Curriculum vitae

PERSONAL INFORMATION

Riccardo Russo

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https://github.com/Nemus-Project https://github.com/Rickr922

www.linkedin.com/in/russoriccardo-2

ORCID 0000-0002-9013-5253

Date of birth 16 May 1992 | Nationality Italian

EDUCATION AND TRAINING

2025 **PhD in Numerical Methods for Acoustics**

Course in Mechanics and Advanced Engineering Sciences DIMSAI, University of Bologna, Italy

Final Grade: Eccellente cum Laude

Thesis title: Non-iterative numerical simulation techniques for nonlinear string vibration in musical acoustics

2021 **M.Sc. in Sound and Music Computing**

Aalborg University Copenhagen, Denmark

Final Grade: 12/12

Thesis Title: Physical Modeling and Optimisation of a EMT 140 Plate Reverb

2018 **I Level Master Course in Sound Engineering**

Università degli Studi di Roma Tor Vergata, Italy

Final Grade: 110/110 cum Laude

Thesis Title: Sviluppo di un plugin per il pitch-tracking polifonico della chitarra

2016 **B.Sc. in Physics**

Alma Mater Studiorum Università di Bologna, Italy

Final Grade: 93/110

Thesis Title: Sviluppo di sistema integrato per rampe isocrone di temperatura

RESEARCH VISITS

November 2023 – April 2024 **Visiting Researcher, Acoustics and Audio Group**

Edinburgh College of Art, ECA, University of Edinburgh, UK

Design of efficient and fast Finite Difference Time Domain algorithms for the simulation of nonlinear string vibration.

October 2023 **Visiting Researcher, Emeraude Research Team**

INSA-Lyon

Work with the team for implementing vibration simulations on FPGA boards.

INTERNSHIPS

September 2020 – January 2021

Graduate Student Intern

GRAME-CNCM, Lyon, France

Development of a library for formalizing Finite-Difference-Schemes physical modeling synthesis into the Faust programming language.

September 2017

Academic Internship

Opal Electronics, Cremona, Italy

Development of a LabVIEW software for the automatic execution of resistive Tritim-type inter-modulation distortion measurement on audio equipment. The measurements were performed using a remote-controlled Rhode&Schwartz UPV audio analyser.

WORK EXPERIENCE

2024 – Present

Post-Doc Researcher

Department of Industrial Engineering (DIN), University of Bologna

NEMUS Project

- Design of Finite Difference algorithms for musical acoustics.
- Modal representations of vibrating systems.
- Software implementations of vibration simulations in C++.

2024 – 2026

Board member, Newsletter team

EAA Young Acousticians Network (Volunteer).

2021 – 2025

PhD Student

Department of Industrial Engineering (DIN), University of Bologna

NEMUS Project (ERC-funded, 2021–2026)

2018 – 2019

C++ Software Developer

IK Multimedia Production S.r.l., Modena, Italy

- GUI and audio programming with the JUCE framework.
- Development of software and audio/midi engines.
- Communication with the product managers for products optimization.
- Communication with graphic dept. for the development of UXs and UIs.

2017 - 2018

Sound-lighting technician

A.B. Illuminazione Professionale di Vincenzo Belsito, Bologna, Italy

- Assistance in the preparation of audio and lighting systems on stages.
- Wiring and placement of microphones, speakers and led walls.

2016, 2021

Sound Engineer

Tactus s.a.s. di Gian Enzo Rossi & C., Bologna, Italy

- Audio Editing with Ableton Live and Motu Digital Performer.
- Editing for therecording: Andrea Antico, Frottole Intabulate per sonare organi, Libro Primo, Roma 1517, Tactus 2017.
- Communication with the artist and the Sound Engineer
- Publisher website: `https://tinyurl.com/AndreaAntico`

ADDITIONAL INFORMATION

Presentations

- Nemus: tastiera aumentata e simulazione numerica. Musica, Tecnologia, Strumenti storici - Convegno internazionale di Studi, Bologna, March 2026.
- Matthew Hamilton, Riccardo Russo, Craig J Webb and Michele Ducceschi. "A two-register haptic interface for articulated control of harpsichord physical models". 11th Convention of the European Acoustics Association, Forum Acusticum/Euronoise, Malaga, Spain, June 2025.
- R.Russo, M. Ducceschi and Craig Webb. "Convergence analysis and relaxation techniques for modal scalar auxiliary variable methods applied to nonlinear transverse string vibration". 25th International Congress on Acoustics (ICA) and 188th Meeting of the Acoustical Society of America (ASA), New Orleans, USA, May 2025.
- Conversazione tra musica e fisica: L'algoritmo musicale – Storia e applicazioni della sintesi sonora a modelli fisici a cura del progetto NEMUS. 110° Congresso Nazionale della Società Italiana di Fisica, In collaborazione con INGV, Istituto Nazionale di Geofisica e Vulcanologia. Conservatorio G.B. Martini, Bologna, September 2024.
- R. Russo, S. Bilbao, and M. Ducceschi. "Scalar Auxiliary Variable Techniques for Nonlinear Transverse String Vibration". 8th IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control (LHMNC), Besançon, France, June 2024
- R. Russo, M. Ducceschi, and S. Bilbao. "Efficient simulation of the yaybahar using a modal approach". 26th Conference on Digital Audio Effects, Copenhagen, Denmark, September 2023.
- R. Russo, M. Ducceschi, S. Bilbao, and M. Hamilton. "Efficient Simulation Of Acoustic Physical Models With Nonlinear Dissipation". 20th Sound and Music Computing Conference, Stockholm, Sweden, June 2023.
- R. Russo, M. Ducceschi, and S. Bilbao. "Efficient simulation of the bowed string in modal form". 25th Conference on Digital Audio Effects, Vienna, Austria, September 2022.
- R. Russo and D. Overholt. "A Faust-Built Mobile Vocoder Instrument". 2nd Nordic Sound and Music Computing Conference, Copenhagen, Denmark, November 2021.
- R. Russo, S. Serafin, R. Michon, Y. Orlarey, and S. Letz. "Introducing Finite Difference Schemes Synthesis in Faust: a Cellular Automata Approach". 18th Sound and Music Computing Conference, Torino, Italy, June 2021.
- R. Russo, F. Bigoni, and G. Palamas. "Modeling Audio Distortion Effects with Autoencoder Neural Networks". 12th Conference on Intelligent Technologies for Interactive Entertainment, INTETAIN, Santa Clara, USA, December 2020.

Conferences

- Musica, Tecnologia, Strumenti storici - Convegno internazionale di Studi, Bologna, March 2026.
- 28th Conference on Digital Audio Effects, Ancona, Italy, September 2025.
- 11th Convention of the European Acoustics Association, Forum Acusticum/Euronoise, Malaga, Spain, June 2025.
- 25th International Congress on Acoustics (ICA) and 188th Meeting of the Acoustical Society of America (ASA), New Orleans, USA, May 2025.
- 27th Conference on Digital Audio Effects, Guildford, UK, September 2024.
- 8th IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control (LHMNC), Besançon, France, June 2024.
- 10th Convention of the European Acoustics Association, Forum Acusticum, Torino, Italy, September 2023.
- 26th Conference on Digital Audio Effects, Copenhagen, Denmark, September 2023.
- 20th Sound and Music Computing Conference, Stockholm, Sweden, June 2023.
- 5th Stockholm Music Acoustic Conference, Stockholm, Sweden, June 2023.
- 4th Vienna Talk, Vienna, Austria, September 2022.
- 25th Conference on Digital Audio Effects, Vienna, Austria, September 2022.
- 2nd Nordic Sound and Music Computing Conference, Copenhagen, Denmark (online), November 2021.
- 18th Sound and Music Computing Conference, Torino, Italy (online), June 2021.
- 12th Conference on Intelligent Technologies for Interactive Entertainment, INTETAIN, Santa Clara, USA (online), December 2020.

Prizes

- POMA Student Paper Competition, 188th Meeting of the Acoustical Society of America.

Academic service

– Session Chair, A11.02/A09.08 Artificial intelligence in Musical Acoustics. 11th Convention of the European Acoustics Association, Forum Acusticum/Euronoise, Malaga, Spain, June 2025.

PERSONAL SKILLS

Mother tongue Italian

Other languages

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C2	C1	C1	C2
	Use of English: C2 C1 CAE Certificate – Cambridge Assessment English – Overall Score 199/210 – May 2019				
Spanish	A2	A2	A2	A2	A2
French	A1	A1	A1	A1	A1

Levels: A1 and A2: Basic user – B1 and B2: Independent user – C1 and C2: Proficient user
Common European Framework of Reference for Languages

Technical skills

– **Programming/Scripting Languages:** C++, C, Java, C#, Arduino, Faust, MATLAB, Python, Bash, LabVIEW.
– **Frameworks:** Unity, JUCE, VST
– **DAWs:** Ableton Live, Avid Pro Tools, Reaper, Logic, N-Track, Motu Digital Performer.
– **Operating Systems:** Windows, MacOS, Linux.
– **Office:** Microsoft Word, Microsoft Excel, Microsoft Power Point.
– **Electronics:** Fundamental knowledge of analog and digital electronics.

Musical Training I have been playing guitar for years.

PUBLICATIONS

[1] Riccardo Russo, Michele Ducceschi, and Stefan Bilbao. “Numerical convergence of the Scalar Auxiliary Variable method applied to nonlinear stiff string models”. In: *Nonlinear Dynamics* 114.857 (2026).

[2] Riccardo Russo, Craig J. Webb, Michele Ducceschi, and Stefan Bilbao. “Convergence analysis and relaxation techniques for modal scalar auxiliary variable methods applied to nonlinear transverse string vibration”. In: *Proceedings of Meetings on Acoustics* 56.1 (Nov. 2025), p. 035007.

[3] Romain Michon, Michele Ducceschi, Pierre Cochard, Travis Skare, Craig J. Webb, and Riccardo Russo. “Evaluating CPU, GPU, and FPGA performance in the context of modal reverberation: a comparative analysis”. In: *Frontiers in Signal Processing* Volume 5 - 2025 (2025). URL: https://www.frontiersin.org/journals/signal-processing/articles/10.3389/frsip.2025.1522604.

[4] Matthew Hamilton, Riccardo Russo, Craig J. Webb, and Michele Ducceschi. “A two-register haptic interface for articulated control of harpsichord physical models”. In: *Proceedings of the Convention of the European Acoustics Association (Forum Acusticum), Malaga, Spain* (2024).

[5] Riccardo Russo. “Non-Iterative Numerical Simulation Techniques for Nonlinear String Vibration in Musical Acoustics”. PhD dissertation. Bologna, Italy: University of Bologna, Apr. 2025.

[6] Riccardo Russo, Craig J. Webb, Michele Ducceschi, and Stefan Bilbao. “Convergence analysis and relaxation techniques for modal scalar auxiliary variable methods applied to nonlinear transverse string vibration”. In: *Proceedings of Meetings on Acoustics* 56.1 (Nov. 2025), p. 035007. URL: https://doi.org/10.1121/2.0002073.

[7] Stefan Bilbao, Riccardo Russo, Craig Webb, and Michele Ducceschi. “Real-time guitar synthesis”. In: *Proc. Digital Audio Effects (DAFx-24)*. Guildford, UK, Sept. 2024, pp. 163–170.

[8] M. Ducceschi, A. Mousseau, S. Bilbao, and R. Russo. “Fast simulation of the Kirchhoff-Carrier string with an energy-storing boundary condition using a Scalar Auxiliary Variable approach”. In: *IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control LHMNC*. 2024.

[9] R. Russo, S. Bilbao, and M. Ducceschi. “Scalar Auxiliary Variable Techniques for Nonlinear Transverse String Vibration”. In: *IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control LHMNC*. 2024.

[10] M. Ducceschi, M. Hamilton, and R. Russo. “Simulation Of The Snare-Membrane Collision In Modal Form Using The Scalar Auxiliary Variable (SAV) Method”. In: *Proc. Forum Acusticum 2023*. Torino, Italy, Sept. 2023.

[11] R. Russo, M. Ducceschi, and S. Bilbao. “Efficient simulation of the yaybahar using a modal approach”. In: *Proc. Digital Audio Effects (DAFx-23)*. Copenhagen, Denmark, Sept. 2023.

[12] R. Russo, M. Ducceschi, S. Bilbao, and M. Hamilton. “Efficient Simulation Of Acoustic Physical Models With Nonlinear Dissipation”. In: *Proc. of Sound and Music Computing with Stockholm Music Acoustic Conf., Stockholm, Sweden*. June 2023.

[13] R. Russo, M. Ducceschi, and S. Bilbao. “Efficient simulation of the bowed string in modal form”. In: *Proc. Digital Audio Effects (DAFx-2022), Vienna, Austria*. Sept. 2022.

[14] D. Sudholt, R. Russo, and S. Serafin. “A Faust Implementation of Coupled Finite Difference Schemes”. In: *Proc. of the 2nd Nordic Sound and Music Computing Conf. (NordicSMC)*. Copenhagen, Denmark, November 2021.

[15] R. Russo and D. Overholt. “A Faust-Built Mobile Vocoder Instrument”. In: *Proc. of Nordic Sound and Music Computing Conf. (NordicSMC)*. Copenhagen, Denmark, November 2021.

[16] R. Russo, S. Serafin, R. Michon, Y. Orlarey, and S. Letz. “Introducing Finite Difference Schemes Synthesis in Faust: a Cellular Automata Approach”. In: *Proc. of Sound and Music Computing Conf.* Torino, Italy, June 2021.

[17] R. Russo, F. Bigoni, and G. Palamas. “Modeling Audio Distortion Effects with Autoencoder Neural Networks”. In: *Proc. of Intelligent Technologies for Interactive Entertainment : 12th EAI International Conference, INTETAIN*. Santa Clara, USA: Springer International Publishing, December 2020, pp. 131–141.