



## OPEN POSTDOCTORAL FELLOWSHIP in INTEGRATIVE NEUROSCIENCE

Umeå University conducts internationally recognized research in several disciplines, including molecular biology, neuroscience, bioengineering or artificial intelligence, and it encourages cross-disciplinary thinking for a sustainable world. Umeå's relatively extreme geographic location in Northern Sweden offers a unique opportunity to study principles of human physiological response to natural daylight and the impact it has on mental health.

A postdoctoral fellowship is now available for a highly motivated individual with a keen interest in photoreception and biological rhythms. The Nordic Daylight Research (<http://www.katlab.org/>) is affiliated with the Wallenberg Centre of Molecular Medicine (WCMM) and led by Assoc Prof Katharina Wulff (<https://www.umu.se/en/staff/katharina-wulff/>) based at the Department of Radiation Sciences. The group strives for bridging disciplinary boundaries, especially combining environmental light measures with high-tech, wearable biomonitoring systems and ultra-sensitive biochemical assays. Postdoctoral fellows in the group receive training and experience across disciplines as part of a research team comprised of chronobiologists, biochemists, psychologists and engineers, who deeply care about transition support for trainees and provide rich opportunities to build personal networks.

### PROJECT DESCRIPTION

Daylight plays a very important role in human mental health, yet, effects of light are predominantly studied with electrical lighting. But daylight differs from electrical light in many ways, one unique factor is the notion that there is *order* in the appearance of natural light. This is received in ways light interacts with other materials, including but not only, photoreceptors and retinal ganglion cells in the eyes, which provide brain regions with important signals required for neuroendocrine control of glands. Glands make hormones of different types and together with the response they induce, affect metabolism and mental health. Taken together, this makes the eye and endocrine milieu an important target from a mental health perspective. But lack of knowledge in the complexity of daylight reception has hampered the detection of susceptibility to daylight changes in psychosomatic illness. This project will therefore investigate the influential role of daylight for the endocrine milieu mediated by retinal adaptation. We apply an entirely new longitudinal real-time small molecule collection method, **ultradian**, that creates a new field of endocrine investigation in people's real life, setting a new dimension that has yet to be explored. The role of change in daylight will then be explored by applying small molecule sampling simultaneously with spectrophotometry and a range of biosensors, including polysomnography, pupil-, eye- and glucose tracking, and ecological momentary assessment. Participants will be studied in a unique daylight facility – **the photon space** – the only research facility worldwide for all-year-round human daylight exposure without pollution by artificial light or skyglow. Our focus is on temporal interaction between daylight and retinal sensitivity with measuring effects on bodytime, hormone profiles and glucose metabolism. From that, new strategies that target these effects will be developed by selectively interfering the temporal interactions using a remotely-controlled LED lighting system. This research is designed to transform and improve our approach to LED technology to consider neuro-sensory capabilities for true human centric lighting.

This is an excellent opportunity for an interested candidate, who is technically competent in a discipline relevant to our integrative approach. Creative, energetic, and dedicated candidates with a strong interest in multimodal methodologies are particularly encouraged to apply. An experienced research nurse will assist with the recruitment of participants and data collection.

This full-time, tax-free postdoctoral fellowship is financed by the Kempe foundations for 2 years at first instance with expectation of completing 2 years of training in key methodologies as described in the project (with the possibility of a 3<sup>rd</sup> year full-time position). All equipment and running costs for the projects are covered by a VELUX STIFTUNG grant.

**The fellowship is immediately available.**

### **REQUIRED QUALIFICATIONS**

Candidates must have a PhD degree, or foreign degree that is deemed equivalent to a European University PhD in one of the following fields: neuroscience, psychology, endocrinology, psychophysics, biomathematics, meteorology or bioengineering. Other relevant fields will be considered. Strong skills in building and implementing mathematical and statistical models and in modern computer programming languages such as Matlab, Python or R are essential. We are looking for a talented candidate with a record of productive research and the ability to work independently as well as part of a team. Good oral and written skills in English are required.

### **APPLICATION**

A full application should include the following documents in a single PDF:

1. A cover letter summarising your qualifications, your scientific interests and explaining your motivation and reason for your interest in this position
2. A curriculum vitae (CV), including experience in research environments, expertise in methods and full publication list
3. Certified copy of the doctoral degree certificate and other completed courses and diplomas
4. Names and e-mail addresses of two reference persons with stated professional relationship with the applicant

**Application deadline: 15 October 2020**

The application should be written in English. The complete application should be sent to [katharina.wulff@umu.se](mailto:katharina.wulff@umu.se)

For more detailed information about the project and the research, please contact Katharina Wulff [katharina.wulff@umu.se](mailto:katharina.wulff@umu.se)

**We look forward to your application.**