BIOGRAPHICAL SKETCH

NAME: Susanne Klauke, PhD

POSITION TITLE: Postdoctoral Research Fellow

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date	FIELD OF STUDY
Philipps-Universität Marburg, Germany	Ph.D.	07/2016	Vision Science

A. Personal Statement

Dr. Susanne Klauke is a Pitt Plastics Research Fellow with the Envision Research Institute. Her mentor is Dr. Ione Fine, a Professor of Psychology at University of Washington. She completed the U.S. equivalency of a Doctorate of Philosophy in Biology at Philipps-Universität Marburg in Germany.

Dr. Klauke evaluated the efficacy of a prototype of a visual prosthesis during a clinical trial. Perceptual tests in six blind human volunteers revealed that the retinal implant is suitable to elicit visual perception in blind retinitis pigmentosa patients. All of the participants reported visual percepts as a result of electrical stimulation of the retina. Moreover, subjects were able to discriminate between stimulation patterns of different orientations or at different locations on the retina (Klauke et al. 2011).

Furthermore, Dr. Klauke has acquired considerable experience in using psychophysics techniques investigating perception of color. Her research, examining how the perceived hue of a colored stimulus is influenced by a colored surround, showed that perceived hues shift away from an inducing surround and that the amount of induced shifts depends on the difference in hue between stimulus and surround in color space (Klauke & Wachtler 2015; Klauke & Wachtler 2016).

Working for many years with a non-profit organization, which offers services to blind and visually impaired individuals, Dr. Klauke developed and supervised inclusive vocational training programs for blind and visually impaired individuals to become information specialists, online journalists, and audio engineers.

In her current research project, she aims to characterize how visual impaired individuals compensate for losing their face recognition abilities, the impact of this loss on daily social interaction, and to develop tools, which might facilitate this compensation.

B. Positions and Honors

Positions and Employment

Present	Postdoctoral Research Fellow, Envision Research Institute, Wichita, KS, USA
2005 - 2009	Research Fellow, Philipps-Universität Marburg, Germany
1998 - 2018	Supervisor for vocational training of blind and visually impaired adults, Stiftung Blindenanstalt, Germany

C. Contributions to Science

1. Electrical stimulation with a wireless intraocular retinal implant: results from the EpiRet3 clinical trial

Electrical stimulation of retinal neurons has been shown to be a feasible way to elicit visual percepts in patients blind from degenerative retinal diseases such as retinitis pigmentosa. The EPIRET3 retinal implant is the first completely wireless intraocular implant for epiretinal stimulation. Stimulation tests have been performed during a clinical trial that was carried out at the eye clinics of Aachen and Essen, Germany to evaluate the safety and the efficacy of the implant.

Six legally blind retinitis pigmentosa patients were included in the study. In accordance with the regulations laid down in the study protocol, three 1-hour perceptual tests for each subject were performed within 4 weeks of surgery. Stimuli were charge-balanced square current pulses of various durations and current amplitudes.

All subjects reported visual percepts as a result of electrical stimulation by the implant. Thresholds for eliciting visual percepts varied between them but were below the safety limits of electrical stimulation. Stimulation success depended stronger on pulse duration than on current amplitude or total charge delivered. Subjects were able to discriminate between stimulation patterns of different orientations or at different locations of the electrode array.

The EPIRET3 system is suitable to elicit visual percepts in blind retinitis pigmentosa patients.

Klauke S, Goertz M, Rein S, Höhl D, Thomas U, Eckhorn R, Bremmer F, Wachtler T (2011) Stimulation with a wireless intraocular epiretinal implant elicits visual percepts in blind humans: results from stimulation tests during the EpiRet3 prospective clinical trial. Invest Ophthalmol Vis Sci. 52:449-455

Laube T, Brockmann C, Goertz M, Klauke S, Roessler G, Walter P, Krueger C, Bornfeld N (2012) Surgical techniques and two-year function of a wireless intraocular epiretinal retina implant system in Göttingen minipigs. Graefe's Arch Clin Exp Ophthalmol. 250:51-59

2. Hue changes induced by chromatic surrounds

The perceived color of a chromatic stimulus is influenced by the chromaticity of its surround. To investigate these influences along the dimension of hue, we measured hue changes induced in stimuli of different hues by isoluminant chromatic surrounds. In color space, induced hue changes were directed away from the hue of the inducing surround and they depended on the magnitude of the hue difference between stimulus and surround. With increasing difference in hue between stimulus and surround, induced hue changes increased up to a maximum and then decreased for larger differences. This qualitative pattern was similar for different inducers, but quantitatively, induction was weaker along some directions in cone-opponent color space than along other directions. The strongest induction effects were found along an oblique, blue-yellow axis that corresponds to the daylight axis. The overall pattern of the induction effect shows similarities to the well-known tilt effect, where shifts in perceived angle of oriented stimuli are induced by oriented surrounds. This suggests analogous neural representations and similar mechanisms of contextual processing for different visual features such as orientation and color.

Klauke S & Wachtler T (2015) “Tilt” in Color Space: Hue changes induced by chromatic surrounds. J Vis. 15(13):17

3. Changes in unique hues induced by chromatic surrounds

A chromatic surround can have a strong influence on the perceived hue of a stimulus. We investigated whether chromatic induction has similar effects on the perception of colors that appear pure and unmixed (unique red, green, blue, and yellow) as on other colors. Subjects performed unique hue settings of stimuli in isoluminant surrounds of different chromaticities. Compared with the settings in a neutral gray surround, unique hue settings altered systematically with chromatic surrounds. The amount of induced hue shift depended on the difference between stimulus and surround hues, and was similar for unique hue settings as for matchings of non-unique hues. Intra-individual variability in unique hue settings was roughly twice as high as for settings obtained in asymmetric matching experiments, which may reflect the presence of a reference stimulus in the matching task. Variabilities were also larger with chromatic surrounds than with neutral gray surrounds, for both unique hue settings and matching of non-unique hues. The results suggest that the neural representations underlying unique hue percepts are influenced by the same neural processing mechanisms as the percepts of other colors.

Klauke S & Wachtler T (2016) Changes in unique hues induced by chromatic surrounds. J Opt Soc Am A. 33:A255-A259

D. Additional Information: Research Support and/or Scholastic Performance

Ongoing Research Support

Interactions between face & voice recognition, visual impairment, and social integration.
Envision Research Fellowship, Pitt Plastics and Envision Research Institute

This study aims to evaluate face and voice recognition abilities of visually impaired individuals and to develop an objective individual measure of recognizing people by face and by voice. Furthermore, it aims to investigate the impact of face and voice recognition abilities on social functioning of visually impaired individuals and to develop tools, which might facilitate the compensation for face recognition loss.