

SARAH D. KOCHER

Lewis-Sigler institute for Integrative Genomics
Princeton University, Washington Rd, Princeton, NJ 08544 USA
skocher@princeton.edu | office: 609.258.9467

EDUCATION

Ph.D., Genetics, 2009
North Carolina State University

B.S., Integrative Biology, 2005
University of Illinois, Urbana-Champaign (UIUC)

PROFESSIONAL EXPERIENCE

- 2015- **Associate Research Scholar**
Lewis-Sigler Institute for Integrative Genomics
Princeton University
- 2010-15 **Postdoctoral fellow**, Drs. Naomi Pierce & Hopi Hoekstra
Department of Organismic and Evolutionary Biology
Harvard University
- 2005-09 **Graduate Student**, Drs. Christina Grozinger & Trudy Mackay
Department of Genetics
North Carolina State University

RESEARCH GRANTS

- 2017 San Diego Zoo Exploration funds, “Integrating genomes, microbiomes, parasites, diets and demography at new scales”
- 2016 *Rutgers Dean’s Award (with R. Winfree), “Barcoding New Jersey Bee Biodiversity”*
- 2013 *NSF IOS 1257543 (with N.E. Pierce), “The interplay of genes and ecology in the social behavior of a halictid bee”*
- 2012 *USDA NIFA Postdoctoral Fellowship, “The effects of a changing environment on populations of the native pollinator, *Augochlorella aurata*”*
- 2011 *Putnam Expedition Grant to collect Halictidae in the Palearctic (with N.E. Pierce), Harvard*
- Research Council Grant, University of Missouri, Columbia (with R. Cocroft), “Treehoppers as a quantitative genetic model for the evolution of maternal care.”*

- 2010 *FQEB Postdoctoral Fellowship*, Harvard “Why cooperate? The genetics and ecology underlying social evolution.”
- Putnam Expedition Grant* to collect *Lasioglossum albipes* in France (with N.E. Pierce), Harvard
- FNRS Visiting Researcher fellowship*, University of Mons, Belgium
- 2009 *NSF Doctoral Dissertation Improvement Grant* (DDIG; with C.M. Grozinger), “The sociogenomics of pheromone response”
- 2008 *Sigma Xi Grant in Aid of Research*, “Variation in pheromone response and the maintenance of facultative sterility in worker honey bees”
- 2005-08 *NIH Graduate Student Fellowship* (NCSU Genetics Training Grant).

PROFESSIONAL PUBLICATIONS

- Kocher, SD, Mallarino, RM, Rubin, BER, Yu, DW, Hoekstra, HE, and Pierce, NE (*in review*). The genetic basis of a social polymorphism in halictid bees.
- Rubin, BER, Sanders, JG, Turner, KM, Pierce, NE, and **Kocher, SD**. (2017). Social behavior in bees influences the abundance of *Sodalis* (Enterobacteriaceae) symbionts. bioRxiv 192617. doi: <https://doi.org/10.1101/192617>
- Crall, JD, Gravish, N, Mountcastle, AM, **Kocher, SD**, Oppenheimer, RL, Pierce, NE, and Combes, SA. (*in revision*) Location matters: spatial fidelity of workers drives collective response to disturbance in a social insect.
- Glastad, KM, Arsenault, SV, Vertacnik, KL, Geib, SM, Kay, S, Danforth, BN, Rehan, SM, Linnen, CR, **Kocher, SD***, Hunt, BG*. (2017) Variation in DNA methylation is not consistently reflected by sociality in Hymenoptera. *Genome Biol Evol*, evx128. *co-corresponding
- Wittwer, BW, Hefetz, A, Simon, T, Murphy, LEK, Elgar, MA, Pierce, NE, and **Kocher, SD**. (2017) Solitary bees reduce investment in communication compared with their social relatives. *PNAS*, 114(25): 6569-6574.
- Engel, P, Kwong, W, McFrederick, Q, Anderson, K, Barribeau, S, Angus Chandler, J, Cornman, S, Dainat, J, de Miranda, J, Doublet, V, Emery, O, Evans, J, Farinelli, L, Flenniken, M, Ganberg, F, Grasis, J, Gauthier, L, Hayer, J, Koch, H, **Kocher, S**, Martinson, V, Moran, N, Munoz-Torres, M, Newton, I, Paxton, R, Powell, R, Sadd, B, Schid-Hempel, P, Schmid-Hempel, R, Song, SJ, Schwarz, R, vanEngelsdorp, D, and Dainat, B, 2016. The bee microbiome: impact on bee health and model for evolution and ecology of host-microbe interactions. *MBio* 7 (2), e02164-15.
- Galbraith, DA, **Kocher, SD**, Glenn, T, Albert, I, Hunt, GJ, Strassmann, JE, Queller, DC and Grozinger, CM, 2016. Testing the kinship theory of intragenomic conflict in honey bees (*Apis mellifera*). *PNAS*, 201516636.
- Kapheim KM, Pan H, Li C, Salzberg SL, Puiu D, Magoc T, Robertson HM, Hudson ME, Venkat A,

Fischman BJ, Hernandez A, Yandell M, Ence D, Holt C, Yocum GD, Kemp WP, Bosch J, Waterhouse RM, Zdobnov EM, Stolle E, Kraus FB, Helbing S, Moritz RF, Glastad KM, Hunt BG, Goodisman MA, Hauser F, Grimmekhuijzen CJ, Pinheiro DG, Nunes FM, Soares MP, Tanaka ÉD, Simões ZL, Hartfelder K, Evans JD, Barribeau SM, Johnson RM, Massey JH, Southey BR, Hasselmann M, Hamacher D, Biewer M, Kent CF, Zayed A, Blatti C, Sinha S, Johnston JS, Hanrahan SJ, **Kocher SD**, Wang J, Robinson GE, Zhang G. (2015). Genomic signatures of evolutionary transitions from solitary to group living. *Science*, 348(6239), 1139-1143.

Kocher, SD, Tsuruda, JM, Gibson, JD, Emore, CM, Arechavaleta-Velasco, ME, Queller, DC, Strassmann, JE, Grozinger, CM, Gribbskov, MR, San Miguel, P, and Westerman, R (2015). A search for parent-of-origin effects on honey bee gene expression. *G3: Genes | Genomes | Genetics*, 5(8), 1657-1662.

Fu, F, **Kocher, SD**, Nowak, MA (2014). The risk-return tradeoff between solitary and eusocial reproduction. *Ecology Letters*, 18(1), 74-84.

Kocher, SD*, Pellissier, L*, Veller, C, Purcell, J, Nowak, M, Chapuisat, M, and Pierce, NE. (2014). Transitions in social complexity along altitudinal gradients reveal a dual impact of climate on social evolution. *Proc Roy Soc B*. 281 (1787): 20140627.

Kocher, SD and Paxton, RJ. (2014). Comparative methods offer powerful insights into social evolution. Invited review, *Apidologie*, 45(3): 289-305.

Kocher, SD*, Li, C*, Yang, W, Tan, H, Yi, SV, Yang, X, Hoekstra, HE, Zhang, G, Pierce, NE, Yu, DW. (2013). The genome of a socially polymorphic halictid bee, *Lasioglossum albipes*. *Genome Biology* 14(12):R142.

Kocher, SD and Grozinger, CM. (2011). Cooperation, conflict, and the evolution of queen pheromones. *Journal of Chemical Ecology*, 37(11): 1263-75. ***Reviewed in F1000**

Wang, Y., **Kocher, SD**, Linksvayer, TA, Grozinger, CM, Page, RE, and Amdam, GV. (2011). Regulation of behaviorally-associated gene networks in worker honey bee ovaries. *Journal of Experimental Biology*, 215(1): 124-134.

Chan QWT, Mutti NS, Foster LJ, **Kocher SD**, Amdam GV, Wolschin, F. (2011). The worker honeybee fat body proteome is extensively remodeled preceding a major life-history transition. *PLoS ONE* 6(9): e24794.

Kocher, SD, Ayroles, JF, Stone, EA, and Grozinger, CM. (2010). Natural variation in pheromone response correlates with reproductive traits and brain gene expression in worker honey bees. *PLoS ONE* 5(2): e9116.

Kocher, SD, Tarpy, DR, and Grozinger, CM. (2010). The effects of mating and instrumental insemination on honey bee flight behavior and gene expression. *Insect Molecular Biology*, 19(2): 153-162.

Kocher, SD, Richard, FJ, Tarpy, DR, and Grozinger, CM. (2009). Queen reproductive state modulates pheromone production and queen-worker interactions in honeybees. *Behavioral Ecology*, 20(5): 1007-1014.

Kocher, SD, Richard, FJ, Tarpy, DR, and Grozinger, CM. (2008). Genomic analysis of post-mating changes in the honey bee queen (*Apis mellifera*). *BMC Genomics*, 9:232.

HONORS AND AWARDS

2017 Elected as co-chair for the Ecological and Evolutionary Genomics Gordon Research Conference
Co-organizer, Social Insect Genomics meeting, Cold Spring Harbor

2012 International Congress of Entomology, Young Investigator Travel Award
Entomological Society of America, Travel Award

2010 Kenneth R. Keller Award for Excellence in Doctoral Dissertation Research, NCSU

2009 Outstanding Talk Award, Genetics Graduate Student Symposium, NCSU

2008 Graduate Student Association Travel Award recipient
Graduate Student Professional Development Award

TEACHING EXPERIENCE

2017 Lecturer, Princeton. "Research Topics in QCB".

2015 Lecturer, Princeton. "Human Genomics: Past, Present, and Future".

2012 Teaching Fellow, Cold Spring Harbor Course, "Programming for Biology".

2010 "Social behavior in Halictids." Guest lecture for Evolution and Insect Societies, Pennsylvania State University

2008 Teaching Assistant, Principles of Genetics, Honors section
"Behavioral genetics." Guest lecture for Principles of Genetics

2007 Teaching Assistant, Principles of Genetics
"Genes and Behavior." Guest lecture for Principles of Genetics

UNDERGRADUATE MENTORSHIP

2017 Katherine Stiefel, Princeton University

2014-15 Li Murphy, Harvard University

2012-14 Elizabeth Colbert, HCRP Research Award
Abby Finkelstein, Brandeis University
Jared Squires, HCRP Research Award
Lauren Tomkinson, HCRP Research Award, MCZ Research Award

2007-09 Sarah C. Jones, Undergraduate Research Award

2005 Cynthia Rouf
Kelly Hutcherson, Undergraduate Research Award

INVITED TALKS (selected)

2017 University of Kentucky, Biology Dept Seminar
University of Illinois, Urbana-Champaign, Entomology Seminar
University of Arizona, PERT Seminar (postdoc-invited speaker)

- Cornell University, Entomology Seminar (Jan 2018)
 LANASE, UNAM Invited Speaker
- 2016 Temple University, Biology Dept Seminar
 University of Pennsylvania, Biology Dept Seminar
 University of Georgia, Biology Dept Seminar
 Penn State, Entomology Seminar
 Plenary, New Model Systems for linking ecology and Evolution, EMBL
 Animal Behavior Society, Invited Speaker, Columbia, MO
 International Congress of Entomology, Orlando, FL
- 2015 Boston Population Genomics Supergroup, Broad Institute, Boston, MA
 Cambridge Entomology Club, Cambridge, MA
 University of New Hampshire, Durham, NH
- 2014 Department of Biology, University of Missouri, Columbia, MO
 Lewis Sigler Institute for Genomics, Princeton University, Princeton, NJ
 Department of Biology, New York University, New York, NY
 International Union for the Study of Social Insects, Cairns, Australia

SERVICE AND OUTREACH

- 2017 Co-organizer, Cold Spring Harbor Meeting, “Biology of Social Insects”
 2016 “The curious behavior of bees”, Guest Lecture on Monhegan Island, ME
 2014 “Ask the scientist” panelist, Young Women in Biology
 2013 Lecturer, AIM-UP! Research Coordination Network. “Evolutionary
 Genomics and the Museum”
 2012 Coordinator, Museum of Comparative Zoology Seminar Series
 2011 Insect Planet, Harvard Museum of Natural History annual outreach
 Coordinator, Museum of Comparative Zoology Seminar Series
 2010 Great Insect fair, Pennsylvania annual outreach program
 2007-09 President, Genetics Graduate Student Association
 2005-09 BugFest, annual community outreach program
 2007-08 GO NCSU, K-12 genetics outreach program
 2007 7th grade class outreach with Professor Pat Estes
 2006-07 Student-invited speaker rep., Genetics Graduate Student Association
 2005-07 Symposium organizer, Genetics graduate student research symposium
 2005 North Carolina School of Science and Math student research initiative