Faculty of Mathematics and Natural Sciences

Profile report: Chronobiology (Chronobiologie)

- Discipline: Chronobiology
- Level: tenure-track assistant or associate professor
- Fte: full time (1,0)

1. Scientific discipline

Chronobiology is a discipline within the life sciences analysing the mechanisms, development, function, and evolution of cyclic biological rhythms over time in physiology and behaviour. It studies these rhythms in a wide array of organisms, ranging from microbes via plants to animals including humans.

2. Vacancy

This position is opened by the Board of the Faculty (letter JK/gl/16/00664 of August 9 2016) and will be embedded in the Groningen Institute for Evolutionary Life Sciences in the expertise group Neurobiology-chronobiology. The position falls within the framework of 'Career Paths in Science 3' ('Bèta's in Banen 3'). Please see link for criteria and conditions.

3. Selection committee (BAC)

Prof.dr Ton Groothuis (director GELIFES)
Dr. Louis van de Zande (Deputy director teaching programme)
Prof.dr Uli Eisel (Neurobiology, GELIFES)
Prof.dr Roelof Hut (Chronobiology, GELIFES)
Prof.dr Marcel Visser (Seasonal Timing of Behaviour, RUG/NIOO)
Prof.dr Johanna Meijer, (Neurophysiology, Leiden University Medical Centre)
Renate Kat (student member GELIFES)

Advisors:
Lourens Boomsma (HR)
Prof.dr Onur Güntürkün (Neuroscience/Biopsychology, University of Bochum, Germany, Advisory Board GELIFES)
Prof.dr Jaap Koolhaas (Emeritus professor Behavioural Physiology, Advisory group Adaptive Life).
Prof.dr Robert Schoevers, (Biological Psychiatry, University Medical Centre Groningen)

4. Research area

Biological rhythms are present in almost all organisms. Chronobiology encompasses a wide array of approaches to the study of these rhythms, from molecular genetics and neurobiology to physiology and behavioural biology. It also plays an increasingly important role in understanding human health and disease. In addition,

biological rhythms have always been seen in the context of adaptation to predictable cyclic environmental changes, many of these due to our rotating planet. These rhythms concern predominantly seasonal changes, day-night rhythms, (circadian rhythms), and within day changes (ultradian rhythms) such as tides and food. The field is therefore also linked with ecology and evolution. There is now an internationally recognised need to integrate mechanistic and evolutionary approaches in chronobiology. Another urgent question is about the relevance of human chronobiology for human health and disease.

5. Embedding: institute

In Groningen, the integration of mechanistic and evolutionary approaches to adaptation is the core of the new Faculty strategic theme Adaptive Life. The institute in which the position will be embedded, the Groningen Institute for Evolutionary Life Sciences (GELIFES), is the main home basis of this theme.

The institute has currently 6 expertise groups, consisting of several professors and tenure-trackers with a non-hierarchical internal structure. At least several of these are envisaged to provide embedding for the new staff member, depending on her/his specific research theme. Within the expertise group *Neurobiology,* chronobiology research is one of the flag ships of the institute, providing a sound basis for the new staff member. It has, apart from outstanding facilities for animal housing, an unique human isolation facility for research of, among others, human rhythms in behaviour and physiology. Other foci of the N*eurobiology* group are behavioural physiology of social behaviour, molecular neurobiology, including ageing, and neuroendocrinology focusing on metabolism and eating disorders. The other expertise groups are *Evolutionary Genetics, Development and Behaviour*, (focusing among others on behavioural and molecular genetics and behavioural development from an evolutionary perspective, working on biological rhythms too), *Behavioural and Physiological Ecology*, (working on behaviour and life history evolution mainly in birds), *Theoretical Research in Evolutionary Life Sciences*, (focusing among a variety of topics on eco-evolutionary dynamics), *Conservation Ecology* (focusing on species' adaptation to changing circumstances)*, and Genomics Research in Ecology and Evolution in Nature* (with research on microbial ecology, as well as marine biology and population dynamics and plant-eco-physiology). Apart from these six expertise groups, the institute has set up so called "integrative topic groups" in which researchers of several expertise groups collaborate, one of these, Evolutionary Medicine, being relevant for chronobiology.

6. Local and (inter)national position

Local: Chronobiology at the University of Groningen has a long tradition and strong reputation in rhythm research, studying a diversity of animal species (insect, rodents, humans). Within the Netherlands it has its own niche by integrating both molecular and neurobiological approaches as well as comparative and evolutionary approaches and mathematical modelling. The work includes sleep research and applications for society, in particular shift work. Local collaborations outside the institute exist with the FMNS/UMCG (Pharmacology, Radiotherapy, Biopsychiatry).

GELIFES coordinates among others (top) master programs in ecology and evolution as well as in behavioural and cognitive neuroscience. The institute participates in the interfaculty research school Behavioural and Cognitive Neurosciences, coordinating its selective master program, and has its own Research School in Ecology and Evolution.

Nationally, the Chronobiology PI's participate in the Centre for Timing Research, in which all chronobiologists in the Netherlands (from universities and companies) are joined: e.g. Leiden (Prof.dr. Meijer, Prof.dr. De Boer, Prof.dr. Michel), Rotterdam (Prof.dr. van der Horst), Amsterdam (Prof.dr. Kalsbeek, Prof.dr. van Someren), Wageningen (Prof.dr. Visser) and Philips (Dr. Schlangen). These labs cover central neurobiology of circadian rhythms, molecular mechanism, peripheral control and annual timing in an ecosystem.

Internationally, Chronobiology PI's have an active participation in the European Biological Rhythm Society (EBRS), the Society for Research on Biological Rhythms (SRBR), and the European Sleep Research Society (ESRS). Close international collaborations exist with Prof.dr. Lucas (Manchester), Prof.dr. Hazlerigg (Tromso), and Prof.dr. Abel (Philadelphia). Chronobiology PI's have been active participants in European networks (BrainTime, Euclock) and are active participants in the national network Centre for Timing Research, the applied science network 'OnTime' and the international ITN 'INsecTIME' network.

7. Expected contributions to research

The new staff member is expected to set up an independent research line within the field of Chronobiology, resulting in publications in high ranking journals, attracting substantial external funding and successful supervision of PhD students. The research is expected to complement ongoing research lines in Chronobiology and provide linkage to some of the other ongoing research within the institute (such as neurobiology, endocrinology and metabolism, genetics, aging, behaviour, animal ecology or theoretical biology), and that of the medical faculty.

8. Expected contributions to teaching

The candidate is expected to contribute to teaching at the bachelor level (especially for the tracks in Medical Biology and/or Behavioural Neuroscience) and at the master level (both courses and research projects).

9. Expected contributions to the organization

The candidate is expected to have an active interest in the management and organizational tasks of the institute. The candidate will participate in relevant national and international organisations.