Research School of Behavioural and Cognitive Neurosciences

BCN Symposium

Creations of the brain

About dreaming, hallucinations, and mind-wandering

© Valeria Glibiciuc

October 30, 2025

Groningen

Theme

Welcome to this year's BCN Symposium "Creations of the brain: about dreaming, hallucinations and mind-wandering".

Through lectures, art, and conversation, we will explore what happens in the brain when it creates its own images and words.

The programme brings together diverse perspectives: from the neurophysiology of dream experiences and the risks of a wandering mind, to visualising mental imagery with fMRI and the relation between hallucinations and nightmares. Alongside contributions from established researchers, early career scientists from BCN will present their work, and students from Minerva Art Academy will show us their brains' creations in the art exhibit 'Dromen/Innerworld'.

We envisage this year's symposium as a place to spark wonder, and a chance to connect. We wish you an inspiring day.

On behalf of the BCN Symposium organizing committee,

Peter Meerlo
Sanne Brederoo
Marlijn Besten
Diana Koopmans

university of groningen

umcg

BCN

The Research School of Behavioural and Cognitive Neurosciences (BCN) is a research and training center for the study of normal and pathological processes of the nervous system at the University of Groningen, the Netherlands.

Our main objectives are twofold:

- to initiate, stimulate and integrate scientific research on the biological bases of behavioural and cognitive processes
- to provide our Research Master and PhD students with an integrated training program consisting of courses, lectures, master classes, workshops, seminars, symposia and multidisciplinary research

Some 300 senior researchers, 50 postdoctoral researchers and about 220 PhD students from five faculties within the University of Groningen participate in BCN. Research ranges from molecular processes to the whole organism and from yeast to humans.

BCN Cross-Disciplinary Symposia

BCN organizes special symposia which are part of the obligatory education program of our PhD students and appreciated meeting platforms for our senior scientists.
With these symposia we aim to:

- demonstrate the value of interdisciplinary research by approaching a single theme, central to BCN, from different angles
- encourage discussion of members of different research faculties, particularly graduate students
- inform BCN members about the state of their relevant research topics

Program BCN Symposium Creations of the brain

About dreaming, hallucinations, and mind-wandering

9:00 –9.30	*Registration with coffee/tea*
9:30 – 9:40	**Let's start!**
9:40 – 10:30	**Dr. Bryony Sheaves** *Sources of distress for voice-hearers: derogatory and threatening voices and nightmares*
10:30– 11:00	**Presentation Minerva Art Academy Students** & Exposition visit
11:00 – 11:30	*Coffee break*
11:30 – 12:20	**Dr. Francesca Siclari** *Dreamscapes and sleep states: a neurophysiological exploration of conscious experiences in sleep*
12:20 – 13.10	**Prof. dr. Ernst Koster** *The wandering mind and risk for affective disorders*
13:10 – 14:00	*Lunch break*
14:00 – 14.50	**Prof. dr. Rainer Goebel** *Decoding mental imagery of objects and emotions using 7 Tesla fMRI brain-computer interfaces*
14:50 – 15:40	**Early career researcher presentations** Vera de Vries *Exploring the boundaries between psychotic and dissociative disorders* Siwen Sheng '*Maladaptive Thinking Patterns and Spontaneous Speech in Individuals at Varying Risk of Depression*' Janna de Boer '*Childhood hallucinations and imaginary friends*'
15:40 – 16:10 '	*Tea break*
16:10 – 17:00	**Dr. Martin Dresler** *Neuroscience of Lucid Dreaming*
17:00 – 17:10	**Closing**
17:10 – 17:40	*Drinks*

Location

Location: Building 3221 (ground floor) A. Deusinglaan 1, Groningen. Entrance via Anda van Kerkhoven Centre.

Location plenary sessions: Faberzaal, Building 3217, 2nd floor.

Dr. Bryony Sheaves

Department of Experimental Psychology, University of Oxford

I am a Research Clinical Psychologist based in the department of Experimental Psychology, University of Oxford and an honorary Consultant Clinical Psychologist at the Oxford Health NHS Foundation Trust. My work aims to improve psychological treatments for people experiencing severe mental health problems, with a particular focus on i) distressing voices and ii) sleep disruption. Our lived experience advisory panel are integral partners in our research to ensure that the perspectives of people experiencing voices and/or sleep disruption inform theory and hypothesis generation, study design, treatment development and implementation work.

My research on voice-hearing spans theory generation (for example the Listening and Believing framework of voice distress), qualitative studies, observational studies, experimental studies and clinical trials. I am currently the Oxford site lead for the multi-site Talking with Voices II trial, led by Dr Eleanor Longden. This trial is testing an innovative dialogical therapy for voice hearers with the aim of improving personal recovery. I have worked on a range of studies led by Prof Daniel Freeman, which have demonstrated that sleep disruption is one contributory cause of mental health problems, including paranoia and hallucinatory experiences (e.g. the OASIS trial). Building on this, I led a pilot randomised controlled trial which demonstrated that a brief intensive sleep treatment on acute inpatient wards was feasible, acceptable and led to promising reductions in insomnia and the duration of admission (OWLS trial). We are currently testing the implementation of this intervention in routine NHS clinical services. I have a particular interest in nightmares, their causes and relationship with mental health problems. Our pilot RCT demonstrated that a brief CBT intervention for nightmares showed promising reductions in nightmares, insomnia and paranoia in a group of patients experiencing persecutory delusions (NIteS).

Sources of distress for voice-hearers: derogatory and threatening voices and nightmares

Around two thirds of patients with auditory hallucinations hear derogatory and threatening voices. High levels of distress are associated with this specific voice presentation: 79% of patients screen positive for depression, 66% for generalised anxiety disorder, and 61% endorse suicidal ideation. Our theory is that distress is heightened when these negative voices are listening to and believed. Qualitative research with voice-hearing patients will be shared which illustrates the range of understandable reasons for listening to and believing derogatory and threatening voices. Next quantitative data will be presented from 591 NHS patients who hear voices which demonstrates that these reasons form seven factors: to better understand the threat; being too worn down to resist; to learn something insightful; being alone with time to listen; voices trying to capture attention; voices sounding like real people; and voices sounding like known people. Each group of reason predicts listening and believing. In turn, listening to and believing derogatory and threatening voices predicts distress for voice-hearers. Whilst some voice-hearers use sleep as respite from their distressing voices, for others, sleep itself is also a source of distress. Around two thirds of voice-hearers experience distressing nightmares at least once per week. These nightmares are rarely discussed with clinicians or directly treated. Nightmares have historically been subsumed as a symptom of PTSD. Research will be presented that suggests that in psychosis patients nightmares i) should be considered in their own right, outside of PTSD; ii) can trigger acute and lasting distress; and iii) might be highly amenable to a brief targeted psychological intervention.

Dr. Francesca Siclari

Netherlands Institute for Neuroscience

Francesca Siclari is a tenured group leader at the Netherlands Institute for Neuroscience in Amsterdam and an invited professor at the University of Lausanne. Her research focuses on how the brain generates dreams and other forms of mental activity during sleep. She studied medicine at the University of Geneva, specialized in neurology and sleep medicine in Lausanne and Zürich, and completed a postdoctoral fellowship at the University of Wisconsin. She later co-directed the Center for Investigation and Research on Sleep in Lausanne. Her work has been recognized with several prestigious awards, including the Swiss National Science Foundation's Ambizione and Eccellenza Professorial Fellowship, as well as an ERC Starting Grant.

Dreamscapes and sleep states: a neurophysiological exploration of conscious experiences in sleep

Dreaming is a unique window into consciousness. In the absence of external input, the sleeping brain can generate entire worlds of vivid perceptions, illusory actions, and strong emotions that are almost indistinguishable from waking life. How the brain achieves such a remarkable simulation, and why, are questions that remain unresolved yet deeply consequential for understanding consciousness. Although the neurobiology of dreaming is still incompletely understood, recent research has begun to identify key neurophysiological correlates of dreams. In this talk, I will outline the phenomenology of dreams, survey advances in their scientific investigation, and discuss how emerging experimental approaches may clarify both the mechanisms of dreaming and the broader principles underlying conscious experience.

Prof.dr. Ernst Koster

Department of Experimental Clinical and Health Psychology, University of Ghent, Belgium

Ernst H.W. Koster, Ph.D., is a Full Professor of Clinical Psychology at Ghent University (UGent) in Belgium, where he is a principal investigator and co-founder of the Psychopathology and Affective Neuroscience Lab (PANlab) within the Department of Experimental Clinical and Health Psychology.
Dr. Koster's research is primarily situated in the field of Experimental Psychopathology and Clinical Psychology. His work focuses on gaining a deeper understanding of the causal mechanisms
underlying common psychological complaints, such as depression and anxiety disorders, with the ultimate goal of developing innovative and effective treatments.

Key areas of his research expertise include:

- Cognitive Processes (e.g., visual attention, memory, and cognition)
- Emotional Regulation and its role as a vulnerability factor for depression
- Rumination (specifically the "impaired disengagement hypothesis")
- The effectiveness of Cognitive Control Training as a preventative intervention for depression
- The impact of Social Media on mental well-being

He has an extensive publication record, including over 250 articles, book chapters, and books, and is highly cited for his work on attentional biases in anxiety and depressive rumination. He formerly served as the Editor for the prestigious journal Clinical Psychology Review (2018–2024). Dr. Koster is also a fully Certified Behavioral Therapist with significant clinical experience, working mainly with patients suffering from depression and anxiety disorders. He maintains a private practice, allowing him to keep a close connection between his academic research and clinical application. He is actively involved in the broader psychological community as a board member of the Flemish Association for Clinical Psychologists and a member of the Federal Council for Healthcare Professions in Belgium.

The wandering mind and risk for affective disorders

Humans spent a substantial proportion of time on mindwandering. There is increasing interest in the affective consequences of mindwandering. In this talk I will discuss the function of mindwandering and empirical work on affective consequences of mindwandering. I will also discuss theoretical and empirical data that suggests that mindwandering can be an important context for key cognitive mechanisms of depression.

Prof.dr. Rainer Goebel

Faculty of Psychology and Neuroscience, Maastricht University

Rainer Goebel studied psychology and computer science in Marburg (1983-1988) and completed his PhD (Dr. rer. nat., summa cum laude) in 1994 at the TU Braunschweig, Germany. He received the Heinz Maier Leibnitz Advancement award in cognitive science in 1993 from the German minister of science, and the Heinz Billing award for scientific computing from the Max Planck Society in 1994. Between 1994 and 2000, he worked as a postdoc at the Max Planck Institute for Brain Research in Frankfurt/Main where he founded one of the first fMRI labs in Europe in 1995. In 2000 he started his full professorship of cognitive neuroscience at Maastricht University where he trained and supervised more than 80 PhD students and 40 postdocs. He is the initiator of the Maastricht ultra-high field MRI centre that was officially opened by King Willem Alexander in 2013. He is Co-PI of the 14 Tesla 'DYNAMIC' project and member of its scientific board. He secured numerous grants, including twice an ERC Advanced grant, and over 10 years funding for his significant work and leadership role in the European Human Brain Project. Rainer Goebel is member

of the Royal Netherlands Academy of Arts and Sciences (KNAW) and the German National Academy of Sciences (Leopoldina). He is also founder, CEO and chief software developer of the company Brain Innovation B.V. producing free and commercial software for neuroimaging data analysis and education.

Decoding mental imagery of objects and emotions using 7 Tesla fMRI brain-computer interfaces

Can we read the contents of our mind's eye? Can we decode emotional cognitive states In real time? In my talk, I approach these questions using high-resolution functional brain imaging. Our results show that it is possible to decode imagined letters from brain activity in early visual cortex. This demonstrates that consciously driven internal processes, such as mental imagery, activate primary visual cortex, likely by sending signals backwards through the visual hierarchy. We also investigate the question why mental imagery is experienced so differently between individuals - some even claiming to not have any internal mental images at all (aphantasia). I will present a novel theory that relates the experienced vividness of mental imagery to activity in cortical layers that can be measured with ultra-high field (7 Tesla) fMRI. I will also report about real-time fMRI BCIs that enable participants to learn to modulate their emotional brain state based on feeedback from ongoing brain activity measurements. This 'neurofeedback' approach is used as a novel treatment for depression. We currently develop an advanced neurofeedback version that decodes and displays semantic information of emotions. The extracted semantic information can be provided to participants in a two-dimensional semantic map depicting the current mental state as a moving point reflecting its distance to pre-measured emotional mental states (e.g. ‘happy’, ‘content’, ‘sad’, ‘angry’). This new approach enables healthy participants and patients to navigate to positive emotional mental states.

Dr. Martin Dresler

Donders Institute Sleep & Memory Lab., Radboud University Medical Center Nijmegen

Martin Dresler received master degrees in biopsychology, philosophy and mathematics from Ruhr University, Bochum; received his PhD from Philipps University, Marburg; and performed postdoctoral research at the Max Planck Institute of Psychiatry, Oxford University and Stanford University. He is an associate professor for cognitive neuroscience

at Radboud University Medical Center, where he leads the Donders Institute Sleep & Memory Lab.

Neuroscience of Lucid Dreaming

During dreaming, we typically do not realize that we are not awake, despite an often bizarre dream environment. The exception of this rule is the phenomenon of lucid dreaming, where dreamers become aware of their current state of mind during ongoing sleep. Despite having been physiologically validated for decades, lucid dreaming is still poorly understood. In this talk I will give an overview on the cognitive neuroscience of lucid dreaming, including its neural correlates and induction strategies.

Early Career researcher presentations

Vera de Vries 'Exploring the boundaries between psychotic and dissociative disorders'

Siwen Sheng 'Maladaptive Thinking Patterns and Spontaneous Speech in Individuals at Varying Risk of Depression'

Janna de Boer 'Childhood hallucinations and imaginary friends'

Speakers

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Artwork cover

The artist of the artwork on the cover is **Valeria Glibiciuc**. The work belongs to the UMCG art collection.

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