

## Curriculum Vitae



**JOAN ROUGHGARDEN**

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**Personal:**

1946, March 13, Born: Paterson NJ, USA

**Education:**

1971: M.S., Ph.D., Biology, Harvard University

1968: A.B., Philosophy, University of Rochester, with Highest Honors

1968: B.S., Biology, University of Rochester, with Distinction and Phi Beta Kappa

**Academic Positions:**

2012-Present: Affiliated Faculty, Hawai'i Institute of Marine Biology, U. of Hawai'i

2011-Present: Professor of Biology, Emerita, Stanford University

2019-Present: Adjunct Researcher, Hawai'i Institute of Marine Biology, U. of Hawai'i

2014-2015: Research Scientist, Hawai'i Institute of Marine Biology, U. of Hawai'i

1972-2011: Assistant, Associate, and Professor of Biology, Stanford University

1992-1999: Director and Founder, Earth Systems Program, Stanford University

1970-1972: Instructor, Assistant Professor of Biology, University of Massachusetts (Boston)

## Professional Recognition:

- 1998: Center Fellow, National Center for Ecological Synthesis and Analysis, University of California (Santa Barbara)
- 1995: Dinkelspiel Award for Undergraduate Teaching, Stanford University
- 1994: Visiting Research Fellow, Merton College, University of Oxford
- 1993: Fellow, American Academy of Arts and Sciences
- 1985: Fellow, Guggenheim Foundation
- 1978: University Fellow, Stanford University

## Professional Experience:

### Associate Editor or Co-Editor:

- 2008-2013: *Philosophy and Theory in Biology*
- 1984-1989: *American Naturalist*
- 1979-1982: *Oecologia*
- 1975-1986: *Theoretical Population Biology*

### National Grant Review Panels:

- 1988: Department of Energy
- 1987: National Science Foundation (General Ecology)

### National Workshops/Symposia Organized:

- 2013: Sexual Selection Studies: Progress, Challenges, and Future Directions, Catalyst Meeting at National Evolutionary Synthesis Center, Durham NC July 15-17.
- 2009-2010: Integrating Functional and Evolutionary Dynamics at Multiple Scales, National Institute for Mathematical and Biological Synthesis, University of Tennessee, Knoxville TN (with Erol Akçay)
- 2008: New Approaches to the Evolution of Social Behavior, Ecological Society of America annual meeting, Milwaukee WI (with Erol Akçay)
- 2004: Family Dynamics, Ecological Society of America annual meeting, Portland OR (with Michael Neubert)
- 1996: Theory of Ecological Economics, National Center for Ecological Analysis and Synthesis, University of California (Santa Barbara) Santa Barbara, CA (with David Starrett)
- 1988: Ecology for a Changing Earth, Santa Fe, NM (with James Brown)
- 1987: Perspectives in Theoretical Ecology, Asilomar, CA (with Robert May and Simon Levin)

### National Oceanographic Steering Committees:

- 1992-1993: Coastal Ocean Processes (CoOP)
- 1990-1991: Global Ocean Ecosystem Dynamics (GLOBEC)

### National Science Advisory Boards:

- 2007: National Research Council Committee on Defining and Advancing the Conceptual Basis of Biological Sciences in the 21st Century
- 2003-2008: Environmental Protection Agency Committee on Valuing the Protection of Ecological Systems and Services
- 1999-2001: Channel Islands Marine Sanctuary
- 1997-1999: Pacific Ocean Conservation Network

### Non-Profit Organization (NGO) Board:

- 2002-2009: Oceanic Society, San Francisco

### Professional and Community Service:

- 2002-2003: Vice-Chair, Chair, Theoretical Ecology Section, Ecological Society of America
- 2002-2003: San Francisco Committee on Parks, Recreation, and Open Space

#### Postdoctoral Students (Primary Advisor)

Dr. Joan Herbers	1978-1979	Dr. David King	1979-1981
Dr. Yoh Iwasa	1981-1983	Dr. Elizabeth Denley	1982-1984
Dr. Steven Gaines	1982-1987	Dr. Stephen Brown	1984-1986
Dr. Sheryl Horowitz	1985-1986	Dr. Hugh Possingham	1987-1988
Dr. Terrence Farrell	1987-1989	Dr. Lloyd Goldwasser	1988-1990
Dr. Douglas Stoner	1989-1991	Dr. Timothy Pennington	1989-1991
Dr. Yehoshua Shkedy	1992-1995	Dr. Jef Huisman	1997-1998
Dr. Erol Akçay	2008-2009		

#### Ph.D. Students (Primary Advisor)

Dr. Ronald Yoshiyama	1972-1977	Dr. David Heckel	1975-1980
Dr. Stephen Pacala	1978-1982	Dr. John D. Rummel	1979-1984
Dr. Kenneth Naganuma	1982-1989	Dr. Sally Blower	1982-1987
Dr. John McLaughlin	1984-1990	Dr. Kristina Miller	1987-1992
Dr. Susan Alexander	1988-1993	Dr. Roman Dial	1988-1992
Dr. Brian Grantham	1991-1997	Dr. Sharoni Shafir	1991-1995
Dr. Eric Bjorkstedt	1992-1997	Dr. Sean Connolly	1994-1998
Dr. Henrique Pereira	1997-2002	Dr. Paul Armsworth	1999-2003
Dr. Lauren Buckley	2001-2005	Dr. Erol Akçay	2004-2008
Dr. Priya Iyer	2005-2009	Dr. Henri Folse	2006-2011

#### Books

1. 2015, Roughgarden, J., *Ram-2050: A Ramayana Epic for the Future*. Kauai Institute. Kapaa HI. (Fiction)
2. 2009, Roughgarden, J., *The Genial Gene: Deconstructing Darwinian Selfishness*. University of California Press. Berkeley CA. French translation, 2012, published by Le Seuil, Paris.
3. 2006, Roughgarden, J., *Evolution and Christian Faith: Reflections of an Evolutionary Biologist*. Island Press. Washington DC.
4. 2004, Roughgarden, J., *Evolution's Rainbow: Diversity, Gender, and Sexuality in Nature and People*. University of California Press. Berkeley CA. Awarded 2005 Stonewall Prize for nonfiction from American Library Association. Portuguese translation, 2005, published by editoria Planta, Brazil. Korean translation, 2010, published by Puriwa Ipari Publishing Co., Seoul, Korea. Tenth Anniversary Edition, 2014, University of California Press, Berkeley CA.
5. 1998, Roughgarden, J., *Primer of Ecological Theory*. Prentice Hall, Upper Saddle River, New Jersey.
6. 1995, Roughgarden, J., *Anolis Lizards of the Caribbean: Ecology, Evolution, and Plate Tectonics*. Oxford University Press, Oxford UK.

7. 1989, Roughgarden, J., R. May, and S. Levin, Eds., *Perspectives in Ecological Theory*. Princeton University Press, Princeton, New Jersey.
8. 1987, Ehrlich, P., and J. Roughgarden, *The Science of Ecology*. Macmillan Publishing Company, New York, New York.
9. 1979, Roughgarden, J., *Theory of Population Genetics and Evolutionary Ecology: An Introduction*. Macmillan Publishing Company, New York. (Reprinted 1987 by Macmillan, and in 1996 by Prentice Hall).

#### Selected Articles

1. 2020, Roughgarden, J., Holobiont evolution: Population genetic theory for the hologenome. *BioRxiv* doi: <https://doi.org/10.1101/2020.04.10.036350>
2. 2020, Roughgarden, J., Holobiont evolution: Mathematical model with vertical vs. horizontal microbiome transmission. *Philos Theor Pract Biol* 12:2 doi:10.3998/ptpbio.16039257.0012.002
3. 2018, Roughgarden, J., Scott F. Gilbert, Eugene Rosenberg, Ilana Zilber-Rosenberg and Elisabeth A. Lloyd, Holobionts as units of selection and a model of their population dynamics and evolution. *Biological Theory* 13(1):44-65 (<https://doi.org/10.1007/s13752-017-0287-1>)
4. 2017, Roughgarden, J. Model of holobiont population dynamics and evolution: A preliminary sketch. Pp 325-350 in: Snait Gissis, Ehud Lamm, and Ayelet Shavit (eds.) *Landscapes of Collectivity in the Life Sciences*, Vienna Series in Theoretical Biology, The MIT Press.
5. 2017, Roughgarden, J. Incentivizing biological cooperation: Direct benefits and the economic theory of the firm. Pp. 227-244 in: Snait Gissis, Ehud Lamm, and Ayelet Shavit (eds.) *Landscapes of Collectivity in the Life Sciences*, Vienna Series in Theoretical Biology, The MIT Press.
6. 2017, Roughgarden, J. A theoretician's perspective on collectivity. Pp. 49-52 in: Snait Gissis, Ehud Lamm, and Ayelet Shavit (eds.) *Landscapes of Collectivity in the Life Sciences*, Vienna Series in Theoretical Biology, The MIT Press.
7. 2017, Roughgarden, J. The scientist dreamer: Epilogue. In: Harman, Oren and Michael Dietrich, (eds). *Dreamers, Visionaries, and Revolutionaries in the Life Sciences*. University of Chicago Press. (in press)
8. 2017, Roughgarden, J. The gender binary in nature, across human cultures, and in the Bible. Pp. 413-440 in: Gerhard Schreiber (ed.), *Transsexualität in Theologie und Neurowissenschaften. Ergebnisse, Kontroversen, Perspektiven* (De Gruyter) [In: Gerhard Schreiber (ed.), *Transsexualism in Theology and Neuroscience. Results, Controversies, Perspectives* (De Gruyter)].
9. 2017, Roughgarden, J. Homosexuality and evolution: A critical appraisal. Pp. 495-516 (Chapter 30) in: Tibayrenc, Michel and Francisco Ayala (eds). *On Human Nature: Biology, Psychology, Ethics, Politics, and Religion*, Academic Press, Elsevier, London.

10. 2015, Roughgarden J, Adkins-Regan E, Akçay E, Crawford JC, Gadagkar R, Griffith SC, Hinde CA, Hoquet T, O'Connor C, Prokop ZM, Prum RO, Shafir S, Snow SS, Taylor D, Van Cleve J, Weisberg M. Sexual selection studies: a NESCent catalyst meeting. *PeerJ PrePrints* 3:e680v3 <https://dx.doi.org/10.7287/peerj.preprints.680v3>
11. 2015, Roughgarden, J. Sexual selection: Is anything left? In: Hoquet, T. (Ed) *Current Perspectives on Sexual Selection: What's Left After Darwin?* Springer Verlag. Pp. 85-102.
12. 2014, Roughgarden, J. and Song, Z. Incentives in the family I: The family firm, an evolutionary/economic theory for parent-offspring Relations. Pp. 220-239 in: Narvaez, D., Valentino, K., Fuentes, A., McKenna, J., & Gray, P. (Eds.) *Ancestral Landscapes in Human Evolution: Culture, Childrearing and Social Wellbeing*. New York: Oxford University Press.
13. 2013, Akçay, E., Roughgarden, J., Fearon, J., Ferejohn, A. and B. Weingast. Biological institutions: the political science of animal cooperation. *Social Science Research Network* <http://ssrn.com/abstract=2370952>.
14. 2012, Roughgarden, J. Individual based models in ecology: An evaluation, or how not to ruin a good thing. In: [2012] Philosophy of Science Assoc. 23rd Biennial Mtg (San Diego, CA) <http://philsci-archive.pitt.edu/id/eprint/9434>.
15. 2012. Roughgarden J. A principal-agent theory of courtship feeding, nuptial gifts and divorce. Preprint available at [http://www.economics.hawaii.edu/research/abstracts/oct26\\_12roughgarden.pdf](http://www.economics.hawaii.edu/research/abstracts/oct26_12roughgarden.pdf)
16. 2012, Roughgarden, J. The social selection alternative to sexual selection. *Phil. Trans. Roy. Soc. B.* 367:2294-2303.
17. 2012, Roughgarden, J. Teamwork, pleasure and bargaining in animal social behaviour *J. Evol. Biol.* 25:1454-1462, doi: 10.1111/j.1420-9101.2012.02505.x
18. 2012, Folse III, H. and Roughgarden. J. Direct benefits of genetic mosaicism and intraorganismal selection: Modeling coevolution between a long-lived tree and a short-lived herbivore. *Evolution* 66-4: 1091-1113.
19. 2011, Roughgarden, J and Iyer, P. Contact, not conflict causes the evolution of anisogamy. pp 96-110, In: *The Evolution of Anisogamy: A Fundamental Phenomenon Underlying Sexual Selection*. Togashi, T. and Cox, P. (eds.) Cambridge University Press, Cambridge.
20. 2011, Akçay, E., and Roughgarden, J. The evolution of payoff matrices: providing incentives to cooperate. *Proc. R. Soc. B* 278:2198-2206, DOI: 10.1098/rspb.2010.2105.
21. 2011, Armsworth, P.R., Block, B., Eagle, J., and Roughgarden, J. The role of discounting and dynamics in determining the economic efficiency of time-area closures. *Theoretical Ecology* 4:513-526, DOI 10.1007/s12080-010-0093-x published online October 2010.
22. 2011, Milam, E., Millstein, R., Potochnik, A., and Roughgarden. J. Sex and sensibility: the role of social selection. Book Symposium. *Metascience* 20:253-277. DOI 10.1007/s11016-010-9464-6

23. 2010, Folse III, H. and Roughgarden, J. What is an individual organism? A multilevel selection perspective. *Quart. Rev. Biol.* 85:447-472.
24. 2010, Roughgarden, J. The responsibility of theology to science. *Tikkun* Nov/Dec: 37-39.
25. 2010, Jung, P. and J. Roughgarden. Gender in heaven: The story of the Ethiopian eunuch in light of evolutionary biology. Pp. 224-240. In: Jung, P. and Vigen, A. (eds.) *God, Science, Sex, Gender*. University of Illinois Press, Urbana, Illinois.
26. 2010, Roughgarden, J. Evolutionary biology and sexual diversity. Pp. 89-104. In: Jung, P. and Vigen, A. (eds.) *God, Science, Sex, Gender*. University of Illinois Press, Urbana, Illinois.
27. 2010, Armsworth, P.R., Block, B.A., Eagle, J. and Roughgarden, J. The economic efficiency of a time-area closure to protect spawning bluefin tuna. *Journal of Applied Ecology*, 47:36-46.
28. 2010, Roughgarden, J. and Akçay, E. Final response: sexual selection needs an alternative. *Animal Behaviour*. 79(3):e18-e23.
29. 2010, Roughgarden, J. and Akçay, E. Do we need a Sexual Selection 2.0? *Animal Behaviour* 79(3):e1-e4.
30. 2009, Akçay, E. and J. Roughgarden. The perfect family: Decision making in biparental care. *PloS ONE* 4:e7345 1-10.
31. 2009, Akçay, E., Van Cleve, J., Feldman, M. W. and Roughgarden, J. A theory for the evolution of other-regard integrating proximate and ultimate perspectives. *Proc. Natl. Acad. Sci. USA* 106:19061-6.
32. 2009, Roughgarden, J. Is there a general theory of community ecology? *Biology and Philosophy* 24:521-529.
33. 2009, Iyer, P. and J. Roughgarden. Alternation of haploid and diploid generations: Evolution by gamete amplification. *Evolutionary Ecology Research* 11:57-77.
34. 2008, Iyer, P. and J. Roughgarden. Dioecy as a specialization promoting sperm delivery. *Evolutionary Ecology Research* 10:867-892.
35. 2008, Iyer, P. and J. Roughgarden. Gametic conflict versus contact in the evolution of anisogamy. *Theoretical Population Biology* 73:461-472.
36. 2008, Roughgarden, J. Social selection vs. sexual selection: Comparison of hypotheses. In: Daniel Lee Kleinman, Karen Cloud-Hansen, Christina Matta, and Jo Handelsman, eds. *Controversies in Science and Technology Volume II: From Climate to Chromosomes*. New Rochelle, NY: Mary Ann Liebert, Inc. pp. 421-463.
37. 2008, Armsworth P. and J. Roughgarden. The structure of clines with fitness dependent dispersal *American Naturalist* 172:648-657.
38. 2007, Akçay, E. and J. Roughgarden. Extra-pair parentage: a new theory based on

- transactions in a cooperative game. *Evolutionary Ecology Research*. 9:1223-1243.
39. 2007, Akçay, E, and J. Roughgarden. Extra-pair paternity in birds: Review of the genetic benefits. *Evolutionary Ecology Research*. 9:855-868.
  40. 2007, Akçay, E., and J. Roughgarden. Negotiation of mutualism: *Rhizobia* and legumes. *Proc. Royal Society B*. 274:25-32.
  41. 2007, Roughgarden J. Challenging Darwin's theory of sexual selection. *Daedalus*. 136(2):1-14
  42. 2006, Akçay, E. and J. Roughgarden. Neither should competition be assumed. *Trends in Ecology and Evolution*. 22:4
  43. 2006, Roughgarden J., M. Oishi, and E. Akçay. Reproductive social behavior: Cooperative games to replace sexual selection. *Science*. 311:965-969.
  44. 2006, Roughgarden J. Foreward. In: J. Kritzer and P. Sale (eds.), *Marine Metapopulations*. Elsevier, Burlington, MA. Pp. xvii--xx
  45. 2006, Buckley, L. and J. Roughgarden. Climate, competition, and the coexistence of island lizards. *Functional Ecology* 20:315-322.
  46. 2006, Buckley, L. and J. Roughgarden. A hump-shaped density-area relationship for island lizards. *Oikos* 113:243-250.
  47. 2005, Roughgarden. J. The myth of sexual selection. *California Wild* 53(3):18-23
  48. 2005, Buckley, L. and J. Roughgarden. Lizard habitat partitioning on islands: the interaction of local and landscape scales. *Journal of Biogeography* 32(12):2113-2121.
  49. 2005, Buckley, L. and J. Roughgarden. Effect of species interactions on landscape abundance patterns. *Journal of Animal Ecology* 74:1182-1194.
  50. 2005, Armsworth, P. and J. Roughgarden. Disturbance induces the contrasting evolution of reinforcement and dispersiveness in directed and random movers. *Evolution* 59(10):2083-2096.
  51. 2005, Armsworth, P. and J. Roughgarden. The impact of directed versus random movement on population dynamics and biodiversity patterns. *American Naturalist* 165:449-465.
  52. 2004, Pereira, H., G. Daily, and J. Roughgarden. A framework for assessing the relative vulnerability of species to land-use change. *Ecological Applications*. 14(3):730-742.
  53. 2004, Dial, R. and J. Roughgarden. Physical transport, heterogeneity, and interactions involving canopy anoles. In: Lowman, M. and H. B. Rinker. (eds.) *Forest Canopies*. Elsevier. Amsterdam. Pp. 270-296.
  54. 2004, Roughgarden, J. The in-crowd. *New Scientist* 181:36-39.

55. 2004, Roughgarden, J. Evolution and the embodiment of gender. *GLQ: A Journal of Lesbian and Gay Studies*. 10:287-291.
56. 2004, Gerber, L., O. Reichman, and J. Roughgarden. Food hoarding: Future value in optimal foraging decisions. *Ecological Modelling*. 175:77-85.
57. 2003, Hughes, T., A. Baird, D. Bellwood, M. Card, S. Connolly, C. Folke, R. Grosberg, O. Hoegh-Guldberg, J. Jackson, J. Kleypas, J. Lough, P. Marshall, M. Nyström, S. Palumbi, J. Pandolfi, B. Rosen, and J. Roughgarden. Climate change, human impacts, and the resilience of coral reefs. *Science* 301:929-933.
58. 2003, Armsworth, P. and J. Roughgarden. The economic value of ecological stability. *Proc. Nat. Acad. (USA)* 100:7147-7151.
59. 2003, Pereira, H., A. Bergman, and J. Roughgarden. Socially stable territories: The negotiation of space by interacting foragers. *American Naturalist* 161:143-152.
60. 2002, Bjorkstedt, E., L. Rosenfeld, B. Grantham, Y. Shkedy, and J. Roughgarden. Distributions of larval rockfish (*Sebastes* spp.) across nearshore fronts in a coastal upwelling region. *Marine Ecology Progress Series* 242:215-228.
61. 2002, Balmford, A., A. Bruner, P. Cooper, R. Costanza, S. Farber, R. Green, M. Jenkins, P. Jefferiss, V. Jessamy, J. Madden, K. Munro, N. Myers, S. Naeem, J. Paavola, M. Rayment, S. Rosendo, J. Roughgarden, K. Trumper, and K. Turner. Economic reasons for conserving wild nature. *Science* 297:950-953.
62. 2002, Pereira, H., S. Loarie, and J. Roughgarden. Monogamy, polygyny and interspecific interactions in the lizards *Anolis gingivinus* and *Anolis pogus*. *Caribbean Journal of Science*, 38:8-12.
63. 2002, Bascompte, J. H. Possingham, and J. Roughgarden. Patchy populations in stochastic environments: Critical number of patches for persistence. *American Naturalist* 159:128-137.
64. 2001, Connolly, S., B. A. Menge and J. Roughgarden. A latitudinal gradient in recruitment of intertidal invertebrates in the Northeast Pacific Ocean. *Ecology*, 82:1799-1813.
65. 2001, Roughgarden, J. and P. Armsworth. Managing ecosystem services. In: Press, M. N. Huntly, and S. Levin, (eds.) *Ecology: Achievement and Challenge*, Blackwell Science, pp. 337-356.
66. 2001, P. Armsworth and J. Roughgarden. An invitation to ecological economics, *Trends in Ecology and Evolution* 16:229-234.
67. 2001, Roughgarden, J. Guide to diplomatic relations with economists. *Bull. Ecol. Soc. America* 82:85-88.
68. 2000, Hughes, J. and J. Roughgarden. Species diversity and biomass stability. *American Naturalist*, 155:618-627.
69. 2000, Boggs, C. and J. Roughgarden. Biodiversity: result of speciation and extinction.



70. 2000, Boggs, C. and J. Roughgarden. Evolution: adaptation and environmental change. Chapter 18 in G. Ernst, ed., *Earth Systems: Processes and Issues*, Cambridge University Press. Pp. 267-277.
71. 1999, Connolly, S. and J. Roughgarden. Theory of marine communities: competition, predation and recruitment-dependent interaction strength. *Ecological Monographs*, 69:277-296.
72. 1999, Connolly, S. and J. Roughgarden. Increased recruitment of northeast Pacific barnacles during the 1997 El Niño. *Limnol. Oceanogr.* 44:466-469.
73. 1999, S. Murray, R. F. Ambrose, J. A. Bohnsack, L. W. Botsford, M. H. Carr, G. E. Davis, P. K. Dayton, D. Gotshall, D. R. Gunderson, M. A. Hixon, J. Lubchenco, M. Mangel, A. MacCall, D. A. McArdle, J. C. Ogden, J. Roughgarden, R. M. Starr, M. J. Tegner, and M. M. Yoklavich. No-take reserve networks: sustaining fishery populations and marine ecosystems. *Fisheries* Nov. 1999 pp. 11-25.
74. 1998, Connolly, S. and J. Roughgarden. A range extension for the volcano barnacle, *Tetraclita rubescens*. *California Fish and Game* 84:182-183.
75. 1998, Hughes, J. and J. Roughgarden. Aggregate community properties and the strength of species' interactions. *Proc. Nat. Acad. Sci. (USA)*, 95:6837-6842.
76. 1998, Dial, R., and J. Roughgarden. Theory of marine communities: the intermediate disturbance hypothesis, *Ecology* 79:1412-1424.
77. 1998, Shafir, S. and J. Roughgarden. Testing predictions of foraging theory for a sit-and-wait forager, *Anolis gingivinus*. *Behavioral Ecology* 9:74-84.
78. 1998, Connolly, S. and J. Roughgarden, A latitudinal gradient in northeast Pacific intertidal community structure: evidence for an oceanographically based synthesis of marine community theory. *American Naturalist*, 151:311-326.
79. 1998, Roughgarden, J., How to manage fisheries. *Ecological Applications*, 8(1):S160-S164.
80. 1998, Roughgarden, J., Production functions from ecological populations: a survey with emphasis on spatially explicit models. In: Tilman, D. and P. Kareiva, (eds.) *Spatial Ecology: The Role of Space in Population Dynamics and Interspecific Interactions*, Princeton University Press, pp. 296-317.
81. 1997, Shkedy, Y., and J. Roughgarden, Barnacle recruitment and population dynamics predicted from coastal upwelling. *Oikos* 80(3): 487-498.
82. 1997, Bjorkstedt E., and J. Roughgarden, Larval transport and coastal upwelling: an application of HF radar in ecological research. *Oceanography* 10(2): 64-67.
83. 1997, Brown, G. and J. Roughgarden, A metapopulation model with private property and a

common pool. *Ecological Economics*, 22:65-71.

84. 1997, Goldwasser, L. and J. Roughgarden, Sampling effects and the estimation of food web properties. *Ecology*, 78:41-54.
85. 1996, Dial, R., and J. Roughgarden, Natural history observations of *Anolisomyia rufianalis* (Diptera: Sarcophagidae) infesting *Anolis* lizards in a rain forest canopy. *Environ. Entomol.* 25:13:25-1328.
86. 1996, Alexander, S.E. and J. Roughgarden, Larval transport and population dynamic of intertidal barnacles: a coupled benthic/oceanic model. *Ecological Monographs*, 66:259-275.
87. 1996, Roughgarden, J. and F. Smith, Why fisheries collapse and what to do about it. *Proc. Nat. Acad. Sci.*, (USA), 93:5078-5083
88. 1996, Shafir, S. and J. Roughgarden, The effect of memory length on the individual fitness of a lizard. In Belew, R.K. and M. Mitchell (Eds.), *Adaptive Individuals in Evolving Populations: Models and Algorithms*, Santa Fe Institute Studies in the Science of Complexity, Addison Wesley, Reading, MA., pp. 173-182.
89. 1996, Roughgarden, J., A. Bergman, S. Shafir and C. Taylor, Adaptive computation in ecology and evolution: a guide for future research. In Belew, R.K. and M. Mitchell (Eds.), *Adaptive Individuals in Evolving Populations: Models and Algorithms*, Santa Fe Institute Studies in the Science of Complexity, Addison Wesley, Reading, MA., pp. 25-32.
90. 1996, Roughgarden, J., Ecology. In: Stephen H. Schneider (ed) *Encyclopedia of Climate and Weather*. (1st Ed.) Pp. 268-269.
91. 1995, Rosenfeld, L., T. Anderson, G. Hatcher, J. Roughgarden, and Y. Shkedy, Upwelling fronts and barnacle recruitment in central California. *Technical Report 95-19*, Monterey Bay Aquarium Research Institute. Moss Landing, CA
92. 1995, Roughgarden, J., Can economics protect biodiversity? Pp. 149-156 in: T. Swanson, Ed., *The Economics and Ecology of Biodiversity Decline*. Cambridge University Press.
93. 1995, Holling, C.S., D.W. Schindler, B.W. Walker and J. Roughgarden, Biodiversity in the functioning of ecosystems: an ecological synthesis. In Perings, C., C.G. Maler, C. Folke, C.S. Holling, and B.O. Jansson (Eds.), *Biodiversity Loss: Economic and Ecological Issues*, Cambridge, Cambridge University Press, pp. 44-83.
94. 1995, Brown, G. and J. Roughgarden, An ecological economy: notes on harvest and growth. In Perrings, C., K.G. Maler, C. Folke, C.S. Holling and B.O. Jansson (Eds.), *Biodiversity Loss: Ecological and Economic Issues*, Cambridge, Cambridge University Press, pp. 150-189. (Reprinted in: J. Barkley Rosser, Jr., 2004. *Complexity in Economics*, Volume III. The International Library of Critical Writings in Economics 174. Edward Elgar, Cheltenham, UK, pp. 383-423.)
95. 1995, Roughgarden, J., Vertebrate patterns on islands. In Vitousek, P.M., L.L. Loope, and H. Andersen (Eds.), *Islands: Biological Diversity and Ecosystem Function*, Springer, Germany, pp. 51-56.

96. 1995, Dial, R., and J. Roughgarden, Experimental removal of insectivores from rain forest canopy: direct and indirect effects. *Ecology*, 76 (6) pp. 1821-1834.
97. 1994, Shafir, S., and J. Roughgarden, The effect of memory length on the foraging behavior of a lizard. In Cliff, D., P. Husbands, J.A. Meyer, and S.W. Wilson (Eds.), *From Animals to Animats 3: Proceedings of the Third International Conference on Simulation of Adaptive Behavior*; MIT Press, Cambridge, MA. pp. 221-225.
98. 1994, Shafir, S., and J. Roughgarden, Instrumental discrimination conditioning of *Anolis cristatellus* in the field with food as a reward. *Caribbean Journal of Science*, 30 (3-4): 228-233.
99. 1994, Dial, R. and J. Roughgarden, Notes on the absolute abundance of canopy anoles: *Anolis cuvieri*, *Anolis stratulus*, and *Anolis evermanni* (Lacertilia: polychridea) in the Luquillo Forest, Puerto Rico. *Caribbean Journal of Science*, 30 (3-4): 278-279.
100. 1993, Fernandez, D., C. Teague, J. Vesecky, and J. Roughgarden, Upwelling and relaxation events inferred from high-frequency radar measurements of coastal surface currents. *Proceedings of the IGARSS '93 Conference -- IEEE International Geoscience and Remote Sensing Symposium*, 4:1931-1933.
101. 1993, Miller, K., and J. Roughgarden, Descriptions of the larvae of *Tetraclita rubescens* and *Megabalanus californicus* with a comparison of the common barnacle larvae of the central California coast. *Journal of Crustacean Biology*, pp. 579-600.
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