Gianluca Susi

List of Publications

International conferences

Works marked with the asterisk (*****) have been presented by Gianluca Susi.

1. G.M. Khanal, S. Acciarito, G.C. Cardarilli, A. Chakraborty, L. Di Nunzio, R. Fazzolari, A. Cristini, G. Susi, and M. Re. ZnO-rGO composite thin film resistive switching device: emulating biological synapse behaviour. In *APPLEPIES Applications in Electronics Pervading Industry, Environment and Society*, Rome, Italy, 2016.

2. G. Lo Sciuto, G. Susi, G. Cammarata, and G. Capizzi. A spiking neural network-based model for anaerobic digestion process. In *IEEE 23rd International Symposium on power electronics, electrical drives, automation and motion (SPEEDAM)*, pages 1838–1842, Anacapri, Italy, 2016. IEEE.

3. S. Acciarito, A. Cristini, L. Di Nunzio, G.M. Khanal, and G. Susi. An aVLSI driving circuit for memristor-based STDP. In *IEEE 12th Conference on PhD Research In Microelectronics and Electronics (PRIME)*, pages 1–4, Lisbon, Portugal, 2016. IEEE.

4. ***** G. Susi, A. Cristini, M. Salerno, and E. Daddario. A low-cost indoor and outdoor terrestrial autonomous navigation model. In *IEEE 22nd Telecommunications Forum (TELFOR)*, pages 675–678, Belgrade, Serbia, 2014. IEEE.

5. ***** A. Cristini, M. Salerno, and G. Susi. A continuous-time spiking neural network paradigm. In *WIRN Italian Workshop on Neural Networks*, Vietri sul Mare, Italy, 2014.

6. G. C. Cardarilli, A. Cristini, L. Di Nunzio, M. Re, Salerno, M., and G. Susi. Spiking neural networks based on LIF with latency: Simulation synchronization effects. In *IEEE 47th Asilomar Conference on Signals, Systems and Computers*, pages 1838–1842, Pacific Grove, California, USA, 2013. IEEE.

7. ***** M. Salerno, G. Susi, A. D 'Annessa, A. Cristini, and Y. Sanfelice. Spiking neural networks as analog dynamical systems: basic paradigm and simple applications. In *International Conference on Computer Science and Communication Devices, ACE*, pages 17–23, Amsterdam, The Netherlands, 2012. ACEEE. **Best Paper Award received**.

8. ***** M. Salerno, G. Susi, and A. Cristini. Accurate latency characterization for very large asynchronous spiking neural networks. In M. Pellegrini, A. L. N. Fred, J. Filipe, and H. Gamboa, editors, *BIOINFORMATICS 2011 - Proceedings of the International Conference on Bioinformatics Models, Methods and Algorithms*, pages 116–124, Rome, IT, 2011. SciTePress.

9. G. Saggio, P. Cavallo, G. Costantini, G. Susi, L.R. Quitadamo, M.G. Marciani, and L. Bianchi. Comparison of different classifiers on a reduced set of features for mental tasks-based brain computer interface. In *BIOSIGNALS2010 - International Conference on Bio-inspired Systems and Signal Processing (BIOSTEC)*, pages 174–179, Valencia, Spain, 2010. INSTICC.

International journals

1. G. Capizzi, G. Lo Sciuto, G. Susi, and M. Wozniak. A spiking neural network-based long-term prediction system for biogas production. 2019. **Under review**.

2. G. Susi, P. Garces, A. Cristini, E. Paracone, M. Salerno, F. Maestu, and E. Pereda. FNS: An event-driven spiking neural network simulator based on the LIFL neuron model. *already published in ArXiv*, 2019. **Under review**.

3. G. Susi, L. Anton Toro, L. Canuet, M.E. Lopez, F. Maestu, C.R. Mirasso, and E. Pereda. A neuro-inspired system for online learning and recognition of parallel spike trains, based on spike latency and heterosynaptic STDP. *Frontiers in Neuroscience*, 12, 2018.

4. S. Acciarito, G.C. Cardarilli, A. Cristini, L. Di Nunzio, R. Fazzolari, G.M. Khanal, M. Re, and G. Susi. Hardware design of LIF with latency neuron model with memristive STDP synapses. *Integration, the VLSI Journal*, 59:81–89, 2017.

5. S. Brusca, G. Capizzi, G. Lo Sciuto, and G. Susi. A new design methodology to predict wind farm energy production by means of a spiking neural network based-system. *International Journal of Numerical Modelling: Electronic Networks, Devices and Fields*, 7 2017.

6. G. Khanal, S. Acciarito, GC. Cardarilli, A. Chakraborty, L. Di Nunzio, R. Fazzolari, A. Cristini, M. Re, and G. Susi. Synaptic behaviour in ZnO-rGO composites thin film memristor. *Electronics Letters*, 53(5):296–298, 2017.

7. G. Susi, A. Cristini, and M. Salerno. Path multimodality in a Feedforward SNN module, using LIF with latency model. *Neural Network World*, 26(4):363–376, 2016.

8. G. Susi. Bio-inspired temporal-decoding network topologies for the accurate recognition of spike patterns. *Transactions on Machine Learning and Artificial Intelligence*, 3(4):27–41, 2015.

9. M. Salerno, G. Susi, A. Cristini, Y. Sanfelice, and A. D 'Annessa. Spiking neural networks as continuous-time dynamical systems: fundamentals, elementary structures and simple applications. *ACEEE Int. J. on Information Technology*, 3(1), 2013.

10. M. Salerno, M. Re, A. Cristini, G. Susi, M. Bertola, E. Daddario, and F. Capobianco. AUDINECT: an aid for the autonomous navigation of visually impaired people, based on virtual interface. *International journal of Recent Trends in Human Computer Interaction*, 4(1):25–33, 2013.

Books

1. G. Susi. *Asynchronous spiking neural networks: paradigma generale e applicazioni*. TeXmat, Rome, 2013.

Chapters

1. D. Lopez-Sanz, J. de Frutos Lucas, G. Susi, and F. Maestu. Diagnostic utility of magnetoencephalography in the preclinical phase of alzheimer disease. In *OXFORD RESEARCH ENCYCLOPEDIA*. Oxford University press, 2019. **Under review**.

2. G. Susi, J. de Frutos Lucas, G. Niso, S.M. Ye Chen, L. Antón Toro, B.N. Chino Vilca, and F. Maestu. Healthy and pathological neurocognitive aging: Spectral and functional connectivity analyses using magnetoencephalography. In *OXFORD RESEARCH ENCYCLOPEDIA OF PSYCHOLOGY AND AGING*. Oxford University press, 2018.

3. G.M. Khanal, S. Acciarito, G.C. Cardarilli, A. Chakraborty, L. Di Nunzio, R. Fazzolari, A. Cristini, G. Susi, and M. Re. ZnO-rGO composite thin film resistive switching device: emulating biological synapse behavior. In A. De Gloria, editor, *Lecture Notes in Electrical Engineering: Applications in Electronics Pervading Industry, Environment and Society*. Springer International Publishing, 2017.

4. A. Cristini, M. Salerno, and G. Susi. A continuous-time spiking neural network paradigm. In S. Bassis, A. Esposito, and F. C. Morabito, editors, *Advances in Neural Networks: Computational and Theoretical Issues. Smart Innovation, Systems and Technologies*, volume 37, pages 49–60. Springer International Publishing, 2015.

Press releases

1. "SiNC", la ciencia es noticia (2019) - Nuevo sistema de detección de patrones neuroinspirado.

2. MedicalXpress (2019) - Neuro-inspired pattern recognition

3. laSexta Tecnoxplora (2019) - Sistema de detección de patrones neuroinspirado.

4. Madri+d notiweb (2019) - Sistema de detección de patrones neuroinspirado.

5. IFISC-CSIC news (2019) - Neuro-inspired pattern recognition.

6. IFISC-CSIC news (2019) - Neuro-inspiración para el reconocimiento de patrones.

7. Boletín e-politécnica investigación e innovación (2019) - Nuevo sistema de detección de patrones neuroinspirado.

8. El diari de la UIB (2019) - Neuro-inspiración para el reconocimiento de patrones.

9. CTB blogspot (2019) - Sistema de detección de patrones neuroinspirado.

10. TODOArgentina (2019) - Nuevo sistema de detección de patrones neuroinspirado.

11. NCYT (2019) - Nuevo sistema de detección de patrones neuroinspirado.

12. Psicologia al dia (2019) - Nuevo sistema de detección de patrones neuroinspirado.

13. Storie di Creativita' - Lazio creativo, Presidenza del Consiglio dei Ministri (2017) - Folies de Seeinteracting: l'Universitá in scena (pag.70).

Posters presented in conferences/meetings

1. S. Brusca, G. Capizzi, G. Lo Sciuto, and G. Susi. A new design methodology to predict wind farm energy production by means of a spiking neural network based-system. Poster @ IEEE optimization and inverse problems in electromagnetism (OIPE). Rome, Italy, 13-15/09/2016.

2. ***** A. Cristini, G. Susi, M. Salerno, R. Fazzolari, L. Di Nunzio, G.C. Cardarilli, and M. Re. Spiking neural network-based character recognition exploiting different coding schemes. Poster @ 31st Annual Meeting of Electrical Engineering Researchers (ET2015). Genova, Italy, 2015.

3. L. Di Nunzio, R. Fazzolari, M. Re, G.C. Cardarilli, G. Susi, A. Cristini, and M. Salerno. Reconfigurable functional unit for digital signal processing acceleration. Poster @ 31st Annual Meeting of Electrical Engineering Researchers (ET2015). Genova, Italy, 18-19/06/2015.

4. M. Salerno, G. Susi, A. Cristini, M. Re, and G.C. Cardarilli. Event-driven simulation of continuous-time neural networks. Poster @ 30th Annual Meeting of Electrical Engineering Researchers (ET2014). Sorrento, Italy, 18-20/06/2014.

5. ***** M. Salerno, G. Susi, A. Cristini, M. Re, and G.C. Cardarilli. Continuous-time spiking neural networks: general paradigm and event-driven simulation. Poster @ 29st Annual Meeting of Electrical Engineering Researchers (ET2013). Padova, Italy, 19-21/06/2013. **Best Poster Award received**.

Abstracts in national conferences/meetings

1. G. Susi. Tuning of spiking brain models. single- or multiple-frequency generators? In *III Congreso Intermiembros MEG - LNCyC*, Almarza (Soria), Spain, 2018. UCM.

2. G. Susi. Resting-state MEG functional connectivity using event-driven spiking neural networks. In *II Congreso Intermiembros MEG - LNCyC*, Almarza (Soria), Spain, 2017. UCM.

3. G.C. Cardarilli, M. Re, M. Salerno, G. Susi, A. Cristini, S. Acciarito, L. Di Nunzio, and R. Fazzolari. Implementazione hardware di reti neurali spiking bio-realistiche, basate su memristore. In *32nd Annual Meeting of the ElecTrical engineering group (ET2016)*, Palermo, Italy, 15-17/06/2016. ElecTrical engineering group.

4. S. Acciarito, G.C. Cardarilli, A. Cristini, L. Di Nunzio, R. Fazzolari, G.M. Khanal, M. Re, and G. Susi. Hardware implementation of a spiking neuron model based on memristor. In *GE-SIE Annual Meeting*, Brescia, Italy, 20-22/06/2016. GE-SIE Gruppo di Elettronica.

5. M. Salerno, G. Susi, A. Cristini, G.C. Cardarilli, and M. Re. A simple approach for different-scale continuous time neural network simulations. In *31st Annual Meeting of the ElecTrical engineering group (ET2015)*, Genova, Italy, 18-19/06/2015. ElecTrical engineering group.

6. M. Salerno, G. Susi, and A. Cristini. Continuous-time neural networks: paradigm and applications. In *30th Annual Meeting of the ElecTrical engineering group (ET2014)*, Sorrento, Italy, 18-20/06/2014. ElecTrical engineering group.

Talks and seminars

1. **Seminar**. G. Susi. A neuro-inspired system for online learning and recognition of parallel spike trains based on spike latency and heterosynaptic stdp. IFISC Instituto de Fisica Interdisciplinar y Sistemas Complejos, University of Balearic Islands, 11/12/2018.

2. **Invited talk**. G. Susi. Structural and functional neural correlates of emotional responses to music. 6th International Workshop on Computational Creativity Concept Invention, and General Intelligence (C3GI). Madrid, Spain, 15/12/2017.

3. **Selected talk**. G. Susi. Reproduction of spontaneous brain activity using event-driven spiking neural networks. 33rd Annual Meeting of Electrical Engineering Researchers (ET2017). Milano, Italy, 30/06/2017.

4. **Invited talk**. G. Susi. Reproduction of MEG spontaneous functional connectivity using spiking neural networks: impact of the "spike latency" neuro-computational feature. II Ibersinc meeting. Madrid, Spain, 25/04/2017.

5. **Invited seminar**. G. Susi. Reproduction of resting-state MEG functional connectivity using spiking neural networks. Complex Systems Group of Universidad Rey Juan Carlos/CTB. Madrid, Spain, 17/02/2017.

6. **Seminar**. G. Susi. Basic mathematical tools for functional connectivity analysis. Center of Biomedical Technology, Technical University of Madrid - Complutense University of Madrid. Madrid, Spain, 08/02/2017.

7. **Invited seminar**. G. Susi. Use of spiking neural networks for the reproduction of large-scale resting-state functional-connectivity in healthy and diseased brain. Center of Biomedical Technology, Technical University of Madrid - Complutense University of Madrid. Madrid, Spain, 29/09/2016.

8. **Invited seminar**. G. Susi. Metodi per il confronto tra attivita cerebrale reale e attivita simulata tramite reti neurali spiking. Universita degli Studi di Cassino e del Lazio Meridionale. Cassino, Italy, 24/11/2015.

9. **Seminar**. G. Susi. Sistemi tempo-discreti e tempo continui. le reti neurali spiking (with Prof. Mario Salerno). 29th Advanced PhD School Ferdinando Gasparini. Napoli, Italy, 2015.

10. **Selected talk**. G. Susi. Reverse engineering the brain: il contributo del ricercatore di elettrotecnica al progresso delle neuroscienze computazionali. 31st Annual Meeting of Electrical Engineering Researchers (ET2015). Genova, Italy, 19/06/2015.

Supervised or co-supervised students

Master's degree/University Master:

1. Roberto Acquafredda. *Tecniche di mastering per compact disc, long playing e broadcasting radio*. Master in Audio Engineering, University of Rome "Tor Vergata", 2011. **Cum Laude**.

2. Fabio Bartolacci. *Validazione del fenomeno della risonanza stocastica mediante l'utilizzo di un modello computazionale di apparato uditivo periferico*. Master in Audio Engineering, University of Rome "Tor Vergata", 2016.

3. Francesca Capobianco. *Progettazione e sviluppo di un prototipo per la navigazione autonoma di non vedenti, basato su interfaccia virtuale*. Master's degree in Medical Engineering, University of Rome "Tor Vergata", 2011.

4. Dario Cesarini. *Chi darà voce al mio pensiero*. Master in Audio Engineering, University of Rome "Tor Vergata", 2016.

5. Valeria Cifaratti. *Progettazione e sviluppo di un dispositivo elettromeccanico per la navigazione autonoma indoor di non vedenti*. Master's degree in Medical Engineering, University of Rome "Tor Vergata", 2014.

6. Domingo Colasurdo. *Batterie elettroniche: stato dell'arte e sviluppi futuri*. Master in Audio Engineering, University of Rome "Tor Vergata", 2011.**Cum Laude**.

7. Alessandro Cristini. *Caratterizzazione e simulazione di reti neurali spiking di grandi dimensioni*. Master's degree in Electronic Engineering, University of Rome "Tor Vergata", 2010. **Cum Laude**.

8. Emiliano Daddario. *Applicazioni Natural User Interface per motion controllers orientate alle arti sonore e visive*. Master in Audio Engineering, University of Rome "Tor Vergata", 2012. **Cum Laude**.

9. Andrea D'Annessa. *Sviluppo e simulazione di reti neurali spiking asincrone orientate alla pattern recognition*. Master's degree in Electronic Engineering, University of Rome "Tor Vergata", 2012.

10. Riccardo Favaretto. *Metodo di analisi timbrica basato sulla manipolazione sonora e la risintesi orientata al musical timbre design*. Master in Audio Engineering, University of Rome "Tor Vergata", 2012. **Cum Laude**.

11. Michele Ferrigno. *Applicazioni di reti neurali spiking in problemi di classificazione: il riconoscitore di immagini*. Master's degree in Electronic Engineering, University of Rome "Tor Vergata", 2012.

12. Carolina Gatica. *Diretta radiofonica: Funzione, modalità di organizzazione e produzione*. Master in Audio Engineering, University of Rome "Tor Vergata", 2013.

13. Giuseppe Sacchi. *Analisi e Risintesi Real-Time in Max/MSP orientata alla Live Performance*. Master in Audio Engineering, University of Rome "Tor Vergata", 2017.

14. Cristiano Salvati. *Design of IR- and RFID-based accessible devices for electronic music*. Master in Audio Engineering, University of Rome "Tor Vergata", 2012.

15. Yari Sanfelice. *Sviluppo e simulazione di reti neurali asincrone di grandi dimensioni"*. Master's degree in Electronic Engineering, University of Rome "Tor Vergata", 2011. **Cum Laude**.

16. Vahid Shahrokhiara. *La presa diretta*. Master in Audio Engineering, University of Rome "Tor Vergata", 2013.

Laurea degree:

1. Jesus Cabrera Alvarez (Co tutoring @ Laboratory of Cognitive and Computational Neuroscience). *Thalamo-cortical resonance phenomena*. Grado en Psicologia, Universidad Complutense de Madrid, 2018.

2. Francesca Capobianco. *Reti neurali spiking : applicazione ai metodi di apprendimento e classificazione*. Laurea degree in Medical Engineering, University of Rome "Tor Vergata", 2009.

3. Matteo Di Giorgio. *BrailNect: sviluppo hardware*. Laurea degree in Electronic Engineering, University of Rome "Tor Vergata", 2013.

4. Veronica Mari. *Reti neurali neuromorfe: plasticita' e darwinismo neurale*. Laurea degree in Medical Engineering, University of Rome "Tor Vergata", 2009.

5. Renato Paciotta. *Valutazione sulle metodologie finalizzate al miglioramento dell'acquisizione di dati tramite sensori di profondità*. Laurea degree in Electronic Engineering, University of Rome "Tor Vergata", 2014.

6. Mirko Rossi. *BrailNect: sviluppo software*. Laurea degree in Electronic Engineering, University of Rome "Tor Vergata", 2013. **Cum Laude**.