

Engineer in neuroscience/cognition with a focus on computer science

📍 21000 DIJON, FRANCE

Application

Online application: https://candidature.jobs.inrae.fr/eConcours.Guichet/workflow_url

Job Description: <https://jobs.inrae.fr/concours/concours-externes-ingenieurs-cadres-techniciens-h-f/ir22-transform-1>

#profile: IR22-TRANSFORM-1

Deadline for application: 24th March 2022

Presentation of INRAE

The National Research Institute for Agriculture, Food and the Environment (INRAE) is a public research institution under the dual supervision of the Ministry of Agriculture and the Ministry of Research.

It is a major player in research and innovation created on January 1, 2020. INRAE is a research institute resulting from the merger of INRA and Irstea. It brings together a community of 12,000 people, with 268 research, service, and experimental units, located in 18 centers throughout France.

The institute is among the world's leading agricultural and food sciences institutions, plant, and animal sciences, and ranks 11th in the world in ecology-environment. Faced with population growth, climate change, resource scarcity, and declining biodiversity, INRAE is building solutions for multi-performing agriculture, quality food, and sustainable management of resources and ecosystems.

Work environment, missions, and activities

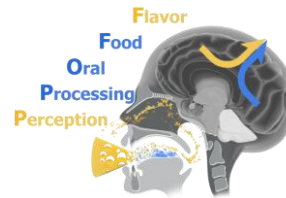
You will be recruited at the Centre des Sciences du Goût et de l'Alimentation (CSGA), a multidisciplinary joint research unit that aims to better understand the physicochemical, biological, and psychological mechanisms that underlie sensory perceptions and eating behavior throughout the life cycle. The unit is composed of ten research teams and a platform, ChemoSens, whose mission is to develop original methods and tools for the characterization of food and its perception.

You will be attached to the ChemoSens platform under the scientific responsibility of the "Flavor, Food Oral Processing, and Perception" team. We study the mechanisms involved in the consumption of food from the mouth to the brain in different populations. Our goal is to better understand the perception of flavor, which is a mental representation of the food produced by the cerebral integration of smell and taste. The cerebral exploration of this perception is confronted with technical and methodological challenges related to the nature of the stimulations (olfactory, gustatory, and somatosensory), to the coupling of the stimulation instruments (e.g. olfactometer-gustometre), to the coupling of the measurement instruments (e.g. EEG-MRI), and the treatments of the associated cerebral and physiological responses. You will also work with the teams "Developmental ethology and cognitive psychology" and "Determinants of eating behavior over the life course, relationship with health", which are interested in the brain integration of other types of multimodal perceptions (olfactory-visual, olfactory-auditory) in relation to an emotional response or food choices. This work involves healthy adults, but also specific populations (infants, children, or obese people) which require methodological adaptations.

Your main missions:

- Acquisition and processing of (neuro-)physiological responses to multimodal dietary stimuli by EEG, EMG, fMRI, facial response...
- Methodological development (tools and protocols) for the analysis of noisy responses to multimodal olfactory, gustatory, somatosensory, visual, and auditory stimuli to study sensory perception and emotional response
- Methodological developments to ensure the synchronization of tools to stimulate, control and measure the physiological response over time linked to the sensory responses

To ensure these missions, you will work with several engineers of the ChemoSens platform and the CSGA: for the coupling of instruments and methods of physicochemical and sensory measurements, for the processing of neurophysiological signals, and the analysis of all these data. You will interact with researchers and engineers of the AgroResonance imaging platform (INRAE Clermont-Ferrand), regarding functional brain magnetic resonance imaging, but also with researchers and technicians of the CHU-Dijon, the Neuraxess platform (CHU-Besançon), the Neuroscience Research Center of Lyon, AgroParisTech, and the Smell & Taste Clinic Dresden (Germany).



Your activities:

- acquisition of physiological data: EEG, EMG, ECG, RED, respiration, fMRI, facial responses
- setting up protocols for multimodal stimulations
- coupling of instruments for:
 - stimulations (gustometer, olfactometer, e-prime)
 - (neuro-)physiological measurements (EEG-MRI, EEG-breathing)
 - physicochemical monitoring and measurement (EEG-PTRMS)
- processing of neurophysiological responses (EEG: time-frequency, source localization, microstates, frequency-tagging; MRI: VBM, CT, brain connectivity)
- development of high-resolution recording methods (EEG and fMRI).

The fMRI recordings will take place mainly on Saturdays at the CHU-Dijon.

Education and skills required

Ph.D., engineering degree, or equivalent

Ph.D. in Cognitive Science or Human Neurophysiology with a focus in Computer Science

Experience:

- Brain exploration techniques
- EEG
- fMRI (appreciated)
- Sensory perception including olfactory and/or gustatory

Skills:

- creative in developing protocols combining methods and instruments in (neuro-)physiology
- flexible and adaptable, to meet the constraints of these methods, in the context of food stimuli
- computer programming to develop coupling tools between stimulation instruments, control, and measurement of neurophysiological responses
- knowledge of sensory perception; in particular, knowledge of food flavor would be appreciated
- taste for teamwork and project mode
- writing skills to contribute to publications on the methods developed and the results obtained
- French skills would be appreciated

Your quality of life at INRAE

By joining INRAE, you will benefit from:

- 30 days of vacation + 15 days of paid leave per year (for a full-time position)
- support for parenthood: CESU childcare, leisure benefits
- skills development programs: training, career counseling, etc.
- social support: advice and listening, social aid and loans
- vacation and leisure services: vacation vouchers, accommodation at preferential rates
- sports and cultural activities;
- collective catering