

# **IMPROVE: IMPROving the Visual Environment for all**

The ultimate goal of the IMPROVE Theme is to define and develop solutions for improving the quality of life of organisms that rely on visual information. In an urban space, this applies not only to healthy individuals but also to elderly and visually impaired individuals as well as animals.

In an interdisciplinary effort, IMPROVE aims at determining optimum levels of visual information necessary for living creatures to navigate the visual world, while preserving biodiversity in a shared environment.

Our senses are essential to detect and discriminate among signals, allowing us to perceive and interact with the world around us and to navigate through it. We are constantly presented with information, at times in overwhelming amounts, which needs to be integrated and processed, providing us with means of shared communication and protecting ourselves from injury. Of the five senses, vision plays a central role and many fear losing their sight above most other ailments.

Vision is far more than just the ability to detect photons and to assign properties and locations to people and objects. The process of visual perception comprises a mass of dynamic interactions that engage the eye and practically the entire brain. An increasing need to fully understand these interactions is felt by researchers in various disciplines. An exchange of experiences and knowledge is crucial to our understanding of how the eye and the brain process the visual world in humans and in animals. Understanding the nature of visual perception is a fundamental problem for science and also of considerable clinical importance for our efforts to develop innovative retinal prosthetics for the visually impaired.

IMPROVE is intended as a means to integrate the know-how available at Lund University (LU), and lay the foundations for new cross-disciplinary research focusing on the pioneering development of a new generation of visual optimization techniques. The Theme engages ten scientists from various research areas at LU, including Biology, Cognitive Sciences, Environmental Psychology, Medicine, Psychophysics, and Physics.

Some of the questions addressed by the group are:

- How to extract useful information from a visual image?
- What are the psycho-physiological and emotional responses to visual stimuli?
- What are the consequences of visual “pollution”?
- What considerations must be made when designing common spaces where different needs exist?
- Is there a need to adjust lighting conditions and visual tasks to the time of day?
- What should the optimal level of information provided by a retinal implant be?
- What can we learn from mobile robots in terms of spatial navigation?