

## Marino Gatto

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Marino Gatto, born in 1949, graduated in Electronic Engineering in 1972, is **Professor Emeritus of Ecology**, School of Civil, Environmental and Land Use Engineering, Politecnico di Milano. His cultural background is engineering and mathematical modelling and his research has entirely focussed on ecology and the management of renewable resources since 1974.

The turning point of his career occurred in 1974 when he became a research fellow in the Ecology Group of IIASA (International Institute for Applied Systems Analysis), Laxenburg, Austria. In 1976 he joined the Institute of Animal Resource Ecology, University of British Columbia, Vancouver, Canada, for about one year to specialize in applied ecology.

### *Professional Appointments*

1978: Assistant Professor of System Theory, University of Naples

1978-1982: Assistant Professor of Optimal Control, Politecnico di Milano and University of Pavia

1983-1987: Associate Professor of Applied Ecology, Politecnico di Milano

1987 - 2020: Professor of Ecology, Politecnico di Milano

1987: visiting Professor, University of Vienna, Austria

1997-2001 and 2006-2007: visiting Professor, Département de biologie , École Normale Supérieure, Paris, France

2011: visiting Professor, Laboratoire de Ecohydrologie, École Polytechnique Fédérale de Lausanne

1991-1999: chair of the Program in Environmental and Land Use Engineering, Politecnico di Milano

1999-2002: vicepresident of the Società Italiana di Ecologia (Italian Society of Ecology).

2003-2006: president of the Società Italiana di Ecologia.

2007-2010: member of the Academic Senate of the Politecnico di Milano

2009-2013: member of the executive board of the Laboratory on Energy and Environment (LEAP-Politecnico di Milano)

2013-2021: member of the scientific committee of the Laboratory on Energy and Environment (LEAP-Politecnico di Milano)

2013-2020: member of the council of CoNISMa, the interuniversity national consortium for marine sciences

2013-2018: vice-dean of the School of Civil, Environmental and Land Use Engineering, Politecnico di Milano.

2017-2020: member of the executive board of the Fondazione CMCC (Centro EuroMediterraneo sui Cambiamenti Climatici)

### *Recent teaching activity*

He is currently teaching the course *Ecosystems Conservation and Management*, Graduate Program in Environmental and Land Use Engineering, Politecnico di Milano; he has been recently teaching

the module *General Ecology*, part of the course *Urban and Landscape Regeneration Studio*, Graduate Program in Sustainable Architecture and Landscape Design, Politecnico di Milano.

#### *Professional Affiliations*

Società Italiana di Ecologia  
American Society of Naturalists

#### *Awards, Honors, National And International Service*

1989: NATO Visiting fellow, State University of New York at Stony Brook, Department of Ecology and Evolution  
1997: short-term visiting scholar, Department of Ecology and Evolution, Princeton University  
1993-2014: associate editor, Theoretical Population Biology  
1997-2011: editor, Ecology and Society (formerly Conservation Ecology)  
2012-2022: editor, Advances in Water Resources  
1997: Anassilaos award for environmental sciences  
2002: Focus award for his studies on energy and the environment  
2003-present: member of the scientific committee, WWF Italy  
2007: elected to the Istituto Lombardo, Accademia di Scienze e Lettere  
2008: elected to the Istituto Veneto di Scienze, Lettere ed Arti  
2015: winner of the Orange Big Data Challenge in the category Health for modelling schistosomiasis in Senegal  
2016: nominated Fellow of the Alta Scuola Politecnica  
2022: nominated honorary member of Società Italiana di Ecologia

#### *Current research activity*

Gatto's main research activity is in the field of ecological modelling and management of biological resources. In the past 10 years he has focused mainly on the following topics

- Disease and parasite ecology
- Management of marine biological resources
- Alien species dynamics
- Impacts of climate change on biodiversity and ecosystems

A good deal of the activity has been conducted in cooperation with other Italian and foreign institutions: University of Parma, Dept. of Environmental Sciences (Italy); École Polytechnique Fédérale de Lausanne, Laboratoire de écohydrologie, ENAC (Switzerland); Princeton University, Dept. of Ecology and Evolutionary Biology and Dept. of Civil and Environmental Engineering, Princeton (USA); Station Biologique de la Tour du Valat (France); Hebrew University of Jerusalem, Department of Evolution, Systematics and Ecology, Jerusalem (Israel); Stanford University, Hopkins Marine Station, Pacific Grove (USA); Pennsylvania State University, Biology Department (USA); Texas A&M University, Dept. of Ocean Engineering (USA).

M. Gatto has authored or coauthored more than 250 articles, books and book chapters. About 150 have appeared in peer-reviewed journals including Nature, Proceedings of the National Academy of Sciences USA, Nature Communications, Proceedings of the Royal Society, Journal of the Royal Society-Interface, BioScience, The American Naturalist, Ecological Applications, Ecology Letters, Water Resources Research, Geophysical Research Letters, Canadian Journal of Fisheries and Aquatic Sciences, Environmental Toxicology and Chemistry, Journal of theoretical Biology, Ecohydrology.

The complete publication list is available at  
<https://gatto.faculty.polimi.it/PublicationList.pdf>

## Selected publications of the past 10 years

### Monographs

- A. Rinaldo, M. Gatto, I. Rodriguez-Iturbe *River networks as ecological corridors: species, populations, pathogens* Cambridge University Press, New York, NY, 2020.
- M. Gatto, R. Casagrandi *Ecosystem conservation and management: models and application* Springer, Switzerland, 2022.

### Disease ecology

- Vanalli C., Mari L., Casagrandi R., Gatto M., Cattadori I. “Helminth ecological requirements shape the impact of climate change on the hazard of infection”, *Ecology Letters*, 2024; 27:e14386. <https://doi.org/10.1111/ele.14386> .
- Vanalli C., Mari L., Casagrandi R., Boag B., Gatto M., Cattadori I. “Modeling the contribution of antibody attack rates to single and dual helminth infections in a natural system”, *Mathematical Biosciences*, 2023, 360:109010. doi:10.1016/j.mbs.2023.109010 .
- Trevisin C., Bertuzzo E., Pasetto D., Mari L., Miccoli S., Casagrandi R., Gatto M., Rinaldo A. “Spatially explicit effective reproduction numbers from incidence and mobility data”, *Proceedings of the National Academy of Sciences*, 2023, 120 (20): e2219816120.
- Bevacqua D., Vanalli C., Casagrandi R., Gatto M. “A climate-driven compartmental model for fungal diseases in fruit orchards: The impacts of climate change on a brown rot-peach system” *Agricultural and Forest Meteorology*, 2023, 332 (2023) 109293
- Dagostin F., Vanalli C. , Boag B., Casagrandi R., Gatto M., Mari L., Cattadori, I. “The enemy of my enemy is my friend: immune-mediated facilitation contributes to fitness of co-infecting helminths” *Journal of Animal Ecology*, 2023, 92: 477-491.
- C. Trevisin, J. C. Lemaître, L. Mari, D. Pasetto, M. Gatto, A. Rinaldo “Epidemicity of cholera spread and the fate of infection control measures” *Journal of the Royal Society Interface*, 19: 20210844 (2022) <https://doi.org/10.1098/rsif.2021.0844>.
- C. Vanalli, L. Mari, L. Righetto, R. Casagrandi, M. Gatto, I. M. Cattadori “Within-host mechanisms of immune regulation explain the contrasting dynamics of two helminth species in both single and dual infections”, *PLOS Computational Biology*, 2020, 16(11): e1008438. <https://doi.org/10.1371/journal.pcbi.1008438>.
- L. Mari, R. Casagrandi, E. Bertuzzo, D. Pasetto, S. Miccoli, A. Rinaldo, M. Gatto "The epidemicity index of recurrent SARS-CoV-2 infections" *Nature Communications*, 12:2752 (2021) <https://doi.org/10.1038/s41467-021-22878>.
- E. Bertuzzo, L. Mari, D. Pasetto, S. Miccoli, R. Casagrandi, M. Gatto, A. Rinaldo “The geography of COVID-19 spread in Italy and implications for the relaxation of confinement measures” *Nature Communications*, 11, 4264 (2020). <https://doi.org/10.1038/s41467-020-18050-2>
- M. Gatto, E. Bertuzzo, L. Mari, S. Miccoli, L. Carraro, R. Casagrandi, A. Rinaldo “Spread and dynamics of the COVID-19 epidemic in Italy: Effects of emergency containment measures”, *Proceedings of the National Academy of Sciences*, 2020, 117 (19) 10484-10491. [www.pnas.org/cgi/doi/10.1073/pnas.2004978117](http://www.pnas.org/cgi/doi/10.1073/pnas.2004978117)
- Hoover, C. M., Sokolow, S.H., Kemp, J., Sanchirico, J. N., Lund, A. J., Jones, I. J., Higginson, T., Riveau, G., Savaya, A., Coyle, S., Wood, C. L., Micheli, F., Casagrandi, R., Mari, L., Gatto, M., Rinaldo, A., Perez-Saez, J., Rohr, J. R., Sagi, A., Remais, J. V., De Leo, G. A. “Modelled effects of prawn aquaculture on poverty alleviation and schistosomiasis control”, *Nature Sustainability*, 2019, 2 (7): 611-620, DOI 10.1038/s41893-019-0301-7
- L. Mari, R. Casagrandi, E. Bertuzzo, A. Rinaldo, M. Gatto “Conditions for transient epidemics of waterborne disease in spatially explicit systems”, *Royal Society Open Science*, 2019, 6:181517.
- A. Rinaldo, E. Bertuzzo, M. Blokesch, L. Mari, M. Gatto “Modeling key drivers of cholera transmission dynamics provides new perspectives on parasitology”, *Trends in Parasitology*,

2017, 33 (8): 587-599, <http://dx.doi.org/10.1016/j.pt.2017.04.002>

- L. Mari, M. Gatto, M. Ciddio, E. D. Dia, S. H. Sokolow, G. De Leo, R. Casagrandi "Big-data-driven modeling unveils country-wide drivers of endemic schistosomiasis", *Scientific Reports*, 7:489, 2017, doi: 10.1038/s41598-017-00493-1
- A. Rinaldo, E. Bertuzzo, L. Mari, L. Righetto, M. Blokesch, M. Gatto, R. Casagrandi, M. Murray, S. Vesenbeckh, I. Rodriguez-Iturbe "Reassessment of the 2010-2011 Haiti cholera outbreak and rainfall-driven multiseason projections" *Proceedings of the National Academy of Sciences*, 2012, 109 (17) 6602-6607, doi:10.1073/pnas.1203333109
- M. Gatto, L. Mari, E. Bertuzzo, R. Casagrandi, L. Righetto, I. Rodriguez-Iturbe, A. Rinaldo "Spatially explicit conditions for waterborne pathogen invasion" *The American Naturalist*, 2013, 182:328-346, DOI: 10.1086/671258
- M. Gatto, L. Mari, E. Bertuzzo, R. Casagrandi, L. Righetto, I. Rodriguez-Iturbe, A. Rinaldo "Generalized reproduction numbers and the prediction of patterns in waterborne disease", *Proceedings of the National Academy of Sciences*, 2012, 109: 19703-19708, doi:10.1073/pnas.1217567109

#### *Management of renewable marine resources*

- L. Mari, P. Melià, M. Gatto, R. Casagrandi "Identification of ecological hotspots for the seagrass *Posidonia oceanica* via metapopulation modeling" *Frontiers in Marine Science*, 8:628976 (2021). doi: 10.3389/fmars.2021.628976.
- B. Mokrane, A. Di Franco, A. Calò, L. Mari, J. Claudet, R. Casagrandi, M. Gatto, J. Lloret, C. Sève, P. Guidetti, P. Melià "Extending full protection inside existing marine protected areas or reducing fishing effort outside can reconcile conservation and fisheries goals", *Journal of Applied Ecology*, 2020, 57: 1948-1957. DOI: 10.1111/1365-2664.13688
- P. Melià, R. Casagrandi, A. Di Franco, P. Guidetti, M. Gatto "Protection reveals density-dependent dynamics in fish populations: a case study in the central Mediterranean", *PLoS ONE*, 2020, 15(2):e0228604, <https://doi.org/10.1371/journal.pone.0228604>
- D. Bevacqua, P. Melià, M. Schiavina, A. J. Crivelli, G. A. De Leo, M. Gatto "A demographic model for the conservation and management of the European eel: an application to a Mediterranean coastal lagoon", *ICES Journal of Marine Science*, 2019, fsz118, <https://doi.org/10.1093/icesjms/fsz118>
- P. Melià, M. Schiavina, M. Rossetto, M. Gatto, S. Frascchetti, R. Casagrandi "Looking for hotspots of marine metacommunity connectivity: a methodological framework" *Scientific Reports*, 6, Article number: 23705 (2016), doi:10.1038/srep23705
- D. Bevacqua, P. Melià, M. Gatto, G. De Leo "A global viability assessment of the European eel" *Global Change Biology*, 2015, doi: 10.1111/gcb.12972
- P. Melià, M. Schiavina, M. Gatto, L. Bonaventura, S. Masina, R. Casagrandi "Integrating field data into individual-based models for the migration of European eel larvae" *Marine Ecology Progress Series*, 2013, 487:135-149, doi: 10.3354/meps10368.
- D. Bevacqua, P. Melià, G. A. De Leo, M. Gatto " Intra-specific scaling of natural mortality in fish: the paradigmatic case of the European eel" *Oecologia*, 2011, 165(2):333-9, DOI 10.1007/s00442-010-1727-9

#### *Network and metapopulation ecology with focus on river networks*

- A. Rinaldo, M. Gatto, I. Rodriguez-Iturbe "River networks as ecological corridors: a coherent ecohydrological perspective" *Advances in Water Resources*, 2018, 112:27-58.
- L. Carraro, L. Mari, M. Gatto, A. Rinaldo, E. Bertuzzo "Spread of proliferative kidney disease in fish along stream networks: a spatial metacommunity framework", *Freshwater Biology*, 2018; 63 (1):114-127, DOI: 10.1111/fwb.12939.
- L. Mari, R. Casagrandi, A. Rinaldo, M. Gatto "A generalized definition of reactivity for ecological systems and the problem of transient species dynamics" *Methods in Ecology and Evolution*,

2017, 8: 1574-1584, doi: 10.1111/2041-210X.12805

- L. Carraro, E. Bertuzzo, L. Mari, I. Fontes, H. Hartikainen, N. Strepparava, H. Schmidt-Posthaus, Th. Wahli, J. Jokela, M. Gatto, A. Rinaldo "An integrated field, laboratory and theoretical study of PKD spread in a Swiss prealpine river", *Proceedings of the National Academy of Sciences*, 2017, 114 (45) 11992-11997. <https://doi.org/10.1073/pnas.1713691114>.
- L. Mari, R. Casagrandi, E. Bertuzzo, A. Rinaldo, M. Gatto "Metapopulation persistence and species spread in river networks" *Ecology Letters*, 17 (4):426-434, 2014
- S. Ceola, E. Bertuzzo, L. Mari, G. Botter, I. Hödl, T. J. Battin, M. Gatto, A. Rinaldo " Light and hydrologic variability as drivers of stream biofilm dynamics in a flume experiment" *Ecohydrology*, 2014, 7:391–400, DOI: 10.1002/eco.1357.
- L. Mari, E. Bertuzzo, R. Casagrandi, M. Gatto, S. A. Levin, I. Rodriguez-Iturbe, A. Rinaldo "Hydrologic controls and anthropogenic drivers of the zebra mussel invasion of the Mississippi-Missouri river system" *Water Resources Research*, 2011, 47, W03523, doi:10.1029/2010WR009920