

## Person of Interest

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### **What made you choose to focus specifically on visual perception as your research topic?**

Although vision is where I initially started, it is not my only research topic any more. However, my experience with vision largely guides my adventures into cognitive and neuroscience research topics and provides a useful perspective on new research topics.

Humans are visual animals. This is what attracted me initially to visual perception. You can easily appreciate the appeal of vision science by demonstrations and visual illusions. It is a fun topic and can teach us a lot about perception, cognition, and neuroscience. The importance of vision is also reflected in our brain. About 25% of our cortex is involved in processing visual information. Historically, vision is also the most understood. For example, the first cortical area that was discovered was the primary visual cortex in 1782 by Gennari. Furthermore, Nobel-laureates Hubel and Wiesel first described the function of cortical neurons in the visual cortex, the first fMRI measurements were done in the visual cortex, and I can give many more examples. The point is that the detailed knowledge of the visual system draws many scientists to vision. Not all these scientists are studying the visual system per se. Some use the visual system to investigate other neural properties, such as attention or consciousness. This makes vision a diverse research field that touches on many other research fields. I like this diversity.

Last, because there is a large knowledge base, the visual system is an ideal system to develop and validate new methods. For example, currently, the visual system provides a gold standard for high-resolution fMRI protocols to reveal columnar and laminar structures. We know where these columns are and where they terminate. Once we can reliably detect these features of the visual system, we can turn our attention to more unexplored regions of cortex. Thus, the visual system is also a hotbed for new technological developments. In our own research we focus both on more biological questions as well as on technological developments.

### **What are the things that drive you and make you enthusiastic every day?**

I love research. Understanding the human brain is one of the final challenges of science and it is ultimately the question of who we are and how we work. In my research, I work on a daily basis with colleagues with a wide range of backgrounds, for example physicists, physicians, biologists, neuroscientists, psychologists, and software and hardware engineers. This is a wonderful dynamic and interdisciplinary field. In every project, there is always a point where you find out whether it is going to



work or not. For me, this point where new knowledge is gathered is the most exciting aspect of science.

### **If you have to describe in one or two sentences what you would like to accomplish with your research group, what would this be? In other words: what is your main message?**

In addition to my professorship in Utrecht, I am now the director of the Spinoza Centre for Neuroimaging in Amsterdam. Therefore, I have a vision for my own research group as well as one for the Spinoza Centre. One is more focused on visual system and the other more on neuroimaging. They collide in what I believe is one of the most exciting challenges today. The brain is organised at different spatial scales; on one hand you have individual neurons and, on the other hand, brain areas. But there is a scale in between, where all the different types of neurons organize themselves in so-called hypercolumnar structures. These groups of neurons form a computational unit that repeats itself across cortex, which may be the most fundamental organization scale of the brain. Advances in ultra-high field MRI can image this organization scale in the human brain for the first time. With my research I hope to contribute to describe this computation unit of the brain and how it underlies perception and cognition.

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