

SIMON A. LEVIN

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LIST OF PUBLICATIONS

2021

723. E Carlson, A.K., Taylor, W.W., DeVries, D.R., Ferreri, C.P., Fogarty, M.J., Hartman, K.J., Infante, D.M., Kinnison, M.T., **Levin, S.A.**, Melstrom, R.T., Newman, R.M., Pinsky, M.L., Rubenstein, D.I., Sullivan, S.M.P., Venturelli, P.A., Weber, M.J., Wuellner, M.R., and G.B. Zydlewski. Stepping up: A U.S. perspective on the ten steps to responsible inland fisheries. *Fisheries*. doi: <https://doi.org/10.1002/fsh.10695>.
722. E Kawakatsu, M., Lelkes, Y., **Levin, S.A.**, and C.E. Tarnita. 2021. Interindividual cooperation mediated by partisanship complicates Madison's cure for 'mischiefs of faction'. *PNAS Special Issue on Polarization* 118(50): e2116950118. doi.org/10.1073/pnas.2102148118.
721. E **Levin, S.A.**, Milner, H.V., and C. Perrings. 2021. The dynamics of political polarization: Introduction to the *Special Feature on Political Polarization, PNAS*. Submitted 10/21. *PNAS Special Issue on Polarization* 118(50): e2116950118. doi.org/10.1073/pnas.2116950118.
720. E Santos, F.P. Lelkes, Y, and **S.A. Levin**. 2021. Link recommendation algorithms and dynamics of polarization in online social networks. *PNAS Special Issue on Polarization* 118(50): e2116950118. doi.org/10.1073/pnas.2102141118.
719. E Vasconcelos, V.V., Constantino, S.M., Dannenberg, A., Lumkowsky, M., Weber, E., and **S. Levin**. 2021. Segregation and clustering of preferences erode socially beneficial coordination. *PNAS Special Issue on Polarization* 118(50): e2116950118. doi.org/10.1073/pnas.2102153118.
718. Laxminarayan, R., Fitzpatrick, S., and **S. Levin**. 2021. "Reflection: The non-COVID vaccinated: Reaching the reluctant." In *The Complex Alternative: Complexity Scientists on the COVID-19 Pandemic*, eds. D. Krakauer, D.C. and G. West, 480-483." Santa Fe, NM: Santa Fe Institute Press.
717. Laxminarayan, R., Fitzpatrick, S., and **S. Levin**. (2020, December 9). How to build trust in Covid-19 vaccines. *The Nautilus 093*. Available from: http://nautil.us/issue/93/forerunners/how-to-build-trust-in-covid_19-vaccines. **Reprinted as:** "Building trust in COVID-19 vaccines." **In:** 2021. *The Complex Alternative: Complexity Scientists on the COVID-19 Pandemic*, eds. D. Krakauer, D.C. and G. West, 473-479. Santa Fe, NM: Santa Fe Institute Press.
716. EI Quinlan, L., Reeves, M., Purser, D., **Levin, S.**, and V.V. Vasconcelos. 2021. Strategies of change. The BCG Henderson Institute. Available from: <https://bcghendersoninstitute.com/strategies-of-change-27fe879caac3>.
715. E Choquette-Levy, N., Wildemeersch, M., Oppenheimer, M., and **S.A. Levin**. 2021. Risk transfer policies and climate-induced immobility among smallholder farmers. *Nature Climate Change*. <https://doi.org/10.1038/s41558-021-01205-4>.
714. E Sumaila, U.R. et al. (including **S.A. Levin**). 2021. World Trade Organization must ban fisheries subsidies. *Science* 374(6567): 544.
713. EI Wagner, C. E., Prentice, J. A., Saad-Roy, C. M., Yang, L, Grenfell, B. T., **Levin, S. A.**, and Laxminarayan, R. 2020. Economic and behavioral influencers of vaccination and antimicrobial use. *Frontiers in Public Health*. doi.org/10.3389/fpubh.2020.614113. **Reprinted in:** 2021. *Covid Ecology and Evolution: Systemic Biosocial Dynamics*, eds. M. Convertino and S.F. Pileggi, 170-267. Lausanne: Frontiers Media SA. doi: 10.3389/978-2-88971-533-6.

712. E1 Cooney, D.B., Levin, S.A., Mori, Y., and J.B. Plotkin. (15 October 2021). Modeling natural selection at multiple levels of organization. 2021. *SIAM News Blog*. <https://sinews.siam.org/Details-Page/modeling-natural-selection-at-multiple-levels-of-organization>.
711. E **Levin, S.A.**, Anderies, J.M., Adger, N., Barrett, S. Bennett, E.M., Cardenas, J.C., Carpenter, S.R., Crépin, A.-S., Ehrlich, P., Fischer, J., Folke, C., Kautsky, N., Kling, C., Nyborg, K., Polasky, S., Scheffer, M., Segerson, K., Shogren, J., van den Bergh, J., Walker, B., Weber, E.U., and J. Wilen. 2021. Governance in the face of extreme events: Lessons from evolutionary processes for structuring interventions, and the need to go beyond. *Ecosystems*: doi:10.1007/s10021-021-00680-2.
710. E Wagner, C.E., Saad-Roy, C.M., Morris, S.E., Baker, R.E., Mina, M.J., Farrar, J., Holmes, E.C., Pybus, O.G., Graham, A.L., Emanuel, E.J., **Levin, S.A.**, Metcalf, C.J.E., and B.T. Grenfell. 2021. Vaccine nationalism and the dynamics and control of SARS-CoV-2. *Science*: doi: 10.1126/science.abj7364.
709. E Kalett, A., **Levin, S.**, Pringle, R., Rubenstein, D., and C. Tarnita. 2021. Foreword. In *Social Butterflies*, by H.S. Horn, vii-viii. *Monographs in Population Biology 65*. Princeton, NJ: Princeton University Press.
708. E Puy, A., Borgonovo, E., Lo Piano, S., **Levin, S.A.**, and A. Saltelli. 2021. Irrigated areas drive irrigation water withdrawals. *Nature Communications* 12, 4525. doi.org/10.1038/s41467-021-24508-8.
707. E **Levin, S.A.** "Will climate change foster increasing pathogen spillovers, possibly triggering further pandemics?" In *Current Issues in Climate Research: With Five Messages to COP26* (Report for the Current Issues in Climate Research Conference, Rome, Italy, September 9-10, 2021), 16-17. Rome, Italy: Accademia Nazionale dei Lincei: 2021. (Preprint)
706. E1 Sridhar, A., Osman, Y., Eletreby, R., **Levin, S.A.**, Plotkin, J.B., and H. Vincent Poor. 2021. Leveraging a multiple-strain model with mutations in analyzing the spread of COVID-19. *ICASSP 2021-2021 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)* (Toronto, June 6-11, 2021): 8163-8167. Available from: <https://ieeexplore.ieee.org/document/9414595>.
705. E Wang, G., Phan, T.V., Shengkai, L., Wombacher, M., Qu, J., Peng, Y., Chen, G., Goldman, D.I., **Levin, S.A.**, Austin, R.H., and L. Liu. 2021. Emergent field-driven robot swarm phase transitions. *Physical Review Letters* 126: 108002.
704. E Romano, R. and **S. Levin**. 2021. Sunsetting as an adaptive strategy. *PNAS Special Feature on Evolutionary Models of Financial Markets*. *PNAS* 118(26): e2015258118.
703. E **Levin, S.A.** and A.W. Lo. Intro to *PNAS Special Feature on Evolutionary Models of Financial Markets* *PNAS* 118(26): e2104800118.
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701. E Xu, L., Patterson, D., Staver, A.C., **Levin, S.A.**, and J. Wang. 2021. Unifying deterministic and stochastic ecological dynamics via a landscape-flux approach. *PNAS* 118(24): e2103779118.
700. E Kempes. C.P., Follows, M.J., Smith, H., Graham, H., House, C.H., and **S.A. Levin**. 2021. Generalized stoichiometry and biogeochemistry for astrobiological applications. *Special Issue of Bulletin of Mathematical Biology in honor of Jim Murray* 83: 73. doi.org/10.1007/s11538-021-00877-5.
699. E Karatayev, V.A., Vasconcelos, V.V., Lafuite A.-S., **Levin, S.A.**, Bauch, C.T., and M. Anand. 2021. A well-timed switch from local to global agreements accelerates climate change mitigation. *Nature Communications* 12(1): 1-7.
698. E Morris, D.H., Rossine, F.W., Plotkin, J.B., and **S.A. Levin**. 2021. Optimal, near-optimal, and robust epidemic control. *Communications Physics* 4(1): 1-8.
697. E Saad-Roy, C.M., Morris, S.E., Metcalf, C.J.E., Mina, M.J., Baker, R.E., Farrar, J., Holmes, E.C., Pybus, O.G., Graham, A.L., **Levin, S.A.**, Grenfell, B.T., and C.E. Wagner. 2021. Partial immunity and SARS-CoV-2 mutations—Response. *Science* 372(6540): 354-355. doi: 10.1126/science.abi6719.

696. E Saad-Roy, C.M., Grenfell, B.T., **Levin, S.A.**, van den Driessche, P., and N.S. Wingreen. 2021. Evolution of an asymptomatic first stage of infection in a heterogeneous population. *Journal of the Royal Society Interface* 18(179): doi: <https://doi.org/10.1098/rsif.2021.0175>.
695. E **Levin, S.** and A. Xepapadeas. 2021. On the coevolution of economic and ecological systems. *Annual Review of Resource Economics* 13: 355-377.
694. E Sabin Aspen Vaccine Science and Policy Group (including **Levin, S.A.**). 2021. *The Sabin Aspen Vaccine Science and Policy Group Report: Powering Vaccine R&D: Opportunities for Transformation*. Available from: <https://www.sabinaspengroup.org/>.
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692. E. Santos, F.P., Santos, F.C., Pacheco, J.M., and S. **Levin**. 2021. Social network interventions to prevent reciprocity-driven polarization. *Proceedings of the 20th International Conference on Autonomous Agents and Multiagent Systems (AAMAS-2021), May 3-7, 2021 (Virtual)*. Available from <http://www.ifaamas.org/Proceedings/aamas2021/>. Also available from the ACM Digital Library (not open access): <https://dl.acm.org/doi/proceedings/10.5555/3461017>.
691. E Haghpanah, F., Lin, G., **Levin, S.A.**, and E. Klein. 2021. Analysis of the potential efficacy and timing of COVID-19 vaccine on morbidity and mortality. *EClinicalMedicine* 35: 100863.
690. E Santos, F.P., Levin, S.A., and V.V. Vasconcelos. 2021. Biased perceptions explain collective action deadlocks and suggest new mechanisms to prompt cooperation. *IScience* 24(4): 102375.
689. E Folke, C. et al. (including **S.A. Levin**). 2021. Our future in the Anthropocene biosphere: Resilient societies and global sustainability. *Ambio* 50: 834-869. doi.org/10.1007/s13280-021-01544-8.
688. EI Romano, R. and **S.A. Levin**. 2021. Sunsetting as an adaptative strategy. *The FinReg Blog* (Global Markets Financial Center, Duke University School of Law). Available from: <https://sites.law.duke.edu/thefinregblog/2021/03/16/sunsetting-as-an-adaptative-strategy/>.
687. E Saad-Roy, C.M., Morris, S.E., Metcalf, C.J.E., Mina, M.J., Baker, R.E., Farrar, J., Holmes, E.C., Pybus, O.G., Rambaut, A., Graham, A.L., **Levin, S.A.**, Grenfell, B.T., and C.E. Wagner. 2021. Epidemiological and evolutionary considerations of SARS-CoV-2 vaccine dosing regimes. *Science*. doi: 10.1126/science.abg8663.
686. E Reeves, M. and **S.A. Levin**. 2021. "Think biologically: Messy management for a complex world." In *Inspiring the Next Game: Strategy Ideas for Forward Looking Leaders*, 13-25. De Gruyter.
685. E Reeves M., **Levin, S.**, Fuller, J., and F. Hassan. 2021. "Your change needs strategy." In *Inspiring the Next Game: Strategy Ideas for Forward Looking Leaders*, 63-76. De Gruyter.
684. E Carlson, A.K., Young, T., Centeno, M.A., **Levin, S.A.**, and D.I. Rubenstein. 2021. Boat to bowl: Resilience through network rewiring of a community-supported fishery amid the COVID-19 pandemic. *Environmental Research Letters* 16: 034054.
683. EI Cudishevitch, C. 2021. Nature teaches us to act collectively: Princeton University Professor Simon Levin mixes mathematics, biology and sociology to understand human behavior. (Interview). Serrapilheira Institute, Brazil. *Ciência Fundamental*, a science blog on *Folha de S.Paulo*, newspaper, Brazil. Published. <https://cienciafundamental.blogfolha.uol.com.br/2021/02/27/a-natureza-nos-ensina-a-agir-coletivamente>.
682. E Gross, L.J., Hallam, T.G., and **S.A. Levin**. 2021. Foreword. *Infectious Diseases and Our Planet. Special Issue of Mathematics of Planet Earth*, ed. M. Teboh-Ewungkem and G. Ngwa, 7-8. Springer.
681. E Saad-Roy, C.M., Grenfell, B.T., **Levin, S.A.**, Pellis, L., Stage, H.B., van den Driessche, P., and N.S. Wingreen. 2021. Superinfection and the evolution of an initial asymptomatic stage. *Royal Society Open Science* 8: 202212.

680. E Saad-Roy, C.M., **Levin, S.A.**, Metcalf, C.J.E., and B.T. Grenfell. 2021. Trajectory of individual immunity and vaccination required for SARS-CoV-2 community immunity: A conceptual investigation. *Journal of the Royal Society Interface* 18: 20200683.
679. E Berry, S. et al. (including **S.A. Levin**). (2021, February 11). Letter regarding use of forests for bioenergy to President-Elect Biden, President von der Leyen, President Michel, Prime Minister Suga, and President Moon. *The Scientist*. Available from: [Scientist Letter to Biden, Von der Leyen, Michel, Sugar & Moon Re: Forest Biomass \(February 11, 2021\)](#)
678. E **Levin, S.A.** 2021. Mathematical ecology, evolution and the social sciences. *Ecology, Economy and Society: the INSEE Journal* (Indian Society for Ecological Economics) 4(1); 5-12. Available from: [Journal website: www.ecoinsee.org/journal/ojs/index.php/ees.](#)
677. E Santos, F.P., Pacheco, J.M., Santos, F.C., and **S. Levin**. 2021. Dynamics of informal risk-sharing in collective index insurance. *Nature Sustainability*. doi.org/10.1038/s41893-020-00667-2.
676. E Carlson, A.K., Rubenstein, D.I., and **S.A. Levin**. 2021. Modeling Atlantic herring fisheries as multiscalar human-natural systems. *Fisheries Research* 236: 105855. doi.org/10.1016/j.fishres.2020.105855.

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675. E Barfuss, W., Donges, J., Vasconcelos, V., Kurths, J., and **S.A. Levin**. 2020. Caring for the future can turn tragedy into comedy for long-term collective action under risk of collapse. *PNAS* 117(23): 12915–12922.
674. E Levin, S.A. 1993. Approaches to forecasting biomass yields in large marine ecosystems. In *Large Marine Ecosystems: Stress, Mitigation, and Sustainability*, eds. K. Sherman, L.M. Alexander, and B.D. Gold, 36-39. Washington, D.C.: American Association for the Advancement of Science (AAAS) Press. **Reprinted in:** 2020. *Ocean Sustainability: Assessing and Managing the World's Large Marine Ecosystems: LME Theory to Practice Volume*, eds. K. Sherman and B. Peterson, 18-22. SCOPE 73.
673. E **Levin, S.A.** 2020. Evolving an ecological perspective. *Winter Issue of The Bridge on Complex Unifiable Systems* 50(4): 58-60.
672. E Patterson, D.D., **Levin, S.A.**, Staver, A.C., and J.D. Touboul. 2020. Probabilistic foundations of the spatial mean-field models in ecology and applications. *SIAM Journal on Applied Dynamical Systems* 19(4): 2682-2719. Erratum 2021.
671. EI Basu, K., Dixit, A., Dufwenberg, M., Holmström, B., **Levin, S.**, Roine, J., Spagnolo, G., Söderberg-Nauclér, C., Wahlgren, M., and J. Weibull. (2020, December 21). Debatt: Den skyddande effekten av munskydd är stor. *Dagens Medicin*. Available from: <https://www.dagensmedicin.se/opinion/debatt/den-skyddande-effekten-av-munskydd-ar-stor/>.
670. E Wagner, C. E., Prentice, J. A., Saad-Roy, C. M., Yang, L., Grenfell, B. T., **Levin, S. A.**, and Laxminarayan, R. 2020. Economic and behavioral influencers of vaccination and antimicrobial use. *Frontiers in Public Health*. doi.org/10.3389/fpubh.2020.614113.
669. EI Reeves, M., **Levin, S.**, Desai, S., and K. Whitaker. (2020, December 18). Resilience vs. efficiency: Calibrating the tradeoff. *BCG: Henderson Institute*. Available from: <https://bcghendersoninstitute.com/resilience-vs-efficiency-calibrating-the-tradeoff-25b50538335b>.
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667. EI Laxminarayan, R., Fitzpatrick, S., and **S. Levin**. (2020, December 9). How to build trust in Covid-19 vaccines. *The Nautilus* 093. Available from: http://nautil.us/issue/93/forerunners/how-to-build-trust-in-covid_19-vaccines.

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665. EI Morris, D.H., Petrova, V.N., Rossine, F.W., Parker, E., Grenfell, B.T., Neher, R.A., **Levin, S.A.**, and C.A. Russell. 2020. Asynchrony between virus diversity and immune selection limits influenza virus evolution. *eLife*. Available from: <https://elifesciences.org/articles/62105>.
664. E Polasky, S. et al. (including **S.A. Levin**). 2020. Corridors of clarity: Four principles to overcome uncertainty paralysis in the *Anthropocene*. *Bioscience*: doi.org/10.1093/biosci/biaa115.
663. E Adger, W.N. et al. (w/**S.A. Levin**). 2020. Urbanization, migration and adaptation to climate change. *One Earth*: doi.org/10.1016/j.oneear.2020.09.016,
662. E Schrom, E.C., **Levin, S.A.**, and A.L. Graham. 2020. Quorum sensing via dynamic cytokine signaling comprehensively explains divergent patterns of effector choice among helper T cells. *PLOS Computational Biology* 16(7): e1008051.
661. E Bolton, P., **Levin, S.**, and F. Samama. 2020. "Navigating the ESG world." In *Sustainable Investing: A Path to a New Horizon*, eds. H. Bril, G. Kell, and A. Rasche. London: Routledge.
- 660 E **Levin, S.**, Reeves, M., and A. Levina. 2020. "Business and sustainability: From the firm to the biosphere." In *Sustainable Investing: A Path to a New Horizon*, eds. H. Bril, G. Kell, and A. Rasche. London: Routledge.
659. E Dobson, A.P., Godfray, C.J., **Levin, S.A.**, Pacala, S.W., Rubenstein, D.I., and J. Seger. 2020. Resolution of respect for Robert May (1936-2000). *Bulletin of the Ecological Society of America* 102 (1): e01769.
658. E Saad-Roy, C.M., Wagner, C.E., Baker, R.E., Morris, S.E., Farrar, J., Graham, A.L., **Levin, S.A.**, Metcalf, C.E., and B.T. Grenfell. 2020. Immune life-history, vaccination and the dynamics of SARS-CoV-2 over the next five years. *Science* 10: 1126. doi: 10.1126/science.abd7343.
657. E Galvani, A., Hastings, A., **Levin, S.A.**, and B.H. Singer. 2020. Robert May, 1936-2020, a man for all disciplines. *PNAS* 117 (38): 23199-23201.
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655. E Brumley, D.R., Carrara, F., Hein, A.H., **Levin, S.A.**, and R. Stocker. 2020. Cutting through the noise: Bacterial chemotaxis in marine microenvironments. *Frontiers of Marine Science* 7, 527. doi: 10.3389/fmars.2020.00527.
654. E Saad-Roy, C.M., Arinaminpathy, N., Wingreen, N.S., **Levin, S.A.** Akey, J.M., and B.T. Grenfell. 2020. Implications of localized charge for human influenza A H1N1 hemagglutinin evolution: Insights from deep mutational scans. *PLoS Computational Biology* 16(6): e1007892.
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651. EI Folke, C. et al. (including **S.A. Levin**). Our future in the Anthropocene biosphere: Resilient societies and global sustainability. *Beijer Discussion Papers Series* 272. Available from: <http://beijer.kva.se/publications/>. Note: Discussion Paper for the First Nobel Prize Summit - Our Planet, Our Future 2021.
650. E Vasconcelos, V.V., Hannam, P., **Levin, S.A.**, and J. Pacheco. 2020. Coalition-structured governance improves cooperation to provide public goods. *Nature Scientific Reports* 10: 9194.

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648. E Carlson, A.K., Taylor, W.W., Rubenstein, D.I., Levin, S.A., and J. Liu. 2020. Global marine fishing across space and time. *Sustainability* 12(11): 4714. <https://doi.org/10.3390/su12114714>.
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645. E Benth, F., Eikeset, A., Levin, S.A., and Ren, W. 2020. Analysis of the risk premium in the forward market for salmon. *Journal of Commodity Markets*: doi.org/10.1016/j.jcomm.2019.100122.
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641. E Folke, C. et al. (including S.A. Levin). 2020. An invitation for more research on transnational corporations and the biosphere. *Nature Ecology & Evolution* 4(494) (2020).
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Letters

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