Juan S. **Gómez-Cañón**

Researcher · Electronic Engineer · Musician

Barcelona, Spain

(+1) 650-6618921 | juans.gomez87@gmail.com | juansgomez87.github.io | juansgomez87 | js.gomez-canon

About me

I have over 7 years of experience in applying machine learning and signal processing techniques to audio (and more specifically, music). My background is in Electronic Engineering, Music, and a Ph.D. in Information and Communication Technologies - I specialize in the intersection of music, technology, and AI. My expertise lies in human-centered approaches to machine learning - focusing on user modeling, personalization strategies, and digital signal processing. I'm an expert in music emotion recognition and cultural aspects of music information research.

Work Experience

Stanford School of Medicine - Psychiatry and Behavioral Sciences

Stanford, USA

Postdoctoral Scholar — *Jan. 2025 - Present*

- Research and development of personalized recommendation systems for therapeutic purposes of music.

Pyrsos AI - Time Machine Capital²

Barcelona, Spain (remote)

Machine Learning Research Scientist — *Jun. 2023 - Dec. 2024*

- Research and development of personalized recommendation systems for multimedia.
  - Adaptive user experience and user modeling.
  - Deployment on Docker and AWS.
  - Multi-armed bandits.
- Natural language processing tasks for clustering and summarization of financial news.
  - Unsupervised learning and sentence embeddings.
  - Retrieval augmented generation - RAG
  - Deployment on FastAPI.
- Development of music segmentation classification systems using LLMs (vector quantization, masked language models - BERT).
- Adaptive signal processing for personalized audio equalization (filter banks, dynamic compression).

Discos Fuentes Edimúsica S.A.

Bogotá, Colombia

External consultant — *Oct. 2022 - Jun. 2023*

- Designing a multi-modal ML algorithm for mood classification to the Licenciame catalog of music (using acoustic features - music emotion recognition and lyrics - sentiment analysis TF-IDF).
- Creation of a visualization tool in ReactJS and Plotly to better understand the predictions of the deep learning algorithm developed to predict moods (see `http://www.musicalsourceseparation.com/`).

Music Technology Group

Barcelona, Spain

Research / Teaching staff — *Oct. 2018 - Oct. 2022*

- Pre-doctoral fellow at the Department of Information and Communication Technologies working on trustworthy music emotion recognition.
  - Mentoring and supervision of thesis of students from the Sound and Computing Masters.
- Teaching assistant for the Signals and Systems I (undergraduate course on digital signal processing at the Universitat Pompeu Fabra).

Fraunhofer Institute for Digital Media Technology

Ilmenau, Germany

Research Assistant — *Jun. 2018 - Aug. 2018*

- Automatic source separation and onset detection for audio applications.
- Sound localization and detection on a robotic platform.

UNICENTRAL-UMA (Universidad Central - Audiovisual Media Unit)

Bogotá, Colombia

Engineer — *Feb. 2014 - Dec. 2015*

- Installation of a new full HD television studio with Panasonic Studio 300 system.
- Design and implementation of a big-data/high-speed system for on-line audiovisual edition and production with fiber optics and centralized file system.
- Live video transmission of events.

Skills

Programming Python · Javascript · ReactJS · Docker · Bash

Libraries Sci-kit learn · Tensorflow · Plotly · Flask · Dash · PyTorch · FastAPI · Django

Languages Spanish (native) · English (C1) · German (B1)

Education

MTG-UPF (Music Technology Group - Universitat Pompeu Fabra)

Barcelona, Spain

Ph.D. in Information and Communication Technologies

Oct. 2018 - Oct. 2022

- Thesis: Human-centered machine learning for music emotion recognition
  - My research is focused on the development of these algorithms taking into account individual and contextual differences of listeners. *Context-sensitive* MER systems draw on factors from the listener's context (e.g., listening mood, uses of music, physiological signals), and *personalized* MER systems incorporate information from the listener's properties (e.g., individual annotations, musical expertise, preference). Grade *excellent, cum laude* mention.
  - Supervisors: Prof. Emilia Gómez, Dr.-Ing. Estefanía Cano, Prof. Perfecto Herrera

TUI-IDMT (TU Ilmenau - Fraunhofer Institute for Digital Media Technology)

Ilmenau, Germany

M.Sc. in Media Technology

Apr. 2016 - Jun. 2018

- Thesis: Automatic Instrument Recognition using Deep Convolutional Networks
  - Implementation of a CNN for instrument recognition in polyphonic audio mixtures and use of source separation algorithms to improve classification performance.
  - Supervisors: Prof. Karlheinz Brandenburg, Dr.-Ing. Jakob Abesser, Dr.-Ing. Estefanía Cano
- Media project: Audio object localization and recognition using multiple microphones on a robotic platform
  - Creation of a real-time audio processing framework in Python to run on a single board computer and control a robot's motion towards a source of interest (i.e., speech) in adverse acoustic environments (e.g., reverberation, noise and music).
  - Supervisor: Prof. Gerald Schuller

UNIANDES (Universidad de los Andes)

Bogotá, Colombia

B.A. in Music majoring in Audio Production

Aug. 2008 - Mar. 2013

- Thesis: Acoustic characterization of an anechoic chamber
  - Supervisor: Prof. Juana Rodriguez

UNIANDES (Universidad de los Andes)

Bogotá, Colombia

B.Sc. in Electronic Engineering

Aug. 2005 - Oct. 2011

- Thesis: Wireless networks for rural schools in Villa de Leyva
  - Supervisor: Prof. Roberto Bustamante

Publications

2025	**M&S**, K. Jakubowski, ... *J.S. Gómez-Cañón*, ... T. Eerola, *Participant and Musical Diversity in Music Psychology Research*, Music & Science.	*Link*
2024	**Science**, Y. Ozaki, ... *J.S. Gómez-Cañón*, ... P. Savage, *Globally, songs and instrumental melodies are slower and higher and use more stable pitches than speech*, Science Advances, Vol. 10, Issue 20.	*Link*
2024	**TNE**, V. Gashaj, D. Trninić, C. Formaz, S. Tobler, *J.S. Gómez-Cañón*, H. Poikonen, M. Kapur *Bridging cognitive neuroscience and education: Insights from EEG recording during mathematical proof evaluation*, Trends in Neuroscience and Education, Vol. 35.	*Link*
2022	**JIIS**, *J.S. Gómez-Cañón*, N. Gutiérrez-Páez, L. Porcaro et al. *TROMPA-MER: an open dataset for personalized music emotion recognition*, Journal of Intelligent Information Systems, pp. 1-22.	*Link*
2021	**SPM**, *J.S. Gómez-Cañón*, E. Cano, T. Eerola, P. Herrera, X. Hu, Y.H. Yang, E. Gómez, *Music Emotion Recognition: Toward new, robust standards in personalized and context-sensitive applications*, IEEE Signal Processing Magazine 38 (6), pp. 106-114.	*Link*
2021	**Collabtech**, N. Gutiérrez-Páez, *J.S. Gómez-Cañón*, et al., *Emotion annotation of music: a citizen science approach*, International Conference on Collaboration Technologies and Social Computing (Collabtech 2021), pp. 51-66.	*Link*
2021	**HCAI-NeurIPS**, *J.S. Gómez-Cañón*, E. Cano, P. Herrera, E. Gómez, *Personalized musically induced emotions of not-so-popular Colombian music*, HCAI Human Centered AI Workshop at the 35th Conference on Neural Information Processing Systems (NeurIPS 2021).	*Link*
2021	**ICASSP**, *J.S. Gómez-Cañón*, E. Cano, A.G. Pandrea, P. Herrera, E. Gómez, *Transfer learning from speech to music: towards language-sensitive emotion recognition models*, Proceedings of the 46th IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 576-580.	*Link*
2021	**ISMIR**, *J.S. Gómez-Cañón*, E. Cano, Y.H. Yang, P. Herrera, E. Gómez, *Let's agree to disagree: Consensus Entropy Active Learning for Personalized Music Emotion Recognition*, Proceedings of the 22nd International Society for Music Information Retrieval Conference (ISMIR), pp. 237-245.	*Link*
2021	**EUSIPCO**, *J.S. Gómez-Cañón*, E. Cano, P. Herrera, E. Gómez, *Transfer learning from speech to music: towards language-sensitive emotion recognition models*, Proceedings of the 28th European Signal Processing Conference (EUSIPCO)), pp. 136-140.	*Link*

2020 **ISMIR**, *J.S. Gómez-Cañón*, E. Cano, P. Herrera, E. Gómez, *Joyful for you and tender for us: the influence of individual characteristics and language on emotion labeling and classification*, Proceedings of the 22nd International Society for Music Information Retrieval Conference (ISMIR), pp. 853-860. *Link*

2020 **ISMIR-LBD**, A.G. Pandrea, *J.S. Gómez-Cañón*, P. Herrera, *Cross-Dataset Music Emotion Recognition: an End-to-End Approach*, Late Breaking/Demo in the 21st International Society for Music Information Retrieval Conference (ISMIR). *Link*

2018 **ISMIR**, *J.S. Gómez-Cañón*, J. Abeßer, E. Cano, *CJazz Solo Instrument Classification with Convolutional Neural Networks, Source Separation, and Transfer Learning*, Proceedings of the 19th International Society of Music Information Retrieval Conference (ISMIR), pp. 577-584. *Link*

Awards

2015 **Scholarship**, DAAD (Deutsche Akademische Austausch Dienst) *Germany*

2015 **Scholarship**, COLFUTURO (Fundación para el Futuro de Colombia) *Colombia*

2022 **Ph.D. cum laude mention**, UPF (Universitat Pompeu Fabra) *Spain*

2022 **International Ph.D. mention**, Durham University - Universitat Pompeu Fabra *UK/Spain*

Interests

Amateur musician, guitar, harmonica, keyboard, and blues

Sports, Bicycle and basketball