

## MERC Publications List

Journal Papers

Preprints

Conference Proceedings

Presentations at Conferences and Seminar series

Summer schools

### JOURNAL PAPERS

2024

- V. Martinelli, D. Fiore, D. Salzano, M. di Bernardo, "[Multicellular Proportional-Integral-Derivative Control for Robust Regulation of Biological Processes](#)", *Journal of the Royal Society Interface*, accepted.
- S. M. Brancato, D. Salzano, D. Fiore, G. Russo, M. di Bernardo, "[Ratiometric control of two microbial populations in a dual chamber bioreactor](#)", *IEEE Control Systems Letters*, 2024, Early Access .
- F. De Lellis, M. Coraggio, G. Russo, M. Musolesi, M. di Bernardo, "[Guaranteeing control requirements via reward shaping in reinforcement learning](#)", *IEEE Transactions on Control System Technology*, 32(6):2102-2113, 2024
- F. De Lellis, M. Coraggio, N. C. Foster, R. Villa, C. Becchio, M. di Bernardo, "[Data-driven architecture to encode information in the kinematics of robots and artificial avatars](#)", *IEEE Control System Letters* 8:1919–1924, 2024
- D. G. Patsatzis, L. Russo, and C. Siettos. "[Slow invariant manifolds of fast-slow systems of ODEs with physics-informed neural networks.](#)" *SIAM Journal of Applied Dynamical Systems*, accepted.
- bin Kamruddin, A., Sandison, H., Patil, G., Musolesi, M., di Bernardo, M., & Richardson, M. J. (2024). Modelling human navigation and decision dynamics in a first-person herding task. *Royal Society Open Science*, 11(10), 231919.

- [A. Lama](#), M. Di Bernardo, [Shepherding and herdability in complex multiagent systems](#), *Physical Review Research* 6, L032012 (2024).
- [A. Della Pia](#), [D. G. Patsatzis](#), L. Russo and C. Siettos, “Learning the latent dynamics of fluid flows from high-fidelity numerical simulations using parsimonious diffusion maps”, *Physics of Fluids*, 36, 105187 (2024).
- [G.C. Maffettone](#), L. Liguori, E. Palermo, M. di Bernardo, M. Porfiri, “Mixed Reality Environment and High-Dimensional Continuification Control For Swarm Robotics”, *IEEE Transaction on Control Systems Technology*, vol. 32, pp 2484-2491, 2024
- [J. A. Dueñas Santana](#), A. Di Benedetto, O. González Gómez, E. Salzano, “[Towards Sustainable Hydrogen Production: An Integrated Approach for Sustainability, Complexity, and Systems Thinking in the Energy Sector](#)”, *Journal of Cleaner Production* 449-141751, Elsevier, 2024
- [G. Fabiani](#), N. Evangelou, T. Cui, J. M. Bello-Rivas, C. P. Martin-Linares, C. Siettos, I. G. Kevrekidis, “[Task-Oriented Machine Learning Assisted Surrogates for Tipping Points of agent-based models](#)”, *Nature Communications* 15, n. 4117, pp. 1-13, 2024
- A. Gnanadesikan, [G. Fabiani](#), J. Liu, R. Gelderloos, G.J. Brett, Y. Kevrekidis, T. Haine, M. Pradal, C. Siettos, J. Sleeman, “[Tipping points in overturning circulation mediated by ocean mixing and the configuration and magnitude of the hydrological cycle: A simple model](#)”, *Journal of Physical Oceanography*, 2024
- [D. G. Patsatzis](#), [G. Fabiani](#), L. Russo, and C. Siettos. “[Slow invariant manifolds of singularly perturbed systems via physics-informed machine learning.](#)” *SIAM Journal of Scientific Computing* 46 (4), C297-C322, 2024
- F. Auricchio, M. R. Belardo, F. Calabrò, [G. Fabiani](#) & A. F. Pascaner, “[On the accuracy of interpolation based on single-layer artificial neural networks with a focus on defeating the Runge phenomenon](#)”, *Soft Computing*, 2024
- [V. Centorrino](#), A. Davydov, A. Gokhale, G. Russo, and F. Bullo. “On Weakly Contracting Dynamics for Convex Optimization”. *IEEE Control Systems Letters*, vol. 8, pp. 1745-1750, 2024. doi: [10.1109/LCSYS.2024.3414348](https://doi.org/10.1109/LCSYS.2024.3414348).
- [V. Centorrino](#), A. Gokhale, A. Davydov, G. Russo, and F. Bullo. “Positive Competitive Networks for Sparse Reconstruction”. *Neural Computation*, vol. 36(6), pp. 1163-1197, 2024. doi: [10.1162/neco\\_a\\_01657](https://doi.org/10.1162/neco_a_01657).
- [V. Centorrino](#), F. Bullo, and G. Russo, “Modelling and Contractivity of Neural-Synaptic Networks with Hebbian Learning”. *Automatica*, vol. 164, p. 111636-111646, 2024. doi: [10.1016/j.automatica.2024.111636](https://doi.org/10.1016/j.automatica.2024.111636).
- [Giuseppe Petrillo](#), Eugenio Lippiello, Jancang Zhuang, Including stress relaxation in point-process model for seismic occurrence, *Geophysical Journal International*, Volume 236, Issue 3, March 2024, Pages 1332–1341, <https://doi.org/10.1093/gji/ggad482>.
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- [A. Della Pia](#), T. Michelis, M. Chiatto, M. Kotsonis and L. de Luca, “Global dynamics and topology of two-phase mixing layer flow through simultaneous gas and liquid velocity measurements”, *Journal of Fluid Mechanics*, 981, A13, 2024.
- W. Marzocchi, L. Sandri, [S. Ferrara](#), and J. Selva, “[From the detection of monitoring anomalies to the probabilistic forecast of the evolution of volcanic unrest: an entropy-based approach](#)”, *Bulletin of Volcanology*, 86(1), 5, 2024
- [Manjunatha, K. K. H.](#), Baron, G., Benozzo, D., Silvestri, E., Corbetta, M., Chiuso, A., Bertoldo, A., Suweis, S., & Allegra, M. (2024). Controlling target brain regions by optimal selection of input nodes. In H. Cagnan (Ed.), *PLOS Computational Biology* (Vol. 20, Issue 1, p. e1011274). Public Library of Science (PLoS). <https://doi.org/10.1371/journal.pcbi.1011274>
- Z. M. Ren, L. Zhao, [W. L. Du](#), T. F. Weng, C. Liu, Y. X. Kong, and Y. C. Zhang, [Tunable resource allocation dynamics for interpreting economic complexity](#). *Chaos, Solitons & Fractals* 181 (2024).
- [H. Vargas Alvarez](#), [G. Fabiani](#), I. G. Kevrekidis, N. Kazantzis, C. Siettos, “[Nonlinear Discrete-Time Observers with Physics-Informed Neural Networks](#)”, *Chaos Solitons and Fractals* 186, 2024
- [G. Fabiani](#), I. G. Kevrekidis, C. Siettos, A. N. Yannacopoulos, “[RandONets: Shallow-Networks with Random Projections for learning linear and nonlinear operators](#)”, *Journal of Computational Physics*, 520, 113433, 2024
- [J. A. Dueñas Santana](#), A. Di Benedetto, E. Salzano, “[An Integrated Systems Thinking Approach for Assessing and Comparing the Safety of Hydrogen and Ammonia Storage](#)”, *Chemical Engineering Transactions*, Vol. 111, 2024.
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- [A. Della Pia](#), T. Michelis, M. Chiatto, M. Kotsonis and L. de Luca, “[Global dynamics and topology of two-phase mixing layer flow through simultaneous gas and liquid velocity measurements](#)”, *Journal of Fluid Mechanics*, 981, A13, 2024.
- Atiyeh Bayani, Fahimeh Nazarimehr, Sajad Jafari, [Kirill Kovalenko](#), Gonzalo Contreras-Aso, Karin Alfaro-Bittner, Rubén J. Sánchez-García & Stefano Boccaletti, “[The transition to synchronization of networked systems](#)”, *Nat Commun* 15, 4955 (2024). <https://doi.org/10.1038/s41467-024-48203-6>
- E. Vasilyeva, I. Samoylenko, [K. Kovalenko](#), D. Musatov, A.M. Raigorodskii, S. Boccaletti, “[Matrix centrality for annotated hypergraphs](#)”, *Chaos, Solitons & Fractals*, Volume 186, 2024, 115256, ISSN 0960-0779, <https://doi.org/10.1016/j.chaos.2024.115256>.

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## 2023

- V. Martinelli, [D. Salzano](#), D. Fiore, M. di Bernardo, "[Multicellular PD control in microbial consortia](#)", IEEE Control Systems Letters, 2023. The contents of this paper were also selected by CDC 2023 Program Committee for presentation at the Conference.
- A. Giusti, [M. Coraggio](#), M. di Bernardo, "[Local convergence of multi-agent systems towards triangular patterns](#)", IEEE Control Systems Letters 7:2869–2874, 2023
- A. Giusti, [G. C. Maffettone](#), D. Fiore, [M. Coraggio](#), M. di Bernardo, "[Distributed control for self-organization of large-scale multiagent systems in geometric patterns](#)", Frontiers in Robotics and Artificial Intelligence, 10, 2023
- [D. Giaquinto](#), W. Marzocchi, J. Kurths, "[Exploring meteorological droughts' spatial patterns across Europe through complex network theory](#)", Nonlin. Processes Geophys., 30, 167–181, 2023
- [G.C. Maffettone](#), M. Porfiri, M. di Bernardo, "[Continuification control of large-scale multiagent systems under limited sensing and structural perturbations](#)", IEEE Control Systems Letters, vol. 7, pp. 2425-2430, 2023
- [G. Fabiani](#), E. Galaris, L. Russo, C. Siettos, "[Parsimonious Random Projection Neural Networks for the Numerical Solution of Initial-Value Problems of ODEs and index-1 DAEs](#)", *Chaos* 33, 043128, 2023.
- [H. Vargas Alvarez](#), [G. Fabiani](#), N. Kazantzis, C. Siettos, I. G. Kevrekidis, "[Discrete-Time Nonlinear Feedback Linearization via Physics-Informed Machine Learning](#)", *Journal of Computational Physics*, 492, 112408, 2023
- F. Lo Iudice, R. Cardona-Rivera, [A. Grotta](#), [M. Coraggio](#), M. di Bernardo, "[Consensus-based Distributed Intentional Controlled Islanding of Power Grids](#)", IEEE Transactions on Control of Network Systems, 11(1): 233-243, 2023
- [G.C. Maffettone](#), A. Boldini, M. di Bernardo, M. Porfiri, "[Continuification Control of Large-scale Multiagent Systems in a Ring](#)", IEEE Control Systems Letters, vol. 7, pp 841-846, 2023
- J. Serrano, J. L. Orozco, A. García, [J. Dueñas](#), M. L. León, Z. Herrera, "[Influence of imbibition temperature on the extraction stage of the cane sugar production](#)", Journal of Food Engineering, Volume 345, 2023.
- M. Giorgio, [A. Piscopo](#), G. Pulcini, "[A new Wiener process with bathtub-shaped degradation rate in the presence of random effects](#)", Applied Stochastic Models in Business and Industry, 1- 24, 2023.
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- [A. Della Pia](#), M. G. Antoniadis, E. S. Ioannidis, Z. A. Wejko, N. S. Barlow, M. Chiatto, S. J. Weinstein and L. de Luca, "[On the shapes of liquid curtains flowing from a non-vertical slot](#)", Journal of Fluid Mechanics, A18, 974, 2023.
- [V. Centorrino](#), A. Gokhale, A. Davydov, G. Russo, and F. Bullo. "Euclidean Contractivity of Neural Networks with Symmetric Weights". IEEE Control Systems Letters, vol. 7, pp. 1724-1729, May 2023. doi: [10.1109/LCSYS.2023.3278250](#).

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- S. Mancini and W. Marzocchi, [“SimpleTAS: a Benchmark Earthquake Forecasting Model Suitable for Operational Purposes and Seismic Hazard Analysis”](#), Seismological Research Letters, 2023.
- W. Marzocchi, L. Sandri, S. Ferrara, and J. Selva, [“From the detection of monitoring anomalies to the probabilistic forecast of the evolution of volcanic unrest: an entropy-based approach”](#), *Bulletin of Volcanology*, 86(1), 5, 2023.

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- L. Chiaraluce, M. Michele, F. Waldhauser, Y. J. Tan, M. Herrmann, D. Spallarossa, S. Mancini et al., [“A Comprehensive Suite of Earthquake Catalogs for the 2016-2017 Central Italy Seismic Sequence”](#), Scientific Data, 9, 2022.
- M. Coraggio, S. Jafarpour, F. Bullo, M. di Bernardo, [“Minimax Flow Over Acyclic Networks: Distributed Algorithms and Microgrid Application”](#), IEEE Transactions on Control of Network Systems, 10(2):937–946, 2022
- J. A. Dueñas Santana, Y. Cuba Arana, O. González, D. Furka, S. Furka, J. L. Orozco, A. Di Benedetto, D. Russo, M. Portarapillo, J. Serrano, [“Fire and Explosion Economic Losses \(FEEL\) Index: A new approach for quantifying economic damages due to accidents in hydrocarbon storage sites”](#) Process Safety and Environmental Protection, 165, 2022.
- E. Galaris, G. Fabiani, I. Gallos, I.G. Kevrekidis, C. Siettos, [“Numerical bifurcation analysis of pdes from lattice Boltzmann model simulations: a parsimonious machine learning approach”](#). *Journal of Scientific Computing*, 92(2), 34, 2022
- L. Malagnini, T. Parsons, I. Munafò, S. Mancini, M. Segou, and E. L. Geist, [“Crustal Permeability Changes Inferred From Seismic Attenuation: Impacts on Multi-Mainshock Sequences”](#), Frontiers in Earth Science, 10, 2022.
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- J. Serrano, J. L. Orozco, J. Dueñas, H. Ramírez, [“Obtaining Mathematical Models to Predict the Behaviour of the Extraction Stage of the Raw Sugar Production Process”](#) Sugar Technology, 2022.

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## 2021

- F. Calabrò, G. Fabiani, C. Siettos, "[Extreme learning machine collocation for the numerical solution of elliptic PDEs with sharp gradients](#)". *Computer Methods in Applied Mechanics and Engineering*, 387, 114188, 2021.
- G. Fabiani, F. Calabrò, L. Russo, C. Siettos, "[Numerical solution and bifurcation analysis of nonlinear partial differential equations with extreme learning machines](#)", *Journal of Scientific Computing*, 89, 1-35. 2021.

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## PREPRINTS

- D. G. Patsatzis, M. di Bernardo, L. Russo, C. Siettos, "[GoRINNs: Godunov-Riemann Informed Neural Networks for Learning Hyperbolic Conservation Laws](#)", submitted to *Journal of Computational Physics*, arXiv preprint arXiv:2410.22193, 2024
- I. Napolitano, A. Lama, F. De Lellis, M. di Bernardo, "[Emergent Cooperative Strategies for Multi-Agent Shepherding via Reinforcement Learning](#)", submitted to the 2025 European Control Conference (ECC), 2025.
- B. Di Lorenzo, G.C. Maffettone, M. di Bernardo, "[A Continuification-Based Control Solution for Large-Scale Shepherding](#)", submitted to the 2025 European Control Conference (ECC25)
- G.C. Maffettone, A. Boldini, M. Porfiri, M. di Bernardo, "[Leader-Follower Density Control of Spatial Dynamics in Large-Scale Multi-Agent Systems](#)", submitted to IEEE Transactions on Automatic Control, 2024.
- G.C. Maffettone, L. Liguori, E. Palermo, M. di Bernardo, M. Porfiri, "[Hybrid Platform for Swarm Robotics: Experiments and High-dimensional Continuification Control](#)", submitted to IEEE Transactions on Control Systems Technology, 2023.
- W. Marzocchi, L. Sandri, S. Ferrara, J. Selva, "[From the detection of monitoring anomalies to the probabilistic forecast of the evolution of volcanic unrest: an entropy-based approach](#)", 25 July 2023, PREPRINT (Version 1) available at Research Square [<https://doi.org/10.21203/rs.3.rs-3156207/v1>].
- A. Davydov, V. Centorrino, A. Gokhale, G. Russo, and F. Bullo. "[Time-Varying Convex Optimization: A Contraction and Equilibrium Tracking Approach](#)", Conditionally accepted on IEEE Transactions on Automatic Control, 2023.
- G. Fabiani, "[Random Projection Neural Networks of Best Approximation: Convergence theory and practical applications](#)", arXiv preprint arXiv:2402.11397, 2024
- G. Fabiani, E. Bollt, C. Siettos, A. N. Yannacopoulos, "[Stability Analysis of Physics-Informed Neural Networks for Stiff Linear Differential Equations](#)", arXiv preprint arXiv:2408.15393, 2024

- A. Tawalo, G. Urciuoli, “Probabilistic approach for assessing multi-site landslide displacements induced by groundwater fluctuation”, submitted for Environmental Earth Sciences.
- A. Tawalo, G. Falcone, A. D’onofrio, M. Pirone, G. Urciuoli, “Numerical modelling of displacements induced by rainfall infiltration in a clayey soil slope: the Miscano (Italy) case study”, submitted for Computers and Geotechnics.
- Giaquinto, D., Di Capua, G., Marzocchi, W., and Kurths, J.: Spatio-temporal evolution of compound hot and dry extremes synchronizations in Europe, in review by Climate Dynamics.
- Tian, Y., Giaquinto, D., Di Capua, G., Claassen, J., Ali, J., Li, H., De Michele, C.: Historical changes in the Causal Effect Networks of compound hot and dry extremes in central Europe, in review by Communications Earth & Environment.
- K.K.H. Manjunatha, M. Bruzzone, G. Nicoletti, S. Suweis, M. dal Maschio. “A method for extracting an approximated connectome from libraries of single anatomically co-registered cell reconstructions”, bioRxiv 2023.05.21.541471; doi: <https://doi.org/10.1101/2023.05.21.541471>
- C. Graciani, “A model for strategic sustainable investment”, to be submitted to Mathematics of Operations Research, 2024.

## CONFERENCE PROCEEDINGS

### 2024

- S. M. Brancato, D. Salzano, F. De Lellis, D. Fiore, G. Russo, M. di Bernardo, "In vivo learning-based control of microbial populations density in bioreactors", accepted for oral presentation at Learning 4 Dynamics and Control, 2024
- A. Grotta\*, M. Coraggio\*, A. Spallone, F. De Lellis, M. di Bernardo, “[Learning-based cognitive architecture for enhancing coordination in human groups](#)”, accepted at 5th IFAC Workshop on Cyber-Physical Human Systems (CPHS), available as arXiv:2406.06297, 2024
- G.C. Maffettone, M. di Bernardo, M. Porfiri, "High-dimensional continuification control of large-scale multi-agent systems under limited sensing and perturbations", accepted for publication in the proceedings of, and presentation at, the 63rd Conference on Decision and Control (CDC), Milan, 2024, [arxiv](#).
- M. Coraggio, M di Bernardo “[Data-driven design of complex network structures to promote synchronization](#)”, 2024 American Control Conference (ACC), pp. 4396–4401, Toronto, Canada, 2024
- J. A. Dueñas Santana, E. Salzano, A. Di Benedetto, “[Systems Thinking for Explosion Safety Management](#)”, presented in the 15th International Symposium on Hazards, Prevention, and Mitigation of Industrial Explosions, [ISHPMIE 2024](#).
- T. Rino, F. Giannino, D. Fiore, "[Feedback control of plant-soil autotoxicity via pulse-width modulation](#)", 2024 European Control Conference (ECC), IEEE, 2024.
- A.Tawalo, G. Urciuoli, “[Probabilistic approach for assessing multi-site slope land displacements induced by groundwater fluctuations](#)”, 3rd International Conference on Natural Hazards and Risks in a Changing World-Addressing Compound and Multi-Hazard Risk, (12-13 June, Amsterdam, Netherland).

- A. Tawalo, G. Falcone, A. D'onofrio, M. Pirone, G. Urciuoli, "[MODELLAZIONE NUMERICA IDRO-MECCANICA DEL VERSANTE DI MISCANO](#)", Incontro Annuale dei Ricercatori di Geotecnica -IARG2024, (Gaeta 4-6 Settembre, Italia).
- A. Tawalo, G. Urciuoli, G. Tsiniadis, "[Simplified approach for assessing the risk of buried pipelines threatened by displacements induced by groundwater fluctuations](#)", 2024 International Workshop on Computational Dynamic Soil-Structure Interaction – CompDSSI, (Assisi 11-13 September, Italy).
- [S. Ferrara](#), W. Marzocchi, J. Selva, L. Sandri, "Forecasting the evolution of volcanic unrest", EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-2811, <https://doi.org/10.5194/egusphere-egu24-2811>, 2024.
- A. Piscopo, N. Esposito, B. Castanier, M. Giorgio, "Maintenance of Degrading Units: New Policy and Some Critical Considerations About Value of Inspections", Advances in Reliability, Safety and Security, Part 2 – Kołowrocki, Magryta-Mut (eds.)© 2024 Polish Safety and Reliability Association, Gdynia, ISBN 978-83-68136-14-2 (printed), ISBN 978-83-68136-01-2 (electronic)
- N. Esposito, A. Piscopo, B. Castanier, M. Giorgio, "Adaptive Maintenance Policy for Gamma Degrading Units with Bathtub-Shaped Degradation Rate Function in the Presence of Random Effect", Advances in Reliability, Safety and Security, Part 3 – Kołowrocki, Magryta-Mut (eds.)© 2024 Polish Safety and Reliability Association, Gdynia, ISBN 978-83-68136-15-9 (printed), ISBN 978-83-68136-02-9 (electronic)

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## 2023

- [bin Kamruddin, A.](#), Patil, G., Musolesi, M., di Bernardo, M., & Richardson, M. J. (2023). Modeling Human Navigation in First-Person Herding Tasks. In *Proceedings of the Annual Meeting of the Cognitive Science Society* (Vol. 45, No. 45).
- F. Lo Iudice, E. Dudkina, [M. Coraggio](#), M. di Bernardo, E. Crisostomi, "[A Distributed Strategy for Parallel Power System Restoration](#)", IEEE Powertech, Belgrade, Serbia, 2023
- F. De Lellis, [M. Coraggio](#), G. Russo, M. Musolesi, M. di Bernardo, "[CT-DQN: Control-Tutored Deep Reinforcement Learning](#)", 5th Annual Learning for Dynamics and Control Conference, Philadelphia, PA, USA, 2023
- [A. Della Pia](#), M. Chiatto and L. de Luca, "[Synchronized oscillations in spatially developing liquid jets](#)", Dynamics Days Europe 2023, Napoli (Italy), 3-8 September 2023.
- [A. Della Pia](#), T. Michelis, M. Chiatto, M. Kotsonis and L. de Luca, "[Experimental characterization of the two-phase wake-mixing layer flow past a splitter plate](#)", AIAA Aviation Forum, San Diego, California (USA), 12-16 June 2023.
- M. R. Acquaviva, [A. Della Pia](#), A. Colanera, M. Chiatto and L. de Luca, "[Numerical investigation of hole propagation in a three-dimensional liquid curtain](#)", AIAA Aviation Forum, San Diego, California (USA), 12-16 June 2023.
- A. Colanera, [A. Della Pia](#), M. Chiatto and L. de Luca, "[Computation of liquid jets BiGlobal spectrum via randomly perturbed numerical data](#)", AIAA Aviation Forum, San Diego, California (USA), 12-16 June 2023.



- [S.K. Joshi](#), “Synchronization of Coupled Neural Oscillators”, Dynamics Days Europe 2023, Napoli (Italy), 3-8 September 2023.
  - [A. Piscopo](#), N. Esposito, B. Castanier, M. Giorgio, “Remaining useful life estimation of gamma degrading units characterized by a bathtub shaped degradation rate in the presence of random effect and measurement error”, Proceedings of the 33rd European Conference on Safety and Reliability (ESREL), Southampton, United Kingdom, 2023.
  - W. Marzocchi and [S. Mancini](#), “[SimpleTAS: a reference earthquake forecasting model](#)”, XXVIII General Assembly of the International Union of Geodesy and Geophysics (IUGG), Berlin, Germany, 2023.
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## 2022

- F. De Lellis, M. Coraggio, G. Russo, M. Musolesi, M. di Bernardo, “[Control-Tutored Reinforcement Learning: Towards the Integration of Data-Driven and Model-Based Control](#)”, Proceedings of The 4th Annual Learning for Dynamics and Control Conference, PMLR, 168:1048–1059, Stanford, CA, USA, 2022
  - J. A. Dueñas Santana, O. González Gómez, J. L. Orozco, “[Probabilistic Risk Assessment for domino effect due to Vapor Cloud Explosions using an integrated Petri-Bayesian network approach](#)”, Proceeding of the 14th International Symposium on Hazards, Prevention, and Mitigation of Industrial Explosions (ISHPMIE2022) Braunschweig, GERMANY – July 11-15, 2022.
  - T. Ali, and O. Rami, “[Study on the seismic behaviour of shallow box tunnels in dry sandy soil](#)”, Proceedings of the 3rd EUROPEAN CONFERENCE ON EARTHQUAKE ENGINEERING & SEISMOLOGY, Bucharest, Romania 2022.
  - V. Centorrino, F. Bullo, and G. Russo. "Contraction Analysis of Hopfield Neural Networks with Hebbian Learning". IEEE 61st Conference on Decision and Control (CDC), pp. 622-627, Cancun, Mexico, 2022. doi: [10.1109/CDC51059.2022.9993009](https://doi.org/10.1109/CDC51059.2022.9993009)
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## 2021

- M. Coraggio, S. Xie, F. De Lellis, G. Russo, M. di Bernardo, “[Intermittent non-pharmaceutical strategies to mitigate the COVID-19 epidemic in a network model of Italy via constrained optimization](#)”, 60<sup>th</sup> IEEE Conference on Decision and Control, 2021
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## PRESENTATIONS AT CONFERENCES AND SEMINAR SERIES

### 2024

- M. Coraggio, “Guaranteeing Control Requirements via Reward Shaping in Reinforcement Learning”, poster presentation at 4th Symposium on Machine Learning and Dynamical Systems, Toronto, Canada, 09-Jul-2024
- M. Coraggio, “Data-driven design of complex network structures to promote synchronization”, invited talk at 11th European Nonlinear Dynamics Conference 2024, Delft, Netherlands, 23-Jul-2024
- M. Coraggio, “Data-driven design of complex network structures to promote synchronization”, invited paper presentation at 2024 American Control Conference (ACC), Toronto, Canada, 12-Jul-2024
- bin Kamruddin, Ayman, “Modelling Herding Behaviours: From Simulations to Human-Machine Teaming”, International Conference on Intelligent Robotics and Systems (IROS), Abu Dhabi, UAE
- A. Della Pia, D. Patsatzis, L. Russo and C. Siettos, “From steady symmetric to chaotic regime: nonlinear manifold learning of fluidic pinball dynamics”, AIMETA Congress 2024, Napoli (Italy), 2-6 September 2024.
- A. Della Pia, D. Patsatzis, L. Russo and C. Siettos, “*Nonlinear manifold learning of chaotic shear flows: the fluidic pinball configuration*”, plenary lecture at GIMC SIMAI YOUNG Congress 2024, Napoli (Italy), 10-12 July 2024.
- A. Della Pia, D. Patsatzis, L. Russo and C. Siettos, “Learning the latent dynamics of Fluid flows from High-Fidelity Numerical Simulations using Parsimonious Diffusion Maps”, Dynamics Days Europe 2024, Bremen (Germany), 29 July-3 August 2024.
- A. Della Pia, “*Thinning-induced break-up of a gravitational liquid jet driven by varicose perturbations*”, ECCOMAS Congress 2024, 2-7 June 2024, Lisbon, Portugal.
- A. Della Pia, “Machine Learning for Fluid Dynamics”, invited Seminar at Politecnico di Torino, 18 July 2024.
- Giaquinto, D., An evolving network approach to assess compounding heat and dry extremes in Europe - Earth Science and Climate Networks Session, NetSciX 2024 - International School and Conference on Network Science, Venice, Italy, 24/01/2024
- Giaquinto, D., Di Capua, G., Marzocchi, W., and Kurths, J.: An evolving network approach to assess compounding heat and dry extremes in Europe., EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-6251, <https://doi.org/10.5194/egusphere-egu24-6251>, 2024.
- G. Fabiani, L. Russo, C. Siettos, “*Physics-Informed Random Projection Neural Networks for the numerical solution of stiff ODEs, DAEs and PDEs*”, SIAM 2024 Conference on Uncertainty Quantification (UQ24), Trieste, Italy, February 28, 2024
- G. Fabiani, L. Russo, C. Siettos, A. N. Yannacopoulos, “*Bridging the gap between Numerical analysis and Physics-informed Machine Learning: Theoretical Convergence and Stability of Random projection Neural Networks for Stiff ODEs and PDEs*”, XLIV Dynamics Days Europe, Bremen, July 29 - August 2, 2024
- V. Centorrino, A. Davydov, A. Gokhale, G. Russo, and F. Bullo. “On Weakly Contracting Dynamics for Convex Optimization”, To be presented in the invited session “Contraction Theory in Systems and Control I”, 63rd IEEE Conference on Decision and Control, Milan, Italy, December 2024.
- V. Centorrino, A. Davydov, A. Gokhale, G. Russo, and F. Bullo, “On Contracting Dynamics for Convex Optimization”, Workshop “Variational Inequalities, Nash Equilibrium Problems and Applications”, Oral Talk, Catania, July 11-12, 2024.

- [V. Centorrino](#), A. Davydov, A. Gokhale, G. Russo, and F. Bullo, “Biologically Plausible Neural Networks for Sparse Reconstruction: a Normative Framework”, Workshop “Mathematics for Artificial Intelligence and Machine Learning”, Oral Talk, Milan, January 17-19, 2024.
- [V. Centorrino](#), [Biologically Inspired Neural Networks and Optimization: Neural Circuits Meet Contraction Theory](#), Seminar, EPFL, Lausanne, June 19, 2024.
- [R. Blasco-Aguado](#), M. Aguiar, J. Mar, “A study of COVID-19 dynamics in Basque Country and Italy”. Contributed Talk at the DSABNS Conference Lisbon (Portugal), February 6-9, 2024
- [F. Ferriero](#), W. Marzocchi, G. Urciuoli, S. Mancini, “A Full Probabilistic Approach to Landslide Forecast”. Poster. Conference, General Assembly 2024 of the European Geosciences Union (EGU), 15-19 April 2024, Vienna, Austria.
- [H. Vargas Alvarez](#), Dimitrios Patsatzis, Lucia Russo, Constantinos Siettos, Learning coarse PDEs from agent-based simulations of crowd dynamics, XLIV Dynamics Days Europe, Bremen, July 29 - August 2, 2024
- I. Samoylenko, D. Aleja, E. Primo, K. Alfaro-Bittner, E. Vasilyeva, [K. Kovalenko](#), D. Musatov, A. M. Raigorodskii, R. Criado, M. Romance, D. Papo, M. Perc, B. Barzel, and S. Boccaletti, “*Why Are There Six Degrees of Separation in a Social Network?*”, Oral presentation at 2024 IEEE Workshop on Complexity in Engineering, Florence, Italy, 22 July-24 July
- Atiyeh Bayani, Fahimeh Nazarimehr, Sajad Jafari, [Kirill Kovalenko](#), Gonzalo Contreras-Aso, Karin Alfaro-Bittner, Rubén J. Sánchez-García & Stefano Boccaletti, “*The transition to synchronization of networked systems*”, Poster presentation at Dynamic Days Europe 2024, Bremen, Germany, 28 July – 2 August
- [A. Tawalo](#), G. Falcone, A. D’onofrio, M. Pirone, G. Urciuoli, “MODELLAZIONE NUMERICA IDRO-MECCANICA DEL VERSANTE DI MISCANO” , Incontro Annuale dei Ricercatori di Geotecnica -IARG2024, (Gaeta 4-6 Settembre, Italia).
- [Tawalo, A.](#), Probabilistic approach for assessing multi-site slope land displacements induced by groundwater fluctuations, 3rd International Conference on Natural Hazards and Risks in a Changing World-Addressing Compound and Multi-Hazard Risk, (12-13 June, Amsterdam, Netherland).

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## [2023](#)

- [M. Coraggio](#), “Data-driven selection of the structure of a complex network”, talk at CCS/Italy 2023, Naples, Italy, 10-Oct-2023
- [M. Coraggio](#), “Data-driven selection of the structure of a complex network”, talk at Dynamics Days Europe 2023, Naples, Italy, 08-Sep-2023
- G.C. Maffettone, M. di Bernardo, M. Porfiri, “Continuification control of large-scale multi-agent systems under limited sensing and structural perturbations”, 62<sup>nd</sup> IEEE Conference on Decision and Control (CDC23), December 13-15, 2023, Singapore.

- G.C. Maffettone, M. di Bernardo, M. Porfiri, “Continuification Control of Large-Scale Multiagent Systems”, Italian Regional Conference on Complex Systems, (CCS/Italy 23), October 9-11 2023, Naples, Italy.
- G.C. Maffettone, A. Boldini, M. di Bernardo, M. Porfiri, “Continuification control of large-scale multiagent systems under limited sensing and structural perturbations ”, Dynamics Days Europe 2023 (DD23), September 3-8 2023, Naples, Italy.
- G. C. Maffettone, A. Boldini, M. di Bernardo, M. Porfiri, “Continuification Control Control of Large-Scale Multiagent Systems in a Ring”, American Control Conference, May 31- June 2, 2023, San Diego, CA, USA
- G. C. Maffettone, A. Boldini, M. di Bernardo, M. Porfiri, “Continuification-Based Control Control of Large-Scale Multiagent Systems in a Ring”, SIAM Conference on Applications of Dynamical Systems, May 14-18 2023, Portland, OR, USA
- D. Giaquinto, Exploring European meteorological droughts through complex networks, Cross RD Seminar Series, Potsdam Institute for Climate Impact Research, Potsdam, Germany, 29/06/2023
- D. Giaquinto, Exploring European meteorological droughts through complex networks, XLIII Dynamics Days Europe, Naples, Italy, 3-8/09/23
- D. Giaquinto, Exploring meteorological droughts spatial patterns across Europe through complex network theory, ccs/italy 2023, Naples, Italy, 9-11/10/2023
- G. Fabiani, N. Evangelou, T. Cui, J. M. Bello-Rivas, C. Martinez-Linares, C. Siettos, I. G. Kevrekidis, “[Machine Learning-based coarse-scale Identification and bifurcation analysis for modelling Tipping Points: a financial market Agent-Based illustration](#)”, AAAI 2023 Spring Symposium Series, MS AI Climate Tipping-Point Discovery (ACTD), Hyatt Regency, San Francisco Airport, California, USA, March 27-29, 2023
- G. Fabiani, N. Evangelou, C. Siettos, I. G. Kevrekidis, “*Constructing Integro-PDEs for the Emergent Dynamics of Agent-Based Simulations: A Machine Learning Approach*”, SIAM DS23, Portland, Oregon, USA, May 14 - 18, 2023
- G. Fabiani, L. Russo, C. Siettos, “*Numerical Solution of stiff ODEs, DAEs with adaptive Physics-Informed Random Projection Neural Networks*”, NUMTA 2023, 14-20 June 2023 | Pizzo Calabro (VV), Italy
- G. Fabiani, “*Parsimonious Physics-Informed Random Projection Neural Networks (PIRPNN) for solving Forward and Inverse Problems*”, CRUNCH Seminar, Brown University, USA – June 23, 2023
- G. Fabiani, “*Parsimonious Physics-Informed Random Projection Neural Networks (PIRPNN) for initial value problems of ODEs, index-1 DAEs and PDEs*”, XLIII Dynamics Days Europe – Naples, Scuola Superiore Meridionale, September 08, 2023
- G. Fabiani, N. Evangelou, C. Siettos, I. G. Kevrekidis, “*Tipping Points via Machine Learning: Comparing Data-driven Global PDE and Local SDE surrogates*”, Italian Regional Conference on Complex Systems, (CCS/Italy 23), October 9-11, 2023, Naples, Italy.
- V. Centorrino, A. Gokhale, A. Davydov, G. Russo, and F. Bullo. “Contractivity of Symmetric Neural Networks for Non-negative Sparse Approximation”, Italian Regional Conference on Complex Systems, (CCS/Italy 23), Poster Presentation, October 9-11, 2023, Naples, Italy.
- V. Centorrino, A. Davydov, A. Gokhale, G. Russo, and F. Bullo, “Euclidean Contractivity of Neural Networks with Symmetric Weights”, Presented in the invited session “Contraction Theory for Analysis,

Synchronization, and Regulation I”, 62nd IEEE Conference on Decision and Control, Singapore, December 13-15, 2023.

- [F. Ferriero](#), W. Marzocchi, G. Urciuoli, S. Mancini, “A Full Probabilistic Approach to Landslide Forecast”. Poster. Conference, American Geophysical Union (AGU) Fall Meeting 2023, 11-15 December 2023, San Francisco, California.
- [F. Ferriero](#), W. Marzocchi, G. Urciuoli, S. Mancini, “A Full Probabilistic Approach to Landslide Forecast”. Oral presentation. BeGEO2023 – Sustainability and Risks: BeGeoScientists on the road to the future, 3-6 October 2023, Naples, Italy.
- [F. Ferriero](#), W. Marzocchi, G. Urciuoli, S. Mancini, “A Full Probabilistic Approach to Landslide Forecast”. Oral presentation. Italian Regional Conference on Complex Systems, (CCS/Italy 23), Poster Presentation, October 9-11, 2023, Naples, Italy.
- [H. Vargas Alvarez](#), G. Fabiani, N. Kazantzis, C. Siettos, I. G. Kevrekidis, “Nonlinear Feedback Linearization with Physics-Informed Neural Networks”, SIAM DS23, Portland, Oregon, USA, May 14 - 18, 2023
- [H. Vargas Alvarez](#), G. Fabiani, N. Kazantzis, C. Siettos, I. G. Kevrekidis, “Feedback Linearization of Discrete Nonlinear Systems with Machine Learning”, NUMTA 2023, 14-20 June 2023 | Pizzo Calabro (VV), Italy
- [H. Vargas Alvarez](#), G. Fabiani, N. Kazantzis, C. Siettos, I. G. Kevrekidis, “Discrete-time nonlinear feedback linearization via physics-informed machine learning”, XLIII Dynamics Days Europe – Naples, Scuola Superiore Meridionale, September 08, 2023
- [H. Vargas Alvarez](#), G. Fabiani, N. Kazantzis, C. Siettos, I. G. Kevrekidis, “Control via Nonlinear Feedback Linearization with Machine Learning”, NODYCON 2023, Rome, Italy, June 18-22, 2023
- [H. Vargas Alvarez](#), G. Fabiani, N. Kazantzis, C. Siettos, I. G. Kevrekidis, “D Learning macroscopic models in the form of PDEs from crowd dynamics’ agent-based simulations using Machine Learning”, CCS, Naples, Italy, October 9-11, 2023

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## 2022

- [M. Coraggio](#), “Minimax flow over acyclic networks: Distributed algorithms and microgrid application”, poster presentation at NecSys22, Zurich, Switzerland, 05-Jul-2022
- [M. Coraggio](#), “Control-tutored reinforcement learning: Towards the integration of data-driven and model-based control”, poster presentation at the 3rd Annual Learning for Dynamics & Control Conference, Palo Alto, CA, USA, 24-Jun-2022
- [G. Fabiani](#), “Identifying the emergent dynamics of Agent Based Models: Coarse-scale Integro-PDEs from fine scale simulations”, Conference on Nonlinear Science and Complexity, Physics Department of the Aristotle University of Thessaloniki, Greece, September 26-29, 2022

- G. Fabiani, L. Russo, A. N. Yannakopoulos, C. Siettos, “Numerical Solution of Quasi-Linear Parabolic Partial Differential Equations with Physics Informed Random Projection Neural Networks”, POSTER session, XLII Dynamics Days Europe – Aberden, August 22–26 2022
- V. Centorrino, F. Bullo, G. Russo. “Contraction Analysis of Hopfield Neural Networks with Hebbian Learning”, Presented in the invited session “Brain Dynamics and Control”, 2022 IEEE 61st Conference on Decision and Control, Cancun, Mexico, December 6-9, 2023.
- Tawalo, A., 3rd European Conference On Earthquake Engineering and Seismology, Bucharest –Romania. “Study on the Seismic Behaviour of Shallow Box Tunnels in Dry Sandy Soil” (Poster)
- Tawalo, A., Italian Regional Conference in Complex Systems, Naples-Italy. “Assessing the land displacements induced by rainfall infiltration (Miscano landslide)” (Poster)

## 2021

- M. Coraggio, “Intermittent non-pharmaceutical strategies to mitigate the COVID-19 epidemic in a network model of Italy via constrained optimization”, invited paper presentation at 2021 60th Conference on Decision and Control (CDC), held online, 15-Dec-2021

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## SUMMER SCHOOLS

### 2024

- Annamaria Pane – Attendance at the third summer school of the INTERNATIONAL ASSOCIATION FOR ENGINEERING GEOLOGY (IAEG) AND THE ENVIRONMENT: Natural hazards, societal impact and risk from theory to practice: identification, assessment, and remediation. University of Aosta Valley, 1-9 July 2024
- M. Paula Diaz Monfort – Attendance to the 8<sup>th</sup> edition school of Complex Networks: Theory, Methods, and Applications. Lake Como School, Villa del Grumello, Como, Italy, May 27-31.
- Salvatore Ferrara – Attendance at the IMPROVE IV Network School at GFZ, Potsdam, Germany, May 27-31 2024.
- Flavia Ferriero - Attendance at the third summer school of the INTERNATIONAL ASSOCIATION FOR ENGINEERING GEOLOGY (IAEG) AND THE ENVIRONMENT: Natural hazards, societal impact and risk from theory to practice: identification, assessment, and remediation. University of Aosta Valley, 1-9 July 2024.
- Wenli Du – Attendance at the second edition of the Economic Fitness and Complexity Summer School at UNU-MERIT, Maastricht, from 8 to 12 July 2024.
- A. Tawalo, ALERT school on Numerical methods in geomechanics, Aussois-France (3-5 October).
- A. Tawalo, International Advanced School on Soil-Structure Interaction in OpenSees (2024 SSI-OS), Assisi-Italy (09-11 September).

### 2023

- Flavia Ferriero - Attendance at the ALERT (Alliance of Laboratories in Europe for Education, Research and Technology) Workshop and Doctoral School - Machine Learning in Geomechanics. Aussois, France, 25-30 September 2023.
- Tawalo, A. 2023, Spring School on Transferable Skills, Online.

## 2022

- D. Giacquinto, Modeling and understanding complex phenomena with Chaos Theory, Physikszentrum, Bad Honnef, Germany, 7 – 12 / 08 / 2022
- D. Giacquinto, Training School on Statistical Modelling of Compound Events, Lake Como School of Advanced Studies, Como, Italy, 26/9 – 7/10/2022
- Tawalo, A., 3rd edition of Mediterranean PhD School 2022- From sustainable to regenerative and resilient design, Naples- Italy.
- Tawalo, A., ALERT school on Machine Learning (ML) in Geomechanics, Aussois-France.

## 2021

- D. Giacquinto, Data-Driven Model Learning of Dynamic Systems, online, 6-9 April 2021
- V. Centorrino, AIRO PhD School 2021 “Optimization and Data Science: Trends and Applications”, online, February 8-10, 2021.