Stephen Kissler, PhD

Postdoctoral Fellow, Harvard T.H. Chan School of Public Health
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Education

Ph.D. Applied Mathematics, University of Cambridge — 2018
Advisor: Julia Gog (jrg20@cam.ac.uk)
Dissertation: Geographic and demographic transmission patterns of the 2009 A/H1N1 influenza pandemic in the United States

M.S. Applied Mathematics, University of Colorado Boulder — 2014
Advisor: David Bortz (dmbortz@colorado.edu)
Thesis: Determination of personalized diabetes treatment plans using a two-delay model

B.S. Applied Mathematics, University of Colorado Boulder — 2014
Magna cum laude

Experience

Postdoctoral Fellow, Harvard T.H. Chan School of Public Health, Boston MA — Jan 2019 – present
- Identified drivers of geographic and temporal variation in antibiotic prescribing in the US
- Produced global COVID-19 projections, measured geographic disparities in COVID-19 transmission in New York City, and characterized SARS-CoV-2 viral load trajectories

Epidemiological Consultant, Partners in Health — Dec 2020 – Apr 2021
- Provided expert consultation on equitable vaccine prioritization strategies leading to guidance documents for public health departments and non-profits in the US

Epidemiological Consultant, National Basketball Association — Jul 2020 – Jun 2021
- Provided model-based guidance on testing, game schedule, and venue occupancy for safely resuming the 2020-21 professional basketball season

Junior Research Fellow, Queens' College, University of Cambridge, Cambridge UK — Oct 2017 – Oct 2020
- Conducted national (UK) citizen science study on human mobility and interaction patterns

Honors and Awards

Barry R. and Irene Tilenius Bloom Fellowship — 2022
Harvard Chan School trainee award recognizing academic merit, leadership potential, and commitment to improving public health in fields and areas of the world in greatest need.

Institut Mittag-Leffler Fellowship — 2018
Awarded funding to attend 2-week residential research exchange on mathematical biology in Stockholm, Sweden.

Research Fellowship, Queens' College, University of Cambridge — 2017
Awarded three years of funding to conduct independent research in mathematics.

65th Lindau Nobel Laureate Meeting — 2015
One of 650 young scientists selected internationally to attend a week-long academic exchange with 70 Nobel Laureates in physics, chemistry, and medicine & physiology.

Gates Cambridge Scholarship — 2014
Merit, leadership, and service-based award for full funding to complete a Ph.D. at the University of Cambridge.

Outstanding Graduate, University of Colorado College of Engineering 2014
Selected for outstanding achievement in research, service, and academics.

COMAP Mathematical and Statistical Modeling Contest Outstanding Submission, MAA Award 2012
Placed in top 10 contestants out of 3,697 teams worldwide. Special distinction given by the Mathematical Association of America.

Boettcher Scholarship 2009
Scholarship for full undergraduate university funding based on academic merit, service, and leadership. Awarded to 40 top Colorado students.

Funding

Submitted

Determining optimal vaccination strategies using empirical contact networks (PI) 2021-2025
National Science Foundation, Mathematical Sciences and Behavioral Sciences
With Co-PIs Joseph Bak-Coleman and Edward Hill

Evaluating optimal non-pharmaceutical interventions for emerging infectious diseases by unifying economic and epidemiological models (Co-PI) 2021-2023
National Science Foundation, Mathematical Sciences and Behavioral Sciences
With PI Andy Atkeson and co-PI Flavio Toxvaerd

Invited Presentations

Modelling Behaviour to Inform Policy for Pandemics (University of Cambridge/Virtual) Nov 2021
Title: The BBC Pandemic Programme

Fred Hutch/Washington State University Workshop on Virus Dynamics (Virtual) Oct 2021
Title: Modeling SARS-CoV-2 dynamics across scales

Harvard/Broad Institute Working Group on SARS-CoV-2 Variants (Virtual) Mar 2021
Title: Viral dynamics of the SARS-CoV-2 variant B.1.1.7

UK Scientific Pandemic Influenza Group on Modelling (SPI-M) (Virtual) Feb 2021
Title: Viral dynamics of the SARS-CoV-2 variant B.1.1.7

Emory University Theory and Modeling of Living Systems symposium on SARS-CoV-2 modeling (Virtual) Jan 2021
Title: Preparing for Gen C: Training a new generation of epidemiologists to meet a new generation of public health crises (https://www.youtube.com/watch?v=vjl8ztuo9Ug&t=2540s)

COVID-19 Dynamics and Evolution (Virtual) Jul 2020
Title: Geographic disparities in SARS-CoV-2 prevalence are predicted by reductions in commuting-style mobility

Council of State and Territorial Epidemiologists training session (Virtual) Jun 2020
Title: Modeling SARS-CoV-2 transmission in a shifting landscape

Boston University Department of Epidemiology colloquium (Boston MA) Jan 2020
Title: Accounting for trends in antibiotic prescribing: better prescribing or less disease?

Infectious Disease Dynamics Conference (Ambleside UK) Sep 2019
Title: Accounting for trends in antibiotic prescribing: better prescribing or less disease?

Probability and Biological Evolution, Centre International de Rencontres Mathématiques (Marseille-Luminy, France) Jun 2018

Title: Human mobility and strain dynamics

Teaching

Harvard T.H. Chan School of Public Health, Boston MA
- Introduction to Infectious Disease Dynamics (EPI501) – Guest lecturer 2021
- Introduction to Clinical Epidemiology (EPI208) – Guest lecturer 2020 – 2021
- Mathematical Modeling of Infectious Diseases (EPI260) – Teaching fellow 2020

Boston University, Boston MA
- Advanced Methods in Infectious Disease Epidemiology (BS825) – Guest lecturer 2021

Brandeis University, Boston MA
- Introduction to Epidemiology, Biostatistics, and Population Health (HSSP 100B) – Guest lecturer 2021

University of Cambridge, Cambridge UK
- Mathematical Biology (Part II) – Supervisor 2015 – 2018
- Social Networks and Behavioural Ecology (Part II) – Guest lecturer 2017

University of Colorado Boulder, Boulder CO
- Technology, Cybersecurity, and Policy seminar (CYBR 5000) – Guest lecturer 2020
- Applied Analysis (APPM 4440) – Course assistant 2012
- Matrix Methods (APPM 3310) – Course assistant 2010

Mentorship

Harvard T.H. Chan School of Public Health, Boston MA

Mentored four graduate students on various projects, including predicting the impact of a gonococcal vaccine on antibiotic prescribing, using point-of-care diagnostics to detect pathogens with antimicrobial resistance, and estimating spatial and temporal variation in antibiotic prescribing and antibiotic resistance. 2019 – present

University of Cambridge, Cambridge UK

Mentored a doctoral student on identifying optimal distance metrics for geographic disease transmission models. 2017 – 2019

University of Colorado Boulder, Boulder CO

Mentored undergraduate students in the Engineering Honors Program and Global Engineering program, providing career advice, tutoring, and organizing events. 2012 – 2014

Service

Harvard T.H. Chan School of Public Health, Boston MA
- Member of the WHO Access to COVID-19 Tools Accelerator (ACT-A) modeling consortium 2021 – present
- Volunteer with Get Out the Vax (bilingual phone banking to register people for vaccination) 2021
- Podcast host for *Pandemic: Coronavirus Edition* 2020 – present
- Contributing member of the CDC COVID-19 modeling working group 2020
- Harvard T.H. Chan Postdoctoral Association Departmental Representative (Immunology and Infectious Diseases), Mental Health Initiative Coordinator 2019 – present
- Ad-hoc journal reviewer (BMJ Open, Clinical Infectious Diseases, eLife, Elsevier S&T Books, Emerging Infectious Diseases, Epidemics, JAMA Network Open, J. Roy. Soc. Interface, The Lancet, Nature, Nature Communications, Nature Human Behaviour, Phil. Trans. Roy. Soc. B, PLOS Computational Biology, PLOS Medicine, PLOS One, PNAS, Science) 2019 – present

- Guest lecturer for the MIDAS Conference to Increase Diversity in Mathematical Modeling and Public Health

University of Cambridge, Cambridge UK

- Queens' College undergraduate admissions interviewer 2017
- Gates Cambridge Orientation Committee treasurer 2016
- Addenbrookes Hospital chaplaincy volunteer 2016-2018
- Sutton Trust Summer School volunteer and presenter 2016 – 2017
- Worms and Bugs Seminars co-organizer (cross-disciplinary disease modeling seminar) 2015 – 2018
- King's College Graduate Society treasurer 2015 – 2016
- King's College Charitable Giving Stewardship Committee, Graduate Representative 2015 – 2016
- Cambridge Science Festival Maths Open Day volunteer and presenter 2015
- Cambridge Maths Circle Outreach Day volunteer 2014

University of Colorado Boulder, Boulder CO

- Engineering Excellence Fund Board Member/Chair (oversaw $500,000 grant budget) 2011 – 2013
- Society for Industrial and Applied Mathematics Chapter Co-President 2010 – 2014

Bibliography

Peer-reviewed publications

S.M. Kissler, Y.H. Grad. Anticipating racial/ethnic mortality displacement from COVID-19. *American Journal of Epidemiology* (in press)

S.M. Kissler*, J. Fauver*, C Mack*, ..., N Grubaugh, Y. Grad. Viral dynamics of SARS-CoV-2 variants in vaccinated and unvaccinated individuals. *New England Journal of Medicine,* Dec. 2021 (*denotes equal contribution)

C. Giannitsarou, **S.M. Kissler**, F. Toxvaerd. Waning Immunity and the Second Wave: Some Projections for SARS-CoV-2. *American Economic Review: Insights,* 3(3), Sep. 2021

S.M. Kissler*, J. Fauver*, C Mack*, ..., N Grubaugh, Y.H. Grad. Viral dynamics of acute SARS-CoV-2 infection and applications to diagnostic and public health strategies. *PLOS Biology,* 19(7): e3001333, July 2021 (*denotes equal contribution)

K.C. Ma, T.F. Menkir, **S.M. Kissler**, Y.H. Grad, M. Lipsitch. Modeling the impact of racial and ethnic disparities on COVID-19 epidemic dynamics. *eLife*, 10:e66601, May 2021

S.M. Kissler, M. Klevens, M.L. Barnett, Y.H. Grad. Childhood respiratory outpatient visits correlate with socioeconomic status and drive geographic patterns in antibiotic prescribing. *Journal of Infectious Diseases,* Apr. 2021
Commentary: S.E. Cosgrove, E.Y. Klein. Reassessing the link between healthcare access and outpatient antibiotic prescribing. *Journal of Infectious Diseases,* Apr. 2021

S.M. Kissler*, M. Mitchell*, Y.H. Grad. Reduction in antibiotic prescribing attainable with a gonococcal vaccine. *Clinical Infectious Diseases,* Mar. 2021 (*denotes equal contribution)

D.B. Larremore, B.K. Fosdick, K.M. Bubar, S. Zhang, **S.M. Kissler**, C.J.E. Metcalf, C.O. Buckee, Y.H. Grad. Estimating SARS-CoV-2 seroprevalence and epidemiological parameters with uncertainty from serological surveys. *eLife*, Mar. 2021

K.M. Bubar, K. Reinholt, **S.M. Kissler**, M. Lipsitch, S. Cobey, Y.H. Grad, D. Larremore. Model-informed COVID-19 vaccine prioritization strategies by age and serostatus. *Science,* eabe6959, Jan. 2021

S.M. Kissler*, N. Kishore*, M. Prabhu*, D. Goffman*, Y. Beilin*, R. Landau, C. Gyamfi-Bannerman, B.T. Bateman, J. Snyder, A.S. Razavi, D. Katz, J. Gal, A. Bianco, J. Stone, D. Larremore, C.O. Buckee, Y.H. Grad. Reductions in commuting mobility are correlated with

geographic differences in SARS-CoV-2 prevalence in New York City. *Nature Communications,* Aug. 2020 (*denotes equal contribution)

J.A. Firth, J. Hellewell, P. Klepac, **S.M. Kissler**, A.J. Kucharski, L.G. Spurgin, CMMID COVID-19 working group. Combining fine-scale social contact data with epidemic modelling reveals interactions between contact tracing, quarantine, testing and physical distancing for controlling COVID-19. *Nature Medicine,* Aug. 2020

A.J. Kucharski, P. Klepac, A. Conlan, **S.M. Kissler**, M. Tang, H. Fry, J.R. Gog, J. Edmunds, CMMID COVID-19 Working Group. Effectiveness of isolation, testing, contact tracing and physical distancing on reducing transmission of SARS-CoV-2 in different settings. *Lancet Infectious Diseases*, Jun. 2020

A.L. Hicks, **S.M. Kissler**, T.D. Mortimer, K.C. Ma, G. Taiaroa, M. Ashcroft, D.A. Williamson, M. Lipsitch, Y.H. Grad. Targeted surveillance strategies for efficient detection of novel antibiotic resistance variants. *eLife,* 9:e56367, Jun. 2020

S.M. Kissler*, C. Tedijanto*, E. Goldstein, Y.H. Grad, M. Lipsitch. Projecting the transmission dynamics of SARS-CoV-2 through the postpandemic period. *Science*, 368(6493):860-868, May 2020 (*denotes equal contribution)
Info and Metrics: Altmetric score of 19,192; #1 research output of 72,492 in *Science* and #18 research output of 18,494,520 overall.

S.M. Kissler, R.M. Klevens, M.L. Barnett, Y.H. Grad. Distinguishing the roles of antibiotic stewardship and reductions in outpatient visits in generating a five-year decline in antibiotic prescribing. *Clinical Infectious Diseases,* Mar. 2020

S.M. Kissler, C. Viboud, L. Simonsen, O.N. Bjørnstad, B.T. Grenfell, J.R. Gog. Symbolic transfer entropy reveals the age structure of pandemic influenza transmission from high-volume influenza-like illness data. *J. Roy. Soc. Interface*, 17:20190628, Mar. 2020

B. Nichols, **S.M. Kissler**. Ending the HIV epidemic in the United States. *The Lancet HIV*, Mar. 2020

A.L. Hicks, **S.M. Kissler,** M. Lipsitch, Y.H. Grad. Quantifying the surveillance required to sustain genetic marker-based antibiotic resistance diagnostics. *PLOS Biology*, 17(11): e3000547, Oct. 2019

S. Lew-Levy, **S.M. Kissler**, A.H. Boyette, A.N. Crittenden, I.A. Mabullah, B.S. Hewlett. Who teaches children to forage? Exploring the primacy of child-to-child teaching among Hadza and BaYaka Hunter-Gatherers of Tanzania and Congo. *Evolution and Human Behavior,* in press, Aug. 2019

S.M. Kissler, J.R. Gog, C. Viboud, V. Charu, O.N. Bjørnstad, L. Simonsen, B.T. Grenfell. Geographic transmission hubs of the 2009 influenza pandemic in the United States. *Epidemics,* 26:86-94, Oct. 2018

B. Dalziel, **S.M. Kissler,** J. Gog, C. Viboud, O. Bjørnstad, J.E. Metcalf, B.T. Grenfell. Urbanization and humidity shape the intensity of influenza epidemics in U.S. cities. *Science,* 362(6410):75-79, Oct. 2018

P. Klepac, **S.M. Kissler**, J.R. Gog. Contagion! The BBC Four Pandemic – the model behind the documentary. *Epidemics,* 24:49-59, Mar. 2018

V. Charu, S. Zeger, J.R. Gog, O.N. Bjørnstad, **S.M. Kissler**, L. Simonsen, B.T. Grenfell, C. Viboud. Human mobility and the spatial transmission of influenza in the United States. *PLOS Comp. Bio.,* 13(2):e1005382, Feb. 2017

S.M. Kissler, C. Cichowitz, S. Sankaranarayanan, D.M. Bortz. Determination of personalized diabetes treatment plans using a two-delay model. *J. Theor. Biol.,* 359:101-111, Oct. 2014

Pre-prints

J.A. Hay*, **S.M. Kissler*,** J.R. Fauver, C. Mack, …, N.D. Grubaugh, Y.H. Grad. Viral dynamics and duration of PCR positivity of the SARS-CoV-2 Omicron variant. *medRxiv* (Under review)

C.B. Boyer, E. Rumpler, **S.M. Kissler,** M. Lipsitch. Infectious disease dynamics and restrictions on social gathering size. *medRxiv* (Under review)

S.M. Kissler. Training a new generation of crisis-ready epidemiologists. (Under review)

S. Lew-Levy, R. Reckin, **S.M. Kissler**, ..., H.E. Davis. Cross-cultural variation in child and adolescent time allocation to work and play in twelve hunter-gatherer and mixed-subsistence societies. *SocArXiv* (Under review)

J.A. Watson, **S.M. Kissler**, N. Day, Y. Grad, N.J. White. Optimal design for phase 2 studies of SARS-CoV-2 antiviral drugs. *medRxiv* (Under review)

A.J.K. Conlan, P. Klepac, A.J. Kucharski, **S.M. Kissler**, M.L. Tang, H. Fry, J.R. Gog. Human mobility data from the BBC Pandemic project. *medRxiv* (Under review)

S.M. Kissler, P. Klepac, M. Tang, J.R. Gog. Sparking "The BBC Four Pandemic": Leveraging citizen science and mobile phones to reveal interpersonal interactions relevant to the spread of disease. *bioRxiv*

P. Klepac, A.J. Kucharski, A.J.K. Conlan, **S.M. Kissler,** M. Tang, H. Fry, J.R. Gog. Contacts in context: large-scale setting-specific social mixing matrices from the BBC Pandemic project. *medRxiv*

Non-refereed publications

S. Kissler. Let's finally get COVID-19 testing right. *The Hill*, 25 May 2021

S. Kissler. If control measures are stopping flu in its tracks, why aren't they stopping coronavirus? *The Conversation,* 4 Feb 2021

S. Kissler. Counting. *Harvard Public Health Magazine,* Fall 2020.

S. Kissler. Coronavirus: does the common cold protect you from COVID? *The Conversation,* 12 Aug 2020

S. Kissler. Will flu or cold viruses push the new coronavirus out of circulation this winter? *The Conversation,* 8 Jun 2020

S. Kissler. Game changers: Stories of the revolutionary minds behind game theory (book review). *PLUS Magazine,* 10 Jan 2020

S. Kissler. Weapons of math destruction: How big data increases inequality and threatens democracy (book review). *PLUS Magazine,* 8 May 2017

S. Kissler. Can you solve my problems? A casebook of ingenious, perplexing and totally satisfying puzzles (book review). *PLUS Magazine,* 9 Jan 2017

V. Roy, D. Chokshi, **S.M. Kissler**, P. Singh. Making Hepatitis C a rare disease in the United States. *Health Affairs Blog*, Jun 2016

Selected interviews and media appearances

E. Anthes and J. Corum. Charting an Omicron infection. *The New York Times,* 22 Jan 2022

D. Leonhart. What do you do when the kids are still unvaccinated? *The New York Times,* 22 Apr 2021

L. Bernstein, A.E. Cha, T. McCoy, J. Dupree. Rise of coronavirus variants will define the next phase of the pandemic in the U.S. *The Washington Post,* 8 Apr 2021

B. Resnick. We wiped out the flu this year. Could we do it again? *Vox,* 11 Feb 2021

D. Grasso, K. Llaneras, M Zafra. Aislar rápido y cortar contagios: cómo los test de antígenos están cambiando la pandemia (Isolate fast and curtail infection: how antigen tests are changing the face of the pandemic). *El País,* 5 Dec 2020

G. Cohen. 58% of Americans say they'd take a COVID vaccine. But is that enough to reach herd immunity? *Verify (WUSA),* 4 Dec 2020

J. Douglas. Research ties curbing the COVID-19 pandemic to saving the economy. *The Wall Street Journal,* 10 Nov 2020

J. Hamblin. How we survive the winter. *The Atlantic,* 18 Sep 2020

B. Abbott, S. Krouse. Growing wait times for COVID-19 test results hinder virus response. *The Wall Street Journal,* 16 Jul 2020

S. Roberts. This is the future of the pandemic. *The New York Times,* 8 May 2020

E. Yong. Our pandemic summer. *The Atlantic,* 14 Apr 2020

E. Yong. How the pandemic will end. *The Atlantic,* 25 Mar 2020

D. Lemon. Interview with Stephen Kissler**.** *Don Lemon Tonight (CNN)*, 14 Apr 2020

E. Garcia de Jesus. Four small cities may have played an outsize role in spreading deadly flu. *Science*, 4 Dec 2018

British Broadcasting Corporation. Contagion! The BBC Four Pandemic. *BBC Four*, 22 Mar 2018