

# Carlos de la Torre Ortiz

*Doctoral Student in Computer Science*

## Statement

I do multidisciplinary research in the intersection of Machine Learning, Neuroscience, and Human-Computer Interaction. My main research area is Brain-computer Interfacing and I also do Cognitive Modeling. My vision is having computing systems augmenting our cognitive abilities and supporting our well-being, naturally integrating with our cognition. I am particularly interested in (i) implicit system adaptations using machine learning on human clinical or physiological data, (ii) how such data can inform us to enhance machine learning algorithms, and (iii) what are the similarities between human cognition and machine learning models.

## Education

- 2021– **PhD Computer Science | University of Helsinki | Finland | Ongoing**  
Thesis: “Cognitive Modeling via Brain-computer Interfacing”. Supervisor: Dr Tuukka Ruotsalo.
- 2016–17 **PCert Clinical Trials | University of Chicago | USA | Grade: 96%**  
Clinical Trials Management and Regulatory Compliance professional certificate.
- 2013–19 **BSc Biotechnology | Universidad CEU San Pablo | Spain | Grade: 78%**  
Bilingual program & Erasmus+ at Cardiff University (2018–19).
- 2013–18 **BSc Pharmacy | Universidad CEU San Pablo | Spain | Grade: 86%**  
MSc-level, bilingual program & Erasmus+ Traineeships at GreenLight Pharmacy (2018).

## Research experience

- 2021– **PhD Student | University of Helsinki | Cognitive Computing Group**
- 2019–21 **Research Assistant | University of Helsinki | Cognitive Computing Group**
- Applied **machine learning** to **neurophysiological signals** for **brain-computer interfacing** (Dr Tuukka Ruotsalo).
  - Used electroencephalography recordings as relevance feedback to **generative models** (GANs) for implicit interactive generation of images that implicitly match the user’s desired visual features.
  - Evaluated the performance of such systems in visual design and crowdsourcing settings.
  - Investigating the relationship between human cognitive processing and latent space in generative models.
- 2019&20 **Research Assistant | Aalto University | User Interfaces Group**
- Contributed to intelligent tutoring systems: selecting teaching interventions by artificial agents in collaboration with humans (Prof Antti Oulasvirta).
  - Applied model-based planning, accounting for key individual and teaching material-specific characteristics.
  - Implemented and tested **cognitive models** of associative memory based on attractor neural networks.
- 2016–19 **Research Assistant | CEU San Pablo | NEUROFAN Group**
- Evaluated the effects of endogenous and pre-clinical compounds related to neurodegenerative diseases, neuroinflammation, and drug addiction (Prof Gonzalo Herradón).
  - Performed a wide range of experimental techniques in **neuroscience**: neurobiology and neuropharmacology; with experience in neuroanatomy, histology, and animal behavioral tests.

## Publications & presentations

Conferences with *CORE* ranking (A\* flagship, A, B, C). Journals with Impact Factor (IF) and quartile (Q1, ..., Q4). Further details at <https://ctorre.me/publications>.

- 2021** Crowdsourced Brain-computer Interfacing for Automated Visual Design (under review) CSCW'21  
**de la Torre-Ortiz C**, Spape MM, Ravaja N, Ruotsalo T (IF: 3.124 Q2)
- 2021** Improving Artificial Teachers by Considering How People Learn and Forget IUI'21  
Nioche A, Murena PA, **de la Torre-Ortiz C**, and Oulasvirta A (CORE: A)
- 2021** [Re] Neural Network Model of Memory Retrieval (replication) ReScience C  
**de la Torre-Ortiz C** and Nioche A (Peer-reviewed)
- 2020** Brain Relevance Feedback for Interactive Image Generation UIST'20  
**de la Torre-Ortiz C**, Spape MM, Kangassalo L, and Ruotsalo T (CORE: A\*)
- 2018** Endogenous pleiotrophin and midkine regulate LPS-induced glial responses Neurosci. Lett.  
Fernandez-Calle R, Vicente-Rodriguez M, Gramage E, **de la Torre-Ortiz C** et al. (IF: 2.376 Q3)
- 2018** Role of pleiotrophin and midkine in LPS-induced astrocytosis: implications in neuroinflammation FarmaJournal  
**de la Torre-Ortiz C**

## Awards & honors

- 2021** Funded PhD: Academy of Finland project BRAINSOURCE (336085)
- 2020** 8% acceptance AScl internship programme scholarship (FCAI & Aalto University, € 6000)
- 2019** 10% acceptance AScl internship programme scholarship (FCAI & Aalto University, € 6400)
- 2018** 1<sup>st</sup>/400 Best MSc/BSc Thesis Project in the Pharmacy Department award (CEU, € 500)
- 2018** 3% top NOVA Talent network member
- 2018** CEU Talent Plus Award: for a profile of excellence in and outside the classroom
- 2018** 3% awarded Erasmus+ mobility to Cardiff, UK. BSc Biotechnology (CEU, € 630)
- 2018** 3% awarded Erasmus+ Traineeships mobility to London, UK. BSc Pharmacy internship (CEU, € 1200)
- 2017** 20% awarded International mobility grant to the University of Chicago (CEU, € 3000)

## Skills & tools

★★★ advanced   ★★ intermediate   ★ beginner

**ML & data science** ★★★ NumPy, pandas, seaborn, matplotlib, ★★ PyTorch, scikit-learn

**Electrophysiology** ★★ EEG preprocessing, EEG analysis, MNE-Python.

**Web and GUI** ★★ Django ★ PyGTK, HTML, CSS, NGINX, Docker, Ansible, JavaScript, SQL.

**Graphics** ★★ GIMP (raster), Inkscape (vector), ★ Blender (video, 3D), ImageMagick (batch).

**Other tech** ★★★ L<sup>A</sup>T<sub>E</sub>X, GNU/Linux (Gentoo, Arch, CentOS, Debian-based), Vim, ★★ Shell, Git.

**Wet lab** ★★★ Brain dissection, cell cultures, ELISA, confocal microscopy, ★★ animal behavior, ★ PCR

**Repositories** [github.com/c-torre](https://github.com/c-torre) [gitlab.com/c-torre](https://gitlab.com/c-torre)

**Languages** English (fluent) TOEFL iBT 108, Spanish (native).

**Soft skills** Coaching Expert, International Coach Federation certified (150 h).

**Interests** Fitness (certified personal trainer), reading, piano.