# DANDRITE Topical Seminar
### by visitor Katja Reinhard

## Thursday 14 July 2015
### 11.00 – 12.00

### Aud. 6 (building 1170, room 347)
Ole Worms Allé 3, 3. floor, 8000 Aarhus C

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### Illuminance-dependent variability in response properties of retinal ganglion cells

The retina is exposed to a highly dynamic visual environment with both rapid and slow modulations in contrast and ambient brightness. Despite these dynamics of the visual input, we perceive a given stimulus very similarly, independently of whether we see it under dim or bright conditions. It is therefore conceivable that the retina is sending very similar signals to the brain when viewing the same scene, irrespectively of the ambient brightness.

One of the most basic properties of ganglion cells – the output neurons of the retina – is their response polarity, i.e. ON-ganglion cells respond to light increments, and OFF-ganglion cells to light decrements. The polarity of ganglion cells has been thought to be "hardwired" and clear-cut, such that the retina provides the visual system with a stable representation of light increments and decrements. Surprisingly, we found that the polarity of ganglion cells is not stable, but strongly modified by changes in the ambient brightness. The majority of mouse OFF-ganglion cells recorded by multi-electrode arrays did not only respond to light decrement but, at various light levels, also to increment, while most ON-ganglion cells also responded to light decrements at specific ambient light levels. These response changes could occur at any tested light level, but were bound to the respective ambient brightness. Further, we confirmed this variability in ganglion cell output in response to different stimuli, in pig retina, and in in-vivo recordings of the LGN.

These findings do not only question the basic assumption of hardwired response polarities in ganglion cells, but have implications on 1) functional classification of sensory neurons, 2) questions of neuronal coding and the ability of the brain to deal with variability in the output of sensory organs, and 3) the need of cell type specificity of treatments against blindness.

**Host:** Group Leader Keisuke Yonehara, DANDRITE