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Understanding Vision: Research by ZEISS into the Fundamental Processes of Vision

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The ZEISS Vision Science Lab at the University of Tübingen in Germany carries out fundamental research into vision [ZEISS Vision Science Lab](#) is a research laboratory based at the University of Tübingen in Germany. It was set up to investigate fundamental aspects of how vision evolves, how light interacts with the eye and eyeglass lenses, and how the brain processes images in a wide variety of dynamic situations. Its goal is to develop new ways of providing natural, individually optimized vision.

Based at Tübingen University Hospital, directly adjacent to the university campus, the ZEISS Vision Science Lab was established in 2013 as an additional 'Industry on Campus' workgroup. Launched as part of Tübingen University's Excellence Initiative, it represents a collaborative project at the interface between basic research and industry applications.

Over 200 million people wear ZEISS eyeglass lenses worldwide – a number which is increasing by the second. ZEISS produces individualized eyeglass lenses capable of correcting numerous visual defects. To do this, it draws on the expertise it has built up over its 160 year history, as well as by tapping into countless patents and product innovations and over 100 years of experience as a pioneer in eye care and ophthalmology. Numerous parameters are taken into account to enhance visual acuity, contrast and color vision, UV protection and visual quality at twilight, at night and in challenging environmental conditions. The [i.Profiler® from ZEISS](#) uses wavefront technology to generate an objective, personalized profile of the human eye. This data is then used to produce individually optimized ZEISS eyeglass lenses.

ZEISS aims higher

However, the way in which our brains process the complex interactions between light waves, the eye and eyeglass lenses is not yet fully understood. ZEISS firmly believes that a deeper understanding of how images are processed on the retina in the brain, and how complex vision defects occur between the crystalline lens and the retina, will lead to significant advances in the treatment of visual defects and poor vision. The ZEISS Vision Science Lab Team works on these kinds of fundamental issues at the interface between basic research and industry applications.

Why did ZEISS choose Tübingen?

As a key player in current developments in ophthalmology, the Department of Ophthalmology at [Tübingen University Hospital](#) is one of the most renowned institutions in its field in Germany and beyond, excelling in both the research arena and the provision of care. It comprises the University Eye Hospital headed by Prof. Dr. Karl Ulrich Bartz-Schmidt and the Institute for Ophthalmic Research headed by Prof. Dr. Marius Ueffing.

Researchers at these two centers work on a collaborative basis to study the causes of degenerative, neoplastic and vascular diseases of the eye and visual pathway on a molecular, cellular and systemic level. The two institutions work closely together, particularly in the field of rare eye diseases.

With this one-of-a-kind competence cluster of neurology, biology, medicine, ophthalmic optics and vision research, the renowned excellence of the university's research, and its intensive collaboration with non-university research institutes in the immediate vicinity of the campus, the stage is set for the ZEISS Vision Science Lab to carry out fundamental research in an outstandingly effective and supportive research environment.

The founders of the ZEISS Vision Science Lab:



Image from left to right: Arne Ohlendorf, Siegfried Wahl, Katharina Havermann

Siegfried Wahl

- Dr. rer.nat., physicist and neurobiologist
- Director of the ZEISS Vision Science Lab

Katharina Havermann

- Dr. rer.nat., physicist and neuroscientist
- Team Leader Visual Neuroscience

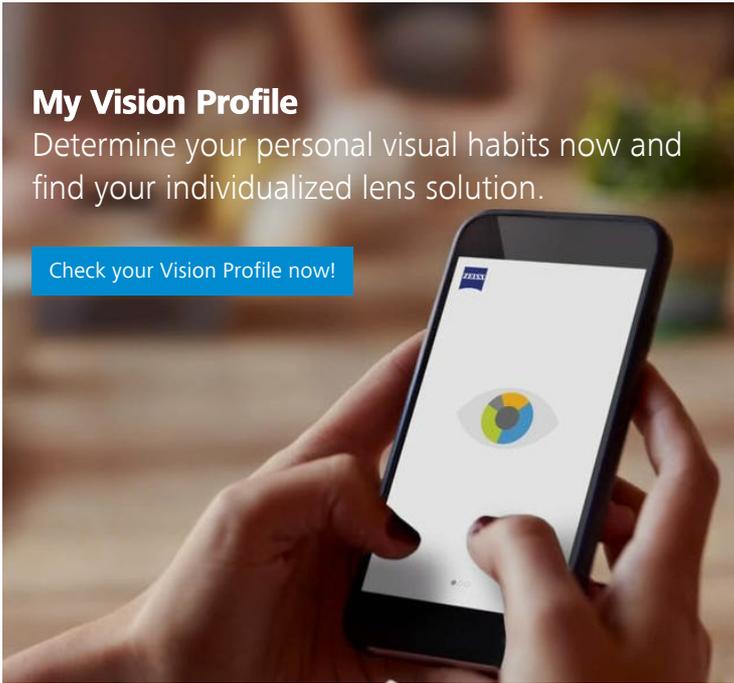
Arne Ohlendorf

- Dr. sc.hum., optometrist and vision scientist
- Team Leader Visual Optics

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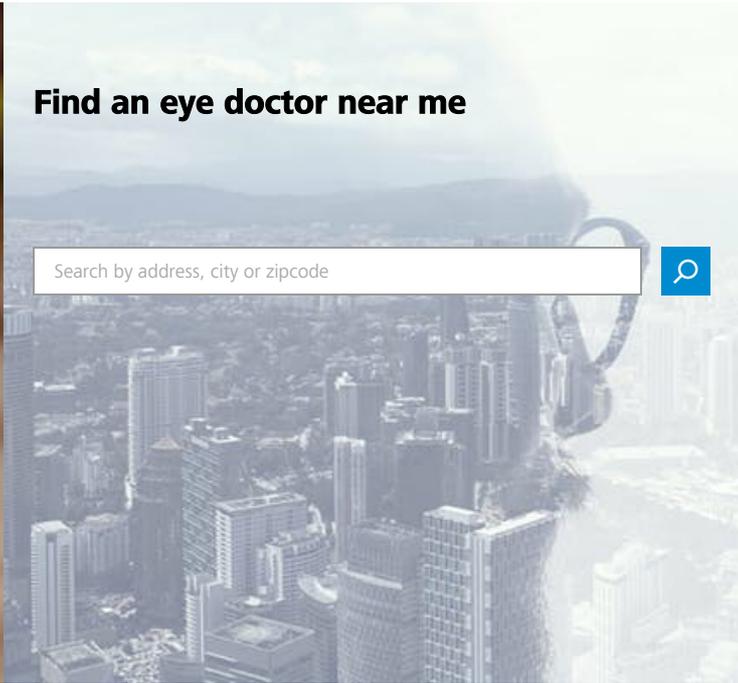
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