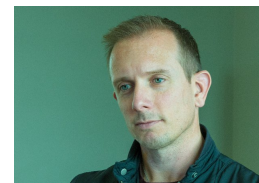


Andrew Barron  
Research Fellow  
Department of Biological Sciences  
Biosecurity Futures Research Centre  
Macquarie University Species Spectrum Research Center  
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## Biography

Dr Barron is an Australian Research Council Future Fellow, and Deputy Head of the Department of Biological Sciences at Macquarie University. He is a neuroethologist, which is a discipline of neuroscience studying the neural mechanisms of natural animal behaviour. Most of his research focuses on insects, especially honey bees. Using advanced techniques to visualise, manipulate, map and record from the insect brain Barron's team has made important contributions to the understanding of fundamental behavioural systems such as cognition, navigation, social behaviour and learning and memory.

He also conducts research to improve honey bee health and welfare. He is studying how bees and bee colonies are impacted by pesticide and disease stressors, and how to best intervene to help bee colonies under stress.

## Employment

### ARC Future Fellow

Research Fellow  
Department of Biological Sciences  
Macquarie University  
1 Jun 2015 → present

### Biosecurity Futures Research Centre

Macquarie University  
1 Jul 2015 → 31 Dec 2018

### Macquarie University Species Spectrum Research Center

Macquarie University  
1 Jan 2017 → 31 Dec 2019

### Biomolecular Discovery and Design Research Centre

Macquarie University  
1 Jan 2017 → 31 Dec 2019

### Australian Research Council Future Fellow

Australian Research Council  
Canberra, Australia  
1 Jan 2015 → present

### President, Australasian Society for the Study of Animal Behaviour

AUSTRALASIAN SOCIETY OF THE STUDY OF ANIMAL BEHAVIOUR  
Australia  
1 Jan 2012 → 1 Jan 2014

### Vice-President, Australasian Society for the Study of Animal Behaviour

AUSTRALASIAN SOCIETY OF THE STUDY OF ANIMAL BEHAVIOUR  
Australia  
1 Jan 2010 → 1 Jan 2012

### Treasurer, Australasian Society for the Study of Animal Behaviour

AUSTRALASIAN SOCIETY OF THE STUDY OF ANIMAL BEHAVIOUR

Australia

1 Jan 2008 → 1 Jan 2010

**Postdoctoral Fellow, Research School of Biological Sciences**

Australian National University

ACT 0200, Australia

1 Jan 2004 → 1 Jan 2007

**Fullbright Postdoctoral Fellow**

University of Illinois

Champaign, United States

1 Jan 2001 → 1 Jan 2004

**Royal Society Postdoctoral Fellow**

University of Sydney

2006, Australia

1 Jan 1999 → 1 Jan 2001

## Research output

**Cocaine directly impairs memory extinction and alters brain DNA methylation dynamics in honey bees**

Søvik, E., Berthier, P., Klare, W. P., Helliwell, P., Buckle, E. L. S., Plath, J. A., Barron, A. B. & Maleszka, R. 13 Feb 2018

In : *Frontiers in Physiology*. 9, FEB, p. 1-11 11 p., 79

**Honey bee (*Apis mellifera*) sociability and nestmate affiliation are dependent on the social environment experienced post-eclosion**

Hewlett, S. E., Wareham, D. M. & Barron, A. B. 13 Feb 2018 In : *Journal of Experimental Biology*. 221, 3, p. 1-8 8 p.,

173054

**Short-term exposure to lambda-cyhalothrin negatively affects the survival and memory-related characteristics of worker bees *Apis mellifera***

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*Environmental Contamination and Toxicology*. 75, 1, p. 59-65 7 p.

**Stress decreases pollen foraging performance in honeybees**

Bordier, C., Klein, S., Le Conte, Y., Barron, A. B. & Alaux, C. 1 Feb 2018 In : *Journal of Experimental Biology*. 221, 4, p. 1-

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**Cooperative defence operates by social modulation of biogenic amine levels in the honey bee brain**

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In : *Proceedings of the Royal Society B: Biological Sciences*. 285, 1871, p. 1-9 9 p., 20172653

**A comparison of honeybee (*Apis mellifera*) queen, worker and drone larvae by RNA-Seq**

He, X. J., Jiang, W. J., Zhou, M., Barron, A. B. & Zeng, Z. J. 15 Dec 2017 In : *Insect Science*.

**Inter-individual variability in the foraging behaviour of traplining bumblebees**

Klein, S., Pasquaretta, C., Barron, A. B., Devaud, J. M. & Lihoreau, M. 1 Dec 2017 In : *Scientific Reports*. 7, 1, p. 1-12 12

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**The evolution of honey bee dance communication: A mechanistic perspective**

Barron, A. B. & Plath, J. A. 1 Dec 2017 In : *Journal of Experimental Biology*. 220, 23, p. 4339-4346 8 p.

**Experience during early adulthood shapes the learning capacities and the number of synaptic boutons in the mushroom bodies of honey bees (*Apis mellifera*)**

Cabirol, A., Brooks, R., Groh, C., Barron, A. B. & Devaud, J. M. Oct 2017 In : Learning and Memory. 24, 10, p. 557-562 6 p.

**The effects of fat body tyramine level on gustatory responsiveness of honeybees (*Apis mellifera*) differ between behavioral castes**

Scheiner, R., Entler, B. V., Barron, A. B., Scholl, C. & Thamm, M. 8 Aug 2017 In : Frontiers in Systems Neuroscience. 11, p. 1-8 8 p., 55

**The frontiers of insect cognition**

Perry, C. J., Barron, A. B. & Chittka, L. Aug 2017 In : Current Opinion in Behavioral Sciences. 16, p. 111-118 8 p.

**Drosophila divalent metal ion transporter Malvolio is required in dopaminergic neurons for feeding decisions**

Søvik, E., Lamora, A., Seehra, G., Barron, A. B., Duncan, J. G. & Ben-Shahar, Y. Jun 2017 In : Genes, Brain and Behavior. 16, 5, p. 506-514

**Different roles for honey bee mushroom bodies and central complex in visual learning of colored lights in an aversive conditioning assay**

Plath, J. A., Entler, B. V., Kirkerud, N. H., Schlegel, U., Galizia, C. G. & Barron, A. B. 30 May 2017 In : Frontiers in Behavioral Neuroscience. 11, p. 1-14 14 p., 98

**Learning, gustatory responsiveness and tyramine differences across nurse and forager honeybees**

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**Epigenetics and the evolution of instincts: instincts may evolve from learning and share the same cellular and molecular mechanisms**

Robinson, G. E. & Barron, A. B. 7 Apr 2017 In : Science. 356, 6333, p. 26-27 2 p.

**Why bees are so vulnerable to environmental stressors**

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**A Computational model of the integration of landmarks and motion in the insect central complex**

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**Making a queen: an epigenetic analysis of the robustness of the honeybee (*Apis mellifera*) queen developmental pathway**

He, X. J., Zhou, L. B., Pan, Q. Z., Barron, A. B., Yan, W. Y. & Zeng, Z. J. 2017 In : Molecular Ecology. 26, 6, p. 1598-1607 10 p.

**Neuropharmacological manipulation of restrained and free-flying honey bees, *apis mellifera***

Søvik, E., Plath, J. A., Devaud, J. M. & Barron, A. B. 17 Nov 2016 In : Journal of Visualized Experiments. 117, p. 1-11 11 p., e54695

**Reply to Adamo, Key et al., and Schilling and Cruse: crawling around the hard problem of consciousness**

Klein, C. & Barron, A. 5 Jul 2016 In : Proceedings of the National Academy of Sciences of the United States of America. 113, 27, p. E3814-E3815 2 p.

**What insects can tell us about the origins of consciousness**

Barron, A. B. & Klein, C. 3 May 2016 In : Proceedings of the National Academy of Sciences of the United States of America. 113, 18, p. 4900-4908 9 p.

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**Starving honey bee (*Apis mellifera*) larvae signal pheromonally to worker bees**

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**Accelerated behavioural development changes fine-scale search behaviour and spatial memory in honey bees (*Apis mellifera* L.)**

Ushitani, T., Perry, C. J., Cheng, K. & Barron, A. B. 1 Feb 2016 In : Journal of Experimental Biology. 219, 3, p. 412-418 7 p.

**Physiology of reproductive worker honey bees (*Apis mellifera*): insights for the development of the worker caste**

Peso, M., Even, N., Søvik, E., Naeger, N. L., Robinson, G. E. & Barron, A. B. 1 Feb 2016 In : Journal of Comparative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology. 202, 2, p. 147-158 12 p.

**A horizon scan of future threats and opportunities for pollinators and pollination**

Brown, M. J. F., Dicks, L. V., Paxton, R. J., Baldock, K. C. R., Barron, A. B., Chauzat, M. P., Freitas, B. M., Goulson, D., Jepsen, S., Kremen, C., Li, J., Neumann, P., Pattemore, D. E., Potts, S. G., Schweiger, O., Seymour, C. L. & Stout, J. C. 2016 In : PeerJ. 4, p. 1-20 20 p., e2249

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**Insects have the capacity for subjective experience**

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**Current progress in understanding the functions of the insect central complex**

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**Embracing multiple definitions of learning**

Barron, A. B., Hebets, E. A., Cleland, T. A., Fitzpatrick, C. L., Hauber, M. E. & Stevens, J. R. 1 Jul 2015 In : Trends in Neurosciences. 38, 7, p. 405-407 3 p.

**Effects of the juvenile hormone analogue methoprene on rate of behavioural development, foraging performance and navigation in honey bees (*Apis mellifera*)**

Chang, L. H., Barron, A. B. & Cheng, K. 1 Jun 2015 In : Journal of Experimental Biology. 218, 11, p. 1715-1724 10 p.

**The Value of Artificial Stimuli in Behavioral Research: Making the Case for Egg Rejection Studies in Avian Brood Parasitism**

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**Pheromonal control: Reconciling physiological mechanism with signalling theory**

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**Death of the bee hive: Understanding the failure of an insect society**

Barron, A. B. 28 Apr 2015 In : Current Opinion in Insect Science. 10, p. 45-50 6 p.

**Rapid behavioral maturation accelerates failure of stressed honey bee colonies**

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**Negative impact of manganese on honeybee foraging**

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**Insect reward systems: Comparing flies and bees**

Søvik, E., Perry, C. J. & Barron, A. B. 2015 In : *Advances in Insect Physiology*. 48, p. 189-226 38 p.

**Behavior and molecular physiology of nurses of worker and queen larvae in honey bees (*Apis mellifera*)**

He, X. J., Tian, L. Q., Barron, A. B., Guan, C., Liu, H., Wu, X. B. & Zeng, Z. J. 1 Dec 2014 In : *Journal of Asia-Pacific Entomology*. 17, 4, p. 911-916 6 p.

**Cocaine affects foraging behaviour and biogenic amine modulated behavioural reflexes in honey bees**

Søvik, E., Even, N., Radford, C. W. & Barron, A. B. 2014 In : *PeerJ*. 2, p. 1-12 12 p., e662

**Differences in the phototaxis of pollen and nectar foraging honey bees are related to their octopamine brain titers**

Scheiner, R., Toteva, A., Reim, T., Søvik, E. & Barron, A. B. 2014 In : *Frontiers in Physiology*. 5, p. 1-8 8 p., 116

**Epigenomics and the concept of degeneracy in biological systems**

Maleszka, R., Mason, P. H. & Barron, A. B. 2014 In : *Briefings in Functional Genomics*. 13, 3, p. 191-202 12 p., elt050

**Genital evolution: why are females still understudied?**

Ah-King, M., Barron, A. B. & Herberstein, M. E. 2014 In : *PLoS Biology*. 12, 5, p. 1-7 7 p., e1001851

**Peak shift in honey bee olfactory learning**

Andrew, S. C., Perry, C. J., Barron, A. B., Berthon, K., Peralta, V. & Cheng, K. 2014 In : *Animal Cognition*. 17, 5, p. 1177-1186 10 p.

**The effects of brood ester pheromone on foraging behaviour and colony growth in apicultural settings**

Peso, M. & Barron, A. B. 2014 In : *Apidologie*. 45, 5, p. 529-536 8 p.

**Honey bees selectively avoid difficult choices**

Perry, C. J. & Barron, A. B. 19 Nov 2013 In : *Proceedings of the National Academy of Sciences of the United States of America*. 110, 47, p. 19155-19159 5 p.

**Invertebrate models in addiction research**

Søvik, E. & Barron, A. B. Nov 2013 In : *Brain, Behavior and Evolution*. 82, 3, p. 153-165 13 p.

**Dynamic modelling of honey bee (*Apis mellifera*) colony growth and failure**

Russell, S., Barron, A. B. & Harris, D. 10 Sep 2013 In : *Ecological Modelling*. 265, p. 158-169 12 p.

**A comparison of digital gene expression profiling and methyl DNA immunoprecipitation as methods for gene discovery in honeybee (*Apis mellifera*) behavioural genomic analyses**

Guan, C., Barron, A. B., He, X. J., Wang, Z. L., Yan, W. Y. & Zeng, Z. J. 9 Sep 2013 In : *PLoS ONE*. 8, 9, p. 1-10 10 p., e73628

**Invertebrate learning and cognition: Relating phenomena to neural substrate**

Perry, C. J., Barron, A. B. & Cheng, K. Sep 2013 In : *Wiley Interdisciplinary Reviews: Cognitive Science*. 4, 5, p. 561-582 22 p.

**Altruistic behavior by egg-laying worker honeybees**

Naeger, N. L., Peso, M., Even, N., Barron, A. B. & Robinson, G. E. 19 Aug 2013 In : *Current Biology*. 23, 16, p. 1574-1578 5 p.

**Cocaine tolerance in honey bees**

Søvik, E., Cornish, J. L. & Barron, A. B. 31 May 2013 In : PLoS ONE. 8, 5, p. 1-10 10 p., e64920

**Modelling food and population dynamics in honey bee colonies**

Khoury, D. S., Barron, A. B. & Myerscough, M. R. 7 May 2013 In : PLoS ONE. 8, 5, p. 1-7 7 p., e59084

**Neural mechanisms of reward in insects**

Perry, C. J. & Barron, A. B. 7 Jan 2013 In : Annual Review of Entomology. 58, p. 543-562 20 p.

**Assessment of flight activity and homing ability in Asian and European honey bee species, *Apis cerana* and *Apis mellifera*, measured with radio frequency tags**

He, X., Wang, W., Qin, Q., Zeng, Z., Zhang, S. & Barron, A. B. Jan 2013 In : Apidologie. 44, 1, p. 38-51 14 p.

**Effect of honey bee queen mating condition on worker ovary activation**

Peso, M., Niño, E. L., Grozinger, C. M. & Barron, A. B. 2013 In : Insectes Sociaux. 60, 2, p. 123-133 11 p.

**Age- and behaviour-related changes in the expression of biogenic amine receptor genes in the antennae of honey bees (*Apis mellifera*)**

McQuillan, H. J., Barron, A. B. & Mercer, A. R. Oct 2012 In : Journal of Comparative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology. 198, 10, p. 753-761 9 p.

**Let's talk about sex**

Barron, A. B. & Brown, M. J. F. 9 Aug 2012 In : Nature. 488, 7410, p. 151-152 2 p.

**General stress responses in the honey bee**

Even, N., Devaud, J. M. & Barron, A. B. 2012 In : Insects. 3, 4, p. 1271-1298 28 p.

**Neurogenomic and neurochemical dissection of honey bee dance communication**

Barron, A. B., Brockmann, A., Sarma, M. S. & Robinson, G. E. 2012 *Honeybee neurobiology and behavior: a tribute to Randolph Menzel*. Galizia, C. G., Eisenhardt, D. & Giurfa, M. (eds.). Dordrecht ; London: Springer, Springer Nature, p. 323-339 17 p.

**Plenty of sex, but no sexuality in biology undergraduate curricula: How sexuality and variation in sexual behaviour are addressed in current biological teaching in relation to recent research findings**

Barron, A. B., Ah-King, M. & Herberstein, M. E. Dec 2011 In : BioEssays. 33, 12, p. 899-902 4 p.

**A quantitative model of honey bee colony population dynamics**

Khoury, D. S., Myerscough, M. R. & Barron, A. B. 2011 In : PLoS ONE. 6, 4, p. 1-6 6 p., e18491

**The roles of dopamine and related compounds in reward-seeking behavior across animal phyla**

Barron, A. B., Søvik, E. & Cornish, J. L. 12 Oct 2010 In : Frontiers in Behavioral Neuroscience. 4, OCT, p. 1-9 9 p., 163

**Optic flow informs distance but not profitability for honeybees**

Shafir, S. & Barron, A. B. 22 Apr 2010 In : Proceedings of the Royal Society B: Biological Sciences. 277, 1685, p. 1241-1245 5 p.

**Effects of cocaine on honey bee dance behaviour**

Barron, A. B., Maleszka, R., Helliwell, P. G. & Robinson, G. E. 15 Jan 2009 In : Journal of Experimental Biology. 212, 2, p. 163-168 6 p.

**Effect of age, behaviour and social environment on honey bee brain plasticity**

Maleszka, J., Barron, A. B., Helliwell, P. G. & Maleszka, R. 2009 In : Journal of Comparative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology. 195, 8, p. 733-740 8 p.

**From social behavior to molecules: models and modules in the middle**

Barron, A. B. & Robinson, G. E. 2009 *Organization of insect societies: from genome to sociocomplexity*. Gadau, J. & Fewell, J. (eds.). Cambridge, Mass.: Harvard University Press, p. 525-544 20 p.

**Learned host preferences**

Barron, A. B. 2009 *Phenotypic plasticity of insects*. Whitman, D. W. & Ananthakrishnan, T. N. (eds.). United States: Science Publishers, p. 767-779 13 p.

**The utility of behavioral models and modules in molecular analyses of social behavior**

Barron, A. B. & Robinson, G. E. Apr 2008 In : *Genes, Brain and Behavior*. 7, 3, p. 257-265 9 p.

**Comparing injection, feeding and topical application methods for treatment of honeybees with octopamine**

Barron, A. B., Maleszka, J., Vander Meer, R. K., Robinson, G. E. & Maleszka, R. Feb 2007 In : *Journal of Insect Physiology*. 53, 2, p. 187-194 8 p.

**Octopamine modulates honey bee dance behavior**

Barron, A. B., Maleszka, R., Vander Meer, R. K. & Robinson, G. E. 30 Jan 2007 In : *Proceedings of the National Academy of Sciences of the United States of America*. 104, 5, p. 1703-1707 5 p.

**Division of labor in the honey bee (*Apis mellifera*): The role of tyramine  $\beta$ -hydroxylase**

Lehman, H. K., Schulz, D. J., Barron, A. B., Wraight, L., Hardison, C., Whitney, S., Takeuchi, H., Paul, R. K. & Robinson, G. E. Jul 2006 In : *Journal of Experimental Biology*. 209, 14, p. 2774-2784 11 p.

**Visual regulation of ground speed and headwind compensation in freely flying honey bees (*Apis mellifera* L.)**

Barron, A. & Srinivasan, M. V. Mar 2006 In : *Journal of Experimental Biology*. 209, 5, p. 978-984 7 p.

**Influence of flight time and flight environment on distance communication by dancing honey bees**

Barron, A. B., Zhu, H., Robinson, G. E. & Srinivasan, M. V. Nov 2005 In : *Insectes Sociaux*. 52, 4, p. 402-407 6 p.

**Selective modulation of task performance by octopamine in honey bee (*Apis mellifera*) division of labour**

Barron, A. B. & Robinson, G. E. Jul 2005 In : *Journal of Comparative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology*. 191, 7, p. 659-668 10 p.

**Measuring the cost of worker reproduction in honeybees: Work tempo in an 'anarchic' line**

Dampney, J. R., Barron, A. B. & Oldroyd, B. P. Jan 2004 In : *Apidologie*. 35, 1, p. 83-88 6 p.

**Octopamine modulates responsiveness to foraging-related stimuli in honey bees (*Apis mellifera*)**

Barron, A. B., Schulz, D. J. & Robinson, G. E. 1 Sep 2002 In : *Journal of Comparative Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology*. 188, 8, p. 603-610 8 p.

**Genetic control of the honey bee (*Apis mellifera*) dance language: Segregating dance forms in a backcrossed colony**

Johnson, R. N., Oldroyd, B. P., Barron, A. B. & Crozier, R. H. May 2002 In : *Journal of Heredity*. 93, 3, p. 170-173 4 p.

**A role for octopamine in honey bee division of labor**

Schulz, D. J., Barron, A. B. & Robinson, G. E. 2002 In : *Brain, Behavior and Evolution*. 60, 6, p. 350-359 10 p.

**Genetic control of the honeybee (*Apis mellifera*) dance language: Segregating dance forms in a backcrossed colony**

Johnson, R. N., Oldroyd, B. P., Barron, A. & Crozier, R. H. 2002 In : *Journal of Heredity*. 93, 3, p. 170-173 4 p.

**Policing of adult honey bees with activated ovaries is error prone**

Dampney, J. R., Barron, A. B. & Oldroyd, B. P. 2002 In : *Insectes Sociaux*. 49, 3, p. 270-274 5 p.

**Policing of adult honeybees with activated ovaries is error prone**

Dampney, J. R., Barron, A. & Oldroyd, B. P. 2002 In : *Insectes Sociaux*. 49, 3, p. 270-275 6 p.

**Social regulation of ovary activation in 'anarchistic' honey-bees (*Apis mellifera*)**

Barron, A. B. & Oldroyd, B. P. 2001 In : *Behavioral Ecology and Sociobiology*. 49, 2-3, p. 214-219 6 p.

**The life and death of Hopkin's host selection principle**

Barron, A. 2001 In : *Journal of Insect Behavior*. 14, 6, p. 725-737 13 p.

**The life and death of Hopkins' host-selection principle**

Barron, A. B. 2001 In : *Journal of Insect Behavior*. 14, 6, p. 725-737 13 p.

**Worker policing and worker reproduction in *Apis cerana***

Oldroyd, B. P., Halling, L. A., Good, G., Wattanachaiyingcharoen, W., Barton, A. B., Nanork, P., Wongsiri, S. & Ratrieks, F. L. W. 2001 In : *Behavioral Ecology and Sociobiology*. 50, 4, p. 371-377 7 p.

**Worker policing in the bee *Apis florea***

Halling, L. A., Oldroyd, B. P., Wattanachaiyingcharoen, W., Barron, A. B., Nanork, P. & Wongsiri, S. 2001 In : *Behavioral Ecology and Sociobiology*. 49, 6, p. 509-513 5 p.

**Worker reproduction in honey-bees (*Apis*) and the anarchic syndrome: A review**

Barron, A. B., Oldroyd, B. P. & Ratrieks, F. L. W. 2001 In : *Behavioral Ecology and Sociobiology*. 50, 3, p. 199-208 10 p.

**Anaesthetising *Drosophila* for behavioural studies**

Barron, A. B. Apr 2000 In : *Journal of Insect Physiology*. 46, 4, p. 439-442 4 p.

**Behavioural induction in *Drosophila*: timing and specificity**

Barron, A. B. & Corbet, S. A. 2000 In : *Entomologia Experimentalis et Applicata*. 94, 2, p. 159-171 13 p.

**Preimaginal conditioning in *Drosophila* revisited**

Barron, A. B. & Corbet, S. A. Sep 1999 In : *Animal Behaviour*. 58, 3, p. 621-628 8 p.

**Garden flowers: Insect visits and the floral reward of horticulturally-modified variants**

Comba, L., Corbet, S. A., Barron, A., Bird, A., Collinge, S., Miyazaki, N. & Powell, M. Jan 1999 In : *Annals of Botany*. 83, 1, p. 73-86 14 p.

**Pre-exposure affects the olfactory response of *Drosophila melanogaster* to menthol**

Barron, A. B. & Corbet, S. A. 1999 In : *Entomologia Experimentalis et Applicata*. 90, 2, p. 175-181 7 p.

**Overwintering survival in the seven spot ladybird, *Coccinella septempunctata* (Coleoptera:Coccinellidae)**

Barron, A. & Wilson, K. 1998 In : *European Journal of Entomology*. 95, 4, p. 639-642 4 p.

## Awards

## Projects

**Analysing the neural mechanisms of animal cognition and behaviour**

Narendra, A., Barron, A., Cheng, K., Hart, N. & Cornish, J.

1/01/16 → 31/12/16



### **An analysis of the distribution of degrees of intelligence across animal groups**

Barron, A.  
4/06/18 → 3/06/20

### **A new understanding of complex systems through study of self-assembled swarm architecture in ants**

Reid, C. & Barron, A.  
30/06/17 → ...

### **Automated Fluorescence Stereo Microscope**

Narendra, A., Taylor, P., Lindsay, S., Barron, A., Herberstein, M., Hart, N., Williamson, J., Griffith, S., Whiting, M., Brock, G. & Jacob, D.  
1/01/17 → ...

### **Biomolecular Discovery and Design Research Centre**

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### **Comprehending and modelling the workings of the animal brain**

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### **MQRES Small: Enhancing electrochemical recording techniques in the animal research facility**

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### **Exploring neurogenomic adaptations to repeated cocaine exposure in honey bees**

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### **Gene expression analysis system**

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### **High quality ultramicrotome for precision specimen preparation for optical and electron microscopy**

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### **High Throughput Molecular Sample Processing Facility**

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**Integrative analysis of honey bee colony function and performance (58-5342-3-004F: Developing the use of sensors to model bee colony dynamics and to monitor bee health, productivity and performance)**

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**Invertebrate olfaction facilities**

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1/01/09 → 31/12/09

**Knowing what you don't know: analyzing the biology of metacognition and uncertainty in a simple model system**

Perry, C., Barron, A. & Perry, C.

1/06/11 → 1/06/14

**Macquarie University Species Spectrum Research Center**

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**Microbalance for integrative behavioral research**

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1/01/10 → 31/12/10

**Molecular memory: how DNA methylation contributes to spatial memory**

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**Navigating brains: the neurobiology of spatial cognition**

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**Neural adaptations for social harmony in bees**

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**Operant behavioural chambers for rat research**

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**Protecting vulnerable Australian honey bees**

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**The bionic bee brain**

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19/06/15 → 24/08/15

**The genomic response to colony disease stress in honey bees**

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**The molecular and cellular basis the memory in the honey bee**

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**Towards a Bionic Brain**

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**Understanding the functions of neural circuit changes in visual navigation**

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**Vulnerability to cocaine use: discovering common mechanisms conserved across animal phyla**

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