

# Jessica Erin Stockdale, PhD MMath

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## Employment

2022-Present	<b>Assistant Professor</b> <ul style="list-style-type: none"><li>Research and teaching in Department of Mathematics</li><li>Leadership team of The Pacific Institute on Pathogens, Pandemics and Society (PIPPS)</li></ul>	<b>Simon Fraser University</b>
2020-2022 2018-2020	<b>Senior Postdoctoral Fellow</b> <b>Postdoctoral Fellow</b> <ul style="list-style-type: none"><li>Research and teaching in Department of Mathematics, with Prof Caroline Colijn and MAGPIE research group</li><li>Secondment part-time to British Columbia Centre for Disease Control for rapid response modelling of COVID-19, Mar-Dec 2020</li></ul>	<b>Simon Fraser University</b>
2018	<b>Research Assistant, Centre for People, Work and Organizational Practice</b> <ul style="list-style-type: none"><li>Support in qualitative and quantitative analysis across centre research projects, including evaluation of UK government 50+ volunteering scheme</li></ul>	<b>Nottingham Business School</b>

## Education

2014-2018	<b>PhD Statistics, School of Mathematical Sciences, University of Nottingham</b> Thesis: "Bayesian computational methods for stochastic epidemics" Advisors: Prof Philip O'Neill and Prof Theodore Kypraios Funded by UK Engineering and Physical Sciences Research Council (EPSRC)
2010-2014	<b>MMath Master of Mathematics, 1<sup>st</sup> Class Hons., University of Nottingham</b> Thesis: "Statistical analysis of mass spectrometry data for melanoma diagnoses"

## Research Interests

Mathematical modelling of infectious diseases and genomic epidemiology; Intersections of mathematics, statistics, and data science for epidemiology and health.

## Publications

**Stockdale JE**, Susvitasari K, Tupper P, Sobkowiak B, Mulberry N, Gonçalves da Silva A, Watt AE, Sherry N, Minko C, Howden BP, Lane CR, Colijn C. Genomic epidemiology offers high resolution estimates of serial intervals for COVID-19. *Nature Communications* (2023) [10.1038/s41467-023-40544-y](https://doi.org/10.1038/s41467-023-40544-y)

Susvitasari K, Tupper P, **Stockdale JE**, Colijn C. A method to estimate the serial interval distribution under partially-sampled data. *Epidemics* (2023) [10.1016/j.epidem.2023.100733](https://doi.org/10.1016/j.epidem.2023.100733)

Yerlanov M, Agarwal P, Colijn C, **Stockdale JE**. Effective population size in simple infectious disease models. *Journal of Mathematical Biology* (2023) [10.1007/s00285-023-02016-1](https://doi.org/10.1007/s00285-023-02016-1)

Hayati M, Sobkowiak B, **Stockdale JE**, Colijn C. Phylogenetic identification of influenza virus candidates for seasonal vaccines. *Science Advances* (2023) [10.1126/sciadv.abp9185](https://doi.org/10.1126/sciadv.abp9185)

Are EB, Song Y, **Stockdale JE**, Tupper P, Colijn C. COVID-19 endgame: from pandemic to endemic? Vaccination, reopening and evolution in low- and high-vaccinated populations. *Journal of Theoretical Biology* (2023) [10.1016/j.jtbi.2022.111368](https://doi.org/10.1016/j.jtbi.2022.111368)

**Stockdale JE**, Liu P, Colijn C. The potential of genomics for infectious disease forecasting. *Nature Microbiology* 7.11 (2022) [10.1038/s41564-022-01233-6](https://doi.org/10.1038/s41564-022-01233-6)

**Stockdale JE**, Anderson SC, Edwards AM, Iyaniwura SA, Mulberry N, Otterstatter MC, Janjua NZ, Coombs D, Colijn C, Irvine MA. Quantifying transmissibility of SARS-CoV-2 and impact of intervention within long-term healthcare facilities. *Royal Society Open Science* 9.1 (2022) [10.1098/rsos.211710](https://doi.org/10.1098/rsos.211710)

**Stockdale JE**, Doig R, Min J, Mulberry N, Wang L, Elliott LT, Colijn C. Long time frames to detect the impact of changing COVID-19 measures, Canada, March to July 2020. *Eurosurveillance* 26.40 (2021) [10.2807/1560-7917.ES.2021.26.40.2001204](https://doi.org/10.2807/1560-7917.ES.2021.26.40.2001204)

**Stockdale JE**, Kypraios T, O'Neill PD. Pair-based likelihood approximations for stochastic epidemic models. *Biostatistics* 22.3 (2021) [10.1093/biostatistics/kxz053](https://doi.org/10.1093/biostatistics/kxz053)

Anderson SC, Mulberry N, Edwards AM, **Stockdale JE**, Iyaniwura SA, Falcao RC, Otterstatter MC, Janjua NZ, Coombs D, Colijn C. How much leeway is there to relax COVID-19 control measures? *Epidemics* 35 (2021) [10.1016/j.epidem.2021.100453](https://doi.org/10.1016/j.epidem.2021.100453)

Tindale LC\*, **Stockdale JE\***, Coombe M, Garlock ES, Lau WYV, Saraswat M, Zhang L, Chen D, Wallinga J, Colijn C. Evidence for transmission of COVID-19 prior to symptom onset. *eLife* 9 (2020) [10.7554/eLife.57149](https://doi.org/10.7554/eLife.57149) \*joint first author

Xu Y, **Stockdale JE**, Naidu V, Hatherell H, Stimson J, Stagg HR, Abubakar I, Colijn C. Transmission analysis of a large tuberculosis outbreak in London: a mathematical modelling study using genomic data. *Microbial Genomics* 6.11 (2020) [10.1099/mgen.0.000450](https://doi.org/10.1099/mgen.0.000450)

Anderson SC, Edwards AM, Yerlanov M, Mulberry N, **Stockdale JE**, Iyaniwura SA, Falcao RC, Otterstatter MC, Irvine MA, Janjua NZ, Coombs D, Colijn C. Quantifying the impact of COVID-19 control measures using a Bayesian model of physical distancing. *PLoS computational biology* 16.12 (2020) [10.1371/journal.pcbi.1008274](https://doi.org/10.1371/journal.pcbi.1008274)

McCarthy Z, Athar S, Alavinejad M, Chow C, Moyles I, Nah K, Kong JD, Agrawal N, Jaber A, Keane L, Liu S, Nahirniak M, St Jean D, Romanescu R, **Stockdale JE**, Seet BT, Coudeville L, Thommes E, Taurel AF, Lee J, Shin T, Arino J, Heffernan J, Chit A, Wu J. Quantifying the annual incidence and underestimation of seasonal influenza: A modelling approach. *Theoretical Biology and Medical Modelling* 17.11 (2020) [10.1186/s12976-020-00129-4](https://doi.org/10.1186/s12976-020-00129-4)

**Stockdale JE**, Kypraios T, O'Neill PD. Modelling and Bayesian analysis of the Abakaliki Smallpox Data. *Epidemics* 19: 13-23. (2017) [10.1016/j.epidem.2016.11.005](https://doi.org/10.1016/j.epidem.2016.11.005)

PhD thesis: **Stockdale JE**. Bayesian computational methods for stochastic epidemics. (2019) <http://eprints.nottingham.ac.uk/id/eprint/56483>

## Book chapters

Are EB, **Stockdale JE**, Colijn C. Long-term dynamics of COVID-19 in a multi-strain model. In: David, J., Wu, J. (eds) *Mathematics of Public Health. Fields Institute Communications*, vol 88. Springer, Cham. (2023) [https://doi.org/10.1007/978-3-031-40805-2\\_11](https://doi.org/10.1007/978-3-031-40805-2_11)

## Teaching

**Introduction to Operations Research** (MATH 208w) 2024. Simon Fraser University

**Mathematical Modelling of Infectious Diseases\*** (MATH 396) 2023. Simon Fraser University

**Calculus II** (MATH 152) 2020. Simon Fraser University

**Foundations of Analytical and Quantitative Reasoning** (FAN X99) 2019. Simon Fraser University

**Reconstructing Transmission with Genomic Data\*** 2020-2023. University of Washington Summer Institute in Statistics and Modeling in Infectious Diseases

Teaching assistant:

**Probability I, Probability II, Statistics I, Statistics II** 2014-2018. University of Nottingham

*\*Designed course*

## Research Supervision

### PhD students:

Shabnam Molan (2023-2027, co-supervisor)

### MSc students:

Niloufar Saeidi Modbarakeh (2023-25, co-supervisor)

### Undergraduate research assistants:

Kunpeng Zhang (2024, 4 months USRA, co-supervisor)

Minh Nguyen (2024, 4 months USRA, co-supervisor)

Jacob Umbach (2024, 2 months Canada Summer Jobs RA, co-supervisor)

Vibhuti Gandhi (2022-23, 13 months RA, co-supervisor)

Christopher Douglas (2023, 4 months USRA, co-supervisor)

### Other:

Co-supervised visiting undergraduate students Catalina Opazo and Patricio Asenjo, Universidad de Concepción (2023), and visiting graduate research assistant Jenny Wu, National Taiwan University (2024)

### Graduate student committees:

Kurnia Susvitasari, PhD (2023, completed)

Yexuan Song. PhD (2023-present)

Mahdi Salehzadeh. PhD (2023-present)

Samara Chaudhury. MSc (2023-present)

## Research Funding & Awards

NSERC Discovery Grant “ <i>Dynamics of pathogens and hosts: modelling methods in genomic epidemiology</i> ” (2023-2028)	165,000 CAD
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NSERC Discovery Launch Supplement (2023)	12,500 CAD
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MATRIX-Simons Travel Grant (2024)	2500 AUD
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PIMS discretionary funding – to support MATRIX workshop (2024)	3000 CAD
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Workshop on Evolution of Viruses, <i>National University of Singapore</i> (2023)	Travel funds
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Fields-CQAM Industrial Problem-Solving Workshop, <i>Fields Institute, Toronto</i> (2019)	Travel funds
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1 <sup>st</sup> place lightning talk, <i>Simon Fraser University Postdoctoral Research Day</i> (2019)	500 CAD
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Best poster, <i>European Meeting of Statisticians, Univ. of Helsinki</i> (2017)	
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University of Nottingham Work Experience Grant, for undergraduate research (2013)	500 GBP
Nuffield Foundation undergraduate research bursary, <i>Univ. of Nottingham</i> (2012)	1,400 GBP
Eliahou Dangoor undergraduate STEM scholarship, <i>Univ. of Nottingham</i> (2011)	1,000 GBP

## Selected Research Collaborations

<b>Vancouver Coastal Health, 2023-present</b>	Building an embedded research program for modelling and operations research within the health authority. 18-month pilot program began Sept 2024.
<b>Public Health Agency of Canada, 2022-present</b>	Modelling global SARS-COV-2 waves and evolutionary patterns.
<b>Health Canada, 2022-23</b>	Cost-effectiveness of rapid testing for COVID-19 in long term care
<b>ATB Financial, 2022-23</b>	Consultancy on COVID-19 and future pandemic preparedness; developing models for workplace transmission.
<b>BCCDC, 2020-22</b>	Secondment for COVID-19 rapid response modelling. Our team built the primary statistical model used by BCCDC and the Public Health Agency of Canada during 2020-21 for COVID-19 transmission modelling and public dissemination. Co-led work evaluating transmission of COVID-19 in BC long-term care.
<b>Fraser Health, 2019-20</b>	Modelling transmission dynamics of Carbapenemase-producing organisms

## Conference & Invited Talks

- “Mathematical modelling of COVID-19: experiences from BC”  
*Undergraduate research seminar, Simon Fraser University, Jul 2024*
- “Lessons learned from pandemic modelling”  
*MATRIX institute, University of Melbourne, Jun 2024*
- “Modelling the COVID-19 pandemic in British Columbia”  
*Simon Fraser University Biophysics seminar, Jan 2024*
- “Genomic epidemiology for estimation of serial intervals in COVID-19 transmission clusters”  
*Invited speaker, Evolution of Viruses, National University of Singapore, Sep 2023*
- “Modelling heterogeneities with simple infectious disease models and the effective population size”  
*Mini-symposium speaker, International Congress on Industrial and Applied Mathematics, Waseda University Tokyo, Aug 2023*
- “A genomics approach to serial intervals in COVID-19 transmission clusters”  
*29th International Dynamics & Evolution of Human Viruses conference, University of California San Diego, Jun 2022*
- “Genomic epidemiology for estimation of serial intervals in COVID-19 transmission clusters”  
*Invited speaker, Banff International Research Station workshop “Preparing for the next pandemic”, University of British Columbia Okanagan, Jun 2022*
- “Using genomic epidemiology to reconstruct transmission in infectious disease outbreaks: an application to serial intervals of COVID-19”  
*Simon Fraser University Department of Mathematics, Jun 2022*

“Modelling the COVID-19 pandemic in British Columbia”

*Plenary speaker, Biennial Meeting of SIAM Pacific Northwest Section, Washington State University  
Vancouver, May 2022*

“Genomic epidemiology offers high resolution estimates of serial intervals for COVID-19”

*Statistics and Probability seminar, University of Nottingham, May 2022*

"How long does it take to detect a change in COVID-19 control measures?"

*Invited speaker, Society for Mathematical Biology Annual Meeting, Online, Aug 2020*

“How long does it take to detect a change in COVID-19 control measures?”

*Elliott Lab journal club, Simon Fraser University, Jul 2020*

“Pair-based likelihood approximations for stochastic epidemic models”

*Mathematical Biology seminar series, University of British Columbia, Nov 2019*

“Modelling and genomics to identify dangerous *Streptococcus pneumoniae* strains”

*Society for Mathematical Biology Annual Meeting, University of Montreal, Jul 2019*

“Approximation methods for stochastic epidemic modelling”

*Postdoctoral Research Day, Simon Fraser University, Mar 2019*

“Bayesian estimation for transmission potential of smallpox” and poster “Likelihood approximation methods for stochastic epidemic models”

*European Meeting of Statisticians, University of Helsinki, Jul 2017*

“Modelling and Bayesian analysis for the Abakaliki smallpox data”

*Stochastic Epidemic Models with Structured Populations, University of Nottingham, Jul 2017*

“Modelling and Bayesian inference for the Abakaliki smallpox data”

*38th Research Students’ Conference in Probability and Statistics, University of Leeds, Jul 2015*

## Service

Thesis examiner	Mina Moeini, MSc (2024) Niloufar Abhari, PhD (2024)
Thesis defense chair	Rebekah Hall, MSc (2024)
Departmental service	Department Colloquium Committee (2024-2025) Tenure and promotion committee (2023-2024) USRA seminar series organizer (2023)
Academic service	PIPPS leadership committee, and outreach to BC health authorities, SFU (2022-present) Organizer, MATRIX Institute research program in infectious disease modelling (Jun 2024) Scientific committee, 4 <sup>th</sup> Biennial Meeting of SIAM Pacific Northwest Section (Oct 2023) Co-led a modelling study and report for the BC Provincial Health Officer on scenario planning for COVID-19 (Jun-Sep 2022)
Outreach & events	Career Development Panel speaker, Mathematics for Public Health Festival (MfPHest). <i>Fields Institute, University of Toronto</i> (Oct 2022)

	Public lecture "COVID data, models and challenges: Where are we headed?". <i>Café Scientifique, SFU (Nov 2020)</i>
	Co-organized "EpiCorona Hack" COVID-19 hackathon. <i>SFU (Feb 2020)</i>
	"Fighting infectious diseases with math and genomics" mini-course at Undergraduate Women's Summer School. <i>PIMS Diversity in Mathematics, SFU (Jul 2019)</i>
Media	BBC Radio 5 Live Science show, <a href="#">interview on influenza research</a> (Nov 2023) Omni Television interview on COVID-19 (Feb 2020)
Peer review	Includes Epidemics, BMC Infectious Diseases, Journal of Theoretical Biology, Nature Scientific Reports, Proceedings of the Royal Society B, Banff International Research Station, UK Research and Innovation, RECOMB 2024, Rapid Reviews\Infectious Diseases.
Training	MobilizeU 9-week course in Knowledge Mobilization. Simon Fraser Univ. (Spring 2024)