

# Marisa C. Eisenberg

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RESEARCH INTERESTS *mathematical epidemiology, parameter identifiability and estimation, infectious diseases, wastewater monitoring, global health, networks, and algebraic approaches in biology*

EDUCATION & APPOINTMENTS

**Director** Center for the Study of Complex Systems, 2022 - present.

**Interim Director** Center for the Study of Complex Systems, 2021 - 2022.

**Associate Professor** Departments of Epidemiology, Complex Systems, and Mathematics, University of Michigan, Ann Arbor, January 2018–present.

**Assistant Professor** Departments of Epidemiology and Mathematics, University of Michigan, Ann Arbor, 2012–2017. Part of the UM Interdisciplinary Cluster Hiring Program in *The Diversity and Complexity of Biological Networks*.

**Postdoctoral Fellow** Mathematical Biosciences Institute, Ohio State University, 2009–2012.

**PhD, MS Biomedical Engineering** (Biocybernetics) University of California, Los Angeles, 2009.

**BS Cybernetics** University of California, Los Angeles, 2003.

RECENT AWARDS & FELLOWSHIPS

**State of Michigan Symbol of Excellence Recognition Coin** This award (typically only awarded internally to state government employees) recognizes significant actions, noteworthy contributions, and extraordinary efforts of an individual. It was awarded for service to the state of Michigan and Michigan Department of Health and Human Services during the pandemic. 2022.

**University of Michigan President’s Award for National and State Leadership** This award honors individuals who provide sustained, dedicated and influential leadership and service in major national or state capacities. 2022.

**2022 CHRT Health Policy Fellowship** The Center for Health & Research Transformation Health Policy Fellowship at the University of Michigan brings together policymakers, researchers, and nonprofit fellows for a four month fellowship based in Ann Arbor, Detroit, Lansing, and Washington, DC, focused on building connections with policymakers to translate research into policy. 2021-2022.

**Anthony Family Fourth Annual Prize Paper Award** awarded to Rachel Gicquelais and co-authors Betsy Foxman, Joseph Coyle, and Marisa Eisenberg for our paper, ‘Hepatitis C transmission in young people who inject drugs: Insights using a dynamic model informed by state public health surveillance,’ by the journal *Epidemics*, 2019.

**Lord Robert May Best Paper Prize** awarded to Michael Kelly, Joseph Tien, Marisa Eisenberg, and Suzanne Lenhart for our paper, ‘The impact of spatial arrangements on epidemic disease dynamics and intervention strategies,’ by the *Journal of Biological Dynamics*, 2017.

GRANTS &  
FUNDING**Current External Funding**

- 2021–2024 Michigan Department of Health and Human Services/Centers for Disease Control and Prevention, “MI Safe Start Map Umbrella.” \$750,000/year (recently expanded to \$1,085,254 for 22-23).  
*Role: Principal Investigator*
- 2021–2024 Michigan Department of Health and Human Services/Centers for Disease Control and Prevention, “University of Michigan SARS-CoV-2 Monitoring in Michigan Wastewater Treatment Plants” \$911,626/year.  
*Role: Principal Investigator (Multiple)*
- 2019–2023 NSF DMS Grant 1853032, “Collaborative Research: Efficient Methods for Identifiability of Dynamic Models.” Total award: \$248,987.  
*Role: Principal Investigator*
- 2022–2024 Michigan Department of Health and Human Services/Centers for Disease Control and Prevention, “University of Michigan Genomic Surveillance and Epidemiology Partnership.” \$4,375,000/year.  
*Role: Co-Investigator*
- 2021–2024 Michigan Department of Health and Human Services/Centers for Disease Control and Prevention, “Targeted Wastewater Based Epidemiology for SARS-CoV-2 in buildings on- and off- University of Michigan Campus” \$1,036,812/year.  
*Role: Co-Investigator*
- 2018–2023 NIH Grant U54, “Center for the Assessment of the Public Health Impact of Tobacco Regulations.” Total award: \$20,005,724.  
*Role: Co-Investigator*

**Completed External Funding**

- 2021–2022 Rockefeller Foundation, Society for Medical Decision-Making, and Johns Hopkins University Grant, MI Safe Start Map Proposal for COVID-19 Modeling Accelerator Total award: \$200,000.  
*Role: Principal Investigator*
- 2020–2022 Bill and Melinda Gates Foundation Grant, “Application of mathematical models to address policy-relevant WASH questions.” Total award: \$472,118.  
*Role: Co-Investigator*
- 2014–2021 NIH Grant U01 CA182915-01A1, “From Mechanism to Population: Modeling HPV-related Oropharyngeal Carcinogenesis.” Total award: \$4,074,026  
*Role: Principal Investigator (Multiple)*
- 2014–2021 NIH MIDAS Grant U01 GM110712-01, “Modeling the Effects of the Environment on Enteric Pathogen Dynamics.” Total award: \$4,128,725.  
*Role: Co-Investigator*
- 2020 Michigan Department of Labor and Economic Opportunity, “COVID-19 Early Detection and Regional Epidemic Alert System: MI Symptoms App & MI Safe Start Map.” Total award: \$450,000.  
*Role: Co-Investigator*

- 2020 Michigan Treasury Department Grant, “Data-Driven Public Health Strategies and Policies to Mitigate COVID-19 Disparities: Exploring Racial/Ethnic Disparities COVID-19 Recovery in Michigan.” Total award: \$500,000.  
*Role: Co-Investigator*
- 2020 Michigan Department of the Environment, Great Lakes, and Energy Grant, “Localized WBE of SARS-CoV-2 for early warning and intervention in college dormitories.” Total award \$180,000.  
*Role: Co-Investigator*
- 2018–2019 NSF DMS Grant 1839609, “Collaborative Research: RoL: FELS: Workshop - Rules of Life in the Context of Future Mathematical Sciences.” Total award: \$10,000.  
*Role: Principal Investigator*
- 2014–2019 NIH MIDAS Grant U54 GM111274-01, “Center for Statistics and Quantitative Infectious Diseases.” Total award: \$180,290.  
*Role: Co-Investigator*
- 2016–2018 GOJO Industries Grant, “Innovative Approaches to Healthy Hand Hygiene Behavior.” Total award: \$9,769.  
*Role: Principal Investigator (Multiple)*
- 2011–2017 NSF EEID Grant 1115881, “Modeling the effects of heterogeneity in water quality on cholera disease dynamics.” Annual direct costs: \$137,265 (currently in no-cost extension).  
*Role: Co-Principal Investigator*
- 2015–2016 NIH Grant R56 AG048937, “Dynamic Social Network Structures in Aging: A Complex Systems Approach.” Annual direct costs: \$229,000.  
*Role: Co-Investigator*
- 2014–2016 WHO Grant 485861-01, “Strategies to Guide the Polio Eradication Endgame.”  
*Role: Co-Investigator*
- 2014–2016 Procter and Gamble Award, “Exploring Dental Biofilm Community Architecture and Structure.” Annual direct costs: \$55,911.  
*Role: Co-Investigator*
- 2013–2014 CDC Grant U01CK000185, “A Randomized Study of Exclusion Criteria in a University Population.” Annual direct costs: \$1,309,879.  
*Role: Co-Investigator*

## PUBLICATIONS

**Published, In Press, and Accepted**(Current and former students/mentees/advisees marked in *italics*)

1. Arts PJ, Kelly JD, Midgley CM, Anglin K, Lu S, Abedi GR, Andino RN, *Bakker KM*, Banman B, Boehm A, Briggs-Hagen M, *Brouwer AF*, Davidson MC, **Eisenberg MC**, Garcia Knight MA, Knight S, Peluso MJ, Pineda-Ramirez J, Tassetto M, Diaz-Sanchez R, Saydeh S, Martin JN, and Wigginton KR. 2023. Longitudinal and Quantitative Fecal Shedding Dynamics of SARS-CoV-2, Pepper Mild Mottle Virus and CrAssphage. *mSphere*, in press.
2. *Brouwer AF*, **Eisenberg MC**, *Bakker KM*, Boerger SN, *Zahid MH*, Freeman MC, Eisenberg JN. 2022. Leveraging infectious disease models to interpret randomized controlled trials: controlling enteric pathogen transmission through water, sanitation, and hygiene interventions. *PLOS Computational Biology* 18 (12): e1010748.
3. *Sund DT*, *Brouwer AF*, Walline HM, Carey TE, Meza R, Jackson T, **Eisenberg MC**. 2022. Understanding the mechanisms of HPV-related carcinogenesis: Implications for cell cycle dynamics. *Journal of Theoretical Biology* 7;551:111235.
4. *Bakker KM*, **Eisenberg MC**, Woods RJ, Martinez ME. 2022. Identifying optimal vaccination scenarios to reduce varicella zoster virus transmission and reactivation. 2022. *BMC Medicine* 20(1):1-0.
5. Petrie JG, **Eisenberg MC**, Lauring AS, *Gilbert J*, Harrison SM, DeJonge PM, Martin ET. 2022. Variant-specific burden of SARS-CoV-2 in Michigan: March 2020 through November 2021. *Journal of Medical Virology* 94: 5251- 5259.
6. Riddell IV J, *Brouwer AF*, Walline HM, *Campredon LP*, Meza R, **Eisenberg MC**, *Andrus EC*, *Delinger RL*, *Yost ML*, *McCloskey JK*, *Thomas TB*, *Huang S*, Ferris RL, Shin DM, Fakhry C, Ow T, Li D, Berlot A, Carey TE, Schlecht NF. 2022. Oral human papillomavirus prevalence, persistence, and risk-factors in HIV-positive and HIV-negative adults. *Tumour virus research* 1;13:200237.
7. *Brouwer AF*, **Eisenberg MC**, Shulman LM, Famulare M, Koopman JS, Kroiss SJ, Hindiyeh M, Manor Y, Grotto I, Eisenberg JN. 2022. The role of time-varying viral shedding in modelling environmental surveillance for public health: revisiting the 2013 poliovirus outbreak in Israel. *Journal of the Royal Society Interface* 18;19(190):20220006.
8. *Brouwer AF*, *Campredon LP*, Walline HM, Marinelli BM, Goudsmit CM, *Thomas TB*, *Delinger RL*, Lau YK, *Andrus EC*, *Yost ML*, *McCloskey JK*, *Sullivan TS*, *Mortensen AS*, *Huang S*, *Murphy K*, *Cheng B*, *Stanek K*, Nair T, Carey TE, Meza R\*, **Eisenberg MC\***. 2022. Prevalence and determinants of oral and cervicogenital HPV infection: Baseline analysis of the Michigan HPV and Oropharyngeal Cancer (MHOC) cohort study. *PloS one* 17 (5): e0268104. (\* Equal contribution)
9. *Stojanovski K*, King EJ, Amico KR, **Eisenberg MC**, Geronimus AT, Baros S, Schmidt AJ. 2022. Stigmatizing Policies Interact with Mental Health and Sexual Behaviours to Structurally Induce HIV Diagnoses Among European Men Who Have Sex with Men. *AIDS and Behavior* 17:1-1.
10. Cramer EY, Huang Y, Wang Y, Ray EL, Cornell M, Bracher J, Brennen A, Rivadeneira AJC, Gerding A, House K, Jayawardena D, Kanji AH, Khandelwal A, Le K, Mody V, Mody V, Niemi J, Stark A, Shah A, Wattanchit N, Zorn MW,

- Reich NG, US COVID-19 Forecast Hub Consortium (includes **Eisenberg MC**). 2022. The United States COVID-19 Forecast Hub dataset. *Sci Data* 1;9(1):462.
11. Cramer EY, Ray EL, Lopez VK, Bracher J, Brennen A, Castro Rivadeneira AJ, Gerding A, Gneiting T, House KH, Huang Y, Jayawardena D, ..., *Corsetti SM*, Baer TM, **Eisenberg MC**, *Falb K*, *Huang Y*, Martin ET, *McCauley E*, *Myers RL*, Schwarz T, et al. 2022. Evaluation of individual and ensemble probabilistic forecasts of COVID-19 mortality in the United States. *Proceedings of the National Academy of Sciences (PNAS)* 12;119(15):e2113561119.
  12. *Brouwer AF*, *Campredon LP*, Walline HM, Marinelli BM, Goudsmit CM, Thomas TB, *Delinger RL*, Lau YK, *Andrus EC*, Nair T, Carey TE, **Eisenberg MC\***, Meza R\*. 2022. Incidence and clearance of oral and cervicogenital HPV infection: longitudinal analysis of the MHOC cohort study. *BMJ open* 12 (1): e056502. (\* Equal contribution)
  13. *Renardy M*, Kirschner D, **Eisenberg M**. 2022. Structural identifiability analysis of age-structured PDE epidemic models. *J. Mathematical Biology* 84(1):1-30.
  14. Masters NB, Zelner J, Delamater PL, Hutton D, Kay M, **Eisenberg MC**, Boulton ML. 2021. Evaluating Michigan’s administrative rule change on nonmedical vaccine exemptions. *Pediatrics* 148(3): e2021049942.
  15. *Andrus E*, Mojola SA, Moran E, **Eisenberg MC**, Zelner J. 2021. Has the relationship between wealth and HIV risk in Sub-Saharan Africa changed over time? A temporal, gendered and hierarchical analysis. *SSM-Population Health* 29:100833.
  16. *Havumaki J*, Eisenberg JN, Mattison CP, Lopman BA, Ortega-Sanchez IR, Hall AJ, Hutton DW, **Eisenberg MC**. 2021. Immunologic and epidemiologic drivers of norovirus transmission in daycare and school outbreaks. *Epidemiology* 32 (3): 351-9.
  17. Steimle LN, *Havumaki J*, **Eisenberg MC**, Eisenberg JN, Prosser LA, Pike J, Ortega-Sanchez IR, Mattison CP, Hall AJ, Steele MK, Lopman BA. 2021. Cost-effectiveness of pediatric norovirus vaccination in daycare settings. *Vaccine* 39 (15): 2133-45.
  18. *Bakker KM*, **Eisenberg MC**, Woods R, Martinez ME. Exploring the seasonal drivers of varicella zoster transmission and reactivation. *American Journal of Epidemiology*. 2021 Mar 18.
  19. *Havumaki J*, Cohen T, Zhai C, Miller JC, Guikema SD, **Eisenberg MC**, Zelner J. Protective impacts of household-based tuberculosis contact tracing are robust across endemic incidence levels and community contact patterns. *PLoS Computational Biology*. 2021 Feb 8;17(2):e1008713.
  20. Zivich PN, Huang W, *Walsh A*, Dutta P, **Eisenberg M**, Aiello AE. Measuring office workplace interactions and hand hygiene behaviors through electronic sensors: A feasibility study. *PLOS One*. 2021 Jan 19;16(1):e0243358.
  21. Masters NB, **Eisenberg MC**, Delamater PL, Kay M, Boulton ML, Zelner J. 2020. Fine-scale spatial clustering of measles nonvaccination that increases outbreak potential is obscured by aggregated reporting data. *Proceedings of the National Academy of Sciences* 117(45):28506-14.

22. *Brouwer AF*, Myers JL, Martin ET, Konopka KE, Luring AS, **Eisenberg MC**, Lephart PR, Nguyen T, Jaworski A, Schmidt CJ. 2020. SARS-CoV-2 surveillance in decedents in a large, urban medical examiner’s office. *Clinical infectious diseases* 72(10): e580-e585.
23. *Renardy M*, **Eisenberg MC**, Kirschner D. 2020. Predicting the second wave of COVID-19 in Washtenaw County, MI. *Journal of Theoretical Biology* 507:110461.
24. Wang L, Zhou Y, He J, Zhu B, Wang F, Tang L, Kleinsasser M, Barker D, **Eisenberg MC**, Song PX. 2020. An epidemiological forecast model and software assessing interventions on COVID-19 epidemic in China. *Journal of Data Science*18(3):446-54.
25. Zivich PN, **Eisenberg MC**, Monto AS, Uzicanin A, Baric RS, Sheahan TP, Rainey JJ, Gao H, Aiello AE. 2020. Transmission of viral pathogens in a social network of university students: the eX-FLU study. *Epidemiology & Infection* 2020;148.
26. *Brouwer AF*, He K, Chinn SB, Mondul AM, Chapman CH, Ryser MD, Banerjee M, **Eisenberg MC**, Meza R, Taylor JM. 2020. Time-varying survival effects for squamous cell carcinomas at oropharyngeal and nonoropharyngeal head and neck sites in the United States, 1973–2015. *Cancer* 126(23): 5137-46.
27. *Brouwer AF*, Zelner JL, **Eisenberg MC**, Kimmins L, Ladisky M, Collins J, Eisenberg JN. 2020. The Impact of Vaccination Efforts on the Spatiotemporal Patterns of the Hepatitis A Outbreak in Michigan, 2016–2018. *Epidemiology* 31(5):628-35.
28. Nair TS, Thomas TB, Yang L, Kakaraparthi BN, Morris AC, Clark AM, *Campredon LP*, *Brouwer AF*, **Eisenberg MC**, Meza R, Carey TE. 2020. Characteristics of head and neck squamous cell carcinoma cell Lines reflect human tumor biology independent of primary etiologies and HPV status. *Translational oncology* 13(10):100808.
29. *Havumaki J* and **Eisenberg MC**. 2020. Using compartmental models to simulate directed acyclic graphs to explore competing causal mechanisms underlying epidemiological study data. *Journal of the Royal Society Interface* 17(167): 20190675.
30. Tien JH, **Eisenberg MC**, Cherng ST, Porter MA. 2020. Online reactions to the 2017 ‘Unite the Right’ rally in Charlottesville: measuring polarization in twitter networks using media followership. *Applied Network Science* 5:1-27.
31. *Havumaki J*, Meza R, Phares CR, Date K, **Eisenberg MC**. 2019. Comparing alternative cholera vaccination strategies in Maela refugee camp: using a transmission model in public health practice. *BMC Infectious Diseases* 19(1):1-7.
32. *Brouwer AF*, **Eisenberg MC**, Love NG, Eisenberg JN. 2019. Phenotypic variations in persistence and infectivity between and within environmentally transmitted pathogen populations impact population-level epidemic dynamics. *BMC infectious diseases* 19(1):449.
33. *Brouwer AF*, *Delinger RL*, **Eisenberg MC**, *Campredon LP*, Walline HM, Carey TE, and Meza R. 2019. HPV vaccination has not increased sexual activity or accelerated sexual debut in a college-aged cohort of men and women. *BMC Public Health* 19:821.

34. *Hayashi MAL, Eisenberg MC, Eisenberg JNS.* 2019. Linking Decision Theory and Quantitative Microbial Risk Assessment: Tradeoffs Between Compliance and Efficacy for Waterborne Disease Interventions. *Risk Analysis* 39(10): 2214-2226.
35. *Brouwer AF, Eisenberg MC, Carey TE, Meza R.* 2019. Multisite HPV infections in the United States (NHANES 2003–2014): An overview and synthesis. *Preventative Medicine* 123: 288-298.
36. *Brouwer AF, Meza R, and Eisenberg MC.* 2019. Integrating measures of viral prevalence and seroprevalence: a mechanistic modelling approach to explaining cohort patterns of human papillomavirus in women in the USA *Philosophical Transactions B* 374 (1773): 20180297.
37. *Gicquelais RE, Foxman B, Coyle J, and Eisenberg MC.* 2019. Hepatitis C Transmission in Young People who Inject Drugs: Insights Using a Dynamic Model Informed by State Public Health Surveillance. *Epidemics* 27: 86-95.
38. *Luo TL, Hayashi MAL, Zsiska M, Circello B, Eisenberg MC, Gonzalez-Cabezas C, Foxman B, Marrs CF, Rickard AH.* 2019. Introducing BAIT (Biofilm Architecture Inference Tool): A Software Program to Evaluate the Architecture of Oral Multi-Species Biofilms. *Microbiology*, 10.1099/mic.0.000761.
39. *Kraay A, Hayashi MAL, Hernandez-Ceron N, Spicknall IH, Eisenberg MC, Meza R, Eisenberg JNS.* 2018. Fomite-Mediated Transmission as a Sufficient Pathway: A Comparative Analysis Across Three Viral Pathogens. *BMC infectious diseases*, 18(1): 540.
40. *Brouwer AF, Eisenberg JNS, Pomeroy CD, Shulman LM, Hindiyeh M, Manor Y, Grotto I, Koopman JS, and Eisenberg MC.* 2018. Epidemiology of the silent polio outbreak in Rahat, Israel based on modeling of environmental surveillance data. *PNAS*, 115.45 (2018): E10625-E10633.
41. *Kao YH and Eisenberg MC.* 2018. Practical unidentifiability of a simple vector-borne disease model: Implications for parameter estimation and intervention assessment. *Epidemics*, 25: 89-100.
42. **Eisenberg MC\***, *Campredon LP, Brouwer AF, Walline, HM, Marinelli BM, Lau YK, Thomas TB, Sullivan TS, Yost ML, Goudsmit CM, Carey TE, Meza R\**. 2018. Dynamics and Determinants of HPV Infection: The Michigan HPV and Oropharyngeal Cancer (M-HOC) Study. *BMJ Open*, 8: e021618. (\*equal co-authorship)
43. *Ryser MD, Gulati R, Eisenberg MC, Shen Y, Hwang ES, Etzioni R.* 2018. Identification of the fraction of indolent tumors and associated overdiagnosis in breast cancer screening trials. *American Journal of Epidemiology*, 188 (1):197-205.
44. *Luo TL, Eisenberg MC, Hayashi MAL, Gonzalez-Cabezas C, Foxman B, Marrs CF, Rickard AH.* 2018. A Sensitive Thresholding Method for Confocal Laser Scanning Microscope Image Stacks of Microbial Biofilms. *Scientific Reports*, 8: 13013.
45. *French DA, Eisenberg MC, Nance T, and Teymuroglu Z.* 2018. Analytical and Computational Study of an Individual-Based Network Model for the Spread of Heavy Drinking. *J. Biological Dynamics*, 12(1): 509-526.

46. *Brouwer AF, Eisenberg MC, Meza R.* 2018. Case Studies of Gastric, Lung, and Oral Cancer Connect Etiologic Agent Prevalence to Cancer Incidence. *Cancer Research*, 78(12): 3386-3396.
47. Greene C, Hernandez Ceron N, **Eisenberg MC**, Koopman J, Xi C, and Eisenberg JNS. 2018. Measuring bi-directional bacterial transfer efficiencies: impact on model parameterization. *American Journal of Infection Control*, 46(6): 620-626.
48. *Blanco N, Walk S, Malani AN, Rickard A, Benn M, Eisenberg MC, Zhang M, Foxman B.* 2018. *Clostridium difficile* shows no trade-off between toxin and spore production within the human host. *Journal of Medical Microbiology*, 67: 631-640.
49. *Petrie JG, Eisenberg MC, Ng S, Malosh RE, Lee KH, Ohmit SE, and Monto AS.* 2017. Application of an Individual-Based Transmission Hazard Model for Estimation of Influenza Vaccine Effectiveness in a Household Cohort. *American Journal of Epidemiology*, In Press, <https://doi.org/10.1093/aje/kwx217>.
50. *Blanco N, Foxman B, Malani AN, Zhang M, Walk S, Rickard A, and Eisenberg MC.* 2017. An *in silico* evaluation of treatment regimens for recurrent *Clostridium difficile* infection. *PLOS ONE*, 12(8): e0182815.
51. **Eisenberg MC\*** and Jain HV\*. 2017. Data and Identifiability in Models of Cancer Chemotherapy: a Confidence Building Exercise. *Journal of Theoretical Biology*, 431: 63-78. (\*Equal contribution)
52. *D'Silva JP and Eisenberg MC.* 2017. Modeling spatial transmission of Ebola in West Africa. *Journal of Theoretical Biology*, 428:65-75.
53. Koopman JS, Henry CJ, Park JH, **Eisenberg MC**, Ionides EL, Eisenberg JNS. 2017. Dynamics Affecting the Risk of Silent Circulation When Oral Polio Vaccination Is Stopped. *Epidemics*, 20C: 21-36.
54. Pengsakul T, Sudsom N, *Foakes G, Bhatt K, Eisenberg MC, Siriyasatien P.* 2017. Molecular DNA identification of blood sources fed on, for Culicine mosquitoes (Diptera: Culicidae) collected in the Songkhla province, southern Thailand. *Songklanakarin Journal of Science and Technology*, 39 (6): 1-7.
55. *Brouwer AF, Weir MH, Eisenberg MC, Meza R, and Eisenberg JNS.* 2017. Dose-response Relationships for Environmentally Mediated Infectious Disease Transmission Models. *PLOS Computational Biology* 13(4): e1005481.
56. *Brouwer AF, Meza R, and Eisenberg MC.* 2017. Parameter estimation for multistage clonal expansion models from cancer incidence data: a practical identifiability analysis. *PLOS Computational Biology*, 13(3): e1005431.
57. *Brouwer AF, Eisenberg MC, Remais JV, Collender PA, Meza R, Eisenberg JNS.* 2017. Modeling biphasic environmental decay of pathogens and implications for risk analysis. *Environmental Science and Technology*, 51 (4), 2186 - 2196.
58. *Lee EC, Kelly MR, Ochocki BM, Akinwumi SM, Hamre KE, Tien JH, and Eisenberg MC.* 2017. Model distinguishability and inference robustness in mechanisms of cholera transmission and loss of immunity. *J. Theoretical Biology*, 420: 68-81.
59. Bell SA, Munro-Kramer M, **Eisenberg MC**, Lori J. 2017. "Ebola Kills Generations": Qualitative interviews with Liberian healthcare providers. *Midwifery* 45: 44-49.

60. *Brouwer AF*, Meza R, and **Eisenberg MC**. 2016. A systematic approach to determining the identifiability of multistage carcinogenesis models. *Risk Analysis*, doi:10.1111/risa.12684.
61. *Blanco-Herrera N*, **Eisenberg MC** (co-corresponding), Stillwell T, Foxman B. 2016. What Transmission Precautions Best Control Influenza Spread in a Hospital? *American Journal of Epidemiology* 183(11): 1045-1054.
62. *Walch OJ* and **Eisenberg MC**. 2016. Parameter identifiability and identifiable combinations in generalized Hodgkin-Huxley models. *Neurocomputing* 199:137-143.
63. *Han SX*, **Eisenberg MC**, Larsen PR, DiStefano JJ. 2016. THYROSIM App for Education and Research Predicts Potential Health Risks of Over-the-Counter (OTC) Thyroid Supplements. *Thyroid* 26(4): 489-498.
64. *Brouwer AF*, **Eisenberg MC**, Meza R. 2016. Age effects and temporal trends in HPV-related and HPV-unrelated oral cancer in the United States: A multistage carcinogenesis modeling analysis. *PLOS One* 11(3): e0151098.
65. *Kelly M*, Tien J, **Eisenberg MC**, Lenhart S. 2016. The impact of spatial arrangements on epidemic disease dynamics and intervention strategies. *Journal of Biological Dynamics* 10(1): 222-249.
66. Aiello AE, Simanek AM, **Eisenberg MC**, *Walsh AR*, Davis B, Volz E, Cheng C, Rainey JJ, Uzicanin A, Gao H, Osgood N, Knowles D, Stanley K, Tarter K, Monto AS. 2016. Design and Methods of a Social Network Isolation Study for Reducing Respiratory Infection Transmission: The eX-FLU Cluster Randomized Trial. *Epidemics* 15:38-55.
67. *Hayashi MAL* and **Eisenberg MC**. 2016. Effects of Adaptive Protective Behavior on the Dynamics of Sexually Transmitted Infections. *J. Theoretical Biology*, 388: 119-130.
68. *Brouwer AF*, **Eisenberg MC**, Carey TE, Meza RM. 2015. Trends in HPV cervical and seroprevalence and analysis of multisite (oral, genital, sero) concurrence and type-concordance in NHANES 2003 – 2010. *BMC Infectious Diseases*, 15:575.
69. *Krishna N*, *Pennington H*, Coppola C, **Eisenberg MC**, Schugart R. 2015. Connecting Local and Global Sensitivities for a Mathematical Model in Wound Healing. *Bulletin of Mathematical Biology*, 77(12): 2294-2324.
70. Meshkat N, Sullivant S, and **Eisenberg MC**. 2015. Identifiability results for several classes of linear compartment models. *Bulletin of Mathematical Biology*, 77 (8): 1620-1651.
71. *Brouwer AF*, Meza R, and **Eisenberg MC**. 2015. Transmission Heterogeneity and Autoinoculation in a Multisite Infection Model of HPV. *Mathematical Biosciences*, 270(A):115-125.
72. Fan K, **Eisenberg MC**, *Walsh AR*, Aiello AE, Heller K. 2015. Hierarchical Graph-Coupled HMMs on Heterogeneity and Personalized Health. KDD '15 Proceedings of the 21th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining, 239-248.

73. Greene C, Vadlamudi G, **Eisenberg MC**, Foxman B, Koopman J, and Xi C. 2015. Fomite-Fingerpad Transfer Efficiency (pick-up and deposit) of *Acinetobacter baumannii* With and Without a Latex Glove. *American Journal of Infection Control*, 43(9):928 – 934.
74. Alexander KA, Sanderson CE, Marathe M, Lewis BL, Rivers CM, Shaman J, Drake JM, Lofgren E, Dato VM, **Eisenberg MC**, Eubank S. 2015. What factors might have led to the emergence of Ebola in West Africa? *PLOS Neglected Tropical Diseases*, 9(6):e0003652.
75. Tien JH, Shuai Z, **Eisenberg MC**, van den Driessche P. 2015. Disease invasion on community networks with environmental pathogen movement. *J. Mathematical Biology* 70(5): 1065-1092.
76. **Eisenberg MC** and *Hayashi MAL*. 2014. Determining Structurally Identifiable Parameter Combinations Using Subset Profiling. *Mathematical Biosciences* 256: 116 – 126.
77. **Eisenberg MC**, Kujbida G, Tuite AR, Fisman DN, Tien JH. 2013. Examining rainfall and cholera dynamics in Haiti using statistical and dynamic modeling approaches. *Epidemics* 5(4): 197 – 207.
78. Robertson SL, **Eisenberg MC**, Tien JH. 2013. Heterogeneity in multiple transmission pathways: modeling the spread of waterborne disease in networks with a common water source. *J. Biological Dynamics* 7(1): 254-275.
79. **Eisenberg MC**, Shuai Z, Tien JH, van den Driessche P. 2013. A Cholera Model in a Patchy Environment with Water and Human Movement. *Math Biosciences* 246(1): 105-112.
80. **Eisenberg MC**, Robertson S, Tien J. 2013. Identifiability and estimation of multiple transmission pathways in cholera and waterborne disease. *J. Theoretical Biology* 324: 84-102.
81. *Ben-Shachar R*, **Eisenberg MC** (corresponding), Huang SA, DiStefano JJ. 2012. Simulation of post thyroidectomy treatment alternatives for T3 or T4 replacement in pediatric thyroid cancer patients. *Thyroid* 22(6):1-9.
82. **Eisenberg MC**, Kim Y, Li R, Ackerman WE, Kniss DA, Friedman A. 2011. Mechanistic modeling of the effects of myoferlin on tumor cell invasion. *Proceedings of the National Academy of Sciences (PNAS)* 108(50): 20078-20083.
83. **Eisenberg MC**, Ash JN, Siegal-Gaskins D. 2011. *In silico* synchronization of cellular populations through expression data deconvolution. *Proceedings of the ACM/IEEE Design Automation Conference (DAC)* 2011. (Reprint available at <http://arxiv.org/abs/1105.0955>)
84. Tuite RA, Tien J, **Eisenberg MC**, Earn JDJ, Ma J, Fisman DN. 2011. Cholera Epidemic in Haiti, 2010 – Using a Transmission Model to Explain Spatial Spread of Disease and Identify Optimal Control Interventions. *Annals of Int Med* 154(9): 593-601.
85. **Eisenberg MC**, Santini F, Marsili A, Pinchera A, DiStefano JJ. 2010. TSH Regulation Dynamics In Central & Extreme Primary Hypothyroidism. *Thyroid* 22(11): 1215-1228.

86. Meshkat NC, **Eisenberg MC**, DiStefano JJ. 2009. Algorithm for finding globally identifiable parameter combinations and reparameterizations of nonlinear ODE models using Gröbner Bases. *Math Biosciences*, 222:61-72.
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### Book Chapters

90. *Brouwer AF*, Meza R, Zelner J, and **Eisenberg MC**. Introduction to Infectious Disease Modeling. In Maxcy-Rosenau-Last Public Health & Preventive Medicine, 2022. McGraw-Hill.

### Journal Commentaries and Letters to the Editor

91. Udow-Phillips M, Jacobson PD, **Eisenberg, MC**. 2022. Public health: From politicization to a path forward. *Journal of Hospital Medicine*. 2022 Aug; 17 (8): 665.
92. Zelner J, **Eisenberg M**. 2022. Rapid response modeling of SARS-CoV-2 transmission. *Science*, 376(6593), 579–580.
93. Meza R, Lau YK, Thomas TB, Carey TE, Walline HMM, and **Eisenberg MC**. 2018. DNA Concentration from self samples for HPV testing. *International Journal of Cancer*, 143(11):3036-3037.
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### Preprints

- Ammerman ML, Mullapudi S, *Gilbert J, Figueroa K*, Cruz FP, *Bakker KM*, **Eisenberg MC\***, Foxman B\*, Wigginton KR\*. 2023. Norovirus GII wastewater monitoring for epidemiological surveillance. medRxiv. 2023:2023-04. Co-senior/co-corresponding authors.
- **Eisenberg MC**. 2019. Input-output equivalence and identifiability: some simple generalizations of the differential algebra approach. arXiv preprint arXiv:1302.5484.
- *Brouwer AF*, **Eisenberg MC**. 2018. The underlying connections between identifiability, active subspaces, and parameter space dimension reduction. arXiv preprint arXiv:1802.05641.

- *Hayashi MA, Eisenberg MC*. 2017. Changing burial practices explain temporal trends in the 2014 ebola outbreak. arXiv preprint arXiv:1709.07319.
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#### Reports (links in title)

- Committee on Community Wastewater-based Infectious Disease Surveillance (includes **Eisenberg, MC**). [Wastewater-based Disease Surveillance for Public Health Action](#). Peer-reviewed consensus study report for the National Academy of Sciences, commissioned by the CDC. National Academies Press. 2023. DOI: 10.17226/26767
- Martin ET, **Eisenberg MC**. [IHPI Policy Brief: Tracking COVID-19 in Michigan: Online tools to support data-driven public health response](#). 08-2021. DOI:10.7302/6709
- **Eisenberg MC, Brouwer AF, Cadham C, D’Silva J, Gilbert J, Hayashi MAL, Hurtado PJ, Kao YH, Martin ET, Petrie J, Stamper A, and the University of Michigan School of Public Health COVID-19 Analysis and Modeling group**. [Modeling Michigan’s Pause to Save Lives](#). 2021.
- Martin ET, **Eisenberg MC**, Kardia S, Petrie J, DeJonge P, *Brouwer A*. [Framework for Monitoring COVID-19 Public Health Indicators](#). 2020.
- Dawes A\*, **Eisenberg MC\***, and Seshaiyer P\*. [Report: Rules of Life in the Context of Future Mathematical Sciences](#). NSF Workshop Report. 2018. (\*equal co-authorship)

#### Amicus Briefs (links in title)

- [Signature Sothebys International Realty, Inc. v. Whitmer](#). Brief of amici curiae Michigan epidemiologists in support of defendants’ motion to dismiss, June 12, 2020
- [Mitchell v. Whitmer](#). Brief of amici curiae Michigan epidemiologists in support of defendants’ motion to dismiss, June 12, 2020
- [Michigan House of Representatives and Michigan Senate v. Whitmer](#). Brief of amici curiae Michigan epidemiologists in support of defendant-appellee Governor Gretchen Whitmer, June 24, 2020

#### Media Commentaries and Opinions (links in title)

- Martin ET and **Eisenberg MC**. [As viral infections skyrocket, masks are still a tried-and-true way to help keep yourself and others safe](#). *The Conversation*, December 14, 2022.
- Lantz PM, Hanna-Attisha M, Boulton ML, Bush L, **Eisenberg MC**, Eisenberg JNS, Furr-Holden CD, Markel H, Marks JS, Martin ET, Meadows P, Misra D, Paneth N, Sunstrum J, Wagner AL. [15 doctors send message to Michiganders on wearing masks, following science](#). *Detroit Free Press*, October 6, 2020.
- Dawes A\*, **Eisenberg MC\***, and Seshaiyer P\*. [Understanding the Rules of Life: An NSF Big Idea for the Mathematical Sciences](#). *SIAM News* (Science Policy section), December 2, 2019. (\*equal co-authorship)
- **Eisenberg MC, Brouwer AF, and Eisenberg JNS**. [Sewage surveillance is the next frontier in the fight against polio](#). *The Conversation*, October 19, 2018.

APPS,  
DASHBOARDS,  
CODE, & TOOLS

My research group develops and maintains a wide range of apps and tools to support public health, particularly around COVID-19. A few highlights are given below, and more can be found on [epimath.org](http://epimath.org) and [dataepi.org](http://dataepi.org) (and associated github accounts):

**MI Start Map ([mistartmap.info](http://mistartmap.info))** MI Safe Start Map is a public dashboard designed to track and display current COVID-19 indicators and risk levels of Michigan regions and counties to assist with public health response efforts. This dashboard has been and continues to be used by state of Michigan officials (Governor Whitmer, Michigan Department of Health and Human Services leadership, etc.) to inform policies (e.g. the [MI Safe Start Plan](#)) and assist in communications, and has been used by a range of journalists, school districts, library organizations, and other organizations to assist in decision-making.

**MI Lighthouse** MI Lighthouse is a private dashboard designed to provide authorized state and local public health officials across Michigan with access to high-resolution vaccine data (from individual-level, to census tract, county, and statewide) to assist with outbreak investigations and resource allocation decisions.

**MI Symptoms** MI Symptoms is a free web app built to help Michigan organizations and businesses screen their members for COVID-19 symptoms. The app has now been retired, but while in operation it received more than 20,000 symptom screening entries per weekday, and was used by thousands of businesses across the state of Michigan.

**UM Wastewater Monitoring ([um.wastewatermonitoring.dataepi.org](http://um.wastewatermonitoring.dataepi.org))** A dashboard for wastewater surveillance efforts across 5 cities in southeast Michigan (a joint project across my lab and the Wigginton and Foxman labs at UM). The dashboard shows trends and levels for SARS-CoV-2 and other pathogens, and for SARS-CoV-2, geocoded COVID-19 cases for each treatment plant catchment area. This dashboard is used by local public health departments and the University of Michigan to understand transmission patterns for COVID-19, norovirus, influenza, RSV, and other pathogens. We also developed a private dashboard to provide University of Michigan and county health department staff with building-level wastewater monitoring across UM (joint project with the Xi Lab at UM).

**BAIT - Biofilm Architecture Inference Tool** BAIT is a image analysis software program that can be used to quantify the architecture of oral multi-species biofilms. BAIT can calculate a variety of features, such as surface area, fluffiness, connectivity, and convex hull porosity. This project was developed together with the Rickard and Hayashi groups at UM.

**param-estimation-SIR** Code resources for running numerical identifiability analyses (such as testing the rank of the Fisher information matrix and running profile likelihoods) in R, python, or Matlab, along with an adaptable example vignette and set of exercises using SIR models. This repository has been starred over 30 times across its two main forks, by researchers from at least 7 countries, and currently has 14 forks by researchers adapting the code for their own projects.

PANDEMIC  
RESPONSE

**Pandemic-Related Public Health Practice Activities**

- Developed models, tools, apps, and dashboards to inform pandemic response policy for the University of Michigan, state of Michigan, and a range of local health departments and hospital systems. These models were adapted for use in informing public health response in other states/communities as well (e.g. Nevada Department of Health and Human Services) (2020-present)
- Worked on model forecasts for CDC ensemble forecasting efforts for COVID-19 (2020-2022)
- Regular briefings on COVID-19 to the Governor and Governor’s office, state and national legislators, local health departments, Michigan Economic Recovery Council, and Washtenaw County Medical Society, 2020-2023
- Briefings to Lt. Governor’s task force on racial disparities, Michigan State Medical Society, Michigan DOD/National Guard and Veteran’s Affairs, various CDC groups, MIDAS, and the US Senate Homeland Security and Governmental Affairs Committee (among others), 2020-2023
- Co-lead a wastewater lab that contributes to university, local, state, and national wastewater surveillance efforts through monitoring of multiple pathogens at five sites across southeast MI, with data that feeds into state monitoring efforts (the SWEEP and SEWER networks), as well as the CDC National Wastewater Surveillance System (NWSS)

PRESENTATIONS  
& SEMINARS

**Selected Recent Seminars and Invited Presentations (2017 – present only)**

- Society for Mathematical Biology (SMB), July 2023, Columbus, OH – “Identifiability and infectious disease interventions: exploring when uncertainty matters” (**Invited talk**)
- CMPD6 (Computational Modeling and Population Dynamics 6), May 2023, Winnipeg, Manitoba, Canada – “Identifiability and infectious disease interventions: exploring when uncertainty matters” (**Invited plenary talk**)
- CMPD6 (Computational Modeling and Population Dynamics 6), May 2023, Winnipeg, Manitoba, Canada – “Models to inform wastewater-based epidemiology: identifiability, uncertainty, and opportunities” (**Invited plenary talk**)
- Go with the Flow Conference, May 2023, Lansing, Michigan – “The future: for wastewater data to impact public health decision-making, it must be integrated, interpretable, and actionable” (**Invited short talk and panel**)
- Center for Health Research and Transformation, 2023, Ann Arbor, MI – “Research Orientation for Health Policy”
- Michigan Infectious Disease Society Annual Meeting, 2022, Novi, MI – “Wastewater-based infection surveillance: current uses, challenges, and future opportunities” (**Invited plenary talk**)
- MI Sapphire Workshop, 2022, Ann Arbor, MI – “ARBWatch: Antibiotic Resistant Bacteria and other Pathogen Wastewater Surveillance” (co-presented)
- UM Campus COVID-19 Presidential Briefing, 2022, Ann Arbor, MI (**Invited discussion**)
- The 69th Annual Economic Outlook Conference, 2021, virtual – “The COVID-19

Pandemic: What Is the Endgame, and When Will We Get There?” (**Invited plenary talk**)

- Computing Our Way Out of a Pandemic: Modeling in the Face of COVID-19, 2021, Ann Arbor, MI – “COVID-19 in Michigan: transmission modeling from campus to regional scales” (**Plenary talk**)
- Good Tech Fest, 2021, virtual – “Building Software in a Pandemic” (**Invited talk/panel**)
- MCRVRR Center Seminar, 2021, Ann Arbor, MI – “Transmission modeling from methods to practice”
- Institute for Health Policy and Innovation, 2021, Ann Arbor, MI – “Tracking COVID-19 in Michigan: Variant Updates & Tools to Inform Decisions” (**Invited talk**, copresented with Emily Martin)
- American Conference on Pharmacometrics, 2020, virtual – “Structural Identifiability: What is possible to estimate from models and data?” (**Invited talk**)
- Battling Emerging & Re-emerging Epidemics & Designing Mitigating Strategies: Webinar Series hosted by the Intercollegiate Biomathematics Alliance, 2020, virtual – “Modeling to inform regional COVID-19 policy: developing forecasts, scenarios, and counterfactuals” (**Invited talk**)
- Biosciences Initiative Virtual Symposium: SARS-COV-2 and COVID19, 2020, Ann Arbor, MI – “Transmission modeling to inform COVID-19 response”
- Panelist for the Center for Disease Modelling’s Canada-China panel on COVID-19 modeling - May, 2020, York, Canada - virtual (**Invited panelist**)
- Michigan Congressional Delegation Briefing, 2020, virtual – “Epidemic overview and outlook” (**Invited talk**)
- Wolverine Caucus Briefing, 2020, Ann Arbor, MI - virtual – “Epidemic overview and outlook” (**Invited talk**)
- Coronavirus Update - Press conference with Governor Whitmer on transmission modeling to inform COVID-19 response in Michigan – April 2020, Lansing, MI
- MICDE Webinar, 2020, Ann Arbor, MI – “Transmission modeling of infectious diseases and the COVID-19 outbreak” (**Invited talk**)
- Lehigh University Mathematics Department Colloquium, 2020, Bethlehem, PA – “Parameter identifiability and uncertainty in modeling infectious disease interventions” (**Invited talk**)
- Colorado School of Mines Mathematics Department Seminar, 2020, Golden, CO – “Parameter identifiability and uncertainty in modeling infectious disease interventions” (**Invited talk**)
- American Institute of Mathematics, 2019, San Jose, CA – “Introduction to Structural & Practical Identifiability” (**Invited talk**)
- Society for Mathematical Biology 2019, Montreal, Canada – “Parameter identifiability and uncertainty in modeling infectious disease interventions” (**Invited talk**)
- Graduate Research Opportunities for Women (GROW) 2019, Urbana, IL – “Connecting Models and Data: Adventures in Mathematics and Public Health” (**Invited plenary**)

- MICDE Symposium, Computational Science: Classical Origins, New Frontiers, 2019, Ann Arbor, MI – “Parameter identifiability and uncertainty in modeling infectious disease interventions” (**Invited talk**)
- Modeling Food-borne Infection and Food Safety Workshop, York University, 2019, York, Canada – “Parameter identifiability and uncertainty in modeling infectious disease interventions” (**Invited talk**)
- Society for Industrial and Applied Mathematics (SIAM) Conference on the Life Sciences, 2018, Minneapolis, MN – “Identifiability and Parameter Estimation of Multiple Transmission Pathways” (**Invited talk**)
- Workshop for Women in Mathematical Biology, Institute for Mathematics and its Applications (IMA), 2018, Minneapolis, MN – “Parameter identifiability and uncertainty in modeling infectious disease interventions” (**Invited talk**)
- Water, Sanitation and Hygiene (WASH) Symposium, Ben-Gurion University, 2018, Beersheba, Israel – “Epidemiological and microbiological challenges associated with modeling environmental surveillance” (**Invited talk**)
- Society for Industrial and Applied Mathematics (SIAM) Conference on Uncertainty Quantification, 2018, Garden Grove, CA – “The Underlying Connections Between Identifiability, Sloppiness, and Active Subspaces”
- NIH MIDAS (Models of Infectious Disease Agent Systems) Network Meeting, 2018, Washington, DC – “Polio & Environmental Surveillance”
- Mathematical Biosciences Institute Workshop on Disease Ecology, 2018, Columbus, OH – “Identifiability & uncertainty in modeling disease dynamics” (**Invited talk**)
- AMS Sectional Meeting, Ohio State University, 2018, Columbus, OH – “Identifiability and Parameter Reduction in Mathematical Biology” (**Invited talk**)
- Epidemiology Department Seminar, University of Michigan, 2018, Ann Arbor, MI – “Identifiability in modeling disease dynamics”
- UM UROP Program, 2018, Ann Arbor, MI – “From Mechanism to Population: Modeling HPV-Related Oropharyngeal Carcinogenesis” (**Invited talk**)
- Scientific Computing Around Louisiana (SCALA), 2018, Baton Rouge, LA – “Identifiability and Parameter Reduction in Mathematical Biology” (**Invited keynote**)
- Tulane University Mathematics Department Colloquium, 2018, New Orleans, LA – “Structural & practical identifiability in modeling disease dynamics” (**Invited talk**)
- UM Complex Networks Group, 2018, Ann Arbor, MI – “Identifiability & Uncertainty in Modeling Disease Dynamics”
- ICMA VI: Sixth International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, 2017, Tucson, AZ – “Identifiability and Uncertainty in Modeling Disease Dynamics” (**Invited talk**)
- Fields Institute Conference on Big Data and Information Analytics, 2017, Toronto, Canada – “Identifiability and Parameter Estimation in Modeling Epidemic Dynamics” (**Invited talk**)
- Society for Industrial and Applied Mathematics (SIAM) Conference on Applied Algebraic Geometry, 2017, Atlanta, GA – “Structural and Practical Identifiability in Multistage Clonal Expansion Models of Cancer” (**Invited talk**)

- Society for Mathematical Biology Annual Meeting, 2017, Salt Lake City, UT – “Identifiability and Uncertainty in Modeling Disease Dynamics” (**Invited talk**)
- Mathematical Biosciences Institute - REU Seminar, 2017, Columbus, OH – “Identifiability and Parameter Estimation in Modeling Disease Dynamics” (**Invited talk**)
- Society for Industrial and Applied Mathematics (SIAM) Conference on Applications of Dynamical Systems, 2017, Snowbird, UT – “Identifiability and Parameter Estimation in Modeling Biological Dynamics”
- Assoc. for Women in Mathematics Annual Meeting, 2017, Los Angeles, CA – “Identifiability and Parameter Estimation in Modeling Disease Dynamics” (**Invited talk**)
- Symposium on Parameter Estimation and Uncertainty Quantification for Dynamical Systems, University of Pittsburgh, 2017, Pittsburgh, PA – “Identifiability and Parameter Estimation in Modeling Disease Dynamics” (**Invited talk**)
- Fifth Midwest Women in Mathematics Symposium, 2017, Indianapolis, IN – “Identifiability and Parameter Estimation in Modeling Disease Dynamics” (**Invited talk**)
- Arizona State University Mathematics Dept. Colloquium, 2017, Tempe, AZ – “Comparing structural and practical identifiability in multistage models of cancer” (**Invited talk**)

SELECTED MEDIA  
MENTIONS AND  
APPEARANCES

My work and commentary have been featured in a wide range of Michigan and national media outlets, including National Public Radio (NPR), the New York Times, The Atlantic, Huffington Post, Bloomberg, Gizmodo, Reuters, the Detroit Free Press, Detroit News, MLive, Bridge Michigan, a range of local news channels and radio, among others.

TEACHING  
EXPERIENCE

**Courses**

**Computer Modeling of Complex Systems (Complex Systems 530)**, University of Michigan, Ann Arbor (Winter 2020 – present). An introduction to computational approaches to complex systems, particularly focused on agent-based models, as well as cellular automata, network models, sensitivity analysis, and other topics.

**Introduction to Complex Systems Modeling for Public Health (Epid 793)**, University of Michigan, Ann Arbor (Summer 2020 – present). A short-course intensive introduction to complex systems/math modeling in public health.

**Advanced Modeling Methods (Epid 814)**, University of Michigan, Ann Arbor (Fall 2017 – present). Graduate course in mathematical modeling methods and working with data, including parameter estimation approaches (such as maximum likelihood and Bayesian methods), uncertainty quantification, stochastic models, topics from dynamical systems, data scraping, data visualization, and basics of machine learning.

**Introduction to Mathematical Modeling in Epidemiology & Public Health (Epid 633)**, University of Michigan, Ann Arbor (2013 – present). An introduction to math modeling in epidemiology, with examples drawn broadly from infectious disease, chronic disease, and social epidemiology.

**Scientific Writing for Epidemiologists (Epid 530)**, University of Michigan, Ann Arbor (2014 – 2015). An introduction to scientific writing and communication, required course for Epidemiology MPH students.

**Systems Modeling of Social Processes, Behavior, and Chronic Disease (Epid 637)**, University of Michigan, Ann Arbor (Fall 2013). Complex systems modeling of

chronic diseases and social behavior processes, using agent-based, network models, and differential equation models.

**Foundations of Higher Mathematics (Math 345)**, The Ohio State University (Fall 2010). this course introduces students (primarily math majors) to basic proof techniques, logic, and set theory.

**Recent Workshops and Tutorials (2017 – present)**

**NC State Tutorial Workshop: Parameter Estimation for Dynamic Biological Models** (Summer 2014, 2016, 2018, 2019). Lectures and labs for a tutorial workshop on parameter estimation at NC State.

**NIMBioS Tutorial Workshop on Uncertainty Quantification** (Summer 2017). A three-day tutorial based at the National Institute for Mathematical and Biological Synthesis, University of Tennessee.

**MBI-NIMBioS-CAMBAM Summer Graduate Program: Connecting Models with Data in Mathematical Biology** (Summer 2013, 2017). A two-week summer graduate program in modeling methods.

MENTORING

**Dissertation chair or co-chair** for 19 doctoral students overall, primarily from Epidemiology and Applied and Interdisciplinary Mathematics, Economics, Ecology and Evolutionary Biology, and Environmental Health Sciences. Currently serving as dissertation chair or co-chair for 8 doctoral students from Epidemiology, Economics, and Applied and Interdisciplinary Mathematics.

**Dissertation committee member** for an additional 24 doctoral students (4 current)

**Master’s students mentored:** 53 (across Epidemiology, Mathematics, and School of Information), including supervising 34 internships and 30 capstone projects. (Currently mentoring 4 master’s students in Epidemiology and the School of Information.)

**Other mentoring experience:** 8 postdoctoral fellows (2 current), 7 faculty launch/mentoring committees (5 current), 20 undergraduate students mentored (4 current), 3 high school students mentored.

SERVICE &  
PROFESSIONAL  
DEVELOPMENT

**Selected University and External Service (2017–present)**

- National Academy of Sciences Committee on evaluating the potential for a national wastewater-monitoring system for public health (2022 – present)
- UM COVID-19 Response and Public Health Advisory Committee (Campus Health Response Committee/Public Health and Infection Prevention Response Advisory Committee) - Member (2021 – present), as well as the Data & Analytics, and Epidemiology & Surveillance subcommittees (2020 – present).
- Michigan Center for Applied and Interdisciplinary Mathematics (MCAIM) Van Loo Postdoctoral Fellows Selection Committee (2020 – present)
- UM Integrated Training in Microbial Systems (ITiMS) Program Advisory Committee (2020 – present)
- Center for the Assessment of Tobacco Regulations (CASTOR) FDA Tobacco Centers of Regulatory Science (TCORS) Steering Committee (2018 – present)
- Michigan Institute for Computational Discovery and Engineering Joint PhD in Scientific Computing Overview Committee (2018 - 2021)

- UM Rackham Predoctoral Fellowship Review Committee (2017 – 18, 2019 – 20)
- Mentor for the UM LSA NextProf Science program in Mathematics (2018, 2019)
- Member of the School for Environment And Sustainability Faculty Search Committee (2017 – 18)
- Member of the Steering Committee for the NIH Models of Infectious Disease Agent Systems (MIDAS) Network (2014 – 2018)
- Advisory Panel Member for the Malaria Host-Pathogen Interaction Center (Malaria Host Pathogen Working Group), based at Emory University, Georgia Tech, and University of Georgia (2013 – 2017)
- Grant proposal reviews for NSF, NIH, Los Alamos National Laboratories, the US-Israel Science Foundation, various universities, etc.
- Reviewer for a wide range of journals across public health, mathematical biology, and mathematics, and regularly write tenure and promotion letters for a range of faculty at universities across the US

#### **Selected Departmental Service (2017–present)**

- Director and Interim Director of Complex Systems, (2021-present)
- Epidemiology Master’s Committee Member (2022-23), served as diversity, equity, and inclusion (DEI) advocate (2022-23)
- Epidemiology Doctoral Committee member (17-18, 19-20, 21-22),
- Complex Systems Faculty Search Committee (2019-20)
- Epidemiology Doctoral program co-chair for 2 years (17-18, 19-20)
- Epidemiology Admissions Committee (2016-17)
- Epidemiology 75th Anniversary Committee (2016-17)
- Complex Systems/Ecology and Evolutionary Biology Faculty Search Committee (2016-17)

#### CONFERENCE & WORKSHOP ORGANIZATION

#### **Conferences, symposia, and workshops organized (2016–present)**

- Co-Organizer for the Charlie Doering Memorial Symposium, 2022
- Organizer for the Complex Systems Annual Nobel Symposium – 2021, 2022
- Co-Organizer for the Michigan Institute for Computational Discovery and Engineering/School of Public Health joint symposium, Computing Our Way Out of a Pandemic: Modeling in the Face of COVID-19, 2021
- Co-Organizer for the Banff International Research Station (BIRS) workshop, Model Theory of Differential Equations, Algebraic Geometry, and their Applications to Modeling, 2020
- Organizing Committee Member for the Society for Industrial and Applied Mathematics (SIAM) Conference on the Life Sciences, 2020
- Co-Organizer for the American Institute of Mathematics (AIM) workshop, Identifiability problems in systems biology, 2019
- Co-Organizer for the workshop, Rules of Life in the Context of Future Mathematical

Sciences, 2018

- Organizer & Lecturer for the NIMBioS Tutorial Workshop on Uncertainty Quantification, National Institute for Mathematical and Biological Synthesis, University of Tennessee, 2017.
- Co-Organizer, Workshop on Population Models in the 21st Century, Mathematical Biosciences Institute, The Ohio State University, 2016.
- Co-Organizer, Advancing Precision Medicine through Complex Systems Biology Symposium, University of Michigan, 2016.

PROFESSIONAL  
MEMBERSHIPS

UM Comprehensive Cancer Center, Cancer Epidemiology and Prevention Section (~2014–present)

UM Center for Systems Biology (~2013–present)

Michigan Institute for Computational Discovery and Engineering (~2013–present)

Michigan Institute for Data Science (~2015–present)

Michigan Center for Applied and Interdisciplinary Mathematics (~2016–present)

Professional Societies: Society for Industrial and Applied Mathematics, Society for Mathematical Biology, Association for Women in Mathematics (~2009–present)