



Postdoctoral Position — CALYPSO Project

CALYPSO — Clinique et AnaLYses PSychiatriques Objectives

Development and validation of AI-based tools for the multimodal analysis of objective clinical markers in severe psychiatric disorders:

Major Depression and Post-Traumatic Stress Disorder (PTSD)

Project Summary

Mental disorders such as **major depressive disorder (MDD)** and **post-traumatic stress disorder (PTSD)** represent a major public health challenge. According to the WHO, over 300 million people worldwide suffer from depression, while PTSD affects approximately 3–4% of the global population, with significantly higher prevalence in conflict-affected regions and high-risk professional environments. In France, 7–10% of the population is affected by depression, while PTSD remains systematically under-diagnosed despite its severe functional and socioeconomic consequences.

Both disorders are associated with **high rates of disability, chronic impairment, and suicide risk**. Despite their severity, clinical assessment continues to rely almost entirely on subjective evaluation and clinician expertise in identifying symptom clusters. To date, no validated biomarker is used in routine psychiatric practice for either condition.

Crucially, both MDD and PTSD manifest through **observable and measurable behavioural and physiological signals**: altered facial expressions and affect regulation, psychomotor slowing or hypervigilance-related micro-movements, changes in vocal prosody, atypical head and gaze patterns, and disrupted emotional reactivity. Recent advances in **computer vision** and **artificial intelligence** now make it possible to objectively capture and quantify these signals in clinical settings.

The **CALYPSO project** aims to: (1) identify and characterise objective markers associated with the severity and clinical profiles of MDD and PTSD; (2) explore cross-disorder similarities and disorder-specific signatures; and (3) assess the predictive value of these markers on clinical remission at 3, 6, and 12 months.

Key Project Information

- **Principal Investigators:** Pr. Mohamed Daoudi (Computer Science & AI), Pr. Ali Amad (Psychiatry), Pr. Fabien D'Hondt (Neurosciences)
- **Funding:** Initiative d'Excellence & France 2030 — <https://initiative-excellence.univ-lille.fr>
- **Salary:** Determined based on candidate experience and University guidelines for postdoctoral fellows.
- **Location:** UMR 9189 CRISTAL / INTERACTIONS — Centre Lille Neuroscience & Cognition, University of Lille.
- **Duration:** 2 years from the date of joining.

Job Description

The postdoctoral researcher will join an interdisciplinary and collaborative team spanning computer science, clinical psychiatry, and cognitive neuroscience to develop and validate AI-based tools for the objective assessment of **both MDD and PTSD**. The work will involve the analysis of multimodal signals (facial expressions, head and body movements, motor activity, voice, physiological signals) recorded during structured clinical interviews and standardised experimental paradigms. The candidate will work



closely with clinicians and senior researchers, with structured support to get familiar with the clinical and multimodal datasets.

Main Responsibilities

- Contribute to the design and implementation of multimodal algorithms for the analysis of facial action units, head and body kinematics, vocal features, and physiological signals.
- Develop machine learning and deep learning models to identify disorder-specific markers and differentiate MDD from PTSD signatures.
- Work with the team to characterise patient subgroups based on objective behavioural phenotypes, including PTSD subtypes.
- Model longitudinal trajectories to predict clinical remission and treatment response over 3, 6, and 12 months.
- Design and conduct rigorous experimental evaluations of the developed methods.
- Collaborate closely with clinical and neuroscience teams to ensure clinical relevance and translational impact.
- Disseminate findings through international conferences and peer-reviewed publications.
- Play an active role in the scientific animation of the CALYPSO project, helping to structure ongoing research activities, organize regular project meetings, and contribute to the supervision and mentoring of PhD and master's students.

The exact balance of these activities will depend on your background and interests.

Profile and Experience

Education

- Ph.D. in Computer Science, Electrical Engineering, Signal Processing, or a closely related field, with a focus on computer vision, machine learning, and/or affective computing.

Research Experience

Must have

- Research background in computer vision, machine learning, and artificial intelligence.
- Experience with deep learning architectures (e.g., CNNs, RNNs, Transformers).
- Familiarity with multimodal data analysis and large-scale experimental evaluation.

Nice to have

- Prior experience in affective computing, behavioural analysis, or clinical AI applications
- Interest in or experience with psychiatric or neurological applications.

Technical Skills

- Proficiency in Python; hands-on experience with common computer vision libraries (e.g., OpenCV, Dlib, MediaPipe) and deep learning frameworks (e.g., TensorFlow, PyTorch)
- Knowledge of signal processing and time-series analysis methods.
- Experience with face and gesture recognition pipelines.
- Ability to work with heterogeneous and sensitive clinical datasets.



Interpersonal & Communication Skills

- Excellent written and oral communication skills in English (French is a plus).
- Ability to work both autonomously and collaboratively within a multidisciplinary team.
- Strong motivation for conducting clinically impactful research at the intersection of AI and mental health.

What we offer

- 2-year funded postdoctoral position with full employment benefits under the French system (e.g., parental leave, sick leave)
- Comprehensive health coverage
- Paid leave depending on your contract with a minimum of 25 days paid leave per year + public holidays
- Flexible working hours, within a shared overlap on certain days
- Access to clinical and multimodal datasets not widely available
- Opportunities to supervise students and develop independent research directions
- The project involves a multidisciplinary team including clinicians, neuroscientists, and engineers, with diverse backgrounds and career stages.
- We value collaborative work, open discussion, and supportive research environment, including regular feedback and mentoring.

Application Guidelines

If your experience does not match every listed requirement but you are interested in the position, we encourage you to apply. Informal inquiries about the position are also welcome. We welcome candidates from a range of backgrounds who are motivated to contribute to clinically meaningful AI research.

Applications should be submitted by email to mohamed.daoudi@imt-nord-europe.fr ; fabien.d-hondt@univ-lille.fr & ali.amad@chu-lille.fr with the subject line [CALYPSO].

The application must include:

- (i) An updated CV with full publication list and a representative sample of published work.
- (ii) A cover letter outlining relevant research experience, motivation for the position, and the earliest possible start date.
- (iii) Two letters of support from academic supervisors or referees (with contact information), written specifically for this position.

Submission deadline: June 19th 2026

We are committed to equal opportunity and aim to provide an inclusive and supportive research environment for all team members.