

Curriculum vitae

Carmine-Emanuele Cella

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In a nutshell

Composer, applied mathematician, inventor and educator.

Education

- 2011 **Doctorate**, *University of Bologna*, Italy.
Ph.D. in Science, cognition and technology (applied logic and mathematics), advisors: Giovanna Corsi and Fabio Bellissima, grading: *excellence*, dissertation title: On symbolic representations of music.
- 2007 **Doctorate**, *Accademia Nazionale "S. Cecilia"*, Rome, Italy.
Ph.D. in Music Composition, advisor: Azio Corghi, grading: 10/10.
- 2004 **Master degree**, *University of Urbino*, Italy.
Master in Philosophy (mathematical logic), grading: *cum laude*, dissertation title: Sulla struttura logica della musica.
- 2003 **Master degree**, *Conservatory of music "G. Rossini"*, Pesaro, Italy.
Master in Music Composition.
- 2001 **Master degree**, *Conservatory of music "G. Rossini"*, Pesaro, Italy.
Master in Computer Music, grading: 10/10.
- 1998 **Master degree**, *Conservatory of music "G. Rossini"*, Pesaro, Italy.
Master in Piano.

Career

- 2021 – Now **Teaching Professor in Computer Music**, *Conservatory of music "G. Rossini"*, Pesaro, Italy.
Teaching to undergraduate students.
- 2019 – Now **Assistant Professor in Music Technology/co-director CNMAT**, *University of California, Berkeley*, USA.
Teaching to undergraduate and graduate students; research in mathematical models for music, machine learning, signal processing, music composition.
- 2017 – 2018 **Adjoint Researcher**, *Ircam, Paris / HEM, Geneve*, France/Switzerland.
Research topics: machine learning models for automatic computer-assisted orchestration.
- 2015 – 2016 **Post-doctorate**, *École Normale Supérieure, Paris*, France, DATA team.
Research topics: mathematical modelling of deep learning; supervisor: Stéphane Mallat.

- 2015 – 2018 **Teaching Professor in Computer Music**, *Conservatory of music “G. Rossini”, Rome, Italy.*
Teaching to undergraduate students.
- 2013 — 2014 **Head of Technical Research**, *Mogees, London, UK.*
Startup company in audio technology; co-author of a patent on algorithms for physical modelling.
- 2013 **Composer in Research**, *Ircam, Paris, France.*
Research topics: machine learning models for signal processing.
- 2012 – 2014 **Teaching Professor in Computer Music**, *Conservatory of music “A. Pedrollo”, Vicenza, Italy.*
Teaching to undergraduate students.
- 2012 **Teaching Professor in Computer Music**, *Conservatory of music “S. Cecilia”, Rome, Italy.*
Teaching to undergraduate and graduate students.
- 2011 **Teaching Professor in Harmony**, *Conservatory of music “D. Cimarosa”, Avelino, Italy.*
Teaching to undergraduate students.
- 2009 – 2011 **Ph.D. Student**, *University of Bologna, Italy.*
Research topics: symbolic representations of music and audio signals.
- 2009 **Co-founder and CTO**, *3itone, Amsterdam, Netherlands.*
Startup company focused on software for musical creation on the iOS platform.
- 2007 — 2008 **Research and Development**, *Ircam, Paris, France.*
Research topics: audio indexing and classification.
- 2005 – 2007 **Ph.D. Student**, *Accademia Nazionale “S. Cecilia”, Rome, Italy.*
Research topics: composition for orchestra and large ensemble.
- 2004 – 2005 **Research and Development**, *Viscount International Spa, Italy.*
Research topics: voice synthesis and transformation.
- 2001 — 2003 **Research and Development**, *Viscount International Spa, Italy.*
Research topics: low-level DSP programming.
- 2000 — 2005 **Répétiteur (pianist for opera productions)**, *Theaters and festivals, Europe.*
For several years I have been a professional pianist working as *répétiteur* in major theaters and festivals in Europe, including Rossini Opera Festival, Wexford Festival Opera, Teatro Comunale di Bologna, etc. I played in recitals with renowned opera singers and I worked as *répétiteur* for Luciano Pavarotti in his atelier in Pesaro, accompanying his students during lessons.

Grants and Awards

- 2022 Recipient of the Traiettorie Music Prize, from Fondazione Prometeo in Parma, Italy.
- 2021 Recipient of the France-Berkeley Fund with the project: *Statistical relational artificial intelligence for assisted orchestration.*

- 2021 Nominated fellow of the Hellman Fund with the project *Understanding and modelling music timbre*.
- 2019 Successful grant application from the TENOR network, meant to be used to create a connection within the UC system.
- 2019 Nomination to the *Franco Abbiati Prize*, an annual award presented by the National Association of Music Critics in Italy.
- 2019 Finalist in the *Basel composition competition*, head of jury Helmuth Lachemann.
- 2018 Nomination for the prestigious prize Pierre de Monaco for composition.
- 2016 Italian Fellow in composition at the American Academy in Rome.
- 2014 Recipient of the A. Rubinstein prize from Teatro La Fenice in Venice.
- 2013 Member of Academie de France á Madrid at Casa de Velazquez (2013-2014).
- 2011 Finalist at the international Isang Yun music prize in South Korea.
- 2010 2nd prize at the ICOMS composition competition.
- 2010 1st prize at the Egidio Carella competition.
- 2008 Recipient of the prestigious Petrassi prize for composition, from the President of the Italian Republic Giorgio Napolitano.
- 2007 Recipient of the Giovanni Guarino grant from Accademia di S. Cecilia in Rome.
- 2007 Recipient of the Emma Contestabile grant from Accademia Chigiana.
- 1998 1st prize at the G. Rossini composition competition.

Dissemination and outreach

Peer Reviewed publications

- 2023 **Journal** Carmine-Emanuele Cella, Daniele Ghisi, Yan Maresz, Alessandro Petrolati, Alexandre Teiller and Philippe Esling *Dynamic Computer-Aided Orchestration in Practice with Orchidea*, Computer Music Journal (CMJ), March 2023
- 2023 **Journal** Daniele Ghisi and Carmine-Emanuele Cella, *A Framework for Modifying Orchestral Qualities in Computer-Aided Orchestration*, Computer Music Journal (CMJ), March 2023
- 2022 **Journal** Carmine-Emanuele Cella, *Orchidea: a comprehensive framework for target-based computer-assisted dynamic orchestration*, Journal of New Music Resaerch (JNMR), Fall 2022
- 2022 **Journal** Daniele Ghisi and Carmine-Emanuele Cella, *A three-dimensional timbre model via Peano curves*, Journal of Mathematics and Music, Spring 2022.
- 2022 **Journal** Maria Mannone, Giovanni Santini, Esther Adedoyin and Carmine-Emanuele Cella, *Color and Timbre Gestures: An Approach with Bicategories and Bigroupoids*, MDPI Mathematics, February 2022.
- 2022 **Conference** Elliott Waissbluth, Jon Gillick and Carmine Cella, *Synthesis by Layering: Learning a Variational Space of Drum Sounds* , 3rd Conference on AI Music Creativity, 2022.

- 2022 **Conference** Jeremy J. Lee, Carmine Cella and H el ene-Camille Crayencour, *Vivace: Web Application for Real-Time feedback on Piano Performance*, 3rd Conference on AI Music Creativity, 2022.
- 2022 **Conference** Luke Dzwonczyk, L eo Ch edin, Alejandro Saldarriaga-Fuertes, Max Sherr, H el ene-Camille Crayencour and Carmine-Emanuele Cella, *Source Separation Methods for Computer-assisted Orchestration*, 3rd Conference on AI Music Creativity, 2022.
- 2021 **Journal** Jon Gillick, Joshua Yang, Carmine-Emanuele Cella and David Bamman, *Drumroll Please: Modeling Music Performances without Quantizing*, Transactions of ISMIR, Spring 2021.
- 2021 **Book chapter** Marcelo Caetano and Carmine-Emanuele Cella, *Imitative Computer-Aided Musical Orchestration with Biologically Inspired Algorithms*, in Handbook of Artificial Intelligence in Music, Springer, Spring 2021.
- 2021 **Book preface** Carmine-Emanuele Cella, preface for *Musica elettronica e sound design, Vol. 3*, by A. Cipriani and M. Giri, ConTempoNet, Roma, Spring 2021.
- 2020 **Journal** Carmine-Emanuele Cella, *Music Information Retrieval and Contemporary Classical Music: A Successful Failure*, Transactions of ISMIR, Volume 3 - issue 1, 2020.
- 2020 **Journal** Mathieu Andreux, Tom as Angles, Georgios Exarchakis, Roberto Leonarduzzi, Gaspar Rochette, Louis Thiry, John Zarka, St ephane Mallat, Joakim And en, Eugene Belilovsky, Joan Bruna, Vincent Lostanlen, Muawiz Chaudhary, Matthew J. Hirn, Edouard Oyallon, Sixin Zhang, Carmine-Emanuele Cella and Michael Eickenberg, *Kymatio: Scattering Transforms in Python*, Journal of Machine Learning Research, 21(60):1-6, 2020.
- 2020 **Conference** Carmine-Emanuele Cella, Luke Dzwonczyk, Alejandro Saldarriaga-Fuertes, Hongfu Liu and H el ene-Camille Crayencour, *A Study on Neural Models for Target-Based Computer-Assisted Musical Orchestration*, Joint conference on AI Music Creativity, 2020, Stockholm, Sweden.
- 2020 **Conference** Carmine-Emanuele Cella, Daniele Ghisi, Vincent Lostanlen, Fabien Levy, Joshua Fineberg and Yan Maresz, *OrchideaSOL: a dataset of extended instrumental techniques for computer-aided orchestration*, ICMC 2020, Santiago, Chile.
- 2020 **Conference** Jon Kulpa, Carmine-Emanuele Cella and Edmund Campion, *QuBits, a System for Interactive Sonic Virtual Reality*, ICMC 2020, Santiago, Chile.
- 2019 **Journal** H el ene-Camille Crayencour and Carmine-Emanuele Cella, *Learning, probability and logic: towards a unified approach for content-based Music Information Retrieval*, Frontiers in Digital Humanities, April 2019.
- 2019 **Conference** Jon Gillick, Carmine-Emanuele Cella and David Bamman, *Estimating unobserved audio features for targed-based orchestration*, ISMIR 2019, Delft, The Netherlands.

- 2018 **Conference** Leonardo Gabrielli, Carmine-Emanuele Cella, Fabio Vesperini, Dario Droghini, Emanuele Principi and Stefano Squartini, *An Unsupervised Neural Network Architecture for Timbre Transfer in the Frequency Domain*, AES 144th, 2018, Milan, Italy.
- 2017 **Conference** Carmine-Emanuele Cella, *Machine listening intelligence*, International Workshop on Deep learning for music, 2017, Anchorage, ALASKA.
- 2016 **Conference** Vincent Lostanlen and Carmine-Emanuele Cella, *Deep convolutional networks on the pitch spiral for musical instrument recognition*, ISMIR 2016, New York, USA.
- 2014 **Conference** Carmine-Emanuele Cella, *Vuza: a functional language for creative applications*, International Computer Music Conference (ICMC) 2014, Athens, Greece.
- 2013 **Conference** Carmine-Emanuele Cella and Juan José Burred, *Advanced sound hybridizations by means of the theory of sound-types*, International Computer Music Conference (ICMC) 2013, Perth, Australia.
- 2011 **Conference** Carmine-Emanuele Cella, *Sound-types: a new framework for symbolic sound analysis and synthesis*, International Computer Music Conference (ICMC), Huddersfield, United Kingdom, 2011.
- 2010 **Conference** Carmine-Emanuele Cella, *Harmonic Components Extraction in Recorded Piano Ton*, 128th AES conference London, United Kingdom, 2010.
- 2009 **Conference** Carmine-Emanuele Cella, *Towards a Symbolic Approach to Sound Analysis*, Second international conference on Mathematics and Computation for Music (MCM), Yale University, New Haven, CT, 2009, Springer.
- 2008 **Conference** Juan José Burred, Carmine-Emanuele Cella, Geoffroy Peeters, Axel Röbel and Diemo Schwarz, *Using the SDIF Sound Description Interchange Format for Audio Features*, International Symposium on Music Information Retrieval (ISMIR), Philadelphia, USA, September 2008.
- 2006 **Book review** Carmine-Emanuele Cella, Review of “Caleidocicli musicali” by Luigi Verdi, *Musica theorica Spectrum*, Fall 2006, Ed. Curci Milano, Italy.
- 2006 **Journal** Carmine-Emanuele Cella, *Il compositore cieco*, *Rivista umbra di musicologia*, n. 50 – 2006/1, pagg. 17 – 27 Perugia (Italy).
- 2005 **Journal** Carmine-Emanuele Cella, *Il semplice sistema*, *Rivista umbra di musicologia*, n. 49 – 2005/2, pagg. 43 – 51 Perugia (Italy).
- 2005 **Journal** Carmine-Emanuele Cella, *Sulla struttura logica della musica*, *Rivista umbra di musicologia*, n. 48 – 2005/1, pagg. 3 – 57, Perugia (Italy).
- 2002 **Conference** Carmine-Emanuele Cella and Federico Paolinelli, *Sintesi per stati e visualizzazione del processo compositivo*, *La Terra Fertile*, Proceedings, 2000, pagg. 87 – 89 L’Aquila (Italy).

[Selected compositions](#)

- 2023 **I am in blood**, large ensemble, augmented instruments, live electronics and 3D spatialisation; first performance: Paris, Espace de projection - Ircam, February 2023; L'itinéraire, conductor Léo Margue, RIM: Etienne Démoulin; published by: Edizioni Suvini Zerboni - Milan.
- 2022 **Improvviso statico III**, for saxophone quartett and live electronics; first performance: Sansepolcro, ilSuono Music Week, July 2022; Les percussions de Strasbourg; published by: Edizioni Suvini Zerboni - Milan.
- 2022 **Kobi**, for augmented Mbira and smart percussions; first performance: Santeria Toscana, Milano Musica, May 2022; Les percussions de Strasbourg; published by: Edizioni Suvini Zerboni - Milan.
- 2021 **Dendrum**, for augmented percussions; first performance: CIRRMT, Montreal, October 2021; Sixtrum ensemble; published by: Edizioni Suvini Zerboni - Milan.
- 2019 **Atlas** for video and live electronics in three cities simultaneously; first performance: Centre Pompidou - Paris, Onassis foundation - Athens and ZKM - Karlsruhe; published by Edizioni Suvini-Zerboni - Milan.
- 2019 **Kore**, for smart percussions; first performance: Hangar Bicocca, Milano Musica, October 2019; Les percussions de Strasbourg; published by: Edizioni Suvini Zerboni - Milan.
- 2019 **Verso la fine del giorno**, for large orchestra; first performance: February, 2019, Oekolampad Basel; Basel Symphony orchestra; conductor: Francesc Prat; published by: Edizioni Suvini Zerboni - Milan.
- 2018 **Stades d'ombre, stade de lumière** for large ensemble; First performance: Milan, Teatro Elfo Puccini, October 2018; Ensemble Orchestral de Lyon (EOC), conductor: Daniel Kawka; published by: Edizioni Suvini Zerboni - Milan.
- 2017 **Inide-out**, for smart percussions; first performance: Paris, LeCentQuatre, June 2017; Les percussions de Strasbourg; published by: Edizioni Suvini Zerboni - Milan.
- 2017 **Pane, sale, sabbia**, opera for 4 voices, actors and chamber orchestra; first performance: Kvyv - National opera theater, June 2017; Uhko ensemble; conductor: Luigi Gaggero; published by Edizioni Suvini Zerboni - Milan.
- 2015 **All of a sudden**, for orchestra; first performance: Florence - Teatro Verdi, September; Orchestra regionale della Toscana; conductor: Marco Angius; published by: Edizioni Suvini Zerboni - Milan.
- 2014 **Improvviso statico II**, for tenor saxophone and live electronics; first performance: Milan, May 2014, sax: Mario Marzi; published by: Edizioni Suvini Zerboni - Milan.
- 2014 **La memoire de l'eau**, for nine musicians; first performance: Reina Sofia - Madrid, May 2014; Ensemble Orchestral Contemporain (EOC); conductor: Daniel Kawka; published by: Edizioni Suvini Zerboni - Milan.
- 2014 **When the light thickens**, for violin, clarinet, cello, piano and live electronics; First performance: Padova, November 2014; Ex-novo ensemble; published by: Edizioni Suvini Zerboni - Milan.

- 2013 **Ali oscillano in fioco cielo**, madrigal for five voices; First performance: Strasbourg, July 2013; La dolce maniera; conductor: Luigi Gaggero; Published by: Edizioni Suvini Zerboni - Milan.
- 2013 **Reflets de l'ombre**, for large orchestra and live electronics; first performance: Paris - Salle Pleyel, June 2013; Orchestre Philharmonique de Radio France; conductor: Jukka-Pekka Saraste; published by: Edizioni Suvini Zerboni - Milan.
- 2012 **Gia' s'ottenebra il giorno**, for orchestra; first performance: Paris - Centre Pompidou (Grande Salle), June 2012; Orchestre Philharmonique de Radio France; conductor: Leo Hussain; published by: Edizioni Suvini Zerboni - Milan.
- 2012 **Improvviso statico** for alto sax and live electronics; First performance: Rome - Conservatorio S. Cecilia, EmuFest, October 2012; sax: Enzo Filippetti; Published by: Edizioni Suvini Zerboni - Milan.
- 2010 **The Manhattan distance** for orchestra (2010, suite from Li Madou); first performance: Seoul Art Center, September 2011; Ensemble TIMF, conductor: Soo-Yeoul Choi; published by: Edizioni Suvini Zerboni - Milan.
- 2010 **Li Madou**, for orchestra, voice and electronics; first performance: Teatro Pergolesi (Jesi), April 2010; Orchestra Filarmonica delle Marche; voice: Lucia Ferrati; conductor: Manlio Benzi; published by: Edizioni Suvini Zerboni - Milan.
- 2005-2017 **Random forests** for orchestra; first performance: Venice - Teatro Malibran, March 2017; Orchestra della Fenice; conductor: Marco Angius; published by: Edizioni Suvini Zerboni - Milan.
- 2004-2016 **Upside-down**, for piano and orchestra; first performance: Kvyv, October 2016; Ukho ensemble; piano: Mark Knopp; conductor: Luigi Gaggero; published by: Edizioni Suvini Zerboni - Milan.

Selected software production

- 2020 **Orchidea** (<http://www.orch-idea.org>): Max/MSP package for computer based assisted orchestration.
- 2020 **Kymatio** (co-author, www.kymat.io): wavelet scattering transform in the Python programming language, for large-scale numerical experiments.
- 2014 Sonic-pad (<http://www.sonic-pad.com>): advanced spectral processing for audio signals.
- 2013 Sparkle (co-author, <https://itunes.apple.com/ca/app/sparkle-advanced-cross-synthesis/id818477094?mt=8>): advancedcross-synthesisforiOSdevices.
- Vuza (<http://www.vuza.org>): functional programming language for creative applications.
- 2007 Ircamdescriptor (co-author, <http://anasynt.h.ircam.fr/home/english/software/ircamdescriptor-c-lib-exe>): computationoflow-leveldescriptorsonaudiosignals.

Teaching (summary)

- 2019 – now University of California, Berkeley: Seminar in contemporary music, Seminar in composition, Computer programming for music applications, Situated instruments for musical expression, Advanced projects in computer music.
- 2014 – now Conservatory “G. Rossini”, Pesaro: Live electronics, Mathematics for sound processing, Digital signal processing.
- 2012 – 2014 Conservatory “A. Pedrollo”, Vicenza: Computer music, Digital signal processing, Musical acoustics.
- 2012 Conservatory “S. Cecilia”, Rome: Mathematics for sound processing, Computer music, Computer audio programming.
- 2011 Conservatory “D. Cimarosa”, Avellino: Harmony.

Selected talks and lectures

- 2023 University of Bordeaux, France: *Optimisation methods for music generations.*
- 2022 [online] University of California, Santa Cruz, USA: *On computational creativity.*
- 2022 [online] University of California, Santa Barbara, USA: *On computational creativity.*
- 2022 University of Bordeaux, France: *Computation, creativity and the arts.*
- 2022 [online] Shanghai Jiao Tong University, China: *Mathematical methods for music creation.*
- 2021 University of Texas, Austin, Texas: *Overview of my compositional work.*
- 2021 [online], University of South Carolina: *From signal representations to music creation.*
- 2021 McGill University (CIRRMT distinguished lecture), Montreal, Canada: *On computational creativity.*
- 2021 [online] Amici della musica di Modena: public conversation on AI and music creation (*Note d’algoritmo. Quando l’AI suona.*)
- 2021 [online] EUSIPCO tutorial: *Statistical Relational AI for Unified Music Understanding and Creation.*
- 2021 [online] University of South Carolina: composition seminar.
- 2020 [online] panelist for the France-Atlanta forum on machine creativity.
- 2020 [online] Ars Electronica, Brussels: Hands on session on Orchidea.
- 2020 [online] Ircam, Paris: guest lecture for the annual workshop for the Actor project.
- 2020 Princeton University: electronic music seminar.
- 2019 Haute École de musique (HEM), Geneve: *Introduction to Orchidea.*
- 2019 Conservatoire National Supérieur de Musique et de Danse de Paris (CNSM): *On computer-assisted orchestration.*
- 2019 McGill University, Montreal, Canada: *Overview on recent developments on computer-assisted orchestration.*

- 2019 Berkeley: guest lecture for the Italian Scientists and Scholars of North America Foundation (Bay Area Chapter).
- 2019 Columbia University, NYC: composition seminar.
- 2019 CCRMA, Stanford University: *From signal representations to musical creation: a geometric approach.*
- 2019 BiD talk, Berkeley institute for design, UC Berkeley: *Can Picasso think in shapes?*
- 2017 Institute of Mathematics - National Academy of Sciences of Ukraine, Kyiv: *From signal representations to musical creation: a geometric approach.*
- 2017 Leibniz-Zentrum für Informatik, Dagstuhl, German: *A composer's perspective on Music Information Retrieval.*
- 2015 École Normale supérieure, Paris: *On symbolic representation of music.*
- 2015 Mamux, Ircam, Paris: *From signal representations to musical creation.*
- 2015 Bibliothèque universitaire de Lyon: *Logical representations of music.*
- 2012 University "Tor Vergata", Rome: *On symbolic representations of sound: the theory of sound-types.*
- 2012 ATIAM, Ircam, Paris: *On the geometric interpretation of musical signals.*
- 2011 Queen Mary University, London: *On symbolic representations of sound: the theory of sound-types.*
- 2011 IRMA (Institut de Recherche Mathématique avancée), Strasbourg: *On symbolic representations and transformations of sound.*
- 2010 McGill University, Montreal, Canada: *A symbolic approach to sound analysis.*
- 2010 University of Bologna, department of computer science: *A survey on Geometry of Interactions.*
- 2009 Ircam, Paris: *Introductory notes on Geometry of Interactions.*
- 2008 Ircam, Paris: A symbolic approach to sound analysis: *type theories and abstraction levels.*
- 2008 University of Pisa, department of mathematics: *Logica, suono, musica.*
- 2006 Mamux, Ircam, Paris: *Logical foundation of music.*

International service

- Organiser of a tutorial for the European Signal Processing Conference (EU-SIPCO).
- Guest professor for the Manifest academy at Ircam in Paris.
- Member of the EURASIP SAT for Acoustic, Speech and Music Signal Processing committee.
- Creator and organiser of the international round-tables Re.M.I.X on music research.
- Reviewer and meta-reviewer in international journals and conferences.
 - Computer Music Journal.
 - EURASIP Journal of Audio Signal Processing (JASP).
 - Colloquio di informatica musicale (CIM).
 - Ircam musical research residency program.
 - Mathematics and computation in music (MCM).
 - International society for music information retrieval (ISMIR).
 - IEEE Transactions on Emerging Topics in Computational Intelligence.
 - ...many more.

Service to UC Berkeley

- Dissertation committees.
- Search committees for hiring lecturers and program officers.
- Organisation of public events such as the *CNMAT OpenLabs*.
- Organisation of guest lectures for visiting/invited professors.
- Supervision of undergraduate and graduate students.

Info

Personal data

Citizenship Italian.
Email carmine.emanuele.cella@gmail.com, carmine.cella@berkeley.edu, cella@ircam.fr.
Web <http://www.carminecella.com>.

Languages

Italian Native speaker.
English Fluent.
French Fluent.
German Basic.
Spanish Basic.

Hobbies

Private pilot for single engine aircrafts (EASA and FAA).