

The brain as image processor and generator

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Propositions of the PhD-thesis

The brain as image processor and generator

towards function-restoring brain-computer-interfaces

Rick van Hoof

1. Human visual perception needs to be studied *in-vivo* before we can understand human vision.
2. Ultra-high field fMRI is an invaluable neuroimaging tool for analyzing human cognitive functions in-vivo at the meso- and macroscopic level.
3. Functional parcellation of cortical brain regions can assist in understanding more complex brain dynamics.
4. Neural responses to specific categories of visual stimuli can be reliably mapped to a flattened model of the cerebral cortex.
5. Retinotopic organization of the visual cortex can partly be derived from anatomical structures, and can therefore also be estimated in blind individuals.
6. Virtual simulations of a visual cortical prosthesis using estimated retinotopic maps can improve visual field coverage of a cortical implant.
7. Studying the process of generating imagined percepts can aid the understanding of visual processing, and vice versa.
8. Visual perception and mental imagery share common circuitry.
9. To understand the mind, we should attempt to grasp the underlying mechanisms.
10. Scientists have the responsibility to evaluate both the risks and potential gains involved with restorative brain-computer-interfaces.
11. The academic publishing system is built on capitalism and is in need of reform.