Andrew Bourke

Personal details

Name :	Andrew Frederick George BOURKE
Present position :	Emeritus Professor
Contact details :	School of Biological Sciences, University of East Anglia, Norwich Research Park, Norwich, NR4 7TJ, U.K.; a.bourke@uea.ac.uk
www :	https://research-portal.uea.ac.uk/en/persons/andrew-bourke https://www.andrewbourke.org
Research interests :	Evolutionary biology, behavioural ecology, conservation biology

Education/Qualifications

Teaching	Fellow, Higher Education Academy, Nov 2019
Ph.D. :	Ph.D., School of Biological Sciences, University of Bath, Dec 1987
First degree :	B.A. (Honours) in Zoology, First Class, University of Cambridge, June 1983

Professional history

2006 - 2023	Professor of Evolutionary Biology, School of Biological Sciences, UEA
2003 - 2006 :	Reader, Institute of Zoology (IoZ), Zoological Society of London (ZSL)
2000 - 2002 :	Senior Research Fellow, IoZ
1992 - 2000 :	Research Fellow, IoZ
1988 - 1991 :	Junior Research Fellow (Jesus College), Dept. Zoology, Univ. of Cambridge

Professional service

Editorships :	*Behavioral Ecology* (Editor, 2000 – 2004; Editor-in-Chief, 2004 - 2006)
Editorial boards :	*Animal Behaviour* (1993 - 1995), *Insectes Sociaux* (2000 - 2006), *Ecology Letters* (2010 - 2018)
Peer review: grants :	- NERC Peer Review College: member, 2005–2009; Core Panel member, 2014–2023; 8 Moderating/Assessment Panels (one as Chair, Nov 2008) - Panel evaluator and reviewer, European Research Council, 2007 - 2017 - Member, Ecology grant assessment panel, Research Council for Biosciences and Environment, Academy of Finland, Feb 2005 - International peer review: Australian Research Council, Danish National Research Foundation, ESF, Fund for Scientific Research (Belgium), Human Frontier Science Program, Killam Program (Canada), National Geographic, NSF (Switzerland), NSERC (Canada), NSF (USA) - National peer review: BBSRC, The British Council, The Leverhulme Trust, NERC, The Nuffield Foundation, The Royal Society
Peer review: journals :	Referee for *Nature*, *Science*, *PNAS*, *Current Biol*, *PLoS Biology*, *Proc R Soc B* and leading subject journals (e.g. *Am Nat*, *Anim Behav*, *Behav Ecol*, *Ecol Letters*, *Evolution*, *J Evol Biol*, *Mol Ecol*, *TREE*)
Peer review: books :	Reader/appraiser for: Cambridge UP, Oxford UP, Princeton UP
Other external professional service :	- External examiner of 10 UK PhD theses (Universities of Belfast, Bristol, Cambridge, Leicester, Oxford, Sheffield and Sussex) and 8 overseas PhD theses (Universities of Aarhus, Copenhagen, Helsinki, Lausanne, Paris), 1994 - present - President, North-west European Section of the International Union for the Study of Social Insects (IUSSI), 2007-2009
Membership of professional bodies and learned societies :	American Society of Naturalists, Association for the Study of Animal Behaviour, European Society of Evolutionary Biology, International Society for Behavioral Ecology, International Union for the Study of Social Insects, Royal Entomological Society

Grants

- 2019 Co-Investigator (Principal Investigator, T. Chapman, UEA BIO); other Co-Investigators: A. Bretman (School of Biology, University of Leeds), E. Fowler (UEA BIO) (Researcher Co-Investigator), D. Yu (UEA BIO); Project Partner: M. Archetti (Center on Population, Health and Aging, Pennsylvania State University); NERC 3-year Research Grant (NE/T007133/1) of £812,805: 'Public goods and socially responsive females' (2020 – 2024)
- 2017 Principal Investigator (Co-Investigator, T. Chapman, UEA BIO), NERC 3-year Research Grant (NE/R000875/1) of £754,351 + £50, 990 NBAF costs: 'Social evolution and the evolution of ageing: testing the hypotheses' (2017 – 2021)
- 2014 Principal Investigator (Co-Investigator, T. Dalmay, UEA BIO), BBSRC 3-year Research Grant (BB/M001482/1) for £489,572: 'Evolution and molecular basis of caste differentiation in bees' (2014 - 2017)
- 2014 Principal Investigator (Co-Investigator, T. Dalmay, UEA BIO), NERC 3-year Research Grant (NE/L006758/1) of £538,619: 'The genetic basis and ground plan of eusocial worker evolution' (2014 - 2017)
- 2014 Sponsor, Visiting Research Fellowship for P. Blacher funded by the Fyssen Foundation to value of 49,920 Euros: 'Effects of sociality and social environment on behaviour and ageing' (2014 - 2016)
- 2013 Principal Investigator, NERC Biomolecular Analysis Facility funding of £22,842 for microsatellite genotyping of worker bumble bees at NBAF-Sheffield (2013)
- 2012 Principal Investigator, NERC Small Grant (NE/J013927/1) for £64,722: 'Lifetime reproductive success and longevity of workers in a social insect' (2012 - 2014)
- 2010 Joint Principal Investigator (with Joint PIs C. Carvell and M. Heard, CEH Wallingford, and W. Jordan and S. Sumner, IoZ/University of Bristol), 3-year Insect Pollinators Initiative grant (funders: BBSRC, Defra, NERC, The Scottish Government, Wellcome Trust)(BB/I001069/1) of £666,104: 'Investigating the impact of habitat structure on queen and worker bumblebees in the field' (2010 - 2013)
- 2010 University supervisor (Joint supervisors, K. Jones, UCL/IoZ and S. Sumner, University of Bristol), NERC Open CASE studentship: 'Evolution and diversification of ants' (2010 - 2014)
- 2008 Joint Principal Investigator (with Joint PI, J. Parker, University of Southampton), NERC 3-year Joint Research Grant (NE/G006164/1) of £629,357: 'Kin-selected conflict and the evolution of lifespan and ageing' (2009 - 2013)
- 2007 Principal Investigator, NERC Small Grant (NE/F011482/1) of £37,245: 'Measuring the heritability of sex ratio in a social insect' (2008 - 2009)
- 2005 Principal Investigator (Co-Investigator, W. Jordan, IoZ), NERC 3-year Research Grant (NE/D003903/1) of £321,177: 'Conflict resolution and direct benefits in kin-selected conflicts in social groups' (2007 - 2009)
- 2005 Collaborator (Principal Investigator: J. Wang, IoZ; Co-collaborator, W. Jordan), BBSRC 3-year Research Grant (BB/D011035/1) of £177,127: 'Inference of genealogical relationships among individuals from genetic markers' (2006 - 2009)
- 2003 With W. Jordan (IoZ), £72,000 subcontract with CEH Monks Wood for genetic censuses of bumble bee numbers in DEFRA-funded project (DEFRA CSA6437/BD1625): 'Restoration and management of bumblebee habitat in agricultural landscapes' (2003 - 2008)
- 2003 With M. Brown (Trinity College Dublin), Royal Irish Academy Royal Society Exchange Scheme Joint Research Project grant for £7,230: 'Conservation genetics of island populations of a rare bumble bee' (2003 - 2004)
- 2002 With R. Green (RSPB/University of Cambridge), £5,000 from RSPB for studies on methods of nonlethal sampling of DNA from bumble bees (2002)
- 2001 Principal Investigator (Co-Investigator, W. Jordan, IoZ), NERC Research Grant (NER/A/S/2000/01318) of £271,311: 'Relatedness and information in reproductive conflicts in social groups' (2001 - 2004)
- 2001 With R. Green (RSPB/University of Cambridge), £5,000 from RSPB for studies on the genetics of scarce bumble bees (2001)
- 2000 Principal Applicant (Additional Applicants, W. Jordan, R. Hammond, IoZ), Leverhulme Trust Research Grant (F/00390/A) of £72,808: 'Differential gene expression in caste determination and evolution in bumble bees' (2001- 2003)
- 1999 Principal Investigator, Association for the Study of Animal Behaviour Research Grant of £2,309

on primary versus secondary sex ratios in slave-making ants (1999-2000)

- 1998 Co-Principal Investigator, with M. Bruford (IoZ), NERC Research Grant (GR3/11792) of £168,087: 'Colony dynamics and the evolution of policing and reproductive skew in multiple-queen ants' (1998 - 2001)
- 1994 Co-Principal Investigator, with M. Bruford (IoZ), NERC Research Grant (GR3/09677) of £61,071: 'Reproductive skew and the evolution of communal breeding in ant societies' (1994 - 1996)
- 1993 Co-Principal Investigator, with M. Bruford (IoZ), NERC Research Grant (GR3/8858) of £39,922: 'Reproductive success in communal breeders: a molecular genetic, ecological and behavioural study in multiple-queen ant societies' (1993 - 1994)
- 1992 Principal Investigator, Royal Society Research Grant for £9,089 to study the behaviour of multiple-queen ants (1992 - 1993)

Publications

Books

1. **Bourke AFG** (2011) *Principles of Social Evolution*. Oxford Series in Ecology and Evolution (eds, P.H. Harvey, R.M. May, C.H. Godfray and J.A. Dunne), Oxford University Press, Oxford. xii + 267 pp.
2. **Bourke AFG**, Franks NR (1995) *Social Evolution in Ants*. Monographs in Behavior and Ecology (eds, J.R. Krebs and T.H. Clutton-Brock), Princeton University Press, Princeton, New Jersey. xiii + 529 pp.

Book chapters

3. **Bourke AFG** (2005) Genetics, relatedness and social behaviour in insect societies. In: Fellowes MDE, Holloway GJ, Rolff J (eds) *Insect Evolutionary Ecology*. CABI Publishing, Wallingford. pp. 1-30.
4. **Bourke AFG** (2004) Social insects. In: Hutchins M, Evans AV, Garrison RW, Schlager N, eds, *Grzimek's Animal Life Encyclopedia, 2nd edition. Volume 3, Insects*. Gale Group, Farmington Hills, Michigan. pp. 67-73.
5. **Bourke AFG** (1997) Sociality and kin selection in insects. In: Krebs JR, Davies NB (eds) *Behavioural Ecology: An Evolutionary Approach*, 4th edition. Blackwell, Oxford. pp. 203-227.

Articles in refereed journals

6. Churchill ER, Fowler EK, Friend LA, Archetti M, Yu DW, **Bourke AFG**, Chapman T, Bretman A (2025) Female fruit flies use social cues to make egg-clustering decisions. *BMC Biology* 23: 306.
7. Fowler EK, Friend LA, Churchill ER, Yu DW, Archetti M, **Bourke AFG**, Bretman A, Chapman T (2025) Female oviposition decisions are influenced by the microbial environment. *Journal of Evolutionary Biology* 38: 379-390.
8. Prince DC, Wirén A, Huggins TJ, Collins DH, Dalmay T, **Bourke AFG** (2024) Molecular basis of eusocial complexity: the case of worker reproductivity in bees. *Genome Biology and Evolution* 16: evae269.
9. **Bourke AFG** (2023) Conflict and conflict resolution in the major transitions. *Proceedings of the Royal Society B* 290: 20231420.
10. Collins DH, Prince DC, Donelan JL, Chapman T, **Bourke AFG** (2023) Costs of reproduction are present but latent in eusocial bumblebee queens. *BMC Biology* 21: 153.
11. Collins DH, Prince DC, Donelan JL, Chapman T, **Bourke AFG** (2023) Developmental diet alters the fecundity-longevity relationship and age-related gene expression in *Drosophila melanogaster*. *The Journals of Gerontology, Series A: Biological Sciences and Medical Sciences* 78: 2240-2250.
12. Holland JG*, Zanette LRS*, Nunes T, **Bourke AFG** (2023) Policing is more effective against eggs of non-natal versus natal workers at early colony stages in a bumblebee. *Ethology* 129: 421-431. *Joint first authors
13. Wang J, **Bourke AFG** (2023) Parentage exclusion of close relatives in haplodiploid species. *Theoretical Population Biology* 154: 40-50.
14. Brock RE*, Crowther LP*, Wright DJ, Richardson DS, Carvell C, Taylor MI, **Bourke AFG** (2021) No severe genetic bottleneck in a rapidly range-expanding bumblebee pollinator. *Proceedings of the Royal Society B* 288: 20202639. *Equal contribution
15. Collins DH, Wirén A, Labédan M, Smith M, Prince DC, Mohorianu I, Dalmay T, **Bourke AFG** (2021) Gene expression during larval caste determination and differentiation in intermediately eusocial

bumblebees, and a comparative analysis with advanced eusocial honeybees. *Molecular Ecology* 30: 718-735.
16. Almond EJ, Huggins TJ, Crowther LP, Parker JD, **Bourke AFG** (2019) Queen longevity and fecundity affect conflict with workers over resource inheritance in a social insect. *American Naturalist* 193: 256-266.
17. **Bourke AFG** (2019) Inclusive fitness and the major transitions in evolution. *Current Opinion in Insect Science* 34: 61-67.
18. Crowther LP, Wright DJ, Richardson DS, Carvell C, **Bourke AFG** (2019) Spatial ecology of a range-expanding bumble bee pollinator. *Ecology and Evolution* 9: 986-997.
19. Blacher P, Huggins TJ, **Bourke AFG** (2017) Evolution of ageing, costs of reproduction and the fecundity-longevity trade-off in eusocial insects. *Proceedings of the Royal Society B* 284: 20170380.
20. Carvell C, **Bourke AFG**, Dreier S, Freeman SN, Hulmes S, Jordan WC, Redhead JW, Sumner S, Wang J, Heard MS (2017) Bumblebee family lineage survival is enhanced in high quality landscapes. *Nature* 543: 547-549. Subject of *Nature* News & Views (https://www.nature.com/articles/nature21897).
21. Collins DH, Mohorianu I, Beckers M, Moulton V, Dalmay T, **Bourke AFG** (2017) MicroRNAs associated with caste determination and differentiation in a primitively eusocial insect. *Scientific Reports* 7: 45674.
22. Lockett GA*, Almond EJ*, Huggins TJ, Parker JD, **Bourke AFG** (2016) Gene expression differences in relation to age and social environment in queen and worker bumble bees. *Experimental Gerontology* 77: 52-61 *Joint first authors
23. Redhead JW, Dreier S, **Bourke AFG**, Heard MS, Jordan WC, Sumner S, Wang J, Carvell C (2016) Effects of habitat composition and landscape structure on worker foraging distances of five bumblebee species. *Ecological Applications* 26: 726-739.
24. **Bourke AFG** (2015) Sex investment ratios in eusocial Hymenoptera support inclusive fitness theory. *Journal of Evolutionary Biology* 28: 2106-2111. Faculty of 1000 Prime Recommended Paper (http://f1000.com/prime/725697354)
25. Carvell C, **Bourke AFG**, Osborne JL, Heard MS (2015) Effects of an agri-environment scheme on bumblebee reproduction at local and landscape scales. *Basic and Applied Ecology* 16: 519-530.
26. Holland JG, **Bourke AFG** (2015) Colony and individual life-history responses to temperature in a social insect pollinator. *Functional Ecology* 29: 1209-1217.
27. Sadd BM, Barribeau SM, Bloch G, de Graaf DC, Dearden P, Elsik CG et al. [144 authors in total including **Bourke AFG**] (2015) The genomes of two key bumblebee species with primitive eusocial organization. *Genome Biology* 16: 76 doi:10.1186/s13059-015-0623-3
28. **Bourke AFG** (2014) The gene's-eye view, major transitions and the formal darwinism project. *Biology & Philosophy* 29: 241-248.
29. **Bourke AFG** (2014) Hamilton's rule and the causes of social evolution. *Philosophical Transactions of the Royal Society Series B* 369: 20130362.
30. Crowther LP, Hein P-L, **Bourke AFG** (2014) Habitat and forage associations of a naturally colonising insect pollinator, the Tree Bumblebee *Bombus hypnorum*. *PLoS One* 9: e107568.
31. Dreier S, Redhead JW, Warren IA, **Bourke AFG**, Heard MS, Jordan WC, Sumner S, Wang J, Carvell C (2014) Fine-scale spatial genetic structure of common and declining bumble bees across an agricultural landscape. *Molecular Ecology* 23: 3384-3395.
32. Ferguson-Gow H, Sumner S, **Bourke AFG**, Jones KE (2014) Colony size predicts division of labour in attine ants. *Proceedings of the Royal Society Series B* 281: 20141411.
33. Friend LA, **Bourke AFG** (2014) Workers respond to unequal likelihood of future reproductive opportunities in an ant. *Animal Behaviour* 97: 165-176.
34. Zanette LRS, Miller SDL, Faria CMA, Lopez-Vaamonde C, **Bourke AFG** (2014) Bumble bee workers drift to conspecific nests at field scales. *Ecological Entomology* 39: 347-354.
35. Holland JG, Guidat FS, **Bourke AFG** (2013) Queen control of a key life-history event in a eusocial insect. *Biology Letters* 9: 20130056.
36. Broadbent AAD, **Bourke AFG** (2012) The bumblebee *Bombus hortorum* is the main pollinating visitor to *Digitalis purpurea* (Common Foxglove) in a U.K. population. *Journal of Pollination Ecology* 8: 48-51.
37. Carvell C, Jordan WC, **Bourke AFG**, Pickles R, Redhead JW, Heard MS (2012) Molecular and spatial analyses reveal links between colony-specific foraging distance and landscape-level resource availability in two bumblebee species. *Oikos* 121: 734-742.

38. Friend LA, **Bourke AFG** (2012) Absence of within-colony kin discrimination in a multiple-queen ant, *Leptothorax acervorum*. *Ethology* 118: 1182-1190.
39. Zanette LRS, Miller SDL, Faria CMA, Almond EJ, Huggins TJ, Jordan WC, **Bourke AFG** (2012) Reproductive conflict in bumblebees and the evolution of worker policing. *Evolution* 66: 3765-3777.
40. **Bourke AFG** (2011) The validity and value of inclusive fitness theory. *Proceedings of the Royal Society Series B* 278: 3313-3320. Faculty of 1000 Must Read paper (http://f1000.com/13296981)
41. Carvell C, Osborne JL, **Bourke AFG**, Freeman SN, Pywell RF, Heard MS (2011) Bumble bee species' responses to a targeted conservation measure depend on landscape context and habitat quality. *Ecological Applications* 21: 1760–1771.
42. Charman TG, Sears J, Green RE, **Bourke AFG** (2010) Conservation genetics, foraging distance and nest density of the scarce Great Yellow Bumblebee (*Bombus distinguendus*). *Molecular Ecology* 19: 2661-2674.
43. Rees SD, Orledge GM, Bruford MW, **Bourke AFG** (2010) Genetic structure of the Black Bog Ant (*Formica picea* Nylander) in the United Kingdom. *Conservation Genetics* 11: 823-834.
44. **Bourke AFG** (2009) The kin structure of sexual interactions. *Biology Letters* 5: 689-692.
45. Lopez-Vaamonde C, Raine NE, Koning JW, Brown RM, Pereboom JJM, Ings TC, Ramos-Rodriguez O, Jordan WC, **Bourke AFG** (2009) Lifetime reproductive success and longevity of queens in an annual social insect. *Journal of Evolutionary Biology* 22: 983-996.
46. **Bourke AFG** (2007) Kin selection and the evolutionary theory of aging. *Annual Review of Ecology, Evolution, and Systematics* 38: 103-128.
47. Heard MS, Carvell C, Carreck NL, Rothery P, Osborne JL, **Bourke AFG** (2007) Landscape context not patch size determines bumble-bee density on flower mixtures sown for agri-environment schemes. *Biology Letters* 3: 638-641.
48. Lopez-Vaamonde C, Brown RM, Lucas ER, Pereboom JJM, Jordan WC, **Bourke AFG** (2007) Effect of the queen on worker reproduction and new queen production in the bumble bee *Bombus terrestris*. *Apidologie* 38: 171-180.
49. Hammond RL, Bruford MW, **Bourke AFG** (2006) A test of reproductive skew models in a field population of a multiple-queen ant. *Behavioral Ecology and Sociobiology* 61: 265-275.
50. Pereboom JJM, Jordan WC, Sumner S, Hammond RL, **Bourke AFG** (2005) Differential gene expression in queen-worker caste determination in bumblebees. *Proceedings of the Royal Society Series B* 272: 1145-1152.
51. Lopez-Vaamonde C, Koning JW, Jordan WC, **Bourke AFG** (2004) A test of information use by reproductive bumblebee workers. *Animal Behaviour* 68: 811-818.
52. Lopez-Vaamonde C, Koning JW, Brown RM, Jordan WC, **Bourke AFG** (2004) Social parasitism by male-producing reproductive workers in a eusocial insect. *Nature* 430: 557-560.
53. Chapman RE, Wang J, **Bourke AFG** (2003) Genetic analysis of spatial foraging patterns and resource sharing in bumble bee pollinators. *Molecular Ecology* 12: 2801-2808.
54. Hammond RL, Bruford MW, **Bourke AFG** (2003) Male parentage does not vary with colony kin structure in a multiple-queen ant. *Journal of Evolutionary Biology* 16: 446-455.
55. Holehouse KA, Hammond RL, **Bourke AFG** (2003) Non-lethal sampling of DNA from bumble bees for conservation genetics. *Insectes Sociaux* 50: 277-285.
56. Lopez-Vaamonde C, Koning JW, Jordan WC, **Bourke AFG** (2003) No evidence that reproductive bumblebee workers reduce the production of new queens. *Animal Behaviour* 66: 577-584.
57. **Bourke AFG** (2002) Genetics of social behaviour in fire ants. *Trends in Genetics* 18: 221-223.
58. Hammond RL, Bruford MW, **Bourke AFG** (2002) Ant workers selfishly bias sex ratios by manipulating female development. *Proceedings of the Royal Society of London Series B* 269: 173-178.
59. **Bourke AFG** (2001) Social insects and selfish genes. *Biologist* 48: 205-208.
60. **Bourke AFG** (2001) Reproductive skew and split sex ratios in social Hymenoptera. *Evolution* 55: 2131-2136.
61. **Bourke AFG**, Ratnieks FLW (2001) Kin-selected conflict in the bumble-bee *Bombus terrestris* (Hymenoptera: Apidae). *Proceedings of the Royal Society of London Series B* 268: 347-355.
62. Chapman RE, **Bourke AFG** (2001) The influence of sociality on the conservation biology of social insects. *Ecology Letters* 4: 650-662.
63. Hammond RL, **Bourke AFG**, Bruford MW (2001) Mating frequency and mating system of the polygynous ant, *Leptothorax acervorum*. *Molecular Ecology* 10: 2719-2728.

64. **Bourke AFG** (1999) Colony size, social complexity and reproductive conflict in social insects. *Journal of Evolutionary Biology* 12: 245-257.
65. **Bourke AFG**, Chan GL (1999) Queen-worker conflict over sexual production and colony maintenance in perennial social insects. *American Naturalist* 154: 417-426.
66. **Bourke AFG**, Ratnieks FLW (1999) Kin conflict over caste determination in social Hymenoptera. *Behavioral Ecology and Sociobiology* 46: 287-297.
67. Chan GL, Hingle A, **Bourke AFG** (1999) Sex allocation in a facultatively polygynous ant: between-population and between-colony variation. *Behavioral Ecology* 10: 409-421.
68. **Bourke AFG** (1997) Sex ratios in bumble bees. *Philosophical Transactions of the Royal Society of London Series B* 352: 1921-1933.
69. **Bourke AFG** (1997) Hymenopteran sex allocation. *Trends in Ecology and Evolution* 12: 488-489.
70. **Bourke AFG**, Green HAA, Bruford MW (1997) Parentage, reproductive skew and queen turnover in a multiple-queen ant analysed with microsatellites. *Proceedings of the Royal Society of London Series B* 264: 277-283.
71. **Bourke AFG** (1995) Further evidence of lack of pheromonal inhibition among queens of the ant *Leptothorax acervorum*. *Ethology* 101: 46-50.
72. Heinze J, Lipski N, Hölldobler B, **Bourke AFG** (1995) Geographical variation in the social and genetic structure of the ant, *Leptothorax acervorum*. *Zoology* 98: 127-135.
73. **Bourke AFG** (1994) Worker matricide in social bees and wasps. *Journal of Theoretical Biology* 167: 283-292.
74. **Bourke AFG** (1994) Indiscriminate egg cannibalism and reproductive skew in a multiple-queen ant. *Proceedings of the Royal Society of London Series B* 255: 55-59.
75. **Bourke AFG**, Chan GL (1994) Split sex ratios in ants with multiple mating. *Trends in Ecology and Evolution* 9: 120-122.
76. **Bourke AFG**, Heinze J (1994) The ecology of communal breeding: the case of multiple-queen leptothoracine ants. *Philosophical Transactions of the Royal Society of London Series B* 345: 359-372.
77. Chan GL, **Bourke AFG** (1994) Split sex ratios in a multiple-queen ant population. *Proceedings of the Royal Society of London Series B* 258: 261-266.
78. **Bourke AFG** (1993) Lack of experimental evidence for pheromonal inhibition of reproduction among queens in the ant *Leptothorax acervorum*. *Animal Behaviour* 45: 501-509.
79. **Bourke A** (1992) Adaptive significance of avian helping behaviour. *Trends in Ecology and Evolution* 7: 102.
80. **Bourke AFG** (1991) Queen behaviour, reproduction and egg-cannibalism in multiple-queen colonies of the ant *Leptothorax acervorum*. *Animal Behaviour* 42: 295-310.
81. **Bourke AFG**, Franks NR (1991) Alternative adaptations, sympatric speciation, and the evolution of parasitic, inquiline ants. *Biological Journal of the Linnean Society* 43: 157-178.
82. Franks NR, Ireland B, **Bourke AFG** (1990) Conflicts, social economics and life history strategies in ants. *Behavioral Ecology and Sociobiology* 27: 175-181.
83. **Bourke AFG** (1989) Comparative analysis of sex investment ratios in slave-making ants. *Evolution* 43: 913-918.
84. Davies NB, **Bourke AFG**, Brooke M de L (1989) Cuckoos and parasitic ants: interspecific brood parasitism as an evolutionary arms race. *Trends in Ecology and Evolution* 4: 274-278.
85. **Bourke AFG** (1988) Dominance orders, worker reproduction, and queen-worker conflict in the slave-making ant *Harpagoxenus sublaevis*. *Behavioral Ecology and Sociobiology* 23: 323-333.
86. **Bourke AFG** (1988) Worker reproduction in the higher eusocial Hymenoptera. *Quarterly Review of Biology* 63: 291-311.
87. **Bourke AFG**, Have TM van der, Franks NR (1988) Sex ratio determination and worker reproduction in the slave-making ant *Harpagoxenus sublaevis*. *Behavioral Ecology and Sociobiology* 23: 233-245.
88. Franks N, **Bourke A** (1988) Slaves of circumstance. *New Scientist* 119: (1627): 45-49 (25 August 1988).
89. Allies AB, **Bourke AFG**, Franks NR (1986) Propaganda substances in the cuckoo ant *Leptothorax kutteri* and the slave-maker *Harpagoxenus sublaevis*. *Journal of Chemical Ecology* 12: 1285-1293.

Other publications/reports

90. **Bourke AFG** (2021) The role and rule of relatedness. *Nature* 590: 392-394. (N&V article)

91. Carvell C, Heard M, Vanbergen A, **Bourke A**, Dicks L (2016) Managing farmed landscapes for pollinating insects. Policy and Practice Note No. 27, Living with Environmental Change Partnership, Polaris House, Swindon. http://www.nerc.ac.uk/research/partnerships/lwec/products/ppn/
92. **Bourke AFG** (2015) Social evolution: uneasy lies the head. *Current Biology* 25: R1077–R1079.
93. **Bourke AFG** (2013) Genes and queens. *Nature* 493: 612-613. (N&V Forum article; 2013 Editors' Choice; http://www.nature.com/nature/journal/v504/n7480/full/504386a.html)
94. **Bourke AFG** (2012) Kin selection. In: Oxford Bibliographies Online: Ecology. Ed. D Gibson. Oxford University Press, New York. (http://oxfordbibliographiesonline.com/; updated March 2015)
95. **Bourke A** (2009) Darwinism versus Intelligent Design. *Eastern Daily Press* (3 February 2009)
96. Charman TG, Sears J, **Bourke AFG**, Green RE (2009) Phenology of *Bombus distinguendus* in the Outer Hebrides. *The Glasgow Naturalist* 25 (Supplement): 35-42.
97. **Bourke AFG** (2008) Social evolution: daily self-sacrifice by worker ants. *Current Biology* 18: R1100-R1101.
98. **Bourke AFG** (2008) Review of Korb J, Heinze J, eds (2008) *The Ecology of Social Evolution*. Springer-Verlag, Berlin. *Myrmecological News* 11: 200.
99. **Bourke AFG** (2007) Social evolution: community policing in insects. *Current Biology* 17: R519-R520.
100. **Bourke A** (2005) Review of Grimaldi D, Engel MS (2005) *Evolution of the Insects*. Cambridge University Press, Cambridge. *Trends in Ecology and Evolution* 20: 288-289.
101. **Bourke AFG**, Holehouse KA (2002) Non-lethal sampling of DNA from free-foraging bumble bees. Report for RSPB.
102. **Bourke AFG**, Hammond RL (2002) Genetics of the scarce bumble bee, *Bombus distinguendus*, and nonlethal sampling of DNA from bumble bees. Report for RSPB.
103. **Bourke AFG**, Chan GL (1998) Kin conflicts in the facultatively polygynous ant *Leptothorax acervorum*. In: Schwarz MP, Hogendoorn K (eds) *Social Insects at the Turn of the Millennium*. XIII Congress of IUSSI, Adelaide. p. 72.
104. **Bourke A** (1994) Review of Keller L (ed.) (1993) *Queen Number and Sociality in Insects*. Oxford University Press, Oxford. *Animal Behaviour* 48: 1246.
105. **Bourke A** (1994) Review of Itô Y (1993) *Behaviour and Social Evolution of Wasps*. Oxford University Press, Oxford. *Journal of Animal Ecology* 63: 497.
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108. **Bourke A** (1991) Review of Trager JC (ed.) (1988) *Advances in Myrmecology*. EJ Brill, Leiden. *Antenna* 15: 26-27.
109. **Bourke A** (1991) Review of Sherman PW, Jarvis JUM, Alexander RD (eds) (1991) *The Biology of the Naked Mole-Rat*. Princeton UP, Princeton. *Trends in Ecology and Evolution* 6: 171-172.
110. **Bourke A** (1990) Review of Hölldobler B, Wilson EO (1990) *The Ants*. Springer Verlag, Berlin. *Times Higher Education Supplement* (9 November 1990).
111. **Bourke AFG**, Franks NR, Ireland B (1990) Reproductive conflict, fitness, and life history strategy in slave-making ants. In: Veeresh GK, Mallik B, Viraktamath CA (eds) *Social Insects and the Environment*. Oxford & IBH Publishing Co., New Delhi. pp. 367-368.
112. Franks NR, **Bourke AFG** (1990) The evolution of inquiline ant parasites: the interspecific versus the intraspecific hypothesis. In: Veeresh GK, Mallik B, Viraktamath CA (eds) *Social Insects and the Environment*. Oxford & IBH Publishing Co., New Delhi. pp. 149-150.
113. **Bourke A** (1989) Evolutionary biology of ant social parasitism. *Journal of Zoology* 217: 522-523.
114. **Bourke A** (1988) Review of Pasteels JM, Deneubourg J-L (1987) *From Individual to Collective Behavior in Social Insects*. Birkhauser Verlag, Berlin. *Biologist* 35: 164.
115. **Bourke AFG** (1987) Alternative reproductive strategies in workers of the slavemaking ant *Harpagoxenus sublaevis*. In: Eder J, Rembold H (eds), *Chemistry and Biology of Social Insects*, Verlag J. Peperny, München, p. 259.
116. **Bourke AFG**, Franks NR (1987) Evolution of social parasites in leptothoracine ants. In: Eder J, Rembold H (eds), *Chemistry and Biology of Social Insects*, Verlag J. Peperny, München, pp. 37-38.
117. **Bourke A** (1987) The social biology of the slave-making ant *Harpagoxenus sublaevis*. Ph.D. thesis, University of Bath.

PhD students

- Liliana Fischer (NERC ARIES DTP Ph.D. studentship), started Oct 2021; primary supervisor: A.F.G. Bourke; secondary supervisors: A. Maklakov, UEA, and T. Chapman, UEA; thesis title, 'Sociality and ageing: longevity and reproductivity in a social insect'. Passed viva 2025
- Jennifer Livesey (NERC EnvEast DTP Ph.D. studentship), started Oct 2018; primary supervisor: A.F.G. Bourke; secondary supervisors: M. Taylor, UEA, and L. Dicks, University of Cambridge; thesis title, 'Dominance and policing in social insects: testing the hypotheses in bumblebees'. Ph.D. awarded 2024
- Ryan Brock (NERC EnvEast DTP Ph.D. studentship), started Jan 2017; primary supervisor: A.F.G. Bourke; secondary supervisors: M. Taylor, UEA, and T. Chapman, UEA; thesis title, 'Sociogenetics and behavioural ecology of the Tree Bumblebee (*Bombus hypnorum*)'. Ph.D. awarded 2022
- Liam Crowther (NERC DTA Ph.D. studentship awarded to UEA, CASE project with CEH Wallingford), started Oct 2013; primary supervisors: A.F.G. Bourke and C. Carvell, CEH Wallingford; secondary supervisor, D. S. Richardson, UEA; thesis title, 'The Tree Bumblebee, *Bombus hypnorum*: ecology and genetics of a naturally colonising pollinator'. Ph.D. awarded 2018
- David Collins (BBSRC DTG/UEA-funded Ph.D. studentship), started Oct 2010; joint supervisors: A.F.G. Bourke and T. Dalmay, UEA; thesis title, 'The role of small RNAs in caste determination and differentiation in the bumblebee, *Bombus terrestris*'. Ph.D awarded 2015
- Henry Ferguson-Gow (NERC Open CASE Ph.D. studentship awarded to supervisors), started Oct 2010; joint supervisors: A.F.G. Bourke, K. Jones, UCL, and S. Sumner, University of Bristol; thesis title, 'The evolution of social traits and biodiversity in the ants'. Ph.D awarded 2015
- Jacob Holland (NERC quota Ph.D. studentship awarded to UEA), started Oct 2009; primary supervisor: A.F.G. Bourke; secondary supervisor: M. Gage, UEA; thesis title, 'Colony life history in the bumble bee *Bombus terrestris*: interactions, timing and control'. Ph.D awarded 2013
- Lucy Friend (NERC quota Ph.D. studentship awarded to UEA), started Oct 2007; primary supervisor: A.F.G. Bourke; secondary supervisor: M. Gage, UEA; thesis title, 'Experimental investigations of inclusive fitness theory in a multiple-queen ant'. Ph.D. awarded 2012
- Simon Rees (NERC quota Ph.D. studentship awarded to IoZ), started Oct 2002; primary supervisor: A.F.G. Bourke; cosupervisor: M. Bruford, Cardiff University; thesis title, 'Conservation genetics and ecology of the endangered Black Bog Ant, *Formica picea*'. Ph.D. awarded 2007
- Tom Charman (NERC quota Ph.D. studentship awarded to Dept Zoology, University of Cambridge, CASE project with RSPB), started Oct 2002; primary supervisor: R. Green (Univ of Cambridge/RSPB); cosupervisors: A.F.G. Bourke, J. Sears (RSPB); thesis title, 'Ecology and conservation genetics of *Bombus distinguendus*, the Great Yellow Bumblebee'. Ph.D. awarded 2007
- Roselle Chapman (NERC quota Ph.D. studentship awarded to IoZ), started Nov 1999; primary supervisor: A.F.G. Bourke; cosupervisor: J. Field, UCL; thesis title, 'Conservation and foraging ecology of bumble bees in urban environments'. Ph.D. awarded 2004
- George Chan (NERC Ph.D. studentship awarded to AFG Bourke), started Oct 1993; primary supervisor: A.F.G. Bourke; cosupervisor: A. Pomiankowski, UCL; thesis title, 'Sex ratio evolution and resource allocation in the multiple-queen ant *Leptothorax acervorum*'. Ph.D. awarded 1997

Undergraduate teaching

School of Biological Sciences (BIO), UEA

- Third-year module creator, organiser and lecturer, 'Social Evolution' (BIO-3C38, BIO-6011B), 2007-8 to 2022-23
- First-year module organiser and lecturer, 'Evolution, Behaviour and Ecology' (BIO-1A04), 2006-7 to 2007-8
- Second-year module lecturer, 'Evolutionary Biology' (BIO-2B10), 2006-7
- Seminar leader, Mathematics and Statistics (BIO-1A6Y, BIO-4008Y), 2006-7 to 2017-18
- 3-4 final-year undergraduate project students per year for BIO/ENV, 2006-7 to 2022-23

Other teaching

- 1992 – 2005: 2 lectures per year on social insects and kin selection, Dept Biology, UCL, London
- 1989 – 1991 and 2001: 2-6 lectures per year on social insects and behavioural ecology, Dept Zoology, University of Cambridge, plus tutorials and field course
- 1998: Invited undergraduate lecture, University of Sheffield

- 1997: Invited undergraduate seminar, University of Sussex
- 1996: Invited core teacher, Darwin Course in Tropical Biology of the Tropical Biology Association, Kibale Forest, Uganda, July - Aug 1996
- Plus 5 final-year undergraduate project students, University of Cambridge and UCL, 1990 – 2003

Invited talks at international conferences and invited international seminars

- 2022 XIXth International Congress of IUSSI, San Diego, USA
- 2021 European Congress IUSSI online symposia, Université Paul Sabatier, Toulouse, France (online)
- 2021 Gutenberg Workshop 'Aging in Social Insects', University of Mainz, Germany (online)
- 2019 Wissenshaftskolleg zu Berlin (Institute for Advanced Study) seminar, Berlin, Germany
- 2016 Major Transitions Workshop, Magdalen College, Oxford University
- 2016 Department of Neurobiology and Behavior, Cornell University, USA
- 2015 Department of Ecology and Evolutionary Biology, University of Toronto, Canada
- 2014 School of Life Sciences, Arizona State University, Phoenix, Arizona, USA
- 2014 Centre for Social Evolution, University of Copenhagen, Denmark
- 2014 Laboratoire d'Ethologie Expérimentale et Comparée, Université Paris Nord, France
- 2013 Anthropological Institute & Museum, University of Zürich, Switzerland
- 2013 14th Congress, European Society for Evolutionary Biology, Lisbon, Portugal
- 2013 Institute of Ecology and Evolution, University of Bern, Switzerland
- 2010 XVIth International Congress of IUSSI, Copenhagen, Denmark (plenary)
- 2010 10th Regensburg Symposium on Evolutionary Biology, Regensburg, Germany
- 2007 Ento07, Annual Meeting of Royal Entomological Society, Edinburgh (keynote)
- 2004 European Union-IHP 'INSECTS' Network Workshop, Helsingor, Denmark (plenary)
- 2003 Department of Zoology, Trinity College Dublin, Republic of Ireland
- 2003 European Society of Evolutionary Biology Meeting, University of Leeds
- 2003 Royal Entomological Society Insect Evolutionary Ecology Symposium, University of Reading
- 2002 Department of Zoology, University of Helsinki, Finland
- 2002 XIVth International Congress of IUSSI, Sapporo, Japan
- 2001 European Union-IHP 'INSECTS' Network Workshop, University of Granada, Spain (keynote)
- 1986 - 2000: 16 previous invited talks at international conferences or invited international seminars

Other seminars and talks

- 1987 - present: 40 invited UK departmental seminars and meetings, including at Universities of Bath, Belfast, Cambridge, Edinburgh, Exeter, Leicester, London (UCL, Imperial, Queen Mary), Newcastle, Oxford, Reading, Sheffield, Southampton, Stirling and Sussex; and at Centre for Ecology and Evolution (UCL/IoZ), CEH Dorset, Easton College (Norwich), Royal Entomological Society and Zoological Society of London.
- 1986 – present: 26 contributed talks at international meetings (e.g. International Congresses on Behavioral Ecology, International Congresses of Entomology, International Congresses of IUSSI)

Other contributions (e.g. administration, management, enabling)

UEA administration and management (2006 – 2023)

- Director of Research, School of Biological Sciences (BIO), 2017 - 2022
- Member, BIO Promotions Committee, 2007 – 2022
- Member, BIO Executive, 2008 – 2011, 2014 – 2022
- REF2021 Unit of Assessment 5 (Biological Sciences) Coordinator, 2018 - 2021
- Deputy Head of School, BIO, 2014 - 2017
- Coordinator, BIO Open Lectures (departmental seminars), 2012 - 2017
- Member, BIO Board of Examiners, 2012 - 2013
- Leader, Organisms & Environment Research Theme, BIO, 2006 - 2011

Institute of Zoology administration and management (1992 – 2006)

- Leader, Behavioural & Evolutionary Ecology Research Theme, 2001 – 2006
- Member, IoZ Senior Management Group, 2003 - 2006

- Member, IoZ Research Committee, 2001 - 2006
- Member, ZSL Strategic Management Group, 2003 - 2006
- Research Assessment Exercise 2001 Data Contact for IoZ, 1998 - 2001

Meetings organised (1994 – present)

- Co-organiser, with Eric Lucas, symposium on 'Evolutionary, genetic and physiological basis of ageing in social insects', XVIIth International Congress of IUSSI, Cairns, Australia, July 2014
- Member, Program Committee, European Meeting of IUSSI, La-Roche-en-Ardenne, Belgium, Aug/Sept 2008
- Organiser, Annual Meeting of Ant Conservation Working Group, IoZ, Jan 2005
- Organiser, ZSL Scientific Meeting on 'Conservation and biology of bumble bees', ZSL, Feb 2003
- Organiser, Annual Meeting of Bumblebee Working Group, IoZ, Feb 2003
- Member, Program Committee, European Meeting of IUSSI, Free University of Berlin, Sept 2001
- Co-organiser, with Andrew Pomiankowski and Austin Burt, of Centre for Ecology and Evolution workshop on 'Sex and asex from microbes to multicells', ZSL, Nov 2000
- 3 other one-day meetings/conference symposia organised or co-organised (1994 - 1999)