

# ROBIN THOMPSON

Christ Church, University of Oxford

[www.robin-thompson.co.uk](http://www.robin-thompson.co.uk) ♦ [robin.thompson@chch.ox.ac.uk](mailto:robin.thompson@chch.ox.ac.uk)

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## RESEARCH POSITIONS

- Oct 2017 – Present** – Christ Church, University of Oxford  
*Junior Research Fellowship in the Sciences*  
Conducting independent research programme in mathematical and statistical epidemiology. Developing mathematical models of pathogen transmission and evolution, parameterising them using statistical inference techniques, and using them for epidemic forecasting and assessing potential control interventions
- Dec 2019 – Present** – London School of Hygiene and Tropical Medicine  
*Assistant Professor (0.2 FTE)*  
Conducting research into real-time modelling of infectious disease outbreaks. Using branching processes to explore the risk of flare-ups of emerging viruses in new locations (working with Dr Sebastian Funk)
- Mar 2016 – Sep 2017** – Department of Zoology, University of Oxford  
*Postdoctoral research assistant in Mathematical Epidemiology*  
Built and analysed probabilistic models for the transmission and evolution of infectious diseases, with application to HIV (working with Dr Katrina Lythgoe)
- Dec 2015 – Feb 2016** – Department of Computer Science, University of Oxford  
*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 – Nov 2015** – Gonville and Caius College, University of Cambridge  
*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 – Jun 2011** – Worcester College, University of Oxford  
*MMath in Mathematics, first class honours*  
Dissertation title: Modelling cell migration and adhesion during development (Supervisors: Professor Ruth Baker and Dr Christian Yates)

## PUBLICATIONS

27. **Thompson RN**, Thompson MJ, Hurrell JW, Sun L, Obolski U. Assessing the threat of major outbreaks of vector-borne diseases under a changing climate. In Press *Astro Space Sci Proc*
26. **Thompson RN**. Pandemic potential of 2019-nCoV. *Lancet Inf Dis* 3099: 30068, 2020
25. **Thompson RN**. Novel coronavirus outbreak in Wuhan, China, 2020: Intense surveillance is vital for preventing sustained transmission in new locations. *J Clin Med* 9: 498, 2020
24. Jung S-M\*, Kinoshita R\*, **Thompson RN\***, Linton NM, Yang Y, Akhmetzhanov A, Nishiura H. Epidemiological identification of a novel pathogen in real time: Analysis of the atypical pneumonia outbreak in Wuhan, China, 2019-2020. *J Clin Med* 9: 637, 2020
23. Greischar MA, Alexander HK, Bashey F, Bento AI, Bhattacharya A, Bushman M, Childs LM, Daversa DR, Day T, Faust CL, Gallagher ME, Gandon S, Glidden CK, Halliday FW, Hanley KA, Kamiya T, Read AF, Schwabl P, Sweeny AR, Tate AT, **Thompson RN**, Wale N, Wearing HJ, Yeh PJ, Mideo N. Evolutionary consequences of feedbacks between within-host competition and disease control. *Evol Med Public Health* 1: 30-34, 2020
22. Hart WS, Hochfilzer LFR, Cunniffe NJ, Lee H, Nishiura H, **Thompson RN**. Accurate forecasts of the effectiveness of interventions against Ebola may require models that account for variation in symptoms during infection. *Epidemics* 29: 100371, 2019
21. **Thompson RN**, Stockwin JE, van Gaalen RD, Polonsky JA, Kamvar ZN, 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. *Epidemics* 29: 100356, 2019
20. Cullerne J, French A, Poon D, Baxter A, **Thompson RN**. The pedagogical power of context: extending the epidemiology of Eyam. *Phys Educ* 55: 015021, 2019
19. **Thompson RN**, Jalava K, Obolski U. Sustained transmission of Ebola in new locations: more likely than previously thought. *Lancet Inf Dis* 19: 1058-59, 2019
18. **Thompson RN**, Brooks-Pollock E. Preface to theme issue 'Modelling infectious disease outbreaks in humans, animals and plants: epidemic forecasting and control'. *Phil Trans Roy Soc B* 374: 20190375, 2019
17. **Thompson RN**, Brooks-Pollock E. Detection, forecasting and control of infectious disease epidemics: modelling outbreaks in humans, animals and plants. *Phil Trans Roy Soc B* 374: 20190038, 2019

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. *Phil Trans Roy Soc B* 374: 20180274, 2019
15. **Thompson RN**, Morgan OW, Jalava K. Rigorous surveillance is necessary for high confidence in end-of-outbreak declarations for Ebola and other infectious diseases. *Phil Trans Roy Soc B* 374: 20180431, 2019
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. *Sci Rep* 9: 4049, 2019
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

\* Joint first authors

† 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

- Jan 2020 – Feb 2020** – Interviewed on the radio (BBC radio 4, LBC) and television (BBC, ITV, Channel 4), and featured in newspapers (including The Guardian, Daily Mail, The Independent) and magazines (Science Magazine and New Scientist) about research into the coronavirus disease 2019 (COVID-19) outbreak
- Nov 2018** Research into the effect of global travel on the pandemic risk featured in *New Scientist*, *The Metro*, *Daily Mail* and international newspapers

## PRIZES AND GRANTS

- Mar 2020** *London Mathematical Society – Computer Science small grant (£800)*  
To develop a collaboration with Dr Shingo Iwami (Kyushu University, Japan) to understand the within-host and population-scale dynamics of multi-strain pathogens
- Apr 2019** *BBSRC Research Experience Placement bursary (£3,700)*  
For undergraduate student Silvia Shen to undertake the project “Estimating the risk of flare-ups of infectious disease in new locations”
- 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

**Apr 2020** Conference on World Affairs, USA (invited panellist)

**Apr 2020** British Applied Mathematics Colloquium, Glasgow (chair of mini-symposium “Multi-scale infectious disease outbreak modelling”)

**Feb 2020** Verdantix Innovation Summit, London (invited as an expert in infectious disease modelling to answer questions about COVID-19 in a question and answer session)

**Nov 2019** Global Forum on Innovations for Marginal Environments – Food security topic stream, United Arab Emirates (UK government-funded delegate)

- Aug 2019** Summer Short Course on Infectious Disease Modelling, Japan (plenary talk)
- 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 2020** Interdisciplinary workshop on Mathematical and Empirical research in the Applied Life Sciences (iMEALS), South Korea (invited talk)
- Feb 2020** Mathematical modelling and statistical analysis of infectious disease outbreaks: heterogeneity in space, time and social structure, and virus evolution, France (invited talk)
- Jan 2020** International workshop on big data applications: forecasting and real-time intervention analyses, Japan (invited talk)
- Sep 2019** On growth and pattern formation: a celebration of Philip Maini's 60<sup>th</sup> birthday, Oxford (session chair)
- Aug 2019** UK Biosecurity roundtable: emerging infectious diseases and bioweapons, Oxford
- Jun 2019** EEID RCN-IDEAS Workshop on Within-host Competition and Disease Control, USA
- May 2019** NERC UK-India Antimicrobial Resistance Partnership Workshop, India (NERC-funded delegate)
- 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**

- Jul 2019** IBM Deep Dive seminar, Kenya
- Jul 2019** CMMID seminar, London School of Hygiene and Tropical Medicine
- Jun 2019** George Institute for Global Health, Oxford
- May 2019** CSIR-National Chemical Laboratory Pune guest lecture, India
- 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
- Sep 2018** University of Tokyo Mathematical Biology 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 2020** Christ Church Horizons workshop, London
- Jan 2020** Christ Church Schools Lecture, Newcastle
- Nov 2019** “Being a researcher” question and answer panel, Oxford
- 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

- Aug 2019** *Lecturer in Mathematical Epidemiology, Institute of Statistical Mathematics, Japan*  
Wrote and delivered four epidemiological modelling lectures to policy-makers and epidemiologists
- Apr 2014 – Jun 2014** *Part IA Mathematical Biology Lecturer, University of Cambridge*  
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 – Mar 2015** *Lecturer in Mathematical Epidemiology, Wellcome Trust*  
Wrote and delivered three epidemiological modelling lectures in both years to policy-makers and epidemiologists, and ran two computing practicals

### Tutorials/classes

- Oct 2017 – Present** *Applied Mathematics Tutor, Christ Church, University of Oxford*  
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 – Sep 2017** *Stipendiary Lecturer in Applied Mathematics and Statistics, Lady Margaret Hall, University of Oxford*  
Delivered weekly tutorials on first and second year undergraduate applied mathematics and statistics 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**

- Jan 2020 –** *DPhil supervisor, University of Oxford*  
**Present** Using mathematical modelling to optimise detection of invading plant pathogens (Francesca Lovell-Read, co-supervised with Professor Christl Donnelly)
- Oct 2018 –** *DPhil supervisor, University of Oxford*  
**Present** Using multi-scale models for infectious disease epidemic forecasting and control (William Hart, co-supervised with Professor Philip Maini)
- 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** Platform diagnostics and their impact on infectious disease outbreak dynamics (Cassidy Nelson, 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 and in collaboration with an industry partner)
- 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 –** *Undergraduate summer project research supervisor, University of Oxford*  
**Present** 2019: Estimating the risk of flare-ups of infectious disease in new locations (Silvia Shen)  
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

- Mar 2020** – *Organising committee member, Interdisciplinary workshop on Mathematical and Empirical research in the Applied Life Sciences (iMEALS), South Korea*
- Invited speakers and arranged programme
- Sep 2019** – *External examiner, University of Lincoln (New Zealand)*
- Examined MSc thesis (Piyush Bhardwaj)
- Jan 2019 – Present** – *Editorial board member, Theoretical Biology and Medical Modelling*
- Handle submitted papers, assign reviewers and make suggestions about editorial decisions
- 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 – Present** – *Research grant and publication reviewer*
- 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, Journal of Mathematical Biology and PLoS Medicine
- Jul 2017 – Nov 2019** – *Editor, Society for Mathematical Biology (SMB) Newsletter*
- Wrote articles, conducted research interviews, edited and distributed the newsletter to readership of 2,500
- Jul 2018 – May 2019** – *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

## REFEREES

1. Dr Nik Cunniffe, Senior Lecturer in Mathematical Epidemiology, University of Cambridge  
Email: [njc1001@cam.ac.uk](mailto:njc1001@cam.ac.uk)
2. 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](mailto:philip.maini@maths.ox.ac.uk)
3. Professor Sunetra Gupta, Professor of Theoretical Epidemiology, University of Oxford  
Email: [sunetra.gupta@zoo.ox.ac.uk](mailto:sunetra.gupta@zoo.ox.ac.uk)