Federico Simonetta

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Nationality: Italian

Research Interests

My main interests are motivated by the attempt to understand how music is connected with the human cultures in different societies around the world and how music psychological and physiological effects can be used to improve our well-being.

My interest in music led me to the Classical Guitar degree and to academic-level studies in music composition. However, they found a full accomplishment in the research activity.

In respect to music for well-being, during my Ph.D. I have imagined an application to democratize the production of music. The objective is to transfer the interpretation recorded by cheap microphones to virtual instruments used in professional music production, allowing everyone to create high-quality music recording.

Regarding the cultural aspects of music, I am interested in building statistical and machine learning tools for the analysis of music in all its aspects, as they developed throughout the history of cultures. This commitment led me to put a particular attention on the symbolic level of music, especially in the "Didone" and "Con Espressione" projects. I am currently working on methods for extracting symbolic information from digital images of music sheets. This field is known as historical document understanding.

MAIN INTERESTS

Document Understanding
Machine Learning
Music Performance Analysis
Computational Musicology
Audio DSP
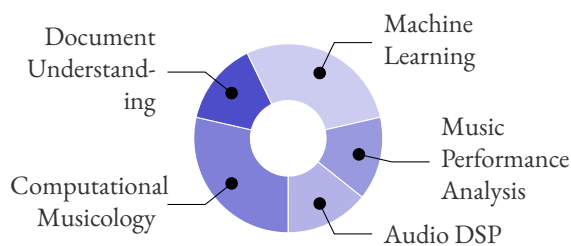
SCIENTIFIC OUTPUT

Source	Citations	h-index
Google Scholar [link]	134	6
Scopus [link]	57	4

The updated list of publications is available online:

https://federicosimonetta.eu.org/publications

Education

2018-2021	**Ph.D.** in Computer Science, University of Milan. Thesis: *Music Interpretation Analysis. A Multimodal Approach to Score-Informed Resynthesis of Piano Recordings*
2016-2018	**MS** in Computer Engineering, University of Padova
2015-2018	Private Music Composition Lessons (Teachers: Fabio Crosera and Gianluca Baldi), Padova
2015	**MA** in Classical Guitar, Conservatoire of Pavia
2011-2014	BS in Computer and Electronic Engineering, University of Pavia

Work

Research

2023-today	Post-doc researcher, "Laudare" ERC project, Gran Sasso Science Institute Post-doc researcher, "Didone" ERC project, Instituto Complutense de Ciencias Musicales, Universidad Complutense de Madrid
2018-2021	Ph.D. Candidate, University of Milan
2018	Research Assistant, "Con Espressione" ERC project, OFAI - Austrian Research Institute for Artificial Intelligence, Vienna

Teaching

2018-2022	Co-supervisor for Bachelor and Master Thesis, University of Milan
2020-2021	Assistant for Advanced Multivariate Statistics (Python lab), University of Milan (Data Science)
2020-2021	Exam Assistant for various courses, University of Milan (Data Science)
2020	Assistant for Java Programming, University of Milan (Mathematics)
2020	Assistant for Mathematics Fundamentals, University of Milan (Economical Sciences)
2020	Teacher for Introduction to Audio Processing, Fondazione Luigi Clerici
2018	Assistant for Computer Science Skills, University of Milan (Medicine)
2016-2018	Tutor for Java Programming, University of Padova (Information Engineering)

Total hours spent in lectures: ~224
Total thesis supervised: 7 Bachelor (6 completed), 5 Masters (3 completed)

Oral Communications at International Workshops and Conferences

2021	24th IEEE International Workshop on Multimedia Signal Processing. Online. *Acoustics-specific Piano Velocity Estimation*
2021	23rd IEEE International Workshop on Multimedia Signal Processing. Tampere, Finland. *Audio-to-Score Alignment Using Deep Automatic Music Transcription*
2020	17th Sound and Music Computing Conference. Online. *ASMD: an automatic framework for compiling multimodal datasets with audio and scores*
2019	6th International Conference on Digital Libraries for Musicology. Delft, Netherlands. *On the Adoption of Standard Encoding Formats to Ensure Interoperability of Music Digital Archives: The IEEE 1599 Format*
2019	20th International Conference of the ISMIR. Delft, Netherlands. *A Convolutional Approach to*

Melody Line Identification in Symbolic Scores

2019   First International Workshop on Multilayer Music Rrepresentation and Processing. Milan, Italy.
Multimodal Music Information Processing and Retrieval: Survey and Future Challenges

Participation to funded projects

2023-today   *The Italian Lauda: Disseminating Poetry and Concepts Through Melody (12th-16th centuries)*
ERC Project, PI: prof. Francesco Zimei. Gran Sasso Science Institute.

2022-2023   *The Sources of Absolute Music: Mapping Emotions in Eighteenth-Century Italian Opera*
ERC Project, PI: prof. Álvaro Torrente. Instituto Complutense de Ciencias Musicales.

2021-2022   *Advanced methods for sound and music computing*
Piano di Sostegno della Ricerca, Linea 2, University of Milan.

2018   *Getting at the Heart of Things: Towards Expressivity-aware Computer Systems in Music*
ERC project, PI: prof. Gherard Widmer. Austrian Research Institute for Artificial Intelligence.

Scientific and Program Committees

Reviewer

- "Information Sciences", Elsevier (journal)
- "PLOS One" (journal)
- "International Society of Music Information Retrieval (ISMIR) Conference": 2020, 2021, 2022
- "Sound and Music Computing Conference": 2019, 2020, 2021, 2022
- "Computer-Supported Music Education (CSME)" – CSEDU: 2020, 2021, 2022
- "First International Workshop on Multilayer Music Representation and Processing (MMRP19)" (Indexed on IEEE Xplore): 2019

Other

- MMRP'19 Organizing Committee (Indexed on IEEE Xplore)
- **IEEE 1599 Standard – Working Group Member** ("IEEE Recommended Practice for Defining a Commonly Acceptable Musical Application Using XML")

Languages

	Understanding		Speaking		Writing
	Listening	Reading	Production	Interaction	
English	B2	C2	C1	C1	C1
Spanish	C1	C1	B2	B2	B1
Italian	mother tongue				

Software

All my research software are Open Source. Additional software projects are available free as in speech: https://federicosimonetta.eu.org/software.

NOTABLE SOFTWARE

- **musif**: a Python module to extract musicological features from symbolic music scores;
- **EWLD**: > 5000 leadsheets enriched with metadata;
- **ASMD**: Python framework for compiling, using, and distributing music datasets;
- **musiF**: Python tool for extracting features from music scores of XVIIIth Century Italian operas;
- **PyCarla**: a Python module to synthesize MIDI events both online and off-line using audio plugins (VST, AU, LV2, SF2, SFZ, etc.); file;

Coding Capabilities

Python

Julia, HTML5, Shell, Latex

C/C++, Java, Lua

R, SQL, PHP, Rust, Go

Main libraries used: PyTorch, Keras, Scikit-Learn, statsmodels, Scikit-Optimize, Pandas, Scipy, Essentia, Librosa, pyjulia (call Julia from python), Binder (C++ python bindings), Cython, Numba.

Transversal skills

- My experience as musician and composer enhanced my **creativity**;
- The activity of academic research improved my abilities to **think outside of the box**;
- In the research projects that I have joined since the Master Thesis, I have developed good **team working** abilities for preparing academic reports and publications, discussing issues, and taking collective decisions;
- I have taken part to 7 international conferences, building strong **public relations** abilities;
- During my teaching experience I have learned to **promote** people skills, as well as to **flexibly** face any difficulty that people can find while learning;
- I have **organized** many music concerts and events and I have participated in the **organization** of an International Workshop (MMRP 2019);