

PhD Position

Brain-inspired world models for navigating dynamic environments

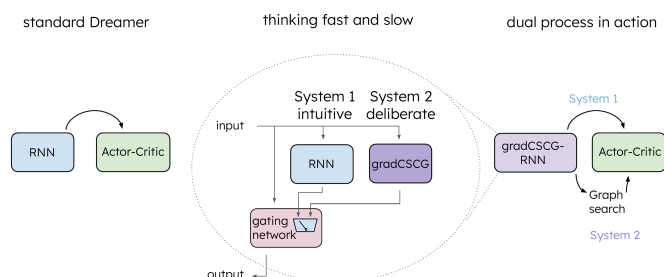
In the group of Tristan Manfred Stöber at the Campus Institute Data Science (CIDAS), University of Göttingen. Funded by the ERC Starting Grant *WoM-BaM - World Models in Brains and Machines*.

Salary	TV-L E13, 100 %: €4,760-5,110/month
Benefits	annual bonus, additional VBL pension
Duration	36 months fully funded, extendable
Start	flexible, ideally still in 2026
Place	CIDAS, Göttingen, Germany
Applications	rolling, first review 24 Sep 2026

What is the position about?

Evaluating future scenarios by mental time travel is a hallmark of intelligence, and it requires an internal representation of the world. To build such a world model, brains and artificial agents have to infer structural knowledge from sequential interactions with their environment. We postulate that the weakness of state-of-the-art reinforcement learning agents in long-horizon navigation stems from a fundamental flaw in their world model: in contrast to the brain, these algorithms fail to develop well-structured representations.

This position is the central AI part of the project. You will use insights and tools from neuroscience to investigate the inductive biases behind these shortcomings, and then develop a novel network architecture inspired by normative hippocampus models.



One direction we are exploring: a fast recurrent system alongside a slow, deliberate one.

What we are after are agents whose world model forms explicit, structured representations - ones that can be operated on directly, by graph search, counterfactual queries or reuse across tasks, instead of staying implicit in a recurrent state. Clone-structured causal graphs, which we have reimplemented in a gradient-based form (gradCSCG), show that this works but do not scale. Finding representations that keep the structure and lose the limits is the core of the project, and the aim is autonomous systems that are more capable, interpretable and data-efficient.

Who are we looking for?

- a Master's degree, or close to completion, in physics, computer science, mathematics, statistics, computational neuroscience, robotics, psychology or a related quantitative field; in exceptional cases a fast track directly from a Bachelor's is possible;
- strong quantitative skills and fluent programming;
- a solid command of modern machine learning.

What matters most is not on that list: a scientific mindset. Someone who chases the question rather than the result, who takes problems apart actively instead of waiting to be unblocked, and who makes the people around them work better. A PhD is a long project, and the group works best when its members genuinely build on each other.

Applications from any gender, country and walk of life are welcome - as are questions upfront.

What do we offer?

- an ambitious environment set up so that you succeed - demanding in its questions, supportive in how it treats you;
- close mentorship, with regular one-on-one meetings and feedback early enough to be useful;
- a network of excellent collaborators in Germany, France, Norway, Japan and the US;
- room to shape your own project and, as one of the first members, how the group works;
- a generous ERC budget for conference travel and publication, for venues such as NeurIPS, Cosyne and FENS.

Where you would be

Göttingen's scientific density is out of all proportion to its size. Gauss, Hilbert and Heisenberg worked here, and that tradition is very much alive: the university sits alongside several Max Planck Institutes, the German Primate Center and the University Medical Center, and the city has drawn a long line of Nobel laureates. It is also a genuinely good place to live - green, bike-friendly, with a beautiful old town and direct trains to Berlin, Hamburg, Frankfurt and Munich. New doctors climb the fountain on the market square and kiss the Gänseliesel - illegal since 1926, never much enforced, and enough to make her the most-kissed girl in the world. We would like to see you up there.

For a project between neuroscience and AI, CIDAS is the ideal home: it gathers machine learning, statistics and data science from across the campus into one place.

How to apply

Send a single PDF to tristan.stoeber@posteo.net with "PhD - World Models" in the subject line: a short motivation letter, your CV, transcripts, and the names and contact details of two referees.

Applications received by 24 September 2026 will receive full consideration; the position remains open until filled. Not sure whether this is for you? Write to me before you apply - I am happy to talk first. More about the group at tristanstoeber.github.io.



Photo: Daniel Schwen, CC BY-SA 2.5