

ROBIN THOMPSON

Christ Church, University of Oxford

www.robin-thompson.co.uk ♦ robin.thompson@chch.ox.ac.uk

RESEARCH POSITIONS

- Oct 2017** – Christ Church, University of Oxford
Present *Junior Research Fellowship in the Sciences*
Conducting independent research programme in mathematical epidemiology. Developing models of pathogen transmission and evolution, parameterising them using statistical inference techniques, and using them for epidemic forecasting and assessing potential control interventions
- Mar 2016** – Department of Zoology, University of Oxford
Sep 2017 *Postdoctoral research assistant in Mathematical Epidemiology*
Built and analysed mathematical models for the transmission and evolution of infectious diseases, with application to HIV (working with Dr Katrina Lythgoe)
- Dec 2015** – Department of Computer Science, University of Oxford
Feb 2016 *Postdoctoral research assistant in Computational Biology*
Developer of Lung Chaste, a computational model of the respiratory system (working with Professor David Kay and Dr Rafel Bordas)

EDUCATION

- Oct 2011** – Gonville and Caius College, University of Cambridge
Nov 2015 *PhD in Mathematical Biology*
Thesis title: Parameter inference and outbreak modelling for forecasting and optimising control of invading infectious diseases (Supervisors: Dr Nik Cunniffe and Professor Chris Gilligan, Department of Plant Sciences)
- Oct 2007** – Worcester College, University of Oxford
Jun 2011 *MMath in Mathematics, first class honours*
Dissertation title: Modelling cell migration and adhesion during development (Supervisors: Professor Ruth Baker and Dr Christian Yates)

PUBLICATIONS

Submitted

19. Hart WS, Hochfilzer L, Cunniffe NJ, Lee H, Nishiura H, **Thompson RN**. Accurate forecasts of the effects of Ebola interventions require variations in symptoms during infection to be accounted for. Submitted *Epidemics*

18. **Thompson RN**, Stockwin JE, van Gaalen RD, Polonsky JA, Demarsh PA, Dahlgvist E, Li S, Miguel E, Jombart T, Lessler J, Cauchemez S, Cori A. Improved inference of time-varying reproduction numbers during infectious disease outbreaks. Submitted *Epidemics*

In Press

17. **Thompson RN**, Brooks-Pollock E. Detection, forecasting and control of infectious disease epidemics: modelling outbreaks in humans, animals and plants. In Press *Phil Trans Roy Soc B*

16. **Thompson RN**, Thompson CP, Pelerman O, Gupta S, Obolski U. Increased frequency of travel in the presence of cross-immunity may act to decrease the chance of a global pandemic. In Press *Phil Trans Roy Soc B* (preprint available on bioRxiv)

15. **Thompson RN**, Morgan OW, Jalava K. A simple rule of thumb for declaring an Ebola outbreak over. In Press. *Phil Trans Roy Soc B* (preprint available on bioRxiv)

14. Obolski U, Gori A, Lourenço J, Thompson C, **Thompson RN**, French N, Heyderman R, Gupta S. Identifying genes associated with invasive disease in *S. pneumoniae* by applying a machine learning approach to whole genome sequence typing data. In Press *Sci Rep* (preprint available on bioRxiv)

Published

13. **Thompson RN**, Wymant C, Spriggs RA, Raghwani J, Fraser C, Lythgoe KA. Link between the numbers of virus particles and variants founding new HIV-1 infections depends on the timing of transmission. *Virus Evol* 5: vey038, 2019

12. Somveille M, Firth JA, Aplin LM, Farine DR, Sheldon BC, **Thompson RN**. Movement and conformity interact to establish local behavioural traditions in animal populations. *PLoS Comp Biol* 14: e1006647, 2018

11. Abdullah N, Graham SC, Birch J, Kelly J, Goncalves-Carneiro D, Mitchell T, **Thompson RN**, Lythgoe KA, Logan N, Hosie MJ, Bavro VN, Willett BJ, Heaton MP, Bailey D. Structure-guided identification of a pathogen with pandemic potential. *J Virol* 92: e01248, 2018

10. Suffert F, **Thompson RN**. Some reasons why the latent period should not always be considered constant over the course of a plant disease epidemic. *Plant Pathol* 67: 1831-1840, 2018

9. **Thompson RN**, Hart WS. Effect of confusing symptoms and infectiousness on forecasting and control of Ebola outbreaks. *Clin Inf Dis* 67: 1472-1474, 2018

8. Obolski U, Lourenço J, Thompson C, **Thompson RN**, Gori A, Gupta S. Vaccination can drive an increase in frequencies of antibiotic resistance among non-vaccine serotypes of *Streptococcus pneumoniae*. *Proc Natl Acad Sci* 1: 201718712, 2018
7. **Thompson RN**, Gilligan CA, Cunniffe NJ. Control fast or control smart: when should invading pathogens be controlled? *PLoS Comp Biol* 14: e1006014, 2018
6. Raghwani J, **Thompson RN**, Koelle K. Selection on non-antigenic gene segments of seasonal influenza A virus and its impact on adaptive evolution. *Virus Evol* 3: vex034, 2017
5. Kraemer MUG, Faria NR, Reiner Jr RC, Golding N, Nikolay B, Stasse S, Johansson MA, Salje H, Faye O, Wint GRW, Niedrig M, Shearer FM, Hill SC, **Thompson RN**, Bisanzio D, Taveira N, Nax HH, Pradelski BSR, Nsoesie EO, Murphy NR, Bogoch II, Khan K, Brownstein JS, Tatem AJ, de Oliveira T, Smith DL, Sall A, Pybus OG, Hay SI, Cauchemez S. Spread of Yellow Fever Virus outbreak in Angola and the Democratic Republic of Congo 2015-2016: a modelling study. *Lancet Inf Dis* 17: 330-338, 2016
4. †**Thompson RN**, Gilligan CA, Cunniffe NJ. Detecting presymptomatic infection is necessary to forecast major epidemics in the earliest stages of infectious disease outbreaks. *PLoS Comp Biol* 12: e1004836, 2016
3. **Thompson RN**, Cobb RC, Gilligan CA, Cunniffe NJ. Management of invading pathogens should be informed by epidemiology rather than administrative boundaries. *Ecol Model* 324: 28-32, 2016
2. **Thompson RN**, Yates CA, Baker RE. Modelling cell migration and adhesion during development. *Bull Math Biol* 74: 2793-2809, 2012
1. Tappin SJ, Howard TA, Hampson MM, **Thompson RN**, Burns CE. On the autonomous detection of coronal mass ejections in heliospheric imager data. *J Geophys Res* 117: A05103, 2012

†This publication was awarded the PLoS Computational Biology Research Prize 2017 for its public impact in highlighting the need for accurate diagnostic tests for Ebola

IN THE NEWS

- | | |
|-----------------|---|
| Nov 2018 | <i>The Daily Beast</i> (22/11/2018)
Stuck on a plane beside a sick person? It might be good for you |
| Nov 2018 | <i>The Metro</i> (7/11/2018)
Mass air travel may put brakes on next pandemic |
| Nov 2018 | <i>Taiwan News</i> (6/11/2018)
Air travel serves as 'natural vaccination' to shield humans from next deadly pandemic |
| Nov 2018 | <i>Daily Mail</i> (2/11/2018) |

Air travel is a ‘natural vaccination’ and could protect humanity from the next pandemic ‘because it strengthens your immune system against killer germs’ by spreading minor illnesses across the globe

Nov 2018 *New Scientist (1/11/2018)*
Why air travel makes deadly disease pandemics less likely

PRIZES AND GRANTS

Aug 2018 *Japan Society for the Promotion of Science (JSPS) Postdoctoral Fellowship (£4,962)*
To undertake research for two months at the University of Hokkaido, Japan, with Professor Hiroshi Nishiura

Apr 2018 *London Mathematical Society vacation bursary (£1,440)*
For undergraduate student Francesca Lovell-Read to undertake the project “The canary in the coal mine: using mathematics to improve surveillance for plant pathogens”

Mar 2018 *EPRSC vacation bursary (£2,380)*
For undergraduate student Leonhard Hochfilzer to undertake the project “Multi-scale models of infectious disease epidemics”

Mar 2018 *EPSRC vacation bursary (£2,380)*
For undergraduate student Thomas Critchley to undertake the project “Optimal targeting of HIV-1 interventions towards at-risk populations in coastal Kenya”

Nov 2017 *PLoS Computational Biology Research Prize 2017 (£1,800)*
For research paper in PLoS Computational Biology with highest public impact

Jun 2017 *Oxford University student-led teaching award nominee*
Nominated in the “Outstanding Tutor” category

Feb 2017 *Keystone Future of Science Award (£1,000)*
For modelling HIV-1 transmission between hosts, to permit travel to the Keystone symposium “Modeling Viral Infections and Immunity” in USA

Apr 2016 *EPRSC vacation bursary (£2,254)*
For undergraduate student William Hart to undertake the project “Choosing appropriate mathematical models for planning control of invading pathogens”

Apr 2016 *Wellcome Trust Summer Research Experience Placement bursary (£1,750)*
For undergraduate student Lauren Enright to undertake the project “Incorporating host heterogeneity into models of virus evolution”

Dec 2012 *University of Lincoln academic grant (£2,000)*
For a research visit to Lincoln, New Zealand, to work with Professor Don Kulasiri

Nov 2012 *Frank Smart studentship (£1,000)*
Research award for studying the spread of citrus greening disease in Florida

May 2012 *Best talk prize, SIAM student conference, Manchester*

Oct 2011 *BBSRC Doctoral Training award*

PRESENTATIONS

Conferences

- Feb 2019** Royal Society bilateral international meeting – Biomathematics topic stream (invited talk)
- Mar 2018** British Applied Maths Colloquium, St Andrews (invited talk)
- Jul 2017** Mathematical Models in Ecology and Evolution, London (talk)
- Jun 2017** Mathematical and Computational Evolutionary Biology, France (talk)
- May 2017** Modeling Viral Infections and Immunity Keystone symposium, USA (talk and poster)
- Aug 2013** International Congress of Plant Pathology, China (talk)
- June 2013** Society for Mathematical Biology Annual Meeting, USA (talk)
- Aug 2012** Models in Population Dynamics and Ecology, Brazil (talk)
- May 2012** SIAM National Student Conference, Manchester (talk)
- Dec 2010** American Geophysical Union fall meeting, USA (poster)

Workshops

- Mar 2018** R Epidemics Consortium meeting, London
- Aug 2016** ICERM Predictive Policing Workshop, USA
- Jun 2016** Hackout 3: Analysis and modelling tools for emergency outbreak response, USA
- Aug 2014** Dynamics of Infectious Diseases Summer School, Finland
- Aug 2013** International Epidemiology Workshop, China (poster)
- Jul 2013** Gates' Epidemiology Workshop, Cambridge

Seminars

- Feb 2019** Department of Infectious Disease Epidemiology seminar, Imperial College London
- Feb 2019** Department for Applied Mathematics and Theoretical Physics seminar, Cambridge
- Feb 2019** Oxford University Invariant Society seminar
- Jan 2018** WCMB mathematical biology meeting, Oxford
- Apr 2017** Department of Zoology infectious diseases seminar, Oxford
- Mar 2017** University of Bath mathematical biology seminar
- Feb 2015** Lady Margaret Hall mathematics seminar, Oxford
- Jul 2014** Department of Plant Sciences mathematical epidemiology seminar, Cambridge
- Jan 2013** University of Lincoln mathematics seminar, New Zealand
- Jul 2012** Department of Plant Sciences mathematical epidemiology seminar, Cambridge
- Jan 2011** Worms and Bugs lecture series, Cambridge

Outreach

- Feb 2019** Christ Church Horizons workshop, London
- Jun 2018** Oxford University undergraduate open day
- Apr 2018** Christ Church mathematics lecture
- Mar 2018** Further Maths – What Next? Oxford University outreach lecture

TEACHING

Lectures

- Apr 2014** – *Part IA Mathematical Biology Lecturer, University of Cambridge*
- Jun 2014** Wrote and delivered seven matrix modelling lectures (to 200 students) and ran associated computer programming practicals. Received top feedback from students since the course began
- Feb 2014** – *Lecturer in Mathematical Epidemiology, Wellcome Trust*
- Mar 2015** Wrote and delivered three epidemiological modelling lectures in both years to policy-makers and epidemiologists, and ran two computing practicals

Tutorials/classes

- Oct 2017** – *Applied Mathematics Tutor, Christ Church, University of Oxford*
- Present** Delivering weekly tutorials on first and second year undergraduate applied mathematics and statistics courses. Other responsibilities involve conducting admissions interviews, setting/marking internal examinations and giving talks at undergraduate open days
- Oct 2014** – *Stipendiary Lecturer in Applied Mathematics, Lady Margaret Hall, University of Oxford*
- Sep 2017** Delivered weekly tutorials on first and second year undergraduate applied mathematics courses including Mathematical Biology, Differential Equations, Calculus of Variations and Fluid Dynamics. Other responsibilities involved conducting admissions interviews, setting/marking internal examinations and pastoral care of 12 undergraduates per year
- Oct 2011** – *Non-Stipendiary Lecturer in Mathematics, Worcester College, University of Oxford*
- Sep 2013** Delivered weekly tutorials on first year undergraduate applied mathematics, probability and statistics courses
- Oct 2011** – *Mathematical Biology Tutor, University of Cambridge*
- Sep 2014** Conducted weekly supervisions in Part IA Mathematical Biology (ten students per year), and assisted the running of associated computer programming practicals

Research supervision

- Oct 2018** – *DPhil supervisor, University of Oxford*
- Present** Using multi-scale models for infectious disease epidemic forecasting and control (William Hart)
- Oct 2018** – *DPhil co-supervisor, University of Oxford*
- Present** Mathematical modelling of the impact of air travel on the pandemic potential (Ben Singer, co-supervised with Professor Michael Bonsall)
- Oct 2018** – *DPhil co-supervisor, University of Oxford*
- Present** Mathematical modelling for improving diagnoses of combined tuberculosis/diabetes cases (Rahil Sachak-Patwa, co-supervised with Professor Helen Byrne)
- Oct 2016** – *MMath dissertation supervisor, University of Oxford*

- Present** 2017-18: Efficient analysis of epidemiological models in which the infectiousness of each infected host is time-dependent (William Hart)
2016-17: The role of host heterogeneity in HIV evolution (Lauren Enright)
- Jun 2016 – Present** *Undergraduate summer project research supervisor, University of Oxford*
2018: The canary in the coal mine: using mathematics to improve surveillance for plant pathogens (Francesca Lovell-Read)
2018: Multi-scale models of infectious disease epidemics (Leonhard Hochfilzer)
2018: Optimal targeting of HIV-1 interventions towards at-risk populations in coastal Kenya (Thomas Critchley, co-supervised by Professor Helen Byrne)
2017: A user-friendly interface for inferring pathogen transmissibility (Jake Stockwin)
2016: Choosing appropriate mathematical models for planning control of invading pathogens (William Hart)
2016: Incorporating host heterogeneity into models of virus evolution (Lauren Enright)
- Oct 2015 – Present** *Visiting student project research supervisor, University of Oxford*
2018: Modelling hidden infections in infectious disease epidemics (Liane Solomon)
2015: Modelling major epidemics of invading pathogens (Brandi Henri)
- Jun 2012 – Sep 2015** *Part II/III Dissertation and Summer Project Co-supervisor, University of Cambridge*
2014-15: Optimising the timing of control of invading pathogens (Fiona Hampshire)
2013-14: Detection of invading pathogens in environments containing multiple host types (Oliver Watson)
2012: Modelling pathogen invasion in a heterogeneous landscape (Ben Price)

POSITIONS OF RESPONSIBILITY

- Jan 2019 – Present** *Editorial board member, Theoretical Biology and Medical Modelling*
Handle submitted papers, assign reviewers and make suggestions about editorial decisions
- Jul 2018 – Present** *Guest editor, Philosophical Transactions of the Royal Society B*
Lead editor of the issue “Detection, forecasting and control of infectious disease epidemics: modelling outbreaks in human, animals and plants” with Dr Ellen Brooks-Pollock and Professor Sunetra Gupta
- Jul 2017 – Present** *Editor, Society for Mathematical Biology (SMB) Newsletter*
Write articles, conduct research interviews, edit and distribute the newsletter to readership of 2,500
- May 2017 – Present** *Examiner, University of Oxford*
Examined DPhil viva (Susan Hawkins), two DPhil Transfer of Status vivas, and three MMath Part C dissertations
- Feb 2013 –** *Research grant and publication reviewer*

Present Reviewed research grants for Medical Research Council and London Mathematical Society, and publications for journals including Philosophical Transactions of the Royal Society B, Scientific Reports, Epidemics and Journal of Mathematical Biology

REFEREES

1. Dr Nik Cunniffe, Senior Lecturer in Mathematical Epidemiology, University of Cambridge
Email: njc1001@cam.ac.uk
2. Professor Sunetra Gupta, Professor of Theoretical Epidemiology, University of Oxford
Email: sunetra.gupta@zoo.ox.ac.uk
3. Professor Philip Maini FRS FMedSci, Professor of Mathematical Biology and Director of Wolfson Centre for Mathematical Biology, University of Oxford
Email: philip.maini@maths.ox.ac.uk