

ANDREA LINN GRAHAM

Department of Ecology & Evolutionary Biology, Princeton University
Princeton, NJ; 08544-2016 USA (+1) 609-258-6703
algraham@princeton.edu <http://algraham.princeton.edu/>

EDUCATION

- 1995-2001 Ph.D. in Ecology & Evolutionary Biology; Cornell University
Thesis: *Heterogeneous distribution of infection and disease among hosts of avian and human schistosomes*
Modern Approaches to the Epidemiology & Control of Infectious Diseases; Oxford University, 1997
Biology of Parasitism: Modern Approaches; Marine Biological Laboratory, Woods Hole, 1996
- 1988-1992 A.B. *Summa cum laude* in Biological Sciences & Sculpture; Mount Holyoke College
Thesis: *Multiple-scale ecology of the koala (Phascolarctos cinereus) infected with Chlamydia psittaci*

EMPLOYMENT

- 2019-now Professor of Ecology & Evolutionary Biology
Princeton University; Department of Ecology & Evolutionary Biology
Assistant Professor (2009-14); Associate Professor (2015-18)
Affiliated Faculty of the Center for Health & Wellbeing
Affiliated Faculty of the High Meadows Environmental Institute
- 2016-2017 Gästprofessorin
ETH Zürich; Institute of Integrative Biology, Theoretical Biology Group
- 2006-2010 David Phillips Research Fellow, Biotechnology & Biological Sciences Research Council
University of Edinburgh; Institutes of Evolution, Immunology & Infection Research
- 2004-2006 Early Career Fellow, Leverhulme Trust
University of Edinburgh; Institutes of Evolution, Immunology & Infection Research
- 2001-2004 Wellcome Trust Post-doctoral Research Associate in Evolutionary Immunology
University of Edinburgh; Institute of Cell, Animal, & Population Biology
- 1996-2001 Howard Hughes Medical Institute Pre-doctoral Fellow in Biostatistics & Epidemiology
Cornell University; Department of Ecology & Evolutionary Biology
- 1993-1995 Summer Research Assistant in Invertebrate Paleontology
American Museum of Natural History; Department of Invertebrates
- 1993-1995 High School Teacher of Investigating (Scientific Method) and Inventing (Sculpture)
New York City Public Schools; Urban Academy
- 1990-1991 Research Assistant in the Epidemiology of Koala Chlamydiosis
University of Queensland, Australia; Koala Conservation Project
- 1989-1990 Summer Research Assistant in the Endocrinology of Diabetes
University of Colorado, Denver; Childhood Diabetes Foundation

HONORS & AWARDS

2025	Phi Beta Kappa Teaching Award
2024	International Professorship Award, The Leverhulme Trust (declined)
2023-24	NIH Pioneer Award Finalist 2X for my comparative immunology project
2020	Elected Fellow of the American Association for the Advancement of Science
2018	Kavli Frontiers of Science Fellow; Kavli Foundation & U.S. National Academy of Sciences
2017	Role Model Award; Leibniz Institute for Zoo & Wildlife Research, Berlin, Germany
2016	Gästprofessorship; ETH Zürich, Switzerland
2015-16	NIH Pioneer Award Semi-Finalist 2X for my rewilding project
2014	Student-Invited Speaker in Immunology; University of British Columbia, Canada
2012-14	Distinguished Visiting Lecturer in Evolutionary Medicine 2X; Yale University
2011	Honorary Speaker for the Postgraduate Society; Doñana Biological Station, Spain
2006	BBSRC David Phillips Fellowship Award
2004	Leverhulme Trust & School of Biological Sciences Early Career Fellowship Award
2003	Wellcome Trust Value in People (VIP) Award
1996	HHMI and NSF Pre-doctoral Fellowship Awards (declined the NSF award)
1996	Burroughs-Wellcome Tuition Award and Cornell University stipend for Woods Hole course
1994	Maurice Hexter Award for Excellence in Teaching in the New York City Public Schools
1992	Election to honor societies Phi Beta Kappa and Sigma Xi
1992	Book awards for overall academic ranking and outstanding senior thesis
1990	Clare Boothe Luce Undergraduate Scholarship for Women in Science

PUBLICATIONS IN REFEREED JOURNALS

For further details or links please see [ORCID ID 0000-0002-6580-2755](https://orcid.org/0000-0002-6580-2755) or [My Bibliography \(NCBI\)](#) or [my website](#) (including for links to preprints, which are superseded here by the peer reviewed versions).

Please note: § denotes equal contributions of designated authors; underlining denotes undergraduate author

- 112) §C. J. E. Metcalf, §**A. L. Graham**, §A. J. Yates, & §D. A. T. Cummings. **2025**. Convergence and divergence of individual immune responses over the life course. *Science* 389: 604-09.
- 111) D. I. Bolnick, L. E. Fuess, **A. L. Graham**, I. Khan, N. C. Steinel, & G. J. Vaziri. **2025**. Evolutionary immunology. *Annual Review of Ecology, Evolution, & Systematics* 56: 27-51.
- 110) Y-H. Chen, K. Zaldaña, F. Yeung, I. Vujkovic-Cvijin, A. E. Downie, J-D. Lin, Y. Yang, C. Herrmann, O. Oyesola, F. Rozenberg, R. Schwartz, D. Kim, Y. Belkaid, P. Loke, **A. L. Graham**, S. B. Koralov, & K. Cadwell. **2025**. Rewilding catalyzes maturation of the humoral immune system. *Science Advances* 11: eads2364.
- 109) B. Rehermann, **A. L. Graham**, D. Masopust, & S. E. Hamilton. **2025**. Integrating natural commensals and pathogens into preclinical research models. *Nature Reviews Immunology* 25: 385-397.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 108) A. Menezes, J. A. Hay, R. Razafindratsimandresy, A. H. Randriamanantena, L. Yang, J.-M. Héraud, S. Cauchemez, A. Wesolowski, B. T. Grenfell, **A. L. Graham** & C. J. E. Metcalf. **2025**. Revealing trends in measles immunity during periods of varying measles circulation in Madagascar. *American Journal of Epidemiology* 194: kwaf005.
- 107) G. F. Albery, D. J. Becker, J. A. Firth, M. Silk, A. R. Sweeny, E. Vander Wal, Q. Webber, B. Allen, S. A. Babayan, S. Barve, M. Begon, R. J. Birtles, T. A. Block, B. A. Block, J. E. Bradley, S. Budischak, C. Buesching, S. J. Burthe, A. B. Carlisle, J. E. Caselle, C. Cattuto, A. S. Chaine, T. Chapple, B. J. Cheney, T. Clutton-Brock, M. Collier, D. J. Curnick, R. J. Delahay, D. R. Farine, A. Fenton, F. Ferretti, H. Fielding, V. Foroughirad, C. Frere, M. G. Gardner, E. Geffen, S.S. Godfrey, **A. L. Graham**, P. S. Hammond, M. Henrich, M. Heurich, P. Hopwood, A. Ilany, J. A. Jackson, N. Jackson, D. Jacoby, A.-M. Jacoby, M. Jezek, L. Kirkpatrick, A. Klamm, J. A. Klarevas-Irby, S. Knowles, L. Koren, E. Krzyszczyk, J. M. Kusch, X. Lambin, J. E. Lane, H. Leirs, S. T. Leu, B. E. Lyon, D. W. MacDonald, A. E. Madsen, J. Mann, M. Manser, J. Marien, A. Massawe, R. A. McDonald, K. Morelle, J. Mourier, C. Newman, K. Nussear, B. Nyaguthii, M. Ogino, L. Ozella, Y. Papastamatiou, S. Paterson, E. Payne, A. B. Pedersen, J. M. Pemberton, N. Pinter-Wollman, S. Planes, A. Raulo, R. Rodriguez-Munoz, C. Sabuni, P. Sah, R. J. Schallert, B. C. Sheldon, D. Shizuka, A. Sih, D. L. Sinn, V. Sluydts, O. Spiegel, S. Telfer, C. A. Thomason, D. M. Tickler, T. Tregenza, K. VanderWaal, E. L. Walters, K. M. Wanelik, E. Wielgus, J. Wilson-Aggarwal, C. Wohlfeil, & S. Bansal. **In press**. Density-dependent network structuring within and across wild animal systems. *Nature Ecology & Evolution*.
- 106) A. Menezes, S. L. Razafimahatratra, O. Wariri, **A. L. Graham**, & C. J. E. Metcalf. **2025**. Strengthening serological studies: The need for greater geographical diversity, biobanking, and data-accessibility for future serological studies. *Trends in Microbiology* 15 Jan: 842X(24)00322-6.
- 105) **A. L. Graham** & R. R. Regoes. **2024**. Dose-dependent interaction of parasites with tiers of host defense predicts “wormholes” that prolong infection at intermediate inoculum sizes. *PLoS Computational Biology* 20: e1012652.
- 104) C. E. Cressler, D. Metz, D. Chang van Oordt, & **A. L. Graham**. **2024**. Immunological feedback loops generate parasite persistence thresholds that explain variation in infection duration. *Proceedings of the Royal Society Series B* 291: 20240934.
- 103) §O. Oyesola, §A. E. Downie, R. S. Barre, N. Howard, K. Kiwanuka, K. Zaldaña, Y-H. Chen, A. Menezes, S. C. Lee, J. Devlin, O. P. Mondragon, C. O. S. Souza, C. Herrmann, S. B. Korolov, K. Cadwell, §**A. L. Graham** & §P. Loke. **2024**. Genetic and environmental interactions contribute to immune variation in rewilded mice. *Nature Immunology* 25: 1270–82.
- Report:** Q. Liu et al. **2024**. Leveraging dirty mice that have microbial exposure to improve preclinical models of human immune status and disease. *Nature Immunology* 25: 947-50.
- Research Briefing:** O. Oyesola & P. Loke. **2024**. Genetics determines how environmental change alters immune phenotypes. *Nature Immunology* 25: 1138–39.
- 102) A. E. Downie, R. S. Barre, A. Robinson, J. Yang, Y-H. Chen, J-D. Lin, O. Oyesola, F. Yeung, K. Cadwell, P. Loke, & **A. L. Graham**. **2024**. Assessing immune phenotypes using simple proxy measures: Promise and limitations. *Discovery Immunology* 3: kyae010.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 101) C. M. Saad-Roy, S. E. Morris, M. Boots, R. E. Baker, B. L. Lewis, J. Farrar, M. V. Marathe, **A. L. Graham**, S. A. Levin, C. E. Wagner, C. J. E. Metcalf & B. T. Grenfell. **2024**. Impact of waning immunity against SARS-CoV-2 severity exacerbated by vaccine hesitancy. *PLoS Computational Biology* 20: e1012211.
- 100) I. Valles-Vega, J. C. Pérez-Urbiola, D. Tovar-Ramírez, **A. L. Graham**, T. Sicard-González & F. Ascencio. **2024**. Immune response of the Almaco jack (*Seriola rivoliana*) against infestation with *Neobenedenia* sp. in three cultivated temperatures. *Parasitology Research* 123: 127.
- 99) §A. E. Downie, §O. Oyesola, R. S. Barre, Q. Caudron, Y-H. Chen, E. J. Dennis, R. Garnier, K. Kiwanuka, A. Menezes, D. J. Navarrete, O. Mondragon Palomino, J. B. Saunders, C. K. Tokita, K. Zaldaña, K. Cadwell, §P. Loke & §**A. L. Graham**. **2023**. Spatiotemporal-social association predicts immunological similarity in rewilded mice. *Science Advances* 9: eadh8310.
- 98) Y-H. Chen, F. Yeung, K. A. Lacey, K. Zaldaña, J-D. Lin, G. C. Wei Bee, C. McCauley, R. S. Barre, C. B. Hansen, A. E. Downie, J. N. Weiser, V. J. Torres, R. J. Bennett, §P. Loke, §**A. L. Graham** & §K. Cadwell. **2023**. Rewilding of laboratory mice enhances granulopoiesis and immunity through intestinal fungal colonization. *Science Immunology* 8: eadd6910.
- 97) L. F. Wait, S. R. Johnson, K. M. Nelson, R. B. Chipman, F. E. Pogmore, A. P. Dobson & **A. L. Graham**. **2023**. Demographic, environmental, and physiological predictors of gastrointestinal parasites in urban raccoons. *International Journal for Parasitology: Parasites & Wildlife* 21: 116-28.
- 96) A. Menezes, S. Takahashi, I. Routledge, C. J. E. Metcalf, **A. L. Graham** & J. A. Hay. **2023**. *serosim*: an R package for simulating serological data arising from vaccination, epidemiological and antibody kinetics processes. *PLoS Computational Biology* 19: e1011384.
- 95) E. C. Schrom II, A. Kinzig, S. E. Forrest, A. L. Graham, S. A. Levin, C. T. Bergstrom, C. Castillo-Chavez, J. P. Collins, R. J. de Boer, A. Doupe, R. Ensafi, S. Feldman, B. T. Grenfell, J. A. Halderman, S. Huijben, C. Maley, M. Moses, A. S. Perelson, C. Perrings, J. Plotkin, J. Rexford & M. Tiwari. **2023**. Challenges in cybersecurity: Lessons from biological defense systems. *Mathematical Biosciences* 362: 109024.
- 94) C. M. Saad-Roy, S. E. Morris, R. E. Baker, J. Farrar, **A. L. Graham**, S. A. Levin, C. E. Wagner, C. J. E. Metcalf & B. T. Grenfell. **2023**. Medium-term scenarios of COVID-19 as a function of immune uncertainties and chronic disease. *Journal of the Royal Society Interface* 20: 20230247.
- 93) **A. L. Graham**, E. C. Schrom II & C. J. E. Metcalf. **2022**. The evolution of powerful yet perilous immune systems. *Trends in Immunology* 43: 117-31.
- 92) E. Mitchell, **A. L. Graham**, F. Ubeda & G. Wild. **2022**. On maternity and the stronger immune response in women. *Nature Communications* 13: 4858.
- 91) **A. L. Graham**. **2021**. Naturalizing mouse models for immunology. *Nature Immunology* 22: 111-17.
- 90) A. E. Downie, A. Mayer, C. J. E. Metcalf & **A. L. Graham**. **2021**. Optimal immune specificity at the intersection of host life history & parasite epidemiology. *PLoS Computational Biology* 17: e1009714.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 89) §C. E. Wagner, §C. M. Saad-Roy, S. E. Morris, R. E. Baker, M. J. Mina, J. Farrar, E. C. Holmes, O. G. Pybus, **A. L. Graham**, E. J. Emanuel, S. A. Levin, C. J. E. Metcalf & B. T. Grenfell. **2021**. Vaccine nationalism and the dynamics and control of SARS-CoV-2. *Science* 373: eabj7364.
- 88) L. F. Wait, T. Kamiya, K. J. Fairlie-Clarke, C. J. E. Metcalf, **A. L. Graham** & N. Mideo. **2021**. Differential drivers of intraspecific and interspecific competition during malaria-helminth co-infection. *Parasitology* 148: 1030-39.
- 87) C. M. Saad-Roy, S. E. Morris, C. J. E. Metcalf, M. J. Mina, R. E. Baker, J. Farrar, E. C. Holmes, O. G. Pybus, **A. L. Graham**, S. A. Levin, B. T. Grenfell & C. E. Wagner. **2021**. Epidemiological and evolutionary considerations of SARS-CoV-2 vaccine dosing regimes. *Science* 372: 363-70.
- 86) E. C. Schrom II, S. A. Levin & **A. L. Graham**. **2020**. Quorum sensing via dynamic cytokine signaling comprehensively explains divergent patterns of effector choice among helper T cells. *PLoS Computational Biology* 16: e1008051.
- 85) L. F. Wait, A. P. Dobson & **A. L. Graham**. **2020**. Do parasite infections interfere with immunisation? A review and meta-analysis. *Vaccine* 38: 5582-90.
- 84) §J. Bär, §J. M. Leung, C. B. Hansen, P. Loke, A. R. Hall, L. Conour & **A. L. Graham**. **2020**. Strong effects of lab-to-field environmental transitions on the intestinal bacterial microbiota of *Mus musculus* are modulated by *Trichuris muris* infection. *FEMS Microbiology Ecology* 96: fiae167.
- 83) C. J. E. Metcalf, B. T. Grenfell & **A. L. Graham**. **2020**. Disentangling the dynamical underpinnings of differences in SARS-CoV-2 pathology using within-host ecological models. *PLoS Pathogens* 16: e1009105.
- 82) §A. Sweeny, §C. Thomason, E. Carbajal, C. B. Hansen, **A. L. Graham** & A. B. Pedersen. **2020**. Experimental parasite community perturbation reveals associations between Sin Nombre virus and gastrointestinal nematodes in a rodent reservoir host. *Biology Letters* 16: 20200604.
- 81) §F. Yeung, §Y-H. Chen, §J-D. Lin, J. M. Leung, C. McCauley, J. C. Devlin, C. B. Hansen, A. Cronkite, Z. Stephens, C. Drake-Dunn, K. V. Ruggles, J. L. Round, §P. Loke, §**A. L. Graham** & §K. Cadwell. **2020**. Altered immunity of laboratory mice in the natural environment is associated with fungal colonization. *Cell Host & Microbe* 27: 809-22.
- Preview:** M. Wu & D. L. Kasper. **2020**. When lab mice go wild, fungi are in play. *Cell Host & Microbe* 27: 687-88.
- 80) §J-D. Lin, §J. C. Devlin, §F. Yeung, C. McCauley, J. M. Leung, Y-H. Chen, A. Cronkite, C. B. Hansen, C. Drake-Dunn, K. V. Ruggles, §K. Cadwell, §**A. L. Graham** & §P. Loke. **2020**. Rewilding *Nod2* and *Atg16l1* mutant mice uncovers genetic and environmental contributions to microbial responses and immune cell composition. *Cell Host & Microbe* 27: 830-40.
- 79) C. J. E. Metcalf, O. Roth & **A. L. Graham**. **2020**. Why leveraging sex differences in immune tradeoffs may illuminate the evolution of senescence. *Functional Ecology* 34: 129-40.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 78) C. E. Brook, M. Boots, K. Chandran, A. P. Dobson, C. Drosten, **A. L. Graham**, B. T. Grenfell, M. A. Müller, M. Ng, L-F Wang & A. van Leeuwen. **2020**. Accelerated viral dynamics in bat cell lines, with implications for zoonotic emergence. *eLife* 9: e48401.
- 77) §C. M. Saad-Roy, §C. E. Wagner, R. E. Baker, S. E. Morris, J. Farrar, **A. L. Graham**, S. A. Levin, M. J. Mina, C. J. E. Metcalf & B. T. Grenfell. **2020**. Immune life-history, vaccination and the dynamics of SARS-CoV-2 over the next five years. *Science* 370: 811-18.
- 76) L. R. Gesquiere, B. Habig, C. B. Hansen, A. Li, K. Freid, N. H. Learn, S. C. Alberts, **A. L. Graham** & E. A. Archie. **2020**. Non-invasive measurement of mucosal immunity in a free-ranging baboon population. *American Journal of Primatology* 82: e23093.
- 75) A. van Leeuwen, S. A. Budischak, **A. L. Graham** & C. E. Cressler. **2019**. Parasite resource manipulation drives bimodal variation in infection duration. *Proceedings of the Royal Society, Series B* 286: 20190456.
- 74) E. C. Cope, M. Opendak, E. A. LaMarca, S. Murthy, C. Y. Park, L. B. Olson, S. Martinez, J. M. Leung, §**A. L. Graham** & §E. Gould. **2019**. The effects of living in an outdoor enclosure on hippocampal plasticity and anxiety-like behavior in response to nematode infection. *Hippocampus* 29: 366-77.
- Spotlight:** J. C. Savage & M. E. Tremblay. **2019**. Studying laboratory mice – Into the wild. *Trends in Neuroscience* 42: 566-68.
- Cover image:** Volume 29 Issue 4 of *Hippocampus*.
- 73) J. M. Leung, S. A. Budischak, H. Chung The, C. B. Hansen, R. Bowcutt, R. Neill, M. Shellman, P. Loke & **A. L. Graham**. **2018**. Rapid environmental effects on gut nematode susceptibility in rewilded mice. *PLoS Biology* 16: e2004108.
- Article for kids:** J. M. Leung et al. **2018**. What happens if we take laboratory mice outside? *Biomedical Science Journal for Kids* 4: 1-5.
- News Feature:** C. Beans. **2018**. What happens when lab animals go wild. *Proceedings of the National Academy of Sciences* 115: 3196-99.
- News Feature:** C. Willyard. **2018**. Send in the germs. *Nature* 556: 16-18.
- Highlight:** Z. Fehervari. **2018**. A more natural response. *Nature Immunology* 19: 511.
- Featured article:** *PLoS Biology* homepage, week of 8 March 2018
- Faculty of 1000 recommendation:** Ecology
- 72) S. A. Budischak, A. E. Wiria, F. Hamid, L. J. Wammes, M. M. Kaiser, L. van Lieshout, E. Sartono, T. Supali, M. Yazdanbakhsh & **A. L. Graham**. **2018**. Competing for blood: the ecology of parasite resource competition in human malaria-helminth co-infections. *Ecology Letters* 21: 536-45.
- 71) C. J. E. Metcalf & **A. L. Graham**. **2018**. Schedule and magnitude of reproductive investment under immune tradeoffs explains sex differences in immunity. *Nature Communications* 9: 4391.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 70) E. C. Schrom II, J. M. Prada & **A. L. Graham**. 2018. Immune signaling networks: Sources of robustness and constrained evolvability during coevolution. *Molecular Biology & Evolution* 35: 676–87.

Faculty of 1000 recommendation: Bioinformatics & Computational Biology

- 69) S. A. Budischak, C. B. Hansen, Q. Caudron, R. Garnier, T. R. Kartzinel, I. Pelczer, C. Cressler, A. van Leeuwen & **A. L. Graham**. 2018. Feeding immunity: physiological and behavioral responses to infection and resource limitation. *Frontiers in Immunology* 8: 1914.

- 68) J. M. Leung, **A. L. Graham** & S. C. L. Knowles. 2018. Parasite-microbiota interactions with the vertebrate gut: Synthesis through an ecological lens. *Frontiers in Microbiology* 9: 843.

- 67) R. Garnier, C. Cheung, K. A. Watt, J. K. Pilkington, J. M. Pemberton & **A. L. Graham**. 2017. Joint associations of blood plasma proteins with overwinter survival of a large mammal. *Ecology Letters* 20: 175-83.

- 66) A. T. Tate & **A. L. Graham**. 2017. Dissecting the contributions of time and microbe density to variation in immune gene expression. *Proceedings of the Royal Society, Series B* 284: 20170727.

- 65) E. C. Schrom & **A. L. Graham**. 2017. Instructed subsets or agile swarms? How T-helper cells may adaptively counter uncertainty with variability and plasticity. *Current Opinion in Genetics & Development* 47: 75-82.

- 64) C. J. E. Metcalf, A. T. Tate & **A. L. Graham**. 2017. Demographically framing tradeoffs between sensitivity and specificity illuminates selection on immunity. *Nature Ecology & Evolution* 1: 1766–72.

News & views: S. Cobey. 2017. Sick if you do, sick if you don't. *Nature Ecol Evol* 1: 1602-03.

- 63) A. T. Tate, P. Andolfatto, J. Demuth & **A. L. Graham**. 2017. The within-host dynamics of infection in trans-generationally primed flour beetles. *Molecular Ecology* 26: 3794–807.

News & views: J. Kurtz & S. A. O. Armitage. 2017. Dissecting the dynamics of trans-generational immune priming. *Molecular Ecology* 26: 3857–59.

- 62) R. Garnier, A. Bento, C. B. Hansen, J. G. Pilkington, J. M. Pemberton & **A. L. Graham**. 2017. Physiological proteins in resource-limited herbivores experiencing a population die-off. *Naturwissenschaften (The Science of Nature)* 104: 68.

- 61) §Q. Caudron, §R. Garnier, J. G. Pilkington, K. A. Watt, C. B. Hansen, B. T. Grenfell, T. Aboellail & **A. L. Graham**. 2017. Robust extraction of quantitative structural information from high-variance histological images of livers from necropsied Soay sheep. *Royal Society Open Science* 4: 170111.

- 60) R. K. Plowright, C. R. Parrish, H. McCallum, P. J. Hudson, A. I. Ko, **A. L. Graham** & J. O. Lloyd-Smith. 2017. Pathways to zoonotic spillover. *Nature Reviews Microbiology* 15: 502-10.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 59) M. Kennedy, **A. L. Graham** & A. T. Tate. **2017**. Relative contributions of environmental and maternal factors to trans-generational immune priming in *Tribolium castaneum*. *Ecological Entomology* 42: 100-04.
- 58) K. M. Pepin, S. L. Kay, B. Golas, S. S. Shriner, A. T. Gilbert, R. S. Miller, **A. L. Graham**, S. Riley, P. Cross, M. D. Samuel, M. Hooten, J. Hoeting, J. O. Lloyd-Smith, C. T. Webb & M. G. Buhnerkempe. **2017**. Inferring infection hazard in wildlife populations by linking data across individual and population scales. *Ecology Letters* 20: 275-92.
- 57) §**A. L. Graham**, §D. H. Nussey, J. O. Lloyd-Smith, D. Longbottom, M. Maley, J. M. Pemberton, J. G. Pilkington, K. C. Prager, L. Smith, K. A. Watt, K. Wilson, §T. N. McNeilly & §F. Brulisauer. **2016**. Exposure to viral and bacterial pathogens among Soay sheep of the St. Kilda archipelago. *Epidemiology & Infection* 144: 1879-88.
- 56) R. Garnier, B. T. Grenfell, A. Nisbet, J. B. Matthews & **A. L. Graham**. **2016**. Integrating immune mechanisms to model nematode worm burden: an example in sheep. *Parasitology* 143: 894-904.
- 55) J. K. Peterson & **A. L. Graham**. **2016**. What is the “true” effect of *Trypanosoma rangeli* on its triatomine bug vector? *Journal of Vector Ecology* 41: 27-33.
- 54) J. M. Leung, T. T. H. Chau, H. D. T. Nghia, N. T. Hoa, N. V. Cuong, N. N. M. Chau, N. H. M. Dinh, S. C. L. Knowles, M. Wolbers, L. T. H. Nhat, G. E. Thwaites, **A. L. Graham** & S. Baker. **2016**. The impact of albendazole treatment on the incidence of viral- and bacterial-induced diarrhea in school children in southern Vietnam: study protocol for a randomized controlled trial. *Trials* 17: 279.
- 53) R. Subramanian, **A. L. Graham**, B. T. Grenfell & N. Arinaminpathy. **2016**. Universal or specific? A modeling-based comparison of broad-spectrum influenza vaccines against conventional, strain-matched vaccines. *PLoS Computational Biology* 12: e1005204.
- 52) J. K. Peterson, **A. L. Graham**, R. J. Elliott, A. P. Dobson & O. Triana Chávez. **2016**. *Trypanosoma cruzi*-*Trypanosoma rangeli* co-infection ameliorates negative effects of single trypanosome infections in experimentally infected *Rhodnius prolixus*. *Parasitology* 143: 1157-67.
- 51) C. J. E. Metcalf, **A. L. Graham**, M. Martinez-Bakker & D. Z. Childs. **2016**. Opportunities and challenges of Integral Projection Models for modeling host-parasite dynamics. *Journal of Animal Ecology* 85: 343-55.
- 50) C. J. E. Metcalf, J. Farrar, F. Cutts, N. Basta, **A. L. Graham**, J. Lessler, N. Ferguson, D. Burke & B. T. Grenfell. **2016**. Use of serological surveys to generate key insights into the changing global landscape of infectious disease. *The Lancet* 388: 728-30.
- 49) §E. Griffiths, §K. J. Fairlie-Clarke, J. E. Allen, C. J. E. Metcalf & **A. L. Graham**. **2015**. Bottom-up regulation of malaria population dynamics in mice co-infected with lung-migratory nematodes. *Ecology Letters* 18: 1387–96.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 48) A. T. Tate & **A. L. Graham**. 2015. Trans-generational priming of resistance in wild flour beetles reflects the primed phenotypes of laboratory populations and is inhibited by co-infection with a common parasite. *Functional Ecology* 29: 1059-69.
- 47) K. J. Fairlie-Clarke, C. B. Hansen, J. E. Allen & **A. L. Graham**. 2015. Increased exposure to *Plasmodium chabaudi* antigens sustains cross-reactivity and avidity of antibodies binding *Nippostrongylus brasiliensis*: dissecting cross-phylum cross-reactivity in a rodent model. *Parasitology* 142: 1703-14.
- 46) A. T. Tate & **A. L. Graham**. 2015. Dynamic patterns of parasitism and immunity across host development influence optimal strategies of resource allocation. *American Naturalist* 186: 495-512.
- 45) O. Restif & **A. L. Graham**, Eds. 2015. Within-host dynamics of infection: From ecological insights to evolutionary predictions. *Philosophical Transactions of the Royal Society, Series B* 370: 20140304. Special issue: <http://rstb.royalsocietypublishing.org/content/370/1675.toc>
- 44) C. E. Cressler, **A. L. Graham** & T. Day. 2015. Evolution of hosts paying manifold costs of defence. *Proceedings of the Royal Society, Biological Sciences* 282: 20150065.
- 43) C. J. E. Metcalf, M. Ferrari, **A. L. Graham** & B. T. Grenfell. 2015. Understanding herd immunity. *Trends in Immunology* 36: 753-55.
- 42) J. K. Peterson, **A. L. Graham**, A. P. Dobson & O. Triana Chávez. 2015. *Rhodnius prolixus* life history outcomes differ when infected with different *Trypanosoma cruzi* I strains. *American Journal of Tropical Medicine & Hygiene* 93: 564-72.
- 41) A. D. Hayward, D. H. Nussey, A. J. Wilson, C. Berenos, J. G. Pilkington, K. A. Watt, J. M. Pemberton & **A. L. Graham**. 2014. Natural selection on individual variation in tolerance of gastrointestinal nematode infection. *PLoS Biology* 12: e1001917.
- Featured article:** *PLoS Biology* homepage and blog, week of 29 July 2014
Primer: L. Raberg. 2014. How to live with the enemy: Understanding tolerance to parasites. *PLoS Biology* 12: e1001989.
- 40) A. D. Hayward, R. Garnier, K. A. Watt, J. G. Pilkington, B. T. Grenfell, J. B. Matthews, J. M. Pemberton, D. H. Nussey & **A. L. Graham**. 2014. Heritable, heterogeneous and costly resistance of sheep against nematodes and potential feedbacks to epidemiological dynamics. *American Naturalist* 184: S58-76.
- 39) D. H. Nussey, K. A. Watt, A. Clark, J. G. Pilkington, J. M. Pemberton, **A. L. Graham** & T. McNeilly. 2014. Multivariate immune defences and fitness in the wild: Complex but ecologically important associations among different plasma antibodies, host health and survival. *Proceedings of the Royal Society, Biological Sciences* 281: 20132931.
- 38) R. Garnier & **A. L. Graham**. 2014. Insights from parasite-specific serological tools in eco-immunology. *Integrative and Comparative Biology* 54: 363-76.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 37) E. Y. Klein, **A. L. Graham**, M. Llinas & S. Levin. **2014**. Cross-reactive immune responses as primary drivers of malaria chronicity. *Infection and Immunity* 82: 140-51.
- 36) **A. L. Graham**, Ed. **2013**. Optimal immunity meets natural variation: the evolutionary biology of host defence. *Parasite Immunology* 35: 315-17.
Special issue: <http://onlinelibrary.wiley.com/doi/10.1111/pim.2013.35.issue-11/issuetoc>
- 35) K. J. Fairlie-Clarke, J. E. Allen, A. F. Read & **A. L. Graham**. **2013**. Quantifying variation in the potential for antibody-mediated apparent competition among nine genotypes of the rodent malaria parasite *Plasmodium chabaudi*. *Infection, Genetics and Evolution* 20: 270-75.
- 34) C. McCaig, A. Fenton, **A. L. Graham**, C. Shankland & R. Norman. **2013**. Using process algebra to develop predator-prey models of within-host parasite dynamics. *Journal of Theoretical Biology* 329: 74-81.
- 33) E. A. Brown, J. G. Pilkington, D. H. Nussey, K. A. Watt, A. D. Hayward, R. Tucker, **A. L. Graham**, S. Paterson, D. Beraldi, J. M. Pemberton & J. Slate. **2013**. Detecting genes for variation in parasite burden and immunological traits in a wild population: testing the candidate gene approach. *Molecular Ecology* 22: 757-73.
- 32) C. J. E. Metcalf, G. H. Long, N. Mideo, J. D. Forester, O. N. Bjørnstad & **A. L. Graham**. **2012**. Revealing mechanisms underlying variation in malaria virulence: effective propagation and host control of uninfected red blood cell supply. *Journal of the Royal Society Interface* 9: 2804-13.
- 31) S. K. J. R. Auld, **A. L. Graham**, P. J. Wilson & T. J. Little. **2012**. Elevated haemocyte number is associated with infection and low fitness potential in wild *Daphnia magna*. *Functional Ecology* 26: 434-40.

Faculty of 1000 recommendations: Recommended (6) in both Ecology & Immunology

- 30) H. H. Yiu, **A. L. Graham** & R. Stengel. **2012**. Dynamics of a cytokine storm. *PLoS ONE* 7: e45027.
- 29) D. Marco, E. Scott, D. Cairns, **A. L. Graham**, J. E. Allen, S. Mahajan & C. Shankland. **2012**. Investigating co-infection dynamics through evolution of Bio-PEPA model parameters: a combined process algebra and evolutionary computing approach. *Proceedings of the 10th Computational Methods in Systems Biology* 7605: 227-46.
- 28) **A. L. Graham**, D. M. Shuker, L. C. Pollitt, S. K. J. R. Auld, A. J. Wilson & T. J. Little. **2011**. Fitness consequences of immune responses: strengthening the empirical framework for ecoimmunology. *Functional Ecology* 25: 5-17.
- 27) G. H. Long & **A. L. Graham**. **2011**. Consequences of immunopathology for pathogen virulence evolution and public health: Malaria as a case study. *Evolutionary Applications* 4: 278-91.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 26) C. J. E. Metcalf, **A. L. Graham**, S. Huijben, V. C. Barclay, G. H. Long, B. T. Grenfell, A. F. Read & O. N. Bjørnstad. **2011**. Partitioning regulatory mechanisms of within-host malaria dynamics using the effective propagation number. *Science* 333: 984-88.

Perspective: K. P. Day & F. J. I. Fowkes. **2011**. Quantifying malaria dynamics within the host. *Science* 333: 943-44.

- 25) A. Camacho, S. Ballesteros, **A. L. Graham**, F. Carrat, O. Ratmann & B. Cazelles. **2011**. Explaining rapid reinfections in multiple-wave influenza outbreaks: Tristan da Cunha 1971 epidemic as a case study. *Proceedings of the Royal Society, Biological Sciences* 278: 3635-43.

- 24) **A. L. Graham**, A. D. Hayward, K. A. Watt, J. G. Pilkington, J. M. Pemberton & D. H. Nussey. **2010**. Fitness correlates of heritable variation in antibody responsiveness in a wild mammal. *Science* 330: 662-65.

Perspective: L. B. Martin & C. A. C. Coon. **2010**. Infection protection and natural selection. *Science* 330: 602-03.

Faculty of 1000 recommendations: Exceptional (10) in both Immunology & Ecology;
Must-read (8) in Rheumatology & Clinical Immunology

- 23) T. J. Little, D. M. Shuker, N. Colegrave, T. Day & **A. L. Graham**. **2010**. The coevolution of virulence: tolerance in perspective. *PLoS Pathogens* 6: e1001006.

- 22) K. J. Fairlie-Clarke, T. J. Lamb, J. Langhorne, **A. L. Graham** & J. E. Allen. **2010**. Antibody isotype analysis of malaria-helminth co-infection: problems and solutions associated with cross-reactivity. *BMC Immunology* 11: 6.

Faculty of 1000 recommendation: Must-read (8) in Immunology & Microbiology

- 21) K. J. Fairlie-Clarke, D. M. Shuker & **A. L. Graham**. **2009**. Why do adaptive immune responses cross-react? *Evolutionary Applications* 2: 122-31.

- 20) §M. Hoeve, §K. Mylonas, K. J. Fairlie-Clarke, S. Mahajan, J. E. Allen & **A. L. Graham**. **2009**. *Plasmodium chabaudi* limits early *Nippostrongylus brasiliensis*-induced pulmonary immune activation and Th2 polarization in co-infected mice. *BMC Immunology* 10: 60.

Featured, highly-accessed article for more than 3 months

- 19) L. Råberg, **A. L. Graham** & A. F. Read. **2009**. Decomposing health: Tolerance and resistance to parasites in animals. *Philosophical Transactions of the Royal Society, Series B* 364: 37-49.

- 18) M. D. Taylor, N. van der Werf, A. Harris, **A. L. Graham**, O. Bain, J. E. Allen & R. M. Maizels. **2009**. Early recruitment of natural CD4⁺Foxp3⁺ regulatory T cells by infective larvae determines the outcome of filarial infection. *European Journal of Immunology* 39: 192-206.

PUBLICATIONS IN REFEREED JOURNALS, CONTINUED...

- 17) **A. L. Graham. 2008.** Ecological rules governing helminth-microparasite co-infection. *Proceedings of the National Academy of Sciences, U.S.A.* 105: 566-70.
- Faculty of 1000 recommendation:** Recommended (6) in Immunology & Ecology
- 16) G. H. Long, B. H. K. Chan, J. E. Allen, A. F. Read & **A. L. Graham. 2008.** Experimental manipulation of immune-mediated disease and its fitness costs for rodent malaria parasites. *BMC Evolutionary Biology* 8: 128.
- Commentary:** B. Penman & S. Gupta. **2008.** Evolution of virulence in malaria. *J. Biol* 7: 22.
- 15) A. Fenton, T. J. Lamb & **A. L. Graham. 2008.** Optimality analysis of Th1/Th2 immune responses during microparasite-macroparasite co-infection, with epidemiological feedbacks. *Parasitology* 135: 841-53.
- 14) G. H. Long, B. H. K. Chan, J. E. Allen, A. F. Read & **A. L. Graham. 2008.** Blockade of TNF receptor 1 reduces disease severity but increases parasite transmission during *Plasmodium chabaudi chabaudi* infection. *International Journal for Parasitology* 38: 1073-81.
- 13) T. J. Lamb, **A. L. Graham** & A. Petrie. **2008.** *t*-testing the immune system. *Immunity* 28: 288-92.
- 12) **A. L. Graham**, I. M. Cattadori, J. Lloyd-Smith, M. Ferrari & O. Bjørnstad. **2007.** Transmission consequences of co-infection: cytokines writ large? *Trends in Parasitology* 23: 284-91.
- 11) T. Day, **A. L. Graham** & A. F. Read. **2007.** Evolution of parasite virulence when host responses cause disease. *Proceedings of the Royal Society, Biological Sciences* 274: 2685-92.
- 10) G. H. Long, B. H. K. Chan, J. E. Allen, A. F. Read & **A. L. Graham. 2006.** Parasite genotype does not alter the effects of TNF- α on the virulence of murine malaria. *Parasitology* 133: 673-84.
- 9) **A. L. Graham**, J. E. Allen & A. F. Read. **2005.** Evolutionary causes and consequences of immunopathology. *Annual Review of Ecology, Evolution & Systematics* 36: 373-97.
- 8) **A. L. Graham**, T. J. Lamb, A. F. Read & J. E. Allen. **2005.** Malaria-filaria co-infection in mice makes malarial disease more severe unless filarial infection achieves patency. *The Journal of Infectious Diseases* 191: 410-21.
- 7) **A. L. Graham**, M. D. Taylor, L. Le Goff, T. J. Lamb, M. Magennis & J. E. Allen. **2005.** Quantitative appraisal of murine filariasis confirms host strain differences but reveals that BALB/c females are more susceptible than males to *Litomosoides sigmodontis*. *Microbes & Infection* 7: 612-18.
- 6) T. J. Lamb, **A. L. Graham**, L. Le Goff & J. E. Allen. **2005.** Co-infected C57BL/6 mice mount appropriately polarized and compartmentalized cytokine responses to *Litomosoides sigmodontis* and *Leishmania major* but disease progression is altered. *Parasite Immunology* 27: 317-24.

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- 5) **A. L. Graham. 2003.** Effects of snail size and age upon the prevalence and intensity of avian schistosome infection: Relating lab to field studies. *Journal of Parasitology* 89: 458-63.
- 4) **A. L. Graham. 2002.** When T-helper cells don't help: Immunopathology during concomitant infection. *The Quarterly Review of Biology* 77: 409-33.
- 3) L. Le Goff, T. J. Lamb, **A. L. Graham**, Y. Harcus & J. E. Allen. **2002.** IL-4 is required to prevent filarial nematode development in resistant but not susceptible strains of mice. *International Journal for Parasitology* 32: 1277-84.
- 2) **A. L. Graham. 2001.** Use of an optimality model to solve the immunological puzzle of concomitant infection. *Parasitology* 122 (Supplement): S61-64.
- 1) N. Begum, **A. L. Graham**, K. E. Sussman & B. Draznin. **1992.** Role of cAMP in mediating effects of fasting on dephosphorylation of insulin receptor. *American Journal of Physiology* 262: E142-49.

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- A. D. Hayward, R. Garnier, D. Z. Childs, B. T. Grenfell, K. A. Watt, J. G. Pilkington, J. M. Pemberton & **A. L. Graham**. **2019**. From population to individual host scale and back again: testing theories of infection and defence in the Soay sheep of St. Kilda. Chapter 4 in: *Wildlife Disease Ecology: Linking Theory to Data and Application*; K. Wilson, A. Fenton & D. Tompkins, Eds., Cambridge University Press: 91-128.
- M. E. Viney & **A. L. Graham**. **2013**. Patterns and processes in parasite co-infection. In: Rollinson, D. (Ed.), Academic Press, *Advances in Parasitology* 82: 321-70.

OTHER PUBLICATIONS

- 12) **A. L. Graham**. **2024**. *Q & A*: Andrea L. Graham. *Current Biology* 34: R607-08.
- 11) S. E. Forrest, A. Kinzig, S. Feldman, **A. L. Graham**, S. A. Levin, J. Rexford & E. C. Schrom II. **2023**. *Popular science*: Mother Nature's Seven Lessons for a safer world. *Nautilus* 257526.
- 10) C. A. Cizauskas, A. D. Washburne, J. E. Knelman, C. B. Hansen, A. Mwangi Nderitu, P. Lokwamo Esinyon, A. P. Dobson & **A. L. Graham**. **2022**. *Preprint*: Natural strongyle infection reduces relative abundance of inflammation-inducing *Prevotella* in wild primates. *bioRxiv*: 494558v2.
- 9) **A. L. Graham**. **2019**. *Book review*: *Immunity, The Evolution of an Idea* by Alfred I. Tauber. *The Quarterly Review of Biology* 94: 449-50.
- 8) **A. L. Graham** & A. T. Tate. **2017**. *Insight*: Are we immune, by chance? *eLife* 6: e32783.
- 7) **A. L. Graham**. **2015**. *Dispatch*: Evolution: Parasite pressure favors fortress-like defence. *Current Biology* 25: R335-37.
- 6) C. M. Lively, J. C. de Roode, M. Duffy, **A. L. Graham** & B. Koskella. **2014**. *Editorial*: Interesting open questions in disease ecology and evolution. *American Naturalist* 184: S1-8.
- 5) **A. L. Graham**. **2012**. *Book review*: Brave new immunology: a review of *Ecoimmunology*, edited by G. E. Demas & R. J. Nelson. *Trends in Ecology & Evolution* 27: 656.
- 4) **A. L. Graham**. **2012**. *Book review*: *Evolutionary Parasitology* by Paul Schmid-Hempel. *The Quarterly Review of Biology* 87: 76.
- 3) S. A. Babayan, J. E. Allen, J. E. Bradley, M. Geuking, **A. L. Graham**, R. K. Grensis, J. Kaufman, K. D. McCoy, S. Paterson, K. G. C. Smith, P. J. Turnbaugh, M. E. Viney, R. M. Maizels & A. B. Pedersen. **2011**. *Meeting report*: Wild immunology: Converging on the real world. *Annals of the New York Academy of Sciences* 1236: 17-29.
- 2) M. Booth, **A. L. Graham** & M. E. Viney, Eds. **2008**. *Editorial*: Parasitic co-infections: Challenges and solutions. *Parasitology* 135: 749.
- 1) A. F. Read, **A. L. Graham** & L. Råberg. **2008**. *Primer*: Animal defenses against infectious agents: is damage control more important than pathogen control? *PLoS Biology* 6: 2638-41.

LEADERSHIP & SERVICE IN THE INTERNATIONAL SCIENTIFIC COMMUNITY

External Professor of the Santa Fe Institute, 2022-28

External Advisor for the Cornell Institute of Host-Microbe Interactions and Disease, 2020-25

President, Jacques Monod CNRS Conference on Host-Parasite Co-Evolution, 2017-23

Vice-President, Jacques Monod CNRS Conference on Host-Parasite Co-Evolution, 2014-17

PI of a 100+ member, NSF-funded research network on infectious disease evolution, 2014-19

Treasurer, International Society of Evolutionary Medicine & Public Health, 2017-19

Executive Council Member, International Society of Evolutionary Medicine & Public Health, 2016-19

Scientific consultant, Research and Policy for Infectious Disease Dynamics (RAPIDD), 2009-15

Department of Homeland Security & Fogarty International Center of the NIH

Steering Committee Member, Wellcome Trust Centre for Immunity, Infection & Evolution; 2008-10

Editorial Board Member for *Advances in Parasitology*, since 2020

Associate Editor for *Evolution, Medicine & Public Health*, since 2012

Associate Editor for *Frontiers in Immunology*, 2020-22

Associate Editor for *Proceedings of the Royal Society, B: Biological Sciences*, 2013-15

Invited guest editor for *PNAS* and *PLoS Pathogens*, periodically since 2016

Invited guest editor, 2015 special issue of *Philosophical Transactions* on within-host dynamics of parasites

Invited guest editor, 2013 special issue of *Parasite Immunology* on the evolutionary biology of defense

CONVENER AND ORGANIZER OF SCIENTIFIC SYMPOSIA, CONFERENCES AND WORKSHOPS

- Feb 2025 (Princeton, NJ): *Workshop on quantitative immunology, from theory to experiment*
Princeton Center for Theoretical Science; organizing committee member
- April 2024 (Princeton, NJ): *Determinants and dynamics of viral emergence and establishment in human populations*
Princeton Center for Theoretical Science; organizing committee member, with C. J. E. Metcalf & B. T. Grenfell
- Oct 2023 (Roscoff, France): *A matter of scale: Within-host & between-host processes driving host-parasite coevolution*
President and primary organizer of Jacques Monod Conference, with Vice-President O. Kaltz (Montpellier)
- June 2019 (Princeton, NJ): *Seventeenth annual conference on the Ecology & Evolution of Infectious Diseases (EEID)*
Primary organizer, supported by C. J. E. Metcalf, A. P. Dobson & B. T. Grenfell
- 2019-2024 (Scottsdale, AZ; Princeton, NJ): *Workshops on complex systems for organismal, cyber, and national security*
Organizing committee member, with S. Levin (Princeton), S. Forrest & A. Kinzig (both Arizona State)
- Aug 2018 (Montpellier, France): *Second Joint Evolution Conference (ESEB, ASN, SSE and SSB)*
Scientific committee member, with 11 others, advising on scope & content of 2500-attendee meeting
- Oct 2017 (Roscoff, France): *Open questions in disease ecology & evolution: basic research to evolutionary medicine*
Vice-President of Jacques Monod Conference, co-organized with President A. Rivero (CNRS, Montpellier)
- April 2015 (Woods Hole, MA): *Woods Hole ImmunoParasitology (WHIP) and Immune selection workshop*
Co-director of evolutionary immunology meeting, with J. E. Allen (Edinburgh) and N. Harris (Lausanne)
- March 2015 (Ouro Preto, Minas Gerais, Brazil): *Co-infection: a global challenge for disease control*
Co-organizer of Keystone Symposium, with R. C. Oliveira (Fiocruz) & D. Dunne (Cambridge)
- April 2014 (Cambridge, England): *Helminths in co-infections*
Co-organizer of symposium for the British Society for Parasitology, with D. Dunne (Cambridge)
- Oct 2011 (Princeton, NJ): *Serological time-series data: Immunological mechanisms to epidemiological dynamics*
Organizer of interdisciplinary workshop funded by NIH and Department of Homeland Security (DHS)
- April 2009 (Edinburgh, Scotland): *Why does immunity to parasites take so long to develop?*
Organizer of inaugural Symposium of the Wellcome Centre for Immunity, Infection & Evolution
- Nov 2007 (London, England): *Parasitic co-infections: Challenges and solutions*
Co-convener of British Society for Parasitology Symposium, with M. Viney (Bristol) & M. Booth (Durham)
- Aug 2006 (Edinburgh, Scotland): *Co-infection common ground*
Organizer of workshop on the evolutionary ecology, epidemiology, & immunology of co-infections

SERVICE TO THE EEB DEPARTMENT AND TO PRINCETON UNIVERSITY

Faculty Director, Stony Ford Center for Ecological Studies; 2023-now

EEB Postdoctoral Research Fellow Search Chair 2023-25

Chair, Committee on Climate for All; 2016-21; Co-Chair 2022-23

Faculty Adviser to the Graduate Women in Science and Engineering (GWISE) Program; 2015-20

Keynote Speaker, Princeton Young Women's Conference; 2012

Member, Advisory Council for the Program in Community College Engagement; 2024-now

Member, Institutional Animal Care and Use Committee (IACUC); 2011-16; 2024-now

Invited speaker, American Association of Laboratory Animal Science (AALAS) NJ chapter, 2014; national meeting 2024

Member, Subcommittee on policy updates; 2025

Member, Subcommittee to develop and revise wildlife research policies; 2013 & 2024

Member, Subcommittee on the implementation of the new *Guide for Care & Use of Lab Animals*; 2012

Member, Subcommittee to adjudicate potential non-compliance issues; 2012

Member, Labyrinth Books Faculty Committee 2014-21; Labyrinth Advisory Group; 2022-now

Faculty Fellow of Mathey College; 2015-now

Executive Committee Member, Global Health Program; 2013-now

Faculty Co-Director, Global Health Program (GHP); 2015-22

Executive Committee Member, Center for Health & Well Being; 2016-19

Member, University Priorities Committee; 2017-20

Member, Molecular Biology Faculty Search Committee, 2020-21

Member, EEB Faculty Search Committees; 2009-10; 2012-13; Search Officer 2018-19

Co-organizer, EEB seminar series (EEB 522: Colloquium on the Biology of Populations); 2012-13

SUCCESSFUL RESEARCH FUNDING APPLICATIONS AS PRINCIPAL INVESTIGATOR

- 2025-2027 National Institutes of Health, National Institute of Neurological Disorders and Stroke R34, BRAIN Initiative Circuits Portfolio
Quantifying the social and family lives of mice in- and out-of-doors
\$738,000 total; \$369,000 to Graham; Ref. 1R34NS138066-01; Co-PI R. Froemke (NYU)
- 2025-2028 Agence Nationale de la Recherche, France
WILDTYPES: T cell repertoire dynamics in rewilded mice
€426,760 total; €100,000 to Graham; Co-PI A. Walczak (École Normale Supérieure)
- 2023-2026 National Science Foundation, Collaborative Research Project Grant
Divisions of Environmental Biology (DEB) and Integrative Organismal Systems (IOS)
Ecology of expulsion: Within-host dynamics driving nematode infection
\$979,579 total; \$671,410 to Graham; Ref. DEB-2153923; Co-PI C. Cressler (UN-Lincoln)
- 2023-2025 Princeton Catalysis Initiative
Fighting inflammation and infection at sea: Comparative immunology of plunging pinnipeds versus terrestrial taxa
\$240,000 total; \$120,000 to Graham; Co-PI M. Singh (Princeton Computer Science)
- 2023-2025 State of New Jersey Annual Appropriations for Collaborative Research
Institute for Infectious and Inflammatory Diseases (i3D), Rutgers University
Rewilding laboratory mice to reveal new biology and improve disease models
\$1M total; \$100,000 to Graham; Co-PI W. Gause (Rutgers)
- 2021-2024 New Ideas in the Natural Sciences Program Grant, Office of the Dean for Research
School of Engineering & Applied Science, Princeton University
Defending the elephant seal: Organismal immunity to species conservation
\$200,000; Co-PIs B. vonHoldt (Princeton) & F. Gulland (UC-Davis)
- 2021-2022 New Jersey Alliance for Clinical and Translational Science (NJ-ACTS; NIH-NCATS)
Pilot Project Grant Award
Improving mouse models of lung defense: neutrophil-mediated parasite resistance, tissue damage and repair
\$110,000; Ref. FP00000350; Co-PI W. Gause (Rutgers)
- 2020-2021 COVID-19 Rapid Response Program Grant, Office of the Dean for Research
School of Engineering & Applied Science, Princeton University
Monitoring SARS-CoV-2 in Princeton: quantifying viral transmission and immunity
\$100,000; Co-PIs J. Ayroles, B. T. Grenfell & C. J. E. Metcalf
- 2016-2019 Defense Advanced Research Projects Agency (DARPA)
Experiments Investigating Resilience
\$594,383 to Graham; Ref. 68255-LS-DRP; Co-PIs D. Schneider & D. Monack (Stanford)
- 2014-2019 National Science Foundation DEB Research Coordination Network Grant
RCN-IDEAS: Infectious Disease Evolution Across Scales
\$499,916; Ref. DEB-1354890

SUCCESSFUL RESEARCH FUNDING APPLICATIONS AS PI, CONTINUED...

- 2016-2017 Health Grand Challenges Program Grant, Center for Health and Wellbeing
School of Public and International Affairs, Princeton University
Should we mass-deworm the world?
\$90,000; Ref. 26016-B0450
- 2015-2017 National Science Foundation Doctoral Dissertation Improvement Grant
The effects of multi-species interactions on the community structure of parasites
\$16,293; Ref. DEB-1501012; Co-PI J. M. Y. Yeung
- 2012-2015 Health Grand Challenges Grant, Center for Health & Wellbeing, Princeton University
The role of humoral immunity in human health
\$200,000; Ref. 2862614
- 2006-2011 David Phillips Research Fellowship, U.K. BBSRC
Cytokine network ecology: towards dynamic understanding of immunity to co-infection
£1,065,017 (Full Economic Cost £1.331 million); Ref. BB/D01977X/1
- 2004-2006 Early Career Fellowship, The Leverhulme Trust
Quantitative evolutionary immunology
£46,587; Ref. ECF/2004/0297
- 1996-2001 Howard Hughes Medical Institute Pre-Doctoral Fellowship
Snail population biology as a determinant of the epidemiology of avian schistosomiasis
\$153,500

SUCCESSFUL RESEARCH FUNDING APPLICATIONS AS CO-INVESTIGATOR

- 2015-2016 NIH National Institute on Aging R01 Bridge Grant
Biodemography of Health, Social Factors and Life Challenge
\$62,041; Ref. 2R01AG016661; PI M. Weinstein
- 2013-2015 NIH National Institute on Aging Center Grant; Pilot Project
Immunosenescence among Taiwanese in the SEBAS cohort
\$60,000; Ref. 400-6251/31; PI C. Paxson
- 2008-2011 The Wellcome Trust Center Grant
Centre-in-Development for Immunity, Infection, and Evolution
£1,489,569 total award; 082611/Z/07/Z; PI R. M. Maizels
- 2010-2011 U.K. Research Councils: Environmental & Social Ecology of Human Infectious Diseases
Why is infection unequal? An inter-disciplinary approach
£58,760 total award; Ref. G0902447; PI M. E. Viney
- 2005-2008 U.K. Biotechnology & Biological Sciences Research Council Project Grant
Empirical immunology meets evolutionary ecology: the virulence of co-infection
£313,872; Ref. BB/C508734/1; PI J. E. Allen

SUCCESSFUL RESEARCH FUNDING APPLICATIONS AS CO-INVESTIGATOR, CONTINUED...

2001-2003 The Wellcome Trust Blueskies Project Grant
Developing optimal immunology, with A.L. Graham as co-author & named postdoc
£84,335; Ref. 064121/Z/01/Z; PIs A. F. Read, J. E. Allen & S. Nee

SUCCESSFUL CONFERENCE FUNDING APPLICATIONS AS PRINCIPAL INVESTIGATOR

2023 CNRS Grant to support Jacques Monod Conference in Roscoff, France; €30,000
NIH R13 Grant to support travel of minoritized individuals to the conference; \$6,500

SUCCESSFUL TEACHING FUNDING APPLICATIONS AS PRINCIPAL INVESTIGATOR

2018-2023 Council of Science & Technology Grant, Princeton University
The Drama Within: Embodying the Immune System on the Stage
\$13,000; Co-PI Ellen K. Graham

TEACHING EXPERIENCE

- 2019-now Professor of **The Drama Within: Embodying the Immune System on Stage & Screen**
Princeton University; Middlesex Community College
Co-designing a novel seminar to explore cellular immunology through the dramatic arts
Lecturing on diversity and dynamics of a cast of immune cell types and parasite species
Co-mentoring student work on character and plot development as well as scientific analysis
- 2009-now Professor of **Immune Systems: from Molecules to Populations**
Princeton University
Designing and delivering a unique interdisciplinary course in evolutionary immunology
Lecturing on topics ranging from co-evolutionary theory to lymphocyte biology
Cultivating scientific reading and writing skills in students from diverse backgrounds
- 2001-now Professor, mentor, and occasional lecturer in **Evolutionary Medicine**
Princeton University; U. of Edinburgh; ETH Zürich; Yale University; U. of Pennsylvania
Developing and leading undergraduate and masters-level seminars
Lecturing in courses for undergraduate, honours and Ph.D. students
Assessing exam work, term papers and theses
- 2012-2013 Professor of **Ecology and Epidemiology of Parasites and Infectious Diseases**
Princeton University; Smithsonian Tropical Research Institute, Panama
Designed field and laboratory work to demonstrate core epidemiological principles
Lectured on the roles of host immunity and multi-species infections in parasite ecology
- 1999 Mentor in **Benthic Ecology** for undergraduate Summer Research Assistant
Flathead Lake Biological Station of the University of Montana
Supervised experimental design and data analysis for honors thesis student
- 1995-1996 Teaching assistant in **Introductory Biology** for pre-medical undergraduates
Cornell University
Supervised students in design of experiments and analysis of data
Developed student skills in science writing by providing 2-3 rounds of feedback on draft papers
Constructed and graded midterm tests; conducted tutorials and office hours
Received recognition for excellence as runner-up for teaching assistant of the year
- 1993-1995 High School Teacher of **Investigating** (Scientific Method) and **Inventing** (Sculpture)
Urban Academy of the New York City Public Schools
Designed syllabi for innovative, hands-on courses in observational science, sculpture & design
Supervised field (subway)-based research projects (e.g., study design, data collection & analysis)
Evaluated write-ups and assisted students in achieving defined scientific competencies
Won city-wide award, along with 15 Urban Academy colleagues, for excellence in teaching
- 1989-1990 Teaching assistant in **Data Analysis & Statistics** for undergraduates
Mount Holyoke College
Tutored students in experimental design and the interpretation of statistical tests
Graded homework, exams and final projects