Melbourne School of Population & Global Health
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Robert Moss

2020–09–29

Current position

Senior Research Fellow
Melbourne School of Population and Global Health, University of Melbourne.

Statement

Rob Moss is a mathematical biologist and epidemiologist, who uses mathematical models to inform national pandemic preparedness and response policy, and develops near-real-time epidemic forecasting methods in collaboration with public health staff across Australia. He is also a member of the WHO Influenza Incidence Analytics Group (IIAG), where he leads the Australian discussions. Despite holding research-only appointments since obtaining his PhD in 2009, Rob is actively involved in curriculum development and delivery activities, develops interactive teaching tools, and regularly engages with audiences outside of the academic classroom.

Specialisation

Mathematical biology; Mathematical epidemiology; Infectious disease dynamics; Epidemic forecasting; Public health; Pandemic preparedness and response.

Education

University of Melbourne, Australia

2005–2008 PhD, Department of Computer Science and Software Engineering.

- Stawell Scholarship recipient, 2008
- Australian Postgraduate Award

2000–2004 BSc(Pure Maths), BE(Software, First Class Honours)

Appointments

University of Melbourne, Australia

Sep 2019– **Senior Research Fellow**, Melbourne School of Population and Global Health.

Aug 2014–Aug 2019 **Research Fellow**, Melbourne School of Population and Global Health.

Feb 2016–Dec 2017 **Academic Convener** (0.2 FTE), Data, Systems and Society Research Network.

Duke University, USA

Oct 2012–Jul 2014 **Visiting Assistant Professor**, Department of Mathematics.

CNRS, France

Jul 2010–Aug 2012 **Postdoc**, IR4M CNRS UMR8081, Université Paris-Sud.

University of Melbourne, Australia

Aug 2009–Jul 2010 **Research Officer**, Melbourne School of Population and Global Health.

Awards

Net amount: $221,155

2020–2021 **Moss R.** *Improving indicators of influenza impact.* Research Fellowship; Australian Partnership for Preparedness Research on Infectious Disease Emergencies (APPRISE) NHMRC Centres of Research Excellence. **Funding:** $141,155

Nov 2019 **Moss R.** Knowledge Transfer Award: Category 1, Open award for excellence in knowledge transfer achievements; Melbourne School of Population and Global Health.

May 2018 Lau T, Skvortsov A, Ristic B, Gailis R, Dawson P, McCaw JM, **Moss R.** *CIVSEC 2018 National Innovation Award for Civil Security*. Civil Security Congress and Exposition, Industry Defence and Security Australia Ltd..

May 2018 Lau T, Skvortsov A, Ristic B, Gailis R, Dawson P, McCaw JM, **Moss R.** *CIVSEC 2018 Innovation Award for Disaster Relief, Emergency Management and Humanitarian Services*. Civil Security Congress and Exposition, Industry Defence and Security Australia Ltd..

Sep 2010 **Moss R.** *The Origins of Renal Physiology*. An annual one-week course for renal fellows, at Mount Desert Island Biologic Laboratories, USA; American Society of Nephrology.

Aug 2008 **Moss R.** Stawell Scholarship; Melbourne School of Engineering. **Funding:** $10,000

Jan 2005–Jun 2008 **Moss R.** Australian Postgraduate Award; Australian Federal Government. **Funding:** $70,000

Grants

Net amount: $2,626,888

Apr 2020 Tomko M, Geard N, **Moss R.** *Modelling the spatio-temporal dynamics of Australian stay-at-home population for epidemiological applications (COVID-19)*. Platform Interdisciplinary Grant; Melbourne School of Engineering. **Funding:** $30,000

Mar 2020 McCaw JM, McVernon J, Dawson P, **Moss R**, Wood J, Shearer F, Price DJ. *Situational awareness analytics to support the COVID-19 response*. Research contract; Australian Government Department of Health. **Funding:** $766,765

Feb 2020 McVernon J, McCaw JM, McBryde E, Glass K, Geard N, **Moss R**, Black A. *Provision of technical support and preparedness modelling of COVID-19*. Research contract; Australian Government Department of Health. **Funding:** $446,690

Jun 2018 McVernon J, **Moss R**, Carvalho N, Herz J, Herry G, Sullivan SG. *Supply arrangements for pandemic influenza vaccine*. Research contract; Australian Government Department of Health. **Funding:** $212,030

Feb 2018 McVernon J, Fielding J, Macartney K, Beard F, Subbarao K, Sullivan SG, Dawson A, Gilbert L, Massey P, Miller A, Durrheim D, Crooks K, McCaw JM, **Moss R.** *Consultancy services to investigate and model initial pandemic influenza vaccination target groups*. Research contract; Australian Government Department of Health. **Funding:** $181,256

Oct 2016 Mitchell L[†], **Moss R**[†]. *Infectious Disease Forecasting Workshop*. Seed funding; Policy relevant infectious disease simulation and mathematical modelling (PRISM²) NHMRC Centres of Research Excellence. **Funding:** $3,300

Aug 2016 McCaw JM, **Moss R.** *Epidemic modelling for infectious diseases forecast*. Research contract; Defence Science and Technology Group. **Funding:** $384,550

Jun 2016 Tomko M, **Moss R**, Geard N. *Evaluation of large-scale tracking data for epidemiological forecasting of influenza epidemics*. Seed funding; Melbourne Networked Society Institute. **Funding:** $45,000

Feb 2016 McVernon J, McCaw JM, **Moss R**, Hunter A, Fielding JE, Glass K. *Model infection control with personal protective equipment during an influenza pandemic*. Research contract; Australian Government Department of Health. **Funding:** $39,969

Feb 2016 McVernon J, McCaw JM, **Moss R**, Hunter A, Fielding JE, Glass K. *Review models of health care delivery in an influenza pandemic*. Research contract; Australian Government Department of Health. **Funding:** $126,558

Jun 2015 McVernon J, McCaw JM, **Moss R**, Cheng A, Hurt A. *Review of the current evidence on the use of neuraminidase inhibitors held in the National Medical Stockpile, in a pandemic*. Research contract; Australian Government Department of Health. **Funding:** $90,770

Oct 2014 McBryde E, Marshall C, Doan T, Ragonnet R, Peach E, McCaw JM, McVernon J, **Moss R**, Geard N, Hort K, Black J, Madden J, Tran N, Giesecke J, Harris T. *Risk and economic implications of importation, transmission and established epidemic of Ebola in the Asia-Pacific Region*. Research contract; Australian Government Department of Foreign Affairs and Trade. **Funding:** $300,000

Other funding **Net amount: $19,241**

Oct 2020 **Moss R.** *Epidemiological forecasting of infectious disease for public health*. Invited speaker travel funding; The Royal Society, Buckinghamshire. **Funding:** $2,160 (1100 GBP)

Oct 2019 **Moss R.** Postdoctoral Researcher and PhD Student Funding Scheme; Policy relevant infectious disease simulation and mathematical modelling (PRISM²) NHMRC Centres of Research Excellence. **Funding:** $760

Aug 2019 **Moss R.** Invited speaker travel funding; Options for the Control of Influenza X, Singapore. **Funding:** $1,501 (1400 SGD)

Aug 2019 **Moss R.** Postdoctoral Researcher and PhD Student Funding Scheme; Policy relevant infectious disease simulation and mathematical modelling (PRISM²) NHMRC Centres of Research Excellence. **Funding:** $1,733

Feb 2019 **Moss R.** Postdoctoral Researcher and PhD Student Funding Scheme; Policy relevant infectious disease simulation and mathematical modelling (PRISM²) NHMRC Centres of Research Excellence. **Funding:** $2,221

Nov 2018 **Moss R.** *Using influenza data for severity assessment*. Invited speaker travel funding; World Health Organization, Geneva. **Funding:** $3,344 (2537 USD)

Aug 2017 **Moss R.** Winner: Best Postdoctoral Presentation; Policy relevant infectious disease simulation and mathematical modelling (PRISM²) NHMRC Centres of Research Excellence. **Funding:** $2,000

Jan 2017 **Moss R.** Postdoctoral Researcher and PhD Student Funding Scheme; Policy relevant infectious disease simulation and mathematical modelling (PRISM²) NHMRC Centres of Research Excellence. **Funding:** $1,847

Nov 2015 **Moss R.** Postdoctoral Researcher and PhD Student Funding Scheme; Policy relevant infectious disease simulation and mathematical modelling (PRISM²) NHMRC Centres of Research Excellence. **Funding:** $3,675

Publications *Peer-reviewed journal articles* *metrics: Google Scholar & SCImago*

33. submitted Baker CM✉, Campbell PT, Chades I, Dean AJ, Hester SM, Holden MH, McCaw JM, McVernon J, **Moss R**, Shearer FM, Possingham HP. "From climate change to pandemics: decision science can help scientists have impact".

32. submitted Zaloumis SG, **Moss R**, Price DJ✉. "Towards navigating the Bayesian inference literature: Better than a random walk".

31. submitted Degeling C✉, Williams JH, Carter SM, **Moss R**, Massey P, Brown D, Gilbert GL, Shih P, Braunack-Mayer A, Crooks K, McVernon J. "Priority allocation of pandemic influenza vaccines in Australia - recommendations of 3 Community Juries".

30. submitted Sullivan SG✉, Fielding JE, Beard F, Macartney K, Williams J, Dawson A, Gilbert GL, Massey P, Crooks K, **Moss R**, McCaw JM, McVernon J. "Constructing an ethical framework for priority allocation of pandemic vaccines".

29. accepted Blakely T✉, **Moss R**, Collins J, Mizdrak A, Carvalho N, Wilson N, Geard N, Flaxman A. "Proportional multistate lifetable modelling of preventive interventions: concepts, code and worked examples". *Int J Epidemiol.*
Citations: – **Journal:** #8 in Epidemiology (Q1)

28. accepted Alahmadi A†, Belet B†, Black AJ†, Cromer D†, Flegg JA†✉, House T†✉, Jayasundara P†, Keith JM†, McCaw JM†, **Moss R**†, Ross JV†, Shearer FM†, Tun STT†, Walker J†, White L†, Whyte JM†, Yan AWC†, Zarebski AE†. "Influencing public health policy with data-informed mathematical models of infectious diseases: Recent developments and new challenges". *Epidemics*.
Citations: – **Journal:** #51 in Infectious Diseases (Q1)

27. accepted Nation ML, **Moss R**, Spittal MJ, Kotsimbos T, Kelly PM, Cheng AC✉. "Influenza vaccine effectiveness against influenza-related mortality in Australian hospitalized patients: a propensity score analysis". *Clin Infect Dis*.
Citations: 1 **Journal:** #10 in Infectious Diseases (Q1)

26. Sep 2020 **Moss R**, Wood J, Brown D, Shearer FM, Black AJ, Cheng AC, McCaw JM, McVernon J✉. "Modelling the impact of COVID-19 in Australia to inform transmission reducing measures and health system preparedness". *Emerg Infect Dis*.
Citations: 14 **Journal:** #14 in Epidemiology (Q1)

25. Aug 2020 Price DJ✉, Shearer FM✉, Meehan MT, McBryde ES, **Moss R**, Golding N, Conway EJ, Dawson P, Cromer D, Wood J, Abbott S, McVernon J, McCaw JM. "Early analysis of the Australian COVID-19 epidemic". *eLife* 9: e58785.
Citations: 3 **Journal:** #26 in Medicine (miscellaneous) (Q1)

24. Mar 2020 Biggerstaff M†, Dahlgren FS†, Fitzner J†, George D†, Hammond A†, Hall I†, Haw D†, Imai N†, Johansson M†, Kramer S†, McCaw JM†, **Moss R**†, Pebody R†, Read JM†, Reed C†, Reich NG†, Riley S†✉, Vandemaele K†✉, Viboud C†, Wu JT†. "Coordinating the real-time use of global influenza activity data for better public health planning". *Influenza Other Respir Viruses* 14(2): 105–110.
Citations: 2 **Journal:** #39 in Infectious Diseases (Q1)

23. Jan 2020 Shearer FM, **Moss R**, McVernon J, Ross JV, McCaw JM✉. "Infectious disease pandemic planning and response: Incorporating decision analysis". *PLoS Med* 17: e1003018.
Citations: 17 **Journal:** #32 in Medicine (miscellaneous) (Q1)

22. Jun 2019 Cuningham W✉, Geard N, Fielding JE, Braat S, Madhi SA, Nunes MC, Christian LM, Lin S-Y, Lee C-N, Yamaguchi K, Bisgaard H, Chawes B, Chao A-S, Blanchard-Rohner G, Schlaudecker EP, Fisher BM, McVernon J, **Moss R**. "Optimal Timing of Influenza Vaccine during Pregnancy: a Systematic Review and Meta-Analysis". *Influenza Other Respir Viruses* 13(5): 438–452.
Citations: 10 **Journal:** #39 in Infectious Diseases (Q1)

21. May 2019 **Moss R**✉, Naghizade E, Tomko M, Geard N. "What can urban mobility data reveal about the spatial distribution of infection in a single city?". *BMC Public Health* 19: 656.
Citations: 4 **Journal:** #84 in Public, Environ, and Occup Health (Q1)

20. Mar 2019 **Moss R**✉, Zarebski AE, Dawson P, Franklin LJ, Birrell FA, McCaw JM. "Anatomy of a seasonal influenza epidemic forecast". *Commun Dis Intell* 43: 1–14.
Citations: 7 **Journal:** #1020 in Medicine (miscellaneous) (Q2)

19. Jan 2019 **Moss R**✉, Zarebski AE, Carlson SJ, McCaw JM. "Accounting for healthcare-seeking behaviours and testing practices in real-time influenza forecasts". *Trop Med Infect Dis* 4(1): 12.
Citations: 8 **Journal:** NA; first issue in Dec 2016

18. Feb 2018 **Moss R**✉, Fielding JE, Stephens N, McVernon J, Dawson P, McCaw JM. "Epidemic forecasts as a tool for public health: interpretation and (re)calibration". *Aust N Z J Public Health* 42(1): 69–76.
Citations: 18 **Journal:** #128 in Public, Environ, and Occup Health (Q1)

17. Feb 2017 Zarebski AE, Dawson P, McCaw JM, **Moss R**✉. "Model selection for seasonal influenza forecasting". *Infect Dis Mod* 2(1): 56–70.
Citations: 14 **Journal:** NA; first issue in Oct 2016

16. Jan 2017 **Moss R**✉, Zarebski AE, Dawson P, McCaw JM. "Retrospective forecasting of the 2010–2014 Melbourne influenza seasons using multiple surveillance systems". *Epidemiol Infect* 145(1): 156–169.
Citations: 20 **Journal:** #88 in Infectious Diseases (Q2)

15. Oct 2016 **Moss R**✉, McCaw JM, Cheng AC, Hurt AC, McVernon J. "Reducing disease burden in an influenza pandemic by targeted delivery of neuraminidase inhibitors: mathematical models in the Australian context". *BMC Infect Dis* 16(1): 552.
Citations: 10 **Journal:** #66 in Infectious Diseases (Q1)

14. Sep 2016 **Moss R**, Hickson RI, McVernon J, McCaw JM, Hort K, Black J, Madden JR, Tran NH, McBryde ES, Geard N✉. "Model-informed risk assessment and decision making for an emerging infectious disease in the Asia-Pacific region". *PLoS Negl Trop Dis* 10(9): e0005018.
Citations: 9 **Journal:** #25 in Infectious Diseases (Q1)

13. Jul 2016 **Moss R**✉, Zarebski AE, Dawson P, McCaw JM. "Forecasting influenza outbreak dynamics in Melbourne from Internet search query surveillance data". *Influenza Other Respir Viruses* 10(4): 314–323.
Citations: 31 **Journal:** #39 in Infectious Diseases (Q1)

12. Aug 2015 Cao P, Yan AWC, Heffernan JM, Petrie S, **Moss R**, Carolan LA, Guarnaccia TA, Kelso A, Barr IG, McVernon J, Laurie KL, McCaw JM✉. "Innate immunity and the inter-exposure interval determine the dynamics of secondary influenza virus infection and explain observed viral hierarchies". *PLoS Comp Biol* 11(8): e1004334.
Citations: 42 **Journal:** #7 in Modelling and Simulation (Q1)

11. May 2014 **Moss R**✉, Layton AT. "Dominant factors that govern pressure natriuresis in diuresis and antidiuresis: a mathematical model". *AJP Renal Physiol* 306(9): F952–F969.
Citations: 20 **Journal:** #36 in Physiology (Q1)

10. Jan 2014 **Moss R**✉, Thomas SR. "Hormonal regulation of salt and water excretion: a mathematical model of whole-kidney function and pressure-natriuresis". *AJP Renal Physiol* 306(2): F224–248.
Citations: 25 **Journal:** #36 in Physiology (Q1)

9. Dec 2012 Dafilis MP✉, **Moss R**, McVernon J, McCaw JM. "Drivers and consequences of influenza antiviral resistant-strain emergence in a capacity-constrained pandemic response". *Epidemics* 4(4): 219–226.
Citations: 7 **Journal:** #51 in Infectious Diseases (Q1)

8. Jun 2012 **Moss R**, Grosse T, Marchant I, Lassau N, Gueyffier F, Thomas SR✉. "Virtual Patients and Sensitivity Analysis of the Guyton Model of Blood Pressure Regulation: Towards Individualized Models of Whole-Body Physiology". *PLoS Comp Biol* 8(6): e1002571.
Citations: 28 **Journal:** #7 in Modelling and Simulation (Q1)

7. Apr 2012 Bolton KJ✉, McCaw JM, **Moss R**, Morris RS, Wang S, Burma A, Darma B, Narangerel D, Nymadawa P, McVernon J. "Likely effectiveness of pharmaceutical and non-pharmaceutical interventions for mitigating influenza virus transmission in Mongolia". *Bull WHO* 90(4): 264–271.
Citations: 24 **Journal:** #14 in Public, Environ, and Occup Health (Q1)

6. Oct 2011 Hernández AI✉, Le Rolle V, Ojeda D, Baconnier P, Fontecave-Jallon J, Guillaud F, Grosse T, **Moss R**, Hannaert P, Thomas SR. "Integration of detailed modules in a core model of body fluid homeostasis and blood pressure regulation". *Prog Biophys Mol Biol* 107(1): 169–182.
Citations: 25 **Journal:** #32 in Biophysics (Q1)

5. May 2011 McCaw JM✉, **Moss R**, McVernon J. "A decision support tool for evaluating the impact of a diagnostic-capacity and antiviral-delivery constrained intervention strategy on an influenza pandemic". *Influenza Other Respir Viruses* 5(Suppl. 1): 212–215.
Citations: 4 **Journal:** #39 in Infectious Diseases (Q1)

4. Feb 2011 **Moss R**✉, McCaw JM, McVernon J. "Diagnosis and Antiviral Intervention Strategies for Mitigating an Influenza Epidemic". *PLoS ONE* 6(2): e14505.
Citations: 28 **Journal:** #10 in Multidisciplinary (Q1)

3. Nov 2009 **Moss R**✉, Kazmierczak E, Kirley M, Harris PJ. "Discrete network models of interacting nephrons". *Physica D* 238(22): 2166–2176.
Citations: 3 **Journal:** #83 in Condensed Matter Physics (Q1)

2. May 2009 Harris PJ✉, Buyya R, Chu X, Kobialka T, Kazmierczak E, **Moss R**, Appelbe W, Hunter PJ, Thomas SR. "The Virtual Kidney: an e-Science interface and Grid Portal". *Phil Trans R Soc A* 367(1896): 2141–2159.
Citations: 8 **Journal:** #69 in Mathematics (miscellaneous) (Q1)

1. May 2009 **Moss R**, Kazmierczak E✉, Kirley M, Harris PJ. "A computational model for emergent dynamics in the kidney". *Phil Trans R Soc A* 367(1896): 2125–2140.
Citations: 12 **Journal:** #69 in Mathematics (miscellaneous) (Q1)

Government reports

12. Jun 2019 Degeling C, Williams J, Massey P, Gilbert L, **Moss R**, Carter S, Braunack-Mayer A, Shih P, Crookes K, McVernon J. "Investigate and model initial pandemic influenza vaccination target groups". Reporting Deliverable 3 (Community Juries) to the Office of Health Protection, Australian Government Department of Health.

11. Sep 2018 Herry G, Herz J, **Moss R**, Carvalho N, Sullivan S, McVernon J. "Evidence base to inform policy development regarding future long-term supply arrangements for pandemic influenza vaccine". Reporting Deliverable (Phases 2 and 3, Modelling and cost-effectiveness of alternative vaccine supply models) to the Office of Health Protection, Australian Government Department of Health.

10. Jun 2018 McVernon J, Fielding JE, Macartney K, Beard F, Subbarao K, Sullivan SG, Williams J, Dawson A, Gilbert L, Massey P, Miller A, Durrheim D, Crooks K, McCaw JM, **Moss R**. "Investigate and model initial pandemic influenza vaccine target groups". Reporting Deliverable 2 (Ethical Framework) to the Office of Health Protection, Australian Government Department of Health.

9. Apr 2018 McVernon J, Fielding JE, Macartney K, Beard F, Subbarao K, Sullivan SG, Dawson A, Gilbert L, Massey P, Miller A, Durrheim D, Crooks K, McCaw JM, **Moss R**. "Investigate and model initial pandemic influenza vaccine target groups". Reporting Deliverable 1 (Evidence Review) to the Office of Health Protection, Australian Government Department of Health.

8. May 2016 Hunter A, Fielding JE, **Moss R**, McVernon J, McCaw JM, Glass K. "Review models of health care delivery in an influenza pandemic". Reporting Deliverable 2 (Stakeholder Consultations) to the Office of Health Protection, Australian Government Department of Health.

7. May 2016 Hunter A, Fielding JE, **Moss R**, McVernon J, McCaw JM, Glass K. "Model infection control with personal protective equipment during an influenza pandemic". Reporting Deliverable 2 (Stakeholder Consultations) to the Office of Health Protection, Australian Government Department of Health.

6. Apr 2016 Hunter A, McVernon J, **Moss R**, McCaw JM, Fielding JE, Glass K. "Review models of health care delivery in an influenza pandemic". Reporting Deliverable 1 (Literature Review and Simulation Modelling) to the Office of Health Protection, Australian Government Department of Health.

5. Apr 2016 Hunter A, Fielding JE, **Moss R**, McVernon J, McCaw JM, Glass K. "Model infection control with personal protective equipment during an influenza pandemic". Reporting Deliverable 1 (Literature Review and Simulation Modelling) to the Office of Health Protection, Australian Government Department of Health.

4. Aug 2015 McCaw JM, **Moss R**, McVernon J, Cheng A. "Review current evidence on the use of neuraminidase inhibitors held in the National Medical Stockpile, in a pandemic". Reporting Deliverable 2 (Model Analysis) to the Office of Health Protection, Australian Government Department of Health.

3. Jun 2015 McCaw JM, **Moss R**, McVernon J, Cheng A. "Review current evidence on the use of neuraminidase inhibitors held in the National Medical Stockpile, in a pandemic". Reporting Deliverable 1 (Evidence Review) to the Office of Health Protection, Australian Government Department of Health.

2. Apr 2015 McBryde E, Marshall C, Doan T, Hickson R, Davis M, McCaw JM, McVernon J, **Moss R**, Geard N, Hort K, Black J, Madden J, Tran N, Giesecke J, Ragonnet R, Peach E, Harris T. "Risk of importation and economic consequences of Ebola in the Asia Pacific Region". Final report to the Department of Foreign Affairs and Trade.

1. Dec 2014 McBryde E, Marshall C, Doan T, Ragonnet R, Peach E, McCaw JM, McVernon J, **Moss R**, Geard N, Hort K, Black J, Madden J, Tran N, Giesecke J, Harris T. "Modelling of Ebola risk in the Asia Pacific region to inform policy strategy". Interim report to the Department of Foreign Affairs and Trade.

Book chapters

Jul 2020 Geard N[†], Giesecke JA[†], Madden JR[†], McBryde ES[†], **Moss R**[†], Tran NH[†]. "Modelling the economic impacts of epidemics in developing countries under alternative intervention strategies", in *Environmental Economics and Computable General Equilibrium Analysis*. Madden JR, Higano Y, Shibusawa H (eds), Springer.

Aug 2016 **Moss R**. "Model assumptions, structure and uncertainty", in *A User's Guide to Infectious Disease Modelling*. McVernon J, Wood J (eds), PRISM² CRE. ISBN: 978-0-7340-5303-9.

Other publications

Feb 2020 Geard N, McVernon J, **Moss R**, Shearer FM, McCaw JM, Black A, McBryde ES. "What maths can tell us about the spread of the new coronavirus", *Pursuit*

Apr 2019 Sullivan SG, **Moss R**. "We can't predict how bad this year's flu season will be but here's what we know so far", *The Conversation*

Jun 2016 McVernon J, Ross J, Glass K, Mitchell L, Geard N, **Moss R**. "Computing helps the study of infections on a global and local scale", *The Conversation*

Aug 2015 **Moss R**, McCaw JM, McVernon J. "Why predicting a flu outbreak is like betting on football or flipping a coin", *The Conversation*

Teaching

Lecturer

2020 Guest Lecturer, Our Planet Our Health II, University of Melbourne

2018 Declarative Programming (Masters), University of Melbourne

2016,2017 Infectious Disease Modelling, University of Melbourne

2015,2016 Guest Lecturer, Mathematics for Biomedicine, University of Melbourne

2015 Advanced Modelling: Case Studies (Masters), University of Melbourne

2013 Multivariable Calculus, Duke University

Team Supervisor

2007–2008 Software Engineering Project, University of Melbourne

Tutor

2005–2008 Software Engineering Methods & Testing, University of Melbourne

2007 Computing Fundamentals A, University of Melbourne

2001–2004 Software Engineering Principles & Tools, University of Melbourne

Supervision

Research staff

2019– Dr Patrick Andersen, Research Fellow

2018– Dr Freya Shearer, Research Fellow

Students

2019– Parinaz Mehdipour, PhD; *Chair, advisory committee*

2019 Bradley Crammond, MBioStat

2019 Zhang Cheng, MIT

2018 Monica Nation, MPH
Influenza vaccination and mortality in elderly patients

2018 Anabel Gil, MPH
Seasonal influenza epidemics variation in the state of Victoria

2015–2019 Alexander Zarebski, PhD
Quantitative Epidemiology: A Bayesian Perspective

2015 William Cuningham, MSc (Epidemiology)
Defining optimal implementation strategies for antenatal influenza vaccination in temperate climates

Presentations

Invited Talks

Oct 2020 **Moss R.** "COVID-19, influenza activity, and physical distancing measures in Australia". *Epidemiological forecasting of infectious disease for public health.* The Royal Society, Buckinghamshire.

Jul 2020 **Moss R.** Webinar, Australian Chapter of the International Society for Pharmacoeconomics and Outcomes Research.

Feb 2020 **Moss R.** "Seasonal influenza forecasting using multiple data sources". Hunter New England Population Health, Newcastle.

Nov 2019 **Moss R.** "Influenza surveillance: gaps between infection and detection". *Infection and Immunity Theme Retreat.* Murdoch Children's Research Institute, Melbourne.

Nov 2019 Degeling C, **Moss R.** *AHPPC face-to-face meeting.* Department of Health, Canberra.

Oct 2019 **Moss R.** "Forecasting in an unusual season: what can we learn from 2019?" *13th Australian Influenza Symposium.* Queensland University of Technology, Brisbane.

Oct 2019 Degeling C, **Moss R.** "Should we seek to protect the most vulnerable or maximise vaccine utility during an influenza pandemic? Participant perspectives from 3 citizens' juries". *CDNA face-to-face meeting.* Department of Health, Hobart.

Sep 2019 **Moss R.** "Impact of pandemic vaccine: model simulation results". *Presentation of expert evidence for Citizens Juries.* Australian Department of Health, Canberra.

Aug 2019 **Moss R.** "Building a forecasting capability for Australian public health". *Options for the Control of Influenza X.* Singapore.

May 2019 **Moss R.** "Seasonal influenza forecasting: models, data, and so many unknowns". *Respiratory Seminar.* The Peter Doherty Institute, Melbourne.

Feb 2019 **Moss R** et al. "Best use of a limited vaccine supply in a pandemic: what does 'best' actually mean?". *Vaccines in the 21st Century*. The Peter Doherty Institute, Melbourne.

Feb 2019 **Moss R** et al. "The mathematics of infectious disease epidemics". *The Melbourne Maths and Science Meetup*. Melbourne.

Nov 2018 **Moss R**. "Seasonal influenza forecasting for Australian cities". *WHO Meeting on Using Influenza Data for Severity Assessment*. Global Influenza Programme, World Health Organization, Geneva.

Oct 2018 **Moss R**. "Early epidemic situational awareness and epidemic forecasting". *Modelling Workshop, Indo-Pacific Centre for Health Security, Department of Foreign Affairs and Trade*. The Peter Doherty Institute, Melbourne.

Apr 2018 **Moss R**, Zarebski AE, McCaw JM. "Who watches the watchmen?". *Mathematics of Biological Systems Management Symposium*. University of Melbourne, Melbourne.

Nov 2017 **Moss R**, Zarebski AE, McCaw JM. "Epidemic forecasting: circulating strains, population immunity, and other headaches". *NHMRC Influenza Program (2014-19) annual retreat*. University of Melbourne, Melbourne.

Nov 2017 **Moss R**, Zarebski AE, McCaw JM. "Epidemic forecasts as a (potential) tool for public health". *12th Australian Influenza Symposium*. Peter Doherty Institute for Infection and Immunity, Melbourne.

Oct 2017 Tomko M, **Moss R**, Naghi Zadeh Kakhki E, Geard N. "Mapping Urban Mobility for Flu Forecasting". *Networked Society Symposium 2017*. University of Melbourne, Melbourne.

Aug 2016 **Moss R**. "Where did I come from? The facts of life without any nonsense and with illustrations". *MSoG Policy Labs: Interdisciplinary Ways of Working*. Melbourne School of Government, The University of Melbourne.

Jun 2016 McVernon J, Fielding J, **Moss R**. "Models of Health Care Delivery & Infection Control with PPE during an Influenza Pandemic – project outcomes". *Communicable Diseases Network Australia face-to-face meeting*. Australian Department of Health, Adelaide.

Nov 2015 **Moss R**, Zarebski AE, Dawson P, Lau T, McCaw JM. "Forecasting seasonal influenza epidemics in Australia (using mathematical models)". *National Influenza Surveillance Committee face-to-face meeting*. Australian Department of Health, Canberra.

Jul 2015 McVernon J, Cheng AC, McCaw JM, **Moss R**, Hurt AC. "Strategic distribution of NAIs in a pandemic – simulation modelling & international context". *Presentation of draft report*. Australian Department of Health, Canberra.

- Presentation to Australia's Chief Medical Officer, Prof Chris Baggoley.

Jun 2015 **Moss R**, Zarebski AE, Dawson P, McCaw JM. "Epidemic forecasting from surveillance data via Bayesian estimation". *Communicable Diseases Network Australia Jurisdictional Executive Group*. Australian Department of Health, Melbourne.

Jun 2015 **Moss R**, Zarebski AE, Dawson P, McCaw JM. "Epidemic forecasting from surveillance data via Bayesian estimation". Quantitative & Applied Ecology Group, University of Melbourne.

May 2015 **Moss R**, Dawson P, McCaw JM. "Epidemic forecasting from surveillance data (using recursive Bayesian estimation)". *Infectious Diseases Epidemiology & Surveillance (IDEAS) meeting*. Victorian Department of Health & Human Services.

Apr 2015 **Moss R**. "Epidemic detection and forecasting from surveillance data via Bayesian estimation". *PRISM^2 NHMRC Centres of Research Excellence inaugural meeting*. The University of Melbourne.

Dec 2014 **Moss R**, Thomas SR, Layton AT. "Predicting hormonal regulation of renal function: a 5,000 piece jigsaw puzzle". Australia & New Zealand Mathematics Convention. The University of Melbourne.

May 2014 **Moss R**. "Regulation of renal function: building a detailed and coherent mathematical model". *Molecular to Systems Physiology*. Mathematical Biosciences Institute, Ohio State University.

Aug 2013 **Moss R**. "Mathematical modelling: hormonal regulation of water and salt excretion". Department of Biomedical Physiology and Kinesiology. Simon Frasier University, Vancouver.

Sep 2009 **Moss R**. "The Clinical Applications of Renal Modelling". Department of Nephrology, Austin Hospital, Melbourne.

Dec 2008 **Moss R**. "A computational model for studying emergent dynamics in the kidney". Laboratory IBISC, Université d'Evry Val d'Essonne, France.

Conferences

Feb 2020 **Moss R**. "Now-casting influenza impact with Bayesian evidence synthesis". *Australia & New Zealand Industrial & Applied Mathematics Conference*. Hunter Valley, Australia.

Nov 2019 **Moss R**. "Influencing public health decisions with influenza forecasts". *PRISM^2 Annual Conference*. University of Melbourne.

Nov 2019 **Moss R**, Dawson A, Fielding JE, Massey P, Sullivan SG, McCaw JM, McVernon J. "Pandemic influenza: what outcomes are achievable with a limited vaccine supply?". *Communicable Diseases Control Conference*. Canberra.

Feb 2019 **Moss R**, Zarebski AE, Carlson SJ, McCaw JM. "Real-time assessment and prediction of influenza severity". *Australia & New Zealand Industrial & Applied Mathematics Conference*. Nelson, New Zealand.

Aug 2018 **Moss R**. "Who watches the watchmen? Vol 2". *PRISM^2 International Conference*. Cairns, Australia.

Aug 2017 **Moss R**, Zarebski AE, Cope RC, Mitchell L. "Using non-specific rate data to estimate denominators for notifications data". *PRISM^2 Annual Conference*. University of Melbourne.

- Winner: Best Postdoc Talk. **Funding:** $2,000.

Feb 2017 **Moss R**, Zarebski AE, McCaw JM. "Bayesian forecasting of seasonal influenza: putting prior knowledge into the prior". *Australia & New Zealand Industrial & Applied Mathematics Conference*. Hahndorf, South Australia.

Jan 2016 **Moss R**, McCaw JM, McVernon J, Cheng AC, Hurt AC. "Evaluating pandemic preparedness and intervention strategies subject to available healthcare capacity and clinical pathways: a modelling study". *Incidence, Severity, and Impact of Influenza 2016*. Institut Pasteur, Paris, France.

Feb 2015 **Moss R**, McCaw JM, Dawson P. "Epidemic detection and forecasting from surveillance data via Bayesian estimation". *Australia & New Zealand Industrial & Applied Mathematics Conference*. Gold Coast, Queensland.

May 2011 **Moss R**, Grosse T, Thomas SR. "La construction d'un modèle multi-agent du rein". *French Society of Theoretical Biology* (*presented in French*). Autrans, France.

Apr 2010 **Moss R**, McCaw JM, McVernon J, Wood J, McBryde E. *NSW Epidemiology Special Interest Group*. NSW Department of Health, Sydney.

Mar 2010 **Moss R**, McCaw JM, McVernon J, Wood J, McBryde E. *MISMS Oceania Regional Influenza Meeting*. Melbourne Business School, Melbourne.

Dec 2009 McCaw JM, McVernon J, Wood J, McBryde E, **Moss R**. "Strategies for Antiviral Usage: Modelling Diagnosis & Treatment". *NHMRC H1N1 workshop*. Canberra, ACT.

Sep 2008 **Moss R**. *UK e-Science 2008 All Hands Meeting*. University of Edinburgh, Scotland.

Jul 2007 **Moss R**. "A Preliminary Model for Studying the Interactions Between Nephrons". *Complex 07: 8th Asia-Pacific Complex Systems Conference.* Gold Coast, Queensland.

- Winner: Best Talk in Track.

Feb 2007 **Moss R**. "A Preliminary Model for Studying the Interactions Between Nephrons". *The Kidney: Cellular, Tubular, and Vascular Physiology*. Mathematical Biosciences Institute, Ohio State University.

Seminars

May 2015 **Moss R**, Dawson P, McCaw JM. "Epidemic forecasting from surveillance data via Bayesian estimation". *Mathematical & Computational Biology Group*. University of Melbourne.

Sep 2014 **Moss R**. "Regulation of renal function: building a detailed and coherent mathematical model". *MathBio Interest Group*. University of Melbourne.

May 2009 **Moss R**. "Decoupled equations for studying complex systems". School of Mathematics and Statistics, University of Melbourne.

Aug 2008 **Moss R**. *PhD Completion Seminar*. Department of Computer Science and Software Engineering, University of Melbourne.

Posters

Nov 2019 **Moss R**, Zarebski AE, Carlson SJ, McCaw JM. "Behavioural insights into case notifications data: Flutracking and community-level surveillance". *Communicable Diseases Control Conference*. Canberra.

Aug 2019 **Moss R**, Zarebski AE, Carlson SJ, McCaw JM. "Improving epidemic forecasts with behavioural insights gained from community-level surveillance". *Options for the Control of Influenza X*. Singapore.

Aug 2019 **Moss R**, Dawson A, Fielding JE, Massey P, Sullivan SG, Williams J, McCaw JM, McVernon J. "Best use of a limited vaccine supply in a pandemic: what does 'best' actually mean?". *Options for the Control of Influenza X*. Singapore.

Dec 2015 **Moss R**, Zarebski AE, Dawson P, McCaw JM. "Forecasting influenza outbreak dynamics from metropolitan Melbourne surveillance data". *Epidemics 5: Fifth International Conference on Infectious Disease Dynamics*. Florida, USA.

Apr 2014 **Moss R**, Layton AT. "A dynamic mathematical model of water & solute excretion". *Experimental Biology 2014*. San Diego, USA.

Apr 2013 **Moss R**, Layton AT. "Modeling the effects on medullary blood flow regulation on pressure natriuresis". *Experimental Biology 2013*. Boston, USA.

Apr 2012 **Moss R**, Grosse T, Thomas SR. "Exploration of pressure-natriuresis mechanisms using a lumped, six-nephron whole-kidney model". *Experimental Biology 2012*. San Diego, USA.

Apr 2011 **Moss R**, Grosse T, LeRolle V, Hernandez A, Thomas SR. "Extended sensitivity analysis of the Guyton model of blood pressure regulation". *Experimental Biology 2011*. Washington, D.C., USA.

Sep 2010 Grosse T, **Moss R**, Bazin J, LeRolle V, Fontecave-Jallon J, Guillaud F, Hannaert P, Baconnier P, Hernandez A, Thomas SR. "Sensitivity analysis of the Guyton model of blood pressure regulation I: Global analysis of the whole model". *VPH 2010 Annual Conference*. Brussels, Belgium.

Professional Service

Manuscript Reviewer

Acta Biotheoretica
American Journal of Physiology – Renal Physiology
ANZIAM Journal
BMC Infectious Diseases
BMC Public Health
Communicable Diseases Intelligence
Epidemiology and Infection
International Journal of Computers and Applications
International Journal of Forecasting
Involve, a Journal of Mathematics
Journal of Pharmacokinetics and Pharmacodynamics
Journal of the Royal Society: Interface
Journal of the Royal Society: Interface Focus
Mathematical Medicine & Biology
Nature Communications
Open Forum Infectious Diseases
PLoS Computational Biology
PLoS ONE
Proceedings of the National Academy of Sciences
Scientific Reports

Grant Reviewer

2017, 2018 NHMRC Project Grants

2017 External scientific advisor, Project Grant: "In silico preclinical models for the preservation of renal organ in vivo & ex vivo" (3 labs, 9 investigators).
French National Research Agency

Event Organisation

Feb 2020 TM Cherry Prize Committee.
ANZIAM 2020 Conference, Hunter Valley, Australia.

Nov 2019 Prepared and delivered materials for PRISM^2 CRE workshop
Communicable Diseases Control Conference 2019, Canberra.

Nov 2019 Session char, PRISM^2 Annual Conference
University of Melbourne.

Sep 2019 Session chair: Imprinting, Sero-epidemiology, Age Profile Differences
Options for the Control of Influenza X, Singapore.

Jun 2019 Prepared materials for PRISM^2 CRE workshop
Global Health Security 2019, Sydney.

Mar 2019 Facilitator, Grand Challenges Workshop
Computational Biology Research Initiative, University of Melbourne

Aug 2018 Workshop: Reproducible Research
PRISM^2 International Conference, Cairns, Australia.

Nov 2017 Shaping the future workforce of digital research experts at Melbourne (3 separate workshops)
University of Melbourne

Aug 2017 PRISM^2 Professional Development Workshop
Treacy Centre, Melbourne

Jun 2017 PRISM^2 Infectious Disease Forecasting Workshop
University of Melbourne

Jun 2017 PRISM^2 Modelling Literacy Workshop
Communicable Diseases Control Conference (CDCC)
Melbourne

Nov 2016 DSSRN Garage Sale
University of Melbourne

Sep 2016 Data, Systems and Society Research Network (DSSRN) launch event
University of Melbourne

Academic Service

Sep 2018 Planning Day
Centre for Epidemiology and Biostatistics

May 2019 HPC/Cloud Compute Architectural Review
Enterprise Architects, University of Melbourne

Nov 2018 Planning Day
Melbourne School of Population and Global Health

Aug 2017 Discussion Paper: "Enhancing and retaining data science capability at the University of Melbourne". Data, Systems and Society Research Network.

External Engagement Events

Nov 2019 National Influenza Surveillance Committee face-to-face meeting
Australian Department of Health, Canberra.

Nov 2019 Workshop: *Emerging Methods in Situational Assessment for Decision Support*
Communicable Diseases Control Conference (CDCC), Canberra.

Oct-Nov 2019 Expert witness: *First Nations Community Panels: Prioritising and privileging First Nations voices in the decision-making about pandemic influenza vaccine allocation in Australia.*
Tamworth, NSW; Cairns, Qld.

Jul 2019 Two-week workshop: *Influencing Public Health Policy with Data-Informed Mathematical Models of Infectious Diseases*
MAThematical Research Institute (MATRIX), Creswick.

Jun 2019 Health Protection Blueprint Workshop
Victorian Department of Health and Human Services.

Apr-May 2019 Expert witness: *A framework for prioritising pandemic influenza vaccines in Australia: views of Community Juries* (3 separate juries).
Wollongong, NSW; Melbourne, Vic; Kalgoorlie-Boulder, WA.

Feb 2019 The Melbourne Maths and Science Meetup, Melbourne.

May 2018 Pandemic vaccination prioritisation and sequencing: Evidence and ethics workshop
University of Sydney.

Apr 2018 Models of Care for Pandemic Influenza: Presentation & Discussion
Victorian Department of Health and Human Services, Melbourne.

Jun 2017 PRISM^2 Modelling Literacy Workshop
Communicable Diseases Control Conference (CDCC)
Melbourne

Aug 2016 MSoG Policy Labs: *Interdisciplinary Ways of Working*
Melbourne School of Government, The University of Melbourne.

Jun 2016 Communicable Diseases Network Australia face-to-face meeting
Australian Department of Health, Adelaide.

Nov 2015 National Influenza Surveillance Committee face-to-face meeting
Australian Department of Health, Canberra.

Oct 2015 PRISM^2 Policy Translation workshop
Improving the communication of scientific results to policy makers
Attendees included public servants from:
- Australian Department of Defence
- Australian Department of Foreign Affairs & Trade
- Australian Department of Health

Australian National University, Canberra

May 2015 Infectious Diseases Epidemiology & Surveillance (IDEAS) meeting.
Victorian Department of Health & Human Services.

Media Contributions

Jul 2020 Quoted in "Why our second lockdown hasn't yet flattened the coronavirus curve", *The Age*.

Jul 2020 Quoted in "Could Melbourne's outbreak reach other Australian cities?", *Lifehacker*.

Apr 2020 Quoted in "Why You'll Need To Postpone Travel Plans For A While", *Lifehacker Australia*.

Mar 2020 Quoted in "Coronavirus: Sydney given hope as infections ease", *The Australian*.

May 2019 Recorded interview, RRR 102.7FM radio news.

May 2018 Approached for comment, news story for *Communications of the ACM*.

Mar 2018 Quoted in "Disease maps to predict the arrival of flu just as weather maps predict rain", *Australian Financial Review*.

Feb 2018 Contributed to, and quoted in, "Forecasting flu outbreaks", *Pursuit*.
Also covered by Futurity and IT News.

Jan 2018 Approached for comment, news story for *Scientific American*.

Nov 2017 Quoted in "How Bad Will the Flu Season Get? Forecasters Are Competing to Figure it Out", *The Scientist*.

Nov 2016 Quoted in "Flu outbreaks are subject to humidity — not just heat", *Cosmos*.

Jul 2016 Quoted in "Defence scientists' bio attack detector could predict flu outbreaks", *The Herald Sun*.

Jun 2010 Mentioned in "Our medical future", *Voice*, University of Melbourne.

Committees

Jun 2019– National Immunisation Program (NIP) Vaccine Evaluations Panel
Commonwealth Department of Health

May 2019– Observer, National Influenza Surveillance Committee
Commonwealth Department of Health

Dec 2018– Large Scale Computing Expertise Group

Jan 2018– MSPGH Research Computing Working Group

Jan 2018– WHO Influenza Incidence Analytics Group

Feb 2016–Dec 2017 Data, Systems and Society Research Network

Professional Courses

May-Nov 2019 Mid-career staff mentoring program. Faculty of Medicine, Dentistry, and Health Sciences, University of Melbourne.

Oct 2019 Early-career staff leadership program. Faculty of Medicine, Dentistry, and Health Sciences, University of Melbourne.

Feb 2019 Advanced Social Media (Melbourne Centre for the Study of Higher Education)

Oct 2016 Social Media: Theory (Melbourne Centre for the Study of Higher Education)

Oct 2016 Social Media: Practice (Melbourne Centre for the Study of Higher Education)

Apr 2016 Writing Opinion Pieces (Melbourne Centre for the Study of Higher Education)

Affiliations

2016 Melbourne School of Government Policy Labs
2014– Australian Mathematical Society (AMS)
2014– Australia & New Zealand Industrial and Applied Mathematics (ANZIAM)

Research Software Tools/Packages

Whole-kidney model of salt and water excretion.
CeCILL v2.0 or CeCILL-C v1.0, also available as a virtual environment.

pypfilt: bootstrap particle filter package for Python.
BSD 3-Clause license, available in the Python Package Index (PyPI).

epifx: epidemic forecasting package for Python.
BSD 3-Clause license, available in the Python Package Index (PyPI).

lhs_framework: Latin hypercube sampling (LHS) framework for MATLAB.
GNU GPLv3 or later, available on figshare.
Used independently by other researchers in:

- McCulloch K et al., *Hepatology*, 2019;
- Campbell PT et al., *Vaccine* 33(43), 2015;
- 2 technical reports to the World Health Organisation;
- 1 technical report to the Australian Department of Health;
- 2 annual reports to the Australian Department of Health, National Surveillance for Hepatitis B Indicators: 2018, 2019.
- 2 conference presentations;
- 1 conference poster;

targeted-NAI: Epidemic & clinical pathways models for evaluating stockpile requirements and population impact of targeted antiviral interventions.
GNU GPLv3 or later, available on figshare.

References

Available upon request