

SIMON A. LEVIN

E = Available as PDF

EI = Electronic Link Provided

LIST OF PUBLICATIONS

2023

773. E Tian, Y., Sridhar, A., Wu, C.W., **Levin, S.A.**, Carley, K.M., Poor, H.V., and O. Yağan. 2023. Role of masks in mitigating viral spread on networks. *Physical Review E* 108(1): 014306. <https://doi.org/10.1103/PhysRevE.108.014306>.
772. E Sood, M., Sridhar, A., Eletreby, R., Wu, C.W., **Levin, S.A.**, Yağan, O., and H.V. Poor. 2023. Spreading processes with mutations over multilayer networks. *PNAS* 120(24): e2302245120. <https://doi.org/10.1073/pnas.2302245120>.
771. E Saad-Roy, C.M., Morris, S.E., Baker, R.E., Farrar, J., Graham, A.L., **Levin, S.A.**, Wagner, C.E., Metcalf, C.J.E., and B.T. Grenfell. 2023. Medium-term scenarios of COVID-19 as a function of immune uncertainties and chronic disease. *Journal of the Royal Society Interface* 20(205): <https://doi.org/10.1098/rsif.2023.0247>.
770. E Patterson, D., Staver, A.C., **Levin, S.A.**, and J.D. Touboul. 2023. Spatial dynamics with heterogeneity. *SIAM Journal on Applied Mathematics*. <https://doi.org/10.1137/22M1509850>.
769. E **Levin, S.A.**, and E.U. Weber. 2023. Polarization and the psychology of collectives. *Perspectives on Psychological Science*. <https://doi.org/10.1177/17456916231186614>.
768. EI Reeves, M., **Levin, S.**, Van der Veeken, R., Nimer, J., and A. Job. (2023, August 24). Biodiversity: The next arena in sustainable business. *BCG Henderson Institute*. Available from: <https://bcghendersoninstitute.com/biodiversity-the-next-arena-in-sustainable-business/>.
767. E Saad-Roy, C.M., **Levin, S.A.**, Grenfell, B.T., and M. Boots. 2023. Epidemiological impacts of post infection mortality. *Proceedings of the Royal Society B* 290: 2020343. <https://doi.org/10.1098/rspb.2023.0343>.
766. EI Dasgupta, P., **Levin, S.A.**, and G. Kell. (2023, May 25). “Economic Factors Underlying Biodiversity Loss.” Interview by Martin Reeves. *BCG Henderson Institute*. Podcast. Available from: <https://bcghendersoninstitute.com/economic-factors-underlying-biodiversity-loss-with-partha-dasgupta-simon-levin-and-georg-kell/>
765. E Perri, S., **Levin, S.**, Hedin, L.O., Wunderling, N., and A.M. Poporato. 2023. Socio-political feedback on the path to net zero. *One Earth* 6: 1-13. <https://www.sciencedirect.com/science/article/pii/S2590332223002403>
764. E Cooney, D.B., **Levin, S.A.**, Mori, Y., and J.B. Plotkin. 2022. Evolutionary dynamics within and among competing groups. *PNAS* 120(20): e2216186120. <https://doi.org/10.1073/pnas.2216186120>.
763. E Traulsen, A., **Levin, S.A.**, and C. Saad-Roy. 2023. Individual costs and societal benefits of interventions during the COVID-19 pandemic. *PNAS* 120(24): e2303546120. <https://doi.org/10.1073/pnas.2303546120>.
762. E Schrom, E., Kinzig, A., Forrest, S., Graham, A.L., **Levin, S.A.**, Bergstrom, C.T., Castillo-Chavez, C., Collins, J.P., de Boer, R.J., Doupe, A., Ensafi, R., Feldman, S., Grenfell, B.T., Halderman, J.A., Huijben, S., Maley, C., Moses, M., Perelson, A.S., Perrings, C., Plotkin, J., and Tiwari, M. 2023. Challenges in cybersecurity: Lessons from biological defense systems. *Mathematical Biosciences* 362: 109024. <https://doi.org/10.1016/j.mbs.2023.109024>.

761. E Jaeger, W.K., Irwin, E.G., Fenichel, E.P., **Levin, S.**, and A. Hertziger, A. 2023. Meeting the challenges to economists of pursuing interdisciplinary research on human-natural systems. *Review of Environmental Economics and Policy* 17(1). <https://doi.org/10.1086/723835>.
760. E Dasgupta, P., and **S. Levin**. 2023. Economic factors underlying biodiversity loss. *Philosophical Transactions of the Royal Society B* 378(1881): 20220197. <https://doi.org/10.1098/rstb.2022.0197>.
759. E Nielsen, B.F., Saad-Roy, C.M., Li, Y., Sneppen, K., Simonsen, L., Viboud, C., **Levin, S.A.**, and B.T. Grenfell. 2023. Host heterogeneity and epistasis explain punctuated evolution of SARS-CoV-2. *PLoS Computational Biology*. <https://doi.org/10.1371/journal.pcbi.1010896>.
758. E Xu, L., Wang, J., Patterson, D., and **S.A. Levin**. 2023. Non-equilibrium early-warning signals for critical transitions in ecological systems. *PNAS* 120(5): e2218663120. <https://doi.org/10.1073/pnas.2218663120>.
757. EI Forrest, S., Kinzig, A., Feldman, S., Graham, A.L., **Levin, S.**, Rexford, J., and E. Schrom. (2023, January 11). Mother Nature’s 7 lessons for a safer world. *Nautilus*. Available from: <https://nautil.us/mother-natures-7-lessons-for-a-safer-world-257526/>.
756. E Walker, B., Crépin, A.-S., Nyström, M., Anderies, J.M., Andersson, E., Elmqvist, T., Queiroz, C., Barrett, S., Bennett, E., Cardenas, J.C., Carpenter, S.R., Chapin III, F.S., de Zeeuw, A., Fischer, J., Folke, C., **Levin, S.**, Nyborg, K., Polasky, S., Segerson, K., Seto, K., Scheffer, M., Shogren, J.F., Tavoni, A., van den Bergh, J., Weber, E.U., and J.R. Vincent. 2023. Response diversity as a sustainability strategy. *Nature Sustainability*. <https://doi.org/10.1038/s41893-022-01048-7>.
755. **Levin, S.A.**, and N. Silitch. (2023, January 3). “Can We Tackle Vaccine Hesitancy and Global Warming with a Similar Playbook: Researchers Think So.” In *Princeton Pulse* [podcast]. Center for Health and Wellbeing, Princeton University. [CHW Link](#).
754. E Anderies, J.M., and **S.A. Levin**. 2023. “Conservation of fragility and the collapse of social orders.” In *How Worlds Collapse: What History, Systems, and Complexity Can Teach Us about Our Modern World and Fragile Future*, eds. M. Centeno, P. Callahan, P. Larcey, and T. Patterson, 262-295. New York: Routledge. DOI (for book): <https://doi.org/10.4324/9781003331384>
753. E Hagstrom, G.I., and **S.A. Levin**. 2023. “Phase transitions and the theory of early warning indicators for critical transitions.” In *How Worlds Collapse: What History, Systems, and Complexity Can Teach Us about Our Modern World and Fragile Future*, eds. M. Centeno, P. Callahan, P. Larcey, and T. Patterson, 358-374. New York: Routledge. DOI (for book): <https://doi.org/10.4324/9781003331384>
- ## 2022
752. Adiga, A., Lewis, B., **Levin, S.**, Marathe, M.V., Poor, H.V., Ravi, S.S., Rosenkrantz, D.J., Stearns, R.E., Venkatramanan, S., Vullikanti, A., and L. Wang. 2022. “AI techniques for forecasting epidemic dynamics: Theory and practice.” In *Artificial Intelligence in Covid-19*, eds. N. Lidströmer and Y.C. Eldar, 193-228. Springer. https://link.springer.com/chapter/10.1007/978-3-031-08506-2_9#chapter-info
751. E Cooney, D., Morris, D.H., **Levin, S.A.**, Rubenstein, D.I., and P. Romanczuk. 2022. Social dilemmas of sociality due to beneficial and costly contagion. *PLoS Computational Biology*. <https://doi.org/10.1371/journal.pcbi.1010670>.
750. E **Levin, S.A.**, and A. Rinaldo. 2022. Ignacio Rodríguez-Iturbe (1942-2022): A review of a pathbreaking academic career combining chance and self-organization. *PNAS* 119(49): e2217606119.
749. E Puy, A., Beneventano, P., **Levin, S.A.**, Lo Piano, S., Portaluri, T., and A. Saltelli. 2022. Models with higher effective dimensions tend to produce more uncertain estimates. *Science Advances* 8(42). Doi: <https://doi.org/10.1126/sciadv.abn9450>
748. E Gibbs, T., **Levin, S.A.**, and J.M. Levine. 2022. Coexistence in diverse communities with higher interactions. *PNAS* 119(43): e2205063119. Doi: <https://doi.org/10.1073/pnas.2205063119>

747. EI Job, A., Verb, L., Reeves, M. and **S.A. Levin**. 2022. Aging gracefully: Avoiding corporate decline by embracing lessons from human biology. BCG Henderson Institute. Available from: <https://bcghendersoninstitute.com/aging-gracefully-7d8ea11168c4>
746. E Yang, L., Constantino, S.M., Grenfell, B.T., Weber, E.U., **Levin, S.A.**, and V.V. Vasconcelos. 2022. Sociocultural determinants of global mask-wearing behavior. *PNAS* 119(41): e2213525119. Doi: <https://doi.org/10.1073/pnas.2213525119>
745. E Cooney, D.B., Rossine, F.W., Morris, D.H., and **S.A. Levin**. 2022. A PDE model for protocell evolution and the origin of chromosomes via multilevel selection. *Bulletin of Mathematical Biology* 84: 109.
744. E Leonard, N., and S.A. Levin. 2022. Collective intelligence as a public good. *Collective Intelligence* 1(1). Doi: <https://doi.org/10.1177/26339137221083293>
743. E Fahimipour, A.K., Zeng, F., Homer, M., Traulsen, A., Levin, S.A., and T. Gross. 2022. Sharp thresholds limit the benefit of defector avoidance in cooperation on networks. *PNAS* 119(33): e2120120119. <https://doi.org/10.1073/pnas.2120120119>
742. E Fischer, I., **Levin, S.A.**, Rubenstein, D.I., Avrashi, S., Givon, L., and T. Oz. 2022. Interacting with others while reacting to the environment. *Behavioral and Brain Sciences*. <https://doi.org/10.1017/S0140525X21001291>
741. E Krueger, E.H., McPhearson, T., and **S.A. Levin**. 2022. Integrated assessment of urban water supply security and resilience: Towards a streamlined approach. *Environmental Research Letters* 17(7): 075006.
740. EI Mediavilla, D. (2022, June 27). “No tenemos otra opción que creer que podemos hacer lo necesario para que la humanidad sobreviva.” (Interview with Simon A. Levin). *El País (Ecología)*. Available from: <https://elpais.com/ciencia/2022-06-28/no-tenemos-otra-opcion-que-creer-que-podemos-hacer-lo-necesario-para-que-la-humanidad-sobreviva.html>
739. E Solé, R., and **S.A. Levin**, eds. 2022. Introduction: *Ecological Complexity and the Biosphere: The Next 30 Years: A Theme Issue Compiled and Edited by Ricard Sole and Simon A. Levin*. *Philosophical Transactions of the Royal Society B*: 377(1857). <https://doi.org/10.1098/rstb.2021.0376>.
738. E Solé, R., and **S.A. Levin**. 2022. Introduction: Ecological complexity and the biosphere: The next 30 years. *Philosophical Transactions of the Royal Society B*: 377(1857): 20210376.
737. E Qiu, Z., Espinoza, B., Vasconcelos, V.V., Chen, C., Constantino, S.M., Crabtree, S.A., Yang, L., Vullikanti, A., Chen, J., Weibull, J., Basu, K., Dixit, A., **Levin, S.A.**, and M.V. Marathe. 2022. Understanding the coevolution of mask wearing and epidemics: A network perspective. *PNAS* 119(26): e2123355119.
736. E Fischer, I., Rubenstein, D.I., and **S.A. Levin**. 2022. Vaccination-hesitancy and global warming: Distinct social challenges with similar behavioural solutions. *Royal Society Open Science* 9: 211515.
735. E Carlson, A.K., Boonstra, W.J., Joosse, S., Rubenstein, D.I., and **S.A. Levin**. 2022. More than ponds amid skyscrapers: Urban fisheries as multiscalar human-natural systems. *Aquatic Ecosystem Health and Management* 25: 1–10.
734. E Krueger, E.H., Constantino, S.M., Centeno, M.A., Elmqvist, T., Weber, E.U., and **S.A. Levin**. 2022. Governing sustainable transformations of urban social-ecological-technological systems. *npj Urban Sustainability*. <https://doi.org/10.1038/s42949-022-00053-1>
733. E Puy, A., Lo Piano, S., Saltelli, A., and **S.A. Levin**. 2022. sensobol: an R package to compute variance-based sensitivity indices. *Journal of Statistical Software* 102(5). <https://doi.org/10.18637/jss.v102.i05>
732. E Vasconcelos, V.V., Dannenberg, A., and **S.A. Levin**. 2022. Punishment institutions selected and sustained through voting and learning. *Nature Sustainability*. <https://doi.org/10.1038/s41893-022=00877-w>

731. E Chapin III, F. Stuart et al. (including **S.A. Levin**). 2022. Earth stewardship: Shaping a sustainable future through interacting policy and norm shifts. *Ambio*. <https://doi.org/10.1007/s13280-022-01721-3>.
730. EI “Complexity and the commons with **Simon Levin**.” (2022, February 28). In *In Common* (No. 087) [podcast]. <https://www.incommonpodcast.org/podcast/087-complexity-and-the-commons-with-simon-levin/>
729. EI **Levin, S.A.** 2022. In *National Academies of Sciences, Engineering, and Medicine 2021. 2021 Nobel Prize Summit: Our Planet, Our Future: Proceedings of a Summit*, 12 (contribution to “Dynamic dialogues: Economics of inequality”), 55 (listing on agenda), 75 (signature on “An urgent call to action”). Washington, D.C.: The National Academies Press. <https://doi.org/10.17226/26310>
728. E Wang, G., Phan, T.V., Li, S., Wang, J., Peng, Y., Chen, G., Qu, J., Goldman, D.I., **Levin, S.A.**, Pienta, K., Amend, S., Austin, R.H., and L. Liua. 2022. Robots as models of evolving systems. *PNAS* 119(12): e2120019119.
727. E Martiny, A.C., Hagstrom, G.I., DeVries, T., Letscher, R.T., Britten, G.L., Garcia, C.A., Galbraith, E., Karl, D., **Levin, S.A.**, Lomas, M.W., Moreno, A.R., Talmy, D., Wang, W., and K. Matsumoto. 2022. Marine phytoplankton resilience may moderate oligotrophic ecosystem responses and biogeochemical feedbacks to climate change. *Limnology and Oceanography* 67: S378-S389.
726. EI Reeves, M., **Levin, S.**, and A. O’Dea. 2022. What did we learn from the COVID crisis? BCG Henderson Institute. Available from: <https://bcghendersoninstitute.com/what-did-we-learn-from-the-covid-crisis-9b078e7aad1e>
725. EI Shmul, Y., Reeves, M., and **S. Levin**. (2022, January 11). Building a mutually reinforcing system of organizational and personal resilience. *BCG Henderson Institute*. Available from: <https://bcghendersoninstitute.com/building-a-mutually-reinforcing-system-of-organizational-and-personal-resilience-d2e4bd69417e>
724. E Rosenkrantz, D.J., Vullikanti, A., Ravi, S.S., Stearns, R.E., **Levin, S.**, Poor, H.V., and M.V. Marathe. 2022. Fundamental limitations on efficiently forecasting certain epidemic measures in networked models. *PNAS* 119(4): e2109228119. <http://doi.org/10.1073/pnas.2109228119>.
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. 2022. Stepping up: A U.S. perspective on the ten steps to responsible inland fisheries. *Fisheries* 47(2): 68-77.
- 2021**
722. E Kawakatsu, M., Lelkes, Y., **Levin, S.A.**, and C.E. Tarnita. 2021. Interindividual cooperation mediated by partisanship complicates Madison's cure for 'mischief 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. Introduction: The dynamics of political polarization. *PNAS Special Feature on Polarization* 118(50): e2116950118.
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 Sustainability*. <https://doi.org/10.1038/s41558-021-01205-4>. *Waiting for editorial decision 06/07/23*.
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:** *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. **EI** 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. 2022 (2021). Governance in the face of extreme events: Lessons from evolutionary processes for structuring interventions, and the need to go beyond. *Ecosystems* 25(3): 697-711.
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. **EI** Sridhar, A., Osman, Y., Eleteby, 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.
702. EI Levin, S.A. and A.W. Lo, eds. *PNAS Special Feature on Evolutionary Models of Financial Markets* *PNAS* 118(26). Available from: <https://www.pnas.org/content/118/26>.
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/>.
693. E. Yagan, O., Sridhar, A., Eletreby, R., Levin, S.A., Plotkin, J.B., and H.V. Poor. 2021. Modeling and analysis of the spread of COVID-19 under a multiple-strain model with mutations. *Harvard Data Science Review, Special Issue 1*. doi. 10.1162/99608f92.a11bf693.
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)*: 1643-1645.
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 adaptive strategy. *The FinReg Blog* (Global Markets Financial Center, Duke University School of Law). Available from: <https://sites.law.duke.edu/finregblog/2021/03/16/sunsetting-as-an-adaptive-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](http://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 multiscale human-natural systems. *Fisheries Research* 236: 105855. doi.org/10.1016/j.fishres.2020.105855.
- 2020**
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. E 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>.
668. EI **Levin, S.A.** (2020, December 15). "Emergent and vanishing biodiversity, and evolutionary suicide." In *Policy Projects: Reversing Biodiversity Loss*. *Philosophical Transactions of the Royal Society B*. Available from: <https://royalsociety.org/topics-policy/projects/biodiversity/emergent-and-vanishing-biodiversity-and-evolutionary-suicide/>.
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.
666. EI Andersson, T., Basu, K., Dixit, A., Holstrom, B., **Levin, S.**, Roine, J., Spagnolo, G., Söderberg-Nauclér, C., Wahlgren, M., and J. Weibull. 2020. DN Debatt: Anders Tegnell's argument mot munskydd håller inte (DN Debate: Anders Tegnell's argument against mouthguards does not hold up). *Dagens Nyheter* (2020, November 19). Available from: <https://www.dn.se/debatt/anders-tegnells-argument-mot-munskydd-haller-inte/>.
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.
656. E Carlson, A.K., Rubenstein, D.I., and **S.A. Levin**. 2020. Linking multiscale fisheries using metacoupling models. *Frontiers in Marine Science* 7: 614. doi: 10.3389/fmars.2020.00614.

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.
653. E Liao, C., Rubenstein, D.I., **Levin, S.A.**, Clark, P.E., and A. Agrawal. 2020. Landscape sustainability science in the drylands: Mobility, rangelands and livelihoods. *Landscape Ecology*. doi: 10.1007/s10980-020-01068-8.
652. E Molina C., Akçay E., Dieckmann U., **Levin S.A.**, and E. Rovenskaya. 2020. Combating climate change with matching-commitment agreements. *Nature Scientific Reports*: doi: 10.1038/s41598-020-63446-1.
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.
649. EI Sabin Aspen Vaccine Science and Policy Group (including **Levin, S.A.**). 2020. *The Sabin Aspen Vaccine Science and Policy Group Report: Meeting the Challenges of Vaccine Hesitancy*. Available from: <https://www.sabin.org/programs/vaccine-acceptance/meeting-challenge-vaccination-hesitancy>.
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>.
647. EI Carlson, A.K., Levin, S.A., and D.I. Rubenstein. 2020. The Garden State to the rescue: Helping build more sustainable food systems. *The Conversation* (June 3, 2020). Available from: <https://theconversation.com/new-jerseys-small-networked-dairy-farms-are-a-model-for-a-more-resilient-food-system-137881>.
646. E Chen, J., Eubank, S. Levin, S. Mortveit, H., Venkataramanan, S., Vullikanti, A., and M. Marathe. 2020. Networked epidemiology for COVID-19. *SIAM News* (June 2020). In print and available from: <https://sinews.siam.org/Details-Page/networked-epidemiology-for-covid-19>.
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.
644. E Li, A., Zhou, L., Su, Q., Cornelius, S.P., Liu, Y.-Y., Wang, L., and **S.A. Levin**. 2020. Evolution of cooperation on temporal networks. *Nature Communications*: doi.org/10.1038/s41467-020-16088-w.
643. E Saad-Roy, C.M., Wingreen, N.S., Levin, S.A., and B.T. Grenfell. 2020. Dynamics in a simple evolutionary-epidemiological model for the evolution of an initial asymptomatic infection stage. *PNAS* 117(21): 11541-11550.
642. EI Levin, S.A. 2020. Collective cooperation: From Ecological communities to global governance and back. In *Unsolved Problems in Ecology*, ed. A. Dobson, D. Tilman, and R. Holt, 311-317. Princeton, NJ: Princeton University Press. Available online. https://www.jstor.org/stable/j.ctvs9fh2n?turn_away=true.
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).
640. E Diekmann, O., Gavrillets, S., Gyllenberg, M., Levin, S., and M. Lewis, eds. 2020. *Special Issue of the Journal of Mathematical Biology to honor Alan Hastings 65th birthday* 80: 1-2 (2020). Preface by eds.

639. EI Reeves, M., **Levin, S.**, Kell, G., Whitaker, K., and S. Nanda. 2020. Emerging strategy lessons from COVID-19. *Boston Consulting Group, Henderson Institute* (April 12, 2010). Available from: <https://bcghendersoninstitute.com/emerging-strategy-lessons-from-covid-19-c1e5f9a7ba83>.
638. E Pinsky, M.L., Fenichel, E., Fogarty, M., **Levin, S.**, McCay, B., St. Martin, K., Selden, R.L., and T. Young. 2020. Fish and fisheries in hot water: What is happening and how do we adapt? *Population Ecology*: doi: 10.1002/1438-390X.12050.
637. E McManus, L.C., Vasconcelos, V.V., **Levin, S.A.**, Thompson, D.M., Kleypas, J.A., Castruccio, S., Curchitser, E.N., and J.R. Watson. 2020. Extreme temperature events will drive coral decline in the Coral Triangle. *Global Change Biology*: doi: 10.1111/gcb.14972.
636. EI Wang, S., Seung, S., and S. Tilghman (signed by **S.A. Levin**). 2020. Unchecked, COVID-19 could kill more than 50K in N.J., group of scientists says. 'The lockdown will save lives. *NJ.com* (March 25, 2020). Available from: <https://www.nj.com/opinion/2020/03/the-lockdown-will-save-lives-group-of-scientists-says-unchecked-covid-19-could-kill-more-than-50k-in-nj.html>.
635. E Garcia, C.A., Hagstrom, G.I., Larkin, A., Ustick, L., **Levin, S.A.**, Lomas, M.W., and A.C. Martiny. 2020. Linking regional shifts in microbial genome adaptation with surface ocean biogeochemistry. *Philosophical Transactions B*: doi.org/10.1098/rstb.2019.0254.
634. E Barrett, S. et al. (including **S.A. Levin**). 2020. Fertility choice and consumption patterns in the Anthropocene. *PNAS*117(12): 6300-6307.
633. E Burgess, M. et al. (including **S.A. Levin**.) 2020. Opportunities for agent-based modeling in human dimensions of fisheries. 2020. *Fish and Fisheries*: doi: 10.1111/faf.12447.
632. E Goel, N., Guttal, V., **Levin, S.A.**, and A.C. Staver. 2020. Dispersal increases the resilience of tropical and savanna and forest distributions. *The American Naturalist* 195(5): 833-850.
631. EI Carrara, F., Brumley, D.R., Hein, A.M., Yawata, Y., Salek, M.M., Lee, K.S., Sliwerska, E., **Levin, S.A.**, and R. Stocker. 2020. Generating controlled, dynamic chemical landscapes to study microbial behavior. *The Journal of Visualized Experiments (JoVE)* 155: doi:10.3791/60589.
630. EI Reeves, M., **Levin S.**, Fink, T., and A. Levina. 2020. Taming complexity. *Harvard Business Review* (January-February). Available from: <https://hbr.org/2020/01/taming-complexity>. Translated into Italian: and available from: <https://www.hbritalia.it/>.

2019

629. E Sabin-Aspen Vaccine Science and Policy Group (including **Levin, S.A.**). 2019. *The Sabin-Aspen Vaccine Science and Policy Group Report: Accelerating the Development of a Universal Influenza Vaccine: A Report from the Sabin-Aspen Vaccine Science and Policy Group*. Available from: <https://www.sabin.org/updates/resources/accelerating-development-universal-influenza-vaccine-report-sabin-aspen-vaccine>.
628. **Levin, S.A.** Preface. 2019. *Mathematical Models in Epidemiology*, ed. F. Brauer, C. Castillo-Chavez, Z. Feng. *Texts in Applied Mathematics*. Springer.
627. E **Levin, S.A.** 2019. The architecture of robustness. In *Handbook on Global Challenges, Governance, and Complexity*, ed. V. Galaz, 16-23. Cheltenham, UK; Northampton, MA: Edward Elgar Publishing.
626. E McManus, L.C., Watson, J.R., Vasconcelos, V.V., and **S.A. Levin**. 2019. Stability and recovery of coral-algae systems: The importance of recruitment seasonality and grazing influence. *Theoretical Ecology* 12(1): 61-72.
625. E Carattini, S., **Levin, S.A.**, and A. Tavoni. 2019. How tangible environmental commitments spur cooperative behavior in local and global commons. *VOX CEPR Policy Portal: Research-Based Policy Analysis and Commentary from Leading Economists* (October 23, 2019). Available from

https://voxeu.org/article/how-tangible-environmental-commitments-spur-cooperative-behaviour-local-and-global-dilemmas?utm_source=dlvr.it&utm_medium=twitter.

- 624. E** Folke, C., Österblom, H., Jouffray, J.B., Lambin, E.F., Adger, W.N., Scheffer, M., Crona, B.I., Nyström, M., **Levin, S.A.**, Carpenter, S.R., Anderies, J.M., Chapin, S. 3rd. Crépin, A.S., Dauriach, A., Galaz, V., Gordon, L.J., Kautsky, N., Walker, B.H., Watson, J.R., Wilen, J., and A. de Zeeuw. 2019. Transnational corporations and the challenge of biosphere stewardship. *Nature Ecology & Evolution* 3: 1396-1403.
- 623. E** Carter, N. **Levin, S.**, and V. Grimm. 2019. Effects of human-induced prey depletion on large carnivores in protected areas: Lessons from modelling tiger populations in stylized spatial scenarios. *Ecology and Evolution*: DOI: 10.1002/ece3.5632.
- 622. E** Klein, E., Van Boeckel, T. Martinez, E., Pant, S., Gandra, S., **Levin, S.**, Goossens, S., and R. Laxminarayan. 2019. What if people use too much antibiotics? *Biomedical Science Journal for Teens* (August). Available from: https://www.sciencejournalforkids.org/uploads/5/4/2/8/54289603/antibiotics_article.pdf
- 621. E** Ellner, S.P., Gross, L.J., **Levin, S.A.**, and M. Lewis. 2019. Foreword. *Special Issue of Theoretical Ecology to Honor Alan Hastings 65th Birthday* 12(2): 129-130. *Special Issue edited by authors*.
- 620. E** Polasky, S., King C.L., **Levin, S.A.**, Carpenter, S.R., Daily, G.C., Ehrlich, P.R., Heal, G.M., and J. Lubchenco. Role of economics in analyzing the environment and sustainable development. *PNAS* 126(2): 5233-5238.
- 619. E** Carattini, S., **Levin, S.**, and A. Tavoni. 2019. Cooperation in the climate commons. *Review of Environmental Economics and Policy* 13(2): 227-247.
- 618. E** Li, Q., Staver, A.C., Weinan, E., and **S.A. Levin**. 2019. Spatial feedbacks and the dynamics of savanna and forest. *Theoretical Ecology* 12(2): 237-262.
- 617. E** Vasconcelos, V.V., **Levin, S.A.**, and F.L. Pinheiro. 2019. Consensus and polarization in competing complex contagion processes. *Journal of the Royal Society Interface* 16: 20190196.
- 616. E** Brumley, D.R., Carrara, F., Hein, A.M., Yawata, Y., **Levin, S.A.**, and R. Stocker. 2019. Bacteria push the limits of chemotactic precision to navigate dynamic chemical agents. *PNAS* 116(22): 10792-10797.
- 615. E.** Staver, A.C., Asner, G.P., Rodriguez-Iturbe, **Levin, S.A.**, and I.P.J. Smit. 2019 Spatial patterning among savanna trees in high-resolution, spatially extensive data. *PNAS* 116(22): 10681-10685.
- 614. E** Chang, C.H., Williams, S.J., Zhang, M., **Levin, S.A.**, Wilcove, D.S., and R.-C. Quan. Perceived entertainment and recreational value motivate illegal hunting in Southwest China. 2019. *Biological Conservation* 234(2019): 100-106.
- 613 E** Rodríguez-Iturbe, I., Chen, Z., Staver, A.C., and **S.A. Levin**. 2019. Tree clusters in savannas result from islands of soil moisture. *PNAS* 116(14): 6679-6683.
- 612. E** Drohan, S.E., **Levin, S.A.**, Grenfell, B.T., and R. Laxminarayan. 2019. Incentivizing hospital infection control. *PNAS* 116(13): 6221-6225.
- 611. E** Tekwa, E., Fenichel, E.P., **Levin, S.A.**, and M. Pinsky. 2019. Path-dependent institutions drive alternative stable states in conservation. *PNAS* 116(2): 689-694.
- 610. E** Elsler, L.G., Drohan, S.E., Schlueter, M., Watson, J.R., and **S.A. Levin**. 2019. Local, global, multi-level market structure and multi-species fishery dynamics. *Ecological Economics* 156: 185-195.

2018

- 609. E** **Levin, S.A.** and A. Lo. 2018. What can Mother Nature teach us about managing financial systems. *Santa Fe Institute* (April 5, 2018). Available from: <https://medium.com/@sfscience/what-can-mother-nature-teach-us-about-managing-financial-systems-39c5f1a6ca35>.

- 608. E1** Levin, S. 2018. Resilience and robustness in ecological systems. IRGC, the International Risk Governance Council (www.irgc.org) and Center at EPFL (<https://irgc.epfl.ch>), 2nd Volume, *Resource Guide on Resilience*. Geneva, Switzerland: IRGC, the International Risk Governance Council and the EPFL International Risk Governance Center.
- 607. E** Perrings, C., Levin, S.A., and P. Daszak. 2018. The economics of infectious disease, trade and pandemic risk. *EcoHealth* 15: 241-243.
- 606. E** Rocha, J.C., Peterson, G., Bodin, O., and S.A. Levin. 2018. Cascading effects of regime shifts in social-ecological systems. *Science* 362(6421): 1379-1383.
- 605. E** Scheffer, M., Bolhuis, J.E., Borsboom, D., Buchman, T.G., Gijzel, S.M.W., Goulson, D., Kammenga, J.E., Kemp, B., van de Leemput, I.A., Levin, S., Martin, C.M., Melis, R.J.F., van Ness, E.H., Romero, L.M., and M.G.M.O Rikkert. 2018. Quantifying resilience of humans and other animals. *PNAS* 115(47): 11883-11890.
- 604. E** Tilman, A.R., Dixit, A., and S.A. Levin. 2018. Localized prosocial preferences, public goods, and common-pool resources. *PNAS*: DOI.org/10.1073/pnas.1802872115.
- 603. E** Klein, E.Y., Tseng, K.K., Levin, S.A., Goossens, H., and R. Laxminarayan. 2018. Reply to Charra et al.: Global longitudinal assessment of 2019 changes in defined daily doses. *PNAS*: DOI.10.1073/pnas.1817182115.
- 602. E** Hein, A.M., Gil, M.A., Twomey, C.R., Couzin, I.D., and S.A. Levin. 2018. Conserved behavioral circuits govern high-speed decision-making in wild fish shoals. *PNAS*: DOI: 10.1073/pnas.1809140115.
- 601. E** Klein, E.Y., Levin, S.A., and R. Laxminarayan. 2018. Reply to Abat et al.: Improved policies necessary to ensure an effective future for antibiotics. *PNAS*: DOI.org/10/1073/pnas.1811245115.
- 600. E** Tilman, A.R., Levin, S.A., and J.R. Watson. 2018. Revenue-sharing clubs provide economic insurance and incentives for sustainability in common-pool resource systems. *Journal of Theoretical Biology* 454: 205-214.
- 599. E** Moreno, A.R., Hagstrom, G.I., Primeau, F.W., Levin, S.A., and A.C. Martiny. 2018. Marine phytoplankton stoichiometry mediates nonlinear interactions between nutrient supply, temperature, and atmospheric CO₂. *Biogeosciences* 15: 2761-2779.
- 598. E** Reeves, M., Levin, S., and K. Whitaker. 2018. Leaping before the platform burns: The increasing necessity of preemptive innovation. *BCG Henderson Institute Publication*. Available from: <https://bcghendersoninstitute.com/leaping-before-the-platform-burns-the-increasing-necessity-of-preemptive-innovation-7e476253c387>.
- 597. E** Torney, C.J., Hopcraft, J.G.C., Morrison, T.A., Couzin, I.D., and S.A. Levin. 2018. From single steps to mass migration: The problem of scale in the movement ecology of the Serengeti wildebeest. *Philosophical Transactions of the Royal Society B* 373: 20170012.
- 596. E** Klein, E.Y., Van Boeckel, T.P., Martinez, E.M., Pant, S., Gandra, S., Levin, S.A., Goossens, H., and R. Laxminarayan. 2018. Global increase and geographic convergence in antibiotic consumption between 2000 and 2015. *PNAS*: DOI/10/1073/pnas/1717295515.
- 595. E** Monk, C.T., Barbier, M., Romanczuk, P., Watson, J.R., Alós, J., Nakayama, S., Rubenstein, D.I., Levin, S.A., and R. Arlinghaus. 2018. How ecology shapes exploitation: A framework to predict the behavioral response of human and animal foragers along exploration-exploitation trade-offs. *Ecology Letters*: DOI: 10.1111/ele.12949.
- 594. E** Touboul, J.D., Staver, A.C., and S.A. Levin. 2018. On the complex dynamics of savanna landscapes. *PNAS*: DOI: 10.1073/pnas.1712356115. Correction for Touboul et al.: *PNAS*, 2018 <https://doi.org/10.1073/pnas.1810993115>.
- 593 E** Power, M.E. et al. (including S.A. Levin). 2018. *Robert T. Paine: 1933-2016: Biographical Memoirs*. Washington, D.C.: National Academy of Sciences.

592. E Levin, S.A. 2018. "Foreword: From seascapes to landscapes and back again." In *Seascape Ecology*, ed. S.J. Pittman, xvii-xix. Hoboken, NJ: John Wiley & Sons, 2018.
- 591 E Nordbotten, J.M., Levin, S., Szathmáry, E., and N.C. Stenseth. 2018. The ecological and evolutionary dynamics of interconnectedness and modularity. *PNAS*: DOI: doi/10.1073/pnas.1716078115.
590. E Eikeset, A.M., Mazzarella, A.B., Davíðsdóttir, B., Klinger, D.H., Levin, S.A., Rovenskaya, E., and N. C. Stenseth. 2018. What is blue growth? The semantics of "sustainable development": of marine environments. *Marine Policy* 87: DOI.org/10.1016/j.marpol.2017.10.019.

2017

589. E Ripple, W.J. et al. (including S.A. Levin). 2017. World scientists warning to humanity: A Second Notice. *BioScience*: DOI.org/10.1093/biosci/bix125.
588. E Tilman, A.R., Watson, J., and S. Levin. 2017. Maintaining cooperation in social-ecological systems: Effective bottom-up management often requires sub-optimal resource use. *Theoretical Ecology* 10(2): 155-165.
587. E Van Boeckel, T.P. Glennan, E.E., Chen, D., Gilbert, M., Robinson, T.P., Grenfell, B.T., Levin, S.A., Bonhoeffer, S., and R. Laxminarayan. 2017. Reducing antimicrobial use in food animals. *Science (Insights)*357(6358): 1350-1352.
586. E Beddington J., Berry, S., Caldeira, K., Cramer, W., Creutzig, F., Kammen, D., Lambin, E., Levin, S.A., Lucht, W., Mace, G., Moomaw, W., Raven, P., Searchinger, T., Stenseth, N.C., and Van Ypersele, J.P. 2017. EU must not burn the world's forests for 'renewable' energy. *The Guardian (December 14, 2017)*.
585. E Joshi, J., Couzin, I.D., Levin, S.A., and V. Guttal. 2017. Mobility can promote the evolution of cooperation via emergent self-assortment dynamics. *PLoS Computational Biology* 13(9): e1005732.
584. E Klinger, D., Levin, S.A., and J.R. Watson. 2017. The growth of finfish in global open-ocean aquaculture under climate change. *Proceedings of the Royal Society B* 284(1864): 20170834.
583. E Levin, S. and A. Xepapadeas. 2017. Transboundary capital and pollution flows and the emergence of regional inequalities. *Discrete and Continuous Dynamical Systems: Series B* 22(3): 913-922.
582. E Fuller, E., Samhuri, J.F., Stoll, J.S., Levin, S.A., and J.R. Watson. 2017. Characterizing fisheries connectivity in marine and social ecological systems. *ICES Journal of Marine Science* 74(8): 2087-2096.
581. E Morin, B.R., Kinzig, A.P., Levin, S.A., and C.A. Perrings. 2017. Economic instruments for the socially optimal management of infectious disease. *EcoHealth*: DOI 10.1007/s10393-017-1270-9.
580. E Hannam, P.M. et al. (w/S.A. Levin). 2017. Incomplete cooperation and co-benefits: Deepening climate cooperation with a proliferation of small agreements. *Climatic Change* 144(1): 65-69.
579. E Reeves, M., Levin, S., Harnoss J.D., and D. Ueda. 2017. The five steps all leaders must take in the age of undercertainty. *The MIT Sloan Management Review (July 11, 2017)*. Available from: <http://sloanreview.mit.edu/article/the-five-steps-all-leaders-must-take-in-the-age-of-uncertainty/>.
578. E Reeves, M., Levin, S., and D. Ueda. 2017. Think biologically: Messy management for a complex world. *The Boston Consulting Group Website (July 19, 2017)*. Available from: <https://www.bcg.com/publications/2017/think-biologically-messy-management-for-complex-world.aspx>
577. E Palumbi, S.R., Estes, J.A., Kareiva, P., Levin, S.A., Lubchenco, J., and M.E. Power. 2017. Robert Treat Paine III (1933-2016). *PNAS* 114(27): 6681-6882.
576. E Dixit, A. and S.A. Levin. 2017. Social creation of pro-social preferences for collective action. In *The Theory of Externalities and Public Goods: Essays in Memory of Richard C. Cornes*, ed. W. Buchholz and R. Rubbelke, 127-143, Springer.

575. E Paine, R., Buhle, E., Levin, S., and P. Kareiva. 2017. Short-range dispersal maintaining metapopulation: the brown alga *Postelsia palmaeformis*. *Ecology*: DOI: 10.1002/ecy.1798.
574. E Chang, C.H., Barnes, M.L., Frye, M., Zhang, M., Quan, R.-C., Reisman, L.M.G., **Levin, S.A.**, and D.S. Wilcove. 2017. The pleasure of pursuit: Recreational hunters in rural Southwest China exhibit low exit rates in response to declining catch. *Ecology and Society* 22(1): 43.
573. E Menge, D.N.L. and S.A. Levin. 2017. Spatial heterogeneity can resolve the nitrogen paradox of tropical forests. *Ecology* 94(4): 1049-1061.
572. E Reeves, M.K. and S. Levin. 2017. Building a resilient business inspired by biology. *Scientific American, Guest Blog* (March 17, 2017).
571. E Hagstrom, G.I. and S.A. Levin. 2017. Marine ecosystems as complex adaptive systems: Emergent patterns, critical transitions and public goods. *Ecosystems*: DOI: 10.1007/s10021-017-0114-3.
570. E Thutupalli, S., Uppaluri, S., Constable, G.W.A., Levin, S.A., Stone, H.A., Tarnita, C.E., and C.P. Brangwynne. 2017. Farming and public goods production in *C. elegans* populations. *PNAS*: DOI: 10.1073/pnas.1608961114.
- 2016**
569. E Lubchenco, J., Cerny-Chipman, E., Reimer, J.N., and S.A. Levin. 2016. The right incentives enable ocean sustainability successes and provide hope for the future. *PNAS*: DOI/10.1073/pnas.1604982113.
568. E Estes, J.A., Dayton, P.K., Kareiva, P., Levin, S.A., Lubchenco, J., Menge, B.A., Palumbi, S.R., Power, M.E., and J. Terborgh. 2016. A keystone ecologist: Robert Treat Paine 1933-2016. *Ecology* 97(11): 2905-2909.
567. E Galvani, A.P., Bauch, C.T., Anand, M., Singer, B.H., and S.A. Levin. 2016. Human-environment interactions in population and ecosystem health. *PNAS* 113(51): 14502-14506.
566. E Bain, J. and S.A. Levin. 2016. Resolution of Respect: Lee N. Miller 1930-2016. *Bulletin of the Ecological Society of America*: DOI: 10.1002/bes2.1259.
565. E Jorgensen, P.S, Wernli, D., Carroll, S.P, Dunn, R.R., Harbarth, S., Levin, S.A., So, A.D., Schlüter, M., and R. Laxminarayan. 2016. Use antimicrobials wisely. *Nature* 537: 159-161.
564. E Nyborg, K., Anderies, J.M., Dannenberg, A., Lindahl, T., Schill, C., Schlüter, M., Adger, W.N., Arrow, K.J., Barrett, S., Carpenter, S., Chapin III, F.S., Crépin, A.-S., Daily G., Ehrlich, P., Folke, C., Jager W., Kautsky, N., Levin, S.A., Madsen O.J., Polasky, S., Scheffer, M., Walker, B., Weber, E.U., Wilen, J., Xepapadeas, A., and A. de Zeeuw. 2016. Social norms as solutions. *Science* 354(6308): 42-43.
563. E Levin, S.A. and A. Lo. 2016. What can Mother Nature teach us about managing financial systems? *Christian Science Monitor* (August 22, 2016). Available from: <https://www.csmonitor.com/Science/Complexity/2016/0822/What-can-Mother-Nature-teach-us-about-managing-financial-systems>.
562. E Hein, A.M. et al. (including S.A.Levin). 2016. Natural search algorithms as a bridge between organisms, evolution, and ecology. *PNAS* 113(34): 9413-9420.
561. E Berdahl, A., Van Leeuwen, A., Levin, S.A., and C.J. Torney. 2016. Collective behavior as a driver of critical transitions in migratory populations. *Movement Ecology* 4 (18): DOI 10.1186/s40462-016-0083-8.
560. E Pacheco, J.M., Santos, F.C., and S. Levin. 2016. Evolutionary dynamics of collective index insurance. *Special issue of Journal of Mathematical Biology to celebrate the 60th Birthday of Mats Gyllenberg* 72(4): 997-1010.
559. E Levin, S.A. 2016. *Dealing with Public Goods and Common Pool Resources*. MSEAS Symposium Online. International Council for the Exploration of the Sea (ICES), Copenhagen, Denmark. Available

from: <http://www.ices.dk/news-and-events/news-archive/news/Pages/MSEAS-2016-Simon-Levin-Dealing-with-public-goods-and-common-pool-resources.aspx>.

- 558. E** Brush, E.R., Leonard, N.E., and S.A. Levin. 2016. The content and availability of information affects the evolution of social-information gathering strategies. *Theoretical Ecology* 9(4): 455-476. Erratum: *Theoretical Ecology* (2017) 10(1): 145.
- 557. E** Hein, A., et al. (including S.A. Levin). 2016. Physical limits on bacterial navigation in dynamic environments. *Journal of the Royal Society Interface* 3: 20150844.
- 556. E** Fenichel, E. et al. (including S.A. Levin). 2016. Wealth reallocation and sustainability under climate change. *Nature Climate Change* 6: 237-244.
- 555. E** Hartnett A.T., et al. (including S.A. Levin). 2016. Role of heterogeneous preference and local nonlinearity in consensus decision-making. *Physical Review Letters* 116: 038701.
- 554. E** Schlüter, M., Tavoni, A., and S.A. Levin. 2016. Robustness of norm-driven cooperation in the commons. *Proceedings B. Proceedings of the Royal Society, Biological Sciences* 283(1822): 20152431.
- 553. E** Rikkert, M. GM Olde et al. (including S.A. Levin). 2016. Slowing down the recovery as generic risk marker for acute severity in chronic diseases. *Critical Care Medicine* 44(3): 601-06.
- 552. E** Reeves, M., Levin, S., and D. Ueda. 2016. The biology of corporate survival. *Harvard Business Review (January-February)*: 47-55.

2015

- 551. E** Sheffer, E. et al. (including S.A. Levin). 2015. Biome-scale nitrogen fixation strategies selected by climatic constraints on nitrogen cycle. *Nature Plants*: DOI: 10.1038/NPLANTS.2015.182.
- 550. E** Levin, S.A. and A.W. Lo. 2015. Opinion: A new approach to financial regulation. *PNAS* 112(41): 12543-12544.
- 549. E** Bonachela, J.A. et al. (including S.A. Levin). 2015. The role of phytoplankton diversity in the emergent oceanic stoichiometry. *Journal of Plankton Research*: DOI: 10.1093/plankt/fbv087. *Selected for the front cover of the magazine.*
- 548. E** Berdahl, A. et al. (including S. A. Levin). 2015. On the evolutionary interplay between dispersal and local adaptation in heterogeneous environments. *Evolution* 69(6): 1390-1405.
- 547. E** Levin, S.A. Foreword: A personal perspective on landscape ecology in the United States. 2015. *History of Landscape Ecology in the United States*, ed. Barrett G.W. and T.L. Barrett, v-viii. New York: Springer.
- 546. E** Castillo-Chavez, C. et al. (including S.A. Levin). 2015. Beyond Ebola: Lessons for mitigating pandemics. *The Lancet* 3 (July 2015): e-354-355.
- 545. E** Carter, N. et al. (including S. A. Levin). 2015. Modeling tiger population and territory dynamics using an agent-based approach. *Ecological Modelling* 312: 347-362.
- 544. E** Fariior C. et al. (including S.A. Levin). 2015. Decreased water limitation under elevated CO2 amplifies potential for forest carbon sinks. *PNAS* 112(23); 7213-7218.
- 543. E** Morin, B.R. et al. (including S.A. Levin). 2015. The social benefits of private infectious disease-risk mitigation. *Theoretical Ecology*: DOI: 10.1007/s12080-015-0262-z.
- 542. E** Van Boeckel, T.P. et al. (including S.A. Levin). 2015. Global trends in microbial use in food animals. *PNAS* 112(18): 5649-5654.

541. E Villa Martin, P. et al. (including S.A. Levin). 2015. Eluding catastrophic shifts. *PNAS*: 112(15): E1828–E1836.
540. E Hannam, P.M. et al. (including S.A. Levin). 2015. Incomplete cooperation and co-benefits: Deepening climate cooperation with a proliferation of small agreements. *Social Science Research Network (January 1, 2015)*. Available at SSRN: <http://ssrn.com/abstract=2575251>. *Climatic Change*: DOI 10.1007/s10584-015-1511-2/
539. E Messier, C. et al. (including S.A. Levin). 2015. From management to stewardship: Viewing forests as complex adaptive systems in an uncertain world. *Conservation Letters*: DOI: 10.1111/conl.12156.
538. E Levin, S.A. and I.D. Couzin, eds. 2015. *Journal of Statistical Physics: Special Issue: Collective Behavior* 158(3). Preface by Levin and Couzin.
537. E Chisholm, R.A. et al. (including S.A. Levin). 2015. The potential for alternative stable states in nutrient-enriched invaded grasslands. *Theoretical Ecology*: DOI: 10.1007-s12080-015-0258-8.
536. E Levin, A. 2015. Foreword: What mathematics can do for sustainability. *Bulletin of Mathematical Biology: Special Issue on Sustainability* 77: 251-253.
535. E Bonachela, J.A. et al. (including S.A. Levin). 2015. Termite mounds can increase the robustness of dryland ecosystems to climatic change. *Science* 347(6222): 651-655.
534. E Tarnita, C. et al. (including S.A. Levin). 2015. Fitness tradeoffs between spores and nonaggregating cells can explain the coexistence of diverse genotypes in cellular slime molds. *PNAS*: 112(9): 2776-2781.

2014

533. E Tanner, C.J. et al. (including S.A. Levin). 2014. Urban ecology: Advancing science and society. *Frontiers in Ecology and the Environment* 12(10): 574-581.
532. E Levin, S.A. 2014. Ecological protection and economic growth. *The Scientific Ravi* 23: 167. Available from: <http://www.gcu.edu.pk/SRavi.htm>.
531. E Levin, S.A. 2014. Some mathematical challenges in the theory of infectious diseases. In *Challenges of Mathematical Education: An American and Iranian Discussion: Conference Proceedings from the Mathematics Education Program (University of California, Irvine, January 27-29, 2014)*, ed. D. Saari, 71-72. Washington D.C.: The Mathematical Association of America.
530. E Torney, C. et al. (including S.A. Levin). 2014. Social information use and the evolution of unresponsiveness in collective systems. *Journal of the Royal Society Interface* 12(103): 201409.
529. E Perrings, C. et al. (including S.A. Levin). 2014. Merging economics and epidemiology to improve the prediction and management of infectious disease. *Journal of EcoHealth* 11(4): 464-75.
528. E Frank, A.B. et al. (including S.A. Levin). 2014. Dealing with femtorisks in international relations. *PNAS* 111(49): 17356-17362.
527. E De Froment, A.J., Rubenstein, D.I., and S.A. Levin. 2014. An extra dimension to decision-making in animals: The three-way trade-off between speed, effort per-unit-time and accuracy. *PLoS Computational Biology* 10(12): e1003937.
526. E Lomas, W. et al. (including S.A. Levin). 2014. Impact of ocean phytoplankton diversity on phosphate uptake. *PNAS* 111(49): 17540-17545.
525. E Troell, M. et al. (including S.A. Levin). 2014. Does aquaculture add resilience to the global food system? *PNAS* 11(37): 13257-13263.

- 524. E** Herlands, W. et al. (including S.A. Levin). 2014. A machine learning approach to musically meaningful homogeneous style classification. *Proceedings of the Twenty-Eighth Conference on Artificial Intelligence held July 27-31, 2014, Québec City, Canada*: 276-282.
- 523. E** Tavoni, A. and S.A. Levin. 2014. Managing the climate commons at the nexus of ecology, behavior and economics. *Nature Climate Change*: DOI: 10.1038/NClimate2375.
- 522. E** Morin, B.R. et al. (including S.A. Levin). 2014. Disease risk mitigation: The equivalence of two selective mixing strategies on aggregate contact patterns and resulting epidemic spread. *Journal of Theoretical Biology* 363: 262-270.
- 521. E** Levin, S.A. 2014. Public goods in relation to competition, cooperation, and spite. *PNAS* 111 (suppl. 3): 10838-10845.
- 520. E** Van Boeckel, T.P. et al. (including S.A. Levin). 2014. Global antibiotic consumption 2000-2010: An analysis of national pharmaceutical sales data. *Lancet Infectious Diseases*: DOI: 10.1016/S1473-3099(14)70780-7.
- 519. E** Berdahl, A., et al. (including S.A. Levin). 2014. A collective navigation hypothesis for homeward migration in anadromous salmonids. *Fish and Fisheries*: DOI: 10.1111/faf.12084.
- 518. E** Lei, J., Levin, S.A., and Nie, Q. 2014. Mathematical model of adult stem cell regeneration with cross-talk between genetic and epigenetic regulation. *PNAS* 111(10): E880-7.
- 517. Ea-b** Vasconcelos, V.T. et al. (including S.A. Levin). 2014. Climate policies under wealth inequality. *PNAS*: DOI/10.1073/pnas.1323479111. a=article; b=supplementary information
- 516. E** Schertzer, E., Staver, A.C., and S.A. Levin. 2014. Implications of the spatial dynamics of fire spread for the bistability of savanna and forest. *Journal of Mathematical Biology* 70: 329-341. DOI: 10.1007/s00285-014-0757-z. (Published online 2014; published in print 2015)
- 515. E** Bonachela, J.A. and S.A. Levin. 2014. Evolutionary comparison between viral lysis rate and latent period. *Journal of Theoretical Biology* 345(21): 32-42.
- 514. E** Salvador, L. et al. (including S.A. Levin). 2014. Mechanistic analysis of the search behavior of *Caenorhabditis elegans*. *Journal of the Royal Society Interface* 11(92): 20131092.
- 513. E** Arrow, K., Ehrlich, P., and S.A. Levin. 2014. Some perspectives on linked ecosystems and socio-economic systems. In *Environment and Development Economics: Essays in Honor of Sir Partha Dasgupta*, ed. S. Barrett et al., 95-116. Springer-Verlag.
- 512. E** Klein, E.Y. et al. (including S.A. Levin). 2014. Cross-reactive immune responses as primary drivers of malaria chronicity. *Infection and Immunity* 82(1): 140.
- 511. E** Walker, J.G., Klein, E.Y., and S.A. Levin. 2014. Disease at the wildlife-livestock interface: Acaricide use on domestic cattle does not prevent transmission of a tick-borne pathogen with multiple hosts. *Veterinary Parasitology* 199(3-4): 206-214.
- 510. E** Thompson, S., Levin, S., and I. Rodríguez-Iturbe. 2014. Rainfall temperatures changes have confounding impacts on *Phytophthora cinnamomi* occurrence risk in the south western USA under climate change scenarios. *Global Change Biology* 20: 1299-1312.

2013

- 509. E** Levin, S.A. Dedication and foreword. 2013. *Special Issue Mathematical Biosciences (in honor of Professor Luigi M. Ricciardi)*. BIOCAMP 2012: Mathematical Modeling and Computational Topics in Biosciences, Vietri sul Mare (Italy), June 4-9, 2012.
- 508. E** Standburg-Peshkin, A. et al. (including S.A. Levin). 2013. Visual sensory networks and effective information transfer in animal groups. *Current Biology* 23(17): R709-R711.

- 507. E** Giuggioli, L. et al. (including S.A. Levin). 2013. Stigmergy, collective actions, and animal social spacing. *PNAS* 110(42): 16904-16909.
- 506. E** Pinsky, M.L. et al. (including S.A. Levin). 2013. Marine taxa track local climate velocities. *Science* 341(6151): 1239-1243.
- 505. E** Levin, S.A. 2013. Resolution of respect: Dick Root 1936-2013. *Bulletin of the ESA* (July): 210-215.
- 504. E** Levin, S.A. 2013. Preface to Special Issue in Honor of Carlos Castillo-Chavez. *Mathematical Biosciences and Engineering* 10 (5-6): xxv-xxvii.
- 503. E** Levin, S.A. 2013. Foreword. *Dispersal, Individual Movement and Spatial Ecology: A Mathematical Perspective*, ed. M.A. Lewis et al., v-vii. *Lecture Notes in Mathematics 2071*. Berlin; Heidelberg: Springer-Verlag.
- 502. E** Lade, S.J., Tavoni, A., Levin, S.A., and M. Schlüter. 2013. Regime shifts in a social-ecological system. *Theoretical Ecology (Special Issue on Regime Shifts and Tipping Points)* 6: 359-372.
- 501. E** Case, M.F., Halpern, C.B., and S.A. Levin. 2013. Contributions of gopher mound and casting disturbances to plant community structure in a Cascade Range meadow complex. *Botany* 91: 555-561.
- 500. E** Farrior, C.E. et al. (including S.A. Levin). 2013. Resource limitation in a competitive context determines complex plant responses to experimental resource additions. *Ecology* 94(11): 2505-2517.
- 499. E** Bonachela, J.A., Allison, S.D., Martiny, A.C., and S.A. Levin. 2013. A model for variable phytoplankton stoichiometry based on cell protein regulation. *BioGeoSciences* 10: 3241-3279.
- 498. Ea-b** Fischer, I. et al. (including S.A. Levin). 2013. Fusing enacted and expected mimicry generates a winning strategy that promotes the evolution of cooperation. *PNAS* 110(25): 10229-10233. a=article; b=supplementary information
- 497. E** Levin, S.A. et al. 2013. Social-economic systems as complex adaptive systems: Modeling and policy implications. *Environment and Development Economics* 18(2): 111-132.
- 496. E** Martiny, A. et al. (including S.A. Levin). 2013. Strong latitudinal patterns in the elemental ratios of marine plankton and organic matter. *Nature Geoscience* 6: 279-283.
- 495. E** Levin, S.A. 2013. Comment on “Voluntary Pledges and Green Growth in the Post-Copenhagen Economy” by Thomas Sterner and “World Economic Crises: Commodity Prices and Environmental Scarcity as Missing Links” by Ramón López. In *Development Challenges in a Postcrisis World*, ed. C. Sepúlveda, A. Harrison, and J.Y. Lin, 195-199. in *The Theory of Externalities and Public Goods: A Memorial Volume Honoring Richard C. Cornes*, ed. W. Buchholz and D. Rubbelke. Springer. *Published 2017*. Washington, D.C.: World Bank.
- 494. E** Levin, S.A. 2013. Mathematics of sustainability. *AMS Notices* 60(4): 392-393.
- 493. E** Torney, C.J., Levin, S.A., and Couzin, I.D. 2013. Decision accuracy and the role of spatial interaction in opinion dynamics. *Journal of Statistical Physics* 151(1-2): 203-217.
- 492. E** Badiou, P. et al. (including S.A. Levin). 2013. *International Boreal Conservation Science Panel: Conserving the World’s Last Great Forest Is Possible: Here’s How*. (Science/Policy Briefing, International Boreal Conservation Science Panel and Associates, November 2011).
- 491. E** Kinzig, A.P. et al. (including S.A. Levin). 2013. Social norms and global environmental challenges: The complex interaction of behaviors, values, and policy. *BioScience* 63(3): 164-175.
- 490a-b. E** Nadell, C.D. et al. (including S.A. Levin). 2013. Cutting through the complexity of cell collectives. *Proceedings of the Royal Society B* 280(1755). DOI:10.1098/rspb.2012.2770. With supplement (485b).

- 489a-b. E** Farrior, C.E., R. Dybzinski, S. Levin, and S. Pacala. Competition for water and light in closed-canopy forests: A tractable model carbon of allocation with implications for carbon sinks. *American Naturalist* 181(3): 314-330. Appendices = 484b.
- 488. E** *Encyclopedia of Biodiversity*. 2013. Preface to the 2nd edition.
- 487. (E)/EI** Levin, S.A. 2012. Ecological resilience and robustness. *Encyclopedia Britannica*. Available from: <http://www.britannica.com/EBchecked/topic/1919092/ecological-resilience>.
- 486. E** Thompson, S., Levin, S., and Rodriguez-Iturbe, I. 2013. Linking plant disease risk and precipitation drivers: A dynamical systems framework. *The American Naturalist* 181(1): 1-38. Available from: <http://www.jstor.org/stable/10.1086/668572>.
- 485. E** Levin S.A. 2013. Cooperation and sustainability. In *Practicing Sustainability*, ed. G. Madhavan et al., 39-43. New York; Heidelberg; Dordrecht; London: Springer. *Copy of proof, but not published one.*

2012

- 484. E** Frank, A. et al. (including S.A. Levin). 2012. Security in the age of systemic risk: Strategies, tactics, and options for dealing with femtorisks and beyond. IIASA Interim Report (IR-12-010). IIASA.
- 483. E** Scheffer, M. et al. (including S.A. Levin). 2012. Anticipating critical transitions. *Science* 338: 334-348.
- 482. E** Jiang, X. et al. (including S.A. Levin). 2012. Functional biogeography of ocean microbes revealed through non-negative matrix factorization. *PLoS One* 7(9): e43866.
- 481. E** Dixit, A.K., Levin, S.A., and Rubenstein, D.I. 2012. Reciprocal insurance among Kenyan pastoralists. *Theoretical Ecology*: DOI: 10.1007/s12080-012-0169-x.
- 480. E** Akcay, E. et al. (including S.A. Levin). 2012. Evolution of cooperation and skew under imperfect information. *PNAS* 109(37): 14936-14941.
- 479. E** Reeves, M., Haanaes, K., Love, C., and Levin, S.A. 2012. Sustainability as adaptability. *Journal of Corporate Finance* 24(2): 14-22.
- 478. E** Levin, S.A., Bonachela, J., and C.D. Nadell. 2012. Mathematical and computational challenges in the study of complex adaptive microbial systems. *The Social Biology of Microbial Communities*. NAS Press.
- 477a-b. E** Levin, S.A. 2012. Epilogue: The challenge of sustainability: Lessons from an evolutionary perspective. In *Sustainability Science: The Emerging Paradigm and the Urban Environment*, ed. M. Weinstein and R.E. Taylor, 168-174. New York: Springer. *** 477a = Entire book. 477b = Levin Epilogue. ***
- 476. E** Klein, E. et al (including S.A. Levin). 2012. Superinfection and the evolution of resistance to antimalarial drugs. *Proceedings of the Royal Society B: Biological Sciences* 279(1743): 3834-42.
- 475. E** Levin, S.A., Arrow, K.J., and Keohane, R.O. 2012. An uncommon woman for the Commons (Elinor Ostrom retrospective). *PNAS* 109(33): 13135-13136.
- 474. E** Shaw, A.K. and Levin, S.A. 2012. The evolution of intermittent breeding. *Journal of Mathematical Biology* 66(4-5): 685-703.
- 473. E** Staver, A.C. and Levin, S.A. 2012. Integrating theoretical climate and fire effects on savanna and forest systems. *The American Naturalist* 180(2) 180(2): 211-224.
- 472. E** Levine, H., Schaefer, P. and Levin, S. 2012. Tribute to Lawrence E. Payne. *Notices of the AMS* 59(5): 653-54.
- 471. E** Bonachela, J.A., Muñoz, M.A., and S.A. Levin. 2012. Patchiness and demographic noise in three ecological examples. *Journal of Statistical Physics* 148: 723-739.

470. E Levin, S.A. 2012. The trouble of discounting tomorrow. *Solutions* 3(4) (August 2012). Available at: <http://www.thesolutionsjournal.com/node/1144>.
469. E Chisholm, R.A. and S.A. Levin. 2012. Linking dispersal and immigration in multidimensional environments. *Bulletin of Mathematical Biology* 74(8): 1754-1763.
468. E Klein, E. et al. (including S.A. Levin). 2012. Relationship between treatment-seeking behavior and artemisinin drug quality in Ghana. *Malaria* 11: 110.
467. E Ziv, G. et al. (including S.A. Levin). 2012. Trading-off fish diversity, food security, and hydropower in the Mekong River Basin. *PNAS* 109 (15): 5609-5614.
466. E Tavoni, A., Schlueter, M., and S.A. Levin. 2012. The survival of the conformist: Social pressure and renewable resource management. *Journal of Theoretical Biology* 299: 152-161.
465. E Levin, S.A. 2012. Preface: Towards the marriage of theory and data. *Interface Focus* 2(1): DOI: rsfs.2012.0006.
464. E Leonard, NE et al. (including S.A. Levin). 2012. Decision versus compromise for animal groups in motion. *PNAS* 109(1): 227-232.

2011

463. E Shaw, A.K. and S.A. Levin. 2011. To breed or not to breed: A model of partial migration. *Oikos* 120: 1871-1879. Erratum.
- 462a-b. E Couzin, ID et al (including S.A. Levin). 2011. Uninformed individuals promote democratic consensus in animal groups. *Science* 334: 1578-1580.
*** 462a = Paper. 462b = Supplementary Information. ***
461. E Archibald, S., Staver, A.C., and S.A. Levin. 2011. The evolution of human-driven fire regimes in Africa. *PNAS* 109(3): 847-852.
- 460a-b. E Staver, A.C., Archibald, S., and S.A. Levin. 2011. The global extent and determinants of savanna and forest as alternative biome states. *Science* 334: 230-232. **a = paper; b = supporting online material.**
- 459a. E Bonachela, J.A., Raghib, M., and S.A. Levin. 2011. Dynamic model of flexible phytoplankton nutrient uptake. *PNAS*: DOI:10.1073/pnas.1118012108. **459b = Errata.**
- 458a-b. E Fortuna, M.A., Bonachela, J.A., and S.A. Levin. 2011. Evolution of a modular software network. *PNAS*: DOI:10.1073/pnas.1115960108.
*** 458a = Paper. 458b = Supplementary Information. ***
457. E Espenshade, T.J., Olgiati, AS, and S.A. Levin. 2011. On nonstable and stable population momentum. *Demography* 48(4): 1581-1599.
456. E Ballantyne, F. IV, O.M.E. Schofield, and S.A. Levin. 2011. The emergence of regularity and variability in marine ecosystems: the combined role of physics, chemistry and biology. *Scientia Marina* 75(4): 719-731.
455. E Staver, A.C., S. Archibald, and S. Levin. 2011. Tree cover in sub-Saharan Africa: Rainfall and fire constrain forest and savanna as alternative stable states. *Ecology* 92(5): 1063-1072.
454. E Levin, S.A. 2011. Evolution at the ecosystem level: On the evolution of ecosystem patterns (Margalef Prize in Ecology Lecture 2010). *Contributions to Science* 7 (1): 11-16.
453. E Levin, S.A. 2011. *Building bridges between ecology and economics. In Bringing Ecologists and Economists Together: The Askö Meetings and Papers*, ed. T. Söderqvist, A. Sundbaum, C. Folk, and K-G. Mäler, 31-34. Dordrecht, Heidelberg, London, New York: Springer. Book webpage: www.springer.com/978-90-481-9475-9.

452. E Bonachela, J.A. *et al* (including S.A. Levin). 2011. Universality in bacterial colonies. *Journal of Statistical Physics* 144(2): 303-315.
451. E Mari, L. *et al* (including S.A. Levin). 2011. Hydrologic controls and anthropogenic drivers of the zebra mussel invasion of the Mississippi-Missouri river basin. *Water Resources Research* 47: W03523.
450. E Stock, C.A. *et al* (including S.A. Levin). 2011. On the use of IPCC-class models to assess the impact of climate on living marine resources. *Progress in Oceanography* 88: 1-27.
449. E Muneeppeerakul, R. *et al* (including S.A. Levin). 2011. Evolution of dispersal in explicitly spatial metacommunities. *Journal of Theoretical Biology* 269: 256-265.
- 2010**
448. E Nara, P.L. *et al* (including S.A. Levin). 2010. How can vaccines against influenza and other viral diseases be made more effective? *PLoS Biology* 8(12): e1000571.
447. E Torney, C.J., S.A. Levin, and I.D. Couzin. Specialization and evolutionary branching within migratory populations. *PNAS* 107(47): 20394-9.
446. E Levin, S.A. 2010. Complex adaptive systems and the challenge of sustainability. In *Toward a Science of Sustainability: Report from the NSF Toward a Science of Sustainability Conference, Warrenton, VA, November 29-December 9, 2009*, ed. S.A. Levin and W.C. Clark, 83-36. Princeton, NJ: Princeton University Printing and Mailing Services.
445. E Anderies, J.M. *et al* (including S.A. Levin). 2010. Working group II: Human-environment systems (HES) as complex adaptive systems. In *Toward a Science of Sustainability*, ed. S.A. Levin and W.C. Clark, 19-28. *Report from the NSF Toward a Science of Sustainability Conference, Warrenton, VA, November 29-December 9, 2009*. Princeton, NJ: Princeton University Printing and Mailing Services.
444. E Levin, S.A. and W.C. Clark. 2010. Executive Summary: Toward a science of sustainability. In *Toward a Science of Sustainability: Report from the NSF Toward a Science of Sustainability Conference, Warrenton, VA, November 29-December 9, 2009*, ed. S.A. Levin and W.C. Clark, 7-10. Princeton, NJ: Princeton University Printing and Mailing Services.
443. E Levin, S.A. and W.C. Clark, eds. 2010. *Toward a Science of Sustainability: Report from the NSF Toward a Science of Sustainability Conference, Warrenton, VA, November 29-December 9, 2009*. Princeton, NJ: Princeton University Printing and Mailing Services. *** (Full report)***
442. E Levin, S.A. 2010. The evolution of ecology. *Chronicle of Higher Education* (August 13): B9-B11.
441. E Sagarin, R. *et al* (including S.A. Levin). 2010. Decentralize, adapt, and cooperate. *Nature* 465: 292-293.
440. E Levin, S.A. 2010. Prologue. In *Modeling Paradigms and Analysis of Disease Transmission Models*, ed. A.B. Gumel and S. Lenhart, xiii-xiv. *DIMACS Series in Discrete Mathematics and Theoretical Computer Science* 75. Providence, RI: American Mathematical Society.
439. E Komarova, N.L. and S.A. Levin. 2010. Eavesdropping and language dynamics. *Journal of Theoretical Biology* 264(1): 104-118.
438. E Gleick, P.H. *et al* (including S.A. Levin). 2010. Climate change and the integrity of science. *Science* 328: 689-670.
437. E Raghieb, M., S.A. Levin, and I.G. Kevrekidis. 2010. Multiscale analysis of collective motion and decision-making in swarms: An advection-diffusion equation with memory approach. *Journal of Theoretical Biology* 264(3): 893-213.
436. E Bartumeus, F., L. Giuggioli, M. Louzao, V. Bretagnolle, D. Oro, and S.A. Levin. 2010. Fishery discards impact on seabird movement patterns at regional scales. *Current Biology* 20: 1-6.

435. E Levin, S.A. 2010. Crossing scales, crossing disciplines: Collective motion and collective action in the Global Commons. A special issue of *Philosophical Transactions of the Royal Society B* (Royal Society's 350th Anniversary) 365(1537): 13-17.

2009

434. E Levin, S.A. 2009. Preface. *Princeton Guide to Ecology*, pp. vii-viii in S.A. Levin, ed. *Princeton Guide to Ecology*. Princeton University Press, Princeton, New Jersey.
433. E Levin, S.A., ed. 2009. *Princeton Guide to Ecology*. Princeton University Press, Princeton, NJ.
432. E Levin, S.A. 2009. Games, groups, norms, and societies, pp. 143-153 in S.A. Levin, ed. *Games, Groups, and the Global Good*. Springer, Berlin; London.
431. E Levin, S.A. 2009. Preface. *Games, Groups, and the Global Good*, pp. v-vi in S.A. Levin, ed. *Games, Groups, and the Global Good*. Springer, Berlin; London.
430. Levin, S.A., ed. 2009. *Games, Groups, and the Global Good*. Springer, Berlin; London.
429. E Johnson, D. and S. Levin. 2009. The tragedy of cognition: Psychological biases and environmental inaction. *Current Science* 97(11). Available from: <http://www.ias.ac.in/currsci/>.
428. E Walker, B., S.A. Levin *et al.* 2009. Looming global-scale failures and missing institutions. *Science* 235: 1345-1346.
427. E Menge, D.N.L. and S.A. Levin. 2009. Facultative versus obligate nitrogen fixation strategies and their ecosystem consequences. *The American Naturalist* 4(174): 466-477.
426. E Gross, T., L. Rudolf, S.A. Levin, and U. Dieckmann. 2009. Generalized models reveal stabilizing factors in food webs. *Science* 325 (5941): 747-750.
425. E Arrow, K and S.A. Levin. 2009. Intergenerational resource transfers with random offspring. *Proceedings of the National Academy of Sciences* 106(33): 13702-13706.
424. E Muneeppeerakul, R., E. Bertuzzo, S.A. Levin, A. Rinaldo, and I. Rodríguez-Iturbe. 2009. River networks as ecological corridors: a complex system perspective for integrating hydrologic geomorphic and ecological dynamics. *Water Resources Research* 45: W01413.
423. E Schlueter, M., H. Leslie, and S.A. Levin. 2009. Managing water use tradeoffs in a semi-arid river delta – a modeling approach. *Ecological Research* 24: 491-503.
422. E Leslie H., Schlueter, M., Cudney-Bueno, R., and S.A. Levin. 2009. Modeling responses of coupled social-ecological systems of the Gulf of California to anthropogenic and natural perturbations. *Ecological Research* 24: 505-519.
421. E Nabet, B., N. Leonard, I.D. Couzin, and S.A. Levin. 2009. Dynamics of decision making in animal group motion. *Journal of Nonlinear Science* 19(4): 399-345.
420. E Ndifon, W., J. Dushoff, and S.A. Levin. 2009. On the use of hemagglutination-inhibition for influenza surveillance: surveillance data are predictive of influenza vaccine effectiveness. *Vaccine* 27(2009): 2447-2452.
419. E Ndifon, W., Wingreen, N.S., and S.A. Levin. 2009. Differential neutralization efficiency of hemagglutinin epitopes, antibody interference, and the design of influenza vaccines. *PNAS* 106(21): 8701-8706.
418. E Takeshi, M., L. Giuggioli, Y. Kobayashi, T. Nagata, and S.A. Levin. 2009. Vertically-structured prokaryotic community can control the efficiency of the biological pump in the oceans. *Theoretical Ecology Theoretical Ecology* 2:199-216.

417. E Moore, S.A., T.J. Wallington, R.J. Hobbs, P.R. Ehrlich, C.S. Holling, S. Levin, D. Lindenmayer, C. Pahl-Wostl, H. Possingham, M.G. Turner, M. Westoby. 2009. Diversity in current ecological thinking: implications for environmental management. *Environmental Management* 43:17-27.

2008

416. E Lu, J., J. Liu, I.D. Couzin, and S.A. Levin. 2008. Emerging collective behaviors of animal groups. *Proceedings of the 7th World Congress on Intelligent Control and Automation, June 25-27, 2008, Chongqing, China*.
415. E Bartumeus, F. and S.A. Levin. 2008. Fractal reorientation clocks: linking animal behavior to statistical properties of search. *PNAS* 105(49): 19072-19077.
414. E Nadell, C.D., B.L. Bassler, and S.A. Levin. 2008. Minireview: Observing bacteria through the lens of social evolution. *Journal of Biology* 7: 27.1-27.4.
413. E Satake, A., Y. Iwasa, and S.A. Levin. 2008. Comparison between perfect information and passive-adaptive social learning models of forest harvesting. *Theoretical Ecology*. DOI 10.1007/S12080-008-0019-z.
412. E Bartumeus, F., P. Fernandez, M.G.E. daLuz, J. Catalan, R.V. Sole and S. Levin. 2008. Superdiffusion and encounter rates in diluted, low dimensional worlds. *European Physics Journal Special Topics* 157: 157-166.
411. E Levin, S. A. and J. Lubchenco. 2008. Resilience, robustness, and marine ecosystem-based management. *Bioscience* 58 (1): 27-32.
410. E Buchman, T.G., J. Dushoff, M.B. Effron, P.R. Ehrlich, S. Fitzpatrick, R. Laxminarayan, B. Levin, S.A. Levin, M. Lipsitch, A. Malani, C. Nemeroff, S.P. Otto, V.L. Patel, and J.S. Solomkin. 2008. Antibiotic overuse: the influence of social norms. *Journal of the American College of Surgeons* 207(2): 265-275.
409. E May, R.M., S.A. Levin, and G. Sugihara. 2008. Ecology for bankers. *Nature* 451: 893-895.
408. E Klausmeier, C.A., E. Litchman, T. Daufresne, and S.A. Levin. 2008. Phytoplankton stoichiometry. *Ecological Research* 23: 479-485.
407. E Menge, D.N.L., S.A. Levin, and L.O. Hedin. 2008. Evolutionary tradeoffs can select against nitrogen fixation and thereby maintain nitrogen limitation. *PNAS* 105(5): 1573-1578.
406. E Nadell, C.D., J. Xavier, S.A. Levin, and K.R. Foster. 2008. The evolution of quorum sensing in bacterial biofilms. *PLoS Biology* 6(1): 171-179.
405. E Perring, M.P., L. Hedin, S.A. Levin, M. McGroddy, and C. de Mazancourt. 2008. Increased plant growth from nitrogen addition should conserve phosphorus in terrestrial ecosystems. *PNAS*. 105(6): 1971-1976.
404. E Stock, C.A., T.M. Powell, and S.A. Levin. 2008. Bottom-up and top-down forcing in a simple size-structured plankton dynamics model. *Journal of Marine Systems* 74(1-2): 134-152.
403. E Wiegand, K., D. Saltz, D. Ward, and S.A. Levin. 2008. The role of size inequality in self-thinning: a pattern-oriented simulation model for arid savannas. *Ecological Modelling* 210: 431-445.

2007

402. E Arrow, Kenneth et al (including S.A. Levin). 2007. Consumption, Investment, and Future well-being: Reply to Daily et al. *Conservation Biology* 21 (5): 1363-1365.
401. E Baskett, M., J. Weitz and S.A. Levin. 2007. The evolution of dispersal in reserve networks. *American Naturalist* 170 (1): 59-78.

400. E Baskett, M., F. Micheli, and S.A. Levin. 2007. Designing marine reserves for interacting species: Insights from theory. *Biological Conservation* 137(2): 163-179.
399. E Cullen, J.J., W.F. Doolittle, S.A. Levin, and W.K.W. Li. 2007. Patterns and predictions in microbial oceanography. *Oceanography* 20(2): 32-44.
398. E Klausmeier, C.A., E. Litchman, and S.A. Levin. 2007. A model of flexible uptake of two essential resources. *Journal of Theoretical Biology* 246(2): 278-289.
397. E Kryazhimskiy, S., U. Dieckmann, S.A. Levin, and J. Dushoff. 2007. On state-space reduction in multi-strain pathogen models, with an application to antigenic drift in influenza A. *PLoS Computational Biology*. <http://compbiol.plosjournals.org/perlserv/?request=getdocument&doi=10.1371/journal.pcbi.0030159&ct=1>.
396. E Levin, S.A. 2007. Introduction: Infectious diseases. *Environment and Development Economics* 12: 625-626.
395. E Levin, S.A. 2007. Book review. Remodeled Foundations. *Theoretical ecology: principles and applications*. 3rd ed. Bob May and Angela McClean, eds. *Science* 316: 1699-1700.
394. E Levin, S.A. 2007. Book review. *Evolutionary Dynamics: Exploring the Equations of Life*, by M.A. Nowak. *Quarterly Review of Biology*.
393. E Lichstein, J.W., J. Dushoff, S. A. Levin, and S.W. Pacala. 2007. Intraspecific variation and species coexistence. *American Naturalist* 170: 807-818.
392. E Ma, J., L. Worden and S.A. Levin. 2007. Evolutionary branching of single traits. (K. McCann, D. Noakes, N. Rooney, eds.). *From Energetics to Ecosystems: The Dynamics and Structure of Ecological Systems*. Chapter 10, p. 191-212.
391. E Moon, S.J., B. Nabet, N. E. Leonard, S.A. Levin, and I.G. Kevrekidis. 2007. Heterogeneous animal group models and their group-level alignment dynamics; an equation-free approach. *Journal of Theoretical Biology* 246: 100-112.
390. E Muneeppeerakul, R., S.A. Levin, A. Rinaldo, and I. Rodriguez-Iturbe. 2007. On biodiversity in river networks: a trade-off metapopulation model and comparative analysis. *Water Resources Research* 43(7): W07426, doi:10.1029/2006WR005857.
389. E Muneeppeerakul, R., J. S. Weitz, S.A. Levin, A. Rinaldo, and I. Rodriguez-Iturbe. 2007. A neutral metapopulation model of biodiversity in river networks. *Journal of Theoretical Biology* 245 (2): 351-363.
388. E Pulliam, J.R.C., J. Dushoff, S.A. Levin, and A.P. Dobson. 2007. Epidemic enhancement in partially immune populations. *PLoS ONE* 2(1): e165
387. E Satake, A., M. A. Janssen, S. A. Levin, and Y. Iwasa. 2007. Synchronized deforestation induced by social learning under uncertainty of forest-use value. *Ecological Economics* 63(2-3): 452-462.
386. E Satake, A., H.M. Leslie, Y. Iwasa, and S. A. Levin. 2007. Coupled ecological-social dynamics in a forested landscape: spatial interactions and information flow. *Journal of Theoretical Biology* 246(4): 695-707.
385. E Scanlon, T., K. Caylor, S.A. Levin, and I. Rodriguez-Inturbe. 2007. Positive feedbacks promote power-law clustering of Kalahari vegetation. *Nature* 449: 209-212 (doi:10.1038/nature06060).
384. E Worden, L. and S.A. Levin. 2007. Evolutionary escape from the prisoner's dilemma. *Journal of Theoretical Biology* 245: 411-422.

2006

383. E Bazykin, G.A., J. Dushoff, S.A. Levin, and A.S. Kondrashov. 2006. Bursts of non-synonymous substitutions in HIV-1 evolution reveal instances of positive selection at conservative protein sites. *Proceedings of the National Academy of Sciences, USA* 103 (51): 19396-19401.
382. E Buchman, T.G., V.L. Patel, J. Dushoff, P.R. Ehrlich, M. Feldman, M. Feldman, B. Levin, D.T. Miller, P. Rozin, S.A. Levin, and S. Fitzpatrick. 2006. Enhancing the use of clinical guidelines: A social norms perspective. *Journal of the American College of Surgeons*. 202 (5): 826-836.
381. E Buchman, T.G., J. Dushoff, P.R. Ehrlich, M. Feldman, M. Feldman, S. Fitzpatrick, B. Levin, S.A. Levin, D.T. Miller, V.L. Patel, and P. Rozin. 2006. Battling bad behavior: how do you convince people to do what's in their best interest? *The Scientist*. 20 (2): 51-57.
380. E Casagrandi, R., L. Bolzoni and S. A. Levin. 2006. The SIRC model for the ecology and evolution of drifting influenza A in seasonal environments. *Mathematical Biosciences*. 200 (2): 152-169.
379. E Chapin, F.S., Hoel, Michael, Carpenter, Steven R., Lubchenco, Jane, Walker, Brian, Callaghan, Terry V., Folke, Carl, Levin, Simon A., Mäler, Karl-Göran, Nilsson, Christer, Barrett, Scott, Berkes, Fikret, Crépin, Anne-Sophie, Danell, Kjell, Rosswall, Thomas, Starrett, David, Xepapadeas, Anastasios, Zimov, Sergey A. 2006. Building Resilience and Adaptation to Manage Arctic Change. *AMBIO: A Journal of the Human Environment*: 35(4): 198–202.
378. E De Leenheer, P., S. A. Levin, E. D. Sontag and C. A. Klausmeier. 2006. Global stability in a chemostat with multiple nutrients. *J. Mathematical Biology* 52 (4): 419-438.
377. E Earn, D.J.D. and S. A. Levin. 2006. Global asymptotic coherence in discrete dynamical systems. *Proceedings of the National Academy of Sciences, USA* 103 (11): 3968-3971. Erratum December 19, 2006, 103 (51) 19605; originally published December 8, 2006.
376. E Levin, S.A. 2006. On Karl Haderler becoming 70. *Journal of Mathematical Biology* 53 (4): 496-498.
375. E Levin, S.A. 2006. Kyoto International Culture Forum. Unity from Division: In search of a collective Kokoro. *In quest of Kokoro/Human Minds for this planet*. October 2006.
374. E Levin, S.A. 2006. Learning to live in a global commons: Socioeconomic challenges for a sustainable environment. *Ecological Research*. Special Feature. 21 (3): 328-333.
373. E Levin, S.A. 2006, Fundamental questions in biology. *PLoS Biology* 4(9): 1471-1472.
372. E Ma, J. and S.A. Levin. 2006. The evolution of resource adaptation: How generalist and specialist consumers evolve. *Bulletin of Mathematical Biology*. 68: 1111-1123.
371. E Nabet, B., Leonard, N.E., Couzin, I. and S.A. Levin. 2006. Leadership in animal group motion: A bifurcation analysis. *Proceedings of the 17th International Symposium on Mathematical Theory of Networks and Systems (MTNS)*, Kyoto, Japan, July 24-28, 2006.
370. E Pascual, M., J. A. Dunne and S. A. Levin, 2006. Challenges for the future: Integrating ecological structure and dynamics. *Ecological Networks: Linking Structure to Dynamics in Food Webs*. Pp. 351-371 eds. M. Pascual and J.A. Dunne. Oxford University Press, New York.
369. E Ruan, S., W. Wang, and S.A. Levin. 2006. The effect of global travel on the spread of SARS. *Mathematical Biosciences and Engineering* 3(1): 205-218.
368. E Sterner, T., M. Troell, J. Vincent, S. Aniyar, S.Barrett, W. Brock, S. Carpenter, K. Chopra, P. Ehrlich, M. Hoel, S. Levin, K. Goran Maler, J. Norberg, L. Pihl, T. Soderquist, J. Wilen and A. Xepapadeas. 2006. Quick Fixes for environment: part of the solution, or part of the problem? *Environment* 48 (10): 20-27

367. E Weitz, J. and S.A. Levin. 2006. Size and scaling of predator-prey dynamics. *Ecology Letters* 9: 548-557.
366. E Wingreen, N.S. and S.A. Levin. 2006. Cooperation among Microorganisms. *PLoS Biology* 4 (9): 1486-1488.
365. E Zea-Cabrera, E., Y. Iwasa, S. Levin and I. Rodriguez-Iturbe. 2006. Tragedy of the commons in plant water use. *Water Resources Research*. 42, W06D02, doi:10.1029/2005WR004514. (figure correction)

2005

364. E Hlodan, O. Simon A. Levin's passion for ecology (Interview). 2005. *BioScience* 55(10): 828-831.
363. E Levin, S.A. 2005. Building on strengths and finding one's purpose (commemorative lecture, Kyoto Prize 2005). *Kyoto Prize e-Museum: Laureates*. In English and Japanese. Available from: www.inamori-f.o.r.jp/laureates/k21_b_simon/img/lct_e.pdf
362. E Levin, S. and A. Xepapadeas. 2005. Transboundary pollution flows, capital mobility and the emergence of regional inequalities. *Beijer International Institute of Ecological Economics Report*.
361. E Levin, S.A., Hyman, J.M., and A.S. Perelson. 2005. Obituary: Lee Segel. *SIAM News*. Available from: <http://www.siam.org/news/news.php?id=10>.
360. E Baskett, M. L., S. A. Levin, S. D. Gaines and J. Dushoff. 2005. Marine reserve design and the evolution of size at maturation in harvested fish. *Ecological Applications* 15(3): 882-901.
359. E Chan, K.M.A. and S. A. Levin. 2005. Leaky prezygotic isolation and porous genomes: Rapid introgression of maternally inherited DNA. *Evolution* 59(4): 720-729.
358. E Couzin, I. D., J. Krause, N.R. Franks, and S.A. Levin. 2005. Effective leadership and decision-making in animal groups on the move. *Nature* 433: 513-516.
357. E Durrett, R. and S.A. Levin. 2005. Can stable social groups be maintained by homophilous imitation alone? *Journal of Economic Behavior and Organization* 57(3): 267-286.
356. E Ehrlich, P.R. and S.A. Levin. 2005. The evolution of norms. *PloS Biology* 3(6): 943-948.
355. E Jolles, A.E., D.V. Cooper and S.A. Levin. 2005. Hidden effects of chronic Tuberculosis in African buffalo. *Ecology* 86(9): 2358-2354.
354. E Katul, G. G., A. Porporato, R. Nathan, M. Siqueira, M.B. Soons, D. Poggi, H. S. Horn and S. A. Levin. September 2005. Mechanistic analytical models for long-distance seed dispersal by wind. *American Naturalist* 166(3): 368-381.
353. E Laxminarayan, R., D.L. Smith, L. A. Real, S.A. Levin. 2005. On the importance of incentives in hospital infection control spending. *Discovery Medicine* 5(27): 303-308.
352. E Levin, S. A. 2005. Self-organization and the emergence of complexity in ecological systems. *BioScience* 55(12): 1075-1079.
351. E Levin, S. A. 2005. The ecology of complexity and the complexity of ecology. In: (Royal Netherlands Academy of Arts and Sciences, ed). *Dr A H Heineken Prize 2004 Lecture for Environmental Sciences*. Royal Netherlands Academy of Arts and Sciences, Amsterdam, The Netherlands. Pp. 31. http://www.knaw.nl/heinekenprizes/prizes_env.html
350. E Livnat, A., S.W. Pacala and S.A. Levin. 2005. The evolution of intergenerational discounting in offspring quality. *American Naturalist* 165(3): 311-321.
349. E Nathan, R., N. Sapir, A. Trakhtenbrot, G. G. Katul, G. Bohrer, M. Otte, R. Avissar, M. B. Soons, H. S. Horn, M. Wikelski and S. A. Levin. 2005. Long-distance biological transport processes through the air: can nature's complexity be unfolded *in silico*? *Diversity and Distributions* 11: 131-137.

348. E Peters, H. A., N. R. Chiariello, H. A. Mooney, S. A. Levin and A. E. Hartley. 2005. Native harvester ants threatened with widespread displacement exert localized effects on serpentine grassland plant community composition. *Oikos* 109: 351-359.
347. E Scanlon, T.M., K. K. Caylor, S. Manfreda, S. A. Levin, and I. Rodriguez-Iturbe. 2005. Dynamic response of grass cover to rainfall variability: Implications for the function and persistence of savanna ecosystems. *Advances in Water Resources* 28: 291-302.
346. E Sherman, K., M. Sissenwine, V. Christensen, A. Duda, G. Hempel, C. Ibe, S. Levin, D. Lluch-Belda, G. Matishov, J. McGlade, M. O'Toole, S. Seitzinger, R. Serra, H.-R. Skjoldal, Q. Tang, J. Thulin, V. Vandeweerd, K. Zwanenburg. 2005. A global movement toward an ecosystem approach to management of marine resources. *Marine Ecology Progress Series* 300: 241-296.
345. E Smith, D. L., S. A. Levin and R. Laxminarayan. 2005. Strategic interactions in multi-institutional epidemics of antibiotic resistance. *Proceedings of the National Academy of Sciences, USA* 102(8): 3153-3158.
344. E van der Meulen, A. J., P. Peláez-Campomanes and S. A. Levin. 2005. Age structure, residents, and transients of Miocene rodent communities. *The American Naturalist* 165(4): E108-E125.
343. E Webb, C. T. and S. A. Levin. 2005. Cross-system perspectives on the ecology and evolution of resilience. Pp. 151-172. In: (E. Jen, ed.), *Robust Design: A Repertoire of Biological, Ecological, and Engineering Case Studies, SFI Lecture Note Series*. Oxford University Press.
342. E Weitz, J. S., H. Hartman and S. A. Levin. 2005. Co-evolutionary arms races between bacteria and bacteriophage. *Proceedings of the National Academy of Sciences, USA* 102(27): 9535-9540.
341. E Williams, J., C.S. ReVelle and S. A. Levin. 2005. Spatial attributes and reserve design models: A Review. *Environmental Modeling and Assessment* (Special Issue). 10(3): 161-162.

2004

340. E Arrow, K., P. Dasgupta, L. Goulder, G. Daily, P. Ehrlich, G. Heal, S. Levin, K.-G. Mäler, S. Schneider, D. Starrett, B. Walker. 2004. Are we consuming too much? *J. Economic Perspectives* 18(3): 147-172.
339. E Cisternas, J., C. W. Gear, S. Levin and I. G. Kevrekidis. 2004. Equation-free modeling of evolving diseases: Coarse-grained computations with individual-based models. *Proceedings of the Royal Society: Mathematical, Physical and Engineering Science* 460: 2761-79.
338. E Dushoff, J., J.B. Plotkin, S.A. Levin and D.D.J. Earn. 2004. Dynamical resonance can account for seasonality of influenza epidemics. *Proceedings of the National Academy of Sciences, USA* 101: 16915-16.
337. E Feng, Z, D.L. Smith, E. McKenzie and S. Levin. 2004. Coupling ecology and evolution: malaria and the *S*-gene across time scales. *Mathematical Biosciences* 189(1): 1-19.
336. E Guichard, F., S.A. Levin, A. Hastings and D. Siegel. 2004. Toward a dynamic metacommunity approach to marine reserve theory. *Bioscience* 54(11): 1004-11.
335. E Heal, G., B. Walker, S. Levin, K. Arrow, P. Dasgupta, G. Daily, P. Ehrlich, K-G. Maler, N. Kautsky, J. Lubchenco, S. Schneider, D. Starrett. 2004. Genetic diversity and interdependent crop choices in agriculture. *Resource and Energy Economics*. 26(2): 175-184.
334. E Klausmeier, C.A., E. Litchman, T. Daufresne, and S.A. Levin. 2004. Optimal nitrogen-to-phosphorus stoichiometry of phytoplankton. *Nature* 429: 171-174.
333. E Klausmeier, C.A., E. Litchman, and S.A. Levin. 2004. Phytoplankton growth and stoichiometry under multiple nutrient limitation. *Limnology and Oceanography* 49: 1463-70.

332. E Levin, S.A. 2004. I love a puzzle. Pp. 150-152. *In: One Hundred Reasons to be a Scientist*, Special 40th Anniversary Publication, The Abdus Salam International Center for Theoretical Physics (ICTP). ICTP Publications, Trieste Italy.
331. E Levin, S.A., J. Dushoff and J.B. Plotkin. 2004. Evolution and persistence of influenza A and other diseases. Special Issue of *Mathematical Biosciences* 188: 17-28.
330. E Levin, S.A., L. U. Ricciardi, O. Diekmann, A. Perelson. 2004. Foreword. Special Issue. *Mathematical Biosciences*. 188: vii-viii.
- 329.E Levin, S., L. Ricciardi, O. Diekmann A. Perelson, eds. 2004. Topics in Biomathematics and Related Computational Problems: selected papers, Vietri Sul Mare, Italy, June 2003. *Mathematical Biosciences* 188: 1-233.
328. E Myers, R.A., S.A. Levin, R. Lande, F.C. James, W.W. Murdoch, R.T. Paine. 2004. Hatcheries and endangered salmon. *Science* 303: 1980.
327. E Nakamaru, M. and S.A. Levin. 2004. Spread of two linked social norms on complex interaction networks. *J. Theoretical Biology* 230: 57-64.
326. E Roy, M., M. Pascual, S.A. Levin. 2004. Competitive coexistence in a dynamic landscape. *Theoretical Population Biology*. 341-353.
325. E Smith, D.L., J. Dushoff, E.N. Perencevich, A.D. Harris and S.A. Levin. 2004. Persistent colonization and the spread of antibiotic resistance in nosocomial pathogens: Resistance is a regional problem. *Proceedings of the National Academy of Sciences, USA* 101(10): 3709-3714.
324. E Tien, J.H., S.A. Levin and D.I. Rubenstein. 2004. Dynamics of fish shoals: identifying key decision rules. *Evolutionary Ecology Research* 6: 555-565.
323. E Williams, J., C.S. ReVelle and S.A. Levin. 2004. Using mathematical optimization models to design nature reserves. *Frontiers in Ecology and the Environment*. 2(2): 98-105.
322. E Xepapadeas, A., S. Carpenter, S. Aniyar, K. Arrow, G. Daily, P. Dasgupta, P. Ehrlich, C. Folke, G. Heal, M. Hoel, N. Kautsky, S. Levin, J. Lubchenco, K-G. Mäler, E. Ostrom, T. Rosswall, D. Starrett and B. Walker. 2004. Sustainability's Compass: Indicators of Genuine Wealth. Beijer Institute Discussion paper 188. http://www.beijer.kva.se/publications/pdf-archive/pdf_archive.html.

2003

321. E Cain, M. L., R. Nathan and S.A. Levin, editors. 2003. Special Feature: Long-distance dispersal. *Ecology* 84(8): 1943-2020.
320. E Chave, J. and S.A. Levin. 2003. Scale and scaling in ecological and economic systems. *Environmental and Resource Economics* 26: 527-557. Reprinted in P. Dasgupta and K.-G. Mäler, eds., *The Economics of Non-Convex Systems (The Economics of Non-Market Goods and Resources, Vol. 4)* (Springer Netherlands, 2004), pp. 29-59.
319. E Kareiva, P. and S.A. Levin, eds. 2003. *The Importance of Species: Perspectives on Expendability and Triage*. Princeton University Press. Pp. 427.
318. E Kinzig, A., D. Starrett, K. Arrow, S. Aniyar, B. Bolin, P. Dasgupta, P. Ehrlich, C. Folke, M. Hanemann, G. Heal, M. Hoel, A. Jansson, B-O. Jansson, N. Kautsky, S. Levin, J. Lubchenco, K-G. Mäler, S.W. Pacala, S.H. Schneider, D. Siniscalco, B. Walker. 2003. Coping with uncertainty: A call for a new science-policy forum. *Ambio* 32(5): 330-335.
317. E Levin, S.A. 2003. Complex adaptive systems: Exploring the known, the unknown and the unknowable. *Bulletin of the American Mathematical Society* 40: 3-19.

316. E Levin, S.A., H.C. Muller-Landau, R. Nathan, J. Chave. 2003. The ecology and evolution of seed dispersal: A theoretical perspective. *Annual Review of Ecology, Evolution, and Systematics*. 34: 575-604.
315. E Levin, S.A. and S.W. Pacala. 2003. Ecosystem dynamics. Pp: 61-95. In: (K.-G. Mäler and J. R. Vincent, eds) *Handbook of Environmental Economics, Volume 1*. Elsevier Science B.V., North Holland, Amsterdam.
314. E Lin, J., V. Andreasen, R. Casagrandi and S.A. Levin. 2003. Traveling wave solutions in a model of influenza A drift. *J. Theoretical Biology* 222: 437-445.
313. E Muller-Landau, H.C., S.A. Levin and J.E. Keymer. 2003. Theoretical perspectives on evolution of long-distance dispersal and the example of specialized pests. *Ecology* 84(8): 1957-1967.
312. E Overton, J. McC. and S.A. Levin. 2003. Components of spatial patterning in a serpentine grassland. *Ecological Research*. 18 (4): 405-421.
311. E Pacala, S.W., E. Bulte, J.A. List and S.A. Levin. 2003. False alarm over environmental false alarms. *Science* 301: 1187-1188.

2002

- 310 E The Royal Society Committee on Infectious Diseases in Livestock (Follet, B., Chair, and including S.A. Levin). 2002. *Infectious Diseases in Livestock: Summary and Main Recommendations*. (Policy Document 19/02, July 2002). Available at: <http://royalsociety.org/policy/publications/2002/infectious-disease-livestock/>.
309. E Bloom, B. R., J. Lederberg, R. Atlas, R. Berkelan, G. Cassell, T. R. Cech, D Franz, C. Fraser, D. Galas, CDR. S. Jone, R. A. Lamb, S. Levin, J. Mekalanos, T. Monath, R. Murch, E.D. Penhoet, D. Relman, P. Rosen, L. Sequeira, J. Taubenberger, D. Wilkening, C. Woteki. 2002. *Countering Bioterrorism: The Role of Science and Technology*. The National Academies Press, Washington, DC. 93 pp.
308. E Buttel, L.A., R. Durrett, and S.A. Levin. 2002. Competition and species packing in patchy environments. *Theoretical Population Biology* 61: 265-276.
307. E Chave, J., H.C. Muller-Landau and S.A. Levin. 2002. Comparing classical community models: Theoretical consequences for patterns of diversity. *American Naturalist* 159: 1-23.
306. E Chave, J., K. Wiegand and S. Levin. 2002. Spatial and biological aspects of reserve design. *Environmental Modeling and Assessment*. 7 (2): 115-122.
305. E Dushoff, J., L. Worden, J. Keymer and S.A. Levin. 2002. Metapopulations, community assembly, and scale invariance in aspect space. *Theoretical Population Biology* 62: 329-338.
304. E Dwyer, G., J. Dushoff, J.S. Elkinton, J. S. Burand, S.A. Levin. 2002. Variation in susceptibility: Lessons from an insect virus. Pp. 74-84. In: (U. Dieckmann, J. A. J. Metz, M. W. Sabelis and K. Sigmund, eds.). *Adaptive Dynamics of Infectious Diseases: In Pursuit of Virulence Management*. Cambridge U Press, Cambridge, UK.
303. E Earn, D.J.D., J. Dushoff and S.A. Levin. 2002. Ecology and evolution of the flu. *Trends in Ecology and Evolution* 117(7): 334-340.
302. E Folke, C., S. Carpenter, T. Elmqvist, L. Gunderson, C.S. Holling, B. Walker, J. Bengtsson, F. Berkes, J. Colding, K. Danell, M. Falkenmark, L. Gordon, R. Kaspersen, N. Kautsky, A. Kinzig, S. Levin, K-G. Mäler, F. Moberg, L. Ohlsson, P. Olsson, E. Ostrom, W. Reid, J. Rockström, H. Savenije and U. Svedin. 2002. Resilience for Sustainable Development: Building Adaptive Capacity in a World of Transformations. A Report for the Swedish Environmental Advisory Council 2002:1, Stockholm, Sweden. Pp 74. <http://www.sou.gov.se/mvb/english/index.htm>. Printed also by: International Council for Science. 2002. ICSU Series on Science for Sustainable Development No. 3. Pp. 37.
301. E Levin, S.A. 2002. Commentary: The wealth of species. *Science and Society Series. Project Syndicate*. Online: <http://www.project-syndicate.org/print/the-wealth-of-species>.

300. E Levin, S.A. 2002. Exploring the complex adaptive nature of ecosystems. Pp. 209-213. In: (A. Fokas, J. Halliwell, T. Kibble and B. Zegarliniski, eds.) *Highlights of Mathematical Physics*. American Mathematical Society, Providence, RI.
299. E Levin, S.A. 2002. New directions in the mathematics of infectious diseases. Pp. 15. In: (C. Castillo-Chavez, S. Blower, P. van den Driessche, D. Kirschner, and A.-A. Yakubu, eds.). *Mathematical Approaches for Emerging and Reemerging Infectious Diseases: An Introduction. IMA Volume in Mathematics and its Applications*, Vol. 125, and *Mathematical Approaches for Emerging and Reemerging Infectious Diseases: Models, Methods and Theory IMA Volume in Mathematics and its Applications*, Vol. 126. Springer, New York.
298. E McFarland, Wm. and S.A. Levin. 2002. Modeling the effects of current on prey acquisition in planktivorous fisheries. *Marine and Freshwater Behaviour and Physiology* 35(1-2): 69-85.
297. E Nathan, R., G.G. Katul, H.S. Horn, S.M. Thomas, R. Oren, R. Avissar, S.W. Pacala and S.A. Levin. 2002. Mechanisms of long-distance dispersal of seeds by wind. *Nature* 418: 409-413.
296. E Nathan, R., H.S. Horn, J. Chave, and S.A. Levin. 2002. Mechanistic models for tree seed dispersal by wind in dense forests and open landscapes. Pp. 69-82. In: D. J. Levey, W. R. Silva and M. Galetti (Eds.) *Seed Dispersal and Frugivory: Ecology, Evolution and Conservation*. CAB International, Oxfordshire, UK.
295. E Plotkin, J.B., J. Dushoff and S.A. Levin. 2002. Hemagglutinin sequence clusters and the antigenic evolution of influenza A virus. *Proceedings of the National Academy of Sciences* 99(9): 6263-6268.
294. E Solé, R.V. and S. Levin. 2002. Preface. Theme issue: The Biosphere as a complex adaptive system. *Philosophical Transactions of the Royal Society, Series B* 357: 617-619.
293. E Solé, R.V. and S. Levin, eds. 2002. Theme Issue: The Biosphere as a complex adaptive system. *Philosophical Transactions of the Royal Society, Series B* 357: 617-725.

2001

292. Levin, S.A. 2001. Preface. pp.xxvii-xxviii. *Encyclopedia of Biodiversity*. Academic Press, San Diego, CA.
291. Levin, S.A., Editor-in-Chief. 2001. *Encyclopedia of Biodiversity*, Volumes 1-5. Academic Press, San Diego, CA.
290. E Levin, S.A. 2001. Robert H. Whittaker (1920-1980). Pp. 611-612 in: (T. Munn, ed.) *Encyclopedia of Global Environmental Change*, Volume 2. John Wiley and Sons Ltd., London.
289. E Levin, S.A. 2001. Immune systems and ecosystems. *Conservation Ecology* 5(1): 17. [online] URL: <http://www.consecol.org/vol5/iss1/art17>
288. E Levin, S.A., J. Dushoff, and J.E. Keymer. 2001. Community assembly and the emergence of ecosystem pattern. *Scientia Marina*, 65 (Suppl. 2): 171-179.
287. E Norberg, J., D.P. Swaney, J. Dushoff, J. Lin, R. Casagrandi and S.A. Levin. 2001. Phenotypic diversity and ecosystem functioning in changing environments: A theoretical framework. *Proceedings of the National Academy of Sciences* 98(20): 11376-11381.
286. E Okubo, A. and S.A. Levin, eds. 2001. *Diffusion and Ecological Problems: Modern Perspectives*, 2nd Edition. *Interdisciplinary Applied Mathematics, Vol 14*. Springer, New York. Pp. 467.
285. E Okubo, A. and S.A. Levin. 2001. The basic diffusion. Pp. 10-20. In: (A. Okubo and S.A. Levin, eds.), *Diffusion and Ecological Problems: Modern Perspectives*, 2nd Edition. *Interdisciplinary Applied Mathematics, Vol 14*. Springer, New York.
284. E Pascual, M., P. Mazzega, and S.A. Levin. 2001. Oscillatory dynamics and spatial scale in ecological systems: the role of noise and unresolved pattern. *Ecology* 82(8): 2357-2369.

283. E Plotkin, J.B. and S.A. Levin. 2001. The Spatial distribution and abundances of species: Lessons from tropical forests. *Comments on Theoretical Biology* 6: 251-278.
282. E Press M.C., N.J. Huntly, and S. Levin, eds. 2001. *Ecology: Achievement and Challenge*. Blackwell Science, Oxford. Pp. 406. (Only preface is included here.)
281. E Post, E., S.A. Levin, Y. Iwasa and N.C. Stenseth. 2001. Reproductive asynchrony increases with environmental disturbance. *Evolution* 55: 830-834.
280. E Rozdilsky, I., J. Chave, S.A. Levin and D. Tilman. 2001. Towards a theoretical basis for ecosystem conservations. *Ecological Research* 16: 983-995.

2000

279. E Arrow, K., G. Daily, P. Dasgupta, S. Levin, K.-G. Mäler, E. Maskin, D. Starrett, T. Sterner and T. Tietenberg. 2000. Managing ecosystem resources. *Environmental Science & Technology* 34: 1401-1406.
278. Bravo de la Parra, R. and S.A. Levin, eds. 2000. Alcala First International Conference on Mathematical Ecology, Alcala de Henares, Spain, September 4-8, 1998. Special issue—*Mathematical Biosciences* 167: 1-86.
277. E Bolker, B.M., S.W. Pacala and S.A. Levin. 2000. Moment methods for stochastic processes in continuous space and time. Pp. 388-411. In: (U. Dieckmann, R. Law and J.A.J. Metz, eds.). *The Geometry of Ecological Interactions: Simplifying Spatial Complexity*. Cambridge University Press, Cambridge.
276. E Daily, G.C., Söderqvist, T., Aniyar, S., Arrow, K., Dasgupta, P., Ehrlich, P.R., Folke, C., Jansson, A., Jansson, B- O., Kautsky, N., Levin, S., Lubchenco, J., Mäler, K-G., Simpson, D., Starrett, D., Tilman, D., and Walker, B. 2000. The value of nature and the nature of value. *Science* 289: 395-396.
275. E Dasgupta, P., S. Levin and J. Lubchenco. 2000. Economic pathways to ecological sustainability. *BioScience* 50(4): 339-345.
274. E Durrett, R. and S. Levin. 2000. Lessons on pattern formation from planet WATOR. *J. Theoretical Biology* 205: 201-214.
273. E Dwyer, G., J. Dushoff, J.S. Elkinton and S.A. Levin. 2000. Pathogen-driven outbreaks in forest defoliators revisited: Building models from experimental data. *American Naturalist* 156: 105-120.
272. E Earn, D.J.D., S.A. Levin and P. Rohani. 2000. Coherence and conservation. *Science* 290: 1360-64.
271. E Gandhi, A., S. Levin and S. Orszag. 2000. Moment expansions in spatial ecological models and moment closure through Gaussian approximation. *Bulletin of Mathematical Biology* 62: 595-632.
270. E Hartvigsen, G., L. Worden, and S. Levin. 2000. Global cooperation achieved through small behavioral changes among strangers. *Complexity* 5(3): 14-19.
269. E Keymer, J.E., P.A. Marquet, J.X. Velasco-Hernandez, S.A. Levin. 2000. Extinction thresholds and metapopulation persistence in dynamic landscapes. *American Naturalist* 156(5): 478-494.
268. E Levin, S. A. 2000. Multiple scales and the maintenance of biodiversity. *Ecosystems* 3: 498-506.
267. Levin, S.A. and Y. Iwasa, eds. 2000. A special issue in honor of Dan Cohen. *Evolutionary Ecology Research* 2: 385-563.
266. E Levin, S.A. and H. Muller-Landau. 2000. The evolution of dispersal and seed size in plant communities. *Evolutionary Ecology Research* 2: 409-435.
265. E Levin, S.A. and H. Muller-Landau. 2000. The emergence of biodiversity in plant communities. *Comptes rendus de l'Académie des sciences, Sciences de la vie / Life Sciences* 323: 129-139.

1999

- Book:** Levin, S.A. 1999. *Fragile Dominion: Complexity and the Commons*. Reading, MA: Perseus Books Group. (Japanese version, 2005; Chinese version, 2006).
264. E Chao, D. and S.A. Levin. 1999. A simulation of herding behavior: The emergence of large-scale phenomena from local interactions. pp. 81-95. In: (S. Ruan, G.S.K. Wolkowicz and J. Wu, eds.). *Differential Equations with Applications to Biology*, Fields Institute Communications, 21. American Mathematical Society, Providence, RI.
263. E Deutschman, D.H., S.A. Levin and S.W. Pacala. 1999. Error propagation in a forest succession model: The role of fine-scale heterogeneity in light. *Ecology* 80: 1927-1943.
262. E Flierl, G., D. Grünbaum, S.A. Levin and D. Olson. 1999. From individuals to aggregations: the interplay between behavior and physics. *Journal of Theoretical Biology* 196: 397-454.
261. E Gandhi, A., S. Levin and S. Orszag. 1999. Nucleation and relaxation from meta-stability in spatial ecological models. *J. Theoretical Biology* 200: 121-146.
260. E Kinzig, A.P., S.A. Levin, J. Dushoff and S. Pacala. 1999. Limiting similarity, species packing, and system stability for hierarchical competition-colonization models. *The American Naturalist* 153: 371-383.
259. E Levin, S. A. 1999. Towards a science of ecological management. *Conservation Ecology* 3(2): 6. [online] URL: <http://www.consecol.org/vol3/iss2/art6>.
258. Levin, S.A. 1992. The problem of pattern and scale in ecology. *Ecology* 73(6): 1943-1967. **Reprinted in:** 1995. (J. Steele and T. Powell, eds) *Ecological Time Series*, pp.277-326. Chapman & Hall, New York.
257. Levin, S. 1999. Series Preface. pp. xix. In: (M.A.J. Chaplain, G.D. Singh and J.C. McLachlan, eds.). *On Growth and Form: Spatio-temporal Pattern Formation in Biology*. John Wiley & Sons, Ltd., Chichester, UK.
256. E Levin, S.A. 1999. Wildebeest and the marine environment: Gnus from the front. (Tribute to Akira Okubo), *Oceanography* 12: 14-16.
255. E Levin, S.A. and V. Andreasen. 1999. Commentary: Disease transmission dynamics and the evolution of antibiotic resistance in hospitals and communal settings *Proceedings of the National Academy of Science, USA*. 96: 800-801.
254. E Lin, J., V. Andreasen and S.A. Levin. 1999. Dynamics of influenza A drift: the linear three-strain model. *Mathematical Biosciences* 162: 33-51.
253. E Molofsky, J., R. Durrett, J. Dushoff and D. Griffeth and S. Levin. 1999. Local frequency dependence and global coexistence. *Theoretical Population Biology* 55: 270-282.
252. E Pascual, M. and S.A. Levin. 1999. From individuals to population densities: Searching for the intermediate scale of nontrivial determinism. *Ecology* 80: 2225-2236.
251. E Pascual, M. and S.A. Levin. 1999. Spatial scaling in a benthic population model with density-dependent disturbance. *Theoretical Population Biology* 56: 106-122.
250. E Policansky, D., H. Mooney, D.L. Alverson, H. Bingham, J. Clark, F. Grassle, E. Hofmann, E. Houde, S. Levin, J. Lubchenco, J. Magnuson, B. McCay, G. Munro, R. Paine, S. Palumbi, D. Pauly, E. Pikitch, T. Powell, M. Sissenwine 1999. *Sustaining Marine Fisheries*. NAS Press, Washington, DC. Pp. 164.

1998

249. E Bazzaz, F., G. Ceballos, M. Davis, R. Dirzo, P.R. Ehrlich, T. Eisner, S. Levin, J.H. Lawton, J. Lubchenco, P.A. Matson, H.A. Mooney, P.H. Raven, J.E. Roughgarden, J. Sarukhan, G.D. Tilman, P. Vitousek, B. Walker, D.H. Wall, E.O. Wilson, G.M. Woodwell. 1998. Letter: Ecological science and the Human predicament. *Science* 282(5390): 879.
248. E Daily, G., P. Dasgupta, B. Bolin, P. Crosson, J. du Guerny, P. Ehrlich, C. Folke, A. M. Jansson, B.-O. Jansson, N. Kautsky, A. Kinzig, S. Levin, K.-G. Mäler, P. Pinstrip-Andersen, D. Siniscalco, and B. Walker. 1998. Food production, population growth, and the environment. *Science* 281: 1291-1292.
247. E Durrett, R. and S.A. Levin. 1998. Spatial aspects of interspecific competition. *Theoretical Population Biology*. 53: 30-43. (Erratum: 1998, 53(3): 284).
246. E Gandhi, A., S. Levin and S. Orszag. 1998. "Critical slowing down" in time-to-extinction: An example of critical phenomena in ecology. *J. Theoretical Biology* 192: 363-376.
245. E Hurtt, G.C., P.R. Moorcroft, S.W. Pacala and S.A. Levin, 1998. Terrestrial models and global change: challenges for the future. *Global Change Biology* 4: 581-590.
244. E Iwasa, Y., M. Nakamaru and S.A. Levin. 1998. Allelopathy of bacteria in a lattice population: Competition between colicin-sensitive and colicin-producing strains. *Evolutionary Ecology* 12: 785-802.
243. E Levin, S.A. 1998. Anticipating environmental disasters. *Environment and Development Economics* 3: 527-529.
242. E Levin, S.A. 1998. The complex adaptive nature of ecosystems and economies. Beijer Annual Report 1997-1998. The Beijer Institute, Sweden, pp 2-3.
241. E Levin, S.A. 1998. Ecosystems and the biosphere as complex adaptive systems. *Ecosystems* 1: 431-436.
240. E Levin, S.A. 1998. Extrapolation and scaling in ecotoxicology. pp. 9-11. In (J.J. Cech, Jr., B.W. Wilson and D.G. Crosby, eds.) *Multiple Stresses in Ecosystems*. Lewis Publishers, Boca Raton, FL.
239. Levin, S.A. 1998. Preface. pp. ix-x. In: (L. Chen, S. Ruan and J. Zhu, eds.). *Advanced Topics in Biomathematics*. Proceedings of the International Conference on Mathematical Biology. World Scientific Publishing Co., Singapore.
238. E Levin, S.A., S. Barrett, S. Aniyar, W. Baumol, C. Bliss, B. Bolin, P. Dasgupta, P. Ehrlich, C. Folke, I.-M. Gren, C. S. Holling, A. Jansson, B.-O. Jansson, D. Martin, K.-G. Maler, C. Perrings, and E. Sheshinsky. 1998. Resilience in natural and socioeconomic systems. *Environment and Development Economics* 3: 225-236.
237. E Ehrlich, P.R. and S.A. Levin. 1998. Biodiversity: What it is and why we need it. pp. 20-23. In: (L. Koebner, J.E.S. Sokolow, F.T. Grifo and S. Simpson, eds.). *Scientists on Biodiversity*. American Museum of Natural History, NY. **Reprinted in:** (M.J. Novacek, ed.). *The Biodiversity Crisis: Losing What Counts*. 2001. The New Press, New York, pp. 46-49.

1997

236. Abe, T., S.A. Levin and M. Higashi, eds. 1997. *Biodiversity: An Ecological Perspective*. Springer-Verlag, New York. 294 pp.
235. Abe, T., S.A. Levin and M. Higashi. 1997. Preface. pp. v. In: (T. Abe, S.A. Levin and M. Higashi, eds.) *Biodiversity: An Ecological Perspective*. Springer-Verlag, New York.
234. E Andreasen, V., J. Lin and S.A. Levin. 1997. The dynamics of cocirculating influenza strains conferring partial cross-immunity. *J. Mathematical Biology* 35: 825-842.
233. E DeLeo, G. and S.A. Levin. 1997. The multifaceted aspects of ecosystem integrity. *Conservation Ecology* [online]. <http://www.consecol.org/vol1/iss1/art3>.

232. E1 Deutschman, D., S.A. Levin, C. Devine and L.A. Buttel. 1997. Scaling from trees to forests: Analysis of a complex simulation model. *Science* 227 [online]: <http://www.sciencemag.org/feature/data/deutschman/index.htm>.
231. E Durand, D., K. Ardlie, L. Buttel, S.A. Levin and L. Silver. 1997. Impact of migration and fitness on the stability of lethal t-haplotype polymorphism in *Mus musculus*: A computer study. *Genetics* 145: 1093-1108.
230. E Durrett, R. and S.A. Levin. 1997. Allelopathy in spatially distributed populations. *J. Theoretical Biology* 185: 165-171.
229. E Hartvigsen, G. and S.A. Levin. 1997. Evolution and spatial structure interact to influence plant-herbivore population and community dynamics. *Proceedings of the Royal Society of London, Series B* 264:1 677-1685.
228. E Helly, J., Case, T., Davis, F., S.A. Levin and W. Michener, Eds. 1997. The state of computational ecology. San Diego Supercomputer Center and the National Center for Ecological Analysis. National Science Foundation Report [online] http://www.sdsc.edu/compeco_workshop/report/helly_publication.html.
227. E Jasanoff, S., R. Colwell, M.S. Dresselhaus, R.D. Goldman, M.R.C. Greenwood, A.S. Huang, W. Lester, S.A. Levin, M.C. Linn, J. Lubchenco, M.J. Novacek, A.C. Roosevelt, J.E. Taylor, N. Wexler. 1997. Conversations with the community: AAAS at the millennium. *Science* 278: 2066-2067.
226. E Levin, S.A. 1997. Biodiversity: Interfacing populations and ecosystems. pp. 277-288. In: (T. Abe, S.A. Levin and M. Higashi, eds.) *Biodiversity: An Ecological Perspective*. Springer-Verlag, New York.
225. E Levin, S.A. 1997. Conceptual and methodological issues in the modeling of biological aggregations. pp. 247-256. In (J.K. Parrish and W.M. Hamner, eds.) *Animal Groups in Three Dimensions*. Cambridge University Press, Cambridge, U.K.
224. Levin, S.A. 1997. Foreword. pp. v-vi. In: (B. Hannon and M. Ruth, eds.) *Modeling Dynamic Biological Systems*. Springer-Verlag, New York.
223. E Levin, S.A. 1997. Human perspectives on the environment. *Trends in Ecology & Evolution*. 12: 91-92.
222. E Levin, S.A. 1997. Management and the problem of scale. *Conservation Ecology* [online] <http://www.consecol.org/vol1/iss1/art13>.
221. E Levin, S.A., B.T. Grenfell, A. Hastings and A.S. Perelson. 1997. Mathematical and computational challenges in population biology and ecosystem science. *Science* 275: 334-343.
220. E Levin, S.A. and S.W. Pacala. 1997. Theories of simplification and scaling of spatially distributed processes. pp. 271-296. In: (D. Tilman and P. Kareiva, eds.) *Spatial Ecology: The Role of Space in Population Dynamics and Interspecific Interactions*. Princeton University Press, Princeton, NJ.
219. E Pacala, S.W. and S.A. Levin. 1997. Biologically generated spatial pattern and the coexistence of competing species. pp. 204-232. In: (D. Tilman and P. Kareiva, eds.) *Spatial Ecology: The Role of Space in Population Dynamics and Interspecific Interactions*. Princeton University Press, Princeton, NJ.
218. E Wu, J. and S.A. Levin. 1997. A patch-based spatial modeling approach: Conceptual framework and simulation scheme. *Ecological Modelling* 101: 325-346.

1996

217. E Andreasen, V., S.A. Levin and J. Lin. 1996. A model of influenza A drift evolution. *Zeitschrift für Angewandte Mathematik und Mechanik*. 76 Supp.~2:421-424.
216. E Durrett, R. and S.A. Levin. 1996. Spatial models for species area curves. *J. Theoretical Biology*. 179:119-127.
215. E Gueron, S., S.A. Levin and D.I. Rubenstein. 1996. The dynamics of mammalian herds: From individuals to aggregations. *J. Theoretical Biology* 182: 85-98.

214. E Levin, S.A. 1996. Economic growth and environmental quality. *Ecological Applications* 6: 12.
213. E Levin, S.A. 1996. New views on the red, white and blue. *Complexity* 1(6): 5.
212. E Levin, S.A. 1996. Robert May receives Crafoord Prize. *Notices of the AMS* 43(9): 977-978.
211. E Levin, S.A. and R. Durrett, 1996. From individuals to epidemics. *Philosophical Transactions of the Royal Society of London, Series B*. 351: 1615-1621.
210. E Moloney, K. A. and S.A. Levin. 1996. The effects of disturbance architecture on landscape-level population dynamics. *Ecology* 77(2): 375-394.A.

1995

209. E Arrow, K., B. Bolin, R. Costanza, P. Dasgupta, C. Folke, C.S. Holling, B-O. Jansson, S.A. Levin, K.-G. Mäler, C. Perrings and D. Pimentel. 1995. Economic growth, carrying capacity, and the environment. *Science* 268:520-521. **Reprinted in:** 1996. *Ecological Applications* 6: 13-15.A
208. E Bolker, B.M., M. Altmann, M. Aubert, F. Ball, N.D. Barlow, R.G. Bowers, A.P. Dobson, J.S. Elkington, G.P. Garnett, C.A. Gilligan, M.P. Hassell, V. Isham, J.A. Jacquez, A. Kleczkowski, S.A. Levin, R.M. May, J.A.J. Metz, D. Mollison, M. Morris, L.A. Real, L. Sattenspiel, J. Swinton, P.White, and B.G. Williams. 1995. Group report: Spatial dynamics of infectious diseases in natural populations. pp. 399-420. In: (B.T. Grenfell and A.P. Dobson, eds.) *Ecology of Infectious Diseases in Natural Populations*. Cambridge University Press, Cambridge, U.K.
207. E Bolker, B.M., S.W. Pacala, C. Canham, F. Bazzaz and S.A. Levin. 1995. Species diversity and ecosystem response to carbon dioxide fertilization: conclusions from a temperate forest model. *Global Change Biology* 1: 373-381.
206. E Butman, C.A., J.T. Boehlert, S.H. Brawley, J.T. Carlton, E.F. DeLong, J.F. Grassle, J.B.C. Jackson, S.A. Levin, A.R.M. Nowell, R.T. Paine, S.R. Palumbi, G.J. Vermeij and L. Watling. 1995. *Understanding Marine Biodiversity: A Research Agenda*. National Academy Press, Washington, D.C. 114 pp.
205. E Dushoff, J. and S.A. Levin. 1995. The effects of population heterogeneity on disease spread. *Mathematical Biosciences* 128: 25-40.
204. E Gueron, S. and S.A. Levin. 1995. The dynamics of group formation. *Mathematical Biosciences* 128:243-264.
203. E Iwasa, Y. and S.A. Levin. 1995. The timing of life history events. *J. Theoretical Biology*. 172: 33-42.
202. E Levin, S.A. 1995. Grouping in population models. pp. 271-278. In (D. Mollison, ed.) *Epidemic Models: Their Structure and Relation to Data*. Cambridge University Press, Cambridge, UK.
201. E Levin, S.A. 1995. Scale and sustainability: A population and community perspective. pp. 103-114. In (M. Munasinghe and W. Shearer, eds.) *Defining and Measuring Sustainability: The Biogeophysical Foundations*. The United Nations University, New York; The World Bank, Washington, D.C.
200. E Mollison, D. and S.A. Levin. 1995. Spatial dynamics of parasitism. pp. 384-398. In (B.T. Grenfell and A.P. Dobson, eds.) *Ecology of Infectious Diseases in Natural Populations*. Cambridge University Press, Cambridge, U.K.

1994

199. E Durrett, R. and S.A. Levin. 1994. Stochastic spatial models: a user's guide to ecological applications. *Philosophical Transactions of the Royal Society of London, Series B* 343:329-350.
198. E Durrett, R. and S.A. Levin. 1994. The importance of being discrete (and spatial). *Theoretical Population Biology* 46:363-394.

197. E Levin, S.A. 1994. Epilogue and prologue. pp. ix-x In (S.A. Levin, ed.) *Frontiers in Mathematical Biology. Lecture Notes in Biomathematics, Vol 100.* Springer-Verlag, Heidelberg.
196. E Levin, S.A. 1994. Frontiers in ecosystem science. pp 381-389 In (S.A. Levin, ed.) *Frontiers in Mathematical Biology. Lecture Notes in Biomathematics, Vol 100.* Springer-Verlag, Heidelberg.
195. E Levin, S.A., ed. 1994. *Frontiers in Mathematical Biology. Lecture Notes in Biomathematics, Vol 100.* Springer-Verlag, Heidelberg. 633 pp.
194. E Levin, S.A. 1994. Patchiness in marine and terrestrial systems: from individuals to populations. *Philosophical Transactions of the Royal Society of London, Series B* 343: 99-103.
193. E Macken, C., S.A. Levin, and R. Waldstätter. 1994. The dynamics of bacteria-plasmid systems. *J. Mathematical Biology* 32:123-145.
192. E Wu, J. and S.A. Levin. 1994. A spatial patch dynamic modeling approach to pattern and process in an annual grassland. *Ecological Monographs* 64:447-464.

1993

191. E Andow, D.A., P.M. Kareiva, S.A. Levin, and A. Okubo. 1993. Spread of invading organisms: patterns of spread. pp. 219-241 In (K.C. Kim and B.A. McPherson, eds.) *Evolution of Insect Pests: The Pattern of Variations.* John Wiley and Sons, New York.
190. E Corson, D.R., R.A. Anthes, J. Baker, E. Bingham, P.L. Busch, K.E. Hoagland, C.S. Holling, T.L. Hullar, A.V. Kneese, K.N. Lee, S.A. Levin, J. Lubchenco, R.S. Nicholson, G.H. Orians, K.N. Patel, A. Schriesheim. 1993. *Research to Protect, Restore, and Manage the Environment.* National Academy Press, Washington D.C. pp. 242.
189. E Gueron, S. and S.A. Levin. 1993. Self-organization of front patterns in large wildebeest herds. *J. Theoretical Biology* 165(4): 541-552.
188. E Levin, S.A. 1993. Approaches to forecasting biomass yields in large marine ecosystems. pp. 36-39 In (K. Sherman, L.M. Alexander, and B.D. Gold, eds.) *Large Marine Ecosystems: Stress, Mitigation, and Sustainability.* American Association for the Advancement of Science (AAAS) Press, Washington, D.C.
187. E Levin, S.A. 1993. Concepts of scale at the local level. pp. 7-19 In (J.R. Ehleringer and C.B. Field, eds.) *Scaling Physiological Processes: Leaf to Globe.* Academic Press, San Diego, CA.
186. E Levin, S.A. 1993. Ecological and Evolutionary Consequences: An Overview. In (S.A. Levin, T. Powell, and J.H. Steele, eds.) *Patch Dynamics.* Lecture Notes in Biomathematics 96, pp. 210-212. Springer-Verlag, Berlin.
185. E Levin, S.A. 1993. Grazing theory and rangeland management. *Ecological Applications* 3(1): 1.
184. Levin, S.A. 1993. Predicting Spatial Effects in Ecological Systems: Introductory Remarks. In: (R. H. Gardner, ed.) *Some Mathematical Questions in Biology: Predicting Spatial Effects in Ecological Systems*, volume 26 American Mathematical Society, Providence, RI.
183. E Levin, S.A. 1993. Preserving Biodiversity. *Ecological Applications* 3(2): 201.
182. E Levin, S.A. 1993. Science and Sustainability. *Ecological Applications* 3(4): 545-546.
181. E Levin, S.A. T. Powell, and J.H. Steele, eds. 1993. *Patch Dynamics.* Lecture Notes in Biomathematics, Vol. 96. Springer-Verlag, Berlin. 307 pp.

1992

180. E Levin, S.A., ed. 1992 *Mathematics & Biology: The Interface.* Lawrence Berkeley Laboratory, University of California, Berkeley, CA. 96 pp. <http://www.bio.vu.nl/nvtb/Interface.html>.

179. E Levin, S.A. 1992. Sustaining ecological research. *ESA Bulletin*, Vol. 73, no. 4.
178. E Levin, S.A. 1992. Orchestrating environmental research and assessment. *Ecological Applications* 2(2): 103-106.
177. E Levin, S.A. 1992. The problem of pattern and scale in ecology. *Ecology* 73(6): 1943-1967. **Reprinted in:** 1995. (J. Steele and T. Powell, eds) *Ecological Time Series*, pp.277-326. Chapman & Hall, New York.
176. E Moloney, K.A., S.A. Levin, N.R. Chiariello, and L. Buttel. 1992. Pattern and scale in a serpentine grassland. *Theoretical Population Biology* 41(3): 257-276.

1991

175. E Cohen, D. and S.A. Levin. 1991. Dispersal in patchy environments: the effects of temporal and spatial structure. *Theoretical Population Biology* 39(1): 63-99.
174. Huntley, B.J., E. Ezcurra, E.R. Fuentes, K. Fujii, P.J. Grubb, W. Haber, J.R.E. Harger, M.M. Holland, S.A. Levin, J. Lubchenco, H.A. Mooney, V. Neronov, I. Noble, H.R. Pulliam, P.S. Ramakrishnan, P.G. Risser, O. Sala, J. Sarukhan, and W.G. Sombroek. 1991. A sustainable biosphere: the global imperative. *Ecology International* 20: 6-14.
173. E Levin, S.A. 1991. An ecological perspective. pp. 45-59 *In* (B.C. Davis, ed.) *The Genetic Revolution: Scientific Prospects and Public Perceptions*. The Johns Hopkins University Press, Baltimore, MD.
172. E Levin, S.A. 1991. The problem of relevant detail. pp. 9-15 *In* (S. Busenberg and M. Martelli, eds.) *Differential Equations — Models in Biology, Epidemiology and Ecology*. Lecture Notes in Biomathematics Vol. 92. Springer-Verlag, Berlin.
171. Levin, S.A. 1991. The mathematics of complex systems. pp. 215-226 *In* (H.A. Mooney, E. Medina, D.W. Schindler, E.-D Schulze, and B.H. Walker) *Ecosystem Experiments*. SCOPE 45. John Wiley, Chichester.
170. E Lubchenco, J., A.M. Olson, L.B. Brubaker, S.R. Carpenter, M.M. Holland, S.P. Hubbell, S.A. Levin, J.A. MacMahon, P.A. Matson, J.M. Melillo, H.A. Mooney, C.H. Peterson, H.R. Pulliam, L.A. Real, P.J. Regal, and P.J. Risser. 1991. The sustainable biosphere initiative: an ecological research agenda. *Ecology* 72(2): 317-412.
169. E Ludwig, D. and S.A. Levin. 1991. Evolutionary stability of plant communities and the maintenance of multiple dispersal types. *Theoretical Population Biology* 40(3): 285-307. (Erratum: 40(3), pp. 285-307.)
168. E Moloney, K.A., A. Morin, and S.A. Levin. 1991. Interpreting ecological patterns generated through simple stochastic processes. *Landscape Ecology* 5(3): 163-174.
167. Oversight Review Board of the National Acid Precipitation Assessment Program (M. Russell, K. Arrow, J. Bailar, J. Gordon, G. Hilst, S. Levin, T. Malone, W. Nierenberg, C. Starr, and J. Tukey). 1991. *The Experience and Legacy of NAPAP. Report to the Joint Chairs Council of the Interagency Task Force on Acidic Deposition*. NAPAP, Washington, D.C.
167. E Real, L.A. and S.A. Levin. 1991. The role of theory in the rise of modern ecology. pp. 177-191. *In* *Foundations of Ecology: Classic Papers with Commentaries*. The University of Chicago Press, Chicago, IL.
166. E Risser, P.G., J. Lubchenco, and S.A. Levin. 1991. Roundtable: Biological research priorities—a sustainable biosphere. *BioScience* 41(9): 625-627.

1990

165. E Andow, D.A., P.M. Kareiva, S.A. Levin, and A. Okubo. 1990. Spread of invading organisms. *Landscape Ecology* 4 (2/3): 177-188.
164. E Dwyer, G., S.A. Levin, and L. Buttel. 1990. A simulation model of the population dynamics and evolution of myxomatosis. *Ecological Monographs* 60: 423-447. (Erratum, 1993. *Ecological Monographs*, vol. 63 (3): 326).

- 163. E** Levin, S.A. 1990. Ecological issues related to the release of genetically modified organisms in the environment. pp. 151-159 *In* (H.A. Mooney and G. Bernardi) *Introduction of Genetically Modified Organisms into the Environment*. SCOPE 44. Wiley, Chichester (England).
- 162. E** Levin, S.A. 1990. Physical and biological scales and the modeling of predator-prey interactions in large marine ecosystems. pp. 179-187 *In* (K. Sherman, L.M. Alexander, and B.D. Gold, eds.) *Large Marine Ecosystems—Patterns, Processes, and Yields*. AAAS Selected Symposium. Publ. No. 90-30S, American Association for the Advancement of Science, Washington, D.C.
- 161. E** Levin, S.A. and C. Castillo-Chavez. 1990. Topics in evolutionary ecology. pp. 327-358 *In* (S. Lessard, ed.) *Mathematical and Statistical Developments of Evolutionary Theory*. NATO ASI Ser. C, vol. 299, Kluwer Academic Publishers, Dordrecht (Netherlands).
- 160. E** Levin, S.A., L.A. Segel, and F. Adler. 1990. Diffuse coevolution in plant-herbivore communities. *Theoretical Population Biology* 37:171-191.

1989

- 159. E** Castillo-Chavez, C., K. Cooke, W. Huang, and S.A. Levin. 1989. The role of long periods of infectiousness in the dynamics of acquired immunodeficiency syndrome (AIDS). pp. 177-189 *In* (C. Castillo-Chavez, S.A. Levin, and C. Shoemaker, eds.) *Mathematical Approaches to Problems in Resource Management and Epidemiology*. Lecture Notes in Biomathematics, Vol. 81, Springer-Verlag, Heidelberg.
- 158. E** Castillo-Chavez, C., K. Cooke, W. Huang, and S.A. Levin. 1989. On the role of long incubation periods in the dynamics of acquired immunodeficiency syndrome (AIDS). Part 1. Single population models. *J. Mathematical Biology* 27: 373-398.
- 157. E** Castillo-Chavez, C., K. Cooke, W. Huang, and S.A. Levin. 1989. On the role of long incubation periods in the dynamics of acquired immunodeficiency syndrome (AIDS). Part 2. Multiple group models. pp. 200-217 *In* (C. Castillo-Chavez, ed.) *Mathematical and Statistical Approaches to AIDS Epidemiology*. Lecture Notes in Biomathematics 83, Springer-Verlag, Heidelberg.
- 156. E** Castillo-Chavez, C., K. Cooke, W. Huang, and S.A. Levin. 1989. Results on the dynamics for models for the sexual transmission of the human immunodeficiency virus. *Applied Mathematical Letters* 2(4): 327-331.
- 155. E** Castillo-Chavez, C., K. Cooke, and S.A. Levin. 1989. On the modelling of epidemics. pp. 389-402 *In*: (J.-L. Delhaye and E. Gelenbe, eds.) *High Performance Computing*. North-Holland, Amsterdam.
- 154. E** Castillo-Chavez, C., H.W. Hethcote, V. Andreasen, S.A. Levin, and W-m. Liu. 1989. Epidemiological models with age structure, proportionate mixing, and cross-immunity. *J. Mathematical Biology* 27:233-258.
- 153. E** Castillo-Chavez, C., S.A. Levin, and C. Shoemaker, eds. 1989. *Mathematical Approaches to Problems in Resource Management and Epidemiology*. Lecture Notes in Biomathematics, Vol. 81, Springer-Verlag, Heidelberg. 327 pp.
- 152. E** Hethcote, H.W. and S.A. Levin. 1989. Periodicity in epidemiological models. pp. 193-211 *In* (S.A. Levin, T.G. Hallam, and L.J. Gross, eds.) *Applied Mathematical Ecology*. Biomathematics 18, Springer-Verlag, Heidelberg.
- 151. E** Iwasa, Y., S.A. Levin, and V. Andreasen. 1989. Aggregation of model ecosystems. II. Approximate aggregation. *IMA J. Math. Applied in Medicine and Biology* 6:1-23.
- 150. E** Levin, S.A. 1989. Analysis of risk for invasions and control programs. pp. 425-435 *In* (J. Drake, H.A. Mooney, F. di Castri, R.H. Groves, F.J. Kruger, M. Rejmánek, and M. Williamson, eds.) *Biological Invasions: A Global Perspective*. SCOPE 37. John Wiley & Sons, Chichester (England). 525 + viii pp.
- 149. E** Levin, S.A. 1989. Challenges in the development of a theory of community and ecosystem structure and function. pp. 242-255 *In* (J. Roughgarden, R.M. May, and S.A. Levin, eds.) *Perspectives in Ecological Theory*. Princeton University Press, Princeton, NJ.

148. E Levin, S.A. 1989. Ecology in theory and application. pp. 3-8 *In* (S.A. Levin, T.G. Hallam, and L.J. Gross, eds.) *Applied Mathematical Ecology*. Biomathematics 18, Springer-Verlag, Heidelberg.
147. Levin, S.A. 1989. Models in ecotoxicology: methodological aspects. pp. 213-220 *In* (Levin, S.A., M.A. Harwell, J.R. Kelly, and K.D. Kimball, eds.) *Ecotoxicology: Problems and Approaches*. Springer Advanced Texts in Life Sciences, Springer-Verlag, New York.
146. E Levin, S.A., T.G. Hallam, and L.J. Gross, eds. 1989. *Applied Mathematical Ecology*. Biomathematics 18, Springer-Verlag, Heidelberg. 491 pp.
145. Levin, S.A., M.A. Harwell, J.R. Kelly, and K.D. Kimball. 1989. Ecotoxicology: problems and approaches. pp. 3-7 *In* (Levin, S.A., M.A. Harwell, J.R. Kelly, and K.D. Kimball, eds.) *Ecotoxicology: Problems and Approaches*. Springer Advanced Texts in Life Sciences, Springer-Verlag, New York.
144. E Levin, S.A., M.A. Harwell, J.R. Kelly, and K.D. Kimball (eds.). 1989. *Ecotoxicology: Problems and Approaches*. Springer Advanced Texts in Life Sciences, Springer-Verlag, New York. 547 pp.
143. E Levin, S.A., K. Moloney, L. Buttel, and C. Castillo-Chavez. 1989. Dynamical models of ecosystems and epidemics. *Future Generation Computer Systems* 5: 265-274.
142. E Levin, S.A., H.A. Mooney, and C. Field. 1989. The dependence of plant root:shoot ratios on internal nitrogen concentration. *Annals of Botany* 64: 71-75.
141. E Levin, S. A., A. Morin, and T. H. Powell. 1989. Patterns and processes in the distribution and dynamics of Antarctic krill. *In* Selected Scientific Papers Part 1 (SC-CAMLR-SSP/5), Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), Hobart, Australia, pp. 281-299.
140. E Limburg, K.E., S.A. Levin, and R.E. Brandt. 1989. Perspectives on management of the Hudson River ecosystem. *In* (D.P. Dodge, ed.) Proceedings of the International Large River Symposium. *Can. Spec. Publ. Fish. and Aquat. Sci.* 106:265-291.
139. E Liu, W-m. and S.A. Levin. 1989. Influenza and some related mathematical models. pp. 235-252 *In* (S.A. Levin, T.G. Hallam, and L.J. Gross, eds.) *Applied Mathematical Ecology*. Biomathematics 18, Springer-Verlag, Heidelberg.
138. E Milgroom, M.G., S.A. Levin, and W.E. Fry. 1989. Population genetics theory and fungicide resistance. Chap. 12, pp. 340-367 *In* (K.J. Leonard and W.E. Fry, eds.) *Plant Disease Epidemiology, Vol. II. Genetics, Resistance, and Management*. McGraw-Hill, New York.
137. E Okubo, A. and S.A. Levin. 1989. A theoretical framework for the analysis of data on the wind dispersal of seeds and pollen. *Ecology* 70(2): 329-338.
136. E Roughgarden, J., R.M. May, and S.A. Levin, eds. 1989. *Perspectives in Ecological Theory*. Princeton University Press, Princeton, NJ. 394 pp.

1988

135. Bedford, B.L. and S.A. Levin. 1988. Interfacing ecosystem science and environmental policy. pp. 223-241 *In* (B. Keenan, R. Rich, A. Merritt, and V. Sorrells, eds.) *Science, Universities, and the Environment*. University of Illinois, Institute of Government and Public Affairs, Chicago, and Urbana-Champaign, IL.
134. E Castillo-Chavez, C., H.W. Hethcote, V. Andreasen, S.A. Levin, and W-m. Liu. 1988. Cross-immunity in the dynamics of homogeneous and heterogeneous populations. pp. 303-316 *In* (T. Hallam, L. Gross, and S.A. Levin, eds.) *Mathematical Ecology*. Proc. of the Autumn Course Research Seminars, Trieste 1986. World Scientific Publishing Co., Singapore.
133. E Castillo-Chavez, C., S.A. Levin, and F. Gould. 1988. Physiological and behavioral adaptation to varying environments: a mathematical model. *Evolution* 42(5): 986-994.

132. Hallam, T.G., L.J. Gross, and S.A. Levin, eds. 1988. *Mathematical Ecology*. Proc. of the Autumn Course Research Seminars, Trieste 1986. World Scientific Publishing Co., Singapore. 779 pp.
131. E Levin, S.A. 1988. An ecological perspective on the introduction of genetically engineered organisms into the environment. *J. Chem. Tech. Biotechnol.* 43: 257-263. (reprinted In (A.D. Dayan, P.N. Campbell, and T.H. Jukes, eds.) *Hazards of Biotechnology: Real or Imaginary?* Elsevier Science Publishers Ltd., England, 1988, pp. 13-19).
130. Levin, S.A. General overview of risk assessment. 1988. pp. 88-89 In *Regulatory Considerations: Genetically-Engineered Plants*. Summary of a Workshop Held at Boyce Thompson Institute for Plant Research at Cornell University. Center for Science Information, San Francisco, CA.
129. E Levin, S.A. 1988. Pattern, scale, and variability: an ecological perspective. pp. 1-12 In (A. Hastings, ed.) *Community Ecology*. Lecture Notes in Biomathematics 77, Springer-Verlag, Heidelberg.
128. E Levin, S.A. 1988. Safety standards for the environmental release of genetically engineered organisms. In Special Combined Issue of *Trends in Ecology and Evolution* 3(4) and *Trends in Biotechnology* 6(4):S47-S49. Elsevier, Cambridge, England.
127. Levin, S.A. 1988. Sea otters and nearshore benthic communities: A theoretical perspective. pp. 202-209 In (G.R. VanBlaricom and J.A. Estes, eds.) *The Community Ecology of Sea Otters*. Ecological Studies Series 65, Springer-Verlag, Heidelberg.
126. E Lubina, J.A. and S.A. Levin. 1988. The spread of a reinvading species: range expansion in the California sea otter. *American Naturalist* 131(4): 526-543.

1987

125. E Andow, D.A., S.A. Levin, and M.A. Harwell. 1987. Evaluating environmental risks from biotechnology: Contributions of ecology. pp. 125-142 In (J.R. Fowle, III, ed.) *Application of Biotechnology, Environmental and Policy Issues*. AAAS Selected Symposium 106, Westview Press, Boulder, CO. Redo, crooked pages.
124. Castillo-Chavez, C., D. Grünbaum, and S.A. Levin. 1987. Designing computer models of the spread of HIV (Human Immunodeficiency Virus). In *FOREFRONTS* Vol. 3(5):3-6, Newsletter, Center for Theory and Simulation in Science and Engineering, Cornell University, Ithaca, NY.
123. E Cohen, D. and S.A. Levin. 1987. The interaction between dispersal and dormancy strategies in varying and heterogeneous environments. pp. 110-122 In (E. Teramoto and M. Yamaguti, eds.) *Mathematical Topics in Population Biology, Morphogenesis and Neurosciences*, Proc. Kyoto 1985. Springer-Verlag, Heidelberg.
122. E Iwasa, Y., V. Andreasen, and S.A. Levin. 1987. Aggregation in model ecosystems. I. Perfect aggregation. *Ecological Modelling* 37: 287-302.
121. E Kauffman, S. and S. Levin. 1987. Towards a general theory of adaptive walks on rugged landscapes. *Journal of Theoretical Biology* 128(1): 11-45.
120. E Levin, S.A. 1987. Calculus for the biological sciences. pp. 116-121 In (L.A. Steen, ed.) *Calculus for a New Century—A Pump, Not a Filter*. MAA Notes No. 8, Mathematical Association of America, Washington, D.C.
119. Levin, S.A. 1987. Ecological and evolutionary aspects of dispersal. pp. 80-87 In (E. Teramoto and M. Yamaguti, eds.) *Mathematical Topics in Population Biology, Morphogenesis and Neurosciences*, Proc. Kyoto 1985. Springer-Verlag, Heidelberg.
118. Levin, S.A. Mathematical ecology. 1987. pp. 516-518 In: *McGraw-Hill Encyclopedia of Science and Technology*, New York.
117. Levin, S.A. 1987. Mathematical ecology and environmental management. Publ. ERC-135, Ecosystems Research Center, Cornell University, Ithaca, NY.

116. Levin, S.A. 1987. Environmental management in an uncertain world: the anticipation of surprise. *Arts and Sciences Newsletter* 8(2): 6, Cornell University, Ithaca, NY.
115. Levin, S.A. 1987. Recurrent themes in mathematical biology. pp. 10-30 *In* (E. Teramoto and M. Yamaguti, eds.) *Mathematical Topics in Population Biology: Morphogenesis and Neurosciences*. Proc. Kyoto 1985. *Lecture Notes in Biomathematics* 71. Springer-Verlag, Heidelberg.
114. E Levin, S.A. 1987. Scale and predictability in ecological modeling. pp. 2-8 *In* (T.L. Vincent, Y. Cohen, W.J. Grantham, G.P. Kirkwood, and J.M. Skowronski, eds.) *Modeling and Management of Resources Under Uncertainty*. Proceedings, Honolulu 1985. *Lecture Notes in Biomathematics* 72. Springer-Verlag, Heidelberg.
113. Levin, S.A. 1987. Workshop perspective from a university scientist. pp. 99-104 *In* (J.W. Gillett, ed.) *Prospects for Physical and Biological Containment of Genetically Engineered Organisms*. Proc., Shackelton Point Workshop on Biotechnology Impact Assessment. Ecosystems Research Center Report ERC-114, Cornell University, Ithaca, NY.
112. E Levin, S.A. and L. Buttel. 1987. Measures of patchiness in ecological systems. Ecosystems Research Center Report No. ERC-130, Cornell University, Ithaca, NY.
111. E Liu, W-m, H.W. Hethcote, and S.A. Levin. 1987. Dynamical behavior of epidemiological models with nonlinear incidence rates. *J. Mathematical Biology* 25(4): 359-380. Redo, crooked pages.
110. Mooney, H.A., F.A. Bazzaz, J. Berry, J.H. Cushman, W.F. Harris, S.A. Levin, J.J. Magnuson, P.L. Parker, W.P. Porter, P. Risser. 1987. Ecology: Review of the Office of Health and Environmental Research Program, Office of Energy Research, U.S. Department of Energy, Washington, D.C.
109. Mooney, H.A., F.A. Bazzaz, J. Berry, J.H. Cushman, W.F. Harris, S.A. Levin, J.J. Magnuson, P.L. Parker, W.P. Porter, P. Risser. 1987. On understanding impacts of energy use and development on ecological systems. Office of Energy Research, U.S. Department of Energy, Washington, D.C.
108. E National Academy of Sciences. 1987. Introduction of Recombinant DNA-Engineered Organisms into the Environment: Key Issues. (A. Kelman, W. Anderson, S. Falkow, N.V. Fedoroff, and S.A. Levin). National Academy Press, Washington, D.C. 24 pp.

1986

107. E Emlen, S.T., J.M. Emlen, and S.A. Levin. 1986. Sex ratio selection in species with helpers-at-the-nest. *American Naturalist* 127(1): 1-8. (Erratum, *American Naturalist* 128(2): 305, August 1986). Erratum.
106. Gillett, J.W., A.M. Stern, S.A. Levin, M.A. Harwell, D.A. Andow, M. Alexander, and the Staff of the Ecosystems Research Center. 1986. Potential impacts of environmental release of biotechnology products: Assessment, regulation, and research needs. (Expanded version of Gillett et al. 1985). *Environmental Management* 10(4): 433-563.
105. Gillett, J.W., A.M. Stern, M.A. Harwell, and S.A. Levin. 1986. Executive summary. pp. 437-440 *In* (J.W. Gillett, et al.) Potential impacts of environmental release of biotechnology products: assessment, regulation, and research needs. *Environmental Management* 10(4).
104. E Hallam, T.G. and S.A. Levin, eds. 1986. *Mathematical Ecology, An Introduction*. Biomathematics Vol. 17, Springer-Verlag, Berlin, Heidelberg. 457 pp.
103. Kelly, J.R. and S.A. Levin. 1986. A comparison of aquatic and terrestrial nutrient cycling and production processes in natural ecosystems, with reference to ecological concepts of relevance to some waste disposal issues. pp. 165-203 *In* (G. Kullenberg, ed.) *The Role of the Oceans as a Waste Disposal Option*. D. Reidel Publishing Co., Dordrecht, Holland.
102. E Levin, S.A. Foreword. 1986. *In* (K.E. Limburg, M.A. Moran and W.H. McDowell) *The Hudson River Ecosystem*. Springer-Verlag, New York.

101. E Levin, S.A. 1986. Random walk models of movement and their implications. pp. 149-154 *In* (T.G. Hallam and S.A. Levin, eds.) *Mathematical Ecology, an Introduction*. Springer-Verlag, Berlin, Heidelberg.
100. Levin, S.A. Research highlights. 1986. pp. 8-9 *In* Biennial Report 1984-85, Hudson River Foundation for Science and Environmental Research, New York.
99. E Levin, S.A. 1986. Risk assessment, risk management and biotechnology. Ecosystems Research Center Report ERC-119, Cornell University, Ithaca, NY. (Also appears in modified form, pp. 231-244 *In* (M.J. Russell, ed.) Proc., 1986 Washington International Conference on Biotechnology. Center for Energy and Environmental Management, Fairfax, VA).
98. E Levin, S.A. and V. Andreasen. 1986. Mathematical models of infectious diseases. *In* FOREFRONTS 2(8): 4-6, Newsletter, Center for Theory and Simulation in Science and Engineering, Cornell University, Ithaca, NY. Too dark?
97. E Levin, S.A., M.A. Harwell, and the Staff of the Ecosystems Research Center. 1986. Potential ecological consequences of genetically engineered organisms. pp. 495-513 *In* (J.W. Gillett et al.) Potential impacts of environmental release of biotechnology products: Assessment, regulation, and research needs. *Environmental Management* 10(4).
96. E Levin, S.A. and M.A. Harwell. 1986. Environmental risks and genetically engineered organisms. pp. 56-72 *In* (S. Panem, ed.) *Biotechnology: Implications for Public Policy*. Brookings Institution, Washington, D.C.
95. Limburg, K.E., S.A. Levin, and C.C. Harwell. 1986. Ecology and estuarine impact assessment: Lessons learned from the Hudson River (U.S.A.) and other estuarine experiences. *J. Environmental Management* 22: 255-280.
94. E Liu, W-m., S.A. Levin and Yoh Iwasa. 1986. Influence of nonlinear incidence rates upon the behavior of SIRS epidemiological models. *J. Mathematical Biology* 23: 187-204. Redo, crooked pages.

1985

93. Gillett, J.W., A.M. Stern, S.A. Levin, M.A. Harwell, D.A. Andow, M. Alexander, and the Staff of the Ecosystems Research Center. 1985. Potential impacts of environmental release of biotechnology products: assessment, regulation. Publ. ERC-075, Ecosystems Research Center, Cornell University, Ithaca, NY.
92. E Kimball, K. and S. Levin. 1985. Limitations of laboratory bioassays, and the need for ecosystem-level testing. *BioScience* 35(3): 165-171.
91. E Levin, S.A. and L.A. Segel. 1985. Pattern generation in space and aspect. *SIAM Review* 27(1): 45-67.
90. E Levin, S.A. and M.A. Harwell. 1985. Environmental risks associated with the release of genetically engineered organisms. *geneWATCH* 2(1):1, 14-16. Comm. for Responsible Genetics, Boston, MA.
89. Levin, S.A. and M.A. Harwell. 1985. Letter to the Editor, *geneWATCH* 2(2): 4 and 2(3): 3.
88. Levin, S.A. 1985. Viewpoint on regulation of genetically engineered organisms. Vantage Point column, *Environmental Update*, Center for Environmental Research, Cornell University, Ithaca, NY.
87. Levin, S.A. 1985. Written testimony for Department of Environmental Conservation Lampricide hearings, Ithaca, NY.

1984

86. Levin, S.A. 1984. Mathematical modelling and the evaluation of the effects of anthropogenic stresses. pp. 162-166. *In* (R. Lamberson, ed.) *Mathematical Models of Renewable Resources, Vol. II*. The Humboldt State University Mathematical Modelling Group, Arcata, CA.

85. Levin, S.A. 1984. Mathematical population biology. *In* (S.A. Levin, ed.) *Population Biology*. Proc. of Symposia in Applied Mathematics, Vol. 30: 1-8. American Mathematical Society, Providence, RI.
84. Levin, S.A., ed. 1984. *Population Biology*. Proc. of Symposia in Applied Mathematics, Vol. 30. American Mathematical Society, Providence, RI. 101 pp.
83. E Levin, S.A. and K. Kimball, eds. 1984. New perspectives in ecotoxicology. (Expanded version of Levin (1982).) *Environmental Management* 8: 375-442. (PDF is in two parts.)
82. E Levin, S.A., D. Cohen, and A. Hastings. 1984. Dispersal strategies in patchy environments. *Theoretical Population Biology* 26(2): 165-191.
81. Levin, S.A. and T.G. Hallam, eds. 1984. *Mathematical Ecology*. Proceedings, Trieste 1982. Lecture Notes in Biomathematics 54, Springer-Verlag, Berlin. 513 pages.
80. Larkin, P.A., C.W. Clark, N. Daan, S. Dutt, V. Hongskul, S.A. Levin, G.G. Newman, D.M. Pauly, G. Radach, and H.K. Rosenthal. 1984. Strategies for multi-species management. pp. 287-301 *In* (R.M. May, ed.) *Exploitation of Marine Communities*. Dahlem Konferenzen. Berlin, Heidelberg, New York, Tokyo: Springer-Verlag.
79. Limburg, K.E., C.C. Harwell, and S.A. Levin, eds. 1984. Principles for estuarine impact assessment: lessons learned from the Hudson River experience. Ecosystems Research Center Report ERC-024, Cornell University, Ithaca, NY.

1983

78. E Levin, S.A. 1983. Coevolution. pp. 328-334 *In* (H. Freedman and C. Strobeck, eds.) *Population Biology*. Lecture Notes in Biomathematics 52, Springer-Verlag, Berlin.
77. E Levin, S.A. 1983. Food webs, biotic control, and regulatory problems. pp. 123-125 *In* (D. DeAngelis, W. Post, and G. Sugihara, eds.) *Current Trends in Food Web Theory - Report on a Food Web Workshop*. Oak Ridge National Laboratory, Oak Ridge, Tennessee. ORNL-5983.
76. E Levin, S.A. 1983. Some approaches to the modelling of coevolutionary interactions. pp. 21-65 *In* (M. Nitecki, ed.) *Coevolution*. University of Chicago Press, Chicago, IL. Redo to single pages.
75. E Levin, S.A. 1983. Ecological factors and the selection of indicator and test species for impact assessment. Ecosystems Research Center Report ERC-012, Cornell University, Ithaca, NY. 11 pages.

1982

74. E Levin, S.A. and L.A. Segel. 1982. Models of the influence of predation on aspect diversity in prey populations. *J. Mathematical Biology* 14: 253-284.
73. E Levin, S.A., ed. 1982. *New Perspectives in Ecotoxicology*. Ecosystems Research Center Report ERC-014, Cornell University, Ithaca, NY. Needs to be redone to single pages.
72. E Levin, S.A. 1982. Profile in science: Viktor Brailovsky. *BioScience* 32(2): 157.
71. Levin, B.R., A.C. Allison, H.J. Bremermann, L.L. Cavalli-Sforza, B.C. Clarke, R. Frenzel-Beyme, W.D. Hamilton, S.A. Levin, R.M. May, and H.R. Thieme. 1982. Evolution in host parasite systems. pp. 213-243 *In* (R.M. Anderson and R.M. May, eds.) *Population Biology of Infectious Diseases*. Dahlem Konferenzen. Springer-Verlag, Berlin, Heidelberg, New York. Available online for a fee.

1981

70. E Paine, R.T. and S.A. Levin. 1981. Intertidal landscapes: disturbance and the dynamics of pattern. *Ecological Monographs* 51(2): 145-78.

69. E Levin, S.A. 1981. Age-structure and stability in multiple-age spawning populations. pp. 21-45 *In* (T.L. Vincent and J.M. Skowronski, eds.) *Renewable Resource Management*. Lecture Notes in Biomathematics, Vol. 40, Springer-Verlag, Heidelberg.
68. E Beddington, J., D. Botkin, and S.A. Levin. 1981. Mathematical models and resource management. pp. 1-5 *In* (T.L. Vincent and J.M. Skowronski, eds.) *Renewable Resource Management*. Lecture Notes in Biomathematics, Vol. 40, Springer-Verlag, Heidelberg.
67. E Levin, S.A. and D. Pimentel. 1981. Selection of intermediate rates of increase in parasite-host systems. *American Naturalist* 117(3): 308-315.
66. E Levin, S.A. 1981. Mechanisms for the generation and maintenance of diversity. pp. 173-94 *In* (R.W. Hiorns and D. Cooke, eds.) *The Mathematical Theory of the Dynamics of Biological Populations*. Academic Press.
65. E Levin, S.A., L.A. Segel, and S. Lerner. 1981. Appeal for Refuseniks. Letter to the Editor, *BioScience* 31(8): 557.
64. E Levin, S.A. 1981. The role of theoretical ecology in the description and understanding of populations in heterogeneous environments. *American Zoologist* 21: 865-875.
63. E Levin, S.A. 1981. Populations in heterogeneous environments. (Invited preview of "The role of theoretical ecology in the description and understanding of populations in heterogeneous environments.") *BioScience* 31(9): 678. Note: Title of reprint in file: "Theory's role in understanding populations."
62. E Levin, S.A. 1981. Models of population dispersal. pp. 1-18 *In* (S. Busenberg and K. Cooke, eds.) *Differential Equations and Applications to Ecology, Epidemics and Population Problems*. Academic Press.
61. E Levin, S.A. 1981. The role of mathematics in biology. Proceedings of Landsmoedet om Matematikken I Danmark, pp. 455-478. Danish Mathematical Society, Copenhagen, Denmark, May 1981.

1980

60. E Orzack, S.H., J.J. Sohn, K.K. Kallman, S.A. Levin, and R. Johnston. 1980. Maintenance of the three sex chromosome polymorphism in the platyfish, *Xiphophorus maculatus*. *Evolution* 34(4): 663-672.
59. E Levin, S.A. and C.P. Goodyear. 1980. Analysis of an age-structured fishery model. *Journal of Mathematical Biology* 9(3): 245-274. (Addendum: *J. of Math. Biology* 12(2): 263.)
58. E Levin, S.A. 1980. Mathematics, ecology, and ornithology. *The Auk* 97(2): 422-25.
57. E Levin, S.A. 1980. Some models for the evolution of adaptive traits. pp. 56-72 *In* (C. Barigozzi, ed.) *Vito Volterra Symposium on Mathematical Models in Biology*. Lecture Notes in Biomathematics, Vol. 39, Springer-Verlag, Heidelberg.

1979

56. E Levin, S.A. 1979. Non-uniform stable solutions to reaction-diffusion equations: applications to ecological pattern formation. pp. 210-22. *In* (H. Haken, ed.) *Pattern Formation by Dynamic Systems and Pattern Recognition*. Springer-Verlag, Heidelberg.
55. Levin, S.A. 1979. Multiple equilibria in ecological models. pp. 164-230 *In* Proceedings of International Symposium on Mathematical Modelling of Man-Environment Interaction. Telavi, Georgia, USSR, September 1978. Computation Center of Academy of Sciences of USSR.
54. Levin, S.A. 1979. The concept of compensatory mortality in relation to impacts of power plants on fish populations. Written testimony prepared for the U.S. Environmental Protection Agency.
53. Levin, S.A., ed. 1979. Lectures on Mathematics in the Life Sciences, Vol. 12: Some Mathematical Questions in Biology XI. American Mathematical Society, Providence, RI. 218 + ix pp.

1978

52. E Levin, S.A. 1978. On the evolution of ecological parameters. pp. 3-26 *In* (P.F. Brussard, ed.) *Ecological Genetics: The Interface*. Proceedings in Life Sciences. Springer-Verlag, New York.
51. E Levin, S.A. 1978. Pattern formation in ecological communities. pp. 433-65 *In* (J.H. Steele, ed.) *Spatial Pattern in Plankton Communities*. Proceedings of the NATO School on Spatial Pattern, Erice, Sicily, November 1977. Plenum Press. (Abstract *in Progress in Scientific Culture*, A. Zichichi, ed. Ettore Majorana Center for Scientific Culture, Erice, Trapani, Sicily, Italy.)
50. Levin, S.A. 1978. Population models and community structure in heterogeneous environments. pp. 439-75 *In* (S.A. Levin, ed.) *Mathematical Association of America Study in Mathematical Biology II: Populations and Communities*. Studies in Mathematics 16. Mathematical Association of America, Washington, D.C.
Reprinted in Hallam and Levin, 1986.
49. Levin, S.A. and R.B. Root. 1978. Community. pp. 127-29 *In* McGraw-Hill 1978 EST Yearbook of Science and Technology. McGraw-Hill, New York.
48. E Pimentel, D., S.A. Levin, and D. Olson. 1978. Coevolution and the stability of exploiter-victim systems. *American Naturalist* 112(983): 119-25.
47. Levin, S.A., ed. 1978. Lectures on Mathematics in the Life Sciences, Vol. 10: Some Mathematical Questions in Biology IX. American Mathematical Society, Providence, RI. 244 + ix pp.
46. Levin, S.A., ed. 1978. Lectures on Mathematics in the Life Sciences, Vol. 11: Some Mathematical Questions in Biology X. American Mathematical Society, Providence, RI. 179 + viii pp.
45. Levin, S.A., ed. 1978. *Mathematical Association of America Study in Mathematical Biology I: Cellular Behavior and the Development of Pattern*. Studies in Mathematics 15. Mathematical Assoc. of America, Washington, D.C. 315 + xiv pp.
44. Levin, S.A., ed. 1978. *Mathematical Association of America Study in Mathematical Biology II: Populations and Communities*. Studies in Mathematics 16. Mathematical Assoc. of America, Washington, D.C. 309 + xviii pp.

1977

43. E Gibson, R.E. and S.A. Levin. 1977. Distinctions between the two-state and sequential models for cooperative ligand binding. *Proceedings of the National Academy of Sciences, U.S.A.* 74(1): 139-43.
42. E Levin, S.A. 1977. A more functional response to predator-prey stability. *American Naturalist* 111(978): 381-83.
41. E Levin, S.A. and J.D. Udovic. 1977. A mathematical model of coevolving populations. *American Naturalist* 111(980): 657-75.
40. E Whittaker, R.H. and S.A. Levin. 1977. The role of mosaic phenomena in natural communities. *Theoretical Population Biology* 12(2): 117-39.
39. E Levin, S.A., J.E. Levin, and R.T. Paine. 1977. Snowy owl predation on short-eared owls. *The Condor* 79(3): 395.
38. Levin, S.A., ed. 1977. Lectures on Mathematics in the Life Sciences, Vol. 9: Some Mathematical Questions in Biology VIII. American Mathematical Society, Providence, RI. 186 + vi pp.

1976

37. E Levin, S.A. 1976. Population dynamic models in heterogeneous environments. *Annual Review of Ecology and Systematics* 7:1287-311.
36. Levin, S.A. 1976. Spatial patterning and the structure of ecological communities. pp. 1-36 In (S.A. Levin, ed.) *Lectures on Mathematics in the Life Sciences, Vol. 8: Some Mathematical Questions in Biology VII*. American Mathematical Society, Providence, RI.
35. Levin, S.A. 1976. Uniqueness theorems for the compressible flow equation. *J. Applicable Analysis* 5(3): 1-9.
34. E Levin, S.A. and R.M. May. 1976. A note on difference-delay equations. *Theoretical Population Biology* 9: 178-87.
33. Levin, S.A. and R.A. Parker. 1976. Mathematical analysis of transients in ecosystems. pp. 40-48 In (R. Dugdale and O. Loucks, eds.) *The Study of Species Transients, Their Characteristics and Significance for Natural Resource Systems*. The Institute of Ecology, Indianapolis, IN.
32. E Levin, S.A. and L.A. Segel. 1976. An hypothesis for the origin of planktonic patchiness. *Nature* 259(5545): 659.
31. E Segel, L.A. and S.A. Levin. 1976. Application of nonlinear stability theory to the study of the effect of diffusion on predator-prey interactions. pp. 123-52 In (R.A. Piccirelli, ed.) *Topics in Statistical Mechanics in Biophysics: A Memorial to Julius L. Jackson*. AIP Conference Proceedings No. 27.
30. Paine, R.T. and S.A. Levin. 1976. Responses to perturbation in the intertidal zone. pp. 23-27 In (R. Dugdale and O. Loucks, eds.) *The Study of Species Transients, Their Characteristics and Significance for Natural Resource Systems*. The Institute of Ecology, Indianapolis, IN.
29. Levin, S.A., ed. 1976. *Ecological Theory and Ecosystem Models*. The Institute of Ecology, Madison, WI. 71 pp.
28. Levin, S.A., ed. 1976. *Lectures on Mathematics in the Life Sciences, Vol. 8: Some Mathematical Questions in Biology VII*. American Mathematical Society, Providence, RI. 182 + vi pp.

1975

27. Brussard, P.F. and S.A. Levin. 1975. Introduction. *Proceedings of the Sixth Berkeley Symposium on Mathematical Statistics and Probability, Volume 5: Darwinian Neo-Darwinian and Non-Darwinian Evolution*. Reprinted from *Evolution* 28(4): 695-696.
26. Chen, C.W., S.A. Levin, and I.C.T. Nisbet. 1975. Simulated systems. pp. 231-39, 349-51 In *Principles for Evaluating Chemicals in the Environment*. National Academy of Sciences, Washington, D.C.
25. E Levin, S.A. 1975. On the care and use of mathematical models. *American Naturalist* 109(970): 785-786.
24. E Levin, S.A. 1975. On the equivalence of quasilinear first-order equations and a class of functional equations. pp. 314-16 In (S.A. Levin, ed.) *Ecosystem Analysis and Prediction*. Proceedings of a Conference on Ecosystems, Alta, Utah, July 1974. SIAM-SIMS, Philadelphia, PA.
23. E Levin, S.A. and R.T. Paine. 1975. The role of disturbance in models of community structure. pp. 56-67 In (S.A. Levin, ed.) *Ecosystem Analysis and Prediction*. Proceedings of a Conference on Ecosystems, Alta, Utah, July 1974. SIAM-SIMS, Philadelphia, PA.
22. E Pimentel, D., S.A. Levin, and A.B. Soans. 1975. On the evolution of energy balance in some exploiter-victim systems. *Ecology* 56(2): 381-390.

21. E Whittaker, R.H., S.A. Levin, and R.B. Root. 1975. On the reasons for distinguishing “niche, habitat, and ecotope.” *American Naturalist* 109(968): 479-82. **Reprinted in:** 2000. pp 115-118. (David R. Keller and Frank B. Golley, eds). *The Philosophy of Ecology: From Science to Synthesis*. University of Georgia Press, Athens, GA.
20. Levin, S.A., ed. 1975. Ecosystem Analysis and Prediction. Proceedings of a Conference on Ecosystems, Alta, Utah, July 1974. Society for Industrial and Applied Mathematics Institute for Mathematics and Society, Philadelphia, PA. 337 + xiv pp.
19. Whittaker, R.H. and S.A. Levin, eds. 1975. *Niche: Theory and Application*. Benchmark Papers in Ecology/3. Dowden, Hutchinson & Ross, Inc., Stroudsburg, PA. 448 + xv pp. No folder.

1974

18. E Levin, S.A. 1974. Dispersion and population interactions. *American Naturalist* 108(960): 207-228.
17. E Levin, S.A. 1974. Stability matrices and the solvability of certain systems of linear inequalities. *Linear and Multilinear Algebra* 2: 253-55.
16. E Levin, S.A. and R.T. Paine. 1974. Disturbance, patch formation, and community structure. *Proceedings of the National Academy of Sciences* 1(7): 2744-47.
15. Levin, S.A., ed. 1974. Lectures on Mathematics in the Life Sciences, Vol. 7: Some Mathematical Questions in Biology VI. American Mathematical Society, Providence, RI. 232 + vi pp.

1964-73

14. E Levin, S.A. 1973. Pollutants in ecosystems. Society for Industrial and Applied Mathematics (SIAM) News 6(4): 2. (Also reprinted in Ecosystem Analysis and Prediction.)
13. E Whittaker, R.H., S.A. Levin, and R.B. Root. 1973. Niche, habitat, and ecotope. *American Naturalist* 107(955): 321-38. (Also reprinted in Niche: Theory and Application.)
12. E Levin, S.A. 1972. A mathematical analysis of the genetic feedback mechanism. *American Naturalist* 106(948): 145-64. (Erratum 1973, 107(954): 320.)
11. E Levin, S.A. 1972. On the reduction of a first-order overdetermined system of partial differential equations. *J. of Mathematical Analysis and Applications* 38(2): 467-70.
10. E Brussard, P.F., S.A. Levin, L.N. Miller, and R.H. Whittaker. 1971. Redwoods: a population model debunked. *Science* 174(4007): 435-36.
9. E Block, H.D. and S.A. Levin. 1970. On the boundedness of an iterative procedure for solving a system of linear inequalities. *Proceedings of the American Mathematical Society* 26(2): 229-35.
8. E Levin, S.A. 1970. Community equilibria and stability, and an extension of the competitive exclusion principle. *American Naturalist* 104(939): 413-23. (Also reprinted in Niche: Theory and Application.)
7. E Levin, S.A. 1970. Principles of nonlinear superposition. *J. Mathematical Analysis and Applications* 30(1): 197-205.
6. E Levin, S.A. 1969. Nonlinear boundary problems for a quasilinear parabolic equation. *J. Differential Equations* 5(1): 32-37.
5. E Levin, S.A. 1968. On some nonlinear boundary problems for the equation of minimal surfaces. *J. Mathematics and Mechanics* 18(2): 125-30.
4. E Levin, S.A. 1967. Uniqueness under nonlinear boundary conditions for elliptic problems. *J. Mathematics and Mechanics* 17(6): 507-22.

3. E Levin, S.A., G.B. Dantzig, and J. Bigelow. 1967. On steady-state intercompartmental flows. *J. Colloid and Interface Science* 23(4): 572-76.
2. E Levin, S.A. 1964. Uniqueness and nonlinearity. Ph.D. Thesis. U.S. Army Research Office (Durham), Technical Report AD-602-033.
1. E Levin, S.A. and M.H. Martin. 1964. Quasi-separable solutions of systems of partial differential equations. I. Elliptic case. pp. 84-96 *In* Atti del Simposio Internazionale sulle Applicazioni dell' Analisi alla Fisica Matematica, Cagliari-Sassari, 1964. Edizioni Cremonese, Rome.

Letters

- 1L. E1 Manski, C. et al. (including S.A. Levin). 2016. Statement to restore science-based policy in government by concerned members of the U.S. National Academy of Sciences. <https://scientistsforsciencebasedpolicy.org>.