

## BRIEF CURRICULUM VITAE

# Stephen James Simpson

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**Date of Birth:** 26 June 1957  
**Nationality:** Australian/ British  
**Correspondence Address:** School of Biological Sciences  
Heydon-Laurence Building, A08  
University of Sydney NSW 2006  
Australia  
**Email:** stephen.simpson@sydney.edu.au  
**Telephone:** +61 (02) 9351 5633  
**Fax:** +61 (02) 9351 2558

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### Mini Biography

Steve Simpson was born and grew up in Australia. After completing his undergraduate degree at the University of Queensland, he travelled to London where he undertook his PhD on locust feeding physiology. Steve then spent 22 years in Oxford, first in Experimental Psychology then in the Department of Zoology and the University Museum of Natural History, before being enticed back to Australia in 2005, where he is currently an Australian Research Council Laureate Fellow in the School of Biological Sciences. Together with colleague David Raubenheimer, Steve developed state-space models for nutrition, which were devised and tested using insects but have since been applied to a wide range of animals and problems, from aquaculture and conservation biology to the dietary causes of human obesity. In the late 1980s a major plague of the desert locust in Africa provided the incentive to begin an investigation into the biology of locust swarming, which has led to an understanding of locust swarming that links chemical events in the brains of individual insects to landscape-scale mass migration. Steve has published 188 papers in peer reviewed journals, 16 book chapters, 3 books and 9 edited books. His work has been cited 5,400 times and he has an h-index of 43 (45 with book chapters).

### Academic and Teaching Career

- 2009 to 2014: ARC Laureate Fellow and Professor, The University of Sydney.
  - 2005 to 2009: ARC Federation Fellow and Professor, The University of Sydney.
  - 2000 to 2004: Associate Head of Department, Zoology, University of Oxford.
  - 2000: Acting Director, Oxford University Museum of Natural History.
  - 1998 to 2004: Professor, Hope Entomological Collections, University of Oxford.
  - 1996 to 1998: Reader in Zoology, University of Oxford.
  - 1995 to 2004: Full Fellow in Biological and Human Sciences, Jesus College, University of Oxford.
  - 1990 to 1995: Guy Newton Senior Research Fellow, Jesus College, University of Oxford.
  - 1990: Principal Curator (Head of Department), Oxford University Museum.
  - 1988 to 1995: Senior Research Fellow, Jesus College, University of Oxford.
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- 1986 to 1996: University Lecturer in Entomology and Curator of the Hope Entomological Collections, Oxford University Museum.
  - 1986 to 1988: Fellow of Linacre College, University of Oxford.
  - 1983 to 1986: Departmental Lecturer in Entomology, Animal Behaviour and Neurobiology, Department of Zoology, University of Oxford.
  - 1983 to 1986: MRC Post-doctoral Research Associate, Department of Experimental Psychology, University of Oxford.
  - 1979 to 1982: University of Queensland Travelling Scholar: Ph.D. at University of London. Supervised by Drs. R.F. Chapman and E.A. Bernays. Thesis title: “The control of food intake in fifth-instar *Locusta migratoria* L. nymphs”.
  - 1975 to 1978: B.Sc. (Hon), majoring in Entomology, University of Queensland, Australia. F.A. Perkins Prize student.

### **Honours, Awards and Visiting Professorships**

- NSW Scientist of the Year 2009.
- NSW Scientist of the Year 2009 Award for Plant and Animal Sciences.
- ARC Laureate Fellowship (2010-2014).
- Inaugural ‘Frontiers in Biology’ Lecturer, Princeton University (2009).
- Eureka Prize for Scientific Research (2008).
- Elected as Fellow, Australian Academy of Science (2007).
- Rockefeller Foundation, Bellagio, Italy, invited participant (2006).
- ARC Federation Fellowship (2005-2009).
- Visiting Professor, Department of Zoology, University of Oxford (2005-2008).
- Senior Research Fellow of Jesus College, University of Oxford (2005-2008).
- Fellow, Wissenschaftskolleg zu Berlin (Institute of Advanced Study) (2002-2003).
- Invited Exhibitor, Royal Society Summer Science Exhibition (2001).
- Distinguished Visiting Professorship, University of Arizona (1999).
- Guest Professorship, University of Basel (1990).

### **Publications**

#### **Articles in refereed journals**

Buhl, J., Sword, G. A., Clissold, F. J. & Simpson, S. J. (2010). Group structure in locust migratory bands. *Behavioural Ecology and Sociobiology* (in press).

Chapuis, M.-P., Berthier, K., Simpson, S.J., Ferenz, H.-J., Habib Kane, C. M., Kang, L., Lange, A., Ott, S. R., Ould Babah, M. A., Rodenburg, K.W., Rogers, S. M., Torto, B., Vanden-Broeck, J., van Loon, J. J. A. & Sword, G. A. (2010). Laboratory populations as a resource for understanding the relationship between genotypes and phenotypes: A global case study in locusts. *Advances in Insect Physiology* (in press).

Ballard, J. W. O., Melvin, R., Lazarou, M., Clissold, F. J. & Simpson, S. J. (2010). Cost of a naturally occurring two-amino acid deletion in cytochrome *c* oxidase subunit 7A in *Drosophila simulans*. *The American Naturalist* (in press).

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- Kearney, M., Simpson, S.J., Raubenheimer, D. & Helmuth, B. (2010) Modelling the ecological niche from functional traits. *Philosophical Transactions of the Royal Society of London, B* (in press).
- Ponton, F., Lalubin, F., Fromont, C., Wilson, K., Behm, C. & Simpson, S. J. (2010). Hosts use altered macronutrient intake to circumvent parasite-induced reduction in fecundity. *International Journal for Parasitology* (in press).
- Gosby, A.K., Campbell, C., Badaloo, A., Soares-Wynter, S., Antonelli, M., Hall, R., Martinez-Cordero, C., Jebb, S.A., Brand-Miller, J., Caterson, I., Conigrave, A., Forrester, T.G., Raubenheimer, D. & Simpson, S.J. (2010). Design and testing of foods differing in protein to energy ratios. *Appetite* (10.1016/j.appet.2010.06.009).
- Sword, G. A., LeCoq, M. & Simpson, S. J. (2010). Phase polyphenism and preventative locust management. *Journal of Insect Physiology* (10.1016/j.jinsphys.2010.05.005).
- Cullen, D., Sword, G. A., Dodgson, T. & Simpson, S. J. (2010). Gregarious behaviour in the Australian plague locust, *Chortoicetes terminifera*, is invoked by stimulation of the antennae. *Journal of Insect Physiology* 56, (10.1016/j.jinsphys.2010.04.023).
- Jensen, K., Mayntz, D., Wang, T., Simpson, S.J. & Overgaard, J. (2010). Metabolic consequences of feeding and fasting on nutritionally different diets in the wolf spider *Pardosa prativaga*. *Journal of Insect Physiology* 56, (10.1016/j.jinsphys.2010.03.001).
- Brooks, R.C., Simpson, S.J. & Raubenheimer, D. (2010). The price of protein: combining evolutionary and economic analysis to understand excessive energy consumption. *Obesity Reviews* 11, (10.1111/j.1467-789X.2010.00733.x).
- Clissold, F.J., Tedder, B.J., Conigrave, A.D. & Simpson, S.J. (2010). The gastrointestinal tract as a nutrient balancing organ. *Proceedings of the Royal Society B* 277, 1751-1759.
- Dussutour, A., Latty, T., Beekman, M. & Simpson, S.J. (2010) Amoeboid organism solves complex nutritional challenges. *Proceedings of the National Academy of Sciences, U.S.A.* 107, 4607-4611.
- Miller, G. A. & Simpson, S.J. (2010) Isolation from a marching band increases haemocyte density in wild locusts (*Chortoicetes terminifera*). *Ecological Entomology* 35, 236-239.
- Sørensen, A., Mayntz, D., Simpson, S.J. and Raubenheimer, D. (2009) Dietary ratio of protein to carbohydrate induces plastic responses in the gastrointestinal tract of mice. *Journal of Comparative Physiology B* 180, 259-266.
- Simpson, S.J., Raubenheimer, D., Charleston, M.A., Clissold, F.J. and ARC-NZ Vegetation Function Network Herbivory Working Group (2009) Modelling nutritional interactions: from individuals to communities. *Trends in Ecology and Evolution* 25, 53-60.
- Clissold, F.J., Sanson, G.D., Read, J. & Simpson, S.J. (2009) Gross versus net income – how plant toughness affects performance of an insect herbivore. *Ecology* 90, 3393–3405.

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- Miller, G.A., Pell, J.K. & Simpson, S.J. (2009) Crowded locusts produce hatchlings vulnerable to fungal attack. *Biology Letters* 5, 845-848.
- Simpson, S.J. & Raubenheimer, D. (2009) The protein leverage hypothesis in human obesity. *Cardiology in General Practice* 10, 32.
- Simpson, S.J. & Raubenheimer, D. (2009) Macronutrient balance and lifespan. *Aging* 1, 875-880.
- Fanson, B.G., Weldon, C.W., Pérez-Staples, D., Simpson, S.J. & Taylor, P.W. (2009) Nutrients, not caloric restriction, extend lifespan in Queensland fruit flies (*Bactrocera tryoni*). *Aging Cell* 8, 514-523.
- Srygley, R.B., Lorch, P.D., Simpson, S.J. & Sword, G.A. (2009) Immediate protein dietary effects on movement and the generalized immunocompetence of migrating Mormon crickets *Anabrus simplex* (Orthoptera: Tettigoniidae). *Ecological Entomology* 34, 663-668.
- Pener, M.P. & Simpson, S.J. (2009) Locust phase polyphenism: an update. *Advances in Insect Physiology* 36, 1-286.
- Miller, G.A., Clissold, F.J., Mayntz, D. & Simpson, S.J. (2009) Speed over efficiency: locusts select body temperatures that favour growth rate over efficient nutrient utilization. *Proceedings of the Royal Society of London B* 276, 3581-3589.
- Raubenheimer, D. & Simpson, S. J., (2009) Nutritional PharmEcology: doses, nutrients, toxins, and medicines. *Integrative and Comparative Biology* 49, 329-337.
- Dukas, R. & Simpson, S.J. (2009) Locusts show rapid individual learning but no social learning about food. *Animal Behaviour* 78, 307-311.
- Felton, A.M., Felton, A., Raubenheimer, D., Simpson, S.J., Foley, W.J., Wood, J.T., Wallis, I.R. & Lindenmayer, D.B. (2009) Protein content of diets dictates the daily energy intake of a free-ranging primate. *Behavioural Ecology* 20, 685-690.
- Warbrick-Smith, J., Raubenheimer, D., Simpson, S.J. & Behmer, S. T. (2009) Three hundred and fifty generations of extreme food specialisation: testing predictions of nutritional ecology. *Entomologia Experimentalis et Applicata* 132, 65-75.
- Maklakov, A.A., Hall, M.D., Simpson, S.J., Dessmann, J., Clissold, F., Zajitschek, F., Lailvaux, S.P., Raubenheimer, D., Bonduriansky, R. & Brooks, R.C. (2009) Sex differences in nutrient-dependent reproductive ageing. *Aging Cell* 8, 324-330.
- Gray, L. J., Sword, G. A., Anstey, M. L., Clissold, F. J. & Simpson, S. J. (2009). Behavioural phase polyphenism in the Australian plague locust (*Chortoicetes terminifera*). *Biology Letters* 5, 306-309.
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- Anstey, M.L., Rogers, S.M., Ott, S.R., Burrows, M. & Simpson, S.J. (2009) Serotonin mediates behavioral gregarization underlying swarm formation in desert locusts. *Science* 323, 627 – 630.
- Raubenheimer, D., Simpson, S.J. & Mayntz, D. (2009) Nutrition, ecology and nutritional ecology: toward an integrated framework. *Functional Ecology* 23, 4-16.
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- Sword, G.A. & Simpson, S.J. (2008) Radiotracking sexual selection [dispatch paper]. *Current Biology* 18, R955-956.
- Chapuis, M.P., Poppo, J.-A., Simpson, S.J., Estoup, A., Martin, J.-F., Steinbauer, M., McCulloch, L. & Sword, G.A. (2008) Eight polymorphic microsatellite loci for the Australian plague locust, *Chortoicetes terminifera*. *Molecular Ecology Resources* 8, 1414–1416.
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- Cheng, K., Simpson, S.J. & Raubenheimer, D. (2008) A geometry of regulatory scaling. *The American Naturalist* 172, 681-693.

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- Lee, K.P., Simpson, S.J. & Wilson, K. (2008) Dietary protein-quality influences melanization and immune function in an insect. *Functional Ecology* 22, 1052-1061.
- Dussutour, A. & Simpson, S.J. (2008) Carbohydrate regulation in relation to colony growth in ants. *Journal of Experimental Biology* 211, 2224-2232. [Outstanding paper of the year award]
- Andrews, G., Pile, A. & Simpson, S.J. (2008) A new method for presenting nutritionally defined food sources to marine organisms. *Limnology and Oceanography: Methods* 6, 299-306.
- Dussutour, A. & Simpson, S.J. (2008) Description of a simple synthetic diet for studying nutritional responses in ants. *Insectes Sociaux* 55, 329-333.
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- Ji, R., Simpson, S.J., Yu, F., He, Q.X. & Yun, C.J. (2008) Diets of migratory rosy starlings (Passeriformes: Sturnidae) and their effects on grasshoppers: Implications for a biological agent for insect pests. *Biological Control* 46, 547-551
- Simpson, S.J. & Sword, G.A. (2008). Locusts. *Current Biology* 18, R364-366.
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- Miller, G.A., Islam, M.S., Claridge, D.W., Dodgson, T. & Simpson, S.J. (2008) Swarm formation in the desert locust (*Schistocerca gregaria*): isolation and NMR analysis of the primary maternal gregarizing agent. *Journal of Experimental Biology* 211, 370-376.
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- Raubenheimer, D. & Simpson, S.J. (2007). Geometric analysis: from nutritional ecology to livestock production. *Recent Advances in Animal Nutrition in Australia* 16, 51-63.

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- Dussutour, A., Simpson, S.J., Despland, E. & Colasurdo, N. (2007). When the group denies individual nutritional wisdom. *Animal Behaviour* 74, 931-939.
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- Warbrick-Smith, J., Behmer, S.T., Lee, K-P., Raubenheimer, D. & Simpson, S.J. (2006) Evolving resistance to obesity in an insect. *Proceedings of the National Academy of Sciences, U.S.A.* 103, 14045-14049.
- Buhl, J., Sumpter, D.J.T., Couzin, I.C., Hale, J., Despland, E., Miller, E. & Simpson, S.J. (2006) From disorder to order in marching locusts. *Science* 312, 1402-1406.
- Lee, K-P, Behmer, S.T. & Simpson, S.J. (2006) Nutrient regulation in relation to diet breadth: a comparison of *Heliothis* sister species and a hybrid. *Journal of Experimental Biology* 209, 2076-2084.
- Despland, E. & Simpson, S.J. (2006) Resource distribution mediates synchronization of physiological rhythms in locust groups. *Proceedings of the Royal Society London B* 273, 1517-1522.
- Lee, K.P., Cory, J.S., Wilson, K., Raubenheimer, D. & Simpson, S.J. (2006) Flexible diet choice offsets protein costs of pathogen resistance in a caterpillar. *Proceedings of the Royal Society London B* 273, 823-829.
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- Simpson, S.J., Sword, G.A., Lorch, P.D. & Couzin, I.D. (2006) Cannibal crickets on a forced march for protein and salt. *Proceedings of the National Academy of Sciences, U.S.A.* 103, 4152-4156.
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- Simpson, S.J., Sword, G.A. & De Loof, A. (2005) Advances, controversies and consensus in locust phase polyphenism research. *Journal of Orthoptera Research* 14, 213-222.
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- Simpson, S.J. & Raubenheimer, D. (2005). Obesity: the protein leverage hypothesis. *Obesity Reviews* 6, 133-142.
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- Lee, K.P., Simpson, S.J. & Raubenheimer, D. (2004) A comparison of nutrient regulation between solitary and gregarious phases of the specialist caterpillar, *Spodoptera exempta* (Walker). *Journal of Insect Physiology* 50, 1171-1180.
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- Simpson, S.J. & Raubenheimer, D. (2010) The nutritional geometry of aging. In *Calorie Restriction, Aging and Longevity* (eds Everitt, A.V., Rattan, S.I.S., Couteur, D.G.I., Cabo, R. de) Springer, Germany, pp.



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- Simpson, S.J. & Sword, G.A. (2009) Phase polyphenism in locusts: mechanisms, population consequences, adaptive significance and evolution. In *Phenotypic Plasticity of Insects: Mechanisms and Consequences* (eds Whitman, D. and Ananthakrishnan, T.N.) Science Publishers, Einfeld, pp. 145-189.
- Beekman, M., Simpson, S.J. & Sword, G.A. (2008) Biological foundations of swarm intelligence. In *Swarm Intelligence – Introduction and Applications*. (eds Blum, C. and Merkle, D.) Springer, Germany, pp. 3-41.
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- Simpson, S.J. (1990) The pattern of feeding. In *A Biology of Grasshoppers* (eds Chapman, R.F. and Joern, T.) John Wiley, New York, pp. 73-103.
- Simpson, S.J. & Simpson, C.L. (1990) The mechanisms of nutritional compensation by phytophagous insects. In *Insect-Plant Interactions*, vol. 2 (ed Bernays, E.A.) CRC Press, Boca Raton, pp. 111-160.

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Simpson, S.J. (1988) The peculiar natural history of New Holland. In *Australia in Oxford* (eds Morphy, H. and Edwards, E.) Pitt Rivers, Oxford, pp. 5-12.

### **Books**

Simpson, S.J. and McGavin, G.C. (1997) *Anglers' Flies*. Apple Press, London.

Simpson, S.J. and McGavin, G.C. (1996) *The Right Fly*. Aurum Press, London. Reprinted under imprint of David & Charles Ltd. (2002).

Simpson, S.J. and McGavin, G.C. (1996) *The Angler's Fly Identifier*. Running Press Books, Philadelphia.

### **Edited books and volumes**

Simpson, S.J. and Casas, J. (eds) (2009) *Physiology of Human and Animal Disease Vectors. Advances in Insect Physiology*, Elsevier, Amsterdam Vol. 37.

Simpson, S.J. and Casas, J. (eds) (2009) *Advances in Insect Physiology*, Elsevier, Amsterdam Vol. 36.

Simpson, S.J. and Casas, J. (eds) (2008) *Insect Mechanics and Control. Advances in Insect Physiology*, Elsevier, Amsterdam Vol. 35.

Simpson, S.J. (ed) (2008) *Advances in Insect Physiology*, Elsevier, Amsterdam Vol. 34.

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Simpson, S.J., Mordue, A.J. and Hardie, J. (eds) (1999) *Insect-Plant Relationships. Proceedings of the 10<sup>th</sup> International Symposium*, Kluwer Academic Publishers, Dordrecht.

### **Graduate supervision and postdoctoral mentoring**

- Supervised 27 PhD students to successful completion. Mentored 29 postdoctoral fellows.

### **Selection of invited, keynote and plenary lectures**

- Invited Speaker, Nutritional Homeostasis Workshop, LIMES Institute, University of Bonn (May 2010).
- Invited Speaker, Institute of Metabolic Science, University of Cambridge (April 2010).
- Invited Speaker, Research Department of Genetics, Evolution and Environment, University College, London (April 2010).

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- Invited speaker, 2009 Garvan International Fellow Symposium, Sydney (December 2009).
  - Invited speaker, Australian Council of Deans of Science Conference, Sydney (November 2009).
  - Invited speaker, P-Health Annual Science Retreat, CSIRO, Sydney (September 2009).
  - Invited speaker, Baker IDI Heart and Diabetes Institute, Melbourne (August 2009).
  - Invited participant, 10<sup>th</sup> Benjamin Franklin/Lafayette Seminar, Fréjus, France (June, 2009).
  - Invited speaker, SATS 2009 Symposium: Evolution, Australian Academy of Science, Canberra (May 2009).
  - Invited speaker, Institute of Molecular Bioscience, University of Queensland (May 2009).
  - Invited speaker and Symposium Chair, ‘Cells to Societies’, Leura (November 2008).
  - Invited speaker, Symposium 26, ComBio 2008, Canberra (September 2008).
  - Invited participant, ARC Graeme Clark Research Outcomes Forum, Parliament House, Canberra (June, 2008).
  - Invited speaker, 4<sup>th</sup> Scientific Meeting of the Asia-Pacific Diabetes and Obesity Study Group, Kobe, Japan (August 2008).
  - Invited speaker and session Chair, Biotechnology for Locust Control Symposium, Rabat, Morocco (July 2008).
  - Invited speaker, Graeme Clark Research Outcomes Forum, ARC, Canberra (June 2008).
  - Invited speaker, 26<sup>th</sup> National Conference, Dietitians Association of Australia, Gold Coast (May 2008).
  - Invited plenary speaker, ‘Systems Biology’, The Centenary Institute Colloquium, Sydney (November, 2007).
  - Invited speaker, 17<sup>th</sup> St Vincent’s & Mater Health Sydney Research Symposium, Sydney (September, 2007).
  - Keynote speaker in plenary symposium “The Protein Leverage Hypothesis in human obesity”, 10<sup>th</sup> European Nutrition Conference, Federation of European Nutrition Societies, Paris (July 2007).
  - Invited international participant, ‘Forecasting in development’, The Inaugural Workshop of the Centre for Human Evolution, Adaptation and Diseases of the Liggins Institute, The University of Auckland (February 2007).
  - Invited speaker and session Chair, 10<sup>th</sup> International Congress of Obesity, Australasian Society for the Study of Obesity, Sydney (September, 2006).
  - Invited speaker, Nutrition Society of Australian Annual Meeting, Sydney (November, 2006).
  - Invited participant, Towards a Developmental Synthesis: developmental plasticity, ecological developmental biology and human health. Rockefeller Foundation, Bellagio, Italy. (December 2006).
  - Plenary speaker, Australasian Society for the Study of Animal Behaviour, Sydney (April 2006).
  - Keynote speaker, “Mass marching in locusts and cannibal crickets: new insights into collective movement “ – Swarming by Nature and Design, Institute for Pure and Applied Mathematics, UCLA (2006).
  - Plenary speaker, The Combined Australian Entomological Society, Society of Australian Systematic Biologists and Invertebrate Biodiversity and Conservation Conference, Canberra (December 2005).

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- Plenary speaker, Nutrition Society of Australia and Dieticians Association of Australia, special evening seminar “Diet and Human Evolution: What are the Implications for the 21<sup>st</sup> Century?”, Australian Museum (November, 2005).
  - Keynote speaker, 4<sup>th</sup> ANZAC Research Institute Symposium: “Focus on Ageing – Nucleic Acids to National Policy”, Sydney (November, 2005).
  - Plenary speaker, 9<sup>th</sup> International Conference of the Orthopterists’ Society, Canmore, Alberta, Canada (August, 2005).
  - Plenary speaker at meeting on Multi-agent Systems – Swarms, Ecology and Society at Max-Planck Institute for the Physics of Complex Systems, Dresden (August-September 2004).
  - Keynote speaker and co-organiser at EU COST action on A Geometric Approach to Diet Optimisation in European Aquaculture, Murcia Spain (2001), Bergen, Norway (2002), Tervo, Finland (2002); Umea, Sweden, (2003), Oxford (2004).
  - Keynote speaker and Section co-convenor (Insect-Plant Relationships) International Congress of Entomology, Brisbane (August, 2004).
  - Keynote speaker, meeting on Advances in the Study of Collective Behaviour, Oxford (November, 2003).
  - Keynote speaker, meeting on Biological and Artificial Swarms, Institute for Pure and Applied Mathematics, University of California, Los Angeles (October, 2003).
  - Invited Public Colloquium, Wissenschaftskolleg (Institute for Advanced Study), Berlin, February, 2003).
  - Invited speaker, 14<sup>th</sup> International Congress of Comparative Endocrinology, Sorrento (May, 2001).
  - Distinguished invited speaker, Monell Chemical Senses Institute, Philadelphia (March, 2001).
  - Plenary speaker, Third Workshop of the COST 827 action on voluntary food intake in fish, Naples (June 2000).
  - Arizona State University, Phoenix (Ditto) (April, 1999).
  - University of Arizona, Tucson (two public lectures as Distinguished Visiting Professor) (April, 1999).
  - Invited speaker, The Nutrition Society, London (January, 1999).
  - Invited speaker, Entomological Society of America, Las Vegas (November, 1998).
  - Invited speaker, European Congress of Entomology, Prague (September, 1998).
  - Invited speaker, International Congress of Ecology, Florence (July, 1998).
  - 10<sup>th</sup> International Symposium on Insect-Plant Relationships, Oxford (Organiser) (July, 1998).

## Grants

- BBSRC Research Grant (Awarded, amount TBA, 2010 to 2013) “Can bees meet their nutritional needs in the current UK landscape?” coordinated by Dr Geraldine Wright at Newcastle University.
- NHMRC Project Grant (\$730,000, 2010 to 2013) on ageing, nutrition and the geometric framework, with Professors Robert Cumming, David Le Couteur, Hal Kendig, A/Professor Vasi Naganathan and Dr Fiona Blyth.
- University of Sydney IPDF-INRC Grant (\$28,000, 2010) for collaborative links with Princeton University, Chinese Academy of Science and Cambridge University on locust research.
- ARC Laureate Fellowship (A\$3,080,000, 2009 to 2014) - “Nutritional Dynamics: from genes to individuals to ecosystems.”

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- NHMRC Project Grant (A\$939,050, 2009 to 2011) on the nutritional geometry of ageing in mice, with Professors David Le Couteur and William Ballard.
  - ARC Discovery (A\$390,000, 2009 to 2011) on the functional genomics of locust migratory behaviour, with Dr Gregory Sword, Professor Stephen Simpson, Dr Nathan Lo, Prof Le Kang.
  - ARC Linkage(A\$340,000, 2009 to 2011) for the autonomous tracking and predictive modelling of Australian plague locust migratory band movement, with Dr Gregory Sword, Dr Salah Sukkarieh, Prof Stephen Simpson, Dr Graham Brooker, Mr Peter Spurgin
  - ARC Discovery (A\$340,000, 2008 to 2010) on the heterarchical modelling of nutritional ecology: from individuals to communities, with Dr Gregory Sword, Dr Michael Charleston, Dr Iain Couzin, A/Prof David Raubenheimer.
  - ARC LIEF Grant (A\$170,000, 2008) for a video analysis suite for the integrative analysis of resource acquisition behaviour in animals, with Prof Richard Shine, Prof Michael Thompson, Dr Frank Seebacher, Dr Adele Pile, Dr Clare McArthur, A/Prof Ross Coleman, Dr Madeleine Beekman, Dr Ashley Ward, Dr Gregory Sword, Dr Robert Brooks, Dr Alistair Poore, Dr Russell Bonduriansky, Prof Gerry Cassis, Prof Mats Olsson, Prof David Booth, Dr Stefan Williams.
  - University of Sydney Bridging Support Grant (\$A50,000, 2007).
  - NHMRC Large Equipment (A\$93,750, 2007) for a P/E Envision Xcite Multilabel Counter, with Associate Professor Arthur Conigrave and others.
  - NHMRC Project Grant (A\$778,000, 2007 to 2009) on testing the protein leverage hypothesis in humans, with A/Professor Arthur Conigrave, and Professors Ian Caterson and Jennie Brand-Miller.
  - University of Sydney Bridging Support Grant (\$A70,000, 2007).
  - ARC Linkage (A\$399,000, 2006 to 2009) on Australian plague locust population genetics and migratory behaviour, with Dr Gregory Sword, Dr Marie-Pierre Chapuis, Laurence McCulloch and Martin Steinbauer.
  - ARC Discovery (A\$500,000, 2006 to 2008) on the study of self-organised movement of animal groups with and without leadership, with Dr Madeleine Beekman at Sydney.
  - ARC Federation Fellowship (A\$1,520,000 with matching funding from University of Sydney, 2005 to 2009) - “Integrative Behaviour: a new synthesis.”
  - BBSRC Research Grant (£220,000, 2004 to 2007) on foraging for multiple nutrients: a study between and within feeding guilds.
  - NERC Research Grant (£240,000, 2004 to 2007) on cost of immunity, a nutritional perspective, with Dr Ken Wilson at Stirling.
  - BBSRC Research Grant (£290,000, 2003 to 2006) with Professor Malcolm Burrows at Cambridge, on the neural bases of phase change in the desert locust.
  - EPSRC Research Grant (£250,000, 2003 to 2006) with Prof. Philip Maini, Mathematics Institute, Oxford, on understanding group formation and collective movement in locusts.
  - EC Research Grant (260,000 Euro, 2001 to 2004) on the geometric approach to diet optimisation in European aquaculture, with partners in Spain, France, Norway, Sweden and Finland.
  - BBSRC Research Grant (£265,000, 2001 to 2004) on adaptability of an insect herbivore, the diamondback moth, to change in its nutritional environment, with Dr David Raubenheimer.
  - BBSRC Research Grant (£230,000, 2000 to 2003) with Professor Malcolm Burrows and Dr Tom Matheson at Cambridge, on the neural bases of phase change in the desert locust.
  - Belgian Science Research Council (£10,000) as collaborator on a study of the endocrine basis of locust phase change with Professor Arnold De Loof (2000 to 2003).

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- Royal Society Grant (£10,000) for HPLC studies of insect tissues.
  - BBSRC Research Grant (£154,000, 1998 to 2001) on the influence of patterns of resource distribution on nutrient balancing in insects, with Dr David Raubenheimer.
  - BBSRC Research Grant (£140,000, 1996 to 1999) on maternal inheritance of phase in the desert locust.
  - Papua New Guinea Oil Palm Research Association (£298,000, 1995 to 1998) for an investigation of host-parasite interactions between *Sexava* bushcrickets and a strepsipteran with Dr Jeya Kathirithamby.
  - FAO/IFAD (UN) Research Grant (US\$70,000, 1995) for fieldwork on desert locust gregarization in Morocco and Mauritania.
  - SERC (BBSRC) Research Grant (£131,000, 1993-7) on a multi-level analysis of nutritional decisions in insects.
  - Schweizerischer Nationalfonds (£50,000, 1993 to 1996) on the cellular basis of feeding in insects.
  - UNDP Research Grant (US\$433,000, 1991 to 1996) on the analysis of the causal factors in desert locust gregarization.
  - AFRC Research Grant (£58,000, 1990 to 1993) on aphid compensatory feeding and the interaction between aphid feeding behaviour, dietary quality and mycetocyte symbionts.

### **Editorial boards**

- *Ecology*, Subject Editor
- *Advances in Insect Physiology*, Editor
- *Entomologia Experimentalis et Applicata*, Associate Editor
- *Journal of Insect Physiology*
- *Physiological Entomology*
- *Chemoecology*
- *Insect Science*
- *Journal of Orthoptera Research*
- *International Journal of Zoology*
- *The Open Entomology Journal*
- *Tunisian Journal of Plant Protection*

### **Government and external appointments and committees**

- Member of the Biological and Biotechnology Sciences Research Evaluation Committee, Excellence in Research for Australia Initiative, Australian Research Council, 2010-2011.
- Chair of Sectional Committee 10, Ecology and Evolutionary Biology, Australian Academy of Science, 2009-2011.
- ARC Selection Advisory Committee Member for Future Fellowships, 2009.
- Chair of Working Group 29, Herbivory, of the ARC-NZ Vegetation Function Network, 2007-2010.
- Member of the North America Exchange Program Committee, Australian Academy of Science, 2007-2010.
- Member of the Federal Government Department of Education, Science and Technology Research Quality Framework Biological Sciences Panel, 2007.
- Section Coordinator, Insect-Plant Relationships, International Congress of Entomology, Brisbane, 2004.
- Exhibitor, Royal Society's Summer Science Exhibition, 2001.

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- Elected to the Council of the International Federation of Comparative Endocrinology, 2001.
  - Member, Organising Committee, International Congress of Dipterology, September 1998.
  - Organiser, 10<sup>th</sup> International Symposium on Insect-Plant Interactions, Oxford, July 1998.
  - Advisor to UN on Desert Locust Control, since 1995.
  - Member of the Council of the Royal Entomological Society, 1990-1993.
  - Regular referee of grant applications for BBSRC, NERC, US National Science Foundation, Schweizerischer Nationalfonds, National Geographic Society, Whitehall Foundation, Leverhulme Trust, US-Israel BARD.
  - Regular peer reviewer for academic upgrading applications for staff members at universities in Australia, USA, Canada and South Africa.
  - Referee for over 40 journals.

### **University of Sydney Committees**

- Review Group Member, Centre for the Mind.
- Design User Group Member, Centre for Obesity Diabetes and Cardiovascular Diseases.
- Faculty of Sciences Liaison Officer and Selection Committee member, Dean of Science appointment.
- Member, DVC (Research) Review Committee on BIONE.
- Staff Development Officer, G08 Workshops for ECDRs and Future Research Leaders.
- Chair, School of Biological Sciences Research Committee
- Member, Faculties of Science Research Committee
- Member, International Office Europe Committee
- ERA Panel Leader, Biological Sciences
- Staff Mentor, School of Biological Sciences
- Head, Animal Plant Interaction Group (APIG)
- Various School committees (SAC, SPG, etc)
- Head, Planning Team EIF 2 – sustainability round – joint bid with the Faculty of Agriculture and the University of New England
- Founding member of management committee of Centre for Mathematical Biology.

### **Selection of features on Simpson's work since 2004**

Q&A. (2009) *Current Biology* 19, R632-R633.

Animal behaviour: feeding the superorganism. (2009) *Current Biology* 19, R366.

Sensible swarming. (2009) *Nature* 457, 132.

Evolutionary ecology: old ideas percolate into ecology. (2009) *Current Biology* 19, R21-R23.

The key to Pandora's box. (2009) *Science* 323, 594-595.

The hunger, the horror. (2008) *New Scientist*, May 31, 42-45.

Locusts, Cannibalism & Human Obesity. (2007) *Australasian Science*, August, 20-22.

How locusts decide it's time to swarm. (2006) *New Scientist*, June 1.

Align in the sand. Perspective. (2006) *Science* 312, 1320-1322.

March of the locusts. Research Highlights. (2006) *Nature* 441, 670.

Push on the marching crickets. News & Views. (2006) *Nature* 440, 38.

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Can the war on locusts be won? (2004) *Science* 306, 1880-1882.

An insect's extreme makeover. (2004) *Science* 306, 1881.

### **Other media**

“Locusts” Animal Planet/Oxford Scientific Films, 2009

“Catalyst” - ABC Television, Sydney, 7/5/2009

“Catalyst” - ABC Television, Sydney, 14/8/2008

“Mega Disasters: Super Swarm” - History Channel, US, 2007

“Killer Swarm” - Channel 5, UK, 2006

“The Perfect Swarm” - National Geographic, US, 2005

More than 100 television and radio interviews and newspaper articles and reports, in both national and international media.