

## Information about the 2019 PhD project positions

Application deadline 1 April 2019

Please see the advertisement on the SU homepage for more information.

When you apply for a project position you should write a project plan that fits with the topic of the project. To help guide your writing you will find the title and abstract of each project below. You will also find contact information to the project leader. For simplicity, only English abstracts are given below, but you may write your research plan in either Swedish or English. If accepted to the program, your work will be bound by the project as per the already funded and planned research, but there will, upon discussion and agreement with your supervisor, be room for creativity in what you do as well, as long as it fits the project.

### **Project position 1: Estimating the Role of Exposure and Access to Natural Environments for Wellbeing, Mental & Cognitive Health Outcomes in a Swedish Population-Based Cohort.**

For further information, contact Dr. Cecilia Stenfors ([cecilia.stenfors@psychology.su.se](mailto:cecilia.stenfors@psychology.su.se)).

Emotional disorders, chronic stress and cognitive dysfunction are major public health concerns associated with vast individual and societal costs. Understanding and targeting modifiable risk factors for these conditions is thus vital. Prior studies have found exposure and access to natural environments beneficial to mood, cognitive performance, stress reduction, and mental health. At the same time, urbanization and urban living can limit the extent of exposure and access to such environments. Importantly, knowledge is presently lacking about the extent to which exposure and access to natural environments play a role in mental and cognitive health at the national population level. This epidemiological project will thus investigate these questions by utilizing a nationally representative population-based longitudinal cohort with detailed health data, and high resolution satellite and geographic land use data (measuring "green space"/vegetation and "blue space"/open waters, and other aspects of the environment surrounding individuals' homes and workplaces). Advanced multivariate statistical data analysis methods will be used, including e.g. structural equation modelling.

Specific aims are to investigate, cross-sectionally and longitudinally, the role of exposure and access to "green" and "blue" space, and other related environmental aspects, for:

- (1) symptoms of depression, chronic stress/burnout, and cognitive complaints;
- (2) prevalence and incidence of affective and cognitive disorders (incl. e.g. depressive, anxiety and stress/exhaustion disorders, mild cognitive impairment) and prescriptions (incl. antidepressants);
- (3) disability adjusted life years and quality adjusted life years, for outcomes 2;
- (4) outcomes 1-3 in different SES, gender and age groups, and buffering of occupational stressors;
- and (5) investigate exposure and access to green and blue spaces in different societal groups in point 4; and (6) work with target agents on the implementation of health-supporting environments in cities and surrounding housing and workplaces. Other important and related health variables will also be studied.

The results from this project will provide important insights and empirical bases for public health and urban planning policies.

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### **Project position 2: Psychophysiological and psychoacoustic studies of auditory attention, echolocation and consciousness.**

For further information, contact Professor Mats Nilsson ([mnn@psychology.su.se](mailto:mnn@psychology.su.se)) and/or Professor Stefan Wiens ([sws@psychology.su.se](mailto:sws@psychology.su.se)).

Unlike other senses, hearing is not limited in scope and can detect stimuli from any direction. Thus, hearing serves as an early-warning system that may constantly monitor the environment. However, the degree of monitoring remains unclear. The goal of the proposed research is to examine how much task-irrelevant auditory stimuli are processed during difficult visual tasks, psychoacoustic mechanisms in echolocation and how these are affected by attention, and potential neural correlates of consciousness. The research uses psychophysics and psychophysiological measures derived from the EEG (e.g., ABR, ASSR, N1).

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**Project position 3: Understanding the cortical representations of odor memories.**

For further information, contact Associate Professor Jonas Olofsson ([jonas.olofsson@psychology.su.se](mailto:jonas.olofsson@psychology.su.se)).

Memory allows us to learn, remember and share information about facts and events—fundamental parts of human life. Memory loss is an early marker of Alzheimer’s type dementia, and tests of visual memory are important diagnostic tools. Based on prior research, the sense of smell is a key to understanding memory functions and how they are affected in dementia. Tests of episodic odor memory, and odor identification (matching odors to their names), may contribute to the early detection of dementia. However, little is known about the unique ways that odors engage the memory systems of the brain when solving such challenges. This project will investigate how odor memories are represented in the brain using a new method for analyzing brain imaging data, Representational Similarity Analysis (RSA), that reveals unique activity patterns carrying information about memory content representations. The project will uncover how the human brain identifies odors and how odors are linked to particular places by systematically comparing memory-related brain representations of odors with those of corresponding pictures (e.g., the smell of a rose vs. a picture of a rose). The unique nature of odor memories will thus be established at a cortical level through analysis of the representations carrying information about memory for olfactory vs. visual content. The research project will provide new insights into how memories from different sensory channels are organized. The project will also help establish how odor-based behavioral assessments might facilitate the prognosis of dementia by challenging the brain in unique ways.

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**Project position 4-5: Understanding production and perception of multimodal emotion expressions: Development of new databases for machine learning research.**

For further information, contact Associate Professor Petri Laukka ([petri.laukka@psychology.su.se](mailto:petri.laukka@psychology.su.se)).

This interdisciplinary project aims to study how emotion expressions are produced and perceived. We will develop novel databases of dynamic multimodal (visual and auditory) expressions. Stimuli will contain both acted and spontaneous expressions of a wide variety of affective states conveyed with different levels of emotion intensity. Emotion perception will be investigated in both behavioral and brain imaging studies. Physical properties of the expressions (e.g., facial gestures, body movements, and speech prosody) will be measured as they unfold in time, and machine-learning methods will be used to detect expressive cue patterns. The goal is to analyze data on three levels – human perception, the physical characteristics of expressions, and brain activity during emotion perception – which will provide a unique opportunity to address fundamental questions about the nature of emotions.

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**Project position 6: Sleep and daytime functioning: How does sleep affect daily cognitive and emotional well-being?**

For further information, contact Dr. Tina Sundelin ([tina.sundelin@psychology.su.se](mailto:tina.sundelin@psychology.su.se)).

Sleep loss and disturbed sleep are common, and can lead to changes in cognitive ability as well as emotional and social functioning. This project will focus on the effects of sleep and sleep loss on daytime functioning - cognitive, emotional, and social. Using several different research methods, the following questions will be studied: What are the individual differences regarding cognitive and social vulnerability to sleep loss? How do people cope with insufficient sleep? How do sleep patterns affect wellbeing and relationship satisfaction, and to what extent is sleep equality between partners a contributing factor? The goal is to learn more about the effects of sleep loss in everyday life, by combining experiments with experience sampling, daily diaries, and physiological measurements both in the lab and in the field.

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**Project position 7: Investigating the psychological foundations for how moral values change in society.**

For further information, contact Dr. Pontus Strimling ([pontus.strimling@su.se](mailto:pontus.strimling@su.se)) or Torun Lindholm ([tlm@psychology.su.se](mailto:tlm@psychology.su.se))

Previous research has established that liberals and conservatives differ in what moral foundations they rely on. This turns out to be key to understanding how moral values have changed during the last fifty years. So to fully understand when and at what speed moral values change we need a better understanding of what determines an individual's moral foundations. Modernization theory provides some of the answers by showing that liberals are more common in affluent nations. Other evidence comes out of experiments that moral foundations are connected to cognition as well as fear. However, we still do not know what determines a person's moral foundations within an affluent society, how stable they are or why they correlate with some other psychological constructs such as openness and generalized trust. This project's aim is to answer those questions in order to get a fuller understanding of how moral values change.

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**Project position 8: What is the effect of organizational prerequisites and leadership on employees work environment, motivation, intention to stay and sickness absence.**

For further information, contact Associate Professor Erik Berntson ([erik.berntson@psychology.su.se](mailto:erik.berntson@psychology.su.se)).

In a context with increasing and conflicting demands, being a manager in the public sector has been argued to be a complex task. For example, being a first-line operational manager, having a position in between the strategic level, with its focus on visions and strategies, and the operational level, with its focus on day-to-day operations, means a responsibility to understand and translate the different logics of these levels.

In this project, we set out to investigate how public sector organizations can facilitate a situation where managers can be supporting and present in the day-to-day operations, and how this is associated with employees' work environment, motivation, intention to stay and sickness absence. Specifically, this project focuses on the structural prerequisites and working conditions that form the context for managers and employees in the public sector. Such prerequisites could, for example, be span of control, geographical location of an organization or the composition of the work force in terms of educational level and type of contract. The project also focuses on factors such as professional trust, recognition and illegitimate task in understanding the mediating role of the manager for the association between organizational prerequisites, working conditions and employee work environment, motivation, intention to quit, and sickness absence.

The project utilizes existing quantitative data from municipal and regional organizations in Sweden. In addition, a large data collection will be initiated in September 2019, where questionnaire data will be collected (from managers and employees in a Swedish municipal organization) together with interviews. The data collection requires field work on site of the participating organization. Therefore,

it is necessary to speak fluent Swedish, and knowledge of the Swedish labor market (specifically public sector) is important for this project.