Andrea **Poltronieri**

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Education

Ph.D. Student in Computer Science and Engineering

Bologna, Italy

Alma Mater Studiorum - University of Bologna

Nov. 2021 - PRESENT

- Ph.D. financed by Polifonia, an European project founded by the EU Horizon 2020 Programme. The main objective of the Ph.D. is to recognise and extract recurring musical patterns of different nature (melodic, harmonic, rhythmic) that have a musicological and/or perceptual relevance. By means of the interaction between technologies used in the field of Music Information Retrieval and the Semantic Web, the aim is to identify such patterns taking into account both signal-related aspects (DSP) and different types of symbolic notation.
- *Supervisor:* Valentina Presutti
- During the Ph.D. course I attended several courses, in order to strengthen my knowledge in the Computer Science domain:
  - Machine Learning and Constrained Optimization, Data Structure and Algorithms, Engineering Intelligent Collective Systems.

Master's degree in Digital Humanities and Digital Knowledge – International Degree

Bologna, Italy

Alma Mater Studiorum – University of Bologna

Oct. 2018 - Mar. 2021

- *Grade:* 110/110 with honour
- *Dissertation title:* Using Semantic Technologies to support Music Representation Interoperability and Musicological Analysis
- *Supervisor:* Aldo Gangemi
- *Co-supervisor:* Albert Meroño Peñuela
- *Dissertation description:* The dissertation aims to develop an ontology that can serve musicological research. This ontology proposes to make different types of musical representations interoperable and to describe an extended set of musicological features, previously extracted with algorithms implemented explicitly for this research.
- During this degree I passed 13 examinations with an average mark of 29.88/30, mainly in the following areas:
  - *Computer Science:* Computational Thinking and Programming, Data Modelling and Multimedia Databases, Information Modelling and Web Technologies, Usability and User Experience, Intangible Artifacts Cultural Heritage and Multimedia, Machine Learning
  - *Knowledge Management:* Knowledge Representation and Extraction, Knowledge Organization and Digital Methods in the Cultural Heritage Domain

Exchange Student – Erasmus+ Program

Lisbon, Portugal

Universidade NOVA de Lisboa

Sep. 2017 - Feb. 2018

- During this exchange period I passed 5 examinations mainly in the following areas:
  - *Computational musicology*: Music and Computing
  - *Musicology*: Philosophy of Music: Foundations, Ethnomusicology: Introduction, Theory and Methods of Ethnomusicology, Theory and Methods in Musicology

Bachelor's degree in DAMS – Drama, Art and Music Studies

Bologna, Italy

Alma Mater Studiorum – University of Bologna

Sep. 2015 - Nov. 2018

- *Grade:* 105/110
- *Dissertation title:* Il "caso Gobatti", un esempio di "fanatismo" nei Teatri d'opera italiani di fine Ottocento
- *Supervisor:* Anna Scalfaro
- During this degree I passed 14 examinations mainly in the following areas:
  - *Historical Musicology:* History of Music II: Seventeenth- Eighteenth Centuries, History of Music III: Nineteenth Century, History of Music IV: Twentieth Century, History of Light Music
  - *Harmony and Music Theory:* Elements of Harmony and Counterpoint

High school diploma in scientific and informatic studies

Ostiglia (MN), Italy

Galileo Galilei High School

Sep. 2007 - Jul. 2012

Experience

Assistant Researcher

Bologna, Italy

University of Bologna, Department of Modern Languages, Literatures, and Cultures - LILEC

May. 2021 - Oct. 2021

- Researcher within the project ArCo4Science (MiBACT). The research project involves the study of a computational approach for analysing large repositories of music content expressed in heterogeneous formats with the aim of identifying and formally representing common and significant patterns that are indicative of music identity and culture.
- In order to improve my skills with regard to the topics covered in the research project, I attended the following courses: *Knowledge Engineering*

Conversation Designer

Bologna, Italy

Heres s.r.l.

Jan. 2020 - Apr. 2021

- Company working on chatbot development at enterprise-level. Within the company, I am responsible for the management and implementation of conversational flows and NLP algorithms.
- Responsabilities:
  - Design and development of conversational flows
  - Natural Language Processing algorithms development
  - Project management and customer relations
  - Research and product development

Event Planner

Mantua, Italy

Mantova Chamber Music Orchestra

May. 2018 - Aug. 2018

- Within the foundation, I managed the organisation of an international classical music festival named *Trame Sonore*. The 2018 edition of the festival hosted 300 international artists who performed in over 200 concerts.
- Responsibilities:
  - Concerts planning and logistical organisation

Musician - Guitarist

Padua, Italy

DEGO Orchestra

Sep. 2014 - Nov. 2019

Extracurricular Activity

Rock Guitar Academy (RGA)

Milan, Italy

CCR Diploma – Rock Guitar Course

Nov. 2012 - Feb. 2015

Acquired skills:

- Instrument practice
- Melodic and harmonic training
- Music scores sight-reading

SciRoc Competition

Bologna, Italy

Logistics and Organisation

Sep. 2021

- I collaborated in the organisation of the second edition of the Smart City Robotics Challenge (SciRoc) held in Bologna in September 2021. The competition involved several international robotics teams that competed in tasks having as central theme the “Smart Inclusion”.

Personal Skills

Italian	Native speaker
English	C1 level (Common European Framework of Reference for Languages) 7.0 IELTS Academic Overall Band Score (test date 18/07/2019)
Portuguese	B1 level (Common European Framework of Reference for Languages)

Technical Skills

Programming	Python, JavaScript, C++, Julia
Web Design	Django, Express, React, HTML5, SASS, Tailwind CSS
MIR and DSP Libraries	music21, Librosa, VIS Framework, MSAV
ML Libraries	Keras, TensorFlow, Scikit-learn
Notation software	Finale, MuseScore, Sibelius
DAW	Cubase, Ableton, Logic
Semantic Web Languages	RDF, SPARQL, OWL
Knowledge Engineering	Protégé

Projects

LHARP

Ph.D. Project *2021*

Work carried on in the context of the Polifonia Project. LHARP is a novel method for harmonic similarity that emphasises shared repeated patterns among symbolic chord sequences. Compared to other harmonic similarity methods on symbolic music, LHARP enables more explorative studies, as it can establish links when local harmonic patterns are found repeated in both sequences, while retaining global information to a lesser extent. This is also complemented with "The Harmonic Network" a computational tool allowing users to explore music collections by visualising harmonic similarities among tracks and interacting with the resulting graph to discover nontrivial relationships among authors, composers, and pieces.

- LHARP GitHub Repository

HaMSE Ontology

University Project *2021*

Project developed for master's course final dissertation. It applies Semantic Technologies to musicological applications. The resulting ontology represents a wide range of musicological aspects (e.g., from the level of single note specificity to the representation of different types of melodic, harmonic, structural and emotional features) and allows interoperability between different representation systems.

- HaMSE Ontology Website
- HaMSE GitHub Repository

Machine Learning Genre and Artist Classification

University Project *2020*

Project developed for the final exam of Machine Learning. The project aims at automatically classifying the music genre and the performing artist of a given song. Both recurrent (RNN), convolutional (CNN), and hybrid approaches (CRNN) deep learning algorithms have then been developed. The results of accuracy in music genre classification stand at 88%.

- GitHub Repository of the Project

Tusmann Project

University Project *2020*

Project developed for the final exam of the course in Information Modelling and Web Technologies. The project aims to use web design technologies to create a web application that can display web pages in different typographic styles from different historical periods. For this project's development, the standard web development technologies were used, in particular HTML, SCSS and JavaScript.

- Project Website

Pop Words - Political Rhetorics of Populism

University Project *2019*

Project developed for the final examination in Knowledge Representation and Extraction. The aim of this project is the analysis of common pattern in political rhetoric. For the project, close and distant reading methods have been employed, such as rhetorical device analysis, topic modelling, sentiment analysis, and lexical space analysis. Pop Words then creates ASAP, an OWL ontology formalizing rhetorical strategies employed by Right-wing populists.

- Project Website

ApolLOD 11

University Project *2019*

Project developed for the final examination in Knowledge Organization and Digital Methods in the Cultural Heritage Domain. ApoLOD11 project creates a Linked Open Data environment for key concepts, figures, and items surrounding the idea of the first lunar exploration, representing the relationships through an E/R Model. The end result is representative items linked in a LOD manner that follows industry standards.

- Project Website

Publications

- Valentina Anita Carriero, Fiorela Ciroku, Jacopo de Berardinis, Delfina Sol Martinez Pandiani, Albert Meroño-Peñuela, Andrea Poltronieri, and Valentina Presutti. Semantic integration of mir datasets with the polifonia ontology network. In *ISMIR Late Breaking Demo*, 11 2021.
- Andrea Poltronieri and Aldo Gangemi. The hamse ontology: Using semantic technologies to support music representation interoperability and musicological analysis. In *Proceedings of the 1st Workshop on Multisensory Data and Knowledge (MDK 2021), Zaragoza, Spain, September 1, 2021.*, 2021.
- Andrea Poltronieri and Aldo Gangemi. The music note ontology. In Karl Hammar, Cogan Shimizu, Hande Küçük McGinty, Luigi Asprino, and Valentina Anita Carriero, editors, *Proceedings of the 12th Workshop on Ontology Design and Patterns (WOP 2021), Online, October 24, 2021.*, 11 2021.