 3 credits  
Jessica Jones, spring 2019, 2 credits  
Omid Arooni, spring 2019, 2 credits  
John Andrade, spring 2018, spring 2019, 3 credits each time  
Corinne Burhyte, spring 2018, 3 credits  
Warren Mandai, spring 2018, 3 credits  
Lena Mihailovic, spring 2018, 3 credits  
Nathaniel Tsiperfal, spring 2018, 3 credits



Jihan Valencia-Gaber, spring 2018, 3 credits  
Mary Ann Chu, fall 2018, 3 credits  
John Andrade, fall 2017, 3 credits  
Alexandrine Labban, fall 2017, 3 credits  
Lena Mihailovic, fall 2017, 3 credits  
Jihan, Valencia-Gaber, fall 2017, 1 credit  
Haya Al Any, spring 2017, 3 credits  
Arianna Bresnan, spring 2017, 2 credits  
Emma Howell, spring 2017, 3 credits  
Warren Mandai, spring 2017, 1 credit  
Mark Matiski, spring 2017, 2 credits  
Wendy Ridley, spring 2017, 1 credit  
Breanna Sykes, spring 2017, 1 credit  
Steven Velasco, spring 2017, 2 credits

Lab-mentoring (only undergraduate students involved in research projects but not purely insect feeding are included):

Clayton Anderson, fall 2016  
Jonathan Galindo, fall 2016  
Madeline Higgins, fall 2016  
Warren Mandalai, fall 2016  
Mark Matiski, fall 2016  
Leo Pacano, fall 2016  
Wendy Ridley, fall 2016  
Steven Velasco, fall 2016  
Jacob Hayton, fall 2015  
Jenny Graves, fall 2015  
Anni Poetzl, fall 2014- fall 2015  
Ryan Guthrie, fall 2014  
Amanda Phomsavanh, fall 2014  
Jennifer DePew, fall 2013  
Kelsey Cozzolino, spring 2013  
Ben Damari, spring 2011- 2012  
Yogesh Pathel, spring 2011  
Barbara Birtcil, fall 2010 – summer 2013  
Jordan Bednarz, summer 2010 – fall 2011  
Beth Trobaugh, summer 2009 – fall 2012  
Auriel Vilaire (Solur), spring 2009 – summer 2010  
Steve Prager, 2007 – summer 2010  
Tal Sandler (Solur), 09.2008 – 05.2009  
James Garcia (Solur), 01. 2008 – 04.2008  
Elizabeth Wrublik (Undergraduate honors credit), Fall 2007  
Leah Drake (Undergraduate honors credit), Fall 2007  
Victoria Frazier-Gonzales (Undergraduate honors credit), Spring 2007

**SERVICE**

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*Professional Service*

### Professional Society Activities:

Member of a planning committee for the 19<sup>th</sup> International Congress of the International Union for the Study of Social Insects 2022 in San Diego, California

Elected member of the awards committee of the International Union for the Study of Social Insects - North American Section (IUSSI-NAS) Jan 2018 to Dec 2020 (shared chair in 2020)

### Symposium Organizer

2014 at the 17<sup>th</sup> International Congress of the International Union for the Study of Social Insects in Cairns, Australia. (co-organized with Dr. Patrizia D’Ettorre). Topic: Decoding the sophisticated chemical communication of social insects

2010 at the 16<sup>th</sup> International Congress of the International Union for the Study of Social Insects in Copenhagen, Denmark. Topic: The role of relatedness in social evolution: a critical assessment of when it matters, and when not

### Meeting Organizer

2005 Annual meeting of the graduate students of the work group “Evolutionary Biology” of the German Zoological Society in Würzburg (co-organizer): Topic “Evolutionary Chemical Ecology”

### Reviewer for:

#### **Funding Agencies:**

European Commission  
Swiss Science Foundation  
German Science Foundation  
German Environment Foundation  
Ministry of Education, Brunei Darussalam  
NSF (ad hoc reviewer)

#### **Student research grant competition**

Animal Behaviour Society

#### **Journals:**

Animal Behaviour, Apidologie, Behavioral Ecology, Behavioral Ecology and Sociobiology, Behavior Genetics, Behaviour, Biological Journal of the Linnean Society, Biology Letters, BMC Biology, Bulletin of Entomological Research, Cell, Chemoecology, Current Biology, Current Opinion in Insect Sciences, Entomologia Experimentalis et Applicata, Ethology, Evolution, Frontiers in Zoology, Functional Ecology, Genome Biology, Genome Biology and Evolution, Insect Molecular Ecology, Insectes Sociaux, Journal of Chemical Ecology, Journal of Insect Behavior, Journal of Insect Physiology, Journal of Ethology, Journal of Experimental Zoology, Journal of Neurobiology, iScience, Molecular Ecology, Myrmecological News, Nature Communications, Nature of Science (Naturwissenschaften), Philosophical Transactions of the Royal Society B, Physiological Entomology, Proceedings of the National Academy of Sciences USA, Proceedings of the Royal Society of London B, PLoS Genetics, PLoS One, Science, Scientific Reports

### *Department and College Service*

- Member of the search committee for the Center of Mechanisms of Evolution: Fall 2019 to spring 2020
- Director of the SoLS Biology PhD graduate program: spring 2013 to spring 2019
- “Director” of a USDA containment area for keeping foreign ants. I manage USDA import permits for ants for several faculty members: 2005 to present
- Director of the SoLS Biology MS graduate program: spring 2013 to fall 2017
- Organizer of the SoLS Social Insect Research Group travel grants since 2017
- Chair of the CLAS Student Affairs and Grievances committee: Fall 2016 to spring 2017 (1 academic year)
- Member of the CLAS Student Affairs and Grievances committee: Fall 2014 to 2017
- Member of the search committee for comparative and functional genomics: Fall 2013 to spring 2014
- Chair of the SoLS Safety Committee: fall 2011 to summer 2012
- Member of the SoLS Safety Committee: fall 2007 to fall 2011
- Member of the Working Committee for the new Interdisciplinary PhD-program in Behavioral Biology: fall 2007 to 2009
- Organizer of the SIRG/PNB meeting in the School of Life Sciences. The meeting is once a week for people interested in social insects and generally in physiology, neurobiology, and behavior: 2007 to 2009 (since mid 2008 co-organized with Kevin McGraw)
- Organizer of the “Animal Behavior” seminar, a monthly meeting with faculty presentations in fall 2009

### *Community Service*

- Science education presentation at Waggoner Elementary School for all second graders: 2012
- Supported the English ammonite film team that was producing an ant movie including ant conflicts 2010
- Interview to the radio station ABC Radio National of Australia 2009
- Interview to the radio station WNYC National Public Radio 2009
- Science education presentation at Waggoner Elementary School for all second graders: 2008
- Science education presentation to Boy Scouts at ASU, ISTB1: 2007
- Interview to the TV channel Eight/KAET in the context of a documentation of ant research at ASU Dec 2007
- Science education presentation at Waggoner Elementary School in a kindergarten class: 2006