

Hanse-Wissenschaftskolleg
Institute for Advanced Study

Workshop

Cortical Prostheses – Interdisciplinary Research Towards Artificial Vision for the Blind

Delmenhorst, 19 – 22 September 2023

Organizer:

Dr. David Rotermund

Dr. Udo Ernst

University of Bremen

Funded by:



Program

Venue:

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Institute for Advanced Study

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Tuesday, September 19, 2023 – Day 1

10:00 – 10:15	Welcome
10:15 – 11:00	<i>Shelley I. Fried</i> Towards the development of a micro-coil based cortical visual prosthesis
11:00 – 11:30	<i>COFFEE BREAK</i>
11:30 – 12:15	<i>Ione Fine</i> Pulse trains to percepts: Using virtual patients to describe the perceptual effects of human visual cortical stimulation
12:15 – 13:00	<i>Avi Caspi</i> Eye tracking in cortical visual prosthesis – from theory to practice
13:00 – 14:30	<i>LUNCH</i>
14:30 – 15:15	Poster Session
15:15 – 16:00	<i>Martin Schrimpf</i> Do Topographic ANNs Predict the Behavioral Effects of Neural Interventions in Primate IT Cortex?
16:00 – 16:30	<i>COFFEE BREAK</i>
16:30 – 17:15	<i>Pieter Roelfsema</i> Visual perception and consciousness and their restoration when the eyes fail
17:15 – 18:00	<i>Eduardo Fernandez Jover</i> Towards an advanced cortical visual neuroprosthesis based on intracortical microelectrodes
18:00 – 19:30	<i>DINNER</i>

Wednesday, September 20, 2023 – Day 2

- 10:00 – 10:45 *Fabian Sinz*
Exploring the visual System with functional digital twins and inception loops
- 10:45 – 11:30 *Umut Guclu*
Neural coding and neuroprosthetics with deep learning and synthetic reality
- 11:30 – 12:00 *COFFEE BREAK*
- 12:00 – 12:45 *Bogdan Raducanu*
Chips to neurons and back: electronic circuits for neural recording and stimulation
- 12:45 – 14:15 *LUNCH*
- 14:15 – 15:00 *Daniel Yoshor*
Implementing a visual cortical prosthetic: Advances and challenges
- 15:00 – 15:45 *Diego Ghezzi*
High-density wide-area cortical visual prosthesis
- 15:45 – 16:15 *COFFEE BREAK*
- 16:15 – 17:00 *Arto Nurmikko (Zoom)*
Wireless networks of implanted microchips for distributed cortical sensing and stimulation
- 17:00 – 18:00 *SOCIALS*
Visit of industry museum "Nordwolle" in Delmenhorst followed by dinner in restaurant "El Mariachi"

Thursday, September 21, 2023 – Day 3

- 10:00 – 10:35 *Udo Ernst*
I-See - Evaluating novel approaches for constructing visual cortical prostheses
- 10:35 – 11:10 *Dirk Jancke*
Probing electrical brain stimulation in genetically modified mice
- 11:10 – 11:50 *COFFEE BREAK*
- 11:50 – 12:25 *Christopher Pack*
Design considerations for an extrastriate visual cortical prosthetic
- 12:25 – 13:00 *Michael Herzog (+ Elsa Scialom)*
A psychophysical approach to object rendering in future V4 prostheses
- 13:00 – 14:30 *LUNCH*
- 14:30 – 15:15 *Theo Doll*
Additively fabricated cortical electrodes – a materials challenge
- 15:15 – 16:00 *Andreas Schander*
Development of neural probes for chronic recording and electrical stimulation
- 16:00 – 16:30 *COFFEE BREAK*
- 16:30 – 17:15 *Gislin Dagnelie*
Early functional outcomes for the first human with the Intracortical Visual Prosthesis (ICVP)
- 17:15 – 18:00 *Michael Beyeler (Zoom)*
Human-in-the-loop optimization of simulated prosthetic vision
- 18:00 – 19:30 *DINNER*
- 19:30 – 21:30 Chats and discussions at the HWK Fireplace

Friday, September 22, 2023 – Day 4

10:15 – 11:00

Carlos Ponce

Estimating the capacity of neuronal population encoding via image reconstructions

11:00 – 11:30

COFFEE BREAK

11:30 – 12:15

Michael Schmid

Influence of visual cortex stimulation on perception: Insights from experiments in non-human primates

12:15 – 13:00

Anna Wang Roe (Zoom)

A novel interface for cortical columnar neuromodulation with multi-point infrared neural stimulation

13:00 – 14:30

LUNCH