CURRICULUM VITAE
AND PUBLICATIONS

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1 Personal information

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2 Current position

- 15 Dec 2020 - present. **Senior Postdoctoral research fellow** (*Assegnista di ricerca Senior Tipo B*) - **Principal investigator** of the project *IT4aREC– Innovative Tools and Algorithms for preserving and Archiving Analogue Audio RECordings*, Department of Information Engineering, University of Padova. Supervisor: Prof. Sergio Canazza.
  I am the **principal investigator** of the IT4aREC project funded under the B Senior Initiative of the Department of Information Engineering, University of Padova (**60.000€**). My responsibilities concern the design of innovative algorithms and the development of new software tools for (a) validating digital preservation copies of historical audio recordings, (b) restoring and analyzing them [J10], (c) supporting the creation of archival units available to researchers and/or common audience and (d) evaluating the suitability of blockchain technologies for long-term preservation of audio recordings. With the collaboration of the MPAI community (`mpai.community`), I am standardizing and developing the reference software of the overall workflow [J9]. Currently, most of my effort focuses on the automatic detection of problems occurred during the digitization process, by analyzing irregularities in the digitized audio coming from tape recordings and in the video of the tape flowing on the recording head with machine learning algorithms.
- Jul 2021 - present. **Associate researcher** (*Ricercatore Associato*) of the Institute for Computational Linguistics "A. Zampolli", National Research Council (ILC-CNR), Pisa, Italy.
  I am currently working at the development of the Archivio Vi.Vo. platform [BC3], which is part of the CLARIN-IT infrastructure (`http://archiviovivo.clarin-it.it`), and hosted in the GARR Consortium (`www.garr.it`) data center. It consists in a cloud infrastructure and *ad hoc* interfaces for preserving, restoring, describing, and accessing digitized audio recordings. My main contribution consists in the design and development of the model at the base of the cloud platform. Currently, I am designing and developing the services for restoring and describing audio recordings.

3 Previous academic positions

- 01 Sep 2020 - 14 Dec 2020. (3 months) **Postdoctoral research fellow** (*Assegnista di ricerca Tipo A*) - Grant at the Department of Information Engineering, University of Padova, working on the project *FONTI 4.0 - Innovative accessing methodologies for digitised oral sources through new technologies of the creative industry 4.0* (original Italian title: *FONTI 4.0 - Fruizione innovativa di fonti Orali digitalizzate mediante le Nuove Tecnologie dell'Industria creativa 4.0*) financed by Veneto Region with FSE funding. Supervisor: Prof. Sergio Canazza.

Responsibilities: Development and assessment of a "transcription chain" for automatizing the analysis and cataloging of digitized oral sources.

- 02 Mar 2020 - 31 Aug 2020. (6 months) **Postdoctoral research fellow** (*Assegnista di ricerca professionalizzante*) - Grant at Institute for Computational Linguistics "A. Zampolli", National Research Council (CNR), Pisa, Italy, working on the projects *Valorisation of the Archival Heritage - Archivio Vi.Vo.* (original Italian title: *Valorizzazione Patrimonio Archivistico - Archivio Vi.Vo.*) and *CLARIN-ERIC - Development of a data center for archiving and storing linguistics data* (original Italian title: *CLARIN-ERIC - Sviluppo di un data center che offre un sistema di archiviazione e deposito di dati linguistici*) financed by Toscana Region and CNR. Supervisor: Dr. Monica Monachini.
  Responsibilities: Development of a cloud platform for the preservation, restoration, description and cataloguing of digitized audio recordings.

- 15 Oct 2019 - 29 Feb 2020. (4.5 months) **Postdoctoral grant** - (*Borsista di ricerca*) - Grant at the Department of Information Engineering, University of Padova, working on the project *Models and IT applications for the exploitation of musical heritage* financed by Department of Information Engineering. Supervisor: Prof. Sergio Canazza.
  Responsibilities: Development of web application for accessing and describing digitized audio recordings.

- 15 Oct 2018 - 14 Oct 2019. (12 months) **Postdoctoral research fellow** (*Assegnista di ricerca Tipo A*) - Grant at the Department of Information Engineering, University of Padova, working on the project *Using Speech Archives: Model and Implementation* financed by the Department of Information Engineering. Supervisor: Prof. Sergio Canazza.
  Responsibilities: Development of model and software for accessing oral archives.

- 09 Oct 2017 - 29 Mar 2018. (6 months) **Visiting Researcher** - Mobility period at Music Technology Group of Universitat Pompeu Fabra, Barcelona, collaborating on ERC project CompMusic (`compmusic.upf.edu`). Supervisor: Prof. Xavier Serra.
  Responsibilities: Creation of a corpus for Arab-Andalusian Music and development of algorithms for its analysis based on the scores.

- 01 Oct 2015 - 30 Sep 2018. (3 years) **PhD Student** - Grant at the Department of Information Engineering, University of Padova, financed by Fondazione Cariparo. Supervisor: Sergio Canazza.
  Responsibilities: a) development of software for the preservation of tape music, b) creation of a multimedia installation for musical heritage, c) development of algorithms for the analysis of Arab-Andalusian music

- 01 Apr 2015 - 30 Sep 2015. (6 months) **Research assistant** - *Assegnista di ricerca Tipo A* - Grant at the Department of Cultural Heritage, University of Padova, working on the project *Archaeology & Virtual Acoustics. A Pan flute from ancient Egypt* financed by the University under the grant CPDA133925. Supervisor: Prof. Paola Zanovello.
  Responsibilities: Design and development of an interactive multimedia installation for playing and exploring the history of an ancient Pan flute.

- 01 Apr 2014 - 30 Mar 2015. (12 months) **Research assistant** - *Assegnista di ricerca Tipo A* - Grant at the Department of Information Engineering, University of Padova, working on the project *Design and development of interactive mobile system for the access to digitized audio documents and artistic multimedia installation* financed by Veneto Region with European Social Funding. Supervisor: Prof. Sergio Canazza.
  Responsibilities: Design and development of skeuomorphic mobile and web applications for accessing historical audio tape recordings.

4 Education

- 14 Feb 2019. **PhD in Information Engineering** - *Dottorato in Ingegneria dell'Informazione, curricolo Scienza e Tecnologia dell'Informazione* - Grant at the Department of Information Engineering, University of Padova, financed by Fondazione Cariparo. Supervisor: Sergio Canazza. PhD thesis: "Cultural Context-Aware Models and IT Applications for the Exploitation of Musical Heritage".
- 06 Mar 2014. **Masters Degree in Computer Engineering** (*Laurea magistrale in Ingegneria Informatica - LM 32*) at the Department of Information Engineering, University of Padova. Supervisor: Sergio Canazza. Masters thesis: "A model for accessing philologically to audio documents: a web-based virtualization of a gramophone to replay digitized shellac discs".
- 23 Jul 2010. **Bachelor Degree in Computer Engineering** (*Laurea triennale in Ingegneria Informatica - Class 9*) at the Department of Information Engineering, University of Padova. Supervisor: Massimo Rumor. Bachelor thesis: "Vestition of topographic database of IGM using SLD".

5 Other relevant educational experiences

- Jun 2018. **International summer school** of the 15th Sound and Music Computing Conference (SMC'18) at Cyprus University of Technology, Lymassol Cyprus. Main topics: Computational ethnomusicology and soundscape.
- Oct 2016 - Dec 2016. **Academic English Course** for PhD students, organized by Language Centre of University of Padova.
- Aug 2016. **International summer school** of the 13th Sound and Music Computing Conference (SMC'16) at Hamburg University of Music and Theatre, Hamburg, Germany. Main topics: Brain-computer music interfaces; Artificial neural networks; Networked music performance.
- Jul 2015. **International summer school** of the 12th Sound and Music Computing Conference (SMC'15) at University of Maynooth, Maynooth, Ireland. Main topics: Sound design for media and enabling audio technologies.

6 Teaching

- 2022 - present. **Adjunct Professor (*Professore a contratto*)** - 6 CFU - and **Responsible** of the course "Foundations of computer science (C)" (*Fondamenti di informatica C*) in the Bachelor Degree in Information Engineering, Computer Science Engineering and Electronic Engineering at the Department of Information Engineering of the University of Padova.
- 2014 - present. **Assistant supervisor (*Correlatore*)** for **20 bachelor**'s and **11 master**'s students, during their theses. Supervisors: a) University of Padova - Sergio Canazza, Carlo Fantozzi, and Antonio Rodà; b) Politecnico di Milano - Augusto Sarti.
- 2021 - 2022. **Teaching assistant (*Didattica Integrativa*)** - 16 hours - for the "Foundations of computer science" (*Fondamenti di informatica*) course in the Bachelor Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Laura Bazzanella, Cinzia Pizzi, Andrea Loreggia). Lectures on recursive algorithms and practicals.
- 2020 - 2021. ***Cultore della materia*** and **Exam committee** for the "Foundations of computer science" (*Fondamenti di informatica*) course in the Bachelor Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Adriano Luchetta).

- 2020 - 2021. ***Cultore della materia*** **and Seminar teaching** for the "Computer science for music and multimedia" (*Informatica per la musica e il multimedia*) course in the Masters Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Sergio Canazza). Lecture on Web Audio API.
- 2020 - 2021. ***Cultore della materia*** for the "Sound design and music technology" course in the Masters Degree in Communication at the Department of Linguistic and Literary Studies of the University of Padova (Prof: Antonio Rodà).
- 2019 - 2020. **Teaching assistant (*Didattica Integrativa*)** - 20 hours - for the "Foundations of computer science" (*Fondamenti di informatica*) course in the Bachelor Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Laura Bazzanella, Sergio Canazza, Adriano Luchetta, Cinzia Pizzi). Lectures on recursive algorithms and complexity of algorithms, and practicals on version control systems (GIT).
- 2019 - 2020. **Seminar teaching** for the "Sound and music computing" (*Informatica musicale*) course in the Masters Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Sergio Canazza, Giovanni De Poli, Antonio Rodà). Lectures on audio recordings preservation and Web Audio API.
- 2017 - 2020. **Projects tutor** for the "Sound and music computing" (*Informatica musicale*) course in the Masters Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Federico Avanzini, Sergio Canazza, Giovanni De Poli, Antonio Rodà).
- 2018 - 2019. **Teaching assistant (*Didattica Integrativa*)** - 32 hours - for the "Embedded system programming" (*Programmazine di sistemi embedded*) course in Bachelor and Masters Degrees in Computer Science at the Department of Information Engineering of the University of Padova (Prof: Carlo Fantozzi). Lectures and practicals in Android app development.
- 2017 - 2019. ***Cultore della materia*** for the "Sound and music computing" (*Informatica musicale*) course in the Masters Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Federico Avanzini, Sergio Canazza, Giovanni De Poli, Antonio Rodà).
- 2017 - 2018. **Laboratory tutor** - 94 hours - for the "Computer architecture" (*Architettura degli elaboratori*) course in the Bachelor Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Matteo Comin, Emanuele Menegatti, Antonio Rodà, Francesco Silvestri). Practicals in Assembly ARM programming.
- 2016 - 2017. **Laboratory tutor** - 100 hours - for the "Foundations of computer science" (*Fondamenti di informatica*) course in the Bachelor Degree in Information Engineering at the Department of Information Engineering of the University of Padova (Prof: Federico Avanzini, Sergio Canazza, Marcello Dalpasso). Practicals in Java programming.

7   Research

From the very beginning of my carrier, my research activity has been marked by a high multidisciplinarity. My main research field is the sound and music computing, and my main topic is related to the computer science technologies applied to audio recordings and cultural heritage in general. Table 1 summarizes the **12 research projects (3 international, 4 national, 5 within the University of Padova)** I contributed to. The consortia are shown in table 2. The projects will be described in the following subsections.

ID	Type	Name
P1	International	MPAI
P2	International	FONTI 4.0
P3	International (ERC)	CompMusic
P4	National	Archivio Vi.Vo.
P5	National	CLARIN-IT
P6	National	Vademecum per le fonti orali
P7	National	PAMU
P8	DEI	IT4aREC
P9	DEI	Models and IT applications for the exploitation of musical heritage
P10	DEI	Using Speech Archives: Model and Implementation
P11	DBC	Archaeology & Virtual Acoustics
P12	DEI	Design and development of interactive mobile system for the access to digitized audio documents and artistic multimedia installation

Table 1: Research projects.

ID	Consortium
P1	MPAI Community (more than 40 International universities and companies)
P2	DEI (IT), EPFL (CH), Fondazione Giorgio Cini (IT)
P3	Pompeu Fabra University (SP), Tetouan-Asmir Center (MA)
P4	University of Siena (IT), CNR (IT), Soprintendenza archivistica e bibliografica della Toscana (IT)
P5	CLARIN-IT Consortium, GARR Consortium
P6	More than 20 Italian central institutions, universities, associations and foundations
P7	3 Departments of UNIPD (IT), IUAV Univeristy (IT), 4 companies
P8	DEI (IT)
P9	DEI (IT)
P10	DEI (IT)
P11	DBC (IT) and DEI (IT)
P12	DEI (IT)

Table 2: Consortium

Date Granted	Funding Body	Title	Amount
15/12/2020	B Senior Initiative, DEI, University of Padova	IT4aREC	60.000€

Table 3: Awarded Grants as Principal Investigator.

7.1 Models, algorithms and interfaces for preserving, analyzing and accessing to historical audio documents

My research interests are primarily focused on the development of models, algorithms and web and mobile interfaces for preserving, restoring, accessing and making use of historical audio recordings.

First projects

My first contribution on the field was the development of web and mobile interfaces during the project [P12]. These interfaces virtualize 78 rpm gramophone and tape recorders alongside their physical carriers to recreate the listening conditions of the time [J1,J2]. Further models and interfaces were developed for managing different kinds of audio contents such as oral sources [P10] and music [P9]. All these interfaces need several tools for the detection of errors and the analysis of the multimedia content. For this reason, my research interest involves the development of automatic tools based on signal processing and machine learning techniques [J3,J5], tackling these complex problems.

IT4aREC – Innovative Tools and Algorithms for preserving and Archiving Analogue Audio RECordings

I am the principal investigator (3) of the IT4aREC project [P8]. It aims to design innovative algorithms and to develop new software tools for (a) validating digital preservation copies, (b) their restoration and analyses, (c) supporting the creation of archival units available to researchers and/or common audience and (d) evaluating the suitability of blockchain technologies for long-term preservation of audio recordings. It is a highly multidisciplinary project. The main achievements are the definition of a restoration workflow and filters for compensating speed and equalization errors occurred during the digitization of audio open-reel tapes as well as for their validation. I collaborated with several national and international researchers and professionals, such as prof. Emery Schubert (University of New South Wales, AU) and Dr. Kurt James Warner (previously at Izotope Inc., US). At the moment, I am working on the automatic detection of irregularities in the video of the tape acquired during the digitization of an audio tape.

IT4aREC is also closely linked to Archivio Vi.Vo. and FONTI 4.0 projects where I worked as research assistant *assegnista di ricerca* and I am currently collaborating with. They are described in the following sections.

Archivio Vi.Vo. & CLARIN-IT

Archivio Vi.Vo. [P4] is an Italian project financed by the Region of Tuscany (officially closed at the end of the 2021, but new research assistants and postdoctoral fellows - *assegnisti di ricerca* - are currently active on this topic), aiming to: (i) explore methods for long-term preservation and secure access to oral sources, and (ii) develop an infrastructure under the CLARIN-IT umbrella [P5], offering several services for scholars from different domains interested in oral sources [BC3]. In these projects, I developed the methodology, and I am co-supervising the development of a platform for the preservation and access to oral sources collaborating with prof. Silvia Calamai (University of Siena and Principal Investigator of the project), Dr. Monica Monachini (Institute of Computational Linguistics, CNR, Pisa and coordinator of CLARIN-IT), and Dr. Maria Francesca Stamuli (Soprintendenza archivistica e bibliografica della Toscana). This platform is deployed in the Italian Gruppo per l'Armonizzazione delle Reti della Ricerca (GARR) infrastructure as service in the European Common Language Resources

and Technology Infrastructure (CLARIN). The algorithms and tools of IT4aREC will be integrated in the platform.

FONTI 4.0 - Fruizione innovativa di fonti Orali digitalizzate mediante le Nuove Tecnologie dell'Industria creativa 4.0

The project FONTI 4.0 [P2] (closed in December 2021) is funded by the Veneto Region though the European Social Funding. The goal is to automatize the extraction of information from analog oral sources through an automatic transcription chain. The steps of the project are: (1) detecting and correcting errors that could occur during the digitized recordings (equalization and speed errors), (2) transcribing the content through existing commercial software, (3) analyzing the transcribed text to identify information such as date, location, important names, etc., and (4) developing an interface for searching and playing digitized oral sources. In this project I am co-supervised the development of the overall transcription chain for automatically analyzing the contents of historical oral sources. This project adopted algorithms of IT4aREC for the restoration of digitized recordings. I collaborated with prof. Frederic Kaplan (head of Digital Humanities Laboratory of École polytechnique fédérale de Lausanne - EPFL), Dr. Alain Dufaux (Cultural Heritage & Innovation Center, EPFL, CH) and Fondazione Giorgio Cini, Venezia.

Vademecum per il trattamento delle fonti orali

Since 2018, I am part of an Italian national working group aiming to define the guidelines for the production, preservation and valorization of oral sources named as "Vademecum per il trattamento delle fonti orali" (`http://www.icar.beniculturali.it/attivita-e-progetti/progetti-in-collaborazione/vademecum-per-il-trattamento-delle-fonti-orali`) [P6]. This multidisciplinary group involves (a) Italian universities such as Ca' Foscari University and University of Siena, (b) several Italian central institutes of the Ministry of Culture such as Direzione generale Archivi, Istituto centrale per gli Archivi, Istituto centrale per i beni sonori e audiovisivi, Istituto centrale per il catalogo e la documentazione, as well as associations such as Associazione italiana di storia orale and Associazione italiana scienze della voce. I am a member of the "preservation of oral archives" and "use and re-use of oral sources" working groups.

CompMusic (ERC)

During my visiting period at the Music Technology Group (University Pompeu Fabra, Barcelona, Spain), I participated to the CompMusic project. It concerns the analysis of music recordings. Despite the world's richness in musical cultures, most of the research is centered on music and metadata of our western commercial music. CompMusic (`compmusic.upf.edu`) [P3] wants to break the huge research bias in music information research, by approaching musical information modelling from a multicultural perspective. It aims at advancing the state of the art while facilitating the discovery and reuse of the music produced outside the western commercial context. CompMusic investigated some of the most consolidated non-western classical music traditions, Indian (hindustani, carnatic), Turkish-Arab (ottoman, andalusian), Chinese (han), developing the needed computational models to bring their music into the current globalized information framework. My main achievement was the creation of a corpus of Arab-Andalusian music [C7] and the development of the first algorithm in literature of Nawba recognition based on music score analysis [C6].

7.2　Standards for artificial intelligence

MPAI - Moving Picture, Audio and Data Coding by Artificial Intelligence

From February 2021 I am a member of the Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI) community (`mpai.community`) aiming at Artificial Intelligence enabled digital data compression specifications [P1]. I am part of the Context-based Audio Enhancement (CAE) and Multimodal Conversation (MMC) standard groups, mainly working at the Audio Recording Preservation (ARP) standardization, which realized a standard that is under evaluation by IEEE P3302. The community involves researchers and companies all around the world, but the most valuable collaborators are Leonardo Chiariglione (co-founder of Moving Picture Experts Group - MPEG - and MPAI president) and prof. Marina Bosi (University of Stanford, US).

7.3　Design and development of interactive museum installations

In recent decades the role of many museums has evolved from preserving and displaying artifacts to that of institutions focused on the education and entertainment of visitors. To this end, museum curators strive to design and implement exhibitions that offer an educational, yet also enjoyable, experience. For these reasons, interactive multimedia installations, augmented and virtual reality applications, and mobile apps are increasingly widespread [C1, J6]. Often historical or modern musical instruments are presented in museums and exhibitions. A visitor must physically interact with musical instruments in order to properly understand them. Usually, this is impossible as preservation policies make the artifact inaccessible, or because degradation makes the instrument unusable. The proposed approach is to transpose the concepts of passive and active preservation from historical audio documents to the field of physical artifacts and musical instruments. In this context, passive preservation is meant to preserve the original instruments from external agents without altering their components, while active preservation involves a new design of the instruments using new components or a virtual simulation of the instruments [J6]. The project "Archaeology and virtual acoustics" [P11] provided an interesting case study. It concerned an exceptionally well-preserved ancient pan flute, most likely of Greek origin, recovered in Egypt in the 1930's and now exhibited in the Museum of Archaeological Sciences and Art (MSA), University of Padova [C2,J6]. It was during this project that I entered this multidisciplinary research area, specifically by managing the development of an interactive multimodal museum installation that virtually recreates the instrument, and communicates different aspects related to history, iconography, acoustics, musicology, and several other disciplines. This installation is now permanently exhibited at MSA.

　　Another important achievement in this field is the *Parco Multimediale delle Mura di Padova* (PAMU - `http://www.parcomurapadova.it/`) [P7]. The project was funded by the Veneto Region (*Parco Multimediale delle Mura di Padova (PAMU), valorizzazione di paesaggi e percorsi culturali in un'ottica creativa e innovativa* - ESF 2014-2020) and it was realized thanks to the synergies beetween IUAV University, the University of Padova and four companies. As external collaborator, I contributed to the development of the multimedia installations of the museum of the Walls of Padua [J4].

7.4　Software and multimedia installations

The most relevant software and installations that I developed during my research activity are:
1. REWIND (acronym for "Restoring the Experience: Web Interfaces for accessiNg Digitized recordings"), a software that consists of two web interfaces that respectively virtualize gramophone for 78

rpm digitized discs and a reel-to-reel audio tape recorder. The code of this software is open source and freely downloadable[12]. The app is described in [J2].

2. REMIND (acronym for "Restoring the Experience: Mobile INterfaces for accessing Digitized recordings"), a mobile app that aims at re-creating the experience of an open-reel audio tape recorder and provides several tools to explore metadata and contextual information, as well as a multi-track manager. The code of this software is open source and freely downloadable[3]. The app is described in [J1].

3. An interactive multimedia installation for the valorization of an ancient Pan flute. The installation is permanently exhibited in the Museum of Archaeological Sciences and Art (MSA), University of Padova. The peculiarity of this installation is the possibility to play a virtual Pan flute by blowing in the 14 holes of the installation representing the pipes of the musical instrument or through a touch interface [J6].

4. Four Jupyter notebooks in Python to download and analyze data and metadata from the Arab Andalusian Corpus of Dunya. The code of this software is open source and freely downloadable[4]. The notebooks are described in [C6,C7].

8 Dissemination and technological transfer

- 2022. I am a **founder member** of *MPAI Store Limited*, a Company Limited by Guarantee (Company number SC740055), incorporated on the 2nd of August 2022 and registered in Dundee, Scotland (https://find-and-update.company-information.service.gov.uk/company/SC740055). It is a non-for-profit company with the mission to collect, verify, certify, and make available the Implementations of technical specifications developed by the Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI - `mpai.community`), under licence by MPAI.

- 2021 - present. Active member of the Context-based Audio Enhancement (CAE) and Multimodal Conversation (MMC) standard groups of MPAI community. I have contributed to the development of the **MPAI-CAE standard**[5] [O2], which is a collection of four Use Cases specifying AI based technologies for audio-related applications including entertainment, communication, post-production, teleconferencing, and restoration [J9]. This standard is under evaluation by IEEE Context-based Audio Enhancement Working Group (CAEWG) under **IEEE P3302** project - *Adoption of Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI) Technical Specification Context-based Audio Enhancement (CAE) Version 1.2* (`https://standards.ieee.org/ieee/3302/10937/`).

- 2020 - 2021. Collaboration with Regesta.exe s.r.l. (under the project Archivio Vi.Vo) in order to develop innovative functionalities for the archival software xDams (`www.xdams.org`).

- 2020 - 2021. Archive Online Academy (AOA) course on Audio Documents Preservation (`www.cini.it/eventi/archive-online-academy`), financed by Fondazione Giorgio Cini and organized by AudioInnova s.r.l., a spin-off of the University of Padova (`www.audioinnova.com`)

- 2015 - 2020. Technology transfer activity collaborating with AudioInnova s.r.l.

- 2015, 2016, 2019. Participation at European night of researchers.

- 2015. Dissemination seminars in high school Tito Livio (Padova).

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[1]Gramophone: `github.com/CSCPadova/rewind_gramophone`.

[2]Tape recorder: `github.com/CSCPadova/rewind_taperecorder`

[3]`github.com/CSCPadova/remind`

[4]`github.com/MTG/andalusian-corpus-notebooks`

[5]`mpai.community/standards/mpai-cae/`

9 Other academic activities

9.1 Guest-editing

I am **Topic Editor** of the international and peer-reviewed journal *Frontiers in Signal Processing*. On the 23rd of September 2022, the topic **Preservation and Exploitation of Audio Recordings: from Archives to Industries** was published. The other topic editors are prof. Sergio Canazza (University of Padova), prof. Emery Schubert (University of New South Wales, Sydney) and prof. Marina Bosi (Stanford University). Research topic link: `https://www.frontiersin.org/research-topics/47296/preservation-and-exploitation-of-audio-recordings-from-archives-to-industries`

9.2 Invited and selected presentations and conference organization

On 22nd March 2021, I also participated as **invited speaker** in one of the seminars on forensic audio organized by the forensic group of the Italian association of voice science (AISV), titled: *L'audio forense: prospettive interdisciplinari.* (ENG: Forensic Audio: interdisciplinary perspectives). My talk title was: *La digitalizzazione di fonti sonore: conservazione, analisi e accesso* (ENG: The digitization of oral sources: preservation, analysis, access). Presentation link (ITA): `www.youtube.com/watch?v=ndVUM4_wHTs&ab_channel=ForensicsGroupChannel`

    I also co-organized **2 virtual courses** of the Archive Online Academy (AOA) financed by the Giorgio Cini Foundation (Venice, Italy):

- Sep 2021. FONTI 4.0 – Preservation, transcription and access of analog oral sources (`www.cini.it/en/events/archive-online-academy-living-lab-how-to-manage-oral-sources`), composed by a workshop with national and international professors on digital humanities, language technology and oral sources fields, 4 lectures and 3 virtual laboratories (98 enrolled people).

- Jun 2020 - Jul 2021. Preservation of historical sound documents

  (`www.cini.it/en/events/preservation-of-historical-sound-documents`), composed by 4 lectures and 3 virtual laboratories (50 enrolled people).

In these courses, I also participated as **speaker** with the following talks:

- 2021 FONTI 4.0 – Preservation, transcription, and access of analog oral sources. Talk titles: (a) Relation between the preservation copy and the archival unit, (b) Restoration laboratory on historical audio recordings, (c) Transcription laboratory, (d) Long term preservation and access. Website link: `www.cini.it/en/events/archive-online-academy-living-lab-how-to-manage-oral-sources`

- 2020 - Preservation of historical sound documents. Talk title: *Conservazione a lungo termine dei supporti analogici e delle digitalizzazioni* (ENG: Long term preservation of analogue support and their digitization). Website link: `www.cini.it/en/events/preservation-of-historical-sound-documents`

I presented **4 posters** and **4 oral contributions** to national and international conferences:

- 30/06/2022. Poster presentation (selected, National Conference) at the Eighth Italian Conference on Computational Linguistics (virtual edition) [C19].

- 30/06/2021. Poster presentation (selected, International Conference) at the 18th Sound and Music Computing Conference (virtual edition) [C16].

- 06/10/2020. Oral presentation (selected, International Conference) at the CLARIN Annual Conference (virtual edition) [C13].

- 26/06/2020. Poster Presentation (selected, International Conference) at the 17th Sound and Music Computing Conference (virtual edition) [C11].

- 06/07/2018. Oral presentation (selected, International Conference) at the 15th Sound and Music Computing Conference, in Limassol, Cyprus [C6].

- 14/11/2017. Oral presentation (selected, National Conference) at the 11th Italian Workshop on Artificial Intelligence for Cultural Heritage (AI*CH), part of the International Conference of the Italian Association for Artificial Intelligence AI*IA, in Bari, Italy [C5].

- 30/07/2015. Poster presentation (selected, International Conference) at the 12th sound and Music Computing Conference, in Maynooth, Ireland [C2].

- 20/10/2014. Oral presentation (selected, National Conference) at the XX Colloquio di Informatica Musicale (Italian Sound and music computing conference), in Rome, Italy [C1].

9.3 Program committees and review activities

I am part of the **Program Committees** of the following conferences:

PC1 Sound and Music Computing conference (SMC) – 2019-2022

PC2 Workshop on Ubiquitous Music (UbiMus) – 2020-2022

PC3 8th International Conference, Culture and Computing (C&C) 2020, Held as Part of the 22nd HCI International Conference, HCII 2020, Copenhagen – 2020

PC4 AudioMostly, Graz, Austria – 2020

PC5 Colloquio di Informatica Musicale (CIM) – 2016, 2018 and 2020

During the conference PC3, I was Chair of the session: "Culture and Computing - Designing Cultural Heritage Explorations"
I also worked as reviewer for the following conferences:

- CLARIN Annual Conference, Pisa – 2020 and 2021

- Convegno Associazione Italiana Scienze della Voce, AISV, Arezzo - 2019

I worked as reviewer for the following scientific journals and books:

- IEEE Access

- Applied Science (MDPI)

- CLARIN Book (under publication)

- Immagine. Note di storia del cinema.

9.4 Memberships

I am member of Association for Computing Machinery (**ACM**), Audio Engineering Society (**AES**), and Institute of Electrical and Electronics Engineers (**IEEE**). Concerning the last one, I am also member of the IEEE Standard Association.

I am member of the Moving Picture, Audio and Data Coding by Artificial Intelligence (**MPAI**) community, where I am part of the Communication Advisory Committee.

I am part of the Italian Committee for Oral Sources (*Coordinamento per le fonti orali*) that involves numerous Italian Central Institutions of the Ministry of Cultural Heritage (Direzione generale Archivi, Istituto centrale per i beni sonori e audiovisivi, Istituto centrale per il catalogo e la documentazione), scientific associations, foundations, and universities, and aims to define good practices for preserving and valorising oral sources.

10 Publications

The overall scientific production consists in **37 contributions**: 10 peer-reviewed international journal articles, 19 peer-reviewed papers on national and international conference proceedings, 2 books, 3 book chapters, the PhD thesis, an international standard and a national guideline.

Published peer-reviewed journal papers

J10 N. Pretto, N. Dalla Pozza, A. Padoan, A. Chmiel, K. J. Werner, A. Micalizzi, E. Schubert, A. Roda, S. Milani, and S. Canazza. A Workflow and Digital Filters for Correcting Speed and Equalization Errors on Digitized Audio Open-Reel Magnetic Tapes. *Journal of the Audio Engineering Society* 70(6), 495-509, 2022. URL: `http://www.aes.org/e-lib/browse.cfm?elib=21798`.

   - Scimagojr index 2021 (2022 not yet available): Q1 - Music; Q2 - Engineering (miscellaneous)

J9 A. Basso, P. Ribeca, M. Bosi, **N. Pretto**, G. Chollet, M. Guarise, M. Choi, L. Chiariglione, R. Iacoviello, F. Banterle, A. Artusi, F. Gissi, A. Fiandrotti, G. Ballocca, M. Mazzaglia, and S. Moskowitz. AI-Based Media Coding Standards. *SMPTE Motion Imaging Journal*, 131 (4), 10-20, 2022, doi: 10.5594/JMI.2022.3160793.

   - Scimagojr index 2021 (2022 not yet available): Q2 - Media technology; Q3 - Electrical and Electronic Engineering

J8 S. Canazza, E. Schubert, A. Chmiel, **N. Pretto**, and A. Rodà. The magnetic urtext: Restoration as music interpretation. *Frontiers in Psychology* 13:844009, 2022. doi: 10.3389/fpsyg.2022.844009.

   - Scimagojr index 2021 (2022 not yet available): Q1 - Psychology (miscellaneous)

J7 N. Pretto, E. Micheloni, A. Chmiel, N. Dalla Pozza, D. Marinello, E. Schubert, and S. Canazza. Multimedia Archives: New Digital Filters to Correct Equalization Errors on Digitized Audio Tapes. *Advances in Multimedia*, Hindawi, 2021. doi: 10.1155/2021/5410218.

   - Scimagojr index 2021: Q3 - Computer Science (miscellaneous)

J6 N. Pretto, E. Micheloni, S. Gasparotto, C. Fantozzi, G. De Poli, and S. Canazza. Technology-enhanced interaction with cultural heritage: an antique Pan flute from Egypt. *ACM Journal on Computing and Cultural Heritage (JOCCH)* 13 (2), 1-20, 2020. doi: 10.1145/3355395.

- Scimagojr index 2020: Q1 - Conservation; Q2 - Computer Graphics and Computer-Aided Design; Q3 - Computer Science Applications, Information Systems

J5 **N. Pretto**, C. Fantozzi, E. Micheloni, V. Burini, and S. Canazza. Computing Methodologies Supporting Preservation of Electroacoustic Music from Analog Magnetic Tape. *Computer Music Journal*, 42(4):59-74, 2018. ISSN: 0148-9267. doi: 10.1162/comj_a_00487.

- Scimagojr index 2018: Q1 - Music; Q2 - Media Technology; Q3 - Computer Science Applications

J4 E. De Feo, E. A. Venier, A. Russo, M. Breschigliaro, and **N. Pretto**. PAMU: A Multimedia Park to Enhance the Renaissance Walls of Padua. DISEGNARECON 11 (21), 7-1-7.19, 2018. URL: `disegnarecon.univaq.it/ojs/index.php/disegnarecon/article/view/459/334`.

- Scimagojr index 2019 (2018 index not available): Q1 - Visual Arts and Performing Arts; Q2 - Architecture; Q3 - Urban Studies

J3 S. Verde, **N. Pretto**, S. Milani, and S. Canazza. Stay true to the sound of history: Philology, phylogenetics and information engineering in musicology. *Applied Sciences*, 8(2), 2018. ISSN 2076-3417. doi: 10.3390/app8020226.

- Scimagojr index 2018: Q1 - Engineering (miscellaneous); Q2 - Fluid Flow and Transfer Processes, Process Chemistry and Technology, Materials Science (miscellaneous), Instrumentation; Q3 - Computer Science Applications

J2 C. Fantozzi, F. Bressan, **N. Pretto**, and S. Canazza. Tape music archives: from preservation to access. *International Journal on Digital Libraries*, 18(3):233-249, September 2017. ISSN 1432-1300. doi: 10.1007/s00799-017-0208-8.

- Scimagojr index 2017: Q2 - Library and Information Sciences

J1 S. Canazza, C. Fantozzi, and **N. Pretto**. Accessing tape music documents on mobile devices. *ACM Transactions Multimedia Computing Communications and Applications (TOMM)*, 12 (1s):20:1-20:20, October 2015. ISSN 1551-6857. doi: 10.1145/2808200.

- Scimagojr index 2015: Q2 - Computer Networks and Communications, Hardware and Architecture

International and national peer-reviewed conference papers

C19 R. B. Luzietti, **N. Pretto**, F. Kaplan, A. Dufaux, and S. Canazza. FONTI 4.0: evaluating speech-to-text automatic transcription of digitized historical oral sources. Eighth Italian Conference on Computational Linguistics, Milan, 2022. URL: `http://ceur-ws.org/Vol-3033/paper45.pdf`.

C18 L. Chiariglione, A. Basso, P. Ribeca, M. Bosi, **N. Pretto**, G. Chollet, M. Guarise, M. Choi, F. Yassa, R. Iacoviello, A. Artusi, F. Banterle, G. Saccardi, A. Fiandrotti, G. Ballocca, M. Mazzaglia, M. Rosano, and S. Moskowitz. AI-based media coding and beyond. In proceedings of IBC conference, 2021. URL: `www.dei.unipd.it/~prettoni/paper/2021_ibc_mpai_published.pdf`.

C17 **N. Pretto**, N. Dalla Pozza, A. Padoan, A. Chmiel, K. J. Werner, A. Micalizzi, E. Schubert, A. Rodà, S. Milani, and S. Canazza. 2021. A workflow and novel digital filters for compensating speed and equalization errors on digitized audio open-reel tapes. In Proceedings of Audio Mostly 2021, AM21,Trento, Italy. doi: 10.1145/3478384.3478409.

C16 M. Bosi, **N. Pretto**, M. Guarise, and S. Canazza. Sound and music computing using AI: Designing a standard. *in Proceedings of the 18th Sound and Music Computing Conference - SMC21*, Virtual Edition, 2021. doi: 10.5281/zenodo.5045003.

C15 S. Calamai, **N. Pretto**, M.F. Stamuli, D. Piccardi, G. Candeo, S. Bianchi, and M. Monachini. Community-Based Survey and Oral Archive Infrastructure in the Archivio Vi.Vo. Project. *Selected Papers from the CLARIN Annual Conference 2020*, 2021. URL: `https://ecp.ep.liu.se/index.php/clarin/article/view/7/7`.

C14 M. Monachini, M.F. Stamuli, S. Calamai, **N. Pretto**, and S. Bianchi. The grey-side of audio archives. *Conference of 22nd International Conference on Grey Literature: Applications of Grey Literature for Science and Society*, GL 2020, Virtual Edition, 2020. URL: `http://www.dei.unipd.it/~prettoni/paper/2020_GL2020_grey_published.pdf`.

C13 S. Calamai, **N. Pretto**, M. Monachini, M.F. Stamuli, S. Bianchi, and P. Bonazzoli. Building a home for Italian audio archives. *Proceedings of CLARIN Annual Conference 2020*. Eds. C. Navarretta and M. Eskevich. Virtual Edition, 2020. URL: `http://www.dei.unipd.it/~prettoni/paper/2020_CLARIN2020_published.pdf`.

C12 VN. Vitale, M. Olivieri, A. Origlia, **N. Pretto**, A. Rodà, and F. Cutugno. Acoustic Experiences for Cultural Heritage Sites: A Pilot Experiment on Spontaneous Visitors? Interest. In *Culture and Computing. HCII 2020. Lecture Notes in Computer Science*, vol 12215. Springer, Cham. doi: 10.1007/978-3-030-50267-6_23.

C11 **N. Pretto**, A. Russo, F. Bressan, V. Burini, A. Rodà, and S. Canazza. Active preservation of analogue audio documents: A summary of the last seven years of digitization at CSC, *in Proceedings of the 17th Sound and Music Computing Conference - SMC20*, Torino, 2020. doi: 10.5281/zenodo.3898905.

C10 A. Russo, **N. Pretto**, A. Rodà, and S. Canazza. L'informatica per la gestione e la conservazione di informazioni acustiche (musica e voce). *In Proceedings of Associazione Italiana Scienze della Voce - Studi AISV*, 2019. URL: `dei.unipd.it/~prettoni/paper/RussoAISV.pdf`.

C9 S. Canazza, C. Fantozzi, **N. Pretto**, A. Rodà, A. Chmiel, and E. Schubert. Quelle voci poco fa: l'intelligenza artificiale a contrastare l'eclisse delle memorie sonore. *1st Convegno Nazionale CINI sull'Intelligenza Artificiale (Ital-IA)*, Rome, IT, 2019. URL: `ital-ia.it/submission/74/paper`.

C8 M. Mandanici, F. Altieri, **N. Pretto**, M. Munaro, S. Canazza, and E. Menegatti. The Good or Bad? Game: Stimulating Listening Skills through Playful Engagement. *In Proceedings of the 4th EAI International Conference on Smart Objects and Technologies for Social Good*, pages 177-182, Bologna, IT, 2018. ACM. ISBN: 978-1-4503-6581-9. doi: 10.1145/3284869.3284917.

C7 R. Caro Repetto, **N. Pretto**, A. Chaachoo, B. Bozkurt, and X. Serra. An open corpus for the computational research of Arab-Andalusian music. *In Proceedings of the 5th International Conference on Digital Libraries for Musicology (DLfM '18)*, pages 78-86, Paris, FR, 2018. ACM. ISBN 978-1-4503-6522-2. doi: 10.1145/3273024.3273025.

C6 **N. Pretto**, B. Bozkurt, R. Caro Repetto, and X. Serra. Nawba recognition for Arab-Andalusian music using templates from music scores. *In Proceedings of 15th Sound and Music Computing Conference (SMC'18)*, pages 405-410, Limassol, Cyprus, July 2018. doi: 10.5281/zenodo.1257388.

C5 E. Micheloni, **N. Pretto**, and S. Canazza. A step toward AI tools for quality control and musicological analysis of digitized analogue recordings: recognition of audio tape equalizations. *In Proceedings of the 11th International Workshop on Artificial Intelligence for Cultural Heritage (AI*CH'17), co-located with the 16th International Conference of the Italian Association for Artificial Intelligence (AI*IA 2017)*, pages 17-24, Bari, Italy, November 2017. URL: `ceur-ws.org/Vol-2034/paper_3.pdf`.

C4 E. Micheloni, **N. Pretto**, F. Avanzini, S. Canazza, and A. Rodà. Installazioni interattive per la valorizzazione di strumenti musicali antichi: il flauto di Pan del Museo di scienze archeologiche e d'arte dell'Università degli studi di Padova. *In Extending interactivity. Atti del XXI CIM - Colloquio di Informatica Musicale (CIM'16)*, pages 203-208, Cagliari, Italy, September 2016. URL: `cim.lim.di.unimi.it/2016_CIM_XXI_Atti.pdf`.

C3 F. Avanzini, S. Canazza, G. De Poli, C. Fantozzi, E. Micheloni, **N. Pretto**, A. Rodà, S. Gasparotto, and G. Salemi. Virtual reconstruction of an ancient greek pan flute. *In Proceedings of the 13th International Sound and Music Computing Conference (SMC'16)*, Hamburg, Germany, September 2016. doi: 10.5281/zenodo.851179.

C2 F. Avanzini, S. Canazza, G. De Poli, C. Fantozzi, **N. Pretto**, A. Rodà, I. Angelini, C. Bettineschi, G. Deotto, E. Faresin, A. Menegazzi, G. Molin, G. Salemi, and P. Zanovello. Archaeology and virtual acoustics. a pan flute from ancient Egypt. *In Proceedings of 12th International Sound and Music Computing Conference (SMC'15)*, pages 31-36, Maynooth, Ireland, August 2015. doi: 10.5281/zenodo.851067.

C1 **N. Pretto**, and S. Canazza. REWIND: Simulazione di un'esperienza d'ascolto storicamente fedele di dischi fonografici digitalizzati. *In Proceedings of the XX Colloquium of Musical Informatics, (CIM'14)*, pages 29-34, Roma, Italy, October 2014. URL: `cim.lim.di.unimi.it/2014_CIM_XX_Atti.pdf`.

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TH1 Cultural Context-Aware Models and IT Applications for the Exploitation of Musical Heritage. **N. Pretto**, Department of Information Engineering, University of Padova, 2019. URL: `dei.unipd.it/~prettoni/paper/pretto_niccolo_tesi_ridotta.pdf`.

Books

B2 A. Artusi, A. Basso, M. Bosi, S. Canazza, L. Chiariglione, M. Choi, F. Columbano, M. Burkay Çöteli, N. Dalla Pozza, R. Dini, M. Guarise, H. Hacıhabiboğlu, R. Iacoviello, C. Jia, J. Kang, P. Kudumakis, V. Lazzaroli, M. Mazzaglia, G. Perboli, **N. Pretto**, P. Ribeca, M. Rosano, M. Seligman. Verso un uso pervasivo ed affidabile dell'intelligenza artificiale. Come gli standard possono mettere una grande tecnologia al servizio dell'umanità. Amazon Publishing, 2022. ISBN-13: 979-8835395675. URL:

`www.amazon.com/Verso-pervasivo-affidabile-dellintelligenza-artificiale/dp/B0B4D6FFTR`

B1 A. Artusi, A. Basso, M. Bosi, S. Canazza, L. Chiariglione, M. Choi, F. Columbano, M. Burkay Çöteli, N. Dalla Pozza, R. Dini, M. Guarise, H. Hacıhabiboğlu, R. Iacoviello, C. Jia, J. Kang, P. Kudumakis, V. Lazzaroli, M. Mazzaglia, G. Perboli, **N. Pretto**, P. Ribeca, M. Rosano, M.

Seligman. Towards Pervasive and Trustworthy Artificial Intelligence. How standards can put a great technology at the service of humankind. Amazon Publishing, December 2021. ISBN-13: 979-8786573368 URL:

`www.amazon.com/Towards-Pervasive-Trustworthy-Artificial-Intelligence/dp/B09NRKX74F`.

Book chapters

BC3 S. Calamai, D. Piccardi, **N. Pretto**, G. Candeo, M. F. Stamuli, and M. Monachini. Not just paper: enhancement of archive cultural heritage. In CLARIN book, edited by D. Fišer and A. Witt, DeGruyter, 2022. (under publication)

BC2 V. Burini, S. Canazza, and **N. Pretto**. Archivi di musica elettroacustica: dalla conservazione all'accesso. In *I documenti Sonori. Voce, suono, musica in archivi e raccolte*, Archivi e biblioteche in Piemonte - Direzione Promozione della Cultura, Turismo e Sport della Regione Piemonte, Torino, Italy, 2021. URL: `dei.unipd.it/~prettoni/paper/BuriniEtAl.Archivi.pdf`.

BC1 A. Russo, M. Kassel, S. Canazza, and **N. Pretto**. Active Preservation of Luciano Berio's Audio Documents. In *Mitteilungen der Paul Sacher Stiftung*, 32:20-25, ISSN 1015-0536, Mitteilungen der Paul Sacher Stiftung, Basel, April 2019. URL: `paul-sacher-stiftung.ch/dam/jcr: d2fda27b-ae19-4b5f-8b27-dc598bba9164/mitteilungen-pss-32-alessandro-russo-matthias -kassel-sergio-canazza-niccolo-pretto.pdf`.

Other publications

O2 L. Chiariglione, Y. Abu Arab, M. Bosi, S. Canazza, M. Burkay Çöteli, N. Dalla Pozza, M. Guarise, H. Hacıhabiboğlu, **N. Pretto**, P. Ribeca, M. Seligman, and F. Yassa. Moving Picture, Audio and Data Coding by Artificial Intelligence (MPAI) Technical Specification Context-based Audio Enhancement (CAE). Last standard version: 1.4, 2022. URL: `https://mpai.community/standards/ mpai-cae/`

O1 S. Calamai, A. Casellato, M. F. Stamuli, P. Cavallari, G. Contini, L. D'Aleo, S. Filippin, A. Fischetti, S. Magrini, M. Monachini, A. Mulè, E. Musumeci, P. Orsini, D. Piccardi, G. Piperno, **N. Pretto**, M. Procaccia, D. Robotti, E. Salvalaggio, C. Scognamiglio, S. Zanisi. Vademecum per il trattamento delle fonti orali, 2021. URL: `www.icar.beniculturali.it/fileadmin/risorse/ Eventi_2021/Vademecum_02.11.21_ultima_versione.pdf`

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Padova, September 25, 2022

Niccolò Pretto