

24 NOVEMBER 2017

Neurovation

PROGRAM

DONDERS
INSTITUTE



NEUROVATION Program

09:30 - REGISTRATION

10.00 - PLENARY MORNING SESSION



10:00

Bart van de Warrenburg (chair)

Welcome



10:10

Louise Gunning

National Research Agenda: A Successful Experiment?



10:30

Cyriel Pennartz

Update NeurolabNL



10:40

Nicky Hekster

The Impact of Cognitive Computing on Health



11:10

Guillén Fernandez

The Healthy Brain Community



11:30

Bas Bloem

The Personalized Parkinson Project



12:00

Boris Konrad

The Brains and Methods of Memory Champions

12:45 - LUNCH

13:45 - BREAK-OUT SESSIONS

- *Healthy Lifestyle & Behavioral Change*
- *NeuroTech-NL*
- *Brain & Learning*
- *Food & Cognition*

16.15 - PLENARY CLOSURE



16:15

Lucas Noldus (chair)

Introduction i3B



16:20

Break-out session leaders

Summaries of break-out sessions



16:50

David Norris

Formal closure

17:00 - DRINKS AND SNACKS (I3B CAFÉ)

Healthy Lifestyle & Behavioral Change

INTRODUCTION

This break-out session will focus on healthy lifestyle and behavioral change. This is a growing field of interest in both academia and industry given the current shift in health care systems from a “*diagnose and treat*” to a “*predict and pre-empt*” model to reduce the costs and burden of lifestyle-related diseases. This break-out session will focus on the following topics:

- Stress & work-life balance:** Negative consequences of stress arguably form one of the greatest health care challenges for the 21st century. Technological developments such as wearables and smartphone applications create new opportunities for stress monitoring and preventive interventions.
- Addiction & bad habits:** Neuroscience has delineated the neural systems underlying addiction and habitual behavior in unprecedented detail. A challenge for the coming years is to apply this knowledge to prevent development of addictive behaviors.
- Sleep & chronobiology:** Disturbed, insufficient or misaligned sleep is a causal factor for many brain disorders. Sleep monitoring systems and cognitive-behavioral strategies can contribute to developing healthy sleep habits.
- Physical exercise:** Physical exercise is one of the most important protective factors for developing lifestyle-related diseases. In recent years, new technologies are emerging for monitoring health benefits and increasing physical activity.

The break-out session will thus serve to integrate latest neuroscientific insights with novel monitoring and intervention technologies, aiming for innovative strategies for personalised feedback and behavior change towards a healthy lifestyle.

PROGRAM

13:45

Walk-in



13:50

Martin Dresler

R&D program Donders Institute



14:00

Privender Saini

R&D program Philips



14:10

Simon Haafs

C.I.A.L.E., i3B

14:15

Pitches

- Sanne Nauts, Philips
- Tsvetomira Tsoneva, Philips
- Joyce Westerink, Philips
- Privender Saini, Philips
- Andrew Spink, Noldus IT
- Nard Clabbers, TNO
- Luc Nies, Orikami
- Ben Krose, HvA

14:50

Break

15:10

Pitches

- Hugo Silva, Plux
- Marianne Floor, Artinis
- Paris Ziogkas, Advantis Medical Imaging
- Jaap van der Spek – ANT Neuro
- Rayyan Tutunji – Donders
- Frederik Weber – Donders
- Thomas Schreiner – Donders
- Albert Batalla – Donders
- Jan Peter Larsen, Sense Health

16:00

Discussion, questions, closure of break-out session



INTRODUCTION

This break-out session will focus on the NeuroTech-NL initiative. Brain-computer interfaces and neuromodulation technologies such as deep brain stimulation are examples of neurotechnologies. Neurotechnology can be defined as any artificial means to interact with the brain and nervous system in order to investigate, access and manipulate the structure and function of neuronal systems. This encompasses, for example, brain research itself; electronic devices that can repair or substitute brain functions; neuromodulation devices used to treat mental illness; wireless technology and computations including neuronal networks for brain-computer interfaces; and the development of artificial intelligence.

The Netherlands has many leading groups in fundamental and clinical neuroscience, as well as world-class technological research labs in academia and industry, including experts in nanotechnology, materials science, optics technology, microchip fabrication, high-performance computing, and wireless technology. NeuroTech-NL will bring these scientists with clinicians together, facilitating the translation of neuroscience and technology into new products. We aim to develop novel methods to interface with human neuronal tissue to create clinically implantable devices. These advances would result in enhanced mobility for patients, reducing their reliance on healthcare providers in daily life. In NeuroTech-NL we will focus on three carrier research lines:

- Bidirectional Cortical Interfacing with electrode grids aligned to cortical topography** - Restoring motor functions in paralyzed people may be achieved with brain implants that record neuronal activity directly from the cortex. Such recordings by non-indwelling electrode grids show promise in facilitating the conversion of topographical activity patterns induced by attempted movement into actions. Additionally, electrical stimulation using such grids could help restore sensory function. However, the technology to fabricate the right electrode density with materials that can be safely implanted chronically in humans has not yet been established. This project will deliver the optimal electrode density for recording and stimulation in humans for various cortical functions, and design optimal decoding and stimulation schemes.
- Self-learning deep brain stimulation (DBS)** - There is currently a strong need for adaptive programming of deep brain stimulation (DBS) settings in patients to optimize the effect of stimulation. The deliverable will be clinical software and hardware that incorporates

individualized, automated and self-learning programming with the goal to improve deep brain stimulation for epilepsy and Parkinson's Disease.

- Cochlear implantation techniques** - It's important to develop new tools to better preserve intracochlear structures (and residual hearing) during cochlear implant-electrode insertion. Such an effort will join together medical and technical universities as well as a cochlear implant manufacturer. It involves the development and validation of an automatic 3D image processing app, providing pre-operative guidance to the surgeon, coupled with a real-time intra-operative monitoring system, based upon electrical and electrophysiological measurements (in part via the implant itself). This will be combined with the development of a robotic insertion tool and ultimately, with novel, less traumatic electrodes with in-built sensors and mechanical actuators.

In the break-out session we will exchange the latest developments in these research areas and discuss possibilities for future funding programs. We are especially interested in industry or researchers with good connections to industry to join these research programs.

PROGRAM

13:45 **Walk-in**

15:00 **Match-making in 3 different groups**

All attendants of the session are invited to actively participate



13:50

Richard van Wezel

NeuroTech-NL introduction



14:40

Johan Frijns

Cochlear implants



&

Filiep Vanpoucke

Cochlear implants



14:00

Pieter Roelfsema

Cortical Interfacing



14:20

Yasin Temel

Self-learning deep brain stimulation

15:45 **General discussion**

16:00 **Closure of break-out session**



NeuroTech-NL

Brain & Learning

INTRODUCTION

Neuroeducation is at the cross-section of education science, psychology, and neuroscience and tries to better education based on neuroscience insights. Already applied learning methods like *'brain-based learning'*, follow (loosely) the insights gained in neuroeducation. Often these insights overlap with already known insights from classic learning science insights. The critical question is how neuroscience can contribute uniquely to education and what is needed from all perspectives involved to get there.

The Donders Innovation program on Learning & Education is aimed at exactly this topic. The innovation program aims to bring scientists working on topics related to education together to foster societal impact. From that starting point, the valorisation program recently launched the national iHub *'Learning, Education & Development'* and now invites interested academics & professionals working on and in education to join the *'Brain & Learning'* session at Neuro-ovation.

In this session, we aim to discuss the aforementioned critical question. We will start with an introduction to neuroeducation and the pro's and con's of the value of the field, based on both a presentation and audience discussion. Next, interdisciplinary teams build up by the participants will come together to plan concrete research on and/or applications of neuroscience knowledge to education, finished by a central closing.



Part of the iHub Learning, Education & Development initiative

PROGRAM

13:45 Walk-in



13:50

Harold Bekkering

Opening and welcome



14:00

Frank Leoné

How can neuroscience & education inform and inspire each other?

14:45 Small-group brainstorms on neuroscience-education cross-overs

15:30 Poster presentation of brainstorm results

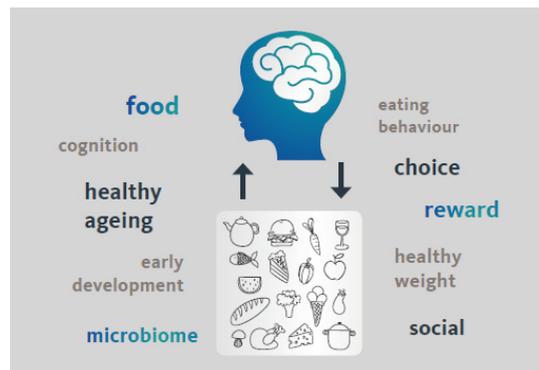
16:00 Closing of session

Food & Cognition

INTRODUCTION

This break-out session will focus on the Food & Cognition research programme. The Food & Cognition Programme is a joint effort between the Radboud campus – as a subtheme of the Healthy Brain initiative – and Wageningen University and Research. Food & Cognition addresses societal challenges concerned with food and cognition from early cognitive development in young children towards healthy adolescence and adult life, up to maintaining cognitive health in ageing. It covers prevention of obesity/metabolic disease and brain disease by studying eating behaviour (changes) and effects of healthy diets and functional ingredients. Moreover, it assesses the effect of nutrients in treating or delaying cognitive impairment in elderly and in neurological and psychiatric diseases, targeted towards the individual. Understanding the cognitive mechanisms of both eating behaviour and personalised nutrition helps people to make the healthy choice, the easy choice.

With the realisation of the Food & Cognition Programme by the two universities in the province of Gelderland, Food Valley Wageningen and Health Valley Nijmegen connect; creating a worldwide uniquely strong expertise position. Food and tech industry (both SMEs and large companies) can benefit greatly from the creation of this public-private open innovation hub for Food & Cognition. In this break-out session, we would like researchers and stakeholders to connect and to discuss how to build on current research ideas from both sides.



PROGRAM

13:45 Walk-in

13:50 Esther Aarts, RU

Introduction Food & Cognition Programme

14:00 Pitches, including:

- **Judith Homberg, RUMC**
Inflammation, serotonin and eating behaviour
- **Rob Beudeker, TIFN, DSM**
- **Matthijs Dekker, WUR**
Food design for mood and cognition
- **Nard Clabbers/TBA, TNO**
- **Ondine van de Rest, WUR**
Nutritional interventions in aging
- **Ric van Tol/Gabriele Gross, Mead Johnson Nutrition**
- **Lisette de Groot, WUR**
Personalised nutrition in Parkinson's disease

15:00 Break

15:15 Pitches, including:

- **Laus Broersen, Nutricia Research**
- **Michiel Kleerebezem/TBA, WUR/NIZO**
Gut microbiome and cognition
- **Isolde Besseling/Elsbeth Pekelharing, Winclove Probiotics**
- **Nina Belei, RU**
Food reward by design
- **Emely de Vet, WUR**
Environmental influences on consumer behaviour
- **Harm Veling, RU**
Creating habits for lower-calorie foods

16:00 Thea van Kemenade, RU

Next steps and closure of session

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