

Angelo Antona

Curriculum Vitae

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Personal Information

Nationality	Italian
Gender	Male
Driver's licence	B

Education and Training

Sept. 2023 to March 2026 **Master's Degree (Laurea Magistrale) in Music and Acoustic Engineering**
Politecnico di Milano, Milan, Italy. Programme delivered entirely in English. **Final grade: 110/110 cum laude.**

Key courses: Computer Music (Representations & Models, Languages & Systems), Multimedia Signal Processing, Fundamentals of Acoustics, Advanced Coding Tools and Methodologies. Project work in audio synthesis, signal processing, AI and IT security.

Master's thesis: "Interactive Binaural Simulation with LUFS Normalization for In-Cabin Acoustics". Carried out at the ISPL Lab, in collaboration with an Italian Luxury Sports Car Manufacturer.

Sept. 2024 to Feb. 2025 **Erasmus exchange, Master's programme in Physics**
Adam Mickiewicz University, Poznań, Poland. Programme delivered entirely in English.

Studies in mobile systems security, machine learning and philosophy of science. Project work in mobile security and neural networks.

Sept. 2019 to July 2023 **Bachelor's Degree (Laurea) in Computer Engineering**
Politecnico di Milano, Milan, Italy.

Programming foundations (C++, Java, Python), software engineering, database systems. Key courses: Information Systems, Communication Signals, Physics, Logic Networks Design Project.

Sept. 2009 to Sept. 2019 **Pre-academic studies in classical piano**
Vincenzo Bellini Conservatory, Caltanissetta, Italy

Classical piano, music theory, ear training, harmony. Programme reached its final year and was interrupted before the entrance examination to the academic level due to relocation to Politecnico di Milano. Multiple national and international competition prizes during this period (see *Awards and Recognitions*). Development of stage discipline, artistic sensitivity and live-performance skills.

Personal Skills

Mother tongue	Italian
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	<i>Language</i>	<i>Understanding</i>		<i>Speaking</i>		<i>Writing</i>
		Listening	Reading	Spoken interaction	Spoken production	
<i>Other languages</i>	English	C1	C1	C1	C1	C1
<i>Levels: Common European Framework of Reference for Languages (CEFR).</i>						
<i>Social skills</i>	Interdisciplinary collaboration in mixed teams of engineers, technical specialists and musicians. Communication of technical concepts to non-specialist audiences.					
<i>Organisational skills</i>	Stress management and adaptability built through live performances, music competitions and complex multi-deliverable projects. Creative problem-solving in interdisciplinary contexts.					
<i>Technical skills</i>	<i>Areas of work:</i> on the audio side, audio synthesis and DSP, real-time and interactive audio systems, embedded programming; on the security side, mobile systems security, encryption and vulnerability analysis. <i>Working stack:</i> C++, Python (with TensorFlow and Keras), MATLAB, JavaScript, Java and Kotlin, working with JUCE, SuperCollider, Web Audio API, Tone.js, VST development and MediaPipe. <i>Security stack:</i> AES-GCM, PBKDF2 with SHA-256, Android Keystore, Trusted Execution Environment and biometric authentication.					
<i>Artistic skills</i>	Classical piano, music composition, production and live performance, including recorded releases with the band Spettri (single <i>BPM</i> , Circuiti Sonori 2021; album <i>Kardia</i> , 2022) and production work on albums for third-party artists. A long-standing practice in drawing and graphic arts has also translated into good skills in photo and video editing.					
<i>Other skills</i>	Creative problem-solving across the boundary between music and engineering; experience in integrating software, interactive audio, mobile security and AI within single-author and team projects.					

Key Projects

<i>Master's Thesis</i>	Real-time embedded platform developed at the ISPL Lab of Politecnico di Milano in collaboration with an Italian Luxury Sports Car Manufacturer: real-time binaural rendering using low-latency partitioned convolution and LUFS-based loudness matching, validated through user-driven A/B testing.
<i>Astra Harmonica</i>	A navigable solar system in the browser, where each celestial body doubles as a sound source feeding a generative harmonic progression. Navigation works either with the mouse or through MediaPipe hand-tracking, and each planet has a chatbot scoped to its own subject matter, used as the educational layer of the experience. <i>Tech:</i> Three.js, Tone.js, MediaPipe Hand Tracking, JavaScript, GLSL shaders, Vite. [demo]
<i>MiniLab Live Synth and Sensor-Controlled Vocoder (v1 → v2)</i>	Started as a way to condense into a single configurable software module the multi-instrument live setup I had built with my last band. Version 1 runs in the browser around an Arturia MiniLab MKII, with MIDI mapping and cloud-stored presets. Version 2 rebuilds it as a JUCE/SuperCollider environment, adding a polyphonic phase vocoder, foot pedals and an accelerometer glove that turns hand inclination into an additional expressive parameter. <i>Tech:</i> JavaScript, Web Audio API, Firebase, MIDI (v1); JUCE/C++, SuperCollider, Processing, OSC, Arduino with MMA7361 accelerometer (v2). [GitHub v1] [GitHub v2] [demo v1] [demo v2]

<i>WDF Distortion</i>	Real-time-friendly emulation of the clipping stage of the MXR Distortion+ guitar pedal using the Wave Digital Filter approach. The circuit is decomposed into series and parallel adaptors with a nonlinear root made of an antiparallel diode pair, solved via the Lambert W function with Fritsch iteration. The MATLAB implementation is validated against a Simscape ground-truth simulation of the same circuit. <i>Tech:</i> MATLAB, Wave Digital Filters, Lambert W function (Fritsch iteration), Simscape (validation reference). [GitHub]
<i>Covert Channel BFSK</i>	A pair of Android apps that move a contact list from one to the other through an inaudible ultrasonic carrier, with no shared permissions: the sender holds READ_CONTACTS, the receiver holds RECORD_AUDIO plus a Google Sheets OAuth token. The point of the project is to show how per-app permission models can be circumvented by splitting capabilities across apps that look harmless on their own. <i>Tech:</i> Android (Kotlin), BFSK modulation/demodulation, band-pass filters, bit-level redundancy with majority voting, Google Sheets API with OAuth. [GitHub]
<i>SecureNotes</i>	An Android notes app developed for the Mobile Systems Security course at AMU Poznań, with the engineering goal of pushing the security model as high as possible. Notes are encrypted with a separately generated MasterKey, which is in turn protected by a key derived from the user's password; this way, a password change only requires re-encrypting one small key rather than the whole vault. Optional biometric unlock stores a hardware-backed copy of the MasterKey inside the device's Trusted Execution Environment. <i>Tech:</i> Android (Kotlin), AES-GCM 256-bit, PBKDF2 with SHA-256, Android Keystore, biometric authentication. [GitHub]
<i>DOA estimator</i>	Direction-of-Arrival estimation for a moving wide-band source recorded by a 16-element MEMS microphone array. Because spatial filtering is intrinsically narrow-band, the signal is broken into frequency bands via STFT and processed band by band, frame by frame, so the source's trajectory can be reconstructed over time. The FFT, the STFT, the covariance matrices and the beamformer were written from scratch in MATLAB and validated against the built-in implementations. <i>Tech:</i> MATLAB, delay-and-sum beamforming, Cooley–Tukey FFT, STFT, pseudospectrum analysis. [GitHub]

Awards and Recognitions

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- **Sept. 2021:** National finalist and winner of the “Mamely” Prize at **SanremoRock Festival 2021**, with the band Spettri. Performance at Teatro Ariston, Sanremo.
 - **May 2014:** 2nd Prize, “**Rahal**” **National Music Competition** (pianists category), Chiaramontano Castle, Racalmuto. Score 94/100. *Vincenzo Bellini Conservatory*.
 - **April 2014:** Semifinalist at **Castrocaro Festival**, with the band Disconnessi.
 - **June 2013:** 1st Absolute Prize, “**Rahal**” **National Music Competition** (pianists category), Chiaramontano Castle, Racalmuto. Perfect score 100/100. *Vincenzo Bellini Conservatory*.
 - **May 2013:** 3rd Prize, “**Musicalmuseo**” **International Competition** (pianists category), Archaeological Museum of Caltanissetta. Score 89/100. *Vincenzo Bellini Conservatory*.
 - **May 2012:** 1st Absolute Prize, “**Musicalmuseo**” **International Competition** (pianists category), Archaeological Museum of Caltanissetta. Perfect score 100/100. *Vincenzo Bellini Conservatory*.
 - **April 2011:** 2nd Prize, “**Musicalmuseo**” **International Music Competition** (pianists category), Archaeological Museum of Caltanissetta. Score 94/100. *Vincenzo Bellini Conservatory*.
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