

Andrew Fraser READ: CV

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Nationality: New Zealand (by birth) & UK (by naturalisation, 2003); US (by naturalization, 2016).

Current Position: [Evan Pugh University Professor](#) of Biology and Entomology (since 2014); Eberly Professor of Biotechnology (since 2015); Director, Center for Infectious Disease Dynamics (since 2010).

Previous Positions

Alumni Professor in the Biological Sciences (2012-2014), Penn State University
Professor of Biology (2007-2011) and Entomology (2007-2014), Penn State University
Professor of Natural History, University of Edinburgh [Chair established 1767; 13th occupant] (1998-2007)
BBSRC Second Advanced Research Fellowship (1998)
BBSRC Advanced Research Fellowship (1993-1997)
Adjunct Professor in Evolutionary Ecology, University of Tromsø, Norway (1992-1997)
Lloyd's of London Tercentenary Fellowship (1991-1992)
Lecturer in Zoology, St Catherine's College, Oxford University (1989-90)
Junior Research Fellowship, Christ Church, Oxford (1988-1992)
Commonwealth Scholarship to Merton College, Oxford University (1985-1988)

Degrees:

D.Phil., University of Oxford (1985-89). [Evolutionary biology/zoology; Advisor: Prof. P. Harvey FRS]
BSc(Hons) 1st Class in Zoology, University of Otago, New Zealand (1981-84)

Awards:

Fellow, The Royal Society (elected 2015)
Fellow, American Academy of Microbiology (elected 2014)
Fellow, American Association for the Advancement of Science (elected 2012)
Eberly College of Science Distinguished Senior Scholar, Pennsylvania State University (2007)
Fellow, Institute for Advanced Studies, Berlin (Wissenschaftskolleg zu Berlin) (sabbatical 2006-7)
Fellow, Royal Society of Edinburgh (elected 2003)
Scientific Medal, Zoological Society of London (1999)
Young Investigator Award, American Society of Naturalists (1991)
Thomas Henry Huxley Award (for D.Phil. thesis), Zoological Society of London (1991)

Summary of academic interests. My group works on the ecology and evolutionary genetics of infectious disease. How does evolution shape the virulence and transmission of infectious diseases? When will natural selection favour enhanced virulence? Can public health strategies, like vaccination, provoke clinically harmful evolution? Will an emergent disease become more infectious? Why are hosts not more resistant? How can we best manage the evolution of drug resistance? How can we combat insecticide-resistant mosquitoes? Our work involves evolutionary biology, ecology, parasitology, microbiology, genetics, and immunology. Currently, much of the work concerns the three players that cause malaria (parasite, vertebrate and vector), as well as entomopathogenic fungi, Marek's disease virus in poultry and myxoma virus in rabbits. I have taught zoology, evolutionary biology, microbiology, parasitology, ecology and statistics, and currently teach non-scientists to be better consumers of science.

GRANTS

(**=currently in play)

- **NIH/NIAID (2015-2020). *Variation in Resistance and Fitness to Artemisinins in African Malaria*. PI Jon Juliano, University of North Carolina; PSU subcontract PI: **Read**. PSU Subcontract c. \$150,000. R01AI121558
- **NIH, NIGMS and UK Biotechnology and Biological Research Council (2012-2017). *Vaccines as drivers of disease emergence: transmission ecology and virulence evolution*. PI: **Read**, Co-I: Nair (Pirbright Institute, UK), Dunn (PSU), Day (Queens, Canada). Funded as part of joint NSF-NIH-USDA Ecology and Evolution of Infectious Disease program as a US-UK collaboration. Total Award c.\$3mil. R01GM105244.
- CURE Epilepsy (2012-2014). *A murine model for preventing post-malarial epilepsy*. PI: Schiff (PSU UP), Co-I: **Read**, Gluckman, Drew (PSU UP), Stoute (PSU Hershey). Total award: \$350,000.
- Bill and Melinda Gates Foundation (2012-2014). *Diagnostic for malaria infection in humans*. PI: Mescher; Co-I: de Moraes, **Read**. Total Award c. \$800,000.
- European Commission (2012-2015). *A low-cost mosquito contamination device for sustainable malaria mosquito control*. PSU subcontract, PI: Thomas (PSU), Co-I: **Read**. Total award: c.\$1mill.
- **NIH, NIAID (2012-2017) *Genomic analysis of the canonical case of virulence evolution: Myxomatosis in Australia*. PI: **Read**, Co-I: Holmes (Sydney), Cattadori, Hudson (PSU), Kerr (CSIRO Canberra), Ghedin (U Pitt). Total award c.\$2.9 million. R01AI093804
- NIH, NIAID (2011-2013). *Effects of temperature on mosquito immunity and vector competence: do some like it hot?* PI: Thomas (PSU); Co-I: **Read**, Cox-Foster (PSU). Total Direct costs \$275,000. R21AI096036.
- NIH, NIAID. *Centre for the Study of Complex Malaria in India*. Total cost c.\$US10 mill. PI: Jane Carlton, NYU. U19A1089676-01. I am involved in two component projects:
- (i) *Using next-generation genomics to study antimalarial drug resistance in India*. (2010-2016). PSU subcontract PI: **Read**. Annual direct costs c.\$75,000. India budget ten-fold higher.
 - ***(ii) Ecological and evolutionary determinants of malaria transmission and the advance towards sustainable insecticidal mosquito control*. (2010-2017) PSU subcontract, PI: Thomas, Co-I: **Read**. Annual direct costs c.\$90,000. India budget ten-fold higher.
- NIH, NIAID (2010-2015). *Within host selection of P. falciparum variants by artemisinin combination therapies*. PI: Jon Juliano, University of North Carolina; PSU subcontract PI: **Read**. PSU Subcontract Direct total \$345,208. R01AI089819.
- NIH, NIGMS R01 (2010-2014). *The evolutionary biology of chemotherapy against infectious agents: towards rational design of patient treatment regimens for resistance management*. PI: **Read** Total c.\$1,150,000. R01 GM089932.
- NIH, NIAID R21 (2010-2013) *Existing malaria control insecticides – without the evolution of insecticide-resistance mosquitoes?* PIs: **Read**, Co-I: Thomas (PSU). Total \$250,697. R21 AI088094
- Innovative Vector Control Consortium, Bill and Melinda Gates Foundation. (2010-2011). *Residual persistence and stability of candidate fungal biopesticides for IRS*. PIs: Thomas (PSU), **Read**. \$101,284.
- Bill and Melinda Gates Foundation (2010-2011). *Diagnostic for malaria infection*. PIs: M Mescher (PSU), C. de Morales (PSU), **Read**. \$US100,000.

The Wellcome Trust. (2010-2013). *Elucidating within-host competition between malaria parasites using mathematical models and Bayesian statistics*. (£152,942; all funding in Edinburgh). PIs: N. Savill (U. Edinburgh), **Read**. Ref. 091078/Z/09/Z.

NIH, Fogarty International Center, DHSS (2009-2013). *Intergovernmental Personnel Agreement for participation in Research and Policy for Infectious Disease Dynamics Program*. PI: **Read**. Total \$250,000.

National Science Foundation/Ecology of Infectious Diseases Program. (2009-2013). *Quantifying the influence of environmental temperature on transmission of vector-borne diseases*. PI: M Thomas; Co-I: Crane, Mann, **Read** (PSU), Scott (UC Davis). Total c\$US 2.3mill. EF-0914384.

Pennsylvania Department of Health Tobacco Settlement Funds (2008-2011). *Research infrastructure for new pesticide technologies for control of insect-borne diseases like malaria*. PI: **Read**. \$1,033,333

Bill and Melinda Gates Foundation (2009-2010). *Giving mosquitoes a 'head cold' to stop odor-driven feeding on humans*. PIs: Baker, Thomas, **Read** (all PSU). \$US100,000.

Grants prior to move to US

The Wellcome Trust. (2007-2009). *Host-parasite interactions elucidated by McMC-based Bayesian inference*. PIs: N. Savill, **Read**. £108,867. Ref. 082601.

Royal Society of New Zealand, Strategic Relocation Fund. *Infectious disease evolution: strategies to overcome resistance, virulence and vaccine escape*. \$NZ9.7mill + matching funds from Otago University. PI: **Read**. Declined.

Wissenschaftskolleg zu Berlin (2006-7). Teaching replacement grant (to enable sabbatical leave). PI: **Read** €60,000.

BBSRC (2006-2010). *Studies leading to sustainable strategies for the control of Marek's disease: Is vaccination responsible for virulence evolution in Marek's disease?* PIs: **Read**, Nair (Institute of Animal Health, Compton, England). £713,930. Ref. BB/E003540/1.

The Wellcome Trust. (2006-2009). *Maximising the short-term efficacy of fungal biopesticide control of malaria*. PIs **Read**, Thomas (CSIRO Canberra). Terminated by Wellcome Trust 03/08 following move to US. £343,951. Ref. GR079077MA

The European Commission (2006-9). *The evolution of parasite virulence: ecological processes shaping virulence of Ophryocystis parasites in monarch butterflies and malaria parasites in mosquitoes*. PI: **Read**; Marie Curie International Fellowship to J de Roode. £169,426. Ref. FP6-2004-Mobility-6, Proposal No. 021353-Virulence Evolution.

The Wellcome Trust (2005-2008). *Parasite evolution in response to blood-stage malaria vaccines*. PI: **Read**; studentship to V. Barclay. £47,087. Ref. 075468/Z/04/A.

The Wellcome Trust (2004-2009). *Flow cytometry for immunology and parasitology*. PIs: Gray, Anderton, Maizels, Matthews and **Read**. £439,023. Ref. 075855/Z/04/Z.

BBSRC (2004-2007). *Evolution of sex allocation in protozoan parasites*. PIs: **Read** & S. West; Recognised Researcher, S. Reece. £183,094. Ref. BB/C509915/1

BBSRC (2004-2007). *Empirical immunology meets evolutionary ecology: the virulence of coinfection* [PIs: J. Allen, **Read** & S. Nee; Recognised Researcher, A. Graham]. £313,872. Ref. BB/C5087341.

The European Commission (2004-2005). *Genetically diverse infection, competition, and the evolution of parasite virulence*. PI: **Read**; Marie Curie Intr-European Fellowship to L. Råberg. €85,534. Ref. MEIF-CT-2003-501567.

The Wellcome Trust (2003-2006). *The role of inflammatory host cytokines and genetic diversity in the determination of malaria virulence*. PI: **Read**; studentship to G. Long. £50,175. Ref. 069299/Z/02/A

The Wellcome Trust (2003-2006). How does in-host competition affect transmission strategies in malaria parasites? PI: **Read**; studentship to A. Wargo. £107,453. Ref. 073094/Z/03/Z.

The Wellcome Trust (2002-2008). Programme Grant: *Parasite life history evolution in response to medical and veterinary intervention*. PI **Read**. £1,187,420. Ref 068292/Z/01/Z.

The Wellcome Trust (2002-2004). *Novel use of fungal entomopathogens for malaria control*. PI: **Read**. £130,038. Ref 068195/B/02/Z. (Supplement £1,750, ref 068195/B/02/A).

The Wellcome Trust (2002). *Centre for Infection Biology and Immunology* (for new Building – now Ashworth 3). PI's: Maizels, Robinson, Allen, Barton, Blaxter, Charlesworth, Gray, Keightley, Leigh Brown, Pemberton, **Read**. £4,734,289. Ref. 064641.

The Wellcome Trust (2001-03). *Developing optimal immunology*. PI's: **Read**, Allen, Nee. £84,335. Ref. 064121/Z/01/Z.

NERC (2000-3): *Does parasite-mediated selection generate dynamical gene frequency fluctuations in wild populations?* PI: **Read**; Recognized Researcher: T. Little. £264,017.

The Wellcome Trust (2001-02). *Do host-parasite arms races occur ex silico?* PI: **Read**. £82,276. Ref. 060770/Z/00/Z.

BBSRC (1997-8). *Evolutionary ecology of host responses to parasitic infection*. PI's: **Read**, Bryant (Stirling). £51,171.

BBSRC (1997-00). *Evolutionary causes and consequences of host responses to parasitic infection* [Fellowship support grant]; PI: **Read**. £138,018 + Read's salary.

The Leverhulme Trust (1997-00). *Evolutionary genetics of parasite virulence*. PI: **Read**. £105,270.

BBSRC (1996-00). *Testing mutational explanations of sexual reproduction*. PI's: **Read**, Barton, Viney; £198,116

The Leverhulme Trust (1996-97). *Is sexual reproduction by parasites an immune evasion strategy?* PI's: **Read**, Viney. £37,320

NERC (1995-98). *Immunocompetence versus ornamentation: an experimental study of sexually-selected breeding coloration and disease resistance in male sticklebacks*. PI's: Braithwaite, Huntingford (Glasgow) & **Read**. £134,270. GR3/10349.

BBSRC (previously AFRC) (1993-97). *Evolutionary ecology of parasite reproductive strategies* [Fellowship support grant]. PI: **Read**. £99,890 + Read's salary.

Leverhulme Trust (1990-4). *Sex allocation and virulence in malaria parasites*. PI's: **Read**, Keymer (Oxford); £97,750.

NERC (1989-92). *Heritability of male quality in great tits*. C. Perrins & **Read** (Oxford). £65,000.

Minor:

NESCent (2010 for 2011) *Catalysis Meeting: Evolution of Infectious Diseases: Integrating Empirical and Modeling Approaches*. PIs Reece, Mideo, **Read**, Savill. \$40,000.

BBSRC (2004, for 2006). International Fellowship Scheme, five month sabbatical visit for Prof. Troy Day, Queens University, Ontario. *The effects of medical intervention on pathogen evolution: integrating theory and data*. PI: **Read**. £6,000.

The Wellcome Trust (2001). Meeting grant: *Parasite Variation: Immunological and Ecological Significance*. 2001. PI's: **Read** and Viney. £2,000. Ref. 065132/Z/01/Z.

The Royal Society (1998). Equipment grant. PI: **Read**. £8,822.

Underwood Fund/BBSRC (1997). To host Prof. Curt Lively, University Indiana, for three month sabbatical. £4,350.

Nuffield Foundation (1995). Summer undergraduate bursary. PI: **Read**. £1,300.

Royal Society (1995). Equipment grant. PI: **Read**. £9,037.

NERC (1994) Small project grant: *Transmission and prevalence of blood parasites in red grouse in relation to grouse survival, parasite sex ratio and abundance of vectors*. PI's: Hudson (Game Conservancy) & **Read** (Oxford). £21,914.

University of Otago, New Zealand (1994). Grant for visit. NZ\$4,000.

Royal Society Research Grant (1991). Equipment grant. PI: **Read**. £10,000.

Oxford University Special Research Grant (1990). *Malaria sex ratios*. PI's: **Read**, Keymer (Oxford). £3,958.

Nuffield Foundation & Royal Society (1990). Study Visit/Travel Grant to Australia and PNG. £2,500.

Norwegian Research Council Visiting Grant (1990). PI's: Skorping (Tromso), **Read**. £6,000.

Leverhume Trust (1989-90): *Sex allocation and virulence in malaria parasites*. PI's: Keymer & **Read** (Oxford). £22,750.

PHD SUPERVISION

Current:

Johanna Ohm (2013-current). PSU Biology. Title TBC. Advisor: **Read**.

Monica Acosta (2012-current). PSU Biology. Title TBC. Advisor: **Read**.

Completed:

Penn State

Nina Wale (2011-2015). PSU Biology. *Evolution-proofing Antimicrobial Drugs Using Resource-depleting Chemotherapy*. Advisor: **Read**. [Currently post-doc, University of Michigan]

Megan Greischar (2009-2014, NSF, NIH). PSU Entomology. *Predicting the Consequences of Diverse Life History in Malaria Parasites: Synchrony and Transmission Investment*. Advisors: Bjørnstad, **Read**. [Currently post-doc, University of Toronto]

Katey Glunt (2008-2013, NIH). PSU Biology. *Understanding the Consequences of Sub-Lethal Insecticide Concentrations for Insecticide Resistance Management and Malaria Control*. Advisors: **Read**, Thomas. [Currently Research Fellow, Barcelona Centre for International Health].

Penny Lynch (2004-2013, self-funding) (Open University PhD). *Mathematical Modelling of the Effects of Health Interventions on the Evolution of Life History in Disease-Causing Organisms*. Supervisors: Dr U. Grimm (Mathematics, Open University) and **Read**. [Currently City of London analyst and part time post-doc with Mike Boots, University of Exeter/UC Berkeley].

University of Edinburgh

Silvie Huijben (2006-2009, Darwin Trust studentship). *Experimental Studies on the Ecology and Evolution of Drug-Resistant Malaria Parasites*. Supervisor: **Read**. [Currently Branco Weiss Fellowship at the Barcelona Center for International Health, Spain, from October 2013]

Vicki Barclay (2005-2008, WT studentship). *Studies Evaluating the Possible Evolution of Malaria Parasites in Response to Blood-stage Vaccination*. Supervisor: **Read**. [After post-doc, Salathe group, Penn Stat, now Research Manager, U Penn].

Grainne Long (2003-2006, WT studentship). *The Role of Inflammatory Host Cytokines and Genetic Diversity in the Determination of Malaria Virulence*. Supervisors: **Read**, Allen, Graham. [Currently Early Development Career Fellow, MRC Epidemiology Unit, Cambridge University, UK, after post-docs at Penn State and University of Sheffield].

Katrina Grech (2003-2006, WT PGRA) (Open University PhD). *The Ecology and Evolution of Malaria: Laboratory Studies of Plasmodium chabaudi and its Rodent and Insect Hosts*. Supervisor: **Read**. [Currently Research

Officer, Drug Modelling Program, University of New South Wales, Sydney after Research Scientist, Moredun Research Institute, Edinburgh].

Andrew Wargo. (2003-2006, WT Prize Studentship & ORS). *How Does In-host Competition Affect Transmission Strategies in Malaria Parasites?* Supervisor: **Read**. [Currently Tenure-track Professor, Virginia Institute of Marine Science after post-doc, Dept Pathobiology, University of Washington, Seattle and at USGS Western Fisheries Research Center, Seattle].

Jaap de Roode (2001-2004, Darwin Trust), PhD: *Within-host Competition and the Evolution of Malaria Parasites*. Supervisor: **Read**. [Currently, Associate Professor, Biology Department, Emory University, GA, USA after Marie Curie International Travelling Fellowship, Athens, GA, USA;].

Meghan Gannon (2001-2004, NSF & ORS), PhD: *Plasticity in Reproductive Traits*. Supervisors: **Read**, Little, West. [Currently post-doc, Buffalo State College & Buffalo Museum of Science, NY, USA].

Lucy Crooks (1996-2004 [2 years abeyance on health grounds]; MRC studentship), PhD: *Gametocyte Investment in Malaria*. Supervisor: **Read**. [Currently, post-doc, Sanger Center, Cambridge, UK, after post-docs in Dept Animal Breeding and Genetics, Swedish University of Agricultural Sciences, Uppsala, and at the ETH Zurich].

Sarah Reece (2000-2003; NERC), PhD: *Evolution and Ecology of Sex Allocation*. Supervisors: West, **Read**. [Currently, Royal Society Fellow, University of Edinburgh, after NERC and Wellcome Fellowships, University of Edinburgh, following lectureship, University of Stirling].

Heather Ferguson (1999-2002; Science Faculty Scholarship & ORS), PhD: *The Ecology and Evolutionary Implications of Malaria Parasite Virulence in Mosquito Vectors*. Supervisor: **Read**. [Currently, Lecturer (Assistant Prof) University of Glasgow, after BBSRC David Phillips Fellowship, University of Glasgow and Ifakara Health Research and Development Centre, Ifakara, Tanzania].

Rebecca Timms (1997-2001; BBSRC studentship), PhD: *The Ecology and Evolution of Virulence in Mixed Infections of Malaria Parasites*. Supervisor: **Read**. [Currently Associate Director, Corporate Finance, Bank of Scotland].

Katrina Lythgoe (1996-1999; BBSRC studentship), PhD: *Genetic Variation in Structured Populations: Space, Time and the Red Queen*. Supervisors: Barton, **Read**. [Currently Wellcome Fellow, Imperial College, London, after being editor *Trends in Ecology and Evolution*, following a Wellcome Travelling Fellowship at Dept. Biology, UC San Diego, and an MSc in Science Communication, Imperial College, London].

Alan Gemmill (1995-1999; NERC studentship), PhD: *Experimental and Comparative Analyses of the Evolutionary Ecology of Parasitic Nematodes*. Supervisors: **Read**, Viney. [Currently Senior Research Officer, Austin & Repatriation Medical Centre, University of Melbourne].

Angus Buckling (1995-1998; MRC studentship), PhD: *Ecological and Evolutionary Effects of Intervention Strategies on the Transmission of Malaria Parasites*. Supervisor: **Read**. [Currently Professor, University of Exeter, after Royal Society University Research Fellow and lecturer, Oxford University, following a lectureship, University of Bath].

Louise Taylor (1993-1997; MRC studentship), PhD: *Epidemiological and Evolutionary Consequences of Mixed-Genotype Infections of Malaria Parasites*. Supervisor: **Read**. [Currently a part time editor and full time mother, following a Wellcome Research Fellow at Centre for Tropical Veterinary Medicine, University of Edinburgh].

Tromsø University, Norway

Per Arneberg (1993-1996; research assistantship, University of Tromsø, Norway), PhD: *Commonness and Rarity among Mammalian Nematodes. A Comparative Study of Parasite Abundance*. Supervisors: Skorping, **Read**. [Currently Research Scientist, Institute of Marine Research following Norwegian Research Council Fellowship, Tromsø University].

University of Oxford, England

Stephanie Schrag (1989-1993; Marshall Scholarship, Oxford), D.Phil. *Factors Influencing Selfing and Outcrossing Rates in the Freshwater Snail, Bulinus truncatus*. [Currently a Senior Research Epidemiologist, CDC Atlanta, after Post-doc, Department of Biology, Emory University, Atlanta, USA]. Supervisors: **Read**, Keymer.

Failed to complete: Rosie Allister (2005-2007; BBSRC studentship + vet supplement). *Evolution of drug resistance and virulence in trypanosomes*. Supervisors: **Read**, Matthews. Withdrew on grounds of ill health.

Supervisory committees

PSU: James Fraser (Molecular, Cellular and Integrative Biosciences, 2016-current), Lauren Quevillon (Biology, 2016-current), Juan Raygoza (Biochemistry and Molecular Biology, 2016-current), Duverney Chaverra-Rodríguez (Entomology, 2016-current), Suprita Singh (Biochemistry and Molecular Biology, 2015-current), Utsav Pandey (Biochemistry and Molecular Biology, 2015-current), Elyse Munoz (Genetics, 2013-current), Kezia Manlove (Biology, 2013-2016), Todd Bodmar (Biology, 2013-2015), Els Campbell (Biology, 2013-current), Raquel Loreto (Entomology, 2013-current), Becky Hennig (Entomology, 2013-2015), John Parkinson (Biology, 2011-2014), Lindsay Beck-Johnson (Biology, 2009-2013), Maia Rabaa (Biology, 2010-2012), Rob Anderson (Entomology, 2009-2011), Ronnie Childs (Entomology, 2008-2011), Olivier Rolin (IID 2008-2012), Jennie Lavine (Entomology 2008-2011), Daniel Tyler (Tay) Pettay (Biology 2008-2011), Heather Simmons (Biology, 2007-2011), Cadhla Ramsden (Biology, 2007-2009), Sara Hester (BMB 2008-2012).

Edinburgh: A. Duncan, B. Craig, T. Lamb, R. Floyd, K. MacKenzie, L. Kruuk, C. Wade.

Oxford: R. Trevelyan, M. Sullivan.

RESEARCH ASSOCIATES, POST-DOCS AND SPONSORED POST-DOC FELLOWS

Current

Andy Bell (2003-2011; 2013-current). Senior Research Associate [NIH]

Elsa Hansen (2013-current). Senior Research Associate [NIH]

David Kennedy (2012-current). [RAPIDD, NIH]

Alumni

Eleanore Sternberg (2012-2014) [EU] Now Research Associate, Thomas Group, Penn State

Jessica Waite (2012-2015) [EU]. Now Research Manager, Thomas Group, Penn State

Jacqui Montgomery (2013-2014). [NIH]. Now Project Development Director, Eliminate Dengue, Monash University, Australia.

Courtney Murdock (2009-2014) [NSF]. Now Assistant Professor, University of Georgia, Athens, GA.

Lauren Cator (2011-2014) [PSU]. Now Assistant Professor, Imperial College, London.

Simon Blanford (2002-2014). [NIH]. Now house dad.

Laura Pollitt (2012-2013) [NIH]. Now Research Fellow, University of Edinburgh.

Rahel Salathe (2011-current) [PSU]. Now full time mom.

Nicole Mideo (2012-2013). [NIH]. Now Assistant Professor, Toronto University.

Silvie Huijben (2009-2012). [NIH]. Now Branco Weiss Fellow, Barcelona Center for International Health.

Krijn Paaijmanns (2008-2012). [NSF]. Now Assistant Professor, Barcelona Center for International Health.

Sue Baigent (2008-2011). [BBSRC]. Still at Pirbright Institute, UK.

Vicki Barclay (2008-2011). [PSU]. Now Post-doc, Salathe lab, PSU.

Kathryn Crouch (2006-8). [BBSRC]. Now in business.

Petra Schneider (2006-2007). [Wellcome Trust]. Now NERC post-doc, University of Edinburgh.

Simmi Mahajan (2005-2007). [BBSRC]. Lost contact.

Damien Drew (2005- 2007). [BBSRC]. Now Senior Research Officer, Burnet Institute, Melbourne.

Lars Råberg (2004-2005). [Marie Curie Fellow]. Now Assistant Professor, University of Lund.

Katrina Lythgoe (2001-2002). [Wellcome Trust Travelling Fellowship]. Now Wellcome Fellow, Imperial College, London, after being editor *Trends in Ecology and Evolution*, after an MSc in Science Communication, Imperial College, London.

Andrea Graham (2001-2004). [Wellcome Trust]. Now Assistant Professor, Princeton University, after Leverhulme and BBSRC Fellowships at the University of Edinburgh.

Sylvain Gandon (2001- 2002). [Wellcome Trust Biomathematics Fellowship]. Now CNRS Research Director, Montpellier.

Sue Mitchell (2000-2004). [NERC]. Now Director, Spot-On Data Solutions.

Tom Little (2000- 2002). [NSERC (Canada) then Wellcome Trust]. Now Full Professor, University of Edinburgh after SBS Research Fellowship and then Wellcome Trust Senior Research Fellow, University of Edinburgh.

Claus Wedekind (2000-2003) [Swiss Marie Curie Fellowship]. Now Associate Professor, University of Lausanne.

Marg Mackinnon (1998-2000). [Leverhulme]. Now Research Fellow, Wellcome Trust Unit, Kilifi, Kenya, after Dorothy Hodgkin Fellowship, Universities of Edinburgh and Cambridge.

Ana Rivero (1999-2000). [BBSRC]. Now a CNRS Research Director, Montpellier, after post-doc in Montpellier, then on a five year Research Fellowship, Spain.

Stu West (1997-1999) [BBSRC]. Now Full Professor (Established Chair), University of Oxford, having been a Royal Society and BBSRC Fellow and Personal Chair, University of Edinburgh.

COMMUNITY SERVICE:

- Chair, Williams Prize Committee, International Society for Evolution, Medicine & Public Health (2016)
- Chair, Omenn Prize Committee, International Society for Evolution, Medicine & Public Health (2016)
- Co-organised NIH/NIGMS workshop: Ecology's Role in Population Genetics and Evolution (15 people from across the US). Bethesda, MD. Co-organizers: Sarah Schaack [Reed College] and Daniel Janes [NIH/NIGMS]
- External Scientific Advisory Committee, Center for Evolution and Medicine, Arizona State University (2015–current).
- Chair, Publications Committee, International Society for Evolution, Medicine & Public Health. (2015–current).
- Organised RAPIDD Workshop, Aquacultural Disease and the Evolution of Virulence (25 people from Europe & US). Co-organisers D. Kennedy [PSU] and G Kurath [USGS]. Seattle (2012).
- Organised RAPIDD Workshop, Evolution of Virulence from Wildlife to Farms (25 people from Europe, US and Asia). Co-organiser C. Webb, [Colorado State]. Fort Collins (2011).
- Steering Committee, American Academy of Microbiology Colloquium, *Designing Drugs That Last*. Philadelphia (2012).
- Co-organised NScent Catalysis Meeting (30 people from Europe and North America). Co-organized with S. Reece, N. Mideo, N. Savill, University of Edinburgh. Duke University (2011)
- Reviewer/interviewer, Strategic Awards Committee, The Wellcome Trust, London (2010).

- Scientific Advisory Board, DFG Priority Program Host-Parasite Coevolution, Germany (2009–current).
- Scientific Advisory Board, Finnish Centre of Excellence in Evolutionary Research (2006–2011).
- Scientific Advisory Board, School of Biological Sciences, University of Cambridge (2006–2008).
- John Maynard Smith Prize Panel, European Society of Evolutionary Biology (2007)
- Philip Leverhulme Prize Panel for Zoology, The Leverhulme Trust, London (2006, 2008).
- NCEAS working group on Establishing Ecology & Health, Santa Barbara, 2006.
- Heads of International Research Organizations (HIRO), Brainstorming Meeting on Ecology of Infectious Diseases, Bethesda, USA, (2005).
- Chair, External Review, Institute of Zoology (2003).
- Scientific Awards Committee, Zoological Society of London (2003-2007; Chair 2005–2007).
- External Examiner, BSc (Biology), University of Stirling (2001-2004).
- Vice Chair, Biodiversity Grant Panel, The Wellcome Trust (2000-2002).
- Member, Infection and Immunity Grant Panel, The Wellcome Trust (1997-2001).
- Member, SHoWCaSE Grant Panel, Wellcome Trust (1999).
- Editorial Board *PLoS Biology* (2012–2019).
- Advisory Board, *Evolutionary Applications* (2008–current).
- Associate Editor, *Evolutionary Applications* (2012–current).
- Senior Associate Editor, *Evolution, Medicine and Public Health* (2012–current).
- Associate Editor, *Evolution* (2009–2011)
- Editorial Board, *Proceedings of the Royal Society of London Series B* (2002–2008).
- Editorial Advisory Board, *Trends in Ecology and Evolution* (2000–current).
- Editorial Board, *Journal of Evolutionary Biology* (1996–2000).
- External PhD examiner:
 - University of Melbourne, Australia: 2014 [C. Kinnear, *Evolutionary Implications of Imperfect Vaccines in a Mouse Typhoid Model*]
 - University of New England, Australia: 2013 [Tanzila Islam, *Replication Kinetics, Shedding, Transmission and Protective Efficacy of Rispens/CVI988 Vaccine Virus in Single and Combined Infections with Very Virulent Marek's Disease Virus.*]
 - Bergen University, Norway: 2011 [Jon Magerøy, *Environmental Impact on Host-Parasite Interaction. A Study on the Adaptive Value of Host Castration and Gigantism When Hosts Can Regain Reproduction*]
 - Bergen University, Norway: 2004 [Per Holmstad, *Do Parasites Affect Ptarmigan Population Dynamics?*]
 - Lund University, Sweden: 2002 [L Råberg, *Costs in the Ecology and Evolution of the Vertebrate Immune System*]
 - Imperial College at Silwood Park: 2001 [J Ferrari, *Evolution of Resistance to Natural Enemies*]
 - University of Cambridge: 2000 [S P Brown, *Social Evolution in Parasites*]
 - University of Pierre & Marie Curie, Paris: 2000 [S Gandon, *Evolution and Coevolution in Metapopulations*]
 - University of Oxford: 2000 [C M Davies, *Snail-Schistosome Interactions and the Evolution of Virulence*]
 - ETH, Switzerland: 1999 [S. Negovetic, *On the Maintenance of a Cline in Mixed Clonal and Sexual Populations of the Freshwater Snail Potamopyrgus antipodarum (Gastropoda: Hydrobiidae)*]

- University of Cambridge: 1999 [T L Braisher, *Genetic Variation in Trichostrongylid Parasites of the Soay Sheep on St Kilda*]
- University of Tromsø, Norway: 1999 [D A Lysne, *The Epidemiology of Macroparasites on Caged Atlantic Cod (Gadus morhua L.)*]
- Uppsala University, Sweden: 1998 [D Nordling, *Trade-offs Between Life History Traits and Immune Defence in the Collared Flycatcher Ficedula albicollis*]
- Imperial College at Silwood Park: 1998 [M Fellows, *Costs of Resistance in Drosophila melanogaster*]
- Oxford University: 1996 [B Walther, *Comparative Analyses of Ectoparasite Communities*]
- Uppsala University, Sweden: 1995 [R Dufva, *Parasites, Reproductive Success and Health Status in Birds*]
- Internal PhD examiner (Edinburgh): 1995 [Blackman], 1998 [Healer], 1999 [Wedgewood-Oppenheim], 2001 [Rokas], 2002 [Aboobaker].
- External Expert for Professorial appointments (Norway, Switzerland, Oxford, Sheffield, London, Max Planck)
- Member British Society for Parasitology, Society for the Study of Evolution, Society of American Naturalists, American Association for Advancement of Science, American Society for Tropical Medicine and Hygiene.

TEACHING:

Penn State

- SC200 – Science in Our World: Certainty and Controversy (2010–current). Course director. Conceived and developed course; teaching the vast majority of it. 70 non-science majors in 2010, 100 in 2011, 170 in 2012 and 2013, 205 in 2014, 330 in 2015, 357 in 2016. <http://sites.psu.edu/siowreflections/>
- Presentations on SC200 to PSU's e-Education Council, PSU's Symposium for Teaching and Learning with Technology, ECoS Dean's Alumni Advisory Board, Department of Biochemistry and Molecular Biology, and Department of Biobehavioral Health (all 2011).
- Guest Lecture, Penn State Altoona (2013).
- SC 297 Frontiers of Research, Lecture to 300 Freshman science students (2013, 2014).
- Guest lecture WSF460 Wildlife Behavior (2012).
- Two sessions with BMMB 598C Microbiology (2012, 2014, 2015).
- Two sessions with ENT 597A Frontiers in Insect Science (2009, 2012, 2013).
- Semester long grad course, BIOL 592 Evaluation of Biological Literature (2009).
- Co-taught semester long grad course ECOL 597 Evolutionary Ecology (2009).
- Undergrad researcher experience in the lab: Michelle Lai (2013–current), Josh Bram (2012–current), Rebecca Seliga (2010–2012), Courtney Babb (2011–2012), Melissa Moody (2010–2011), Lucas Nell* (2009–2010), Danielle Tomasello* (2008–2009). *=author on refereed lab papers.

University of Edinburgh

- Pathogen Evolution Module, 4th year Medical Microbiology (2003–2005). Course organiser, 4 lectures, plus associated computer practicals and tutorials.
- Malaria Module, 4th year Zoology course (2003–2006). Three lectures plus associated discussion sessions.
- Quantitative Zoology, 4th year Zoology course (1999–2006). Designed and developed course; course organiser, 12 lectures, plus associated computer practicals and tutorials.
- Evolution Core Module, 4th year Zoology course (1998–2003). Six lectures.
- Community and Population Biology, 1st year course (2000–2006). Five lectures and associated library project on Animal Extinction.
- Population and Community Ecology, 3rd year course (2000–2002). Four lectures and two associated practicals.
- Miscellaneous lectures in Evolutionary and Ecological genetics (3rd year) and Biometrics 2h (2nd year), and 0th week Gee-Whizz Evolution lecture for 1st year students.

Other

- Guest Lectures, Evolutionary Medicine courses at Queens and Toronto Universities (2016)
- Faculty, Lausanne Graduate Workshop in Evolutionary Biology, Riederalp, Switzerland (2015).
- Guest Lecturer, Evolutionary Medicine course, Yale University (2012, 2013).
- Faculty, Guarda Workshop in Evolutionary Biology, Switzerland (2006, 2012).
- Tromsø University, Norway, graduate course in epidemiology (1993-1996).
- Supervision of 2-6 undergraduate projects per year at Edinburgh (1995–2006); five at Oxford (1987-1990).
- Undergraduate laboratory classes (Otago University 1983-1985).
- Undergraduate tutorials in evolution, behaviour and ecology (Oxford University 1986-1992).

UNIVERSITY SERVICE:

Penn State

- Director, Center for Infectious Disease Dynamics (2010-current) www.ciddd.psu.edu
- Steering Committee, Penn State's Keystone Institute (2016-current).
- Enhancing Health Steering Committee, PSU Strategic Plan Implementation (2016-current)
- Huck Scientific Advisory Board on Global Health Biosecurity (2016-current)
- Chair, Seminar Committee, Department of Biology (2016-current)
- Nominations Committee, Department of Entomology (2016-current)
- Chair, Alex and Jessie C Black Award for Excellence in Research Committee, College of Ag Sci (2016).
- Search Committee, BSL3 Faculty, Department of Veterinary and Biomedical Science, College of Ag Sci (2015-current)
- Search Committee, Academic Administrator Replacement, Department of Biology (2015)
- Search committee, Chair of Biology (2015)
- Search committee, Dean, Eberly College of Science (2014-5)
- Tombrose Fellow responsible for general education development, Center for Excellence in Science Education, Eberly College of Science, Penn State (2012-2014)
- Directors Advisory committee, Huck Institute for Life Science (2013–current)
- Huck Institute Transformative Science award committee, Huck Institute for Life Science (2012-3)
- Awards Committee, Department of Entomology (2011-2014)
- Department Head Advisory Committee, Department of Entomology (2012-2014)
- Mentoring Committee, Department of Biology (2007–2016)
- Faculty Mentor: Jesse Lasky (Assistant Professor, Department of Biology, 2016-current), Heather Hines (Assistant Professor, Dept Biology, 2013-current), Ping Du (BIRCWH Scholar, Assistant Professor, Division of Epidemiology, Dept Public Health Sciences, 2010–2013); David Hughes (Assistant Professor, Dept. Entomology, 2011–current); Matt Ferrari (Assistant Professor, Dept Biology, 2011–tenure, 2016); Marcel Salathe (Assistant Professor, Dept Biology, 2011–2015, left PSU pre-tenure), Isabella Cattadori (Assistant Professor, Dept Biology, 2009–tenure, 2014).
- Seminar Organiser, Entomology Department (2010-2011)
- Promotion and Tenure Review Committee, Department of Biology (2010–2012)
- Huck Infectious Disease Cluster Hire Umbrella Committee (Chair) (2009–2011) [c.15 faculty hired]
- Advisory/Long Term Planning Committee, Department Biology (2009–current)
- Promotion and Tenure Review Committee, Department of Entomology (2009–2011)
- Faculty and Staff Awards Committee, Department of Biology (2008–current)
- Candidacy Committee, Department of Biology (2009–2016)
- Graduate Committee, Department of Biology (2007–2008)

Edinburgh

- Convener of Exam Board, Evolutionary Biology Honours (2005–2006)
- Convener of Exam Board, Zoology Honours (1999–2006)
- Convener of Exam Board, Animal Biology 2h, Parasite Biology 3M, and Behavioural Ecology 3M (1999–2006)
- Convener of Exam Board, Population and Community Ecology 3 (2004–2006)
- Chairman, Davis Trust Committee (2000–2006)
- Management Committee, Centre for Infectious Diseases (2003–2006)
- Management Advisory Group, ICAPB (1998–2004)
- SBS Animal Units Management Group (1999–2006)
- Steering Committee, School of Biology (1999–2003)
- Chairman of Examiners, Parasitology Honours (1999–2003)
- Faculty Research Staff Review Board (1999–2001)
- Member, University Disciplinary Tribunals and Grievance Committee (1999–2003)

FURTHER EDUCATION:

- Insights Programme: leadership and management development for senior academics, University of Edinburgh (2006)
- UK Home Office, Modules 1-3, Animal Licensing (2000)
- UK Home Office, Module 5 course, Animal Licensing (1999)
- Contract Researcher Initiative SHEFC Project (CRISP) Research Managers Workshop (1997)
- BBSRC Media Training Course (1997)
- Open University: Introduction to Calculus (1995), Mathematical Methods and Models (1996)
- Wellcome Trust Summer School 'Molecular Parasitology' (1990)

PUBLIC OUTREACH:

- 23rd Annual American Society for Microbiology Conference on Undergraduate Education (ASMCUE). Invited talk : *Overwhelming Evolution. Patients, Microbes and the Darwinian Process*. 2016. July.
- University Health Services, University Park. 2016. Invited seminar (Continuing Medical Education): *Antimicrobial resistance, patients and the Darwinian process*.
- 21st Annual Advances in Physiology & Pharmacology in Anesthesia and Critical Care, Wake Forest Baptist Medical Center NC held at the Hilton Head Island, SC. 2014. Special Lecture (Continuing Medical Education): *Our bugs are getting smarter, are we?*
- Eberly Family Distinguished Lecture, *Medicine and the (mis)Management of Evolution*. Penn State, 2015.
- Wissenschaftskolleg zu Berlin, Public Lecture *When Evolution Matters*. 2014.
- Coursera MOOC *Epidemic – the Dynamics of Infectious Diseases*. I am one of 8 PSU faculty involved in producing this course; I produced 8 videos and contributed to overall course design. Ran from October 2013. <https://www.coursera.org/course/epidemics>
- Palo Alto Institute <http://paloaltoinstitute.org/> Invited speaker, Evolutionary Medicine symposium. <https://www.paloaltoinstitute.org/events/evolutionary-medicine>. 2012.
- Invited speaker TedMed 2012 <http://www.youtube.com/watch?v=cvXc9aMF6CA>
- Member, NESCent Working Group “*Infusing Premedical and Medical Education with Evolutionary Thinking*”. This is aimed at developing model curricula and curricular Materials in Evolutionary Medicine. Participant, 2012-2013.
- Co-organizer and teaching faculty on CME course *Evolutionary Foundations for Medicine and Public Health* with special emphasis on Cancer and Infections. This week long course at the Mt Desert Island Biological Laboratories was designed primarily to introduce physicians, public health specialists and non-evolutionary biomedical scientists. 2012.

- ECoS Frontiers of Science public lecture in the series *Epidemic! Infectious Disease on a Changing Planet*. Viewable at <http://science.psu.edu/news-and-events/lectures-and-events/frontiers/watch-videos/epidemic/future-of-disease-in-pharmaceutical-age>. 2011.
- Penn State Physician CME Weekend, Annual Physician Alumni Gathering. (Invited lectures). 2010, 2013.
- Princeton University, Public lecture, *The Future of Infectious Disease in a Pharmaceutical Age* sponsored by Princeton University Press. 2010.
- Major contributor to BBC Horizon Documentary ‘Are humans still evolving?’. 2010.
- Pennsylvania Veterinary Medical Association, 9th Annual Spring Clinic. (Invited speaker). 2007.
- Festival of Science, British Association for the Advancement of Science (Invited public lecture). 2007
- International Congress of Parasitology, Glasgow (Invited public lecture). 2006.
- British Association for the Advancement of Science Media Fellow 2003. Six week placement with *The Irish Times*, Dublin, culminating in a week covering the BA Festival of Science. For full list of published stories, plus thoughts and a sample of published articles see <http://www.thereadgroup.net/author/andrew/>
- Acadia University, Canada. 17th Annual Huggins High School Science Seminar (Invited Keynote). 2002.
- Faculty of Science and Engineering, University of Edinburgh (Invited public lecture). 1997.

SABBATICAL S AND SIGNIFICANT LEAVE

- Department of Internal Medicine, Division of Infectious Diseases, University of Michigan Medical School (March-August 2014) (Research Leave).
- Wissenschaftskolleg zu Berlin (2006-7) (Sabbatical from University of Edinburgh)

INVITED CONFERENCE PRESENTATIONS AND RESEARCH SEMINARS:

2017

Marilyn’s meeting

Department of Microbiology, New York University School of Medicine (invited seminar). January.

2016

Penn State Hershey Medical School (invited, Grand Rounds).

Penn State MD/PhD Retreat (invited speaker).

NIH Rockview, MD (invited seminar).

ISGlobal, Barcelona (invited seminar).

2015

Georgetown University, Department of Biology (invited seminar)

NIH/NIGMS, Workshop: *Ecology’s Role in Population Genetics and Evolution*, Bethesda, MD (invited speaker)

Royal Society-National Academy of Sciences Sackler USA-UK Scientific Forum *Trends in Synthetic Biology and Gain of Function and Regulatory Implications* London (invited speaker)

Latsis Symposium, *Drug Resistance*, ETH Zurich, Switzerland (invited speaker).

Department of Ecology and Evolution, University of Lausanne, Switzerland (invited seminar).

Inaugural Meeting, Foundation for Evolution, Medicine and Public Health, Phoenix, AZ (invited speaker).

International Poultry Scientific Forum, Atlanta (Dendy Keynote Address).

2014

MEEGID XII – 12th International Conference on Molecular Epidemiology and Evolutionary Genetics of Infectious Disease, Bangkok, Thailand (Keynote speaker).

NSCent Celebration, Durham NC (Invited speaker).

Department of Ecology and Evolutionary Biology, University of Michigan (Invited seminar).

10th International Symposium on Marek’s Disease and Avian Herpesviruses, East Lansing, Michigan (accepted talk).

School of Public Health, Yale University (Invited seminar).

Department of Ecology and Evolutionary Biology, UCLA (Invited seminar).
Department of Life Sciences, EPFL, Switzerland (Invited seminar).
British Society for Parasitology, Annual Conference, Cambridge, UK (Invited speaker).
Department of Ecology and Evolutionary Biology, University of Michigan (Invited keynote, Young Investigator Symposium).
School of Life Sciences, Arizona State University (Invited seminar).
Department of Genetics, North Carolina State (Graduate student invited seminar).

2013

Department of Ecology and Evolutionary Biology, Yale University (Invited seminar).
Foundation Mérieux, Annecy France, Meeting, Vaccination: an evolutionary engine for species? (Invited speaker).
Drexel University College of Medicine, PA (Invited seminar).
Intecol Congress, London, UK (Invited Speaker).
Gordon Conference, Microbial Population Biology (Plenary speaker).
2nd International Biannual Evolution and Cancer Conference, UCSF (Plenary speaker).
American Society of Naturalists, Vice Presidential Symposium, Snowbird, Utah (Invited speaker).
British Society for Parasitology Annual Conference, Bristol, UK (Plenary conference speaker + Keynote speaker in the associated British Ecological Society Special Interest Symposium).
University of Chicago Medical School (Invited seminar).
Department of Ecology and Evolution, University of Chicago (Invited seminar).
Evolutionary Medicine Month, UCLA Medical School (Invited, Grand Rounds).

2012

Avian Disease and Oncology Laboratory, ARS, USDA, East Lansing, Michigan (invited seminar).
RAPIDD Drug Resistance and Coinfection Workshop, Princeton University (invited speaker).
Ecology and Evolution of Infectious Disease Annual Meeting, Berkeley (invited speaker).
Department of Ecology and Evolutionary Biology, Yale University (Invited seminar).
Division of Biology, Kansas State University (Invited seminar).
Department of Biology, University of Vermont (Invited seminar).
Institute for Science and Technology, Austria (Invited seminar).
Department of Pharmacology, University of Hawaii, Hilo (Invited seminar).

2011

Department of Biology, University of Bergen, Norway (Invited seminar).
Department of Biology, University of Rochester, NY (Invited seminar).
International Meeting on Malaria and Related Haemosporidian Parasites of Wildlife, NSF-sponsored Research Coordination Network for Haemosporida of Terrestrial Vertebrates (Plenary speaker).
American Association of Veterinary Parasitologists/Livestock Insect Workers Conference/International Symposium of Ectoparasites of Pets, St Louis, Missouri (Plenary speaker).
Laboratory of Parasitic Diseases, National Institutes of Health, Bethesda (Invited seminar).
Stanford University School of Medicine CA, Department of Microbiology and Immunology (Invited seminar).
Louis Thaler Lecture, IFR “Biodiversité”, Montpellier, France.
Department of Biological Sciences, Vanderbilt University, Nashville TN. (Invited seminar).
National Academy of Sciences Colloquium *In the Light of Evolution V: Cooperation*, Irvine CA (Invited speaker).

2010

Keystone Symposium, *Molecular Targets for Control of Vector-Borne Diseases: Bridging Lab and Field Research*, Copper Mountain, Colorado (Invited speaker)
Princeton University, Frontiers in Biology Public Seminar Series (Invited speaker).
Department of Ecology and Evolutionary Biology, Princeton University, NJ (Invited seminar).
Walter Reed Army Institute of Research, MD. (Invited, Distinguished Speakers Seminar Program)

2009

*Epidemics*² Conference, Athens, Greece, December (Invited keynote speaker).

University of Lausanne, Switzerland, Implications of Evolution for Human Health (Invited speaker).
Finnish Centre of Excellence in Evolutionary Research, University of Jyväskylä (Invited seminar).
Institute for Animal Health, Compton, UK (Invited seminar).
MITACS Summer School, Mathematics of Evolution and Invasions in Ecology and Epidemiology, Banff International
Research Station for Mathematical Innovation and Discovery (Invited speaker).
Department of Biology, University of Virginia (Invited seminar).

2008

American Museum of Natural History (Invited seminar).
Department of Molecular Microbiology and Immunology and the Division of Infectious Diseases of Johns Hopkins
University Medical Institutions (Invited seminar).
ESF Exploratory Workshop: Re-evaluating the extended phenotype paradigm in evolutionary biology. Copenhagen.
(Invited participant).
NIH National Institute of Allergy and Infectious Diseases Twinbrook Campus (Invited seminar).
Department of Entomology, University of Maryland (Invited seminar).
The American College of Epidemiology, Annual Meeting, Symposium: The Dawn of Evolutionary Epidemiology:
Applying Evolutionary Theory in an Epidemiologic Context. Tucson, AZ (Invited speaker)
Department of Biology, University of Notre Dame, IL (Invited seminar).
Ecology and Evolution of Infectious Disease Conference, Fort Collins, Colorado (Invited speaker)
Finnish Centre of Excellence in Evolutionary Research, University of Jyväskylä (Invited seminar).
Institute for Advanced Study, Berlin, Workshop: New Opportunities at the Evolution Medicine Interface (Invited
speaker).
Yale University, Symposium on Evolutionary Medicine (Invited speaker).

2007

XIth Congress of European Society for Evolutionary Biology. Uppsala, Sweden (Invited speaker).
ESF conference: The impact of the environment on innate immunity. Obergurgl, Austria (Invited speaker).
ETH Zurich, Switzerland (Invited seminar).
University of Emory, Atlanta, GA, USA, Dept of Biology (Invited seminar).
Penn State University, PA, USA, Dept of Biology (Invited seminar).
Wissenschaftskolleg zu Berlin, Germany (Invited seminar).

2006

Finnish Centre of Excellence in Evolutionary Research, University of Jyväskylä (Invited seminar).
European Molecular Biology Laboratory, 8th International EMBL PhD Student Symposium: Biology of Disease, A
Molecular Battlefield (Invited speaker).
University of Basel, Department of Biology (Invited seminar).

2005

Wellcome Trust Centre for Molecular Parasitology, University of Glasgow (Invited seminar).
Gordon Conference, Malaria, Oxford (Invited speaker).
Xth Congress of European Society for Evolutionary Biology, Krakow, Poland (Invited speaker).
Department of Biology, Queens University, Canada (Invited seminar).
Department of Zoology, University of Toronto, Canada (Invited seminar).
Centre for Discrete Mathematics and Theoretical Computer Science (DIMACS) Workshop on Evolutionary
Considerations in Vaccine Use. Rutgers University, New Jersey, USA.

2004

Journées Scientifiques, Laboratories «Functioning and Evolution of Ecological Systems» and «Evolutionary
Parasitology» Paris (invited speaker).
Jacques Monod Conference on Evolutionary Ecology of Host-Parasite Relationship. Roscoff, France (invited speaker).
7th International Symposium on Marek's disease. Oxford (Invited speaker).
Max Planck Institute for Limnology, Ploen, Germany (Invited seminar).
Ecology and Evolution of Infectious Diseases Meeting, Emory University, Atlanta, USA (Invited speaker).

2nd International Malaria Research Conference, Johns Hopkins Malaria Research Institute, Baltimore, USA (Invited speaker).
Society of Infectious Diseases and Foundation of Infectious Diseases of the Netherlands, Symposium, Vaccine safety and arthropod-borne viral encephalitis: cross-roads between public individual patient care and public health care. Utrecht, The Netherlands (Invited speaker).

2003

XXI Symposium Scandinavian Society for Parasitology. Bergen, Norway (Invited plenary speaker).
Latsis Symposium, Evolution, Immunity and Infectious Disease, ETH Zürich, Switzerland (Invited speaker).

2002

Dept of Biology, University of Lund, Sweden (Invited seminar).
Association for Tropical Biology, Panama (Invited speaker).
Centre for Infectious Diseases, University of Edinburgh, Annual Symposium (Invited speaker).
Department of Biology, Keele University, UK (Invited seminar).
Symposium of the NGW Vaccine Working group, The Netherlands. Vaccines and the Evolution of Virulence. UMC Utrecht, Holland (Invited speaker).
Centre for Ecology and Evolution, UCL, Institute of Zoology and Imperial College, Symposium: Evolutionary and ecological aspects of disease and parasitism (Invited speaker).
Burt Memorial Lecture, St Andrew's University, UK.
Department of Biology, University of Utah, USA (Invited seminar).
Keystone Symposium. Malaria's challenge: from infants to genomics to vaccines. Keystone, Colorado, USA (Invited speaker).

2001

VIIIth Congress of European Society for Evolutionary Biology. Aarhus, Denmark (Invited plenary).
Institute of Biological Sciences, University of Stirling, UK (Invited seminar).
Ecology Center, Department of Biology, University of Sunderland, UK (Invited seminar).
NERC Advances in Ecology Course, Imperial College at Silwood Park, UK (Invited seminar).
NERC Centre for Ecology and Hydrology, Banchory, Aberdeenshire, UK (Invited seminar).
Institute for Animal Health, Compton, UK (Invited seminar).
Association for Study of Animal Behaviour, Summer Conference, Interfacing Behaviour with Other Disciplines. Glasgow, UK (Invited speaker).
British Society for Parasitology, Autumn Symposium, Parasite Variation: Ecological and Immunological Consequences, London (Invited speaker).
Infectious Disease: Host-Pathogen Evolution. Hinxton Retreat, Wellcome Trust Genome Campus, Cambridge, UK (Invited Speaker).
Department of Biology and Centre for Integrative Study of Animal Behaviour, Indiana University, Bloomington, USA. W.D.Hamilton International Symposium (Invited speaker).
Wellcome Trust Centre for the Epidemiology of Infectious Disease, Zoology Department, University of Oxford, UK (Invited seminar).

2000

Oxford 2000: Joint Meeting of the British Society for Parasitology, The Royal Society of Tropical Medicine and Hygiene & The American Society for Tropical Medicine and Hygiene (Invited plenary).
Centre for Population Biology, Imperial College at Silwood Park, UK (Invited seminar).
Department of Biology, University of Sussex, UK (Invited seminar).

Last century (recorded from 1993)

Department of Experimental Ecology, ETH Zürich, Switzerland (Invited seminar). 1999.
Laboratory of Ecology, University of Montpellier, France ESF Workshop: The Evolutionary Biology of Host-Parasites Relationships: Models Meet Reality (Invited speaker). 1999.

University of Maryland and the Smithsonian Institution (NSF-Research Training Group), Washington D.C. USA, Symposium: Effects of Small Population Size on the Evolutionary and Ecological Dynamics of Parasitism (Invited speaker). 1998.

Department of Biomolecular Sciences, Wageningen University, The Netherlands . Symposium: Molecular Ecology (Invited speaker). 1998.

Baltic and Scandanvian Societies of Parasitology, Vilnius, Lithuania. Symposium: Ecology of Bird-Parasite Interactions (Invited speaker). 1998.

Department of Zoology, University of Uppsala, Sweden. ESF Workshop: Ecological Immunology (Invited speaker). 1998.

Department of Animal and Plant Sciences, University of Sheffield, UK (Invited seminar). 1998.

Zoological Laboratory, University of Groningen, The Netherlands Workshop: Ecological Immunology (Invited speaker). 1998.

International Institute for Advanced Systems Analysis, Laxemburg, Austria. Workshop: Virulence Management: Between Theory and Experiment (Invited speaker). 1997.

Department of Integrative Biology, University of Bâsel, Switzerland (Invited seminar). 1997.

Experimental Ecology, ETH Zürich and Department of Biology, University of Zürich (Invited seminar). 1997.

Max-Planck-Institute für Verhaltenphysiologie, Seewiesen, Germany. International Summer School, The Evolution of Sex (Invited speaker). 1997.

Department of Biology, University College London (Invited seminar). 1997.

Glasgow University Zoology Society (Invited seminar). 1997.

European Multicolloquium of Parasitology VII, Parma, Italy (Invited talk). 1996.

St Andrew's University Biology Society, UK (Invited seminar). 1995.

Uppsala University, Dept Zoology, Sweden (Two invited seminars). 1995.

Cambridge University, Zoology Department, Behaviour and Ecology Series (Invited seminar). 1995.

Department of Zoology, University of Otago, New Zealand, 6th Annual Student Colloquium (Invited keynote speaker). 1994.

Zoology Department, University of Otago, New Zealand (Invited seminar). 1994.

International Congress of Genetics, Birmingham, UK (Invited talk). 1993.

Andrew Fraser READ: PUBLICATIONS

pdfs: www.thereadgroup.net

MOST SIGNIFICANT PUBLICATIONS IN LAST DECADE

- Day, T., & **Read, A.F.** (2016). Does high-dose antimicrobial chemotherapy prevent the evolution of resistance? *PLoS Computational Biology* 12: e1004689.
- Read, A.F.**, Baigent, S.J., Powers, C., Kgosana, L.B., Blackwell, L., Smith, L.P., Kennedy, D.A., Walkden-Brown, S.W., & Nair, V.K. (2015). Imperfect vaccination can enhance transmission of highly virulent pathogens. *PLoS Biology* 13: e1002198.
- Huijben, S., Bell, A.S., Sim, D.G., Salathe, R., Tomasello, D., Mideo, N., Day, T. & **Read, A.F.** (2013). Aggressive chemotherapy and the selection of drug resistant pathogens. *PLoS Pathogens* 9:e1003578..
- Barclay, V.C., Sim, D., Chan, B.H.K., Nell, L.A., Rabaa, M.A., Bell, A.S., Anders, R.F. & **Read, A.F.** (2012). The evolutionary consequences of blood-stage vaccination on the rodent malaria *Plasmodium chabaudi*. *PLoS Biology* 10: e1001368.
- Read, A.F.**, Day, T. & Huijben, S. (2011). The evolution of drug resistance and the curious orthodoxy of aggressive chemotherapy. *Proceedings of the National Academy of Science USA* 108: 10871-10877.
- Read, A.F.**, Lynch, P.A. & Thomas, M.B. (2009). How to build an evolution-proof insecticide for malaria control. *PLoS Biology* 7: e1000058.
- Read, A.F.** & Mackinnon, M.J. (2008). Pathogen evolution in a vaccinated world. In: Stearns, S.C. & Koella, J. *Evolution in Health and Disease* 2nd ed. pp139-152. Oxford University Press.
- Wargo, A. R., Huijben, S., de Roode, J.C., Shepard, J. & **Read, A.F.** (2007). Competitive release and facilitation of drug resistant parasites following therapeutic chemotherapy in a rodent malaria model. *Proceedings of the National Academy of Science USA* 104: 19914-19919..
- Råberg, L., Sim, D. & **Read, A.F.** (2007). Disentangling genetic variation for resistance and tolerance to infectious diseases in animals. *Science* 318: 812-814.

PEER-REVIEWED PUBLICATIONS

Preprint Servers

Kennedy, D.A., Cairns, C., Jones, M.J., Bell, A.S., Salathe, R., Baigent, S.J., Nair, V.K., Dunn, P.A., & **Read A.F.** (submitted). Industry-wide surveillance of Marek's disease virus on commercial poultry farms: viral population dynamics underlying potential for virulence evolution and vaccine escape. <http://biorxiv.org/content/early/2016/09/14/075192>

In press

Hansen, E.A., Woods, R.J., & **Read, A.F.** (in press). On the use of a chemotherapeutic agent when resistance to it threatens the patient. *PLoS Biology*.

2016

201. Pandey, U., Bell, A.S., Renner, D.W., Kennedy, D.A., Shreve, J.T., Cairns, C.L., Jones, M.J., Dunn, P.A., Read, A.F., & Szpara, M.L. (2016). DNA from dust: comparative genomics of large DNA viruses in field surveillance samples. *mSphere* 1: e00132-16.
200. Greischar, M.A., Mideo, N., **Read, A.F.**, & Bjørnstad, O.N. (2016). Predicting optimal transmission investment in malaria parasites. *Evolution* 70:1542-1558.

199. Ohm, J.R., Teeple, J., Nelson, W.A., Thomas, M.B., **Read, A.F.**, & Cator, L.J. (2016). Fitness consequences of altered feeding behavior in immune-challenged mosquitoes. *Parasites and Vectors* 9:113. PMC4772315
198. Greischar, M.A., Mideo, N., **Read, A.F.**, & Bjørnstad, O.N. (2016). Quantifying transmission investment in malaria parasites. *PLoS Computational Biology* 12: e1004718. PMC4759450
197. Mideo, N., Bailey, J.A., Hathaway, N.J., Ngasala, B., Saunders, D.L., Lon, C., Kharabora, O., Jamnik, A., Balasubramanian, S., Björkman, A., Mårtensson, A., Meshnick, S.R., **Read, A.F.**, & Juliano, J.J. (2016). A deep sequencing tool for assessing clearance by antimalarials in polyclonal infections. *Evolution, Medicine and Public Health* 2016:21-36. PMC4753362
196. Kennedy, D.A., Kurath, G., Brito, I.L., Purcell, M.K., **Read, A.F.**, Winton, J.R., & Wargo, A.R. (2016). Potential drivers of virulence evolution in aquaculture. *Evolutionary Applications* 9(2): 344-354. doi: 10.1111/eva. PMC4721074
195. Day, T., & **Read, A.F.** (2016). Does high-dose antimicrobial chemotherapy prevent the evolution of resistance? *PLoS Computational Biology* 12: e1004689. PMC4731197

2015

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