

Andrew Barron
Professor
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Biography

Professor Barron is the Director of the Macquarie Minds and Intelligences Initiative. 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

Professor

Professor
School of Natural Sciences
Macquarie University
1 Jan 2022 → present

Leverhulme Visiting Professor: The University of Sheffield

1 Jan 2018 → 1 Jan 2019

Australian Research Council Future Fellow

Australian Research Council
Canberra, Australia
1 Jan 2015 → 1 Jan 2022

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
Canberra, Australia
1 Jan 2004 → 1 Jan 2007

Fullbright Postdoctoral Fellow

University of Illinois at Urbana-Champaign

Champaign, United States
1 Jan 2001 → 1 Jan 2004

Royal Society Postdoctoral Fellow
University of Sydney
Camperdown, Australia
1 Jan 1999 → 1 Jan 2001

Research output

Quantifying the impact of crop coverings on honey bee orientation and foraging in sweet cherry orchards using RFID
Warren, R. J., Colin, T., Quarrell, S. R., Barron, A. B. & Allen, G. R., 19 Mar 2024, (E-pub ahead of print) In: *Journal of Applied Entomology*.

Environmental exposure to metallic pollution impairs honey bee brain development and cognition
Monchanin, C., Drujont, E., Le Roux, G., Lösel, P. D., Barron, A. B., Devaud, J. M., Elger, A. & Lihoreau, M., 5 Mar 2024, In: *Journal of Hazardous Materials*. 465, p. 1-11 11 p., 133218.

Impact of isolated and unattractive crops on honeybee foraging: a case study using radio frequency identification and hybrid carrot seed crops
Warren, R. J., Colin, T., Quarrell, S. R., Barron, A. B. & Allen, G. R., 24 Dec 2023, (E-pub ahead of print) In: *Agricultural and Forest Entomology*.

Comment on "Food wanting is mediated by transient activation of dopaminergic signaling in the honey bee brain"
Barron, A., Fahrbach, S. E., Mercer, A. R., Mesce, K. A., Schulz, D. J., Smith, B. H. & Søvik, E., 4 Aug 2023, In: *Science (New York, N.Y.)*. 381, 6657, p. 1 1 p., adg3916.

Transitions in cognitive evolution
Barron, A. B., Halina, M. & Klein, C., 12 Jul 2023, In: *Proceedings of the Royal Society B: Biological Sciences*. 290, 2002, p. 1-10 10 p., 20230671.

How honey bees make fast and accurate decisions
MaBouDi, H., Marshall, J. A. R., Dearden, N. & Barron, A. B., 27 Jun 2023, In: *eLife*. 12, p. 1-26 26 p., e86176.

Feeding and amines stimulate the growth of the salivary gland following short-term starvation in the black field cricket, *Teleogryllus commodus*
Othman, N. W., Barron, A. B. & Cooper, P. D., Jun 2023, In: *Insects*. 14, 6, p. 1-16 16 p., 495.

The diverging epigenomic landscapes of honeybee queens and workers revealed by multiomic sequencing
Zhang, Y., He, X. J., Barron, A. B., Li, Z., Jin, M. J., Wang, Z. L., Huang, Q., Zhang, L. Z., Wu, X. B., Yan, W. Y. & Zeng, Z. J., Apr 2023, In: *Insect Biochemistry and Molecular Biology*. 155, p. 1-12 12 p., 103929.

Vision: flies move their eyes
Nordström, K. & Barron, A. B., 9 Jan 2023, In: *Current Biology*. 33, 1, p. R20-R22 3 p.

Heavy metal pollutants: the hidden pervasive threat to honey bees and other pollinators
Monchanin, C., Burden, C., Barron, A. B. & Smith, B. H., 2023, *Environmental Threats to Pollinator Health and Fitness*. Harrison, J. F. (ed.). London: Elsevier, p. 255-288 34 p. (Advances in Insect Physiology; vol. 64).

How animal minds can help reveal the human mind
Barron, A. B., Dec 2022, In: *Nature Reviews Psychology*. 1, 12, p. 687-688 2 p.

Bumblebees retrieve only the ordinal ranking of foraging options when comparing memories obtained in distinct settings
Solvi, C., Zhou, Y., Feng, Y., Lu, Y., Roper, M., Sun, L., Reid, R. J., Chittka, L., Barron, A. B. & Peng, F., 27 Sept 2022, In: *eLife*. 11, p. 1-12 12 p., e78525.

The best of both worlds: dual systems of reasoning in animals and AI

Kelly, M. & Barron, A. B., Aug 2022, In: *Cognition*. 225, p. 1-9 9 p., 105118.

Honey bees cannot sense harmful concentrations of metal pollutants in food

Monchanin, C., Gabriela de Brito Sanchez, M., Lecouvreur, L., Boidard, O., Méry, G., Silvestre, J., Le Roux, G., Baqué, D., Elger, A., Barron, A. B., Lihoreau, M. & Devaud, J. M., Jun 2022, In: *Chemosphere*. 297, p. 1-9 9 p., 134089.

The involvement of a floral scent in plant-honeybee interaction

Liu, Y. B., Zeng, Z. J., Barron, A. B., Ma, Y., He, Y. Z., Liu, J. F., Li, Z., Yan, W. Y. & He, X. J., Jun 2022, In: *Science of Nature*. 109, 3, p. 1-10 10 p., 30.

Extent and complexity of RNA processing in honey bee queen and worker caste development

He, X. J., Barron, A. B., Yang, L., Chen, H., He, Y. Z., Zhang, L. Z., Huang, Q., Wang, Z. L., Wu, X. B., Yan, W. Y. & Zeng, Z. J., 20 May 2022, In: *iScience*. 25, 5, p. 1-19 19 p., 104301.

Evaluating the foraging performance of individual honey bees in different environments with automated field RFID systems

Colin, T., Warren, R. J., Quarrell, S. R., Allen, G. R. & Barron, A. B., May 2022, In: *Ecosphere*. 13, 5, p. 1-15 15 p., e4088.

EchoVPR: Echo State Networks for visual place recognition

Ozdemir, A., Scerri, M., Barron, A., Philippides, A., Mangan, M., Vasilaki, E. & Manneschi, L., Apr 2022, In: *IEEE Robotics and Automation Letters*. 7, 2, p. 4520-4527 8 p.

Non-additive gene interactions underpin molecular and phenotypic responses in honey bee larvae exposed to imidacloprid and thymol

Paten, A. M., Colin, T., Coppin, C. W., Court, L. N., Barron, A. B., Oakeshott, J. G. & Morgan, M. J., 25 Mar 2022, In: *Science of the Total Environment*. 814, p. 1-11 11 p., 152614.

Traces of a neonicotinoid pesticide stimulate different honey bee colony activities, but do not increase colony size or longevity

Meikle, W. G., Colin, T., Adamczyk, J. J., Weiss, M. & Barron, A. B., Feb 2022, In: *Ecotoxicology and Environmental Safety*. 231, p. 1-8 8 p., 113202.

Did prosociality drive the evolution of homosexuality? Response to Luoto (2021)

Barron, A. B., Oct 2021, In: *Archives of Sexual Behavior*. 50, 7, p. 2781-2783 3 p.

Current permissible levels of metal pollutants harm terrestrial invertebrates

Monchanin, C., Devaud, J. M., Barron, A. B. & Lihoreau, M., 20 Jul 2021, In: *Science of the Total Environment*. 779, p. 1-8 8 p., 146398.

A model of resource partitioning between foraging bees based on learning

Dubois, T., Pasquaretta, C., Barron, A. B., Gautrais, J. & Lihoreau, M., Jul 2021, In: *PLoS Computational Biology*. 17, 7, p. 1-19 19 p., e1009260.

Don't kill, repel

Colin, T. & Barron, A. B., 5 Jun 2021, In: *New Scientist*. 250, 3337, p. 23 1 p.

Metal pollutants have additive negative effects on honey bee cognition

Monchanin, C., Drujont, E., Devaud, J-M., Lihoreau, M. & Barron, A. B., Jun 2021, In: *Journal of Experimental Biology*. 224, 12, p. 1-7 7 p., jeb241869.

Chronic exposure to trace lead impairs honey bee learning

Monchanin, C., Blanc-Brude, A., Drujont, E., Negahi, M. M., Pasquaretta, C., Silvestre, J., Baqué, D., Elger, A., Barron, A. B., Devaud, J. M. & Lihoreau, M., 1 Apr 2021, In: *Ecotoxicology and Environmental Safety*. 212, p. 1-9 9 p., 112008.

Effects of late miticide treatments on foraging and colony productivity of European honey bees (*Apis mellifera*)
Colin, T., Forster, C. C., Westacott, J., Wu, X., Meikle, W. G. & Barron, A. B., Apr 2021, In: Apidologie. 52, 2, p. 474-492 19 p.

Non-numerical strategies used by bees to solve numerical cognition tasks
MaBouDi, H., Barron, A. B., Li, S., Honkanen, M., Loukola, O. J., Peng, F., Li, W., Marshall, J. A. R., Cope, A., Vasilaki, E. & Solvi, C., 24 Feb 2021, In: Proceedings of the Royal Society B: Biological Sciences. 288, 1945, p. 1-10 10 p., 20202711.

Effects of commercial queen rearing methods on queen fecundity and genome methylation
Yi, Y., Liu, Y-B., Barron, A. B. & Zeng, Z-J., Feb 2021, In: Apidologie. 52, 1, p. 282-291 10 p.

Pesticide dosing must be guided by ecological principles
Colin, T., Monchanin, C., Lihoreau, M. & Barron, A. B., Dec 2020, In: Nature Ecology and Evolution. 4, 12, p. 1575-1577 3 p.

Transcriptomic, morphological, and developmental comparison of adult honey bee queens (*Apis mellifera*) reared from eggs or worker larvae of differing ages
Yi, Y., Liu, Y. B., Barron, A. B. & Zeng, Z. J., Dec 2020, In: Journal of economic entomology. 113, 6, p. 2581-2587 7 p.

Transgenerational accumulation of methylome changes discovered in commercially reared honey bee (*Apis mellifera*) queens
Yi, Y., He, X. J., Barron, A. B., Liu, Y. B., Wang, Z. L., Yan, W. Y. & Zeng, Z. J., Dec 2020, In: Insect Biochemistry and Molecular Biology. 127, p. 1-11 11 p., 103476.

Response to Luoto's (2020) "Did Prosociality Drive the Evolution of Homosexuality?"
Barron, A. B., Oct 2020, In: Archives of Sexual Behavior. 49, 7, p. 2245-2246 2 p.

Honeybees solve a multi-comparison ranking task by probability matching
MaBouDi, H., Marshall, J. A. R. & Barron, A. B., 9 Sept 2020, In: Proceedings. Biological sciences. 287, 1934, p. 1-9 9 p., 20201525.

Vertical lobes of the mushroom body are essential for view-based navigation in Australian *Myrmecia* ants
Kamhi, J. F., Barron, A. B. & Narendra, A., 7 Sept 2020, In: Current Biology. 30, 17, p. 3432-3437 9 p.

The miticide thymol in combination with trace levels of the neonicotinoid imidacloprid reduces visual learning performance in honey bees (*Apis mellifera*)
Colin, T., Plath, J. A., Klein, S., Vine, P., Devaud, J. M., Lihoreau, M., Meikle, W. G. & Barron, A. B., Aug 2020, In: Apidologie. 51, 4, p. 499-509 11 p.

A hybrid compact neural architecture for visual place recognition
Chancan, M., Hernandez-Nunez, L., Narendra, A., Barron, A. B. & Milford, M., Apr 2020, In: IEEE Robotics and Automation Letters. 5, 2, p. 993-1000 8 p.

Prosociality and a sociosexual hypothesis for the evolution of same-sex attraction in humans
Barron, A. B. & Hare, B., 16 Jan 2020, In: Frontiers in Psychology. 10, p. 1-7 7 p., 2955.

First-person interventions and the meta-problem of consciousness
Klein, C. & Barron, A. B., 2020, In: Journal of Consciousness Studies. 27, 5-6, p. 82-90 9 p.

How experimental neuroscientists can fix the hard problem of consciousness
Klein, C. & Barron, A. B., 2020, In: Neuroscience of Consciousness. 6, 1, p. 1-10 10 p., niaa009.

The capping pheromones and putative biosynthetic pathways in worker and drone larvae of honey bees *Apis mellifera*
Qin, Q-H., He, X-J., Barron, A. B., Guo, L., Jiang, W-J. & Zeng, Z-J., Dec 2019, In: Apidologie. 50, 6, p. 793-803 11 p.

Long-term dynamics of honey bee colonies following exposure to chemical stress

Colin, T., Meikle, W. G., Paten, A. M. & Barron, A. B., 10 Aug 2019, In: Science of the Total Environment. 677, p. 660-670 11 p.

Traces of a neonicotinoid induce precocious foraging and reduce foraging performance in honey bees

Colin, T., Meikle, W. G., Wu, X. & Barron, A. B., 16 Jul 2019, In: Environmental Science and Technology. 53, 14, p. 8252-8261 10 p.

A maternal effect on queen production in honeybees

Wei, H., He, X. J., Liao, C. H., Wu, X. B., Jiang, W. J., Zhang, B., Zhou, L. B., Zhang, L. Z., Barron, A. B. & Zeng, Z. J., 8 Jul 2019, In: Current Biology. 29, 13, p. 2208-2213 9 p.

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., Jun 2019, In: Insect Science. 26, 3, p. 499-509 11 p.

Honey bees increase their foraging performance and frequency of pollen trips through experience

Klein, S., Pasquaretta, C., He, X. J., Perry, C., Søvik, E., Devaud, J. M., Barron, A. B. & Lihoreau, M., 1 May 2019, In: Scientific Reports. 9, 1, p. 1-10 10 p., 6778.

Effects of thymol on European honey bee hygienic behaviour

Colin, T., Lim, M. Y., Quarrel, S. R., Allen, G. R. & Barron, A. B., 25 Apr 2019, In: Apidologie. 50, 2, p. 141-152 12 p.

Biogenic amine modulation of honey bee sociability and nestmate affiliation

Hewlett, S. E., Delahunt Smoleniec, J. D., Wareham, D. M., Pyne, T. M. & Barron, A. B., 25 Oct 2018, In: PLoS ONE. 13, 10, p. 1-18 18 p., e0205686.

The development of honey bee colonies assessed using a new semi-automated brood counting method: Combcount

Colin, T., Bruce, J., Meikle, W. G. & Barron, A. B., 16 Oct 2018, In: PLoS ONE. 13, 10, p. 1-14 14 p., e0205816.

Abstract concept learning in a simple neural network inspired by the insect brain

Cope, A. J., Vasilaki, E., Minors, D., Sabo, C., Marshall, J. A. R. & Barron, A. B., 17 Sept 2018, In: PLoS Computational Biology. 14, 9, p. 1-21 21 p., e1006435.

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

Liao, C. H., He, X. J., Wang, Z. L., Barron, A. B., Zhang, B., Zeng, Z. J. & Wu, X. B., Jul 2018, In: Archives of Environmental Contamination and Toxicology. 75, 1, p. 59-65 7 p.

Using within-day hive weight changes to measure environmental effects on honey bee colonies

Meikle, W. G., Holst, N., Colin, T., Weiss, M., Carroll, M. J., McFrederick, Q. S. & Barron, A. B., 23 May 2018, In: PLoS ONE. 13, 5, p. 1-21 21 p., e0197589.

Relationship between brain plasticity, learning and foraging performance in honey bees

Cabirol, A., Cope, A. J., Barron, A. B. & Devaud, J. M., 30 Apr 2018, In: PLoS ONE. 13, 4, p. 1-18 18 p., e0196749.

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.

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. 1-5 5 p., jeb171470.

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

Nouvian, M., Mandal, S., Jamme, C., Claudianos, C., D'Ettorre, P., Reinhard, J., Barron, A. B. & Giurfa, M., 31 Jan 2018, In: Proceedings of the Royal Society B: Biological Sciences. 285, 1871, p. 1-9 9 p., 20172653.

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.

Inter-individual variability in the foraging behaviour of traplining bumblebees

Klein, S., Pasquaretta, C., Barron, A. B., Devaud, J. M. & Lihoreau, M., 4 Jul 2017, In: Scientific Reports. 7, 1, p. 1-12 12 p., 4561.

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 9 p.

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

Scheiner, R., Reim, T., Søvik, E., Entler, B. V., Barron, A. B. & Thamm, M., 15 Apr 2017, In: Journal of Experimental Biology. 220, 8, p. 1443-1450 8 p.

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

Klein, S., Cabirol, A., Devaud, J-M., Barron, A. B. & Lihoreau, M., Apr 2017, In: Trends in Ecology and Evolution. 32, 4, p. 268-278 11 p.

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., Mar 2017, In: *Molecular Ecology*. 26, 6, p. 1598-1607 10 p.

A Computational model of the integration of landmarks and motion in the insect central complex
Cope, A. J., Sabo, C., Vasilaki, E., Barron, A. & Marshall, J. A. R., 27 Feb 2017, In: *PLoS ONE*. 12, 2, p. 1-19 19 p., e0172325.

Neuropharmacological manipulation of restrained and free-flying honey bees, *apis mellifera*
Søvik, E., Plath, J. A., Devaud, J. M. & Barron, A. B., 26 Nov 2016, In: *Journal of Visualized Experiments*. 117, p. 1-11 11 p., e54695.

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., 9 Aug 2016, In: *PeerJ*. 4, p. 1-20 20 p., e2249.

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.

A systems approach to animal communication
Hebets, E. A., Barron, A. B., Balakrishnan, C. N., Hauber, M. E., Mason, P. H. & Hoke, K. L., 16 Mar 2016, In: *Proceedings of the Royal Society B: Biological Sciences*. 283, 1826, p. 1-10 10 p., 20152889.

Starving honey bee (*Apis mellifera*) larvae signal pheromonally to worker bees
He, X. J., Zhang, X. C., Jiang, W. J., Barron, A. B., Zhang, J. H. & Zeng, Z. J., 29 Feb 2016, In: *Scientific Reports*. 6, p. 1-9 9 p., 22359.

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*. 202, 2, p. 147-158 12 p.

Insect consciousness: commitments, conflicts and consequences
Klein, C. & Barron, A. B., 2016, In: *Animal Sentience*. 1, 9, p. 1-12 12 p.

Insects have the capacity for subjective experience
Klein, C. & Barron, A. B., 2016, In: *Animal Sentience*. 1, 9, p. 1-19 19 p.

Current progress in understanding the functions of the insect central complex
Plath, J. A. & Barron, A. B., 10 Dec 2015, In: *Current Opinion in Insect Science*. 12, p. 11-18 8 p.

Decision-making and action selection in insects: inspiration from vertebrate-based theories
Barron, A. B., Gurney, K. N., Meah, L. F. S., Vasilaki, E. & Marshall, J. A. R., 18 Aug 2015, In: *Frontiers in Behavioral Neuroscience*. 9, p. 1-14 14 p., 216.

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

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

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

Hauber, M. E., Tong, L., Bán, M., Croston, R., Grim, T., Waterhouse, G. I. N., Shawkey, M. D., Barron, A. B. & Moskát, C., Jun 2015, In: Ethology. 121, 6, p. 521-528 8 p.

Pheromonal control: reconciling physiological mechanism with signalling theory

Peso, M., Elgar, M. A. & Barron, A. B., 1 May 2015, In: Biological Reviews. 90, 2, p. 542-559 18 p.

Rapid behavioral maturation accelerates failure of stressed honey bee colonies

Perry, C. J., Søvik, E., Myerscough, M. R. & Barron, A. B., 17 Mar 2015, In: Proceedings of the National Academy of Sciences of the United States of America. 112, 11, p. 3427-3432 6 p.

Negative impact of manganese on honeybee foraging

Søvik, E., Perry, C. J., LaMora, A., Barron, A. B. & Ben-Shahar, Y., 1 Mar 2015, In: Biology Letters. 11, 3, p. 1-4 4 p., 20140989.

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.

Peak shift in honey bee olfactory learning

Andrew, S. C., Perry, C. J., Barron, A. B., Berthon, K., Peralta, V. & Cheng, K., Sept 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., Sept 2014, In: Apidologie. 45, 5, p. 529-536 8 p.

Epigenomics and the concept of degeneracy in biological systems

Maleszka, R., Mason, P. H. & Barron, A. B., May 2014, In: Briefings in Functional Genomics. 13, 3, p. 191-202 12 p., e1050.

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

Sovik, 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.

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.

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 Sept 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 Sept 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., Sept 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. 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. 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 β -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*. 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 Sept 2002, In: *Journal of Comparative Physiology A*. 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.

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.

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. 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. & Ratnieks, 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. & Ratnieks, 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., Sept 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

ActiveAI - active learning and selective attention for robust, transparent and efficient AI
Barron, A. & Philippides, A.
1/11/19 → 31/10/22

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 → 31/12/17

Best practices for evaluation of bee health technology
Barron, A. & Colin, T.
1/05/23 → 31/10/26

Biomolecular Discovery and Design Research Centre
Packer, N., Paulsen, I., Nevalainen, H., Haynes, P., Molloy, M., Atwell, B., Barron, A., Beggs, P., Bergquist, P. L., Brown, L., Cornish, J., Chung, R., De Deene, Y., Garcia-Bennett, A., Gillings, M., Goodchild, A., Guillemin, G., Hallinan, J., Hose, G., Jaschke, P., Mabbutt, B., Raftos, D., Ranganathan, S., Sofronov, G., Sunna, A., Tetu, S., Andersen, M., Willows, R., Ahn, C., Breen, E., Campbell, M., Care, A., Cordina, N., Curach, N., Everest Dass, A., Elbourne, L., Goold, H., Hassan, K., Kautto, L., Krisp, C., Kroukamp, H., Lee, A., Lin, C., Mackie, A., McKay, M., McQuade, L., Mirzaei, M., Mohamedali, A., Ostrowski, M., Parker, L., Pascovici, D., Penesyan, A., Shah, B., Sun, A., Thompson, E. & Williams, T.
1/01/17 → ...

Biosecurity Futures Research Centre
Taylor, P., Gillings, M., Raftos, D., Leishman, M., Sunna, A., Bishop, M., Barron, A., Beattie, A., Beaumont, L., Connally, R., Grech, A., Griffith, S., Guillemin, G., Hughes, L., Inglis, D., Jamie, I., Jamie, J., Lu, Y., Morelli De andrade, R., Nevalainen, H., Park, S. J., Perez, J., Power, M., Ranjan, R. & Vickery, K.
1/07/15 → ...

Combined gas chromatography/ electroantennogram detector for insect olfaction research
Taylor, P., Jamie, I., Herberstein, M., Kemp, D., Barron, A., Jamie, J., Akter, H., Adnan, S., Moadeli, T., Masud, K., Bakshi, D. & MQRES, M.
1/01/15 → 31/12/15

Comprehending and modelling the workings of the animal brain
Barron, A., MQRES (International), M. & MQRES, M.

1/06/15 → 31/12/20

MQRIS Small: Enhancing electrochemical recording techniques in the animal research facility
Cornish, J., Baracz, S., McMullan, S., Goodchild, A., Barron, A. & Hildreth, C.
1/01/18 → 31/12/18

Exploring neurogenomic adaptations to repeated cocaine exposure in honey bees
Barron, A.
22/10/08 → 21/10/09

DP24 (ANU Led): Finding equivalence between natural and artificial intelligences
Klein, C. & Barron, A.
1/03/24 → 28/02/27

Gene expression analysis system
Barron, A., Cheng, K., Taylor, P., Nelson, X. & Pryke, S.
1/01/08 → 31/12/08

High quality ultramicrotome for precision specimen preparation for optical and electron microscopy
Deng, W., Chung, R., Nevalainen, H., Phillips, J. K., McMorran, B. & Barron, A.
1/01/14 → 31/12/14

High Throughput Molecular Sample Processing Facility
Zakoshanski, I., Paulsen, I., Whiting, M., Power, M., Lanfear, R., Barron, A., Westoby, M., Warren, D., Van Sluyter, S., Clarke, T., Wunderlin, T., Ostrowski, M., Mazard, S. & Tetu, S.
4/02/15 → 31/12/15

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)
Barron, A. & Meikle, W.
1/07/13 → ...

Invertebrate olfaction facilities
Taylor, P., Herberstein, M., Barron, A., Weldon, C., Nelson, X. & Prenter, J.
1/01/09 → 31/12/09

Knowing what you don't know: analyzing the biology of metacognition and uncertainty in a simple model system
Solvi, C. & Barron, A.
1/06/11 → 1/06/14

Macquarie University Species Spectrum Research Center
Herberstein, M., Gillings, M., Jacob, D., Saintilan, N., Barron, A., Westoby, M., Sofronov, G. & Tetu, S.
1/01/17 → ...

Microbalance for integrative behavioral research
Taylor, P., Barron, A. & Weldon, C.
1/01/10 → 31/12/10

Molecular memory: how DNA methylation contributes to spatial memory
Maleszka, R., Cornish, J. & Barron, A.
1/01/10 → 31/12/12

Navigating brains: the neurobiology of spatial cognition
Cheng, K., Zeil, J., Narendra, A., Barron, A., Wehner, R. & MQRES, M.
30/06/15 → 29/06/19

Navigating brains: the neurocomputational foundations of insect spatial cognition

Cheng, K., Barron, A. & Wehner, R.

1/01/14 → 31/12/14

Neural adaptations for social harmony in bees

Barron, A.

1/01/08 → 31/12/08

Operant behavioural chambers for rat research

Cornish, J., Clemens, K., Staples, L., Goodchild, A., Haynes, P., Barron, A., Baillie, A. & Pilowsky, P.

1/01/11 → 31/12/11

Origin of Consciousness and it's Computational Applications in Machines (MQ Discretionary Scheme)

Barron, A., Klein, C., Balleine, B. W., Bell, G., Millford, M. & Van Swinderen, B.

12/02/18 → 31/12/18

Protecting Australia's honey bee pollinators

Barron, A.

1/11/21 → 31/10/23

Protecting vulnerable Australian honey bees

Barron, A.

25/07/17 → ...

Real-time qPCR system for gene detection, gene expression analysis and single nucleotide polymorphisms genotyping in Biology research

Hart, N., Ponton, F., Narendra, A., Barron, A., Shine, R. & Clulow, S.

1/01/20 → 29/05/20

The bionic bee brain

Barron, A.

19/06/15 → 24/08/15

The genomic response to colony disease stress in honey bees

Barron, A. & Gillings, M.

1/07/12 → 30/06/14

MTEC: The major transitions in the evolution of cognition

Barron, A.

1/11/20 → 31/10/23

The molecular and cellular basis the memory in the honey bee

Barron, A.

1/08/09 → 30/07/11

Towards a Bionic Brain

Barron, A.

30/04/14 → 25/12/14

Understanding colony collapse: a social analysis of honey bee colony failure

Barron, A.

1/07/11 → 31/12/14

Understanding the functions of neural circuit changes in visual navigation

Kamhi, F., Narendra, A. & Barron, A.

1/01/17 → 31/12/18

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

Barron, A., Cornish, J. & Maleszka, R.

1/01/09 → 31/12/12