



**Dr Emily Bell**  
**MSc(Oxford), BSc(Lond.), PhD**

Lecturer

**Area of research**

Phenotypic plasticity and evolution of castes in eusocial insects

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**Summary**

**Biography**

**2016-present:** Lecturer, School of Biological Sciences, University of Bristol

**2011-2016:** PhD, Institute of Zoology and University of Bristol.

**2010-2011:** MSc in Biology (Integrative Bioscience), University of Oxford.

**2008-2010:** Educational Volunteer, ZSL London Zoo.

**2007-2010:** BSc in Zoology, University College London.

**2005-2006:** Entomological curatorial assistant, Museum of Natural History, University of Oxford.

**Activities / Findings**

Understanding the evolution of major biological transitions is one of the major challenges in evolutionary biology. The evolution of sociality is one such transition the peak of which has been reached in organisms that have a distinct division of labour such as the eusocial insects (bees, ants and wasps). In these species some members "worker castes" commit to a lifetime of sterility whilst others remain reproductive "queen castes". These castes result individuals displaying altruistic tendencies, whereby some individuals sacrifice their own reproductive potential to help raise the offspring of kin.

In advanced eusocial insects (ants, honeybees, some vespid wasps) castes are determined during development, and queen and worker larvae embark on different developmental pathways in response to environmental cues. These species however tell us little about the origins of caste evolution as many of their features are secondarily derived. Whereas simple or primitively eusocial insects, such as paper wasps, have simple behavioural castes (rather than morphological castes) and represent one of the earliest or simplest stages of eusociality. My interests lie in trying to determine what influences the plastic nature of castes in simple eusocial societies in order to help us better understand the evolution of caste differentiation which will ultimately shed light on the factors involved in the evolution of sociality.

Selected publications

Southon, R. J., Bell, E., Graystock, P. & Sumner, S. Long live the wasp: adult longevity in captive colonies of the eusocial paper wasp *Polistes canadensis* (L.). *Peer J*.

Heathcote, R. J. P., Bell, E. et al. (2014) The scent of sun worship: basking experience alters scent mark composition in male lizards. *Behavioural Ecology and Sociobiology*.

Bell, E. & Sumner, S. (2013) Ecology and Social Organisation of Wasps. eLS, Encyclopedia of Life Sciences.

Bell, E., Andres, B. & Goswami, A. (2011) Integration and dissociation of limb elements in flying vertebrates: a comparison of pterosaurs, birds and bats. *Journal of Evolutionary Biology*, 24(12), 2586-2599.

## Keywords

- Social insects
- Evolution
- Phenotypic plasticity
- Behavioural Ecology
- Animal behaviour

## Methodologies

- Behavioural assays
- Gene expression
- barcoding

## Memberships

## Organisations

[School of Biological Sciences](#)

## Research groups

- [Evolutionary Biology](#)
- [Animal Behaviour and Sensory Biology](#)

## Links

-  [Check out one of my Science Outreach Talk Videos](#)

## Recent publications

- Southon, R, Bell, E, Graystock, P, Wyatt, CDR, Radford, A & Sumner, S, 2019, '[High indirect fitness benefits for helpers across the nesting cycle in the tropical paper wasp \*Polistes canadensis\*](#)'. *Molecular Ecology*, vol 28., pp. 3271-3284
- Miller, S, Bluher, S, Bell, E, Cini, A, Silva, Rd, Souza, Ad, Gandia, K, Jandt, J, Loope, K, Prato, A, Pruitt, J, Rankin, D, Rankin, W, Southon, R, Uy, F, Weiner, S, Wright, C, Downing, H, Gadagkar, R, Lorenzi, C, Rusina, L, Sumner, S, Tibbetts, E, Toth, A & Sheehan, M, 2018, '[WASPnest: a worldwide assessment of social Polistine nesting behavior](#)'. *Ecology*.
- Sumner, S, Bell, E & Taylor, D, 2018, '[A molecular concept of caste in insect societies](#)'. *Current Opinion in Insect Science*, vol 25., pp. 42-50
- Southon, RJ, Bell, EF, Graystock, P & Sumner, S, 2015, '[Long live the wasp: Adult longevity in captive colonies of the eusocial paper wasp \*Polistes canadensis\* \(L.\)](#)'. *PeerJ*, vol 2015.

[View complete publications list](#) in the University of Bristol publications system

## Courses

Dr Bell currently teaches 2 courses: