

Honey bee Foraging Ecology and Pollinator Health

The Couvillon Lab at Virginia Tech seeks highly motivated, independent students with a keen interest in honey bee foraging and recruitment behavior and/or pollinator health to join our newly established research group (<http://www.freelyflyingbees.com/>) in the late spring or early autumn 2018 under Dr. Margaret Couvillon, Assistant Professor of Pollinator Biology and Ecology in the Department of Entomology, Virginia Tech, Blacksburg, Virginia.

Available positions: One PhD (4 years) and one MSc/MS (2 years) positions studying the foraging ecology of honey bees and other pollinators in the Couvillon Lab.

Application deadline: 15 December, 2017

Start date: late spring or early autumn 2018 (but open to negotiation)

Background: The ongoing pollinator crisis exemplifies how public interest in scientific issues can be a mixed blessing, simultaneously raising awareness of important issues while also generating rallying cries for untested solutions. For example, lack of forage is a factor contributing to bee declines. This stressor can act directly, where hungry bees are unable to meet their nutritional needs, or indirectly, where the resulting nutritional stress reduces the bees' ability to cope with other stressors like diseases and pesticides. Media coverage has been wide, and as a consequence, everyone wants to feed hungry bees by planting bee-friendly flowers indiscriminately. Such help is offered with best intentions, but efficacy is undermined by two crucial knowledge gaps: firstly, we do not fully understand the foraging dynamics of bees across diverse landscapes, especially when and where bees experience forage gaps, because the current methods of surveying, cataloging, and comparing floral abundance at a landscape-scale is intensely time-consuming. Secondly, nutritional stress is often studied either in honey bees (*Apis mellifera* spp.) or non-honey bees, creating a dichotomy that limits the usefulness of resulting recommendations. Thus, there is a critical need to develop new methods to survey *Apis* forage on a landscape scale and to determine if landscapes preferred by honey bees are additionally preferred by non-*Apis* bees. Only with such data may we implement a best management strategy for improving food availability to benefit overall pollinator health in a meaningful, targeted way.

Potential applied and basic science projects may include these questions:

- How and when do honey bees forage across diverse, representative landscapes?
- How do these foraging dynamics relate to the abundance, diversity, and health of non-*Apis* bees?
- How do foraging behaviors affect colony exposure to other stressors, such as pesticides?
- What are the causes and consequences of honey bee waggle dance (mis)communication? (in collaboration with [Schürch lab](#) at Virginia Tech)

MSc requirements:

- BSc/BS in Biology, Entomology, Landscape Ecology or related STEM field
- An excitement for working with live, whole organisms (that sting!)
- A willingness to learn new skills, such as experimental design, scientific reproducibility, statistics, GIS, and insect identification
- Proficiency in English and excellent verbal and written communication skills
- A collaborative, helpful, team-oriented spirit

Additional PhD requirements:

- An MSc/MS in Biology, Entomology, Landscape Ecology, or related STEM field
- If you are from an international location where English is not your first language, you will be required to take the TOEFL (see [Graduate School requirements](#))

Please note that the selected candidates for the positions must then apply and be accepted into the Graduate School at Virginia Tech. Virginia Tech is an equal opportunity employer.

We offer:

- A funded position (MSc/MS or PhD) working with economically vital and scientifically fascinating insects
- Training as a well-rounded, critically-thinking scientist
- Exciting combination of field studies and experiments with freely flying and behaving bees; new methods in video and landscape analysis with ArcGIS; opportunities to learn experimental design, scientific reproducibility, and statistical modelling
- Regular collaborations with other research teams in the department, university, and within the larger field
- A Departmental instructional program offering a variety of basic and applied courses

Blacksburg is a lovely college town set between the Blue Ridge and Allegheny Mountains with many outdoor opportunities, high standard of living, and a warm and welcoming community feel.

Application:

Please email your application to Dr. Couvillon as a single pdf attachment. Application should include a cover letter (1-2 pages) introducing yourself and describing your background and research interests, a CV, and the contact information for two potential academic references before **December 15, 2017**. Please remember to indicate which position interests you. A short list of candidates will be invited to interview either in person or over Skype in January 2018, and selection should occur by February 2018.

For more details on the research and our lab, please see www.freelyflyingbees.com or contact Dr. Maggie Couvillon (mjc@vt.edu) directly. You may also “Join” our Facebook page **The BeeGroup @ VT**.

References

Couvillon, Schürch & Ratnieks (2014). Dancing bees communicate a foraging preference for rural lands in High Level Agri-Environment Schemes. *Current Biol* 24(11), 1212-1215.

Couvillon, Schürch & Ratnieks (2014) Waggle dance distances as integrative indicators of seasonal foraging challenges. *PLOS One*, 9 (4), e93495.

Couvillon & Ratnieks (2015). Environmental consultancy: dancing bee bioindicators to evaluate landscape “health”. *Frontiers in Ecol and Evol* 3, 44.

Schürch, Ratnieks, Samuelson, & Couvillon (2016). Dancing to her own beat: honey bee foragers communicate via individually calibrated waggle dances. *J Exp Biol* 219 (9), 1287-1289.

Couvillon, Al Toufailya, Butterfield, Schrell, Ratnieks, Schürch (2015). Buzzing bees: caffeinated forage tricks honey bees into increasing foraging and recruitment behaviors. *Current Biol* 25 (21), 2815-2818.