PhD position in Developmental Computational Psychiatry
E13 TV-L 65% (f/m/d)

The Neuroscience in Developmental Psychiatry Lab at the Department of Child and Adolescent Psychiatry of the **University Hospital Würzburg,** in cooperation with the Department of Neurology at the **Max Planck Institute for Human Cognitive and Brain Sciences** invites applications for a PhD position within the DFG-funded project **'Sources of noise – neurocomputational underpinnings of non-greedy decision-making in youth and ADHD'** (PIs: Dr. Maria Waltmann and Prof. Lorenz Deserno). The position is initially funded for 3 years (extension intended).

Background

Human decision-making is remarkably inconsistent: the same person will often make different choices when facing identical situations – for no apparent reason. This seemingly random variability, or "noise", can have profound real-world consequences. On the milder end, it can lead individuals to occasionally make suboptimal choices (like risky or impulsive decisions). On the more extreme end, excessive noise can create an unpredictability that may undermine a person's sense of self-efficacy and self-control, and strain relationships with others. Despite its pervasive influence on decision-making, particularly during childhood and adolescence and in common developmental disorders like ADHD, noise remains poorly understood from a neurocomputational perspective. It is typically dismissed as meaningless variance – a methodological nuisance in investigations of learning and decision-making, their development and alterations in psychiatric disorders. This project turns this logic on its head: by treating noise as a signal, we aim to transform it into a source of mechanistic insight, helping us understand why kids make decisions differently than adults, why people with ADHD struggle with impulsive decisions and attentional lapses, and how medications such as methylphenidate may stabilise behaviour.

Research questions

As part of their PhD work, the candidate will explore:

- *Development of noise* – How do different types of noise change as we grow up and how do they interact with the development of other parts of the learning and decision-making system?
- *Noise in ADHD* – How does noise differ between children with ADHD and controls? Can monoaminergic medication change noise within children and adolescents with ADHD? Does this relate to longitudinal differences in treatment response?
- *Modulation of noise* – Can we alter noise within healthy individuals using brain stimulation?

Methods

We employ state-of-the-art methods in cognitive neuroscience, including tailor-made behavioural experiments, neuroimaging using task-based fMRI combined with ECG (capturing heart-brain interactions) and pupillometry (indexing autonomic arousal and noradrenergic activity), analysis using computational models of reinforcement learning, and ecological momentary assessment to link lab-based metrics with real-world behaviour.

Position

This PhD position is ideal for candidates with a strong interest in clinical and developmental applications of cognitive and computational neuroscience, and enthusiasm for interdisciplinary research at the intersection of psychiatry, neuroscience, and computational modelling ("Computational Psychiatry"). The candidate will **focus on the clinical aspects of the research programme**. They will become part of the Neuroscience in Developmental Psychiatry Lab and **work at University Hospital Würzburg under the direct supervision of Lorenz Deserno**. They will have access to graduate training opportunities with the Graduate School of Life Science of the University as well as with the Research Training Group on Approach and Avoidance hosted by the Psychology Department. Additional supervision will be provided by Dr. Maria Waltmann.

Your Tasks:

- Prepare and conduct complex multimodal experiments with children, adolescents and adults, including clinical populations (ADHD)
- Analyse experimental behavioural data using traditional statistics (e.g., generalised linear mixed models) and computational models (e.g., reinforcement learning models)
- Analyse neural and physiological data (fMRI, ECG, pupillometry) informed by modelling
- Prepare manuscripts and present results at conferences
- Coordinate research assistants and supervise interns and master's students
- Attend lab meetings, journal clubs and regular study team meetings and support other lab members
- Collaborate within an interdisciplinary team including clinicians to facilitate patient recruitment (Prof. Deserno leads the ADHD outpatient service in Würzburg)

Your profile:

Required

- Master's degree or equivalent in Psychology, Neuroscience, Cognitive Science, Computer Science, Medicine, or related disciplines (or near completion)
- Strong interest in using experimental and computational approaches to study complex human behaviour and clinical phenomena
- Experience collecting and analysing behavioural experimental data
- Solid background in statistics, ideally including generalised linear mixed models
- Excellent English language skills (minimum C1 level, written and spoken)
- Conversational German allowing interaction with study participants (minimum B1.2 level)

Desirable

- Experience with computational modelling of behavioural data (e.g., reinforcement learning models)
- Experience with collecting and/or analysing task-based fMRI, ECG, or pupillometry data
- Programming skills in MATLAB, R, Python or similar

We offer:

- A friendly and interdisciplinary team (psychologists, neuroscientists, medical doctors) that is well integrated into the local, national, and international research communities
- The opportunity to develop a variety of methodological skills, including computational psychiatry approaches
- Close scientific supervision and mentorship by enthusiastic project leaders
- Access to excellent research infrastructure
- Graduate training opportunities through Graduate School of Life Sciences (GSLS) / DFG-funded Research Training Group Approach Avoidance
- Flexible working hours to support work-life balance

The successful candidate will be part of a dynamic research team that values curiosity, kindness, and mutual support. We are committed to diversity in terms of ethnicity, gender identity or expression, disability, nationality, and other characteristics, and aim to optimally promote the professional development of all members. People with disabilities are explicitly encouraged to apply.

Please submit your complete application by **15 December 2025** (planned starting date 1 March 2026) via the online application form (https://karriere.ukw.de), including

- a **cover letter** with a brief summary of your research interests and motivation to work with us,
- a **full CV**, and
- the **names and contact details** of two people willing to provide references.

We look forward to receiving your application. Please do not hesitate to reach out to either Maria Waltmann (waltmann_m@ukw.de) or Lorenz Deserno (deserno_l@ukw.de) beforehand – we're happy to discuss the position and answer any questions you may have!