

2008 Finalist

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Hendrikje Nienborg received an MSc in Neuroscience from the University of Oxford (UK) in 2000, her MD in 2003 and her doctorate in 2005, both from the University of Munich (Germany). She then joined Bruce Cumming's lab at the NIH as a post-doctoral fellow. Being a sculptor, Hendrikje is fascinated by visual perception and in particular by our ability to perceive depth, which has been the focus of her research. In her graduate work she showed that disparity selective neurons in the primate primary visual cortex are limiting factors for the perception depth. In her post-doctoral work, Hendrikje seeks to identify the mechanisms underlying neuronal correlates of perceptual decisions that monkeys make about visual stimuli.

Visual perception: interactions between sensory and decision processes

Dr. Hendrikje Nienborg is interested in how neuronal signals encode information about the visual world, how they are influenced by our expectations and how these signals ultimately lead to perception. Using electrophysiological recordings, she studies the neural signals in the visual cortex in monkeys performing visual tasks. When the monkeys are required to make decisions about a visual stimulus, it has been shown that the activity from individual neurons predicts the monkey's decision. It has generally been thought that

this predictive activity reflects a causal effect that these neurons have on the decision. In her essay, Dr. Nienborg describes a series of experiments suggesting that instead, this reflects an effect of the monkey's expectation, and/or the decision itself, on sensory neurons early in the visual pathway. The neural mechanisms underlying perception are constantly adjusted dynamically, such that our cognition influences what we perceive.