# Célia Benquet

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## EDUCATION

**EPFL, Lausanne, Switzerland**                                                                                        May 2023 – (May 2027)
PhD in Electrical Engineering, ELLIS Society PhD program.

**EPFL, Lausanne, Switzerland**                                                                                        Sept 2019 – Aug 2022
MSc in Life Sciences & Computational Sciences Engineering (minor). Grade: 5.42/6.0.
- ESN EPFL – Head of communication, member of the board of direction.

**KTH, Royal Institute of Technology, Stockholm, Sweden**                                          Sept 2018 – June 2019
Academic Exchange Year.

**EPFL, Lausanne, Switzerland**                                                                                        Sept 2016 – June 2019
BSc in Life Sciences Engineering. Grade: 5.05/6.0.

## EXPERIENCE

**Research Software Engineer**                                                                                          Oct 2022 – May 2023
EPFL, Mathis Laboratory of Adaptive Intelligence.                                                         *Geneva, Switzerland*
- Implementing new functionalities in CEBRA, an open-source package for dimensionality reduction for neural data, using contrastive learning (Schneider et al., Nature, 2023).
- Joint modeling of auxiliary and time series data. Maintenance of existing code, building data management & inference pipelines.

**Visiting Student**                                                                                                         Feb 2022 – Sep 2022
Harvard University, Uchida Laboratory.                                                                            *Cambridge, US*
- Neural basis of belief state computation in the brain.
- Leading my own independent research agenda and corresponding investigations. GLMs, dynamical systems, data mining, spiking neural data.

**R&D Engineer Intern**                                                                                                  Aug 2021 – Feb 2022
RDS (Rhythm Diagnostic Systems).                                                                                 *Strasbourg, France*
- Worked on normality models to detect noises and anomalies in clinical physiologic signals (ECG and PPG).
- Data mining, AI/ML models, Riemannian geometry. Part of an AGILE work environment.

**Student Research Assistant**                                                                                        Feb 2020 – Jul 2021
EPFL.                                                                                                                              *Lausanne, Switzerland*
- Laboratory of Adaptive Intelligence (Mathis): Discrete representation of behaviors in a multi-agent dataset.
- Laboratory of Psychophysics (Herzog): Modeling of serial dependency in visual perception.
- Laboratory of Neuroepigenetics (Gräff): Functional mapping of remote fear memory extinction.

**Summer Research Intern**                                                                                            Jul 2019 – Aug 2019
University of Cambridge.                                                                                                  *Cambridge, UK*
- Developed an easy-to-use accessible Matlab GUI to map freezing & vocalizing behaviors when fear or anxiety in rats from experimental videos to facilitate behavioral analysis.

## AWARDS

**EPFL WISH Foundation Fellowship:** EPFL-WISH (Women in Science and Humanities) rewards EPFL's best female students and supports them in their Master's Theses abroad.

## PUBLICATIONS

**Célia Benquet**, Hossein Mirzaei, Steffen Schneider, Mackenzie W. Mathis. "A Unified Encoder for Modeling Neural Dynamics with Contrastive Learning". *Submitted to the 42nd International Conference on Machine Learning (ICML), 2025.*

*Under review*

## TEACHING

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|---|---|
| **Systems Neuroscience**, new Master's course; main Teaching Assistant. | Feb 2024 – June 2024 |
| **Basic Neuroscience**, Bachelor's course. | Sept 2023 – Dec 2023 |
| **Basic C++ and Algorithms**, Bachelor's first-year course. | Feb 2019 – June 2019 |
| **Complex and vectorial analysis**, Bachelor's course. | Feb 2019 – June 2019 |
| **Thermodynamic & Relativity**, Bachelor's first-year course. | Feb 2017 – June 2017 |

## POSTERS

**Swiss Society for Neuroscience Annual Meeting 2025:** A Unified Encoder for Modeling Neural Dynamics with Contrastive Learning. **Benquet**, Mirzaei, Schneider, Mathis.

Feb 2025
*Poster*

**Swiss Society for Neuroscience Annual Meeting 2025:** An augmented reality system to study active visual sensing in dynamically occluded environments. **Benquet\***, Sainsbury\*, Cai, Fahrey, Franke, Franco, Pitkow, Niell, Tolias, Mathis.

Feb 2025
*Poster*

**FENS 2024:** Mice learn to adapt to visuomotor perturbations by rapidly adapting limb kinematics. Hausmann, Kane, Sainsbury, Kousi, **Benquet**, Bowles, Mathis. *Not the main presenter.*

June 2024
*Poster*

**Neuro-X retreat 2024:** An augmented reality system to study active visual sensing in dynamically occluded environments. **Benquet**, Sainsbury, Cai, Fahrey, Franke, Franco, Pitkow, Niell, Tolias, Mathis.

June 2024
*Poster*

**Cosyne 2024:** Neural dynamics in prefrontal regions as a candidate mechanism for instantiating belief states. Romero Pinto, Linderman, Uchida, Hennig, Okada, **Benquet**, Burrell, Gershman. *Not the main presenter.*

March 2024
*Poster*

**ELLIS Doctoral Symposium 2023:** Explainable and consistent embeddings of high-dimensional recordings using auxiliary variables. Schneider, Hwa Lee, González Laiz, **Benquet**, Mathis.

Sept 2023
*Poster*

## TECHNICAL SKILLS

**Programming Languages:** Python (PyTorch, Numpy, scikit-learn, OpenCV), C++, Java, MATLAB, Bash.

**Data Analysis:** Image processing, statistical modeling, neural data analysis (NWB, Dandi), data visualization (Matplotlib, Seaborn, Plotly, pandas).

**Tools & Technologies:** Git (GitHub CI/CD, Bitbucket), Linux, Docker, Jupyter, VS Code, Unity, Weights & Biases, Figma, Latex, MS Office, Google Suite.

**Animal Research:** Mouse handling, basic surgical techniques, injections, welfare assessment, experimental design (3Rs, EU Directive 2010/63/EU; FELASA Accredited – ResAL Module 1).

## LANGUAGES

French (Native), English (Fluent; C1), German (Beginner; A2-B1).

## INTERESTS

Runner (Marathon 4:17:02; Half-Marathon 1:48:58), skier, hiker, scuba diver, kite surfer, sailer, climber, theater & currently improv, experimenting with watercolor. Facilitator at Fresque du Climat.