

**C. Jessica E. Metcalf**  
Department of Ecology and Evolutionary Biology  
and the Woodrow Wilson School  
Princeton University  
Princeton, NJ, USA

## EDUCATION & RESEARCH

2014-present, Assistant Professor in Ecology, Evolution and Public Affairs, Princeton University, USA.  
2010-2014, Royal Society University Research Fellowship, Department of Zoology, Oxford University, UK.  
2009-2010, Post-doctoral researcher, Department of Ecology and Evolution, Princeton University, USA.  
2008-2009, Post-doctoral researcher, Center for Infectious Disease Dynamics, Penn State University, USA.  
2006-2008, Duke Population Research Institute Post-doctoral Fellow, Duke University, Durham, USA.  
2005-2006, Post-doctoral researcher, Max Planck Institute for Demographic Research, Rostock, Germany.  
2002-2005, Imperial College London, UK Ph.D. on "The Evolutionary Demography of Monocarpic Perennials"  
2000, University of Oxford, St Hugh's College, UK. B.A. (hons), Biology. First Class.  
1996, Lycée Français d'Antananarivo, Madagascar. Baccalauréat S. Mention Très Bien

## PUBLICATIONS

### Forthcoming

- Van Boeckel, T.P., Takahashi, S., Xing, W., Lai, S., Hsiao, V., **Metcalf, C.J.E.**, Yu, H., Grenfell, B.T. Hand, foot, and mouth Disease in China: Critical Community Size and Spatial Vaccination Strategies. *Scientific Reports*

### 2016

- Meaden, S., **Metcalf, C.J.E.**, Koskella, B.T. 2016 The effects of host age and spatial location on bacterial community composition in the English Oak tree (*Quercus robur*) *Environmental Microbiology Reports* (link)
- Fournier-Level, A., Perry, E.O., Wang, J., Braun, P.T., Migneault, A., Cooper, M.D., **Metcalf, C.J.E.**, Schmitt, J. 2016. Predicting the evolutionary dynamics of seasonal adaptation to novel climates in *Arabidopsis thaliana*. *Proceedings of the National Academy of Sciences* **2** 201517456
- Wesolowski, A., Mensah, K., Brook, C.A., Andrianjafimasy, M., Winter, A., Buckee, C.O., Razafindratsimandresy, R., Tatem, A.J., Heraud, J-M., **Metcalf, C.J.E.** 2016. Introduction of Rubella-Containing-Vaccine to Madagascar: implications for roll-out across Low-Income countries *Journal of the Royal Society Interface* **13** 117
- **Metcalf, C.J.E.**, Farrar, J., Cutts, F.T., Basta, N., Graham, A.L., Lessler, J., Ferguson, N., Burke, D., Grenfell, B.T. 2016. Serological surveys: Generating key insight into the changing global landscape of infectious disease. *Lancet* **16** 30164-7
- **Metcalf, C.J.E.** 2016. Invisible trade-offs: van Noordwijk & de Jong and life history evolution *American Naturalist* **87**iii
- Takahashi, S., Liao, Q., Van Boeckel, T.P., Xing, W., Sun, J., Hsiao, V.Y., **Metcalf, C.J.E.**, Chang, Z., Liu, F., Zhang, J., Wu, J.T., Cowling, B.J., Leung, G.M., Farrar, J.J., van Doorn, H.R., Grenfell, B.T., Hongjie, Y. 2016. Hand, foot, and mouth disease in China: modelling epidemic dynamics of enterovirus serotypes and implications for vaccination *PLoS Medicine* **13** e1001958
- Dalziel, B., Bjornstad, O.N., Van Panhuis, W.G., Burke, D.S., **Metcalf, C.J.E.**, Grenfell, B.T. 2016. Persistent chaos of measles epidemics in the prevaccination United States caused by a small change in seasonal transmission patterns *PLoS Computational Biology* **12** 2
- Bughardt, L., **Metcalf, C.J.E.** & Donohue, K. 2016. A cline in seed dormancy can conserve the environment experienced during reproduction across a range *American Journal of Botany* **103** 47-49
- **Metcalf, C.J.E.**, Graham, A.L., Martinez-Bakker, M., Childs, D.Z. 2016. Opportunities and challenges of Integral Projection Models for modeling infectious diseases and their dynamics. *Journal of Animal Ecology* **83** 343-355

### 2015

- **Metcalf, C.J.E.**, Ferrari, M., Graham, A.L., Grenfell, B.T. 2015. Understanding herd immunity. *Trends in Immunology* **36** 753-755
- Griffiths, E., Fairlie-Clarke, K., Allen, J.E., **Metcalf, C.J.E.**, Graham, A.L. 2015. Bottom-up control of malaria population dynamics in mice co-infected with lung-migratory nematodes *Ecology Letters* **18** 1387-1396

- **Metcalf, C.J.E.**, Ellner, S.P., Childs, D.Z., McMahon, S.M., Merow, C., Jongejans, E., Salguero-Gomez, R. & Rees, M. 2015 Statistical modelling of annual variation for inference on stochastic population dynamics using Integral Projection Models *Methods in Ecology and Evolution* **6** 1007-1017
- Wesolowski, A.\*, **Metcalf, C.J.E.\***, Kombich, J., Grenfell, B.T., Bjornstad, O.N., Lessler, J., Eagle, N., Tatem, A.J. & Buckee, C.O. 2015. Quantifying seasonal population fluxes driving rubella transmission dynamics using mobile phone data *PNAS* [\*these authors contributed equally] **112** 11114-11119.
- Birger, R., Kouyos, R.D., Cohen, T., Griffiths, E., Huijben, S., Mina, M., Volkova, V., Grenfell, B.T., **Metcalf, C.J.E.** 2015. The impact of coinfection on anti-microbial chemotherapy and drug resistance. *Trends in Microbiology* **23** 537-544
- **Metcalf, C.J.E.**, Bughardt, L.T., Koons, D.N. 2015. Avoiding the crowds: the evolution of plastic response to seasonal cues in a density dependent world. *Journal of Ecology* **103** 819-828
- Mina, M., **Metcalf, C.J.E.**, de Swart, R., Osterhaus, A., Grenfell, B.T. 2015 Long-term measles-induced immune-amnesia explains major reductions in all-cause childhood mortality following measles vaccination *Science* **348** 694-699
- Heesterbeek, J.A.P., Anderson, R., Dye, C., Eames, K., Edmunds, J., Funk, S., Hollingsworth, D., House, T., Isham, V., Lessler, J., Lloyd-Smith, J., **Metcalf, C.J.E.**, Pellis, L., Pulliam, J., Roberts, M., Isaac Newton Institute IDD group. 2015. Modelling infectious disease dynamics in the complex landscape of global health. *Science* **347** aaa4339
- Takahashi, S., **Metcalf, C.J.E.**, Ferrari, M., Truelove, S., Grenfell, B.T., & Lessler, J. 2015. Confronting the Growing Risk of a Post-Ebola Epidemic of Childhood Infections *Science* **347** 1240-1242.
- Perkins, T.A., **Metcalf, C.J.E.**, Grenfell, B.T., Tatem, A.J. 2015. Chikungunya: forecasting the invasion landscape in the Americas *PLoS Currents*
- **Metcalf, C.J.E.** & Jones, J.H. 2015. The evolutionary dynamics of timing of maternal immunity: evaluating the role of age-specific mortality *Journal of Evolutionary Biology* **28** 493-502
- Morris, S., Pitzer, V.E., Viboud, C., **Metcalf, C.J.E.**, Grenfell, B.T. 2015. Demographic buffering: titrating the effects of birth rate and imperfect immunity on epidemic dynamics. *Journal of the Royal Society Interface* **12** s20141245
- **Metcalf, C.J.E.**, Birger, R., Funk, S., Kouyos, R.D., Lloyd-Smith, J., Janzen, V. 2015 Five challenges in the evolution of infectious diseases. *Epidemics* **10**:40-44
- **Metcalf, C.J.E.**, Lessler, J. & Edmunds, W.J. 2015. Six challenges in policy for modeling. *Epidemics* **10**:93-96
- **Metcalf, C.J.E.**, Andreasen, V., Bjornstad, O.N., Eames, K.T., Edmunds, W.J., Hollingsworth, T.D., Lessler, J., Viboud, C. & Grenfell, B.T. 2015 Seven challenges in modeling vaccine preventable diseases. *Epidemics* **10**:11-15
- Cunniffe, N., Koskella, B., Gottwald, T., Parnell, S. Van den Bosch, F. **Metcalf, C.J.E.**, Gilligan, C. A. 2015 Thirteen challenges in plant infectious diseases. *Epidemics* **10**:6-10
- Lloyd-Smith, J.O., Mollison, D., **Metcalf, C.J.E.**, Heesterbeek, J.A.P. 2015 Challenges in modeling infectious disease dynamics: preface. *Epidemics* **10**:1-5
- Klepac, P., Funk, S., Hollingsworth, T.D., **Metcalf, C.J.E.**, Hampson, K. 2015 Six challenges in the eradication of infectious diseases. *Epidemics* **10**:97-101
- Pitzer, V.E., Viboud, C., Alonso, W.J., Wilcox, T., **Metcalf, C.J.E.**, Steiner, C.A., Panozzo, C.A. & Grenfell, B.T. 2015 Environmental drivers of the spatiotemporal dynamics of respiratory syncytial virus in the United States. *PLoS Pathogens* **11** e1004591-e1004591
- Caudron, Q., Mahmud, A.S., **Metcalf, C.J.E.**, Gottfreosson, M., Viboud, C., Cliff, A.D., Grenfell, B.T. 2015 Predictability in highly stochastic systems: measles in small populations. *Journal of the Royal Society Interface* **12**: 20141125
- Bughardt, L., **Metcalf, C.J.E.**, Wilczek, A. Johanna Schmitt, J. & Donohue, K. 2015 Predicting plant life cycles in seasonal environments *American Naturalist* **185** 212-227
- Salguero-Gomez, R., Jones, O.R., Archer, C.R., Buckley, Y.M., Che-Castaldo, J., Caswell, H., Scheuerlien, A., Conde, D.A., Baudisch, A., Brinks, E., de Buhr, H., Farack, C., France, G., Hartmann, A., Henning, A., Hoppe, G., Romer, G., Runge, J., Ruoff, T., Wille, J., Zeh, S., Vierigg, D., Altwegg, R., Colchero, F., Dong, M., Hodgson, D., de Kroon, H., Lebreton, J-D., **Metcalf, C.J.E.**, Neel, M., Takada, T., Valverde, T., Velez-Espino, L.A., Wardle, G.M., Franco, M. & Vaupel, J. 2015 The COMPADRE Plant Matrix Database: an Open Online Repository for Plant Demography. *Journal of Ecology* **103**: 202-218

## 2014

- Kouyos, R.D.\*, **Metcalf, C.J.E.\***, Birger, R.\*, Klein, E.Y., Day, T., Huijben, S., Cohen, T., Greenhouse, B., Wale, N., Mideo, N., Nimalan, A., Grenfell, B.T., Pollitt, L.C., Bogich, T.L., Brower, C., zur Wiesch, P.A., Read, A., Smith, D., Bonhoeffer, S. 2014 The path of least resistance: aggressive or moderate treatment? *Proceedings of the Royal Society of London - B* **281** 20140566 [\*contributed equally]

- **Metcalfe, C.J.E.**, Tatem, A.J., Bjornstad, O.N., Lessler, J., O'Reilly, K., Takahashi, S., Cutts, F., & Grenfell, B.T. 2014. Transport networks and inequities in vaccination: remoteness shapes measles vaccine coverage and prospects for elimination across Africa. *Epidemiology and Infection* 1-10
- Merow, C., Dahlgren, J.P., **Metcalfe, C.J.E.**, Childs, D.Z., Evans, M.E.K., Jongejans, E., Record, S., Rees, M., Salguero-Gomez, R. & McMahon, S.M. 2014. Advancing population ecology with integral projection models: a practical guide *Methods in Ecology and Evolution* 4 195-200

## 2013

- Rozhnova, G., **Metcalfe, C.J.E.** & Grenfell, B.T. 2013 Characterizing the dynamics of rubella relative to measles: the role of stochasticity. 2013 *Journal of the Royal Society Interface* 10 20130643
- **Metcalfe, C.J.E.**, Hampson, K., Tatem, A., Grenfell, B.T., & Bjornstad, O.N. 2013 Persistence in epidemic metapopulations: quantifying the rescue effects for measles, mumps, rubella and whooping cough. *PLoS ONE* 10 e1371
- Cutts, F.T., Lessler, J. & **Metcalfe, C.J.E.** 2013 Measles elimination: progress, challenges and implications for rubella control *Expert Reviews Vaccines* 12 917-932
- Flegg, J., **Metcalfe, C.J.E.**, Gharbi, M., Venkatesan, M., Shewchuk, T., Sibley, C.H., & Guerin, P.J. 2013 Trends in antimalarial drug use in Africa *American Journal of Tropical Medicine and Hygiene* 13 0129
- Lessler, J. & **Metcalfe, C.J.E.** 2013 Balancing evidence and uncertainty when considering rubella vaccine introduction. *PLoS ONE* 8, e67639
- Klepac, P., **Metcalfe, C.J.E.**, McLean, A., Hampson, K. 2013 Towards the endgame and beyond: complexities and challenges for the elimination of infectious diseases. *Philosophical Transactions of the Royal Society* 368 20120137
- Gharbi, M., Flegg, J., Hubert, V., Kendjo, E., **Metcalfe, C.J.E.**, Bertaux, L., Guerin, P.J., Le Bras, J. & Members of the French National Reference Centre for Imported Malaria Study. 2013 Longitudinal study assessing the return of chloroquine susceptibility of *Plasmodium falciparum* in isolates from travellers returning from West and Central Africa between 2000-2011. *Malaria Journal* 12, 35
- Vaupel, J.W., Missov, T. & **Metcalfe, C.J.E.** 2013 Optimal Semelparity. *Plos One* 8, e57133
- **Metcalfe, C.J.E.**, Cohen, C., Lessler, J., McAnerney, J.M., Ntsohe, G.M., Puren, A., Klepac, P., Tatem, A., Grenfell, B.T., & Bjørnstad, O.N. 2013 Implications of spatially heterogeneous vaccination coverage for the risk of Congenital Rubella Syndrome in South Africa *J. Roy. Soc. Interface* 10, 20120756

## 2012

- Mideo, N., Reece, S.E., Smith, A.L., & **Metcalfe, C.J.E.** 2012. The Cinderella Syndrome: Why do malaria-infected red blood cells burst at midnight? *Trends in Parasitology* 29, 10-16
- **Metcalfe, C.J.E.**, McMahon, S.M., Salguero-Gomez, R. & Jongejans, E. 2012. IPMPack: an R package for Integral Projection Models *Methods in Ecology and Evolution* 4, 195-200
- Klepac, P., Bjørnstad, O.N., **Metcalfe, C.J.E.** & Grenfell, B.T. 2012. Optimizing reactive responses to outbreaks of immunizing infections: balancing case management and vaccination *PLoS One* 7, e41428
- **Metcalfe, C.J.E.**, Long, G.H., Mideo, N. Forrester, J.D., Bjørnstad, O.N., Graham, A.L. 2012. Revealing mechanisms underlying variation in malaria parasite virulence: effective propagation and host control of uninfected red blood cell supply. *J. R. Soc. Interface* 9, 2804-2813
- Cutts, F.T., **Metcalfe, C.J.E.**, Lessler, J. & Grenfell, B.T. 2012. Rubella vaccination: must not be business as usual *The Lancet Correspondence* 380, 217-218
- Lessler, J., **Metcalfe, C.J.E.**, & Grenfell, B.T. 2012. Measurement of vaccine derived immunity: how do we use all the data? *Expert Reviews Vaccines* 11, 747-749
- **Metcalfe, C.J.E.**, Lessler, J., Klepac, P., Cutts, F., Grenfell, B.T. 2012. Impact of birth rate, seasonality and transmission rate on minimum levels of coverage needed for rubella vaccination *Epidemiology and Infection* 140, 2290-2301
- **Metcalfe, C.J.E.**, Lessler, J., Klepac, P., Morice, A., Grenfell, B.T., Bjørnstad, O.N. 2012 Structured models of infectious disease: inference with discrete data *Theoretical Population Biology* 82, 275-282

## 2011

- Lessler, J., **Metcalfe, C.J.E.**, Grais, R.F., Luquero, F.J., Cummings, D.A.T., Grenfell, B.T. 2011. Measuring the performance of vaccination programs using cross-sectional surveys *PloS Medicine* 8, e1001110
- **Metcalfe, C.J.E.**, Graham, A.L., Huijben, S.L., Barclay, V.C., Long, G., Grenfell, B.T., Read, A.F., Bjørnstad, O.N. 2011. Partitioning regulatory mechanisms of within host malaria dynamics using the effective propagation number *Science* 333, 984-988

- McMahon, S.M., **Metcalf, C.J.E.**, & Woodall, C. 2011. High-dimensional coexistence of temperate tree species: functional traits, demographic rates, life-history stages, and their physical context *PLoS One* **6**, e16253
- **Metcalf, C.J.E.**, Bjørnstad, O.N., Klepac, P., Ferrari, M., Bharti, N., Lopez-Gatell, H. & Grenfell, B.T. 2011. The epidemiology of rubella in Mexico: transients, seasonality, and spatial dynamics. *Epidemiology and Infection* **139**, 1029-1038
- **Metcalf, C.J.E.**, Muayco-Escate, C., Chowell, G., Grenfell, B.T. & Bjørnstad, O.N. 2011. Rubella meta-population dynamics and importance of spatial coupling to the risk of Congenital Rubella Syndrome in Peru *J. R. Soc. Interface* **8**, 369-376

## 2010

- Childs, D.Z., **Metcalf, C.J.E.**, & Rees, M. 2010 Evolutionary bet-hedging in the real world: empirical evidence and challenges revealed by plants *Proc. R. Soc. B* **277**, 3055-3064
- **Metcalf, C.J.E.**, Klepac, P., Ferrari, M., Grais, R.F., Djibo, A. & Grenfell, B.T. 2010. Modeling the first dose of measles vaccination: the role of maternal immunity, demographic factors, and delivery systems *Epidemiology and Infection* **139**, 265-274
- Clark, J.S., Bell, D.M., Chu, C., Courbaud, B., Dietze, M.C., Hersh, M., HilleRisLambers, J., Ibanez, I., LaDeau, S., McMahon, S., **Metcalf, C.J.E.**, Mohan, J.E., Moran, E., Pangle, L., Pearson, S.F., Salk, C.F., Shen, Z., Valle, D.R., Wyckoff, P. 2010 High dimensional coexistence based on individual variation: a synthesis of evidence *Ecol. Monogr.* **80**, 569
- Rees, M., **Metcalf, C.J.E.** & Childs, D.Z. 2010. When Worlds collide: reconciling models, data, and analysis *Israel Journal of Ecology and Evolution* **55**, 227-231
- Rees, M., **Metcalf, C.J.E.** & Childs, D.Z. 2010. Commentary on Olofsson et al. 2010. Bet-hedging as an evolutionary game: the trade-off between egg size and number *Proc. Roy. Soc. B.* **277**, 1149-1151

## 2009

- **Metcalf, C.J.E.**, Bjørnstad, O.N., Grenfell, B.T., & Andreasen, V. 2009 Seasonality and comparative dynamics of six childhood infections in pre-vaccination Copenhagen. *Proc. Roy. Soc. B.* **276**, 4111-4118
- **Metcalf, C.J.E.**, Horvitz, C.C., Tuljapurkar, S. & Clark, D.A. 2009 A time to grow and a time to die: a new way to analyze the dynamics of size, light, age and death of tropical trees. *Ecology* **90**, 2766-2778
- **Metcalf, C.J.E.** & Mitchell-Olds, T. 2009 Life-history in a model system: opening the black box with *Arabidopsis thaliana* *Ecology Letters* **12**, 593-600
- Koons, D.N., Pavard, S., Baudisch, A., & **Metcalf, C.J.E.** 2009 Is Life-History Buffering or Lability Adaptive in Stochastic Environments? *Oikos* **118**, 972-980
- **Metcalf, C.J.E.**, Stephens, D., Rees, M., Louda, S.M. & Keeler, K.H. 2009 Understanding allocation of resources between vegetative and sexual reproduction: Using Bayesian inference to capture interdependent demography with incomplete observations. *J. Appl. Stat.* **58**, 143-170.
- **Metcalf, C.J.E.**, Clark, J.S., & McMahon, S.M. 2009 Modeling tree mortality as a non-parametric function of diameter and growth, with prior weights on mortality of large trees. *Canad. J. Forest. Res.* **39**, 1677-1687
- **Metcalf, C.J.E.**, Clark, J.S. & Clark, D.A. 2009. Tree growth inference and prediction when the point of measurement changes: modeling around buttresses in tropical forests. *J. Trop. Ecol.* **25**, 1-12.
- **Metcalf, C.J.E.**, Rees, M., Buckley, Y.M., & Sheppard, A.W. 2009. Seed predators determine the evolutionarily stable flowering strategy in the invasive plant *Carduus nutans*. *Evol. Ecol.* **23**, 893-906

## 2008

- Koons, D.N., **Metcalf, C.J.E.**, & Tuljapurkar, S. 2008. Evolution of delayed reproduction in uncertain environments: a life history perspective. *Am. Nat.* **172**, 797-805
- **Metcalf, C.J.E.**, Rees, M., Rose, K.E., Sheppard, A., & Grubb, P.J. 2008. Evolution of flowering decisions in a stochastic, density-dependent environment. *PNAS* **105**, 10466-10470.
- Pavard, S., **Metcalf, C.J.E.**, & Heyer, E. 2008. Senescence of Reproduction may explain Adaptive Menopause in Humans: a Test of the "Mother" Hypothesis *Am. J. Phys. Anth.* **136**, 194-203.
- McMahon, S.M., & **Metcalf, C.J.E.** 2008. Transient sensitivities of non-indigenous shrub species indicate complicated invasion dynamics *Biol. Inv.* **10**, 833-846.

## 2007

- Pavard, S., & **Metcalf, C.J.E.** 2007. Negative selection on *BRCA1* susceptibility alleles sheds light on the population genetics of late-onset diseases and aging theory *PLoS-One* **11**, e1206.

- **Metcalfe, C.J.E.**, & Pavard, S. 2007. All paths to fitness lead through demography *Trends Ecol. Evol.* **22**, 563-564.
- **Metcalfe, C.J.E.**, & Koons, D.N. 2007. Environmental Autocorrelation and the Evolution of Survival *Proc. Roy. Soc. B.* **1622**, 2153-2160.
- **Metcalfe, C.J.E.**, & Pavard, S. 2007. Why evolutionary biologists should be demographers *Trends Ecol. Evol.* **22**, 205-212.
- **Metcalfe, C.J.E.**, Hampson, K., Gray, A., & Andrianirina, R. 2007. Herpetofaunal assemblages on seven offshore islands of Northwestern Madagascar. *Trop. Zool.* **20**, 151-161.
- **Metcalfe, C.J.E.**, Hampson, K., & Koons, D.N. 2007. What happens when density increases? Sudden and gradual influx into refuges and implications for conservation. *Animal Cons.* **10**, 478-486.
- **Metcalfe, C.J.E.**, Hampson, K., Andriamizava, A., Andrianirina, R., Cairnes, T., Gray, A., Ramiarisoa, C., & Sondotra, H. 2007. The beaches of Northwest Madagascar: an important nesting habitat for green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) turtles. *Oryx* **41**, 232-238.

## 2006

- Rees, M., Childs, D.Z., **Metcalfe, C.J.E.**, Rose, K.E., Sheppard, A., Grubb, P.J., & Ellner, S.P. 2006. Evolution of seed dormancy and delayed flowering in monocarpic plants: selective interactions in a stochastic environment *Am. Nat.* **168**, E53-E71.
- **Metcalfe, C.J.E.**, Rees, M., Alexander, J.M., & Rose, K.E. 2006. Growth-survival trade-offs and allometries in rosette-forming perennials. *Funct. Ecol.* **20**, 217-225.

## 2005

- **Metcalfe, C.J.E.**, Bayly, N., Bisoa, M., Rabearivony, J., & Stewart-Jones, A. 2005. Edge effect from paths on two chameleon species in Madagascar *African J. Herp.* **54**, 99-102.
- **Metcalfe, C.J.E.**, Bayly, N., Bisoa, M., Rabearivony, J., & Stewart-Jones, A. 2005. *Furcifer oustaleti*, *Furcifer rhinocerotus* (NCN) Density. *Herp. Rev.* **36**, 447.
- **Metcalfe, C.J.E.**, Bayly, N., Bisoa, M., Rabearivony, J., & Stewart-Jones, A. 2005. *Furcifer oustaleti*, *Furcifer rhinocerotus* (NCN) Predation. *Herp. Rev.* **36**, 447-448.

## 2003

- **Metcalfe, J.C.**, Rose, K., & Rees, M. 2003. Evolutionary demography of monocarpic perennials. *Trends Ecol. Evol.* **18**, 471-480.

## BOOK CHAPTERS

- **Metcalfe, C.J.E.** 2016 Life History Evolution in Plants. In Kliman, R. (ed.) *Encyclopaedia of Evolutionary Biology*. vol2 p359-360. Oxford: Academic press.
- Bughardt, L. **Metcalfe, C.J.E.** 2017. The evolution of environment-dependent senescence in semelparous plants: insights into the genetic and physiological basis from a model organism. *Chapter in: The Evolution of Senescence in the Tree of Life*
- Arinaminpathy, N. **Metcalfe, C.J.E.** & Grenfell, B.T. 2013. Viral dynamics and mathematical models in 'Viral Infections in Humans: Epidemiology and Control (5th Ed)' Eds. Springer. Editors: RA Kaslow, LR Stanberry, JW LeDuc
- Clark, J.S., Bell, D., Dietze, M., Hersh, M., Ibanez, I., LaDeau, S., McMahon, S.M., **Metcalfe, C.J.E.**, Moran, E., Pangle, L. & Wolosin, M. 2008. Models for demography of plant populations in *Handbook of Bayesian Analysis* Eds. A. O'Hagan & M. West.
- Buckley, Y.M., & **Metcalfe, C.J.E.** 2006. Density dependence in invasive plants: demography, herbivory, spread and evolution in *Conceptual Ecology and Invasions Biology: Reciprocal Approaches to Nature*. Eds. Cadotte, McMahon & Fukami. Springer-Verlag. Dordrecht, The Netherlands.

## REPRESENTATIVE PRESENTATIONS

- Feb 2016. Challenges of measles control and elimination in resource poor settings. Invited panel. AAAS Annual Meeting, Washington DC, USA.
- Jan 2016. Disease in motion: childhood infections in a changing world. Invited Seminar. Department of Ecology and Evolutionary Biology, University of Toronto, Canada.

- Dec 2015. Childhood infections and our changing demography: declining births, increasing mobility and measles and rubella. Invited Seminar. British Ecology Society Annual Meeting, Session on 'Predicting the future: Ecological forecasting in a changing world'
- Nov 2015. Measles and rubella in Madagascar: current burden, impending risks, and prospects for control. Centre for Health and Wellbeing, Princeton University.
- Nov 2015. Disease in motion: understanding drivers and optimising control of infectious diseases, Invited Seminar. Dept of Ecology and Evolutionary Biology, Yale University
- Oct 2015. Human demography and childhood infections: measles and rubella in a changing world. Invited Seminar. Dept of Demography, UC Berkeley.
- Aug 2015. Landscapes of Immunity: the ecology of childhood infections, and the impacts of vaccination. Invited Seminar, Ecology, Evolution and Environmental Biology Department, Columbia University.
- Aug 2015. Evolution of age trajectories of mortality and infectious disease Invited Talk, Ecological Society of America, Annual Meeting, Baltimore, USA.
- June 2015. Measles and Rubella in Madagascar. Invited Talk, Institut Pasteur de Madagascar, Antananarivo, Madagascar.
- June 2015 Mapping geographic heterogeneity in immunity for risk assessment and targeting of measles and rubella control. Invited Talk, Vaccine Modeling Initiative meeting, London, UK.
- April 2015. Mapping Immunity: Dynamics of Herd Protection and Consequences for Public Health. Centre for Health and Wellbeing Seminar Series, Princeton University.
- March 2015. Opportunities and challenges of Integral Projection Models for modelling infectious diseases and their dynamics. Invited Speaker. BES conference, Sheffield, Demography beyond the population.
- Jan 2015. The intersection of demography and epidemiology: the dynamics of longitudinal herd immunity. Invited speaker; Epidemiology of Microbial Diseases Seminar Series, Yale School of Public Health; Yale.
- March 2014. Rubella and vaccination: the intersection of biology, ecology and public policy. Invited Speaker. Harvard School of Public Health Infectious Disease Seminar Series
- April 2014. Life history evolution in monocarps: from population patterns to genetic mechanisms. Invited Speaker. Duke Biology Seminar Series
- Jan 2014. Rubella and vaccination: the intersection of biology, ecology and public policy. Invited Speaker. Infectious Disease Group, UCLA California Centre for Population Research Seminar.
- June 2013. Human demography shapes the dynamics and burden of Rubella: implications for vaccination policy. Invited Speaker. The Keyfitz Centennial Symposium on Mathematical Demography. Mathematical Biosciences Institute, Ohio, USA.

## FUNDING SOURCES

- 2015-2017: The Wellcome Trust (\$ 619,618). Seasonal drivers of human movement and aggregation in a changing climate: consequences for infectious disease dynamics and control. PI.
- 2013-2015: Bill & Melinda Gates Foundation (\$ 1,024,809). Use of novel modelling approaches to improve measles and rubella vaccination strategies. co-PI.
- 2013-2014: Royal Society Research Grant (£13,000) for research into microbial communities of oak trees
- 2010-2015: University Research Fellowship from the Royal Society. PI
- 2012-2103: John Fell Oxford University Press Research Fund (£68,122) award for research into the horse chestnut bleeding canker pathogen PI.
- 2013: Max Planck society grant "Demography in a continuous world: new advances in integral projection models II" (€30,000). co-PI
- 1998; 1999; 2000 Royal Geographic Society award; Henrietta Hutton award; BP conservation award, Oxford Society grant for undergraduate expeditions to Borneo and Madagascar.

## TEACHING

- April 2016 *Introduction of rubella-containing vaccine*, at Johns Hopkins Bloomberg School of Public Health, as part of the Master of Public Health course
- 2016 (spring) *Epidemiology: an ecology and evolutionary perspective*, undergraduate level course, Princeton; WWS598/GHP351

- Nov 2015 *Evolutionary Medicine*, contributed seminar, with Stephen Sterns, Yale University
- 2015 (fall) *Disease Ecology, Economics, and Policy*, undergraduate course, co-taught With B. Grenfell, Princeton
- 2015 (spring) *Epidemiology*, graduate level course, Woodrow Wilson School, Princeton; WWS598/GHP350
- 2015 (spring) lecture on *Evolutionary demography with monocarpic perennials*, as part of the International Max Planck Training School for Demography, Rostock.
- 2014 (fall) *Disease Ecology, Economics, and Policy*, undergraduate course, co-taught With B. Grenfell, Princeton
- 2014 (spring) *Epidemiology*, graduate level course, Woodrow Wilson School, Princeton
- 2013 *Class A Non-Stipendiary Lecturer in Biological Sciences at St Catherines College, Oxford*
- 2013 *Integral Projection Models* two day course at the 1st Meeting of the Evolutionary Demography Society, Max Planck Odense
- 2012 *Demography In a Continuous World: New Advances In Integral Projection Models* at the Ecological Society of America meeting
- 2012 *Integral Projection Models* week long course at the International Max Planck Training School for Demography
- *Integrating demography with life history evolution and evolutionary theory* as part of the Stanford Workshop on Biodemography, May 2013.
- 2011; 2012 *Modeling for Public Health: the Example of Rubella Vaccination* at Johns Hopkins Bloomberg School of Public Health, as part of the Master of Public Health course
- 2006 *Evolutionarily Stable Strategies in Stochastic Environments* as part of the Winter Semester Evolutionary Demography Course, Max Planck Institute for Demographic Research

## INTERNATIONAL RESEARCH MEETINGS / SPECIAL SESSIONS ORGANIZED

British Ecological Society Meeting, Edinburgh, 14<sup>th</sup> Dec 2015.

*Using Ecology to Guide Public Health Policy* [with Golding]

British Ecological Society Meeting, Sheffield, 24<sup>th</sup> -26<sup>th</sup> March 2015.

*Demography beyond the population* [with Griffiths, Jongejans, Merow, McMahon, Salguero-Gomez]

PIIRS Workshop, Princeton, US, 23<sup>rd</sup> -24<sup>th</sup> Feb 2015.

*Globalization and the spatial spread of infectious disease: opportunities and challenges of novel and existing data-sets.*

RAPIDD Workshop, Princeton, US, 14<sup>th</sup> -15<sup>th</sup> May 2014.

*The impact of co-infection on antimicrobial chemotherapy and drug resistance part II.*

RAPIDD Workshop, Princeton, US, 29<sup>th</sup> April-2<sup>nd</sup> May 2012.

*The impact of co-infection on antimicrobial chemotherapy and drug resistance.*

Evolutionary Demography Workshop, Duke, USA, 23-25 October 2006.

*What determines quantitative differences in age trajectories?*

Evolutionary Demography Workshop, Rostock, Germany, 15-18 August 2005.

*What determines qualitative differences in age trajectories?*

## POSTDOCS

Ben Daziel: 2014-2015

Joaquin de Prada: 2014-current

## GRADUATE STUDENTS

### Advisor

Amy Winter: 2013-current

Saki Takahashi: 2014-current

Malavika Rajeev: 2015-current

### Committee member

Esther Shyu (Woods Hole Oceanographic Institute): 2013-2015

Ruthie Birger (Princeton): 2014-current

Sinead Morris (Princeton): 2014-current

Cara Brook (Princeton): 2014-current  
Matthew Aardema (Princeton): 2014-current  
Elizabeth Heppenheimer (Princeton): 2015-current  
**Membre du Jury**  
Keitly Mensah (Faculté de Médecine, Lyon): 2015. Thèse pour le Grade de 'Docteur en Médecine'

## SERVICE

- 2015: **Reviewed papers** for *American Journal of Epidemiology*, *PloS Biology*, *the New England Journal of Medicine*, *Ecology Letters*; **Guest Editor** at the *Journal of Applied Ecology*
- 2015 - present: **Associate Editor** for *Ecology Letters*.
- 2015 - present: **Editorial board** of *Philosophical Transactions of the Royal Society*
- 2014 - present: **Associate Editor** for *Methods in Ecology and Evolution*
- 2014 - 2016: **Associate Editor** for *American Naturalist*.
- 2014 - present: member of the **Advisory Science Committee** of two data-bases of demographic information on plants and animals (COMPADRE and COMADRE) hosted at the Max Planck Institute of Demographic Research.
- 2013 - present: Board member of the **Society for Evolutionary Demography**.
- 2014: **Reviewed papers** for *American Journal of Epidemiology*, *Journal of Ecology*, *PloS Biology*, *PloS Currents*, *PloS Computational Biology*, *PloS Medicine*, *PloS Pathogens*, *Proceedings of the Royal Society of London Series B*, *Science*, *Vaccine*, **grant proposals** for the *National Science and Engineering Research Council, Canada*, and **fellowship proposals** for the *Medical Research Council, UK*
- 2014: **Guest Edited** a Special Issue of *Epidemics* on the subject of current challenges in infectious disease modelling.
- 2013: **Guest Edited** a Special Issue of *Philosophical Transactions of the Royal Society* on the subject of Infectious Disease Eradication.
- 2013: **Internal Examiner** for two PhD candidates (Rob Noble; Claire Dooley) at Oxford University, Dept of Zoology
- 2011: **Technical Advisor** to the *World Health Organization Strategic Advisory Group of Experts* on the topic of the introduction of rubella vaccination.

Before 2015, I **reviewed papers** for (among others): *American Journal of Epidemiology*, *American Naturalist*, *Ecology*, *Ecology Letters*, *Genetics*, *the Journal of Animal Ecology*, *the Journal of Applied Ecology*, *the Journal of Evolutionary Biology*, *Journal of the Royal Society Interface*, *Proceedings of the National Academy of Sciences*, *Proceedings of the Royal Society of London Series B*, *PloS Medicine*, *PloS Pathogens*, *Science*, *Vaccine*. I have **reviewed grant proposals** for the *National Science Foundation, USA* and the *British Ecological Society*.

## PUBLIC OUTREACH

2013: Are we at risk of a global pandemic? Cafe scientifique for the Royal Society.  
2013: BBC health check interview (<http://www.bbc.co.uk/programmes/p0114n5q>)

## SOFTWARE PRODUCED

**IPMpack**: an R package for modeling demography of populations structured by continuous traits.  
With Sean McMahon, Rob Salguero-Gomez, Cory Merow and Eelke Jongejans. (<http://ipmpack.r-forge.r-project.org>)

**vacem**: an R package for estimating parameters for a Vaccination Activities Coverage Estimation Model.  
With Justin Lessler. (<http://cran.r-project.org/web/packages/vacem/index.html>)