

## Programme

- 08h30-09h00**      **Opening**
- 09h00-09h30      **InnerSpeech** project presentation, *LPNC, GIPSA-lab-DPC, LIP, Grenoble*
- 09h30-10h30      **Charles Fernyhough, Durham University**  
**The Voices in our Heads**
- 10h30-11h00**      **Coffee break and posters**
- 11h00-12h00      **Agustin Vicente, University of the Basque Country, San Sebastián**  
**The linguistic determination of conscious thought contents**
- 12h00-13h30**      **Buffet lunch and posters**
- 13h30-14h30      **Blaise Yvert, BrainTech Laboratory & Thomas Hueber, GIPSA-lab, Grenoble**  
**First steps towards a brain computer interface for speech rehabilitation**
- 14h30-15h30      **Ernst H. W. Koster, Ghent University**  
**The remarkable persistence of negative thought**  
**Insights from cognitive science**
- 15h30-16h00      **Stéphanie Smadja, CERILAC, Université Paris Diderot**  
**Literary Representation of Inner Speech Disorders**
- 16h00-16h30**      **Coffee break and posters**
- 16h30-17h30      Panel Discussion
- 17h30-19h00      **Brainarium: Immersive brain performance**  
*Booking required:*  
<https://www.eventbrite.com/e/journee-scientifique-lpnc-cerveaurium-tickets-34744326215>  
<http://www.r-grandchamp.fr/cerveaurium>
- 20h**                      **Potluck party**  
*Booking required:*  
<https://www.eventbrite.com/e/journee-scientifique-du-lpnc-pot-luck-party-tickets-34788704953>

# Journée Scientifique LPNC

## Inner language forms, functions and dysfunctions

23 June 2017

Maison des Sciences de l'Homme – Alpes

Inner language plays a beneficial role in many cognitive functions, such as memory, thinking, planning, computation, self-regulation and self-awareness. As suggested by philosophers and writers and as confirmed by experimental psychologists and neuroscientists, it manifests in various ways: from wilful generation to verbal mind wandering, from expanded inner speech to abstract covert verbal production, from interior monologue to imaginary dialogues and from inner speech to inner sign. It can be disrupted and have a more negative role, however. Verbal rumination is a form of excessive negative inner speech which can interfere with cognitive performance and is a risk factor for depression, anxiety and other psychiatric disorders. Disruption of inner speech in schizophrenia may result in auditory verbal hallucinations, where one's own verbal thoughts are perceived as external voices.

The aim of this one-day colloquium is to bring together literary scholars, philosophers, linguists, cognitive psychologists, neuroscientists and speech scientists to attempt to improve our understanding of inner language. It will address the phenomenology and forms of inner speech, its nature and functions, as well as its dysfunctions. It will also discuss methodological issues that constrain its study, as well as recent technological advances that may provide fresh insights into its nature.

# Abstracts

## **InnerSpeech, LPNC, GIPSA-lab, LIP**

The *INNERSPEECH* ANR project aims at providing a theoretical account of inner speech by examining the neural and physiological correlates of various forms of inner speech, including wilful inner speech (with one's own or someone else's voice, with 1st or 3rd person perspective) as well as less deliberate inner speech forms such as mind wandering or verbal rumination and by comparing objective and introspective data.

## **Charles Fernyhough, Durham University**

### **The Voices in our Heads**

A dominant psychological model of voice-hearing holds that it involves a disturbance to the process by which inner speech—our ordinary internal dialogue—is attributed to the self. Accounting for the phenomenological richness and varied pragmatics of voice-hearing requires, however, an equally nuanced conception of the functional and structural heterogeneity of the ordinary voices in our heads. I review some key recent findings on voice-hearing and inner speech, and explore their implications for three main areas of enquiry: the paradox of the apparent ubiquity of inner speech, the value of reading some forms of voice-hearing as inner dialogue rather than as atypical communicative acts, and the dynamic interaction in voice-hearing of inner speech and memory.

## **Agustin Vicente, University of the Basque Country, San Sebastián**

### **The linguistic determination of conscious thought contents**

I address the issue of what determines the content of our conscious thoughts against the background provided by recent claims to the effect that phenomenal characters individuate thought contents (at least conscious thought contents). I present one prominent way to develop this view and then examine the 'sensory inner speech views', which provide an alternative way of accounting for content determinacy. I argue that such views fare well with covert speech thinking but have problems accounting for unsymbolized thinking or "bare" thoughts. Within such dialectics, I present an account on the nature of unsymbolized thinking that is continuous with the activity of inner speech and also gives us a way of explaining content determinacy in terms of linguistic structures and representations. The upshot of the view is not only that conscious propositional thinking may be necessarily linguistic but also that linguistic thought may be necessarily conscious.

**Blaise Yvert, BrainTech Laboratory &  
Thomas Hueber, GIPSA-lab, Grenoble**

### **First steps towards a brain computer interface for speech rehabilitation**

Brain-computer interfaces have been used for restoring communication capabilities in patients unable to speak. However, to date these systems are based on decoding brain activity (for instance hand or arm movements from the primary motor cortex) to control cursor movements and click events allowing the selection of letters to spell words. Such communication tools have become more and more efficient but remain an indirect way to restore communication as compared to speech. Here, we will discuss another strategy based on the decoding of brain activity to control an artificial speech synthesizer in real time. Our first steps toward this goal include the development of an articulatory-based speech synthesizer that we tested in a closed-loop paradigm, where subjects could produce intelligible speech in real time from sole articulatory movement signals. Current work now focus on recording and decoding cortical activity recorded by ECoG and intracortical electrode arrays in frontal speech areas. In parallel we develop new high density cortical implants and methods to automatically process neural activity to overcome the limitations of currently available devices.

**Ernst H.W. Koster, Ghent University**

### **The remarkable persistence of negative thought: Insights from cognitive science**

Extensive research has demonstrated that repetitive negative thinking styles such as rumination and worry can play an important role in the etiology and maintenance of affective disorders such as depression and anxiety. In the past decades there has also been remarkable progress in understanding the cognitive mechanisms involved in ruminative thought where different theories emphasize that attentional factors play a key role in the susceptibility to rumination. In this talk I will discuss some of the key models of rumination and discuss the empirical evidence for these models. I highlight that there are interesting insights mainly from studies examining thought processes during rest (e.g., mindwandering) as well as in task context. Based on these studies I will discuss both the value of established therapeutic treatments of rumination and I will introduce a number of interesting new avenues to reduce rumination.

**Stéphanie Smadja, CERILAC, Université Paris Diderot**

### **Literary Representation of Inner Speech Disorders**

For the representation and the study of inner life, literature can play a central role. Subjectivity has disappeared from the emergent humanities. In parallel, the representation of inner life was more and more important in literature. Subjectivity finds shelter in literature and literature can keep track of it. Literature cannot give the answers to our questions, but it can help to pave the way to self discovery, a mirror of consciousness. Long before theories emerge clearly in humanities, social sciences and neurosciences, quite a few have already been explored in literature. Regarding inner speech disorders, there is a choice of literary representations. Simone de Beauvoir's character, Murielle, falls into circular mental rumination in a short story, "Monologue" (*La Femme rompue*, 1967). Earlier in the xx<sup>th</sup> century, Cocteau created a dialogue-monologue, *The Human Voice* (1930), which was adapted as an opera by Poulenc in 1958. This play can be construed as a mental crisis involving auditory hallucinations. Can literature be a key to understand and analyse the linguistic forms of inner speech? In both cases, may we find potentially useful linguistic characteristics of inner speech disorders?