

**Program for Hiring Postdoctoral Researchers in New Collaborative Projects –  
María de Maeztu Unit of Excellence – CIMCYC**

**Research project:** TEMporal Predictive brain under exercise-induced arOusal (TEMPO)

**Principal Investigators:**

[Mariagrazia Capizzi](#) | Contact: [mgcapizzi@ugr.es](mailto:mgcapizzi@ugr.es)

[Chiara Avancini](#) | Contact: [chiara.avancini@ugr.es](mailto:chiara.avancini@ugr.es)

**Summary:** TEMPO addresses a fundamental question in cognitive neuroscience: how the human brain perceives and processes time in the millisecond-to-seconds range, a critical ability for sensorimotor control, learning and higher cognition. Despite extensive research, the neural and computational mechanisms of time perception remain elusive. A major difficulty arises from the fact that time perception lacks a dedicated sensory organ and is strongly influenced by internal physiological states, such as arousal, which has been inconsistently operationalized in previous studies. TEMPO overcomes this challenge by conceptualizing arousal as a dynamic physiological state that continuously shapes cognitive processing, rather than as a static or an all-or-none phenomenon. The project's originality also lies in framing time perception within the 'predictive brain' framework, casting the brain as a Bayesian inference system that continuously generates and updates temporal predictions.

By combining arousal manipulation with advanced behavioral modeling and EEG, TEMPO seeks to uncover how physiological states modulate temporal prediction and its neural correlates. The project unites two complementary research groups, integrating expertise in computational modeling, temporal processing and the physiology of arousal. TEMPO will make significant scientific contributions by advancing current models of time perception and, more broadly, of brain function. Its findings could also inform applications in learning, decision making and performance under stress, providing a foundation for future research in both basic, and applied settings such as healthcare, sports and virtual reality. By pioneering a predictive, arousal-based account of time perception, TEMPO establishes an innovative framework with high impact on the study of time and cognition.

**Position:** 1 Postdoctoral Researcher contract - María de Maeztu Unit of Excellence – CIMCYC

**Job description:** Postdoctoral researcher for the collaborative research project "TEMporal Predictive brain under exercise-induced arOusal (TEMPO)" from the María de Maeztu Unit of Excellence at the Mind, Brain, and Behavior Research Center (CIMCYC) at the University of Granada. The tasks to be performed include:

- Adaptation and implementation of audio temporal discrimination paradigms in a cycling environment with EEG and peripheral measurements.
- Preparation of experimental protocols (including pre-registration of hypotheses and analysis plans), coordination of recruitment, and management of participants.
- Development of the project data management plan.
- Data collection through stress tests, EEG recordings, and physiological measurements.
- Preprocessing and advanced analysis of behavioral, electrophysiological, and cardiovascular data using computational models.

- Design and maintenance of a reproducible workflow for data processing and governance (version control, documentation, and deposit in open repositories).
- Writing scientific manuscripts, preparing conference presentations, and monitoring the project schedule.
- Participation in the preparation of funding applications.
- Contribution to the supervision and training of doctoral and master's students and research assistants.
- Scientific dissemination activities aimed at non-specialist audiences.

### REQUIREMENTS

**Qualification:** PhD degree

#### Desirable skills

- High motivation to support Open Science in research.
- Meticulous attention to detail and excellent organisational skills.
- Ability to work on multiple projects simultaneously, set priorities, and meet deadlines.
- Strong interpersonal skills, ability to motivate individuals and groups both independently and as part of different teams.
- Willingness to undertake further training and autonomous learning, where appropriate.

### EVALUATION CRITERIA

#### Training (30%)

- Master's degree in Cognitive or Computational Neuroscience, Psychology, Data Science, or related disciplines.
- Doctorate in Psychology, Cognitive or Computational Neuroscience, Computer Science, Engineering or related disciplines.
- English and/or Spanish language accreditation, if applicable (C1 certificate or equivalent fluency, if applicable).

#### Experience (40%)

- Experimental research with humans in cognitive neuroscience and/or experimental psychology, preferably in areas related to temporal perception, sensory prediction, and/or physical exercise combined with psychophysiological measurements.
- Behavioral data modeling, including Bayesian approaches.
- Collection and analysis of electrophysiological data.
- Statistical analysis.
- Programming skills, preferably in Python, R and/or Matlab.
- Participation in competitive research projects.
- Practices related to Open Science (e.g., pre-registration of research plans, publication of research material in open repositories, code used for data collection and/or analysis, anonymized raw data and research results, publication of open preprints in green repositories, etc.).
- Dissemination of research to non-specialist audiences.

#### Other criteria (30%)

- Scientific output in line with the academic stage (articles, conference papers).
- Experience and international projection of the research career in prestigious centers (e.g., country and centers where the different stages of training



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were completed: master's, bachelor's, doctorate, and postdoctoral experience; stays at foreign research centers; network of prestigious international collaborations reflected in publications, etc.).

- Letters of recommendation. Letter of motivation for the position.
- Personal interview (if applicable).

#### **OTHER RELEVANT INFORMATION**

The working languages at CIMCYC are Spanish and English.

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