

# Curriculum Vitae

## INFORMAZIONI PERSONALI

**Nome** MARIA CATERINA  
**Cognome** MANNONE  
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## FORMAZIONE TITOLI

### Ph.D.

**Music Composition, University of Minnesota**, May 6 2017

**Equipollent** to the Italian university doctorate, protocol no. 000036, January 22, 2020

Thesis title: "Musical Gestures between Scores and Acoustics: A Creative Application to Orchestra"

*Doctoral committee: Prof. Alex Lubet (advisor, composer), Prof. Mikhail Shifman (theoretical physicist, Dirac medalist), Prof. David Walsh (Opera director), Prof. Maja Radovanlija (music performer).*

### Master 2 ATIAM (Acoustics, Signal Processing and Computer Science applied to Music), equivalent to "Laurea Magistrale"

IRCAM – UPMC Paris VI Sorbonne, 9/9/2013; Marks: 12.30/20

Thesis title: "Segmentation de series temporelles pour l'orchestration automatique." *Advisor: Prof. Carlos Agon*

### Master in Orchestral Conducting (Diploma V.O., equiparato alla Laurea Magistrale)

Conservatorio di Musica "Vincenzo Bellini", Palermo, 7/4/2012; Marks: 10/10. *Advisor: Prof. Carmelo Caruso*

### Master in Theoretical Physics (Laurea Magistrale in Fisica Teorica)

Università degli Studi di Palermo, 3/28/2012; Marks: 110/110 *summa cum laude*, and thesis mentioned for the Prize Gugino competition

Thesis title (translated into English): "Non-Markovianity in open quantum systems under the action of Random External Fields and with decay" (*containing applications of non-Markovianity dynamics to musical structures*). *Advisor: Prof. Giuseppe Compagno*

### Bachelor in Physics (Laurea in Fisica)

Università degli Studi di Palermo, 11/12/2009; Marks: 97/110

Thesis title: "Dynamics of violation of Bell-Mermin's inequalities in open quantum systems." *Advisor: Prof. Giuseppe Compagno*

### Master in Composition (Diploma V.O., equiparato alla Laurea Magistrale)

Conservatorio di Musica "Vincenzo Bellini", Palermo, 10/1/2009; Marks: 9/10. *Advisor: Prof. Marco Betta*

### Master in Piano (Diploma V.O., equiparato alla Laurea Magistrale)

Conservatorio di Musica "Vincenzo Bellini", Palermo, 9/25/2008; Marks: 10/10. *Advisor: Prof. Renato Giarrizzo*

## PUBBLICAZIONE

### Journal Papers

**M. Mannone**, V. Seidita, A. Chella. *Modeling and Designing a Robotic Swarm: a Quantum Computing Approach*. Swarm and Evolutionary Computation, 79: 101297, 2023. <https://doi.org/10.1016/j.swevo.2023.101297>.

A. Chella, S. Gaglio, **M. Mannone**, G. Pilato, V. Seidita, F. Vella, S. Zammuto. *Quantum Planner for Swarm Robotics*. Robotics and Autonomous Systems (RAS), 2022, DOI [10.1016/j.robot.2023.104362](https://doi.org/10.1016/j.robot.2023.104362).

**M. Mannone**, V. Distefano, and G. Santini. *Classes of Colors and Timbres: A Clustering Approach*. Electronic Journal of Statistical Analysis, 15 (3), 2022. <http://siba-ese.unisalento.it/index.php/ejasa/article/view/25173/21936>.

**M. Mannone** and M. Montiel. *Atlanta: Mathematics and Music*. Journal of Mathematics and the Arts, 2022. <http://dx.doi.org/10.1080/17513472.2022.2137890>

**M. Mannone** and G. Compagno. *Characterization of the degree of Musical non-Markovianity*. Journal of Creative Musical Systems, 2022, accepted DOI: 10.5920/jcms.975. Former version: 2013, <https://arxiv.org/abs/1306.0229>

**M. Mannone** and V. Seidita. *Quantum Creativity of Humans and Robots*, Journal of Artificial Intelligence and Consciousness, 9 (3), 2022, 1–16, DOI: 10.1142/S2705078522500102.

**M. Mannone** and T. Yoshino. *Temari Balls, Spheres, SphereHarmonic: from Japanese Folkcraft to Music*. Accepted for publication on Algorithms, 2022

**M. Mannone**, V. Seidita, and A. Chella. *Categories, Quantum Computing, and Swarm Robotics: A Case Study*. Mathematics, 2022, 10(3): 372. <https://www.mdpi.com/2227-7390/10/3/372>

**M. Mannone**, G. Santini, E. Adedoyin, and C. E. Cella. *Color and Timbre Gestures: an Approach with Bicategories and Bigroupoids*. Mathematics, 2022, 10(4): 663. <https://www.mdpi.com/2227-7390/10/4/663>

**M. Mannone**. "Mirrors." Women and Music: A Journal of Gender and Culture 25 (2021): 87-89. doi:10.1353/wam.2021.0006.

**M. Mannone**. *Reversing Arrows: Duality*. Journal of Mathematics and the Arts, 2021. DOI:10.1080/17513472.2021.1979910

**M. Mannone**. *A musical reading of a contemporary installation and back: mathematical investigations of patterns in Qwalala*. Journal of Mathematics and Music, 2021, DOI:10.1080/17459737.2021.1871787

**M. Mannone** and F. Favali. *Musical Form and Architectural Structure: Some Considerations on Qwalala*. Context 46 (2020): 35–49 (indexed on the International Index of Music Periodicals)

D. Rocchesso and **M. Mannone**. *A Quantum Vocal Theory of Sound*. Quantum Information Processing, 2020, 19(292) <http://dx.doi.org/10.1007/s11128-020-02772-9>, SJR: 0.610 updated to 2018, H-Index: 51 according to Scimago, <https://doi.org/10.1007/s11128-020-02772-9>,

P. beim Graben and **M. Mannone**. *Musical pitch quantization as an eigenvalue problem*. Journal of Mathematics and Music, 14(3): 329-346, 2020, <https://doi.org/10.1007/s11128-020-02772-9>

[www.tandfonline.com/doi/abs/10.1080/17459737.2020.1763488](http://www.tandfonline.com/doi/abs/10.1080/17459737.2020.1763488)

**M. Mannone** and D. Papageorgiou. *Gestural Similarity, Mathematics, Psychology. Hints from a First Experiment and some Applications between Pedagogy and Research*. Journal of Collected papers of Academy of Arts of Novi Sad (Zbornik radova Akademije umetnosti), Eight Issue, Zbornik, Serbia, 2020, pp. 137-153  
doi: 10.5937/ZbAKU2008137M. ISSN 2334-8666

**M. Mannone**, F. Favali, B. Di Donato, and L. Turchet. *Quantum GestART: Identifying and Applying Correlations between Mathematics, Art, and Perceptual Organization*. Journal of Mathematics and Music, 2020, 15:1, 62-94 <https://www.tandfonline.com/doi/abs/10.1080/17459737.2020.1726691>

**M. Mannone**, I. Iaccarino, and R. Iembo. *Dense Geometry of Music and Visual Arts: Vanishing Points, Continuous Tonnetz, and Theremin Performance*, The STEAM Journal, 3 (2), article 15, 2018 <https://scholarship.claremont.edu/steam/vol3/iss2/15/>

**M. Mannone**, *Artist's Statement: Some Parametric Art*, The STEAM Journal, 2018, 3 (2), article 13, 2018  
<https://scholarship.claremont.edu/steam/vol3/iss2/13/>

**M. Mannone**, *cARTegory Theory: framing Aesthetics of Mathematics*, Journal of Humanistic Mathematics, 9 (18), 277--294, 2019, <https://scholarship.claremont.edu/jhm/vol9/iss1/16>

**M. Mannone**, E. Kitamura, J. Huang, R. Sugawara, and Y. Kitamura, *Musical Combinatorics, Tonnetz, and the CubeHarmonic*, Journal of Collected papers of Academy of Arts, Sixth Issue, pp. 104-116, Zbornik, Serbia, 2018, <https://scindeks-clanci.ceon.rs/data/pdf/2334-8666/2018/2334-86661806104M.pdf>

**M. Mannone**, *Introduction to Gestural Similarity in Music. An Application of Category Theory to the Orchestra*, Journal of Mathematics and Music, 12 (2), pp. 63-87, 2018, <https://www.tandfonline.com/doi/full/10.1080/17459737.2018.1450902>

**M. Mannone**, *Knots, Music, and DNA*, Journal of Creative Music Systems, March 2018, <https://www.jcms.org.uk/article/id/523/>  
Indexed on SCOPUS

**M. Mannone**, K. Gkoudina, E. Tyler, *Narrating the Origin of the Universe through the Music: a Case Study*, Journal of Collected papers of Academy of Arts of Novi Sad, Fifth Issue, pp. 110-119, Zbornik, Serbia, 2017, <http://scindeks-clanci.ceon.rs/data/pdf/2334-8666/2017/2334-86661705110M.pdf>  
A video abstract is available: <https://www.youtube.com/watch?v=-Mb6FnGDZiI>

**M. Mannone**, *Networks of Music and Images*, Gli Spazi della Musica, University of Torino, 6 (2), 2017, <http://www.ojs.unito.it/index.php/spazidellamusica/article/view/2528>

**M. Mannone**, *Marco Orsini conducts Music without Seeing*, American Council of the Blind, ACB E-Forum Volume LV June 2017 No.12, <http://acb.org/content/acb-e-forum-volume-lv-june-2017-no-12>

G. Mazzola and **M. Mannone**, *Global Functorial Hypergestures over General Skeleta for Musical Performance*, Journal of Mathematics and Music, 2016, <http://dx.doi.org/10.1080/17459737.2016.1195456>

G. Mazzola and **M. Mannone**, *Hegel's Conceptual Group Action on Creative Dynamics in Music*, Gli spazi della musica, University of Torino, 2014, <https://www.ojs.unito.it/index.php/spazidellamusica/article/view/819>

**M. Mannone**, R. Lo Franco and G. Compagno, *Comparison of non-Markovianity criteria in a qubit system under random external fields*, Physica Scripta, Phys. Scr. T153 (2013) 014047, <https://iopscience.iop.org/article/10.1088/0031-8949/2013/T153/014047>

#### Papers in Conference Proceedings

**M. Mannone**, V. Seidita, A. Chella, A. Giacometti, P. Fazio. *Energy and SNR-Aware Robotic Swarm Coordination for Aquatic Cleaning Operations*. IEEE Vehicular Technology Conference, VTC 2023, accepted for publication, 2023.

**M. Mannone**, V. Seidita, and A. Chella. *Quantum Robotic Swarms: What, Why, and How*. AIRO workshop, Udine (2022), in press

**M. Mannone**, V. Seidita, and A. Chella. *Does Creativity Help Us Survive? A Possible Approach with Quantum-Driven Robots*. CEUR, CREAI workshop on artificial intelligence and creativity, Udine (2022), vol. 3278, ISSN 1613-0073, <https://ceur-ws.org/Vol-3278/>

**M. Mannone**, V. Seidita, and A. Chella. *Quantum RoboSound: Auditory Feedback of a Quantum-Driven Robotic Swarm*. 2022 31st IEEE International Conference on Robot and Human Interactive Communication (RO-MAN), Naples 2022, pp. 287-292, doi: 10.1109/RO-MAN53752.2022.9900578.

**M. Mannone** and V. Distefano. *Sonification and Clustering: a Multi-Sensory Perspective for Precision Medicine*. SoniHed conference, Stockholm, 2022. In: Pualetto, S., Delle Monache, S. and Selfridge, R. (Eds) Proceedings of the Conference on Sonification of Health and Environmental Data (SoniHED 2022), pages 63-67. ISBN: 978-91-8040-358-0. <https://doi.org/10.5281/zenodo.7243855>.

**M. Mannone** and V. Distefano. *Trajectory-based and Sound-based Medical Data Clustering*. Conference. ACM BCB '22: 13th ACM International Conference on Bioinformatics, Computational Biology and Health Informatics Northbrook Illinois August 7 - 10, 2022. Article No.: 62, Pages 1, <https://doi.org/10.1145/3535508.3545102> (remotely-sent poster; Abstract).

**M. Mannone**. *Seeds, Brains, and Bridges*. Creativity & Cognition ACM conference, Venice 2022. June 2022, Pages 649–651, <https://doi.org/10.1145/3527927.3531194>. Extended abstract.

**M. Mannone**, T. Yoshino, P. Chiu, and Y. Kitamura. *Hypercube + Rubik's Cube + Music = HyperCubeHarmonic*. In: Montiel M; A. Agustin-Aquino O; Gomez F; Kastine F; Lluis-Puebla E; Milam B. (Eds.), *Mathematics and Computation in Music*. LECTURE NOTES IN ARTIFICIAL INTELLIGENCE, vol. LNAI 13267, BERLIN HEIDELBERG: Springer-Verlag, ISSN: 0302-9743, Atlanta, June 21-24 2022, doi: 10.1007/978-3-031-07015-020.

**M. Mannone** and J. S. Arias-Valero. *Some Mathematical and Computational Relations Between Timbre and Color*. In: Montiel M; et al, *Mathematics and Computation in Music*. LECTURE NOTES IN ARTIFICIAL INTELLIGENCE, vol. LNAI 13267, p. 127-139, BERLIN HEIDELBERG: Springer-Verlag, ISSN: 0302-9743, Atlanta, June 21-24 2022, doi: 10.1007/978-3-031-07015-011.

**M. Mannone** and T. Yoshino. *Mathematical Aspects of a new Spherical Musical Instrument: the SphereHarmonics*. In: Viana, V., Nagy, D., Xavier, J., Neiva, A., Ginoulhiac, M., Mateus, L. & Varela, P., Viana, V., Nagy, D., Xavier, J., Neiva, A., Ginoulhiac, M., Mateus, L. & Varela, P. (Eds.), *Symmetry: Art and Science | 12th SIS-Symmetry Congress* [Special Issue]. Porto: International Society for the Interdisciplinary Study of Symmetry. Porto, July 2022.

**M. Mannone**, V. Distefano, C. Silvestri, and I. Poli. *Comparison of clustering methods for diabetic kidney disease patients formalized through category theory*. APPLIED STATISTICS 2021, Statistical Society of Slovenia, pp. 33-33, <https://akastrin.si/as-book-2021.pdf>

Distefano V, **Mannone M**, Silvestri C, Poli I (2021). *Cluster analysis of diabetic kidney disease longitudinal data*. In: Kontoghiorghes, E J, Book of Abstracts: CFE-

CMStatistics 2021; 15th International Conference on Computational and Financial Econometrics, 14th International Conference of the ERCIM Working Group on Computational and Methodological Statistics. King's College London, UK, 2021

**M. Mannone**, V. Distefano, C. Silvestri, and I. Poli. *Clustering Longitudinal Data with Category Theory for Diabetic Kidney Disease*. CLADAG 2021 conference: Book of Abstracts and Short Papers, pp. 364-367 (2021), ISSN 2704-601X (PRINT) - ISSN 2704-5846 (ONLINE), <https://media.fupress.com/files/pdf/24/7254/194072021>.

V. Distefano, **M. Mannone**, C. Silvestri, and I. Poli, *Categories and Clusters to investigate Similarities in Diabetic Kidney Disease Patients*, 50th Conference of the Statistics Italian Society, Books of Short Papers SIS 2021, pp. 1162-1167, Pearson, ISBN 9788891927361, 2021

**M. Mannone**, E. Kitamura, J. Huang, R. Sugawara, P. Chiu, and Y. Kitamura, *CubeHarmonic: A New Musical Instrument Based on Rubik's Cube with Embedded Motion Sensor*, ACM SIGGRAPH '19, Los Angeles, California, USA, pages 53:1-53:2, 2019, <http://doi.acm.org/10.1145/3306214.3338572>.  
H-Index: 144 according to Scimago

**M. Mannone** and F. Favali, *Categories, Musical Instruments, and Drawings: A Unification Dream*, Proceedings of the Conference of Mathematics and Computation in Music, Madrid. M. Montiel, F. Gómez and O. Agustín-Aquino (editors), Lecture Notes in Computer Science, Springer, pages 59-72, 2019, <https://link.springer.com/chapter/10.1007/978-3-030-21392-35>. **Lecture Notes in Computer Science book series (LNCS, volume 11502), Lecture Notes in Artificial Intelligence book sub series (LNAI, volume 11502)**

**M. Mannone** and L. Turchet, *Shall We (Math and) Dance?*, Proceedings of the Conference of Mathematics and Computation in Music, Madrid. M. Montiel, F. Gómez and O. Agustín-Aquino (editors), Lecture Notes in Computer Science, Springer, pages 84-97, 2019, <https://link.springer.com/chapter/10.1007/978-3-030-21392-37>. **Lecture Notes in Computer Science book series (LNCS, volume 11502), Lecture Notes in Artificial Intelligence book sub series (LNAI, volume 11502)**

**M. Mannone**, *Have Fun with Math and Music!*, invited contribution, Mathematics and Computation in Music Conference, Madrid. M. Montiel, F. Gómez and O. Agustín-Aquino (editors), Lecture Notes in Computer Science, Springer, pages 379-382, 2019, <https://link.springer.com/chapter/10.1007/978-3-030-21392-333>. **Lecture Notes in Computer Science book series (LNCS, volume 11502), Lecture Notes in Artificial Intelligence book sub series (LNAI, volume 11502)**

D. Rocchesso and **M. Mannone**, *Embryo of a Quantum Vocal Theory of Sound*, CIM Conference, Udine, Italy, Proceedings of the 22nd CIM, Udine, November 20-23, 101-108, 2018, <http://cim.lim.di.unimi.it/2018CIMXXIIAtti.pdf>

**M. Mannone**, E. Kitamura, J. Huang, R. Sugawara, and Y. Kitamura, *CubeHarmonic: A New Interface from A Magnetic 3D Motion Tracking System to Music Performance*, Proceedings of the International Conference on New Interfaces for Musical Expression, editors Luke Dahl, Douglas Bowman, Thomas Martin, Virginia Tech, 2018, pp. 350-351, <http://www.nime.org/proceedings/2018/nime2018paper0076.pdf>

**M. Mannone**, *Mathematics, Art, and Cognitive Sciences: Some Examples of Connection*, Proceedings of the Conference of the International Journal of Arts and Sciences, University of Catania, Italy, May 29 2017, 10 (2), 233-238, <http://www.universitypublications.net/proceedings/1002/pdf/S7Y131.pdf>

**M. Mannone** and G. Mazzola, *Hypergestures in Complex Time: Creative Performance Between Symbolic and Physical Reality*. Proceedings of the Conference of Mathematics and Computation in Music, Lecture Notes in Computer Science, Springer, 2015, <https://link.springer.com/chapter/10.1007/978-3-319-20603-514>. **Lecture Notes in Artificial Intelligence (LNAI 9110)**

#### Books

F. Favali and **M. Mannone** (editors and translators), "Simmetrie fra Matematica e Musica," selection and translation into Italian of English articles on music and symmetry, Palermo University Press/New Digital Frontiers, I quaderni di Clio no. 3, 2020

**M. Mannone**, *Mathematics, Nature, Art*, Palermo University Press, Palermo, 2019

G. Mazzola, R. Guitart, J. Ho, A. Lubet, **M. Mannone**, M. Rahaim, F. Thalmann, *The Topos of Music III: Gestures*, Springer Series Computational Music Science, 2018

G. Mazzola, **M. Mannone**, Y. Pang, M. O' Brien, N. Torunsky, *All About Music: The Complete Ontology: Realities, Semiotics, Communication, and Embodiment*, Springer Series Computational Music Science, 2016

G. Mazzola, **M. Mannone**, Y. Pang, *Cool Math for Hot Music*, Springer Series Computational Music Science, Heidelberg et al., 2016

**M. Mannone**, *Dalla Musica all'Immagine, dall'Immagine alla Musica - Relazioni matematiche fra composizione musicale e arte figurative (From Music to Images, from Images to Music - Mathematical relations between musical composition and figurative art)*, Edizioni Compostampa, Palermo, 2011

#### Book Chapters

**M. Mannone** and F. Jedrzejewski. *Venice, Glass, and Math*. Women in MathArt (editor: Shanna Dobson), Springer, accepted for publication, to appear 2023

**M. Mannone** and D. Rocchesso, *Sing and Measure: Sound as Voice as Quanta*. In: (eds.) Miranda E. R., Quantum Computer Music. Springer, Cham (2022), 297-312. <https://doi.org/10.1007/978-3-031-13909-312>

**M. Mannone** and D. Rocchesso, *Quanta in sound, the sound of quanta: a voice-informed quantum theoretical perspective on sound*. In: (eds.) Miranda E. R., Quantum Computing in the Arts and Humanities. Springer, Cham (2022), 193-226. <https://doi.org/10.1007/978-3-030-95538-06>

**M. Mannone**, "Theoretical Physics and Category Theory as Tools for Analysis of Musical Performance and Composition," in *Mathematical Music Theory: Algebraic, Geometric, Combinatorial, Topological and Applied Approaches to Understanding Musical Phenomena*, eds. M. Montiel and R. W. Peck, 215-231, World Scientific, 2018

**M. Mannone**, "Can Mathematical Music Theory be Easily Learnt and also be Fun?" in *Theoretical and Practical Pedagogy of Mathematical Music Theory: Music for Mathematics and Mathematics for Music, From School to Postgraduate Levels*, eds. M. Montiel and F. Gómez, 281-298, World Scientific, 2018

#### Selected Italian Publications

**M. Mannone**. *Dante e l'Ipersfera: una felice intuizione*. Nuova Lettera Matematica, n. 4, 2022, pp. 59-67

**M. Mannone**. *Alberi e Sinfonie*. Nuova Lettera Matematica, 2021, pp. 79-83

**M. Mannone** and D. Passaro. *Stereotipi che allontanano: il violino e il legame perduto fra arte, matematica e scienze*. Query, 2020

**M. Mannoni** and D. Passaro. *E se l'Arte e la Matematica tornassero ad abbracciarsi? STEAM, intelligenza artificiale e arte*. Prisma, 2020

**M. Mannoni**, *Libellule, fiori, origami: Momenti artistici al Joint Mathematics Meetings 2020*. Nuova Lettera Matematica, 1, June 2020

**M. Mannoni** and D. Passaro, *Matematica, Arte e Coding*. La leva di Archimede, Archimede, rivista per gli insegnanti e i cultori di matematiche pure e applicate, Year LXX, October-December 2018, Number 4, Le Monnier, 2018

**M. Mannoni**, *Il corso di ascolto e teoria musicale al Liceo Classico "G. Meli,"* in: *L'insegnamento musicale a livello di base*, Quaderni del Toscanini (*Course of listening and musical theory, basic level*, "Books of the Toscanini"), Piccola biblioteca musicale Ars Nova, Palermo, 2012

**M. Mannoni**, *Forme e funzioni matematiche come collegamento fra le arti visive e musicali: un'ipotesi di reversibilità parziale*, Atti del Convegno *Composizione Musica Architettura* (*Mathematical forms and functions as a link between visual and musical arts: an hypothesis of partial reversibility*), *Proceedings of the Conference Composizione Musica Architettura*, Casa Editrice Libria, Dicembre 2013

## **AMBITI DI RICERCA**

Swarm robotics; quantum computing; mathematical music theory