# Martin A. Miguel

Post-doctoral Fellow · Psychology, Neuroscience and Behavior

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## Academic Positions

**McMaster University** *Hamilton, Ontario, Canada*

Post-doctoral Fellowship *September 2022 - Present*

- Advisor: Laurel Trainor - Auditory Development Lab, McMaster University
- Advisor: Jonathan Cannon - METRE Lab, McMaster University

## Education

**University of Buenos Aires (UBA)** *Buenos Aires, Argentina*

PhD in Computer Science *April 2016 - August 2022*

- Advisor: Diego Fernandez Slezak - Applied Artificial Intelligence Lab (LIAA), Computer Science Department, University of Buenos Aires, Buenos Aires, Argentina; Computer Science Institute, National Scientific and Technical Research Council (CONICET)-UBA, Argentina
- Co-advisor: Mariano Sigman - Neuroscience Laboratory, Torcuato Di Tella University, Buenos Aires, Argentina; Faculty of Language and Education, Nebrija University, Madrid, Spain

**Contemporary Music School** *Buenos Aires, Argentina*

Professonal Musician *April 2015 - June 2017 (Paused)*

**University of Buenos Aires** *Buenos Aires, Argentina*

BS + MS in Computer Science *April 2008 - December 2015*

## Main Publications

Cossavella, F., **Miguel, M.A**, Fernandez Slezak, D. *The Role Of The Motor System In The Processing Of Rhythmic Complexity: A Critical Review* CogSci 2024, Rotterdam, Netherlands, July 2024 (In press) Conference paper reviewing fMRI studies reporting the relative activation of motor areas with respect to rhythmic complexity.

Kiss L, Guiot C, Hashim S, D'Aleman Arango N, **Miguel MA**. (2022) The 14th International Conference of Students of Systematic Musicology (SysMus21). Music & Science. doi:10.1177/20592043221076613. Conference report.

**Miguel, MA** and Fernandez Slezak, D. (2021) Modeling beat uncertainty as a 2D distribution of period and phase: a MIR task proposal. Proc. of the 22nd Int. Society for Music Information Retrieval Conf., Online. Paper describing a methodology to model beat uncertainty considering period and phase from free tapping data and an evaluation criterion for MIR models.

Pironio N, Fernandez Slezak D, and **Miguel MA**. (2021) Pulse clarity metrics developed from a deep learning beat tracking model. Proc. of the 22nd Int. Society for Music Information Retrieval Conf., Online, 2021. Paper describing metrics of pulse clarity obtained from modifications to a neural-network based beat tracking model.

**Miguel MA**, Riera P, and Fernandez Slezak D. (2021) A simple and cheap setup for timing tapping responses synchronized to auditory stimuli. Behav Res. https://doi.org/10.3758/s13428-021-01653-y Paper describing an experimental setup for capturing timing of tapping responses synchronized against auditory stimuli. The setup requires minimal programming skills and uses unexpensive equipment.

**Miguel MA**, Sigman M, and Fernandez Slezak D. (2020) From beat tracking to beat expectation: Cognitive-based beat tracking for capturing pulse clarity through time. PLoS ONE 15(11): e0242207. https://doi.org/10.1371/journal.pone.0242207 Paper presenting a model of beat tracking adapted to produce a metric of pulse-clarity over time.

## Other publications

Vladisauskas, M., Paz, G.O., Nin, V., Guillén, J.A., Belloli, L., Delgado, H., **Miguel, M.A.;**, Macario Cabral, D., Shalom, D.E., Forés, A., et al. (2024) The Long and Winding Road to Real-Life Experiments: Remote Assessment of Executive Functions with Computerized Games—Results from 8 Years of Naturalistic Interventions. Brain Sci. 2024, 14, 262. `https://doi.org/10.3390/brainsci14030262` Review of 8 years of usage of the MateMarote platform to test the efficacy of computerized games used in naturalistic settings to train attention and excecutive function in children.

Belloli, L. **Miguel, M.A.**, Goldin, A.P. (2016) Mate Marote: a BigData platform for massive scale educational interventions. 45-JAIIO, 2016, Buenos Aires, Argentina (ISSN: 2451-7569, p107-114). Paper describing a web platform that hosts and collects data from educational games.

## Teaching Experience

**Teaching Fellow**, Algorithms and Data Structures II, *University of Buenos Aires* — April 2016 - present
**Teaching Assistant**, Algorithms and Data Structures II, *University of Buenos Aires* — March 2011 - July 2012

## Industry Experience

**Technical Consultant**, *MateMarote Project (Online Educational Games)* — June 2017 - June 2022
**Data Scientist**, *Avenida.com* — January 2016 - March 2016
**Software Engineer**, *MateMarote Project (Online Educational Games)* — April 2015 - December 2015
**Software Engineer Intern**, *Google.com* — January 2014 - April 2014
**Java Programmer**, *Despegar.com* — August 2012 - December 2013
**Java Programmer (J2ME / Blackberry)**, *SenseByte* — January 2009 - January 2010

## Mentoring

**Lucas Somacal**, Main advisor in master's thesis: Modeling musical style with Variational Autoencoders — 2023
*Licenciature in Computer Science, Computer Science Department, Faculty of Natural and Exact Sciences, University of Buenos Aires, Argentina.*

**Francisco Cossavella**, Co-advisor in master's thesis: Cortical mu-rhythms during beat perception and synchronization with naturalistic music stimuli. — 2021
*Licenciature in Psychology, Faculty of Behavior and Human Sciences, Favaloro University, Buenos Aires, Argentina*

**Lucas Somacal**, Mentor of undergraduate research internship: Exploration of music style transfer techniques based on VAE's latent spaces from symbolic music data. — 2021
*Computer Science Department, Faculty of Natural and Exact Sciences, University of Buenos Aires, Argentina.*

**Nicolás Pironio**, Mentor of undergraduate research internship: Analysis of the behaviour of a deep-learning beat tracking model to estimate pulse clarity. — 2020
*Computer Science Department, Faculty of Natural and Exact Sciences, University of Buenos Aires, Argentina.*

## Conferences and Schools

### Conference presentations

**Miguel, M.A**, Cannon, J., Trainor, L. *Exploitation vs. exploration in partner dancing: whether switching partners enhances communication in partner dancing* The Neurosciences and Music – VIII, Helsinki, Finland, June 2024

**Miguel, M.A**, Trainor, L., Cannon, J. *Co-representation vs. attenuation: whether motor representation of a distractor makes it more distracting* Symposium on Timing and Rhythm (STAR), Hamilton, Canada, April 2024

Cossavella, F., **Miguel, M.A**, Fernandez Slezak, D. *The Role Of The Motor System In The Processing Of Rhythmic Complexity: A Critical Review* Neuromusic 19, Hamilton, Canada, 2023

**Miguel, M.A**, Trainor, L., Cannon, J. *Co-representation vs. attenuation: whether motor representation of a distractor makes it more or less distracting.* Neuromusic 19, Hamilton, Canada, 2023 (DOI 10.17605/OSF.IO/NC7FE)

Kirk et al. *The highs and lows of music: subjective and neurophysiological responses during a live concert experience.* International Conference of Students of Systematic Musicology 23, Online and Sheffield, United Kingdom, 2023.

**Miguel, M.A**, Cannon J., Trainor, L. *Modeling the subjective beat in period, phase and uncertainty.* Neuromusic 18, Hamilton, Canada, 2022 (DOI 10.17605/OSF.IO/2J6HM)

**Miguel, M.A**, Fernandez Slezak, D. *Modeling beat ambiguity in period and phase.* International Conference of Students of Systematic Musicology 21, Online and Aahrus, Denmark, 2022 (DOI 10.17605/OSF.IO/5WRS3) Poster presenting a methodology from gathering a beat distribution from free tapping data.

**Miguel, M.A**, Sigman, M., Fernandez Slezak, D. Neuromusic VII, Online and Aahrus, Denmark, 2021. Poster describing an updated evaluation of our beat expectation model's measure of pulse clarity considering new data and constrating models.

Pironio, N., Fernandez Slezak, D., **Miguel M.A.**. *Evaluation of pulse clarity models on multiple datasets.* Rhythm Perception and Production Workshop 2021, Online and Oslo, Norway, 2021 (DOI 10.17605/OSF.IO/SDQ5P) Poster preseting the evaluation of pulse clarity models on multiple datasets.

Pironio, N., Fernandez Slezak, D., **Miguel M.A.**. *Analysis of the behaviour of a beat tracking model to estimate pulse clarity.* 16th International Conference on Music Perception and Cognition, Online 2021 Poster presenting metrics of pulse clarity obtained from modifications to a neural-network based beat tracking model.

**Miguel, M.A**, Sigman, M., Fernandez Slezak, D. *Experimental setup for exploring subjective tacti distribution and pulse clarity.* Biannual meeting of the Society of Music Perception and Cognition 2019, New York, USA (DOI 10.17605/OSF.IO/7SQAW). Poster describing a novel experimental setup that extends on previous methods allowing exploration of subjective tacti on top of pulse clarity.

**Miguel, M.A**, Sigman, M., Fernandez Slezak, D. *A continuous model of pulse clarity: towards inspecting affect through expectations in time.* Biannual meeting of the Society of Music Perception and Cognition 2019, New York, USA (DOI 10.17605/OSF.IO/FGVB2). Poster describing how our beat expectation model's measure of pulse clarity relates with pulse clarity extracted from empirical data.

## Schools

Assistance to KHIPU 2019. University of the Republic, Montevideo, Uruguay

Assistance to Machine Learning Summer School (MLSS 2018). Torcuato Di Tella University, Buenos Aires, Argentina

Assistance and volunteering at International Joint Conference in Artificial Intelligence 2015. Buenos Aires, Argentina