

Giorgio Gosti

Università di Roma, Sapienza
Dipartimento di Fisica, Roma, Italy

Esperienze di Ricerca

Asegno di collaborazione ricerca, Dip. di Fisica, Università degli Studi di Roma “La Sapienza”, dal 2021.
Archiviazione di pattern nelle reti neurali e apprendimento osservazionale.
Supervisors: Prof. Giancarlo Ruocco.

Collaboratore con con qualifica di Postdoc, Istituto Italiano di Tecnologia Center for Life Nano Science, Roma, Italy, 2015 - 2021.
The statistical mechanics of neurons: imaging, networks, and development.

Asegno di collaborazione ricerca, Dip. di Medicina Molecolare, Università degli Studi di Roma “La Sapienza”, 2013 - 2015.
Advanced modeling of social behavior of human stem cells.
Supervisors: Prof. Giorgio Parisi e Dr. Paolo Bianco.

Formazione

PhD (& MA), Institute for Mathematical Behavioral Sciences, University of California, Irvine, 2013.

Tesi: **The evolution of naming conventions on networks.**
Supervisore: Prof. W. H. Batchelder.
Argomenti approfonditi: Game Theory, Collective Problem Solving, Naming Game, Communication Networks.

Dottorato in, **Matematica e Informatica per la Elaborazione e la Rappresentazione dell'Informazione e della Conoscenza**, University of Perugia, Italy, 2011.

Tesi: **Search as emergence of solutions on random distributed systems.**
Supervisore: Prof. S. Bistarelli.
Argomenti approfonditi: Multi-Agent Systems, Constraint Satisfaction Problems, Teoria dei Giochi.

Diploma di Laurea Vecchio Ordinamento in **Fisica Teorica**, Università di Roma, “La Sapienza”, Italia, 2007.

Tesi: **Negotiation dynamics with homonymy.**
Supervisore: Prof. V. Loreto.
Argomenti approfonditi: Naming Game, Communication Networks, Statistical Mechanics.

Pubblicazioni

Matteo Paoluzzi, Luca Angelani, Giorgio Gosti, M. Cristina Marchetti, Ignacio Pagonabarraga, Giancarlo Ruocco: **Alignment interactions drive structural transitions in biological tissues.** arXiv:2107.00523, 2021.

Mattia Miotto, Lorenzo Di Rienzo, Giorgio Gosti, Leonardo Bo, Giacomo Parisi, Roberta Piacentini, Alberto Boffi, Giancarlo Ruocco, Edoardo Milanetti: **Inferring the stabilization effects of SARS-CoV-2 variants on the binding with ACE2 receptor**. bioRxiv, 2021.04.18.440345, 2021.

Giovanna Peruzzi, Mattia Miotto, Roberta Maggio, Giancarlo Ruocco, Giorgio Gosti: **Asymmetric binomial statistics explains organelle partitioning variance in cancer cell proliferation**. Communications Physics, 4, 188, 2021.

Mattia Miotto, Lorenzo Di Rienzo, Giorgio Gosti, Edoardo Milanetti, Giancarlo Ruocco: **Does blood type affect the COVID-19 infection pattern?** PLOS ONE 16(5): e0251535, 2021.

Milanetti Edoardo, Miotto Mattia, Di Rienzo Lorenzo, Nagaraj Madhu, Monti Michele, Golbek Thaddeus W., Gosti Giorgio, Roeters Steven J., Weidner Tobias, Otzen Daniel E., Ruocco Giancarlo: **In-Silico evidence for two receptors based strategy of SARS-CoV-2**. Frontiers in Molecular Biosciences, 8: 690655, 2021.

Enrico Lanza, Silvia Di Angelantonio, Giorgio Gosti, Giancarlo Ruocco, Viola Folli: **A recurrent neural network model of *C. elegans* responses to aversive stimuli**. Neurocomputing 430, pp. 1-13, 2021.

Edoardo Milanetti, Mattia Miotto, Lorenzo Di Rienzo, Michele Monti, Giorgio Gosti, Giancarlo Ruocco: **2D Zernike polynomial expansion: Finding the protein-protein binding regions**. Computational and Structural Biotechnology Journal 19, pp. 29-36, 2021.

Marco Leonetti, Viola Folli, Edoardo Milanetti, Giancarlo Ruocco, Giorgio Gosti: **Network dilution and asymmetry in an efficient brain**. Philosophical Magazine, Part B: Condensed Matter Physics, 2020.

Giorgio Gosti, Viola Folli, Marco Leonetti, Giancarlo Ruocco: **Beyond the maximum storage capacity limit in Hopfield recurrent neural networks**. Entropy 21 (8), 726, 2019.

Edoardo Milanetti, Giorgio Gosti, Luca De Flavii, Pier Paolo Olimpieri, Silvia Schwartz, Davide Caprinia, Giancarlo Ruocco, Viola Folli: **Investigation of the binding between olfactory receptors and odorant molecules in *C. elegans* organism**. Biophysical Chemistry, Volume 255, 106264, 2019.

Viola Folli, Giorgio Gosti, Marco Leonetti, Giancarlo Ruocco: **Effect of dilution in asymmetric recurrent neural networks**. Neural Networks, 104, pp. 50-59, 2018.

Giorgio Gosti: **Signaling chains with probe and adjust learning**. Connection Science, 30 (2), pp. 186-210, 2018.

Giorgio Gosti: **The evolution of naming conventions on networks**. PhD Dissertation, University of California, Irvine, 2013.

Stefano Bistarelli, Giorgio Gosti, Francesco Santini: **Solving fuzzy distributed CSPs: An approach with naming games**. Declarative Agent Languages and Technologies X, pp. 116-135, 2013.

Giorgio Gosti: **The evolution of heterogeneous naming conventions**. 2012 AAAI Fall Symposium Series, pp. 17-23, 2012.

Stefano Bistarelli, Giorgio Gosti, and Francesco Santini: **Solving fuzzy DCSPs with naming games**. 23rd IEEE International Conference on Tools with Artificial Intelligence, pp. 930-931, 2011.

Giorgio Gosti, William H. Batchelder: **Naming on a directed graph**. 2011 International Conference on Social Computing, Behavioral-Cultural Modeling, and Prediction (SBP11), pp. 358-365, 2011.

Giorgio Gosti: **Search as emergence of solutions on random distributed systems**. Tesi di dottorato, University of Perugia, 2011.

Stefano Bistarelli, Giorgio Gosti: **Solving distributed CSPs probabilistically**. *Fundamenta Informaticae*. 105 (1-2): pp. 57-78, 2010.

Stefano Bistarelli, Giorgio Gosti: **Solving CSPs with naming games**. *Recent Advances in Constraints 2009*, pp. 16-32, 2009.

Giorgio Gosti: **Resolving CSP with naming games**. *International Conference on Logic Programming 2008 (ICLP 2008)*, pp. 807-808, 2008.

Giorgio Gosti: **The role of homonymy in the naming game**. Undergraduate tesi, Sapienza University, Rome, 2007.

Presentazioni a Convegni e Workshop

Phase transitions in the self-organization of Neural Stem Cells. *Physics of Active Matter: Statphys 2019 Satellite Meeting*, Vina del Mar, Chile, July 17th, 2019.

Modeling observational learning with recurrent hopfield neural networks. *The 9th International Conference on Computational Methods (ICCM2018)*, Rome, Italy, August 9th, 2018.

Live imaging of collective behavior in cell populations. *Nano Innovation 2017*, Rome, Italy, September 29th, 2017.

Stem cells and the evolution of organized tissue: an emergent behavior prospective. *8th International Discussion Meeting on Relaxations in Complex Systems*, Wisla, Poland, July 25th, 2017.

Computer models of Bone Marrow Stromal Cells. ITZ, Jose Carreras Cord Blood Bank, University Medical Center Duesseldorf, Cartilage and bone Regeneration in Vivo from Umbilical Cord Blood, Duesseldorf, Germany, May 4th, 2015.

The evolution of heterogeneous naming conventions. *AAAI Fall Symposium 2012 on Social Networks and Social Contagion*, Nov 2nd, 2012.

Learning and signaling games over a noisy channel. *Santa Fe' Institute Theme Weeks, Combining Information Theory and Game Theory, Breakout Sessions*, I hosted this section with Behrouz Touri, August 16th, 2011.

Naming on a directed graph. *44th Annual Meeting of the Society for Mathematical Psychology*, Tufts University Medford, Massachusetts, July 18th, 2011.

Solving CSPs with naming games. *CILC09: 24-esimo Convegno Italiano di Logica Computazionale*, University of Ferrara, Italy. June 25th, 2009.

Resolving CSP with Naming Games. *Doctoral Consortium. International Conference on Logic Programming 2008*. Udine, Italy. December 10th, 2008.

Poster Sessions

SARS-CoV-2 variants and the adaptation of the spike-ACE2 bound. *Predicting Evolution*, European Molecular Biology Laboratory (EMBL), Heidelberg, Germany, 2021.

Differentiation and symmetry breaking in the evolution of Neural Rosettes derived from human Induced Pluripotent Stem cells (hiPSCs). *Tissue Self-Organisation: Challenging the Systems*, European Molecular Biology Laboratory (EMBL), Heidelberg, Germany, 2018.

Symmetry breaking in the evolution of neural rosettes derived from human induced pluripotent stem cells (hiPSCs). Disordered serendipity: a glassy path to discovery. Sapienza Università di Roma, Italy, 2018.

Emergent behavior in Neural Rosettes derived from human Induced Pluripotent Stem Cells (hiPSCs). International Society for Stem Cell Research Annual Meeting, Boston, USA, 2017.

A collective behavior approach to the evolution of human Skeletal Stem Cells Clonal Colonies. International Society for Stem Cell Research Annual Meeting, Boston, USA, 2017.

The emergent behavior of human Induced Pluripotent Stem Cells (iPSCs) in Neural Rosette formation. Nanoengineering for Mechanobiology, Camogli, Italy, 2017.

A collective behavior approach to the evolution of Skeletal Stem Cell clonal colonies. Advanced Lecture Course on Systems Biology, Innsbruck, Austria, 2016.

Dynamic analysis and modeling of clonal colony growth initiated by Single Skeletal Stem Cells. Hydra XI Summer School on Stem Cell Biology, Hydra, Greece, 2015.

Collective and emergent behaviors of single human Stem Cell derived colonies. International Society for Stem Cell Research Annual Meeting, Stockholm, Sweden, 2015.

Solving fuzzy DCSPs with naming games. 23rd IEEE International Conference on Tools with Artificial Intelligence. Boca Raton, Florida, USA, 2011.

Naming on a directed graph. 2011 International Conference on Social Computing, Behavioral-Cultural Modeling, and Prediction (SBP11), University of Maryland University College, College Park, MD, 2011.

A “dis-ambiguous” naming game. International Summer School on Embodied Language Games and Construction Grammar, Cortona, Italy, 2009.

Premi e Borse

Golden Key Research Grant, conferito dalla Golden Key International Honor Society, 2012.

Graduate Student Researcher Support, conferito da Professor Donald Saari, Director of the Institute of Mathematical Behavioral Sciences, University of California, Irvine, School of Social Sciences, Fall 2012.

Graduate Student Fellowship Stipend, conferito da William H. Batchelder, Cognitive Psychometric Lab PI, and Cognitive Science Professor, Irvine, School of Social Sciences, Fall 2012.

Kugelman Citizen Peacebuilding Research Fellowship, University of California, Irvine, Center for Citizen Peacebuilding (CCPB), 2012-13.

Borsa di Dottorato per il dottorato di ricerca in “Matematica e Informatica per la Elaborazione e la Rappresentazione dell’Informazione e della Conoscenza” presso l’Università degli Studi di Perugia.

Social Science Merit Fellowship & Social Science Tuition Fellowship, University of California, Irvine, School of Social Sciences, 2008-09.

Insegnamento

Physics Laboratory II. Guidato esperienze di laboratorio. 2021 Supervisore: Prof. A. Nucara, Università di Roma, “La Sapienza”, Dipartimento di Fisica.

Physics Laboratory II. Guidato esperienze di laboratorio. 2016-2020 Supervisore: Prof. F. Bordi, Università degli Studi di Roma, “La Sapienza”, Dipartimento di Fisica.

Introduction to Psychology. Guidato Esercitazioni. Supervisore: Dr. J. Hagedorn, University of California, Irvine, School of Social Sciences.

Probability and Statistics for Social Sciences. Guidato Esercitazioni. Supervisore: Prof. P. Shirey, University of California, Irvine, School of Social Sciences.

Computer-Based Research in the Social Sciences. Guidato Esercitazioni. Supervisore: Prof. J. Christopherson University of California, Irvine, School of Social Sciences.

Calculus for Computer Science 1 e 2. Assistito il professore ad esami orali e alla valutazione esami scritti. Supervisore: Prof. A. Boccuto, Università degli Studi di Perugia, Dipartimento di Matematica e Informatica.

Workshops e Summer Schools

Workshop, *Predicting Evolution*, European Molecular Biology Laboratory (EMBL), Heidelberg, Germany, 2021.

Symposium, *Tissue Self-Organisation: Challenging the Systems*, European Molecular Biology Laboratory (EMBL), Heidelberg, Germany, 2018.

Workshop, *Cartilage and bone regeneration in vivo from umbilical cord blood*, ITZ, Jose Carreras Cord Blood Bank, University Medical Center Duesseldorf, Duesseldorf, Germany, 2015.

Santa Fe' Institute Theme Weeks, *Combining Information Theory and Game Theory*, Santa Fe', USA, 2012.

San Diego Super Computing, 2012 Summer Institute, *Big Data Supercomputing*, San Diego, USA, 2012.

International Summer School, *Embodied Language Games and Construction Grammar*, Cortona, Italy, 2009.

Viaggi di Ricerca

Guest of the Santa Fe' Institute come parte del causality meeting group, guidato da Prof. D. White. Dal 28 agosto al 9 settembre 2011.

Guest of the Max Planck Institute for Mathematics in the Sciences, Leipzig, Germany, partecipato al joint project “Causal Graph Analysis”, come studente di Prof. D. White's. Dal 16 giugno al 2 luglio 2011.

Service

Reviewer

Computation, MDPI, 2021.

Machine Learning and Knowledge Extraction, MDPI, 2021.

Algorithms, MDPI, 2020-2021.

Applied Sciences, MDPI, 2020-2021.

Neural Networks Journal, Elsevier, 2018-2020.

PeerJ Computer Science, 2020.

Neural computation, MIT Press, 2019.

2011 IEEE International Symposium on Circuits and Systems, 2011.

Auxiliary Reviewer

16th Italian Conference on Theoretical Computer Science (ICTCS 2015), 2015.

10th International Conference on Integration of Artificial Intelligence and Operations Research techniques in Constraint Programming, 2013.

18th International Conference on Principles and Practice of Constraint Programming, 2012.

24th Conference on Artificial Intelligence (AAAI-10), 2010.

European Conference on Artificial Intelligence (ECAI 2010), 2010.

21st International Joint Conference on Artificial Intelligence (IJCAI-09), 2008.