

SANG WOO PARK

Department of Ecology & Evolution, University of Chicago
Chicago, IL 60637 USA
swp2@uchicago.edu

ACADEMIC APPOINTMENTS

University of Chicago, Chicago, IL, USA July, 2024–now
Postdoctoral Researcher and Life Sciences Research Foundation fellow
Advisor: Sarah E. Cobey

EDUCATION

Princeton University, Princeton, NJ, USA 2019–May, 2024
PhD in Ecology and Evolutionary Biology
Thesis Title: Cross-scale dynamics of infectious disease
Advisor: Bryan T. Grenfell

McMaster University, McMaster University, Hamilton, ON, Canada 2014–2019
BSc in Mathematics and Statistics (Honours)
Thesis Title: Estimating time-varying transmission rates of the SIR model
Advisor: Benjamin. M. Bolker

AWARDS AND FELLOWSHIPS

Life Sciences Research Foundation fellowship	2024
COVID Response Recognition Award, Princeton University	2023
Honorific Fellowship: Charlotte Elizabeth Procter Fellowship, Princeton University	2023
Undergraduate Student Research Awards, NSERC	2018

ALL PUBLICATIONS

Park, S.W., Noble, B., Howerton, E., Nielsen, B.F., Lentz, S., Ambroggio, L., Dominguez, S., Mes-sacar, K., and Grenfell, B.T., 2024. Predicting the impact of non-pharmaceutical interventions against COVID-19 on *Mycoplasma pneumoniae* in the United States. *Epidemics*, 49, 100808.

Charniga, K., **Park, S.W.**, Akhmetzhanov, A.R., Cori, A., Dushoff, J., Funk, S., Gostic, K.M., Linton, N.M., Lison, A., Overton, C.E., Pulliam, J.R.C., Ward, T., Cauchemez, S., and Abbott, S., 2024. Best practices for estimating and reporting epidemiological delay distributions of infectious diseases using public health surveillance and healthcare data. *PLoS Computational Biology*, 20 (10) e1012520.

Park, S.W., Lawal, T., Marin, M., Marlow, M.A., Grenfell, B.T., Masters, N.B., 2024. Modeling the population-level impact of a third dose of MMR vaccine on a mumps outbreak at the University of Iowa. *PNAS*, 121 (43) e2403808121.

Park, S.W., Cobey, S., Metcalf, C.J.E., Levine, J.M., and Grenfell, B.T., 2024. Predicting pathogen mutual invasibility and co-circulation. *Science*, 386(6718), 175-179.

Yang, Q., **Park, S.W.**, Saad-Roy, C.M., Ahmad, I., Viboud, C., Arinaminpathy, N., and Grenfell, B.T., 2024. Assessing population-level target product profiles of universal human influenza A vaccines. *Epidemics*, 48, 100776.

Earn, D.J., **Park, S.W.**, and Bolker, B.M., 2024. Fitting Epidemic Models to Data: A Tutorial in Memory of Fred Brauer. *Bulletin of Mathematical Biology*, 86(9), 1-32.

Holmdahl, I., Bents, S.J., Baker, R.E., Casalegno, J.S., Trovão, N.S., **Park, S.W.**, Metcalf, C.J.E., and Grenfell, B.T., 2024. Differential impact of COVID-19 non-pharmaceutical interventions on the epidemiological dynamics of respiratory syncytial virus subtypes A and B. *Scientific Reports*, 14(1), 14527.

Park, S.W., Messacar, K., Douek, D.C., Spaulding, A.B., Metcalf, C.J.E., and Grenfell, B. T., 2024. Predicting the impact of COVID-19 non-pharmaceutical intervention on short-and medium-term dynamics of enterovirus D68 in the US. *Epidemics*, 46, 100736.

Yang, Q., Wang, B., Lemey, P., Dong, L., Mu, T., Wiebe, R. A., Guo, F., Sequeira Trovao, N., **Park, S.W.**, Lweis, N., Tsui, J.L.-H., Bajaj, S., Cheng, Y., Yang, L., Haba, Y., Li, B., Zhang, G., Pybus, O.G., Tian, H., and Grenfell, B.T., 2024. Synchrony of Bird Migration with Global Dispersal of Avian Influenza Reveals Exposed Bird Orders. *Nature Communications*, 15(1), 1126.

Park, S.W., Daskalaki, I., Izzo, R., Aranovich, I., te Velthuis, A., Notterman, D., Metcalf, C.J.E., and Grenfell, B.T., 2023. Relative role of community transmission and campus contagion in driving the spread of SARS-CoV-2: lessons from Princeton University. *PNAS Nexus*, 2(7): pgad201.

Park, S.W., Sun, K., Abbott, S., Sender, R., Bar-On, Y.M., Weitz, J.S., Funk, S., Grenfell, B.T., Backer, J.A., Wallinga, J., Viboud, C., and Dushoff, J., 2023. Inferring the differences in incubation-period and generation-interval distributions of the Delta and Omicron variants of SARS-CoV-2. *PNAS*, 120(22), e2221887120.

Park, S.W., Dushoff, J., Grenfell, B.T., and Weitz, J.S., 2023. Intermediate levels of asymptomatic transmission can lead to the highest levels of epidemic fatalities. *PNAS Nexus*, 2(4): pgad106.

Harris, J.D.* , **Park, S.W.*** , Dushoff, J., and Weitz, J.S., 2022. How time-scale differences in asymptomatic and symptomatic transmission shape SARS-CoV-2 outbreak dynamics. *Epidemics*, 100664.

*Contributed equally.

Lee, W.E., **Park, S.W.**, Weinberger, D.M., Olson, D., Simonsen, L., Grenfell, B.T., and Viboud, C., 2023. Direct and indirect mortality impacts of the COVID-19 pandemic in the United States, March 1, 2020 to January 1, 2022. *eLife*, 12:e77562.

Baker, R.E., Saad Roy, C.M., **Park, S.W.**, Farrar, J., Metcalf, C.J.E., and Grenfell, B.T., 2022. Long-term benefits of nonpharmaceutical interventions for endemic infections are shaped by respiratory pathogen dynamics. *PNAS*, 119(49), e2208895119.

Messacar, K., Baker, R.E., **Park, S.W.**, Nguyen-Tran, H., Cataldi, J.R., and Grenfell, B.T., 2022. Preparing for uncertainty: endemic paediatric viral illnesses after COVID-19 pandemic disruption. *The Lancet*, 400(10364): 1663-1665.

Lizewski, R.A.* , Sealfon, R.S.G.* , **Park, S.W.*** , Smith, G.R.* , Porter, C.K.* , Gonzalez-Reiche, A.S.* , Ge, Y.* , Miller, C.M.* , Goforth, C.W., Pincas, H., Termini, M.S., Ramos, I., Nair, V.D., Lizewski, S.E., Alshammari, H., Cer, R.Z., Chen, H.W., George, M.-C., Arnold, C.E., Glang, L.A., Long, K.A., Malagon, F., Marayag, J.J., Nunez, E., Rice, G.K., Santa Ana, E., Schilling, M.A., Smith, D.R., Sugiharto, V.A., Sun, P., van de Guchte, A., Khan, Z., Dutta, J., Vangeti, S., Voegtly, L.J., Weir, D.L., Metcalf, C.J.E., Troyanskaya, O.G., Bishop-Lilly, K.A., Grenfell, B.T., van Bakel, H., Letizia, A.G.* , and Sealfon, S.C.* , 2022. SARS-CoV-2 outbreak dynamics in an isolated US military recruit training center with rigorous prevention measures. *Epidemiology*, 33(6): 797-807.

*Contributed equally.

Sender, R., Bar-On, Y., **Park, S.W.**, Noor, E., Dushoff, J., and Milo, R., 2022. The unmitigated profile of COVID-19 infectiousness. *eLife*, 11:e79134.

Park, S.W., Bolker, B.M., Funk, S., Metcalf, C.J.E., Weitz, J.S., Grenfell, B.T., and Dushoff, J., 2022. The importance of the generation interval in investigating dynamics and control of new SARS-CoV-2 variants. *Journal of The Royal Society Interface*, 19: 20220173-20220173

- Nguyen-Tran, H., **Park, S.W.**, Messacar, K., Dominguez, S.R., Vogt, M.R., Permar, S., Permaul, P., Hernandez, M., Douek, D.C., McDermott, A.B., Metcalf, C.J.E., Grenfell, B.T., and Spaulding, A.B., 2022. Enterovirus D68: a test case for the use of immunological surveillance to develop tools to mitigate the pandemic potential of emerging pathogens. *The Lancet Microbe*, 3(2): e83-e85.
- Baker, R.E., **Park, S.W.**, Wagner, C.E., and Metcalf, C.J.E., 2021. The limits of SARS-CoV-2 predictability. *Nature Ecology & Evolution*, 5(8): 1052-1054.
- Dushoff, J., and **Park, S.W.**, 2021. Speed and strength of an epidemic intervention. *Proceedings of the Royal Society B: Biological Sciences*, 288(1947): 20201556.
- Park, S.W.**, Pons-Salort, M., Messacar, K., Cook, C., Meyers, L., Farrar, J., Grenfell, B.T., 2021. Epidemiological dynamics of enterovirus D68 in the United States and implications for acute flaccid myelitis. *Science Translational Medicine*, 13(584): eabd2400.
- Park, S.W.**, Sun, K., Champredon, D., Li, M., Bolker, B.M., Earn, D.J.D., Weitz, J.S., Grenfell, B.T. and Dushoff, J., 2020. Forward-looking serial intervals correctly link epidemic growth to reproduction numbers. *PNAS*, 118(2): e2011548118.
- Weitz, J.S., **Park, S.W.**, Eksin, C. and Dushoff, J., 2020. Awareness-driven behavior changes can shift the shape of epidemics away from peaks and toward plateaus, shoulders, and oscillations. *PNAS*, 117(51): 32764-32771.
- Baker, R.E., **Park, S.W.**, Yang, W., Vecchi, G.A., Metcalf, C.J.E. and Grenfell, B.T., 2020. The impact of COVID-19 nonpharmaceutical interventions on the future dynamics of endemic infections. *PNAS*, 117(48): 30547-30553.
- Park, S.W.**, Sun, K., Viboud, C., Grenfell, B.T., and Dushoff, J., 2020. Potential Role of Social Distancing in Mitigating Spread of Coronavirus Disease, South Korea. *Emerging Infectious Diseases*, 26(11): 2697-2700.
- Metcalf, C.J.E., Morris, D.H., and **Park, S.W.**, 2020. Mathematical models to guide pandemic response. *Science*, 369(6502): 368-369.
- Park, S.W.**, Bolker, B.M., Champredon, D., Earn, D.J.D., Li, M., Weitz, J.S., Grenfell, B.T. and Dushoff, J., 2020. Reconciling early-outbreak estimates of the basic reproductive number and its uncertainty: framework and applications to the novel coronavirus (SARS-CoV-2) outbreak. *Journal of the Royal Society Interface*, 17: 20200144.
- Park, S.W.**, Champredon, D., and Dushoff, J., 2020. Inferring generation-interval distributions from contact-tracing data. *Journal of the Royal Society Interface*, 17(167): 20190719.
- Weitz, J.S., Beckett, S.J., Coenen, A.R., Demory, D., Dominguez-Mirazo, M., Dushoff, J., Leung, C.-Y., Li, G., Măgălie, A., **Park, S.W.**, Rodriguez-Gonzalez, R., Shivam, S., and Zhao, C.Y., 2020. Modeling shield immunity to reduce COVID-19 epidemic spread. *Nature medicine*, 26(6): 849-854.
- Park, S.W.**, Cornforth, D.M., Dushoff J., and Weitz J.S., 2020. The time scale of asymptomatic transmission affects estimates of epidemic potential in the COVID-19 outbreak. *Epidemics*, 31: 100392.
- Park, S.W.**, and Bolker, B.M., 2020. A note on observation processes in epidemic models. *Bulletin of Mathematical Biology*, 82(3): 1-8.
- Park, S.W.**, Champredon, D., Weitz, J.S., and Dushoff, J., 2019. A practical generation-interval-based approach to inferring the strength of epidemics from their speed. *Epidemics*, 27: 12-18.
- Park, S.W.**, Dushoff, J., Earn, D.J.D., Poinar, H., and Bolker, B.M., 2018. Human ectoparasite transmission of the plague during the Second Pandemic is only weakly supported by proposed mathematical models. *PNAS*, 115(34): E7892-E7893.

Park, S.W., and Bolker, B.M., 2017. Effects of contact structure on the transient evolution of HIV virulence. *PLoS Computational Biology*, 13(3): e1005453.

Rekart, M.L., Ndifon, W., Brunham, R.C., Dushoff, J., **Park, S.W.**, Rawart, S., and Cameron, C.E., 2017. A double-edged sword: does highly active antiretroviral therapy contribute to syphilis incidence by impairing immunity to *Treponema pallidum*?. *Sexually Transmitted Infections*, 93(5): 374-378.

INVITED TALKS

Community ecology of infectious disease pathogens. *University of Maryland, College Park*. 2025.

Using serosurveillance data to clarify epidemic trajectories: Enterovirus D68 case study. *Hema-Net Serosurveillance Meeting, CITF*. 2024.

Generation and serial intervals in epidemics. *Epinowcast Community Seminars*. 2023.

Dynamical biases in epidemic inference. *Institut de Biologie de l'Ecole Normale Supérieure*. 2022.

Characterizing the dynamics of enterovirus D68. *Acute Flaccid Myelitis (AFM) working group meeting and CDC Acute Flaccid Myelitis (AFM) task force meeting*. 2021.

Potential roles of social distancing in mitigating the spread of coronavirus disease 2019 (COVID-19) in South Korea. *WHO modelling call*. 2020.

Quantifying the time scale of disease transmission: generation and serial intervals. *Georgia Institute of Technology*. 2020.

CONTRIBUTED TALKS AND POSTERS

Park, S.W., Grenfell, B.T., and Cobey, S., 2025. Susceptible host dynamics explain pathogen resilience to perturbations. *Life Sciences Research Foundation Annual Meeting*. (Poster)

Park, S.W.. 2025. Community ecology of infectious diseases. *American Society of Naturalists, Asilomar*. (Talk)

Park, S.W., Dushoff, J., and Bolker, B.M., 2019. Transmission mechanisms of plague cannot be uniquely identified from historical mortality data. *Ecology and Evolution of Infectious Diseases (EEID)*. 2019. (Poster)

Dushoff, J., **Park, S.W.**, and Champredon, D., 2017. Generation intervals in space. *Epidemics*6. 2017. (Poster)

Bolker, B.M., and **Park, S.W.**, 2016. HIV virulence evolution in structured epidemic models. *Ecology and Evolution of Infectious Diseases (EEID)*. 2016. (Poster)

TEACHING

Graduate Assistantship in Instruction. Fall 2019, 2020, 2021
Disease Ecology, Economics, and Policy, Princeton University

UNDERGRADUATE STUDENT MENTORING

Catalina Posada Spring 2024
Princeton University junior undergraduate student.

Joanne Wha-Eum Lee Fall 2020–Spring 2021
Princeton University undergraduate senior thesis project.
Title: Direct and indirect mortality impacts of COVID-19 in the US, March–December 2020.

Tomi Lawal Fall 2019–Spring 2020
Princeton University undergraduate senior thesis project.

Title: Analyzing the impact of a third dose of the measles–mumps–rubella vaccine used in a university mumps outbreak.

SOFTWARE

Howes, A., **Park, S.W.**, and Abbott, S., 2024. `epidist`: Estimate epidemiological delay distributions for infectious diseases. <https://github.com/epinowcast/epidist>.

Park, S.W., and Bolker, B.M., 2022. `fitode`: Tools for Ordinary Differential Equations Model Fitting. <https://cran.r-project.org/web/packages/fitode/index.html>.

TEXTBOOK

Alama S., and **Park. S.W.**, 2017. MATH 2XX3 – Advanced Calculus II: Class notes recorded, adapted, and illustrated by Sang Woo Park. Available at McMaster University Library.

PROFESSIONAL SERVICE

Manuscript reviewer for American Naturalist, BMC Medicine, BMC Public Health, Emerging Infectious Diseases, Epidemics, Mathematical Biosciences, Nature Ecology & Evolution, PeerJ, PLOS Computational Biology, PLOS One, PNAS, Proceedings of the Royal Society A, Proceedings of the Royal Society B, Scientific Reports, etc.

Modeling SARS-CoV-2 outbreak responses and control strategies for Princeton University and the US Navy.