OHBM HAMBURG 2014

Celebrating 20 Years

humanbrainmapping.org/OHBM2014

program

OHBM 2014 Annual Meeting **June 8-12**

CCH-Congress Center Hamburg Hamburg, Germany

EGI Sponsored Lunch Symposium

Tuesday, 10 June 2014
12:00 pm – 2:30 pm, hall G1
boxed lunch provided

EGI
dense array EEG

"Geodesic Transcranial Electrical Neuromodulation (GTEN): Dense array methods for tDCS and tACS"

Speakers:

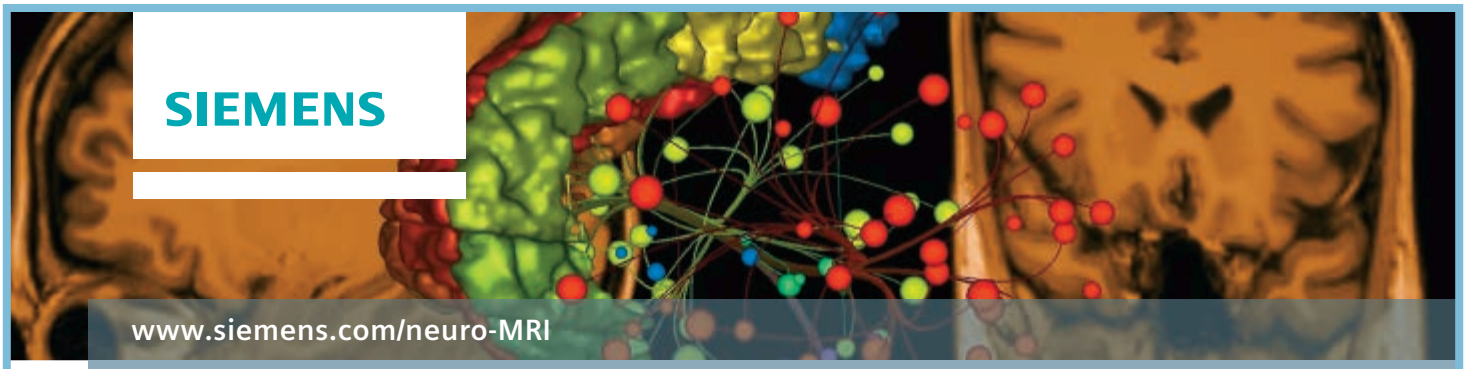
"Goals and Challenges of Geodesic Transcranial Electrical Neuromodulation"
–Don Tucker, PhD, Chief Executive Officer, Electrical Geodesics, Inc.

"Accurate Head Models for Transcranial Electrical Neuromodulation"
–Sergei Turovets, PhD, Scientist, Electrical Geodesics, Inc.

"Visualizing the Effects of Transcranial Electrical Neuromodulation on the Cortex"
–Erik Anderson, PhD, Scientist, Electrical Geodesics, Inc.

"Integrating GTEN with Dense Array EEG"
–Phan Luu, PhD, Chief Technology Officer, Electrical Geodesics, Inc.

register at
www.egi.com/ohbm2014



The revolution in ultra-fast MR imaging for neuroscience

Siemens Lunch Symposium, OHBM 2014

Wednesday, June 11th
12:00 p.m. – 2:30 p.m.
Hall 2, Congress Center Hamburg

Lunch will be provided for the first 200 attendees

Driving the revolution with leading-edge technologies
Keith Heberlein, PhD, Siemens Medical Solutions, USA

Simultaneous Multi-Slice Acquisition for Connectomic Applications and Beyond
Kawin Setsompop, PhD, Center for Biomedical Imaging, MGH/HST Athinoula A. Martinos

Multislice accelerated RESOLVE for time-efficient, high-resolution diffusion imaging
Robert Frost, PhD, FMRIB Centre, University of Oxford

Multiband techniques for functional and structural neuroimaging: Technical challenges, applications and future prospects
Essa Yacoub, PhD, CMRR, University of Minnesota

Answers for life.

welcome

Thank you for joining us in Hamburg, Germany to celebrate the Organization for Human Brain Mapping's 20th Annual Meeting! Many of you have attended this meeting over the past 20 years and can serve as testament to the tremendous growth and evolution of discoveries in the field of human brain mapping. OHBM's first meeting in Paris, France drew an attendance of 700. Today, in Hamburg, you will network with and learn alongside over 3,000 of your peers.

Eve Marder will kick off our meeting as Talairach Lecturer followed by outstanding Keynote Lectures by Katrin Amunts, Shihui Han, Hanna Damasio, James Haxby, Yaniv Assaf, Richard Frackowiak and John Duncan.

We have several suggestions to help you make the most of your Annual Meeting experience:

- Attend one of many educational courses offered on Sunday including: Advanced fMRI, Anatomy and its impact on structural and functional imaging, Introduction to Imaging Genetics, Pattern Recognition for NeuroImaging (or PR4NI), Brain Stimulation: Past, Present and Future, Electromagnetical Neuroimaging, Functional ASL: Perfusion based functional MRI using arterial spin labeling, Tools to parcellate the brain and its relation to function, A New Paradigm for Studying Drug Effects: Calibrated FMRI and Resting, MR Diffusion Imaging: Getting Your Measures Right, Neuroimaging Meta-Analysis and The Art and Pitfalls of fMRI Preprocessing.
- Learn from the scientific education offered throughout the four days of the meeting including three member-initiated symposia, one LOC symposium, oral sessions and morning workshops.
- Learn the results from this year's OHBM Hackathon and participate in the ongoing dialogue throughout the meeting. Learn more about the OHBM Hackathon.
- Engage in conversation with over 2,900 poster presenters sharing the latest research in a variety of disciplines.
- Visit with our knowledgeable exhibitors to learn about the latest products and services available for the brain mapping community.
- Take time to build new relationships during one of several networking events, including the Welcome Reception on Sunday; Club Night on Wednesday at Edelfettwerk; and poster wine/beer receptions being held on Tuesday and Thursday after programming.
- During and after the meeting, utilize OHBM resources including:
  - The Annual Meeting mobile app.
  - **The Onsite Career Resource room** where job seekers can connect with employers Onsite Career Resource.
  - **The Online Library**, which contains program presentations from this and past OHBM meetings.
  - **E-Posters**, which contain hundreds of posters that you may have missed.

Don't miss the Opening Ceremonies on Sunday, June 8th where OHBM will present its first-ever OHBM Glass Brain Award! This award was established to recognize and reward a lifetime of achievement by a gifted and talented individual using neuroimaging to discover original and influential findings to the organization of the human brain. OHBM is excited to add this prestigious award to this year's Annual Meeting and to future meetings.

We hope you find the 20th Annual Meeting of the Organization for Human Brain Mapping memorable and scientifically exciting. We thank each of you for joining us here in Hamburg and look forward to your involvement.

Sincerely,

Stephen Smith
Chair, Council

Pedro Valdes Sosa
Chair, Program Committee

Arno Villringer & Christian Buechel
Co-Chairs, Local Organizing Committee

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Sunday, June 8

EDUCATIONAL COURSES

8:00 – 17:00
Full Day Courses
Advanced fMRI Course
Hall 1

Anatomy and its impact on structural and functional imaging
Hall A

Introduction to Imaging Genetics
Hall B

Pattern Recognition for NeuroImaging (or PR4NI)
Hall C

8:00 – 12:00
Morning Courses
Brain Stimulation: Past, Present and Future
Hall D

Electromagnetical Neuroimaging
Hall E

Functional ASL: Perfusion based functional MRI using arterial spin labeling
Hall F

Tools to parcellate the brain and its relation to function
Hall 8

13:00 – 17:00
Afternoon Courses
A New Paradigm for Studying Drug Effects: Calibrated FMRI and Resting
Hall D

MR Diffusion Imaging: Getting Your Measures Right
Hall E

Neuroimaging Meta-Analysis
Hall F

The Art and Pitfalls of fMRI Preprocessing
Hall 8

17:30 – 19:00
Opening Ceremonies and Talairach Lecture
Hall 1

Eve Marder
Variability, Robustness and Compensation in Neurons and Networks

19:00 – 21:00
Welcome Reception
Hall 3, 4 and Ground Floor Foyer

Monday, June 9

8:00 – 9:15
MORNING WORKSHOPS
A brave new world? Ethical considerations for individual assessments based on advanced neuroimaging
Hall G1

Methodological Advances in Lesion Symptom Mapping
Hall 1

Cerebro-cerebellar interplay and cognition
Hall 2

The predictive power of neuroimaging
Hall G2

15 minute break

9:30 – 10:15
Keynote Lecturer: Katrin Amunts
"Towards ultra-high resolution models of the human brain"
Hall 1

10:30 – 11:45
LOC Symposium
Brain Machine Interfaces: Foundations and Perspectives
Hall 1

11:45 – 12:45
Lunch

12:45 – 14:45
Poster Session
Hall H

14:45 – 16:00
Symposium:
Intracranial Electrophysiology of Resting State Networks
Hall 1

16:15 – 17:00
Keynote Lecture: Shihui Han
"Racial in-group favoritism in emotion understanding and sharing: Neuroimaging approach"
Hall 1

15 minute break

17:15 – 18:30
Oral Sessions
O-M1: Multivariate Modelling and Machine Learning
Hall 8

O-M2: Imaging Physiology
Hall 2

O-M3: Learning and Memory
Hall G1

O-M4: Psychiatric disorders
Hall G2

O-M5: Lifespan Development
Hall 1

Tuesday, June 10

8:00 – 9:15
MORNING WORKSHOPS
Biophysics, acquisition methods and interpretation of laminar specific functional MRI
Hall 2

Is there a continued role for PET in studies of normal human cognition?
Hall G1

Computational and imaging tools for targeting non-invasive brain stimulation
Hall 1

Imaging the human brainstem in VIVO: techniques and applications
Hall G2

15 minute break

9:30 – 10:15
Keynote Lecturer: Hanna Damasio
"Visualizing Human Brain Anatomy"
Hall 1

10:30 – 11:45
Oral Sessions
O-T1: Neuroanatomy
Hall 1

O-T2: Imaging Methods
Hall 2

O-T3: Higher Cognitive Functions
Hall G1

O-T4: Genetics
Hall G2

11:45 – 12:45
Lunch

12:45 – 14:45
Poster Session
Hall H

14:45 – 16:00
Symposium:
The Many Faces of "Top-down": An Integrative Perspective
Hall 1

15 minute break

16:15 – 17:00
Keynote Lecture: James Haxby
"A common high-dimensional linear model of representational spaces in human cortex'
Hall 1

17:00 – 18:30
Poster Reception
Hall H

program-at-a-glance

Wednesday, June 11

8:00 – 9:15
MORNING WORKSHOPS
What Can We Learn from Integrating Multimodal Neuroimaging Data?
Hall G2

The hemodynamic response and neurovascular coupling: from sources to measures to models
Hall G1

Mobile Brain/Body Imaging (MoBI) — New directions in human neuroscience
Hall 2

Advances in neuroscience and clinical research using ultra-high speed fMRI
Hall 1

15 minute break

9:30 – 10:15
Keynote Lecture: Yaniv Assaf
"The Role of Neuroimaging in Redefining Neuroplasticity Beyond The Synapse "
Hall 1

15 minute break

10:30 – 11:45
Oral Sessions
O-W1: Brain Stimulation
Hall 1

O-W2: Resting-State Networks and Functional Parcellation
Hall 2

O-W3: Perception and Attention
Hall G1

O-W4: Developmental Disorders
Hall G2

11:45 – 12:45
Lunch

12:45 – 14:45
Poster Session
Hall H

14:45 – 16:00
Symposium:
Novel uses of natural viewing paradigms in EEG, fMRI and fcMRI
Hall 1

15 minute break

16:15 – 17:00
Keynote Lecture: Richard Frackowiak
"The Role of Neuroimaging in the Human Brain Project"
Hall 1

15 minute break

17:15 – 18:15
Town Hall Meeting
Hall 1

Transition Time

20:30 – 2:00
Club Night
Edelfettwerk

Thursday, June 12

8:00 – 9:15
MORNING WORKSHOPS
The Dys-Connectome: Effects of focal injury on the brain's functional organization and behavior
Hall G1

The dynamic human brain
Hall 2

Using neuroimaging to develop novel biomarkers: A case study of "big data" in Huntington's disease
Hall G2

Mapping the Human Language Network: Development, Disorder and Culture-Specific Research
Hall 1

15 minute break

9:30 – 10:15
Keynote Lecture: John Duncan
"A core brain system in assembly of cognitive episodes"
Hall 1

15 minute break

10:30 – 11:45
Oral Sessions
O-TH1: Social Neuroscience
Hall 1

O-TH2: Modeling Electrophysiology
Hall 2

O-TH3: Emotion and Motivation
Hall G1

O-TH4: Neurologic Disorders
Hall G2

11:45 – 12:45
Lunch

12:45 – 14:45
Poster Session
Hall H

14:45 – 16:00
Closing Comments and Meeting Highlights — Susan Bookheimer
Hall 1

16:00 – 17:30
Farewell Poster Reception
Hall H

general information

CONFERENCE VENUE

CCH-Congress Center Hamburg
Am Dammtor / Marseiller Str.
20355 Hamburg, Germany
Phone: +49 40 3569-0 | Fax: +49 40 3569-2183
Email: info@cch.de

All events will take place at the CCH-Congress Center Hamburg unless otherwise noted.

REGISTRATION HOURS

Main Entrance, Ground Floor
Saturday, June 7: 15:00 – 18:00
Sunday, June 8: 7:00 – 19:30
Monday, June 9: 7:30 – 17:00
Tuesday, June 10: 7:30 – 17:00
Wednesday, June 11: 7:30 – 17:00
Thursday, June 12: 7:30 – 15:00

EXHIBIT HOURS

Hall H
Monday, June 9: 8:00 – 16:00
Tuesday, June 10: 8:00 – 18:30
Wednesday, June 11: 8:00 – 16:00
Thursday, June 12: 8:00 – 17:30

WELCOME RECEPTION

Sunday, June 8, 19:00 – 21:00
Hall 3, 4 and Ground Floor Foyer
Join us for the 2014 Annual Meeting Welcome Reception. The reception will be held at the CCH-Congress Center immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 8th. **Please make sure to wear your name badge, which will serve as your ticket to the event**. Additional guest badges are $50 USD / 37 Euro.

TOWN HALL FORUM

Wednesday, June 11, 17:15 – 18:15
Hall 1
The Forum is the top source for the latest breaking news and commentary on issues impacting the neuroimaging community and your member organization. It is also an opportunity for you to voice your opinions and questions to the Council — which helps shape future agendas. **If you have never attended the Forum before, this is the year to participate!** Member input will be sought on several topical issues including the future of OHBM's Hackathon, research quality and ways to bridge regional and special interests. The new elected leadership will be announced as well as dates and venues for future Annual Meetings.

CLUB NIGHT

Wednesday, June 18, 20:30 – 2:00
Edelfettwerk is located at Schnackenburgallee 202, 22525 Hamburg, The Edelfettwerk is a unlike any other club in Hamburg, featuring 6,000 sqm of redesigned space into various bars and dance floors with plenty of outdoor space to enjoy.

There will be a DJ that will play dance music throughout the evening. The party is complimentary to registrants. Please make sure to bring your ticket to the Edelfettwerk. Additional guest tickets are $50 USD / 37 EURO and must be purchased at the conference registration desk.

SPEAKER READY ROOM

Hall 18, Ground Floor

Hours
Saturday, June 7: 15:00 – 18:00
Sunday, June 8: 7:00 – 19:30
Monday, June 9: 7:00 – 19:45
Tuesday, June 10: 7:00 – 18:00
Wednesday, June 11: 7:00 – 18:00
Thursday, June 12: 7:00 – 16:00

INTERNET CAFE AND DOCKING STATION

Ground Floor Foyer
A limited number of complimentary computer terminals and docking stations will be available. Please limit your time at a terminal to 15 minutes.

Hours
Saturday, June 7: 15:00 – 18:00
Sunday, June 8: 7:00 – 19:30
Monday, June 9: 7:30 – 17:00
Tuesday, June 10: 7:30 – 17:00
Wednesday, June 11: 7:30 – 17:00
Thursday, June 12: 7:30 – 15:00

OHBM ART EXHIBIT/SIDEWISE IN TIME

Ground Floor Foyer starting Monday, May 9th
The fourth annual art exhibit at OHBM considers the concept of time and its perception. Impossible chronologies and alternative timelines are explored by artists working with dreams, memory traces and our experience of sound and space in time. A number of collaborations between neuroscientists and artists will be featured in this multi-media show. *Sidewise in Time* is curated by Berlin-based artistic director of the Association of Neuroaesthetics, art historian and curator, Elena Agudio, is coordinated by the Neuro Bureau, and has been supported by many of you! We look forward to seeing you there.

2014 OHBM HACKATHON

Hall 6
This unique 3-day event (June 5-7, 2014) was held prior to OHBM at the legendary c-base, a decked-out collaborative art and technology space at the heart of the Berlin hacker community. In keeping with the spirit of prior neuroimaging Hackathons such as OHBM 2013 and Brainhack 2012 and 2013, participants had the opportunity to propose collaborative projects and engage in a number of open challenges. For updated information on the developing Hackathon content, and to contribute your own, check out

www.brainhack.org and visit us in the onsite collaboration room in Hall 6 on the Main Entrance Level open throughout the meeting.

MOBILE APP

The 2014 Mobile App, powered by EventLink and created by Core-Apps LLC, is a native application for smartphones (iPhone and Android), a hybrid web-based app for Blackberry, and there's also a web-based version of the application for all other web browser-enabled phones.

How to Download:
For iPhone (plus, iPod Touch & iPad) and Android phones: Visit your App Store or Android Market on your phone and search for OHBM.

For All Other Phone Types (including BlackBerry and all other web browser-enabled phones): While on your smartphone, point your mobile browser to http://m.core-apps.com/ohbm2014. From there you will be directed to download the proper version of the app for your particular device, or, on some phones, you simply bookmark the page for future reference.

ONSITE CAREER RESOURCES

Back by popular demand, OHBM has created an electronic job board where PIs can post "Positions Available" notices (under "Labs Looking for People") and trainees can post CVs (under "People Looking for Jobs"), before and during the Annual Meeting. OHBM has reserved Hall 19 at the CCH-Congress Centre Hamburg from Sunday, June 8th through Thursday, June 12th for job seekers to meet and network with job providers to gather and discuss employment opportunities.

TWITTER

Join the conversation on Twitter using the hash tag **#OHBM2014**

E-POSTERS

All poster presenters are encouraged to upload an electronic version of their poster (E-poster) as a pdf. To access E-Posters, please go to http://ww4.aievolution.com/hbm1401/.

WIRELESS CONNECTION

Sponsored by SIEMENS

Wireless connections will be available throughout the Congress Center. Connect to "OHBM wireless" and enter the password "ohbm2014".

EVALUATIONS ONLINE!

Conference evaluations will be conducted online only.
It is only through attendee's feedback that we can continue to improve the content, format, and schedule of the meeting. Your input is very important to us, and we urge you to fill out these quick surveys. **NEW: For each evaluation form you complete, you will be entered into a drawing for one of two $250 Visa cards!**

ACCME ACCREDITATION

CME CREDIT: This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through sponsorship of the Organization for Human Brain Mapping. The OHBM is accredited by the ACCME to provide continuing medical education for physicians.

The Organization for Human Brain Mapping designates this educational activity for a maximum of 29.50 PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity. **CME forms will only be available online.**

EDUCATIONAL COURSES	
Anatomy and its impact on structural and functional imaging (Full Day)	7.00
Advanced fMRI Course (Full Day)	7.00
Pattern Recognition for NeuroImaging (or PR4NI) (Full Day)	7.00
Introduction to Imaging Genetics (Full Day)	7.00
Brain Stimulation: Past, Present and Future (Half Day)	3.50
Tools to parcellate the brain and its relation to function (Half Day)	3.50
Functional ASL: Perfusion based functional MRI using arterial spin labeling (Half Day)	3.50
Neuroimaging Meta-Analysis (Half Day)	3.50
MR Diffusion Imaging: Getting Your Measures Right (Half Day)	3.50
A New Paradigm for Studying Drug Effects: Calibrated FMRI and Resting State Connectivity (Half Day)	3.50
Electromagnetical Neuroimaging (Half Day)	3.50
The Art and Pitfalls of fMRI Preprocessing (Half Day)	3.50
MAXIMUM NUMBER OF POSSIBLE CREDITS EARNED AT EDUCATIONAL COURSES	**7.00**

ANNUAL MEETING CREDITS	
Talairach Lecture	0.75
Keynote Lectures	0.75 each
Morning Workshops	1.25 each
Oral Sessions	1.25 each
Symposia	1.25 each
LOC Symposia	1.25
Meeting Highlights	1.00
Town Hall Forum	0.50
Total number of possible credits earned at Annual Meeting	**22.50**
TOTAL NUMBER OF POSSIBLE CREDITS	**29.50**

Advanced fMRI Course

Full Day Course | 8:00 – 17:00
Hall 1

Organizers

Tor Wager, *University of Colorado at Boulder, Boulder, CO*

Nikolaus Kriegeskorte, *MRC Cognition and Brain Sciences Unit, Cambridge, United Kingdom*

Functional magnetic resonance imaging (fMRI) has taken a central role in the study of human brain function. fMRI is inherently transdisciplinary, and data acquisition and analysis are constantly evolving. Thus, there is a n*eed for contin*uing education on new methods and cutting-edge neuroscientific applications of fMRI. This course addresses this need and is intended for an audience of research scientists with intermediate to advanced knowledge of fMRI techniques, who wish to extend the breadth and depth of their understanding of the current state of the art.

This year's course covers cutting-edge theory and research in a spectrum of topics critical for fMRI acquisition and analysis. This includes the physics and physiology of fMRI, best-practice statistical approaches, computational model- and pattern-based approaches to fMRI analysis, and new developments in connectivity and causal modeling.

Learning Objectives

The course is designed to develop participants' understanding of:

1. The physics and physiology underlying fMRI;
2. The potential and limitations of fMRI;
3. Statistical brain mapping techniques, including advanced analyses of connectivity, causality, and pattern information;
4. Computational modeling of brain information processing and its integration into the analysis of fMRI data.

Target Audience:

This course addresses the need for continuing education on new methods and cutting-edge neuroscientific applications of fMRI. It is intended for an audience of research scientists with intermediate to advanced knowledge of fMRI techniques, who wish to extend the breadth and depth of their understanding of the current state of the art.

COURSE SCHEDULE

8:00 – 8:30
Introduction: New developments in fMRI
Tor D. Wager, *University of Colorado, Boulder, US,*
Nikolaus Kriegeskorte, *MRC Cognition and Brain Sciences Unit, Cambridge, UK*

SECTION 1: DESIGN AND ACQUISITION

8:30 – 9:00
Imaging at high spatial and temporal resolution: Emerging directions
Lawrence Wald, PhD, *Massachusetts General Hospital/ Harvard University, Boston, United States*

9:00 – 9:30
Advances in fMRI aquisition, and how to take advantage of them
Karla L. Miller, *University Research Lecturer, Welcome Trust Career Development Fellow, Oxford Centre for Functional MRI of the Brain (FMRIB)*

9:30 – 10:00
Advances in physiological noise modeling
Rasmus Birn, *Assistant Professor, Department of Psychiatry, Department of Medical Physics, University of Wisconsin Madison*

10:00 – 10:30
Break

10:30 – 11:00
Multimodal imaging: Combining fMRI and EEG
Mark Cohen, *Professor, Department of Psychiatry and Biobehavioral Science Neurology, UCLA*

11:00 – 11:30
Experimental design for fMRI
Tom Liu, Ph.D., *Director and Professor, Center for Functional MRI, University of California San Diego*

Advanced fMRI Course, *continued*

SECTION 2: UNIVARIATE AND MULTIVARIATE ANALYSIS: PATTERNS, PREDICTION, AND DYNAMICS

11:30 – 12:10
Advances in thresholding and multiple comparisons
Tom Nichols, *Wellcome Trust Senior Research Fellow of Basic Biomedical Science, Principal Research Fellow, and Head of Neuroimaging Statistics*

12:10 – 13:30
Lunch

13:30 – 14:00
Posterior Probability Mapping
Will Penny, *Reader in imaging neuroscience*

14:00 – 14:30
Combining ICA and prediction to improve translation
Vince Calhoun, *Executive Science Officer, MRN & Distinguished Professor, UNM*

14:30 – 15:00
Modeling change points in fMRI: Activity and dynamic effective connectivity
Martin Lindquist, *Associate Professor, Department of Biostatistics, Johns Hopkins University*

15:00 – 15:30
Break

15:30 – 16:00
Pattern information analysis and human neuroscience
Dwight Kravitz, *Assistant Professor, George Washington University*

16:00 – 16:30
Fundamentals of dynamic causal modeling
Rosalyn Moran, *Assistant Professor, Virginia Tech Carilion Research Institute & Bradley Department of Electrical & Computer Engineering, Virginia Tech*

16:30 – 17:00
Dynamic causal models for prediction
Klaas Stephan, *Professor of Translational Neuromodeling, University of Zurich and ETH Zurich*

17:00 – 17:15
Wrap Up and Discussion

Anatomy and its Impact on Structural and Functional Imaging

Full Day Course | 8:00 – 17:00
Hall A

Organizers

Katrin Amunts, *Research Centre Juelich (INM-1), Juelich; Aachen, Germany*

Karl Zilles, *Research Center Jülich, Jülich, Germany*

Results of neuroimaging studies cannot be understood without knowing the anatomy of the brain, and the way how brain structure influences the interpretation of the results through interaction with image acquisition, processing and analysis. The course will provide an introduction and critical overview of classical and modern approaches for studying the anatomy of the brain using neuroimaging techniques. It is aimed at a multidisciplinary audience, and will provide an introduction to brain macroscopy, gross anatomical landmarks and its intersubject variability, the microstructural organization of the brain including cortical segregation, the representation of cognitive functions as well as brain development as assessed by MR techniques. Neuroimaging methods will be discussed with respect to their advantages, disadvantages and potential pitfalls as it concerns anatomy. The relevance of anatomical knowledge for the interpretation of structural and/or functional imaging data will be made explicit. The course will cover talks introducing anatomical concepts and developmental aspects, also showing how MRI contributes; discussing organizational principles of the brain's microstructure (cyto-, receptor- and myeloarchitecture), at thus critically reflecting the perspectives and limits of MR imaging with respect to these aspects of brain organization; and elucidating the relationship between microstructure and brain function, and providing an overview of some widely distributed neuroimaging tools in this field. Participants of the course will thus be able to interpret neuroimaging findings within the underlying anatomical framework of the brain and to critically evaluate advantages and limitations of different neuroanatomical and neuroimaging methods.

Learning Objectives

1. Understand the organizational principles of the human brain on a macroscopic and microscopic level, and their changes during development;
2. Understand the advantages and limitations of neuroanatomical techniques including receptor mapping and cytoarchitectonics;
3. Understand methods for design and analysis of structural and functional MRI data, and interpret the measures they provide and their limitations.

Target Audience

The prime target audience is researchers with an interest in understanding the relationship between brain structure and function. This includes researchers with limited previous anatomical knowledge, but prior experience with neuroimaging.

Anatomy and its Impact on Structural and Functional Imaging, *continued*

COURSE SCHEDULE

8:00 – 8:30
Surface anatomy of the brain and landmarks
Svenja Caspers, *Institute of Neuroscience and Medicine, INM-2, Research Center Julich, Julich, Germany*

8:30 – 9:00
Development of the cerebral cortex
David Van Essen, *Washington University*

9:00 – 9:30
High-throughput analysis of brain anatomy using MRI
Alan Evans, *McConnell Brain Imaging Centre, Montreal Neurological Institute, McGill University, Montreal, Quebec, Canada*

9:30 – 10:00
High resolution imaging and anatomy
Noam Harel, *University of Minnesota, Minneapolis, MN, United States*

10:00 – 10:30
Break

10:30 – 11:00
Cytoarchitecture of the human cerebral cortex
Katrin Amunts, *Research Centre Juelich (INM-1), Juelich; Aachen, Germany*

11:00 – 11:30
Receptorarchitecture and neural systems
Karl Zilles, *Research Center Jülich, Jülich, Germany*

11:30 – 12:00
Cortical diffusion MRI and validation by histology
Alard Roebroeck, *Maastricht University, Maastricht, Netherlands*

12:00 – 13:00
Lunch

13:00 – 13:30
Functional and structural architecture of the brain
Christian Beckmann, *NL Donders Institute for Brain, Cognition and Behavior Radboud University Nijmegen, Nijmegen, Netherlands*

13:30 – 14:00
Tools to combine structural MRI with cytoarchitecture and function
Simon Eickhoff, *Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Duesseldorf, Germany*

14:00 – 14:30
Functional segregation of the cortex
Bertrand Thirion, *Parietal Team, INRIA Saclay – Île-de-France, Saclay, France*

14:30 – 15:00
Anatomical conditions and MR-morphometry
Christian Gaser, *Jena University Hospital, Departments of Psychiatry and Neurology, Jena Germany*

15:00 – 15:30
Break

15:30 – 16:00
Anatomical background of dynamic causal modelling and connectivity
Jakob Heinzle, *Translational Neuromodelling Unit, University Zurich & ETH Zurich, Zurich, Switzerland*

16:00 – 17:00
Questions and Discussion

Introduction to Imaging Genetics

Full Day Course | 8:00 – 17:00
Hall B

Organizers

Jason Stein, *University of California, Los Angeles*

Jean-Baptiste Poline, *CEA, Neurospin, Gif-sur-Yvette, France*

Thomas Nichols, *University of Warwick, Dept. of Statistics, Coventry, United Kingdom*

This course will introduce the fundamentals of "Imaging Genetics," the process of modeling and understanding how genetic variation influences the structure and function of the human brain as measured through brain imaging. The course begins with two lectures on the fundamentals of genetics, including the types of variation observed in the human, the mechanism by which that variation develops, and understanding how to relate genetic variation to a measured phenotype. We will then delve more into applications of genetics to neuroimaging phenotypes with an overview of imaging phenotypes and an introduction to both uni and multi-variate statistics for their analysis. Finally, we will explore how to combine datasets using meta-analysis. In the afternoon, we will have practical lectures introducing how to use software for analysis of heritability of imaging traits, association of common and rare variants to imaging traits, and meta-analysis across many sites. In addition, we will have a lecture on how to interpret the significance of genetic findings. Overall this course will provide the neuroimager who is not familiar with genetics techniques both theoretical and practical understanding of the genetics field when exploring neuroimaging phenotypes.

Learning Objectives

1. Understand the fundamentals of the molecular basis of genetic variation, and how that variation is modeled in traditional genetics studies.
2. Understand the difference between linkage, association and heritability analyses.
3. Understand the relative strengths & weaknesses of each different type of brain imaging phenotype used to find genetic association.

Target Audience

The course is designed for neuroimaging practitioners who do not necessarily have a background in genetics.

COURSE SCHEDULE

8:00 – 8:30
Molecular Basis of Genetic Variation and Structure and Analysis of Genetic Variation
Sven Cichon, *Research Center Jülich, Jülich, Germany*

8:30 – 9:00
Quantitative Traits: Heritability, Linkage & Association
Elliot Hong, *Department of Psychiatry, University of Maryland School of Medicine, Baltimore, MD, United States*

9:00 – 9:30
Neuroimaging Phenotypes & Endophenotypes
Roberto Toro, *CNRS URA 2182 'Genes, synapses and cognition', Paris, France*

9:30 – 10:00
Univariate & Multivariate Approaches to Understand Imaging & Genetic Data
Vince Calhoun, *University of New Mexico, Albuquerque, New Mexico, United States*

10:00 – 10:30
Break

10:30 – 11:00
Imputation & Meta-analysis
Thomas Nichols, *University of Warwick, Dept. of Statistics, Coventry, United Kingdom*

11:00 – 11:30
Reproducibility of Imaging Genetics Findings
Jean-Baptiste Poline, *Helen Wills Neuroscience Institute, University of California at Berkeley, United States*

11:30 – 12:00
Practical Heritability
Peter Kochunov, *Maryland Psychiatric Research Center, Baltimore, United States*

12:00 – 13:00
Lunch

13:00 – 13:30
Searching for Common Variants
Derrek Hibar, *University of Southern California, Los Angeles, CA, United States*

13:30 – 14:00
Practical Meta-analysis
Sarah Medland, *Queensland Institute of Medical Research, Brisbane, Australia*

14:00 – 14:30
Break

14:30 – 15:00
Searching for Rare Variants
Kwangsik Nho, PhD, *Indiana University, Indianapolis, IN, United States*

15:00 – 15:30
Interpretation of Results
Jason Stein, *University of California, Los Angeles, Los Angeles, California, United States*

15:30 – 17:00
Questions and Discussion

Pattern Recognition for NeuroImaging (or PR4NI)

Full Day Course | 8:00 – 17:00
Hall C

Organizers

Christophe Phillips, Ir, Phd, *Cyclotron Research Centre, University of Liege, Sart Tilman, Liege, Belgium*

Janaina Mourão-Miranda, *University College London, London, United Kingdom*

The application of pattern recognition techniques to neuroimaging data has increased substantially in the last years leading to a large body of publications. Pattern recognition approaches consist of a whole family of tools coming from the "machine learning" community (at the border of statistics and engineering), which have been adapted to investigate neuroscience questions. Depending on the research question asked, experimental design and imaging modality, it is important that the experimenter knows which tools to use and how to draw reliable conclusions.

The course will focus on subject and/or patient classification (for cognitive and clinical applications) but also on regression issues. The usual functional and structural MRI modalities will be covered but the presentations will also consider other types of data such as PET, EEG/MEG and network metrics. Model validation and statistical inference are particularly crucial as these notions somewhat differ from the standard univariate statistics usually applied to analyse neuroimaging data (e.g. General Linear Model) and should thus be specifically addressed. After introducing the theoretical foundations of pattern recognition in neuroimaging, the remaining talks will introduce more advanced methodological points as illustrated by specific applications and/or modalities.

At the end of the course, the neuroscientist should have a global understanding of pattern recognition approaches, how to apply these tools to his/her own data to address new questions and how to interpret the outcomes of these analyses and draw reliable conclusions.

Learning Objectives

The course is organized such that the participant acquire knowledge about

1. The various pattern recognition tools available,
2. The "dos and don'ts" of the technique in neuroimaging, and
3. The application of these methods to their own data.

Target Audience

Research scientists with intermediate to advanced knowledge of standard neuroimaging analysis techniques, who wish to learn how to apply pattern recognition methods to their data.

COURSE SCHEDULE

8:00 – 8:10
Introduction to the Pattern Recognition for NeuroImaging (or PR4NI)
Christophe Phillips and Janaina Mourão-Miranda

8:10 – 8:45
Pattern recognition in neuroimaging: principles & tools
Janaina Mourão-Miranda, *University College London, London, United Kingdom*

8:45 – 9:20
Validation & inference
Georg Langs, *Medical University of Vienna, Vienna, Austria*

9:20 – 9:55
Interpreting predictive models in terms of anatomically labelled regions
Jessica Schrouff, *Stanford University, Stanford, CA, United States*

9:55 – 10:00
Questions and Discussion

10:00 – 10:30
Break

10:30 – 11:05
Multivariate models of inter-subject anatomical variability
John Ashburner, *Wellcome Trust Centre for Neuroimaging, London, United Kingdom*

11:05 – 11:40
Spatial Regularization & sparsity for brain mapping.
Bertrand Thirion, *Parietal Team, INRIA Saclay – Île-de-France, Saclay, France*

11:40 – 12:00
Questions and Discussion

12:00 – 13:00
Lunch

13:00 – 13:35
Decoding of conceptual representations
Marcel van Gerven, *Donders Institute for Brain, Cognition and Behaviour, Nijmegen, Netherlands*

Pattern Recognition for NeuroImaging (or PR4NI)

COURSE SCHEDULE, *continued*

13:35 – 14:10
Decoding and predicting intentions
John-Dylan Haynes, *BCCN, Berlin, Berlin, Germany*

14:10 – 14:45
PET based classification for clinical diagnosis
Christophe Phillips, Ir, Phd, *Cyclotron Research Centre, University of Liege, Cyclotron Research Centre, Sart Tilman, Liege, Belgium*

14:45 – 15:00
Questions and Discussion

15:00 – 15:30
Break

15:30 – 16:05
Network based predictive models
Maria Rosa, *King's College London, London, United Kingdom*

16:05 – 16:40
M/EEG classification and brain computer interfacing
Moritz Grosse-Wentrup, *Max Planck Institue for Intelligent Systems, Tübingen, Germany*

16:40 – 17:00
Questions and Discussion

Brain Stimulation: Past, Present and Future

Half Day Course | 8:00 – 12:00
Hall D

Organizer

Vince Clark, *University of New Mexico, Albuquerque, NM*

Every few years a new technology comes along that energizes the human brain mapping community: MEG, PET, and fMRI are some examples. The number of published studies using brain stimulation has increased dramatically, and this is likely to become a mainstay of cognitive neuroscience. Similar in many respects to the early days of fMRI and other technologies, this excitement and explosion in the use of stimulation will likely lead to many exciting new findings, but also to the potential for mistakes, misstatements, and ultimately to poor science, which will inevitably lead to a loss of trust in a potentially very useful set of technologies. Education is key, both for training scientists in the proper use of these technologies, but also for keeping them grounded in terms of knowing and respecting the limitations of these methods. Many OHBM members are interested in brain stimulation but have not yet tried it due to lack of knowledge, or have tried it but would like to learn more regarding what technologies are available, how to set up a laboratory to perform stimulation studies, and so on. Presenting this as a full day educational course will help to remedy some of these issues, by describing the technologies, their proper use, and examples of how to apply them to questions important to the OHBM community.

Lectures will begin with an overall introduction (Clark), overviews of basic technologies (Nitsche-tDCS/TES, Luber-TMS, Fried-DBS), modelling and imaging of the brain effects of stimulation (Parra-Modelling, Strafella-TMS/PET, Antal-tDCS/fMRI, Stagg-tDCS/MRS/DTI) and examples of brain stimulation and imaging applied to controls and specific patient groups (Priori, Flöel).

Learning Objectives

1. Understand what technologies are available for brain stimulation and the basic physics and physiology of brain stimulation action on the nervous system;
2. Know the basic equipment required to do brain stimulation and the proper use of these technologies for clinical, research and neuroenhancement applications;
3. Be aware of the ways in which brain stimulation can be used as a mapping modality, including physiological probe and facilitator, inhibitor, and blocker of regional activity.

Target Audience

The target audience will be those interested in learning about the technology, methods and applications of brain stimulation, and could range from novice students to experienced researchers.

Brain Stimulation: Past, Present and Future, *continued*

COURSE SCHEDULE

8:00 – 8:10
Introduction to Brain Stimulation: Past, Present and Future
Vince Clark, *University of New Mexico, Albuquerque, NM*

8:10 – 9:05
Overviews of basic technologies
tDCS/TES — Michael Nitsche, *Clinical Neurophysiology, Goettingen, Germany*

TMS — Bruce Luber, *Duke, Durham, NC, USA*

DBS — Itzhak Fried, *Tel Aviv Sourasky Medical Center, Tel Aviv, Israel*

9:05 – 10:00
Modelling and imaging of the brain effects of stimulation
Modelling — Lucas Parra, *City College of New York, CUNY, New York, NY*

TMS / PET — Antonio Strafella, *University of Toronto, Toronto, Canada*

tDCS / fMRI — Andrea Antal, *Georg-August Universität, Göttingen, Germany*

tDCS / MRS / DTI — Charlotte Stagg, *University of Oxford, Oxford, United Kingdom*

10:00 – 10:30
Break

10:30 – 11:30
Examples of brain stimulation and imaging applied to controls and specific patient groups
Alberto Priori, *University of Milan, Milan, Italy*
Agnes Flöel, *Charite Universitätsmedizin Berlin, Berlin, Germany*

11:30 – 12:00
Questions and Discussion

Electromagnetical Neuroimaging

Half Day Course | 8:00 – 12:00
Hall E

Organizers

Thomas Koenig, *University Hospital of Psychiatry, University of Bern, Bern, Switzerland*

Petra Ritter, *Max Planck Institute for Human Cognitive and Brain Sciences & Dept. Neurology Charité, Berlin, Germany*

Neuroimaging is becoming increasingly multimodal, and the integration of hemodynamic, electromagnetic, structural and behavioral data is offering insights unavailable to a single method alone. For conclusions to converge across modalities, the analysis strategies must however contain sufficient conceptual and statistical vigor. Aim of this educational course is to give a critical introduction to the available concepts and methods to analyze multichannel electromagnetic data recorded from the human scalp in an unambiguous and coherent way. Particular care is given to present methods that offer explicit junctions to other imaging modalities, allowing converging and/or complementary conclusions and translational research.

Learning Objectives

1. Understand the basic rationale of neuroimaging based on brain-electromagnetic data.
2. Understand the possibilities and caveats of combining EEG and fMRI.
3. Have an overview of the possibility of multimodal, multicenter studies allowing translational research.

Target Audience

Neuroscientists, psychologists, physicians, physicists and other researchers interested in learning state of the art strategies to analyse brain electromagnetic data in a way that allows a meaningful integration into results obtained with other imaging modalities.

Electromagnetical Neuroimaging, *continued*

COURSE SCHEDULE

8:00 – 8:30
Basics of electromagnetic field mapping
Thomas Koenig, *University of Bern, Switzerland*

8:30 – 9:00
Understanding baselines
Daniel Brandeis, *University of Zurich, Switzerland & CIMH University of Mannheim /Heidelberg, Germany*

9:00 – 9:30
A framework for collective multimodal reverse engineering the brain
Petra Ritter, *Charité & Bernstein Center for Computational Neuroscience, Berlin, Germany*

9:30 – 10:00
Scalp field dynamics in health and disease
Christoph Michel, *University of Geneva, Switzerland*

10:00 – 10:30
Break

10:30 – 11:00
Source analysis and multimodal integration
Bin He, *University of Minnesota, USA*

11:00 – 11:30
The physiological basis of multimodal integration in a clinical context
Christian Bénar, *Institut National de la Santé et de la Recherche Médicale, Marseille, France*

11:30 – 12:00
Connectivity in source space
Guido Nolte, *University Medical Center Hamburg-Eppendorf, Germany*

Functional ASL: Perfusion Based Functional MRI Using Arterial Spin Labeling

Half Day Course | 8:00 – 12:00
Hall F

Organizer

Luis Hernandez-Garcia, *University of Michigan, Ann Arbor, United States*

ASL techniques have been around for over twenty years but have not been widely adopted by the community because of the technical challenges they pose. Additionally, the community of ASL users was largely fragmented until recently because of the many variants of the technique, which created a great deal of confusion among those investigators trying to adopt ASL. While the field has ample experience and expertise with BOLD imaging, ASL is still in the fringes of the community although it is rapidly gaining popularity.

Fortunately, recent developments in ASL acquisition and processing schemes as well as greater consensus in the community have greatly overcome those challenges, putting ASL in a position to be a very powerful tool for mapping human brain function.

Given these circumstances, this is the right time to offer the community a short course that covers all the key aspects of ASL techniques, from labeling and acquisition schemes to pre-processing and quantification.

It is our hope to provide the audience of this course the theoretical foundation of the technique as well as a set of tools and guidelines for collecting and analyzing ASL data.

Learning Objectives

1. To understand the physics and physiology of arterial spin labeling (ASL).
2. To understand the statistical analysis tools necessary to detect and quantify brain activity using ASL.
3. To understand what sort of studies are best and worst suited for ASL imaging.

Target Audience

The target audience is composed of neuroscientists and psychologists with an interest in using perfusion as a marker for brain activity.

The target audience also includes statisticians and engineers with an interest in developing and implementing ASL acquisition and processing schemes.

Functional ASL: Perfusion Based Functional MRI Using Arterial Spin Labeling, *continued*

COURSE SCHEDULE

8:00 – 8:30
The basics of arterial spin labeling
Matthias Gunther, *Institute for Medical Image Computing, Bremen, Germany*

8:30 – 9:00
Modeling and Quantification
David Thomas, *University College London, London, United Kingdom*

9:00 – 9:30
Blood flow, blood Volume, oxygen consumption and the BOLD effect
Alberto Vazquez, Ph.D., *University of Pittsburgh, Radiology and Bioengineering, Pittsburgh, PA, United States*

9:30 – 10:00
Statistical Analysis of functional ASL images
Daniel Rowe, *Marquette University, Milwaukee, WI, United States*

10:00 – 10:30
Break

10:30 – 11:00
Artefacts and pre-processing in ASL
Gregory Lee, PhD, *Cincinnati Children's Hospital Medical Center*, *Cincinnati, OH, United States*

11:00 – 11:30
Applications of ASL in neuroscience
Luis Hernández-García, *University of Michigan, Ann Arbor, MI, United States*

11:30 – 12:00
How can I use ASL? An interactive panel discussion
Laura Parkes, Dr, *Imaging Sciences, School of Cancer and Enabling Sciences, The University of Manchester, Manchester, United Kingdom*

Tools to Parcellate the Brain and its Relation to Function

Half Day Course | 8:00 – 12:00
Hall 8

Organizers

Michel Thiebaut de Schotten, *Institute of Brain and Spine, Paris, France*

Marco Catani, *Institute of Psychiatry — King's College London, London, United Kingdom*

Over the past century and an half, human brain mapping consisted in pinning small functionally responsive areas within the brain. However the real extent of these areas and their eventual overlap remains unknown.

The challenge now facing neuroscience is to define boundaries for functionally responsive areas at the group and the individual level. Many approaches parcellating the brain in areas with different features became recently available including post-mortem and in vivo architectonics, tractography-based connectivity, functional coactivation, and resting state functional connectivity. However, what these methods really measure and which conclusion can be drawn, are not yet fully clear to the scientific community.

This course addresses this need and is intended for a large audience of research scientist (e.g. from beginner to advanced level).

Learning Objectives

Having completed this course, participants will be able to
1. Understand the rationale and the difference between the different methods for brain parcellation.
2. Understand the advantage and the limitation between the different methods for brain parcellation.
3. Give examples of approaches to parcellate the brain
4. Choose the appropriate method to fulfill a research project objective.

Target Audience

The prime target audience is researcher with an interest with the relation between new brain subdivision results and functional specialization of the brain. This includes researchers with limited knowledge in neuroimaging. Background will be provided for those without experience in methods for brain parcellation but some parts of the talks will also address advanced methodological issues that would be of interest to people with more experience.

Tools to Parcellate the Brain and its Relation to Function, *continued*

COURSE SCHEDULE

8:00 – 8:10
Introduction to Tools to parcellate the brain and its relation to function
Michel Thiebaut de Schotten and Marco Catani

8:10 – 8:45
PART I Parcellate the brain using anatomical features: Histological and neurochemical architecture
Simon Eickhoff, *Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Duesseldorf, Germany*

8:45 – 9:20
PART I Parcellate the brain using anatomical features: Myelin mapping in vivo
Matthew Glasser, *Washington University in St. Louis, Anatomy and Neurobiology, St. Louis, MO, United States*

9:20 – 9:55
PART I Parcellate the brain using anatomical features: Tractography based subdivision
Michel Thiebaut de Schotten, *Institute of Psychiatry, London, United Kingdom*

9:55 – 10:00
Questions and Discussion

10:00 – 10:30
Break

10:30 – 11:05
PART II Parcellate the brain using functional features: Functional MRI coactivation parcellation
Danilo Bzdok, *Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Dusseldorf, Germany*

11:05 – 11:40
PART II Parcellate the brain using functional features: Resting state functional connectivity subdivision
Carl Hacker, *Washington University School of Medicine, St. Louis, MO, United States*

11:40 – 12:00
Questions and Discussion

A New Paradigm for Studying Drug Effects: Calibrated FMRI and Resting State Connectivity

Half Day Course | 13:00 – 17:00
Hall D

Organizer

Lisa Nickerson, *McLean Hospital & Harvard Medical School, Belmont, United States*

While BOLD FMRI has revolutionized the study of in vivo human brain function, BOLD contrast during task performance arises from a complex interplay of changes in cerebral blood flow (CBF), cerebral blood volume (CBV), and blood oxygenation, and thus remains largely qualitative. While adequate for studying task-related FMRI signal changes in healthy subjects, this is an oft-overlooked serious limitation to the use of BOLD FMRI for studying acute drug effects. This limitation also renders BOLD FMRI of limited use for understanding disease effects because disease-related changes in cerebrovascular function confound measurements of disease-related changes in neural function. Calibrated FMRI attempts to disentangle changes in oxygen metabolism that are closely related to neural activity from these other effects and thus shows great promise for these applications. Independently, the use of FMRI to study endogenous brain activity, termed resting state FMRI, has exploded over the last few years and has been established as a robust approach for probing the functional connectivity of large-scale brain networks that are "active" both at rest and during task performance. Combining a resting state approach with calibrated FMRI to study alterations in brain function associated with pharmacologic manipulations would take advantage of the best qualities of both techniques for studying drug effects, namely the quantitative aspects of calibrated FMRI and the mathematical methods and simple study design (e.g., no task per se, but with a drug on board) used to probe large-scale networks of resting state FMRI. This course focuses on presenting the fundamentals of calibrated FMRI, applying this technique to assess resting state functional connectivity, and finally bringing these two techniques together to study the pharmacologic actions of drugs.

Learning Objectives

1. Understand the challenges of pharmacologic FMRI using BOLD and why a calibrated FMRI approach is advantageous.
2. Understand the basics of calibrated FMRI, including study design, pulse sequences needed, analysis and modeling, and related issues including dealing with artifacts and noise.
3. Understand how to use the calibrated FMRI approach to probe functional connectivity of large-scale brain networks and the as yet unresolved issues with this approach.
4. Gain insight into the application of resting state calibrated FMRI to investigate acute drug effects through examination of a real study.

A New Paradigm for Studying Drug Effects: Calibrated FMRI and Resting State Connectivity, *continued*

Target Audience
This course is intended for research scientists with an interest in utilizing quantitative FMRI methods to investigate the functional connectivity of large-scale brain networks and for researchers with an interest in using FMRI to study acute drug effects, e.g. pharmacologic FMRI.

COURSE SCHEDULE
13:00 – 13:25
Pharmacologic FMRI and Methodological Concerns
Richard Wise, *Cardiff University Brain Research Imaging Centre, Cardiff, United Kingdom*

13:25 – 13:50
Overview of Calibrated FMRI
Richard Hoge, *Université de Montréal, Montréal, Canada*

13:50 – 14:15
Modeling and What We Have Learned About Calibrated FMRI From Studying Caffeine
Valerie Griffeth, Ph.D., *University of California, San Diego, CA, United States*

14:15 – 14:40
How to Map Functional Connectivity Based on Synchronized CMRO2 Fluctuations During the Resting State
Yihong Yang, *Neuroimaging Research Branch, National Institute on Drug Abuse, National Institutes of Health, Baltimore, United States*

14:40 – 15:05
Neurovascular Factors in Resting State FMRI
Thomas Liu, *University of California, San Diego, CA, United States*

15:05 – 15:35
Break

15:35 – 16:00
Physiological Noise in Resting State Pharmacologic FMRI
Najmeh Khalili Mahani, *Leiden University, Netherlands*

16:00 – 16:25
Pulling it all Together: Resting State Pharmacologic Calibrated FMRI Study of Alcohol and Nicotine
Lisa Nickerson, *McLean Hospital Harvard Medical School, Belmont, United States*

16:25 – 16:50
Future Directions
Richard Buxton, *University of California, San Diego, CA, United States*

16:50 – 17:00
Questions and Discussion

MR Diffusion Imaging: Getting Your Measures Right

Half Day Course | 13:00 – 17:00
Hall E

Organizer
Flavio Dell'Acqua, Dr., *King's College London — Institute of Psychiatry, London, United Kingdom*

Diffusion Imaging is a very fast evolving neuroimaging field and today there are several advanced methods or complex analyses that can be performed using diffusion imaging data. But how can we get the best data for our study? How can we check if data is actually good or that we have chosen the right pre-processing and processing methods for our study? Sometimes, one of the problem faced by researchers coming from different fields or also students starting a PhD, is to start to use advanced methods and complex "high-level" analyses while still relying on poor acquisitions, simplified pre-processing or not adequate diffusion models. The aim of this educational course is to offer a practical overview about optimal strategies available today for both acquisition and processing of diffusion imaging data.

By following an ideal diffusion imaging pipeline, 5 lectures will review the current state of the art of diffusion imaging methods and the possible pitfalls and limitations that need to be taken in account before getting to the final results.

Learning Objectives
1. To learn the optimal acquisition strategies available today for diffusion imaging and how to pre-process and quality control diffusion data.
2. To learn which diffusion models and tractography methods are available and can be applied in neuroimaging and neuroscience research.
3. To understand what are the main limitations today for diffusion imaging and the risks behind each step of the diffusion pipeline.

Target Audience
The target audience for this course is the broad neuroscience and neuroimaging community either with technical or clinical background, interested to learn and apply diffusion imaging in research. This course will offer a good opportunity for students and researchers new to this field to learn the basics of diffusion imaging and will also provide practical guidelines how to directly start to work with diffusion imaging data.

MR Diffusion Imaging: Getting Your Measures Right, *continued*

COURSE SCHEDULE

13:00 – 13:30
Introduction to MR Diffusion Imaging: Getting Your Measures Right
Flavio Dell'Acqua, Dr.

13:30 – 14:00
Diffusion MRI data acquisition
Karla Miller, *University of Oxford, Oxford, United Kingdom*

14:00 – 14:30
Data Processing and Quality Control of DTI data
Alexander Leemans, *University Medical Center Utrecht, Utrecht, Netherlands*

14:30 – 15:00
Diffusion Imaging Models 1: from DTI to HARDI models
Flavio Dell'Acqua, Dr., *King's College London — Institute of Psychiatry, Neuroimaging, London, United Kingdom*

15:00 – 15:30
Break

15:30 – 16:00
Diffusion Imaging Models 2: from DTI to microstructure quantification
Gary Zhang, PhD, *University College of London, London, United Kingdom*

16:00 – 16:30
Diffusion Tractography
Maxime Descoteaux, *Université de Sherbrooke, Sherbrooke, Québec, Canada*

16:30 – 17:00
Questions and Discussion

Neuroimaging Meta-Analysis

Half Day Course | 13:00 – 17:00
Hall F

Organizers

Simon Eickhoff, *Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Duesseldorf, Germany*

Thomas Nichols, *University of Warwick, Dept. of Statistics, Coventry, United Kingdom*

Functional neuroimaging has provided a wealth of information on the cerebral localization of mental functions. In spite of its success, however, several limitations restrict the amount of knowledge that may be gained from each individual experiment. These include a usually rather small sample size, limited reliability of an indirect signal like BOLD fMRI and the need to base inference on relative contrasts between conditions.

Learning Objectives

Having completed this course, participants will better understand:

1. The conceptual and technical foundations of neuroimaging meta-analyses.
2. The main software tools and resources available to the community.
3. Methods for data-mining and the meta-analytic investigation of brain networks.
3. The potential contribution of these approaches to understand brain organization.

Target audience

Imaging researchers interested in databases, meta-analyses and functional atlasing of the brain as well as cognitive psychologists who wish to learn about emerging computational approaches to understanding mental functions. While some background in neuroimaging will be helpful, this course does introduce all basic concepts and approaches and focus on providing instructive examples on how to conduct actual meta-analyses.

COURSE SCHEDULE

13:00 – 13:10
Overview: Foundations and potential of meta-analyses
Peter Fox, *Research Imaging Institute, San Antonio, TX, United States*

13:10 – 13:40
How to plan and prepare a meta-analysis
Claudia Rottschy, *Department of Neurology, University Hospital Aachen*

13:40 – 14:05
Overview on Meta-Analysis methods
Tom Nichols, *University of Warwick, Dept. of Statistics, Coventry, United Kingdom*

Neuroimaging Meta-Analysis

COURSE SCHEDULE, *continued*

14:05 – 14:30
ALE and BrainMap
Angela Laird, *Florida International University, Miami, FL, USA*

14:30 – 15:00
MKDA and Neurosynth
Tor Wager, *Department of Psychology and Neuroscience, University of Colorado at Boulder, Boulder, CO, USA*

15:00 – 15:30
Break

15:30 – 15:55
Co-activation mapping and parcellation
Simon Eickhoff, *Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Duesseldorf, Germany*

15:55 – 16:20
Sources of whole-brain image data for mega-analyses
Jessica Turner, *Georgia State University, Atlanta, GA, USA*

16:20 – 16:45
Inferring mental states from imaging data: OpenfMRI and the Cognitive Atlas
Russ Poldrack, *UT Austin, Austin, TX, USA*

16:45 – 17:00
Questions and Discussion

The Art and Pitfalls of fMRI Preprocessing

Half Day Course | 13:00 – 17:00
Hall 8

Organizers

Qolamreza Razlighi, *Columbia University, New York, United States*

Christian Habeck, *Columbia University, New York, NY*

Awareness of the critical importance of fMRI pre-processing is increasing for both task-based and especially resting-state fMRI research. Most resting-state studies address questions of functional connectivity, i.e. target the correlation of brain activity in one area with activity in a different brain area. This means that regressors used in first-level linear models of resting-state fMRI come from the brain itself, rather than from externally generated task designs that are unaffected by acquisition artifacts or pre-processing steps in task-based fMRI. In contrast to task-based fMRI, independent and dependent variables are thus both affected by artifacts and pre-processing steps, and there is a greater chance of artificially induced functional connectivity than task-based activation. It follows further that those common pre-processing pipelines which have gained acceptance in task-based fMRI practices should not necessarily be carried over to resting-state studies of functional connectivity. After attending our proposed educational course the audience should have gained a thorough understanding (1) of the kinds of artifacts are affecting the hemodynamic signal recorded in fMRI scanners and (2) of the state-of-the-art tools to counteract these artifacts. Beyond these initial learning objectives, course attendees should have gained awareness of the problem of pipeline dependence and the ability to follow, and possibly engage in, methodological research that aims at pipeline optimization using real-world as well as simulated data.

Learning Objectives

Concrete learning objectives we hope to achieve for the audience will include, but not be limited to:

1. an understanding of the kinds of artifacts that affect the recorded fMRI signal and current state-of-the-art algorithms, and their software implementations, to correct these artifacts;
2. an appreciation of the interaction of different processing modules, possible ordering effects, and the need for an optimization of the pre-processing pipeline as a whole;
3. the ability to follow, and possibly initiate, methodological investigations that deal with the assessment and optimization of pipeline dependence in task-based and resting-state fMRI, using both real-world and simulated data.

Educational Courses

The Art and Pitfalls of fMRI Preprocessing, *continued*

Target Audience

The target audience of the course will primarily consist of the fMRI data analysts who are faced with the need for pre-processing before embarking on group-level analysis to answer substantive research questions of basic and diagnostic neuroscience. We hope to attract both novices, who are just becoming familiar with fMRI data analysis, as well as more seasoned practitioners who already have experience with standard pre-processing implementations in common software packages (i.e. FSL, SPM).

COURSE SCHEDULE

13:00 – 13:30
Introductory remarks: the problem of pre-processing pipeline dependence for task-based and resting-state fMRI
Christian Habeck, *Columbia University, New York, NY, United States*

13:30 – 14:00
Temporal Preprocessing (slice-timing, temporal filtering, spike removal)
Blaise Frederick, *McLean Hospital, Belmont, MA, United States*

14:00 – 14:30
Spatial Preprocessing (Spatial Alignment, Normalization, and Smoothing)
Qolamreza Razlighi, *Columbia University, New York, United States*

14:30 – 15:00
Interaction of Preprocessing Steps
Nathan Churchill, *University of Toronto*

15:00 – 15:30
Break

15:30 – 16:00
Artefact Removal (motion-related)
Christian Windischberger, *MR Center, Medical University of Vienna, Vienna, Austria*

16:00 – 16:30
Artefact Removal (Physiological)
Rasmus Birn, *University of Wisconsin-Madison, Madison, WI, United States*

16:30 – 17:00
Data-driven Structured Noise Removal (FIX)
Ludovica Griffanti, *Oxford University FMRIB Centre, Oxford, United Kingdom*

SUNDAY, JUNE 8
EVENING EVENTS

17:30 – 19:00
HALL 1

Opening Ceremonies

Please join us for the OHBM Scientific Program Opening Ceremonies. OHBM will present their first Annual Glass Brain Award. The Wiley Young Investigator Award and Elsevier's "Editor's Choice Awards" will also be presented.

Talairach Lecture: Variability, Robustness and Compensation in Neurons and Networks
Eve Marder, Ph.D, *Brandeis University, Waltham, MA, USA*

Theoretical and experimental work demonstrates that similar circuit outputs can be produced with highly variable circuit parameters. This work argues that the nervous system of each healthy individual has found a set of different solutions that give "good enough" circuit performance.

19:00 – 21:00

Welcome Reception

CCH-CONGRESS CENTER HAMBURG
HALL 3, 4 AND GROUND FLOOR FOYER

Join us for the 2014 Annual Meeting Welcome Reception. The reception will be held at the CCH-Congress Center Hamburg immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 8th. Please make sure to wear your badge as that will serve as your ticket to the event. Additional guest badges are $50 USD / 37 EURO.

Morning Workshop
A Brave New World? Ethical considerations for individual assessments based on advanced neuroimaging

8:00 – 9:15
Hall G1

Organizer
Karen Davis, *Toronto Western Hospital University of Toronto, Toronto, Canada*

The last few years has seen tremendous advances in technical and computational approaches, such as machine learning and multivariate pattern analysis, that are now being used decode and predict cognitions, based on neuroimaging data. These approaches, coupled with the development of "big data" efforts, are also being used to identify brain biomarkers of disease and their risk factor/vulnerabilities, as well as individual traits. However, the validity of individual evaluations are critically dependence on the sensitivity and specificity of the neuroimaging task and study design, numerous technical and statistical criteria, and must avoid common flaws such as reverse inference that lead to misinterpretations. This symposium will provide an overview of these developments and discuss the ethical, societal, and privacy implications of a "Brave New World" in which brain imaging could identify individual characteristics, predict future behaviour and disease. The desired learning outcomes include gaining an understanding of:

1. New neuroimaging approaches (machine learning, multivariate pattern analysis, etc.), that can decode and predict cognitions, and identify disease biomarkers.
2. Reverse inference logic that can lead to misinterpretations, but can be avoided with careful study designs.
3. Technical and biological limitations of vascular-based (e.g., fMRI) and electrical/magnetic-based (EEG, MEG) technologies at the individual subject level.
4. Neuroethical implications of neuroimaging-based diagnostic biomarkers and prediction of risk/vulnerabilities in individuals.

Learning Objectives
1. To understand how new neuroimaging approaches (machine learning, multivariate pattern analysis, etc.), can decode and predict cognitions, and identify disease biomarkers.
2. To understand technical and practical limitations of neuroimaging at the individual level based on spatial, temporal, statistical, and study design (e.g., reverse inference).
3. To consider the neuroethical implications of neuroimaging-based diagnostic biomarkers and prediction of risk/vulnerabilities in individuals.

Neural mind-reading: Promises and limitations
Yukiyasu Kamitani, *ATR Computational Neuroscience Laboratories, Kyoto, Japan*

Brain decoding to predict pain: truths and myths
Giandominico Iannetti, *UCL, London, UK*

Ethical considerations for research imaging: maintaining privacy, autonomy and the management of unexpected finding
Paul Matthews, *Division of Brain Sciences, Imperial College London, London, UK*

A need for an ethical framework in which to consider biological, neurophysiological and technical factors that impact sensitivity and specificy of neuroimaging in individual subjects
Karen Davis, *Toronto Western Hospital, Toronto, Canada*

Morning Workshop
Methodological Advances in Lesion Symptom Mapping

8:00 – 9:15
Hall 1

Organizer
Jan Gläscher, *University Medical Center Hamburg-Eppendorf, Hamburg, Germany*

The analysis of behavioral deficits in lesion patients is arguably the root of cognitive neuroscience and all brain imaging efforts. Single case studies like H.M., Phineas Gage, and Paul Broca's "Monsieur Tan" have critically shaped initial theories about human cognition and remain highly influential today. Most lesion mapping studies of the 20th century compared neuropsychological performance of relative small samples of controls and patients with rather coarse anatomical precision. The advent of voxel-based lesion symptom mapping (VLSM) ten years ago (Bates et al., 2003) revolutionized the field by bringing mass-univariate statistical analysis to lesion symptom mapping akin to standard analysis techniques for functional brain imaging.
As a results VLSM has become the de facto standard for large-scale studies on lesion symptom mapping.
This symposium will take a look at the future of lesion symptom mapping beyond VLSM and present cutting-edge methods that will revolutionize the field once again. Speakers will present studies that (a) employ Bayesian approaches to lesion symptom mapping, (b) utilize graph theory for modeling brain connectivity in patients, (c) make use of multivariate decoding techniques for analyzing lesion-induced behavioral impairments, and (d) combine computational modeling with lesion mapping to identify neural signatures of cognitive models. We believe that these modern analysis techniques will reshape lesion symptom mapping and lay the foundation for a computational neuropsychology.

Learning Objectives

1. Learn about the lesion symptom mapping compared to other functional brain imaging techniques.
2. Recognize the advantages and limitations of voxel-based lesion symptom mapping.
3. Realize how the presented methods can overcome these limitations and allow for novel and exciting explorations of lesion and brain imaging data.

Game-theoretical analysis of multi-site lesions in the brain
Claus Hilgetag, *University Medical Center Hamburg-Eppendorf, Hamburg, Germany*

Spatial Bayesian Modelling of Binary Lesion Data
Thomas Nichols, *University of Warwick, Dept. of Statistics, Coventry, UK*

Multivariate approaches to large scale lesion-function mapping
Parashkev Nachev, *Institute of Neurology, London, UK*

Combining computational cognitive modeling and lesion symptom mapping
Jan Gläscher, *University Medical Center Hamburg-Eppendorf, Hamburg, Germany*

Morning Workshop
Cerebro-Cerebellar Interplay and Cognition

8:00 – 9:15
Hall 2

Organizers

Richard Frackowiak, *LREN, Département des Neurosciences Cliniques, CHUV, Université de Lausanne, Lausanne, Switzerland*

Arseny Sokolov, *Département des Neurosciences Cliniques, Centre Hospitalier Universitaire Vaudois (CHUV) Lausanne, Switzerland*

Over the past few decades, brain imaging and lesion studies have contributed to substantially extend the role of the cerebellum beyond motor control and coordination. Cerebellar involvement in attention, working memory, language but also visual perception and emotional processing has been demonstrated. However, comprehension of underlying mechanisms remains limited. With the recent advent of sophisticated techniques, substantial progress has been achieved in imaging interplay between the cerebellum and cortical areas subserving cognitive function. This symposium intends to bridge the gap between concepts on cognitive processing in the cerebellum and current knowledge on cerebellar connectivity. Novel multimodal evidence from fMRI, DTI, transcranial magnetic stimulation (TMS), resting state and effective connectivity analyses will be presented. A differentiated pattern of cerebellar topography will be extracted from lesion, fMRI as well as structural and functional connectivity data, fostering an ongoing paradigm shift and providing a framework for design and interpretation of future research. Clinical implications will also be highlighted, particularly referring to cerebellar lesions, addiction, autistic spectrum disorders (ASD) and schizophrenia. In summary, the symposium aims at promotion of up to date knowledge of cognitive processing through cerebro-cerebellar interactions. Learning outcomes include better understanding of cerebellar engagement in working memory, action perception and social cognition; corresponding findings on resting state functional and task-dependent effective communication between the cerebellum and the cerebral cortex; and contemporary approaches to investigate cerebro-cerebellar pathways.

Learning Objectives

1. Understand cerebellar involvement in cognitive processing;
2. Become acquainted with novel concepts on cerebro-cerebellar connectivity; and
3. Integrate the cerebellum in models of cognitive processing and brain circuitries.

Intrinsic Cerebellar Connectivity and Anatomic Correlates
Christophe Habas, *Service de Neuro-Imagerie, Centre Hospitalier National d'Ophtalmologie des XV-XX Paris, France*

Cerebellar Contributions to Working Memory
Cherie Marvel, *PhD, Johns Hopkins University School of Medicine, Neurology, Baltimore, USA*

The Cerebellum and Visual Perception of Action
Arseny Sokolov, *Département des Neurosciences Cliniques, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland*

Imaging Cerebellar Networks with Tractography
Marco Catani, *Institute of Psychiatry – King's College London, London, UK*

Morning Workshop
The Predictive Power of Neuroimaging

8:00 – 9:15
Hall G2

Organizer
Hugh Garavan, *University of Vermont, Burlington, VT, USA*

From its advent, neuroimaging has offered great potential as a tool to aid in predicting important clinical and developmental outcomes. By illuminating the brain mechanisms that underlie clinically-relevant symptoms, it has been anticipated that neuroimaging measures would contribute to the prediction of a wide range of important matters such as which older persons will develop dementia, which at-risk teens will transition to schizophrenia, which depressed patients will respond to treatment, and which abstinent drug users will relapse. Identifying neurobiological predictors are important both for their diagnostic potential and, by revealing risk factors and vulnerabilities, for exposing possible etiological mechanisms. However, it is only recently that this potential is being realized due, in large part, to the availability of sufficiently powered longitudinal studies and the use of appropriate analytic techniques to determine and quantify prediction. To communicate the current state of the field this symposium will describe a number of applications of neuroimaging in the prediction of important clinical and neurodevelopmental questions. The speakers, drawn from separate European and US institutions, are each experts in employing neuroimaging for prediction. Their studies utilize both functional MRI and PET modalities, address questions that span childhood, adolescence, adulthood and ageing, and employ a number of sophisticated analytic approaches. The talks will address a number of questions where prediction is critical. These include the prediction of drug relapse, the transition to MCI and Alzheimer's, the development of cognitive abilities in childhood, and the prediction of binge drinking in adolescence. Additionally, the symposium will address the importance of utilizing appropriate analytic methods so as to avoid spurious "predictors" and maximize the yield from rich, multi-modal datasets. Finally, we will address two key questions: First, whether or not neuroimaging measures, which can be quite costly, provide unique predictive power over-and-above what is currently provided by existing cognitive and clinical measures; and second, how close is the field to being able to predict outcomes at the individual rather than group level.

Learning Objectives
Attendees will learn about the value of neuroimaging in predicting important developmental and clinical outcomes. The talks will describe state of the art applications of neuroimaging measures to these predictions and will address the unique predictive value of these measures and their utility in providing prognostic information on an individual patient level. In addition, attendees will learn about best practice in analytic methods. The use of optimal methods is important in avoiding the identification of spurious predictors given the potential for data over fitting that accompanies large multivariate analyses.

Predicting Working Memory Development during Childhood
Torkel Klingberg, *Neuroscience Department, Karolinska Institutet, Stockholm, Sweden*

Can brain data predict substance use initiation?
Robert Whelan, *University of Vermont, University of Vermont, Burlington, VT, USA*

Using PET to predict a positive response to treatment and the negative side of addiction in cocaine abuse
Diana Martinez, *Columbia University, New York, NY, USA*

Early predictive markers of MCI and AD using pattern analysis methods
Christos Davatzikos, *University of Pennsylvania, Philadelphia, PA, USA*

Break
9:15 – 9:30

Keynote Lecture
9:30 – 10:15
Hall 1

Towards ultra-high resolution models of the human brain

Katrin Amunts, *Institute of Neuroscience and Medicine, INM-1, Research Centre Jülich, and C. & O. Vogt Institute, University Düsseldorf, Germany*

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Human brain models at microscopical resolution provide the bridge between the cellular level of organization and that of cognitive systems. Data size and complexity of brain organization make it challenging to create them. Models of cellular and fiber architecture were developed based on advanced ICT, opening new perspectives to decode the human brain.

Break
10:15 – 10:30

Monday, June 9

Scientific Program

LOC Symposium

Brain Machine Interfaces: Foundations and Perspectives

10:30 – 11:45
Hall 1

Organizers

Christian Buchel, *University Medical Center Hamburg-Eppendorf*
Arno Villringer, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

How can the brain interface with computers, with prostheses, with avatars, or — in new ways — with the "own" body? In order to achieve this, new communication channels between the brain and these external devices (or the own body) have to be established. It will be important to get some — ideally real time — information about the status of the brain and to transfer this information to the respective device. It is also crucial to identify the "relevant" information of the brain and to be able to translate this info into something that can be "understood" and "translated" into some "action". This research field encompasses basic neuroscience, brain imaging, as well as clinical aspects. International leaders will inform us about the cutting edge of these developments.

Speakers

Rainer Gobel, University of Maastricht Brain Imaging Centre, Maastricht University, The Netherlands
Real-Time fMRI Brain Computer Interfaces at 3 and 7 Tesla: From Basic Research to Clinical Applications

Andrew B. Schwartz, Department of Neurobiology, University of Pittsburgh, Pittsburgh, PA, USA
Recent Work Towards High-Performance Brain-Computer Interface

Hansjorg Scherberger, German Primate Center, Gottingen, Germany
Coding and decoding of hand grasping movements

Lunch

11:45 – 12:45

Poster Session

12:45 – 14:45
Hall H

Poster Numbers #1000-2457:
Even Number Posters Stand By

Disorders of the Nervous System: Addictions, Alzheimer's Disease and Other Dementias, Developmental Disorders, Schizophrenia and Psychotic Disorders, Traumatic Brain Injury, Mood and Anxiety Disorders

Emotion and Motivation: Emotional Learning, Emotional Perception, Reward and Punishment, Sexual Behavior

Higher Cognitive Functions: Decision Making, Executive Function, Imagery, Music, Reasoning and Problem Solving, Space, Time and Number Coding

Imaging Methods: Anatomical MRI, BOLD fMRI, Diffusion MRI, EEG, MEG, MR Spectroscopy, Multi-Modal Imaging, Non-BOLD fMRI, Optical Imaging/NIRS, PET

Learning and Memory: Implicit Memory, Long-Term Memory (Episodic and Semantic), Neural Plasticity and Recovery of Function, Skill Learning, Working Memory

Modeling and Analysis Methods: Task-Independent and Resting-State Analysis, Diffusion MRI Modeling and Analysis, EEG/MEG Modeling and Analysis, Exploratory Modeling and Artifact Removal, fMRI Connectivity and Network Modeling, Image Registration and Computational Anatomy

Symposium

Intracranial Electrophysiology of Resting State Networks

14:45 – 16:00
Hall 1

Organizer

Josef Parvizi, *Stanford University, Stanford, CA, USA*

Network architecture of brain areas is commonly described using functional connectivity measures derived from statistical analyses of fluctuations of the blood oxygen level-dependent (BOLD) signal recorded by functional magnetic resonance imaging (fMRI). However, the contributions of artifactual sources of apparent functional connectivity may be difficult to account for using standard motion correction and signal regression paradigms. Electrophysiological method provides another window into brain connectivity as well as a measure by which fMRI signal processing may be evaluated. Speakers of this symposium have solved the challenges of electrophysiological source localization by invasive recordings using subdural electrode arrays that are surgically implanted over the cerebral cortex enabling a direct recording from the surface of the human and non-human primate brains. This unique opportunity to study human brain electrophysiology during rest provides a means of intraindividual corroboration of noninvasive and invasive functional connectivity measures. Furthermore, direct electrical stimulation of individual electrodes among arrays with simultaneous recording of the corticocortical evoked potential (CCEP) helps address effective connectivity among different nodes of the resting state networks. Finally, in conscious human subjects, the subjective effects of electrical stimulation of the resting state networks can also be studied.

Learning Objectives

1. Understand the basics of resting electrophysiology.
2. Learn the neurophysiological mechanisms of resting state networks in the human and non-human primate brains as recorded from inside the brain.
3. Review perceptual and subjective changes associated with the electrical stimulation of resting state networks in conscious human subjects

Intracranial EEG recordings and electrical brain stimulations in human resting state networks
Josef Parvizi, *Stanford University, Stanford, CA, USA*

Intrinsic covariation of brain activity
Pascal Fries, *Ernst Strüngmann Institute (ESI) in Cooperation with Max Planck Society, Frankfurt, Germany*

Dynamics and informational content of spontaneous (resting state) electrophysiological fluctuations recorded intracranially from the human cortex
Rafi Malach, *The Weizmann Institute of Science, Rehovot, Israel*

Analysis of Functional and Effective Brain Networks using Electrocorticography and Corticocortical Evoked Potentials: Correspondence with fMRI and beyond
Ashesh Mehta, *Department of Neurosurgery. Hofstra North Shore LIJ School of Medicine, Manhasset, NY, USA*

Break
16:00 – 16:15

Keynote Lecture
16:15 – 17:00
Hall 1

Racial In-group Favoritism in Emotion Understanding and Sharing: A Neuroimaging Approach

Shihui Han, *Department of Psychology, Peking University, Peking, China*

Humans understand and share others' emotions and this empathy ability is critical for prosocial behavior. However, we do not empathize everyone equally. Racial in-group favoritism in empathy and altruism has been documented widely. We have been trying to understand the neural correlates of racial in-group bias in empathy using different neuroimaging methods. I'll present the results of our recent neuroimaging studies that outline the neural, cognitive, and genetic mechanisms underlying racial in-group bias in empathy for pain, and different approaches that may reduce the racial in-group bias in empathic neural responses.

Oral Sessions
17:15 – 18:30
Oral session presentations are chosen by the Program Committee from submitted abstracts using criteria of quality and timeliness; a wide spectrum of investigation is represented.

O–M1: Multivariate Modelling and Machine Learning

Hall 8
Chair: Janaina Mourao-Miranda, *University College London, London, UK*

17:15 – 17:30
3606: Applications of Multivariate Modeling to Neuroimaging Group Analysis: A Comprehensive Approach
Gang Chen, *SSCC/DIRP/NIMH, National Institutes of Health, Bethesda, MD, USA*

17:30 – 17:45
1757: Improving interpretability of graphical models in fMRI analysis via variable-selection
Irina Rish, *IBM T.J. Watson Research Center, USA*

17:45 – 18:00
3469: Brain mapping in decoding: identifying predictive regions from fMRI with sparse total variation
Gael Varoquaux, *France*

18:00 – 18:15
3513: Sparse multivariate measures of similarities and differences between brain imaging datasets
Maria Rosa, *King's College London, London, UK*

18:15 – 18:30
3460: Deep learning models for brain imaging: model depth enhances discovery power
Sergey Plis, *The Mind Research Network, Albuquerque, NM, USA*

O–M2: Imaging Physiology

Hall 2
Chair: Mark Schira, *University of Wollongong, Wollongong, NSW, Australia*

17:15 – 17:30
4218: Investigating frequency-specific electrophysiological correlates of spontaneous fMRI activity
Catie Chang, *National Institutes of Health, Bethesda, MD, USA*

17:30 – 17:45
4221: Contribution of Neurovascular Factors to Resting-State fMRI Functional Connectivity
Sungho Tak, *Rotman Research Institute at Baycrest Centre Toronto, Ontario, Canada*

17:45 – 18:00
4220: BOLD and CBF post-stimulus undershoots are correlated with post-stimulus neuronal activity in humans
Karen Julia Mullinger, *University of Nottingham, Nottingham, UK*

18:00 – 18:15
2121: Thick and fast: In vivo correlation between Axon Diameter and Conduction Velocity in the Human brain
Assaf Horowitz, *Tel Aviv University, Tel Aviv, Israel*

18:15 – 18:30
2062: Laminar analysis: The spatiotemporal profile of the BOLD response changes with depth
Alexander Puckett, *University of Wollongong, Wollongong, Australia*

O–M3: Learning and Memory

Hall G1
Chair: Noa Ofen, *Wayne State, Detroit, MI, USA*

17:15 – 17:30
2387: Reshaping Brain Networks for Superior Memory
William Shirer, *Stanford University, Stanford, CA, USA*

17:30 – 17:45
2352: Thinking outside the box: Neural correlates of learning by insight
Jasmin Kizilirmak, *Otto-von-Guericke-University, Magdeburg, Germany*

17:45 – 18:00
1475: Mechanisms of control during memory encoding & retrieval: Complimentary roles of the dACC and dPFC
Eric Woodcock, *Wayne State University School of Medicine, Detroit, MI, USA*

18:00 – 18:15
2418: On-line, off-line, and sleep dependent consolidation of motor sequence learning revealed by fMRI
Shahabeddin Vahdat, *McGill, Montreal, Canada*

18:15 – 18:30
2408: A longitudinal fMRI investigation of simultaneous interpretation training
Alexis Hervais-Adelman, *University Of Geneva, Switzerland*

O–M4: Psychiatric Disorders

Hall G2
Chair: Randy Gollub, *Department of Psychiatry, Massachusetts General Hospital*

17:15 – 17:30
1179: Multimodal Imaging in Individuals at Clinical High Risk for Psychosis
Tiziano Colibazzi, *Columbia University, New York, NY, USA*

17:30 – 17:45
1379: Dissociable Medial Prefrontal Cortex Activity and Connectivity Related to Anhedonia and Depression
Christina Young, *Northwestern University, Evanston, IL, USA*

17:45 – 18:00
1300: Extended social-affective default network: altered connectivity in depression
Maren Amft, *Clinical neuroscience and medical psychology, Düsseldorf, Germany*

18:00 – 18:15
1293: Interoceptive awareness as MDD state marker — fMRI in healthy, depressed and remitted participants
Christine Wiebking, *Institute of Mental Health Research, Ottawa, Canada*

18:15 – 18:30
1354: (S)-citalopram influences amygdalar modulation in healthy subjects demonstrated by DCM for fMRI
Ronald Sladky, *Center for Medical Physics and Biomedical Engineering, Medical University of Vienna, Austria*

O–M5: Lifespan Development

Hall 1
Chair: Kristen Kennedy, *Behavioral and Brain Sciences Center for Vital Longevity, The University of Texas at Dallas*

17:15 – 17:30
4421: Heterogeneous developmental trajectories of fetal functional brain connectivity
András Jakab, *Department of Biomedical Imaging and Image-guided Therapy, Medical University of Vienna, Austria*

17:30 – 17:45
4426: Development of Thalamocortical Connectivity during Infancy and Its Behavioral Correlations
Sarael Alcauter, *University of North Carolina at Chapel Hill, Chapel Hill, NC, USA*

17:45 – 18:00
4428: Automatic analysis of cerebellar growth trajectories in normal child development
Vladimir Fonov, *Montreal Neurological Institute, Montreal, Canada*

18:00 – 18:15
4380: Human white matter across the lifespan: changes in development predict changes in aging
Aviv Mezer, *Stanford University, Stanford, CA, USA*

18:15 – 18:30
4454: Spectral signatures of network development in resting state MEG
Javeria Hashmi, *Harvard Medical School, Charlestown, MA, USA*

Tuesday, June 10

Scientific Program

Morning Workshop

Biophysics, acquisition methods, and interpretation of laminar specific functional MRI

8:00 – 9:15
Hall 2

Organizer

Amir Shmuel, *Montreal Neurological Institute, McGill University, Montreal, Canada*

Motivation and Importance: The laminar structure of the neocortex is universal. In spite of some variation in structure and cell type, the composition of the 6 cortical laminae is conserved in virtually all neocortical areas and amongst all mammalian species. Therefore, it is expected that the function of the cerebral cortex is based on a canonical micro-circuit of anatomical and functional connectivity within and between layers. However, the function of cortical layers remains largely unknown.

Hardware advancements and optimization of acquisition techniques at high fields have pushed the spatial resolution of fMRI from voxel edges of 3 mm to 0.5 mm. As has been demonstrated in recent studies, fMRI at high-magnetic field is capable of reaching the resolution of cortical layers in humans. The symposium will focus on acquisition methods, biophysics and interpretation of laminar-specific functional MRI.

Timeliness: A substantial number of sites own now a high-field magnet, and therefore the infra-structure necessary for reaching the resolution of cortical layers. However, in most cases, this potential is not realized. The aim of the symposium is to expand the awareness of the Human Brain Mapping community of the possibility of laminar-specific functional imaging.

Learning Objectives

1. Be aware of the laminar specificity of neurophysiological and BOLD responses.
2. Be informed about pulse sequences at high-field and analysis methods that greatly improve the spatial specificity of fMRI by enhancing contributions from capillaries and suppressing contributions from large vessels.
3. Learn of studies which have implemented these methods successfully for imaging human brain function at the resolution of cortical layers.

Inter-laminar functional connectivity and neurovascular coupling during spontaneous activity and evoked responses
Amir Shmuel, *Montreal Neurological Institute, McGill University, Montreal, Canada*

Quantitative neuroenergetic basis of laminar specific imaging of cortical and subcortical regions
Fahmeed Hyder, *Yale University, New Haven, CT, USA*

Data-acquisition methods for high-resolution fMRI in humans at high fields
Essa Yacoub, *University of Minnesota, Minneapolis, MN, USA*

Layer resolution fMRI to investigate cortical feedback in the visual cortex
Lars Muckli, *Centre for Cognitive NeuroImaging, Research Institute of Neuroscience and Psychology, Glasgow, UK*

Morning Workshop

Is there a continued role for PET in studies of normal human cognition?

8:00 – 9:15
Hall G1

Organizers

Barry Horwitz, *NIDCD-NIH, Bethesda, MD, USA*

Kristina Simonyan, *Mount Sinai School of Medicine, New York, NY, USA*

In a recent commentary (Cumming, Neuroimage, 2013), it was argued that the neuroimaging field no longer employs positron emission tomography (PET) to any great extent in studies of normal human cognition. Although still an important imaging device in patient studies, PET seems to have been supplanted by fMRI. In this workshop, we hope to demonstrate that there are still many cognitive neuroscience questions that PET can help address. Barry Horwitz will discuss how PET can continue to be used in studies that require interrogation of brain processes (e.g., language production) or brain areas (e.g., temporal pole) that are difficult to image with fMRI. Hartwig Siebner will show that important advances will continue to be made in terms of integrating neurotransmitter involvement with functional activation. As examples, investigation of dopamine function in cognitive processes will be presented by Kristina Simonyan for speech production and by Alain Dagher for reward response to stimuli such as music. We hope that the functional imaging community will learn that performing PET may well provide increased insight into the neural basis of normal cognitive function.

Learning Objectives
1. Attendees will increase their understanding of recent PET studies that provided insight into specific aspects of normal human cognition.
2. Attendees will increase their understanding of the use of PET to measure various neurotransmitter signals in humans during the performance of specific cognitive tasks.
3. Attendees will increase their understanding of how PET neurotransmitter investigations can be combined with fMRI activation and network analysis studies.

Introduction and PET activation studies of language production and comprehension
Barry Horwitz, *NIDCD-NIH, Rockville, USA*

Multimodal PET/MRI studies – new developments
Hartwig Siebner, DMSc, *Danish Research Centre for Magnetic Resonance, Hvidovre, Denmark*

Combining neurotransmitter data with fMRI in speech production studies
Kristina Simonyan, *Mount Sinai School of Medicine, New York, USA*

PET Measures of in vivo dopamine signaling in reward processing
Alain Dagher, *McGill University, Montreal, Quebec, Canada*

Morning Workshop
Computational and imaging tools for targeting non-invasive brain stimulation

8:00 – 9:15
Hall 1

Organizers
Dana Brooks, *Center for Integrative Biomedical Computing, BSPIRAL Group, ECE Dept. Northeastern Univ., Boston, MA, USA*

Rob MacLeod, *Center for Integrative Biomedical Computing & Scientific Computing and Imaging Institute, U. of Utah, Salt Lake City, UT, USA*

Don Tucker, Ph.D., *Electrical Geodesics, Inc, Eugene, OR, USA*

Non-invasive transcranial electrical and magnetic brain stimulation (tDCS,tCS, and TMS) is rapidly becoming of increasing interest in both research and clinical communities. However, targeting stimulation for desired effects remains difficult and results are highly variable across individuals and stimulation schemes. Thus, there is a clear need to develop better understanding of how different stimulus approaches affect currents in the brain, taking into account the many factors involved. These factors include individual anatomical differences, anisotropic structures, the important role of current direction on stimulus effect, and the variety of stimulation technologies. In this symposium we bring together presentations from four different laboratories, all taking different and complementary approaches, with a variety of mathematical, imaging, and software platforms. The speakers will illustrate challenges and possibilities for both imaging and modeling approaches towards better understanding and control of transcranial stimulation. Participants can expect to learn about current challenges in non-invasive brain stimulation and the state-of-the-art in modeling and targeting methods. They will be exposed to a variety of approaches to subject-specific modeling and stimulus optimization and to methods and tools underlying current practice and future directions.

Learning Objectives
1. What is the state-of-the-art of non-invasive brain stimulation and what are the critical current challenges?
2. What are state-of-the-art techniques to target specific brain structures with specific desired effects while minimizing the impact onto non-target regions? What is the role of subject-specific imaging and modeling, as contrasted with population-average approaches, in improving stimulation effectiveness?
3. What computational, imaging, and software tools are available, or needed, for more wide-spread simulation and optimization of brain stimulation?

Determining optimal electrode locations for tDCS
Dick Stegeman, *Radboud University Nijmegen Medical Centre, Donders Institute for Brain, Cognition and Behaviour, Nijmegen, The Netherlands*

New numerical methods for electrode optimization and current density modeling in tCS
Sven Wagner, *Institute for Biomagnetism and Biosignalanalysis, University of Münster, Münster Germany*

Simulation, Visualization and Optimization of non-invasive brain stimulation using the SCIRun open-source software package
Moritz Dannhauer, *SCI, Salt Lake City, UT, USA*

Targeting brain networks with TMS and tDCS
Michael Fox, M.D., *Department of Neurology, Massachusetts General Hospital, Brigham and Women's Hospital, Boston, MA, USA*

Tuesday, June 10

Scientific Program

Morning Workshop

Imaging The Human Brainstem In Vivo: Techniques and Applications

8:00 – 9:15
Hall G2

Organizers

Christian Lambert, MD/PhD, *St Georges University of London, London, UK*

Florian Beissner, *Somatosensory and Autonomic Therapy Research, Hannover Medical School, Hannover, Germany*

The human brainstem is a densely packed, complex but highly organized structure. It not only serves as a conduit for long projecting axons conveying motor and sensory information, but also is the location of multiple primary nuclei that control or modulate a vast array of functions, including homeostasis, consciousness and reflexive behaviors. These include the specialized neuromodulatory systems (dopaminergic, serotonergic, cholinergic, and noradrenergic), that are involved in a range of widely studied processes such pain, reward and arousal. Additionally there is now emerging evidence for the early involvement of brainstem nuclei in several neurodegenerative disorders, such as Parkinson's, Alzheimer's and Motor Neuron Disease, which precede the traditionally recognized clinical syndromes by many years. Despite its importance in understanding normal brain function and neurodegenerative processes, it remains sparsely studied in the neuroimaging literature. In part, this is due to the difficulties in imaging the internal architecture of the brainstem in vivo in a reliable and repeatable fashion.

In recent years there have been considerable advances in non-invasive in vivo brainstem imaging. Novel sequences have emerged that enable increasing levels of detail to be captured, and strategies developed to tackle the technical problems for both for fMRI and structural imaging. Furthermore, improvements in pre-processing and analytical methods now allow detailed functional and quantitative structural analysis in vivo.

The aim of this symposium is to provide an overview into brainstem functional systems and pathology, with a focus on the optimized design of MRI studies that are applicable to both 3T and 7T systems.

Learning Objectives

1. To characterize the challenges of imaging the human brainstem in vivo, and describe potential methods available to address these known issues.
2. To demonstrate the techniques and applications of fMRI brainstem analysis.
3. To demonstrate approaches for quantitative structural analysis of the brainstem in vivo at 3T and 7T.

Functional imaging of the brainstem: problems and solutions
Jonathan Brooks, *PhD, CRiCBristol, University of Bristol, Bristol, UK*

Multimodal quantitative analysis of the Human Brainstem at 3T: Methods and Applications
Christian Lambert, *MD/PhD, St Georges University of London, Stroke and Dementia Research Group, London, UK*

Resting-state functional connectivity of brainstem nuclei
Florian Beissner, *Somatosensory and Autonomic Therapy Research, Hannover Medical School, Hannover, Germany*

Quantitative Susceptibility Mapping: A New Contrast for High-Resolution MR Imaging of the Human Brain and Brainstem
Jürgen Reichenbach, *Medical Physics Group, Institute of Diagnostic and Interventional Radiology 1, Jena University Hospital, Jena, Germany*

Break

9:15 – 9:30

Keynote Lecture

9:30 – 10:15
Hall 1

Visualizing Human Brain Anatomy

Hanna Damasio, *Dornsife Neuroimaging Center at USC, Los Angeles, CA, USA*

Early lesion method studies were the forerunners of both cognitive neuroscience and human neuroimaging, a fact often obscured by the hundred years that would pass before modern brain scanning began in the 1970's. I will review this history in the perspective of human brain anatomy as revealed by current neuroimaging.

Break

10:15 – 10:30

Tuesday, June 10

Scientific Program

Oral Sessions

10:30 – 11:45

Oral session presentations are chosen by the Program Committee from submitted abstracts using criteria of quality and timeliness; a wide spectrum of investigation is represented.

O–T1: Neuroanatomy

Hall 1

Chair: Birte Forstmann, *University of Amsterdam, Amsterdam, The Netherlands*

10:30 – 10:45
3924: Crossing the scales with 3D-PLI: from classical myeloarchitecture to diffusion tensor imaging
Markus Axer, *Research Centre Juelich, Juelich, Germany*

10:45 – 11:00
3875: Laminar characteristics of gyrencephaly using high resolution diffusion tensor imaging in vivo at 7T
Michiel Kleinnijenhuis, *Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behaviour, Nijmegen, The Netherlands*

11:00 – 11:15
3878: Asymmetric depth of the superior temporal sulcus: A widely stable landmark in the human brain
Francois Leroy, *INSERM, Paris, France*

11:15 – 11:30
3815: Examining the right dorsal premotor mosaic: a connectivity-based parcellation approach
Sarah Genon, *Cyclotron Research Centre, Liege, Belgium*

11:30 – 11:45
3917: Mismatch between cortical and callosal myelination assessed with T1/T2-weighted MRI
Stefano Sandrone, *King's College London, London, UK*

O–T2: Imaging Methods

Hall 2

Chair: Essa Yacoub, *University of Minnesota, Minneapolis, MN, USA*

10:30 – 10:45
3575: In-vivo Cortical Layers Reconstruction using IR-MRI
Shlomi Lifshits, *Tel Aviv University, Tel Aviv, Israel*

10:45 – 11:00
2245: RtfMRI Neurofeedback of Thalamus Enhances Correlation of Thalamic BOLD Activity and EEG Alpha Rhythm
Vadim Zotev, *Laureate Institute for Brain Research, Tulsa, OK, USA*

11:00 – 11:15
2013: Accelerating Resting State FMRI Acquisition using k-t FASTER: In Vivo Validation
Mark Chiew, *University of Oxford, Oxford, UK*

11:15 – 11:30
1633: NODDI with dispersion anisotropy
Maira Tariq, *University College London, London, UK*

11:30 – 11:45
2283: Sub-millimeter resting state functional connectivity within the mammalian primary visual cortex
Anil Vasireddi, *University of Pittsburgh School of Medicine, Pittsburgh, PA, USA*

O–T3: Higher Cognitive Functions

Hall G1

Chair: Benjamin Xu, *NIH, Bethesda, MD, USA*

10:30 – 10:45
3699: Development of neural networks for passage reading: Activity and connectivity
Matthew Scoggins, *St. Jude Childrens Research Hospital. Memphis, TN, USA*

10:45 – 11:00
3759: Mirror visual feedback induces sensorimotor high gamma oscillations in the absence of movement
Vladimir Litvak, *UCL Institute of Neurology, London, UK*

11:00 – 11:15
1409: Sustaining exploration during value-based learning with frontopolar brain stimulation
Anjali Raja Beharelle, *Rotman Research Institute of Baycrest Centre, Toronto, Canada*

11:15 – 11:30
1499: Cognitive Control of Emotion and Action: Similar But Not the Same- An ALE Meta-Analysis
Robert Langner, *Heinrich Heine University, Duesseldorf, Germnay*

11:30 – 11:45
1556: Frontal-striatal system underlies children's inter-trial variability during problem solving
Shaozheng Qin, *Stanford University, Stanford, CA, USA*

Tuesday, June 10

Scientific Program

O–T4: Genetics

Hall G2

Chair: Lukas Pezawas, *Medical University of Vienna, Vienna, Austria*

10:30 – 10:45
2372: Genetically induced diffuse impairment of retinal ganglion cells is linked to extrastriate cortical plasticity
Miguel Castelo-Branco, *Universidade de Coimbra, Coimbra, Portugal*

10:45 – 11:00
1754: Heritability of Intrinsic Connectivity Network Profiles in the Human Brain
Zhi Yang, *Institute of Psychology, Chinese Academy of Sciences, Beijing, China*

11:00 – 11:15
3384: Additive Gene-Environment Effects on Hippocampal Structure in Healthy Humans
Ulrich Rabl, *Medical University of Vienna, Vienna, Austria*

11:15 – 11:30
3100: Common Variants of the Oxytocin Receptor Gene Impact Functional and Structural Brain Connectivity
Leanna Hernandez, *University of California, Los Angeles, CA, USA*

11:30 – 11:45
3253: Multiple sclerosis risk gene associations with white matter integrity at 4 Tesla
Daniel Rinker, *University of Southern California, Los Angeles, CA, USA*

Lunch

11:45 – 12:45

Poster Session

12:45 – 14:45
Hall H

Poster Numbers #1000-2457:
Odd Number Posters Stand By

Disorders of the Nervous System: Addictions, Alzheimer's Disease and Other Dementias, Developmental Disorders, Schizophrenia and Psychotic Disorders, Traumatic Brain Injury, Mood and Anxiety Disorders

Emotion and Motivation: Emotional Learning, Emotional Perception, Reward and Punishment, Sexual Behavior

Higher Cognitive Functions: Decision Making, Executive Function, Imagery, Music, Reasoning and Problem Solving, Space, Time and Number Coding

Imaging Methods: Anatomical MRI, BOLD fMRI, Diffusion MRI, EEG, MEG, MR Spectroscopy, Multi-Modal Imaging, Non-BOLD fMRI, Optical Imaging/NIRS, PET

Learning and Memory: Implicit Memory, Long-Term Memory (Episodic and Semantic), Neural Plasticity and Recovery of Function, Skill Learning, Working Memory

Modeling and Analysis Methods: Task-Independent and Resting-State Analysis, Diffusion MRI Modeling and Analysis, EEG/MEG Modeling and Analysis, Exploratory Modeling and Artifact Removal, fMRI Connectivity and Network Modeling, Image Registration and Computational Anatomy

Tuesday, June 10

Scientific Program

Symposium

The Many Faces of "Top-down": An Integrative Perspective

14:45 – 16:00
Hall 1

Organizers

Tobias Donner, *Department of Psychology, University of Amsterdam, Amsterdam, The Netherlands*

Floris de Lange, *Donders Institute, Radboud University Nijmegen, Nijmegen, The Netherlands*

It has been known since more than two decades that the state of even early sensory cortices is heavily influenced by attention. However, only recently has it become clear that top-down effects in sensory cortex can be much richer and more complex than the attentional modulation originally described. Various cognitive factors such as reward, expectation, and decision signals conspire to shape the state of sensory cortex. Our symposium will take the visual cortex as a showcase to expose these top-down effects, from the level of single neurons over neural populations to perception and behavior. To this end, we will draw from human and monkey data, as well as from various different measurement modalities. The research highlighted by our symposium uncovers a remarkable degree of adaptability of sensory cortex. It also sheds new light on the link between the BOLD-fMRI signal and electrophysiological measures of neuronal activity.

Learning Objectives

1. To understand the many faces of top-down modulations of sensory cortex.
2. To gain insights into the link between the BOLD-fMRI signal and electrophysiological activity.

Exploring the Origin of Neuron-Behavior Correlations in Early Visual Cortex
Hendrikje Nienborg, *Werner Reichardt Center for Integrative Neuroscience, Universitaet Tuebingen, Tuebingen, Germany*

Decision Signal in Visual Cortex Predicts the Stability of a Perceptual Illusion
Tobias Donner, *Department of Psychology, University of Amsterdam, Amsterdam, The Netherlands*

Reward Signals Selectively Decrease fMRI Activity in Primate Visual Cortex
Wim Vanduffel, Massachusetts General Hospital, Charlestown, MA, USA

Foreknowledge Automatically Biases Early Sensory Representations
Floris de Lange, *Donders Institute, Radboud University Nijmegen, Nijmegen, The Netherlands*

Break

16:00 – 16:15

Keynote Lecture

16:15 – 17:00
Hall 1

A common high-dimensional linear model of representational spaces in human cortex

James Haxby, *Director for the Center for Cognitive Neuroscience at Dartmouth and a professor at the Center for Mind/Brain Sciences (CIMeC), University of Trento*

The functional architecture of human cortex can be modeled as high-dimensional representational spaces in which patterns of brain activity are recast as vectors with basis functions that have tuning profiles and patterns of connectivity that are common across brains. Transformation matrices that rotate individual anatomical spaces into the common model space are derived with searchlight-based, whole cortex hyperalignment. Patterns of brain activity in individual brains are modeled as multiplexed topographic basis functions. This model provides a common structure that captures fine-grained distinctions among cortical patterns of response that are not modeled well by current brain atlases.

Poster Reception

17:00 – 18:30
Hall H

Wednesday, June 11

Scientific Program

Morning Workshop

What Can We Learn from Integrating Multimodal Neuroimaging Data?

8:00 – 9:15
Hall G2

Organizer

Mark S. Cohen, *Department of Radiology, UCLA, CA, USA*

Pamela K. Douglas, *Laboratory of Integrative Neuroimaging Technology, UCLA, CA, USA*

It is widely held that neuroimaging techniques including EEG, NIRS, MEG, ECoG, and fMRI measure distinct and often complementary information about the dynamics of the human brain. Each modality detects fluctuations that are believed to be tightly coupled to neuronal computation, and measurements across modalities may themselves be linked, albeit perhaps indirectly. Theoretically, one could analyze data collectively to harness the respective strengths of each method to improve overall spatio-temporal resolution — beyond the signal detection limits of using a single instrument in isolation. Nonetheless, collecting and subsequently analyzing data that often reside in different dimensional spaces and measured at different time scales has historically proven quite challenging. As multimodal data becomes increasingly available, one of the main goals is to develop methods to synthesize information across recordings to better answer questions related to cognitive processing as well as to improve diagnosis and localization of neurological disorders.

In this workshop, we will discuss the challenges and recent advancements made in studying multimodal neuroimaging data collected either separately or concurrently. Specifically, we will describe novel methods for collecting simultaneous EEG-fMRI and removing artifact from these data. We will then describe two new algorithms specifically designed to analyze data that are non-stationary in nature, particularly useful for improving our understanding of both the unique and mutual information described between modalities. We illustrate these methods using concurrently collected EEG-NIRS and ECoG-electrode recording data, and finally discuss clinical applications of these techniques for localization of epileptic foci.

Learning Objectives

1. Understand key challenges and solutions involved with data collection, and artifact removal from concurrently collected EEG-fMRI and EEG-NIRS data.
2. Equip the audience with cutting-edge tools to study inherently non-stationary neuroimaging data.
3. Understand the advantages of using these techniques in both the cognitive neuroscience research and clinical settings.

Mapping Epileptiform Discharges Using Mutual Information
Louis Lemieux, *Department of Clinical and Experimental Epilepsy, Institute of Neurology, University College London, UK*

Kernel Methods for Canonical Correlation Analysis
Felix Biessmann, *Cognitive Algorithms Lab, Brain and Cognitive Engineering Department, Korea University*

Beyond Morlet — Wavelet Methods for Analyzing Non-stationary Data
Jerome Gilles, *Computer and Applied Mathematics Lab, Department of Mathematics, University of California, Los Angeles, CA, USA*

Analysis of Concurrent EEG-fMRI Data
Pamela Douglas, *Laboratory of Integrative Neurotechnology, Center for Cognitive Neuroscience, University of California, Los Angeles, CA, USA*

Morning Workshop

The hemodynamic response and neurovascular coupling: From sources to measures to models

8:00 – 9:15
Hall G1

Organizer

Mark Schira, *University of Wollongong, Wollongong, NSW, Australia*

The hemodynamic response function and its measurements are the basis of the broad majority of functional brain imaging applications in humans. As MRI hardware and sequences are improving at breathtaking speed, high resolutions in space and time are becoming more and more feasible. Exploiting these new measurement techniques calls for a better understanding of neurovascular coupling and the hemodynamic response function. Despite a decade of intense debate, the neuronal substrates of underlying the origin of the BOLD signal is still elusive, with major questions centered around the temporal and spatial properties or the oxygen metabolism remain unclear. Here we present four current approaches using cutting edge imaging techniques to measure and model neurovascular coupling and the hemodynamic response function. We will discuss variations in the above-mentioned time courses for a variety of situations, and highlight applications derived from the current state of understanding.

Learning Objectives

1. Evaluate current concepts of neurovascular coupling and its consequence for functional brain imaging.
2. Discuss the effects of brain states on BOLD measurements.
3. Explain current models of the hemodynamic response.

Are blood flow and oxygen metabolism driven by different aspects of neural activity?
Richard Buxton, *University of California, San Diego, CA, USA*

Abnormal physiological parameters underlying neurovascular decoupling in focal epilepsy: from models to paradigms
Jorge Riera Diaz, *Florida International University, Miami, FL, USA*

New model for the fMRI hemodynamic response function based on brief arterial vasodilation
David Ress and Jung Hawn Kim

From Visual Stimulus to BOLD Measurements, a complete spatiotemporal model derived from sub millimetre fMRI
Kevin Aquino, MJ Beakspear, A Puckett, P. Robinson and MM. Schira

Morning Workshop
Mobile Brain/Body Imaging (MoBI) — New directions in human neuroscience

8:00 – 9:15
Hall 2

Organizer
Klaus Gramann, *Berlin Institute of Technology, Berlin, Germany*

This symposium brings together leading scientists that developed and spearheaded new technologies and experimental approaches in imaging human brain dynamics in actively moving participants. Advances in data-driven analyses approaches, sensor technologies, and experimental protocols have made imaging of brain dynamics in actively behaving participants increasingly feasible. However, understanding of brain dynamic states accompanying changes in behavioral states in complex and dynamic environments requires new approaches to experimental protocols, data analyses approaches and new ideas of investigating embodied cognition. The symposium will provide an overview of the field through selected topics in MoBI demonstrating the feasibility of mobile brain imaging with advanced hardware and software technologies, revealing new insights into the human cognitive architecture during active behavior, and demonstrating applicability of the method in a wide range of scientific areas from basic to applied research questions.

Learning Objectives
Participants of the symposium will learn new approaches to imaging human brain dynamics in actively moving participants; they will learn about recent software and hardware developments and how they allow for measuring brain activity in mobile participants; the audience will get a feeling how mobile brain/body imaging might provide new insights in their research areas.

Brain dynamics of orientingin 3D space
Klaus Gramann, *Berlin Institute of Technology, Berlin, Germany*

Cognitive Flexibility of a Body in Motion — Applications of Mobile Brain-Body Imaging (MoBI) in Aging
John Fox, *Albert Einstein College of Medicine, Bronx, NY, USA*

Your brain on the move: electrocortical dynamics during human locomotion
Dan Ferris, *University of Michigan, Ann Arbor, MI, USA*

Mobile Brain/Body Imaging to record and model natural human actions and interactions
Scott Makeig, *Swartz Center for Computational Neuroscience, UCSD, La Jolla, CA, USA*

Morning Workshop
Advances in Neuroscience and Clinical Research using Ultra-High Speed fMRI

8:00 – 9:15
Hall 1

Organizer
Stefan Posse, *University of New Mexico, Department of Neurology, Albuquerque, NM, USA*

This symposium brings together leading experts who are at the forefront of the development and application of ultra-high speed fMRI data acquisition and statistical analysis, which have increased temporal resolution of fMRI to time scales on the order of 100 ms and faster. This symposium aims to highlight major advances in neuroscience and clinical research made possible by unprecedented increases in temporal resolution and sensitivity using these high-speed fMRI to map task-based activation and the temporal dynamics of brain-states. Ultra-high speed fMRI methods are now gaining widespread acceptance in the brain imaging community and are expected to replace conventional fMRI methods in selected applications, such as resting state fMRI.

The topic of this workshop is timely as there is rapidly increasing need for faster and more sensitive data acquisition methods to map functional connectivity in distributed networks in the context of the Connectome Project and related endeavors. The symposium will discuss the utility of ultra-high speed fMRI for selected applications, highlight the potential for future advances and discuss the physiological basis of novel contrast in ultra-high speed fMRI.

Wednesday, June 11

Scientific Program

Learning Objectives

1. Identify neuroscience and clinical applications that will benefit from the use of ultra-high speed fMRI.
2. Understand the capabilities and limitations of different ultra-high speed fMRI methods, and their hardware requirements.
3. Have an awareness of statistical analysis approaches that take into consideration autocorrelations in the data and high-frequency physiological noise.

Presurgical mapping of task based and resting state network dynamics using ultra-high-speed fMRI
Stefan Posse, *University of New Mexico, Department of Neurology, Albuquerque, NM, USA*

Functional neuroimaging applications of generalized inverse imaging (GIN)
Rasim Boyacioglu, *Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behaviour Nijmegen, The Netherlands*

Measurement of dynamic fast functional activity using MR-Encephalography
Pierre LeVan, *University Medical Center Freiburg, Medical Physics, Freiburg, Germany*

Pushing Speed and Squeezing Resolution of fMRI
David Feinberg, *Advanced Technologies, UC Berkely Helen Wills Neuroscience Institute, Berkley, CA, USA*

Break

9:15 – 9:30

Keynote Lecture

9:30 – 10:15
Hall 1

The Role of Neuroimaging in Redefining Neuroplasticity Beyond The Synapse

Yaniv Assaf, *Strauss Center for Computational Neuroimaging of Tel Aviv University, Tel Aviv, Israel*

Neuro-plasticity is one of the key processes in brain's physiology. In the last decade, structural MRI studies of long-term brain plasticity revealed significant volumetric/regional changes following weeks of training. Yet, none of the known hallmark mechanism of neuroplasticity (i.e. synaptic plasticity) can explain these effects. As a consequence, the micro-structural and cellular correlates of these structural plasticity changes are not well understood. In the lecture, we will explore the origins of structural plasticity, as revealed by MRI, and it's evolution in time (from seconds to months). We will discuss the impact of using MRI in studying neuroplasticity — the ability to localize and explore this basic process of brain physiology, in-vivo and for the whole brain both in rodents and humans.

Break

10:15 – 10:30

Oral Sessions

10:30 – 11:45

Oral session presentations are chosen by the Program Committee from submitted abstracts using criteria of quality and timeliness; a wide spectrum of investigation is represented.

O–WI: Brain Stimulation

Hall 1
Chair: Michael Nitsche, *Georg-August-University of Göttingen, Göttingen, Germany*

10:30 – 10:45
1540: Transcranial direct current stimulation over the parietal cortex modulates arithmetic learning
Roland Grabner, *Georg-August-University of Göttingen, Göttingen, Germany*

10:45 – 11:00
3023: Modulating plasticity in the atypically developing brain to enhance learning and cognition
Chung Yen Looi, *University of Oxford, Oxford, UK*

11:00 – 11:15
3022: Transcranial direct current stimulation modulates networks of working memory in ADHD
Sotnikova, *Philips-University, Marburg, Germany*

11:15 – 11:30
1507: TMS to preSMA at rest induces activity in frontal-basal-ganglia network that influences inhibition
Benjamin Xu, *NIH, Bethesda, MD, USA*

11:30 – 11:45
3050: Distinct parieto-frontal networks for auditory word comprehension. A combined cTBS-fMRI study.
Gesa Hartwigsen, *Kiel University, Kiel, Germany*

O–W2: Resting-State Networks and Functional Parcellation

Hall 2
Chair: Serge Rombouts, *Leiden University Medical Center, The Netherlands*

10:30 – 10:45
1840: Brain regions extraction from rest fMRI using stochastic total-variation dictionary learning
Alexandre Abraham, *INRIA, Saclay, France*

10:45 – 11:00
3578: Functional Parcellation of the Cortex from rs-fMRI with Graph-based Methods and shape priors
Nicolas Honnorat, *University of Pennsylvania, Philadelphia, PA, USA*

11:00 – 11:15
3595: Functional parcellation of the human thalamus using internal network dynamics
Erik van Oort, *MIRA Institute, University of Twente, Donders Institute, Radboud University Nijmegenm, Nijmegen, The Netherlands*

11:15 – 11:30
1750: Dynamic functional connectivity: Better characterized by separated states or a mixture of patterns?
Nora Leonardi, *Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*

11:30 – 11:45
1717: Time-resolved functional connectomics: Dynamics of human brain connectivity at rest
Andrew Zalesky, *Melbourne Neuropsychiatry Centre, The University of Melbourne, Victoria, Australia*

O–W3: Perception and Attention

Hall G1
Chair: Lars Muckli, *Centre for Cognitive NeuroImaging, Research Institute of Neuroscience and Psychology, Glasgow, UK*

10:30 – 10:45
4152: Resolving human object recognition in space and time
Radoslaw Cichy, *Massachusetts institute of technology, Cambridge, MA, USA*

10:45 – 11:00
4039: Response Latencies in Human Auditory Cortex: An Intracranial Electrophysiology Study
Krill Nourski, *The University of Iowa, Iowa City, IA, USA*

11:00 – 11:15
3423: The neural dynamics of Bayesian model updating in the somatosensory system
Dirk Ostwald, *Bernstein Centre Berlin, Berlin, Germany*

11:15 – 11:30
4145: How is the body (and its parts) represented in visual cortex?
Stefania Bracci, *Trento University, Rovereto, Italy*

11:30 – 11:45
3972: Visual Hierarchy revealed through directed influence asymmetries at distinct frequency bands
Julien Vezoli, *Ernst Strüngmann Institute (ESI) for Neuroscience in Cooperation with Max Planck Society, Frankfurt, Germany*

O–W4: Developmental Disorders

Hall G2
Chair: Tonya White, *Erasmus MC, Rotterdam, The Netherlands*

10:30 – 10:45
3070: Dysmaturation of Functional Connections Between Cortical Language Areas in Autism
Stuart Washington, *Georgetown University Medical Center, Washington, DC, USA*

10:45 – 11:00
3233: Involuntary interference in emotion dysregulation: Amygdala hyper-modulation of brain networks
Kristy Abraham, *Wayne State University, Detroit, MI, USA*

11:00 – 11:15
1301: Prenatal depressive symptoms, intelligence and brain morphology — a population-based imaging study
Henning Tiemeir, *Erasmus Medical Centre-Sophia Children's Hospital, Rotterdam, The Netherlands*

Wednesday, June 11

Scientific Program

11:15 – 11:30
3092: Impaired manual dexterity in Autism correlates with abnormalities in short fronto-parietal networks
Abigail Thompson, *Institute of Psychiatry, London, UK*

11:30 – 11:45
3241: A DTI-tractography study of newborns: white matter changes associated with prenatal alcohol exposure
Paul Taylor, *UCT, AIMS, Cape Town, South Africa*

Lunch

11:45 – 12:45

Poster Session

12:45 – 14:45
Hall H

Poster Numbers #3000-4455:
Even Number Posters Stand By

Brain Stimulation Methods: Deep Brain Stimulation, Direct Electrical/Optogenetic Stimulation, TDCS, TMS

Disorders of the Nervous System: Autism, Other Disorders, Stroke, Obsessive-Compulsive Disorder and Tourette Syndrome, Parkinson's Disease and Movement Disorders, Epilepsy, Sleep Disorders

Genetics: Genetic Association Studies, Genetic Modeling and Analysis Methods, Neurogenetic Syndromes

Informatics: Atlases, Databasing and Data Sharing, Pipelines

Language: Language Acquisition, Language Comprehension and Semantics, Reading and Writing, Speech Perception, Speech Production

Lifespan Development: Aging, Normal Brain Development: Fetus to Adolescence

Modeling and Analysis Methods: Bayesian Modeling, Classification and Predictive Modeling, Motion Correction and Preprocessing, Multivariate modeling, Other Methods, PET Modeling and Analysis, Segmentation and Parcellation, Univariate Modeling

Motor Behavior: Brain Machine Interface, Mirror System, Motor Planning and Execution, Visuo-Motor Functions

Neuroanatomy: Anatomy and Function, Brain Networks, Cortical Anatomy and Segregation, Subcortical Structures, White Matter Anatomy, Fiber Pathways and Connectivity

Perception and Attention: Attention: Auditory/Tactile/Motor, Attention: Visual, Chemical Senses: Olfaction, Taste, Consciousness and Awareness, Perception: Auditory/Vestibular, Perception: Multisensory and Crossmodal, Perception: Pain and Visceral, Perception: Tactile/Somatosensory, Perception: Visual, Sleep and Wakefulness

Physiology, Metabolism and Neurotransmission: Cerebral Metabolism and Hemodynamics, Neurophysiology of Imaging Signals, Pharmacology and Neurotransmission

Social Neuroscience: Self Processes, Social Cognition, Social Interaction

Symposium

Novel uses of natural viewing paradigms in EEG, fMRI and fcMRI

14:45 – 16:00
Hall 1

Organizers

Tamara Vanderwal, MD, *Yale Child Study Center, New Haven, Connecticut, United States*

Lucas Parra, PhD, *The City College of the City University of New York, New York, United States*

The last two years have seen a significant expansion in the scope of studies utilizing natural viewing paradigms. This symposium brings together emerging approaches from EEG, task-based fMRI and functional connectivity MRI (fcMRI) that use movies as stimuli. Natural viewing paradigms have multiple characteristics that facilitate unique approaches to data analysis. Movies have been shown to evoke patterns of neural activity that are synchronized across individuals, and even across species. In addition, time courses derived from features of the movie such as luminance and sound intensity can be used to interrogate different facets of neurofunctional systems with improved precision. Movies thus present a powerful and flexible medium with which to engage multiple networks in a concerted and dynamic fashion. From a clinical standpoint, the use of movies in the context of functional connectivity facilitates longer data collection times and decreases head movement in both adults and children. This workshop provides an overview of novel analytic methods being used to exploit these characteristics, including new approaches to fMRI and fcMRI temporal dynamics, work with movie-watching monkeys, links between neural synchrony and behaviors of large audiences, and a novel class of paradigm designed to decrease head movement in clinical groups. The strengths and limitations of these approaches and the ways that natural viewing paradigms might be usefully combined with existing methodologies for studies of functional connectivity will be discussed.

Learning Objectives

1. Participants will be able to list (at least) three unique features of natural viewing paradigms and how these features can be exploited in signal processing.

2. Participants will be able to define new concepts in the field, such as "temporal receptive windows" (Uri Hasson's talk) and provide an example of how neural responses during movies are being applied to predict behavior (Lucas Parra's talk).
3. Participants will be able to describe how natural viewing paradigms are being used to relate movie content to brain activity in humans and monkeys (Andreas Bartels' talk) and to tailor novel paradigms for work with young children (Tamara Vanderwal's talk).

Topographic mapping of temporal receptive windows using natural stimuli
Uri Hasson, PhD, *Department of Psychology and the Neuroscience Institute, Princeton University, Princeton, NJ, USA*

Audience preferences are predicted by reliability of fast neural processing
Lucas Parra, PhD, *The City College of the City University of New York, New York, NY, USA*

Mapping of multiple functionally specialized regions using natural stimuli
Andreas Bartels, PhD, *Centre for Integrative Neuroscience, Tübingen, Germany*

A novel video paradigm for use in functional connectivity MRI
Tamara Vanderwal, MD, *Yale Child Study Center*

Break
16:00 – 16:15

Keynote Lecture
16:15 – 17:00
Hall 1

The Role of Neuroimaging in the Human Brain Project

Richard Frackowiak, *LREN, Département des Neurosciences Cliniques, CHUV, Université de Lausanne, Lausanne, Switzerland*

Human functional and structural brain imaging with MRI continues to revolutionize tissue characterization from development, through ageing and as a function of disease. Multi-modal and multi-sequence imaging approaches that measure different aspects of tissue integrity are leading to a rich mesoscopic-level characterization of brain tissue properties. Novel image classification techniques that capitalize on advanced machine learning techniques and powerful computers are opening the road to individual brain analysis. Data-mining methods, often developed in other data-rich domains of science, especially particle and nuclear physics, are making it possible to identify causes of disease or its expression from patterns derived by exhaustive analysis of combinations of genetic, molecular, clinical, behavioral and other biological data. Imaging is generating data that links molecular and cellular levels of organization to the systems that subtend, action, sensation, cognition and emotion. These ideas will be illustrated with reference to the human dementias and in the context of the Human Brain Project.

Break
17:00 – 17:15

Town Hall Forum
17:15 – 18:15
Hall 1

The Forum is the top source for the latest breaking news and commentary on issues impacting the neuroimaging community and your member organization. It is also an opportunity for you to voice your opinions and questions to the Council — which helps shape future agendas. **If you have never attended the Forum before, this is the year to participate!** Member input will be sought on several topical issues including the future of OHBM's Hackathon, research quality and ways to bridge regional and special interests. The new elected leadership will be announced as well as dates and venues for future Annual Meetings.

Club Night @ Edelfettwerk
20:30 – 2:00

Edelfettwerk is located at
Schnackenburgallee 202, 22525 Hamburg

The Edelfettwerk is a unlike any other club in Hamburg, featuring 6,000 sqm of redesigned space into various bars and dance floors with plenty of outdoor space to enjoy. There will be a DJ that will play dance music throughout the evening. The party is complimentary to registrants. Please make sure to bring your ticket to the Edelfettwerk. Additional guest tickets are $50 USD / 37 EURO and must be purchased at the conference registration desk.

Morning Workshop
The "Dys-Connectome": effects of focal injury on the brain's functional organization and behavior

8:00 – 9:15
Hall G1

Organizers

Maurizio Corbetta, *Dept. Neurology, Radiology, and Anatomy and Neurobiology, Washington University School of Medicine St. Louis, MO*

Michel Thiebaut de Schotten, *Institute of Brain and Spine, Paris, France*

In the US alone, every year, more than 795,000 people suffer from a stroke. Stroke is the third cause of mortality and the leading cause of disability in the Western world. Despite advances in diagnosis and treatment, little is known on how focal injury induced by stroke impacts the local and large-scale functional organization of the brain, and, correspondingly, whether recovery of function is associated with reorganization or compensation of network-level interactions. This symposium is organized around four young researchers (all post-docs or junior faculty) who have carried out important studies on this important topic using a variety of methodologies (voltage gated signals; optical imaging; fMRI; DTI) in both humans and rodent models. The four lectures will show that: (1) synaptic networks are damaged and recover from stroke-induced damage in mice; (2) functional and structural connectivity reorganize after experimental stroke and hemispherectomy in rats; (3) focal injury in patients and transcranial magnetic inactivation in healthy subjects can affect global, regional, and local indices of large-scale network interactions that inform us about the normal connectivity; and, finally, (4) multi-network changes in functional connectivity correlate with the severity of attention deficits post-stroke independently of structural damage. Together these studies indicate the importance to understand not only the local neural processes affected by stroke, but also the global physiological effects of stroke on brain networks.

Learning Objectives

1. Learn about the application of functional and structural connectivity methods to the study of stroke and its recovery.
2. Understand the relationship between systems and synaptic measures of connectivity.
3. Learn the effect of stroke on brain functional networks.

Effect of focal stroke on spontaneous cortical activity patterns reveals novel intracortical mechanisms in mouse
Majid Mohajerani, *Canadian Centre for Behavioural Neuroscience The University of Lethbridge Lethbridge, Canada*

Characterization of neural network remodeling in experimental focal brain injury models using structural and functional MRI
Wim Otte, *Rudolf Magnus Institute of Neuroscience, Utrecht, The Netherlands*

Changes in the magnitude and organization of large-scale network interactions after focal disruption, as measured in humans with resting state fMRI
Caterina Gratton, *Helen Wills Neuroscience Institute, University of California, Berkeley, CA, USA*

Large-scale changes in network interactions as a physiological signature of Spatial Neglect
Antonello Baldassarre, *Washington University in St. Louis, St. Louis, MO, USA*

Morning Workshop
The Dynamic Human Brain

8:00 – 9:15
Hall 2

Organizers

Dimitri Van De Ville, *UniGE/EPFL, Lausanne, Switzerland*

Douglas Garrett, *Center for Lifespan Psychology, Max Planck Institute for Human Development, Berlin, Germany*

Brain activity is intrinsically dynamic, whether at rest or on task. Although the term "dynamic" is used broadly in the current literature, there are many different dimensions of dynamic processes that require careful definition and differentiation to enable (1) a comprehensive view of measurable brain dynamics, and (2) optimal resulting theoretical development and integration. In one key dimension, it has become increasingly apparent that the structure of intrinsic functional networks changes dynamically from moment to moment (on msec and sec scales), and relates to cognition and disease. Thus, long held assumptions about network stationarity are under increasing scrutiny. Importantly, network dynamics are often calculated after time series normalization, effectively and intuitively removing the influence of the magnitude of these variations across moments so that subjects can be compared. However, a bourgeoning body of work on the importance of amplitude fluctuations provides a complementary second dimension of dynamics; both node- and network-based brain signal variability/complexity magnitudes themselves have important functional implications for cognitive performance, development, aging, and disease. Thus, brain dynamics can emerge across a number of theoretically and mathematically separable dimensions, but these are rarely examined simultaneously in the literature.

In particular, our four confirmed speakers will present their latest results on how brain dynamics relate to (a) physiological measures; (b) the relationship between EEG and fMRI; (c) fluctuation amplitudes of dynamic brain signals as information-carrying measures that relate to neurotransmission, age, cognition, and connectivity; and (d) how we can identify "atoms" of dynamic functional connectivity as either states or building blocks. This body of work argues that the various dimensions of non-stationarity of brain signals should not be ignored, and importantly, highlights new challenges for analysis and interpretation of dynamic brain data.

Learning Objectives

1. Understand the various emerging approaches in the study of functional brain dynamics, and how they complement each other.
2. Recognize the functional and predictive implications of brain signal dynamics across task types, cognitive domains, and developmental and clinical groups.
3. Appreciate the various definitional and computational constraints when examining brain dynamics.

EEG and physiological correlates of resting-state fMRI connectivity dynamics
Catie Chang, *NINDS/NIH, Advanced MRI section, LFMI, Bethesda, USA*

Multivariate methods for characterizing variability in spatial and temporal connectivity among intrinsic brain networks
Vince Calhoun, *The Mind Research Network and UNM, Albuquerque, NM, USA*

Bring the 'noise:' Variability as 'signal' in the human brain
Douglas Garrett, *Center for Lifespan Psychology, Max Planck Institute for Human Development, Berlin, Germany*

Decomposing dynamic functional connectivity: states or building blocks?
Dimitri Van De Ville, *UniGE/EPFL, Lausanne, Switzerland*

Morning Workshop

Using neuroimaging to develop novel biomarkers: A case study of "big data" in Huntington's disease

8:00 – 9:15
Hall G2

Organizers

Jane Paulsen, *The University of Iowa, Iowa City, IA USA*

Jatin Vaidya, *The University of Iowa, Iowa City, IA, USA*

Functional and structural neuroimaging has transformed the neuroscientific study of human thought, behavior, and emotion. However, neuroimaging is also playing an increasingly important role in applied research that seeks to identify neural biomarkers of neurological and psychiatric disease. This symposium focuses on functional and structural biomarkers of Huntington's disease (HD), an inherited neurodegenerative disorder that ultimately leads to progressive loss of motor and cognitive functions. The results presented here are based on the PREDICT-HD project, a multi-site, longitudinal study investigating neural and behavioral changes in individuals who are genetically predisposed to develop HD. Presenters will discuss novel longitudinal methods and connectivity analysis techniques as well as "big data" integration methodologies that may ultimately lead to novel neural biomarkers of early disease progression that can be used in clinical trials to measure the effectiveness of new therapeutic agents.

Learning Objectives

1. Identify different ways of applying neuroimaging techniques for biomarker research.
2. Characterize patterns of corticostriatal degeneration associated with Huntington's disease.
3. Learn novel ways of analyzing longitudinal neuroimaging data.

Abnormalities in brain circuitry in prodromal Huntington's disease revealed using covariate-adjusted structural equation modeling of multi-site resting state fMRI data
Jatin Vaidya, *The University of Iowa, Iowa City, IA, USA*

Imaging Brain Networks in Huntington's disease
Andrew Feigin, *The Feinstein Institute for Medical Research, North Shore-LIJ Health System, Manhasset, NY, USA*

Shape analysis of basal ganglia structures in Huntington's disease
Tilak Ratnanather, *Center for Imaging Science, Johns Hopkins University, Baltimore, MD, USA*

Severity in Huntington's disease predicted via deep learning network analysis of structural brain imaging
Sergey Plis, *The Mind Research Network, Albuquerque, NM, USA*

Thursday, June 12

Scientific Program

Morning Workshop

Mapping the Human Language Network: Development, Disorder and Culture-specific Research

8:00 – 9:15
Hall 1

Organizers

Angela D. Friederici, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

Tianzi Jiang, *Institute Of Automation, Chinese Academy of Sciences, Beijing, China*

Although there are hundreds of studies on human language processing, the description of the neural basis of language and speech still remains difficult. Recent studies have shown that human language processing can manifest on neural networks rather than segregated regions. Technical advances in neuroimaging have helped us to investigate the functional architecture of language network and its anatomical basis in both the mature and developing brain. But before a real understanding human language and the brain will be achieved, there are still many issues that need to be solved. The goal of this symposium is to provide new evidence and answers to a number of open issues.

Learning Objectives

1. Understand the structure and function of the adult human neural language network and its impairment;
2. Learn about the relation between the maturation of the structural neural network, functional brain activation and language performance during development;
3. Learn about the cross-culture differences of human language network, especially the neural systems for Chinese and English;
4. Know how speech and reading are lost and recovered following neurological damage or developmental delay.

The Language Network during Development: Functional and Structural Aspects
Angela D. Friederici, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

Where is Wernicke's area? Redefining its anatomical boundaries
Tianzi Jiang, *Institute Of Automation, Chinese Academy of Sciences, Beijing, China*

The adaptive brain: Effects of structural brain changes on language function
Lorraine Tyler, *University of Cambridge, Department of Psychology, Cambridge, UK*

Neural networks of Chinese reading
Li-Hai Tan, *State Key Laboratory of Brain and Cognitive Sciences, University of Hong Kong, Hong Kong, China*

Break

9:15 – 9:30

Keynote Lecture

9:30 – 10:15
Hall 1

A core brain system in assembly of cognitive episodes

John Duncan, *Medical Research Council, Cambridge, UK*

All human cognition is controlled in a series of attentional episodes, breaking complex problems into simpler, more solvable sub-problems. In human fMRI studies, a common or multiple-demand (MD) pattern of frontal and parietal activity is associated with diverse cognitive demands, and with standard tests of fluid intelligence. Based on behavioural, neuropsychological, fMRI and single unit data, I suggest that the core function of MD cortex is to control complex cognition in a structured sequence of attentional episodes.

Break

10:15 – 10:30

Oral Sessions

10:30 – 11:45

Oral session presentations are chosen by the Program Committee from submitted abstracts using criteria of quality and timeliness; a wide spectrum of investigation is represented.

O-TH1: Social Neuroscience

Hall 1
Chair: Leonhard Schilbach, *University of Cologne, Cologne, Germany*

10:30 – 10:45
4327: Connectivity among "Theory of Mind" Regions reflects Social Inference Computations
Andreea Oliviana Diaconescu, *Translational Neuromodeling Unit (TNU), University & ETH Zürich, Switzerland*

10:45 – 11:00
4254: The role of the rTPJ in attention and social interaction as revealed by ALE meta-analysis|
Sarah Constance Krall, *Jülich Research Center (INM-3), Jülich, Germany*

11:00 – 11:15
4317: Predictive representation of others' actions in a synchronous joint task: An EEG study
Dimitrios Kourtis, *Ghent University, Ghent, Belgium*

11:15 – 11:30
4293: Subdifferentiation in the Human Dorsomedial Prefrontal Cortex
Lukas Hensel, Research Center Jülich, Jülich, Germany

11:30 – 11:45
4240: Orienting the Self: A 7 Tesla study of self-orientation in spatial, temporal and personal domains
Roy Salomon, *EPFL, Lausanne, Switzerland*

O-TH2: Modeling Electrophysiology

Hall 2
Chair: Silvina Horovitz, *NIH, Bethesda, MD, USA*

10:30 – 10:45
4223: What can MEG reveal about the neuronal activity underlying positive and negative BOLD responses?
Stephen Mayhew, *University of Birmingham, Birmingham, UK*

10:45 – 11:00
1600: Resting-State Networks Derived from ECoG and Their Dependence on State of Consciousness
Jeff Duyn, *National Institutes of Health, Bethesda, MD, USA*

11:00 – 11:15
1696: Regularized Partial Lagged Coherence for Functional Connectivity Analysis in Presence of Cross-talk
Sergul Aydore, *University of Southern California, Los Angeles, CA, USA*

11:15 – 11:30
1690: Laminar distribution of cross-frequency couplings of spontaneous current sources and sinks
Robert Sotero, *Montreal Neurological Institute, Montreal, Canada*

11:30 – 11:45
1681: Automated model selection for covariance estimation and spatial whitening of M/EEG signals
Denis A. Engemann, *Institute of Neuroscience and Medicine, Cognitive Neuroscience (INM-3), Juelich Research Centre, Jülich, Germany*

O-TH3: Emotion and Motivation

Hall G1
Chair: Dean Mobbs, *Columbia University, New York, NY, USA*

10:30 – 10:45
1897: Phasic BOLD activity in the locus coeruleus and pupil dilation at different levels of tonic arousal
Silvy Collin, *Donders Institute, Nijmegen, The Netherlands*

10:45 – 11:00
1901: Distinct cerebellar lobules encode arousal and valence in specific time windows: an MEG study
Charis Styliadis, *Aristotle University, Thessaloniki, Greece*

11:00 – 11:15
1874: Neural correlates of risk and resilience to anxiety in healthy youths with a history of adversity
Valérie La Buissonnière Ariza, *University of Montreal, Montreal, Canada*

11:15 – 11:30
2345: 7T fMRI of SN/VTA, locus coeruleus & hippocampus during emotional & reward-related memory encoding
Anne Maass, *Institute of Cognitive Neurology and Dementia Research, Otto-von-Guericke-University Magdeburg, Germany*

11:30 – 11:45
3558: The Latent Factor Structure of Biological & Behavioral Markers of Reward Sensitivity in Adolescence
Colin Sauder, University of Texas Health Science Center, San Antonio, TX, USA

O-TH4: Neurologic Disorders

Hall G2
Chair: Michael Greicius, Stanford University, Stanford, CA, USA

10:30 – 10:45
1697: Dopamine depletion leads to aberrant coordination across striatal, motor and cerebellar networks
Peter Bell, *The University of Sydney, Sydney, Australia*

10:45 – 11:00
3345: Theta burst transcranial magnetic stimulation in subacute stroke: an fMRI study
Lukas Jan Volz, *Max-Planck Institute for Neurological Research, Cologne, Germany*

11:00 – 11:15
3249: Prediction of cortical thickness from MWF imaging in Multiple Sclerosis
Michael Dayan, *IRCCS Santa Lucia Foundation, Rome, Italy*

Thursday, June 12

Scientific Program

11:15 – 11:30
1074: Effect of Neuroinflammation in Preclinical Alzheimer's Disease
Barbara Bendlin, *University of Wisconsin-Madison, Madison, WI, USA*

11:30 – 11:45
3124: Disrupted DMN connectivity in medial temporal lobe epilepsy indicates episodic memory capacity
Cornelia McCormick, *University of Toronto, Toronto, Canada*

Lunch

11:45 – 12:45

Poster Session

12:45 – 14:45
Hall H

Poster Numbers #3000-4455:
Odd Number Posters Stand By

Brain Stimulation Methods: Deep Brain Stimulation, Direct Electrical/Optogenetic Stimulation, TDCS, TMS

Disorders of the Nervous System: Autism, Other Disorders, Stroke, Obsessive-Compulsive Disorder and Tourette Syndrome, Parkinson's Disease and Movement Disorders, Epilepsy, Sleep Disorders

Genetics: Genetic Association Studies, Genetic Modeling and Analysis Methods, Neurogenetic Syndromes

Informatics: Atlases, Databasing and Data Sharing, Pipelines

Language: Language Acquisition, Language Comprehension and Semantics, Reading and Writing, Speech Perception, Speech Production

Lifespan Development: Aging, Normal Brain Development: Fetus to Adolescence

Modeling and Analysis Methods: Bayesian Modeling, Classification and Predictive Modeling, Motion Correction and Preprocessing, Multivariate modeling, Other Methods, PET Modeling and Analysis, Segmentation and Parcellation, Univariate Modeling

Motor Behavior: Brain Machine Interface, Mirror System, Motor Planning and Execution, Visuo-Motor Functions

Neuroanatomy: Anatomy and Function, Brain Networks, Cortical Anatomy and Segregation, Subcortical Structures, White Matter Anatomy, Fiber Pathways and Connectivity

Perception and Attention: Attention: Auditory/Tactile/Motor, Attention: Visual, Chemical Senses: Olfaction, Taste, Consciousness and Awareness, Perception: Auditory/Vestibular, Perception: Multisensory and Crossmodal, Perception: Pain and Visceral, Perception: Tactile/Somatosensory, Perception: Visual, Sleep and Wakefulness

Physiology, Metabolism and Neurotransmission: Cerebral Metabolism and Hemodynamics, Neurophysiology of Imaging Signals, Pharmacology and Neurotransmission

Social Neuroscience: Self Processes, Social Cognition, Social Interaction

Closing Comments and Meeting Highlights

14:45 – 16:00
Hall 1

Susan Bookheimer, *UCLA, Los Angeles, CA, USA*

Farewell Poster Reception

16:00 – 17:30
Hall H

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- Sleep & Behavioral Research

At HBM 2014 we will launch our new product developments. Visit us at our booth and discover new solutions for your research. We are looking forward to meeting you!

Exhibitor List

Brainnetome Center
BOOTH #4

95 Zhong Guan Cun East Rd
Beijing 100190
China
www.brainnetome.org
nmzuo@nlpr.ia.ac.cn

Brainnetome Initiative is launched to reveal how the brain works as well as to understand the pathophysiological mechanism of psychiatric and neurological disorders from a perspective of brain networks on different scales with various brain imaging technologies.

Cambridge Research Systems
BOOTH #33

80 Riverside Estate, Sir Thomas Longley Road
Rochster, Kent
MEZ 4BH
United Kingdom
www.crsltd.com
janine.payne@crsltd.com

Integrated MR safe solutions for fMRI including displays, audio, eye tracking, response devices and patient comfort. BOLDscreen32 LCD display provides the highest quality visual stimulation: it's the only 7T MR safe display offering up to 16-bit colour control, 120Hz panel drive, 3D capability, no time lag and integrated calibration.

Compumedics Ltd
BOOTH #15

30-40 Flockhart Street
Abbotsford VIC 3067
Australia
www.compumedics.com
www.neuroscan.com
sales@compumedics.com

Compumedics Neuroscan provides complete systems for acquiring and integrating neuroimaging data from all functional and structural data modalities. Our product line includes CURRY7 Neuroimaging Suite software with advanced image processing and source localization capabilities, SynAmps RT digital amplifier systems, and the MicroMagLink RT package for simultaneous EEG/fMRI data acquisition.

Conaptic Limited
BOOTH #35

C21, Didcot Enterprise Centre, Hawksworth
Didcot
OX11 7PH
United Kingdom
www.calpendo.com
info@conaptic.com

Conaptic produces web-based database software such as Calpendo and Exprodo SDM. Calpendo is an intelligent rules-based booking system for managing projects and shared equipment. Exprodo SDM is a system for storing research or clinical trial data securely on the web.

Current Designs, Inc.
BOOTH #29

3950 Haverford Ave.
Philadelphia, PA 19104
United States
www.curdes.com
sales@curdes.com

Current Designs' fORP offers the best solution for computer response in the MR/MEG room. At over 1200 sites globally, our fiber optic response systems provide many options for complex tasks including joystick, trackball, and gripforce. Best of all, there is no metal and nothing magnetic in the MR/MEG room, so no worries that the fORP will add noise to the images or raise safety concerns.

Electrical Geodesics, Inc. (EGI)
BOOTH #19, 20

500 East 4th Ave, Suite 200
Eugene, OR 97401
www.egi.com
info@egi.com

Whole-head, fMRI-compatible EEG with 32, 64, 128, or 256 channels. Complete systems include the Geodesic Sensor Net for easy and comfortable application, amplifier, and software with Metafile Format that facilitates interoperation with third party software. EGI also offers source estimation software, experimental control workstations, and integrated eye tracking systems.

g.tec Guger Technologies OG
BOOTH #23

Sierningstrasse 14
Schiedlberg 4521
Austria
www.gtec.at
office@gtec.at

g.tec developed the first commercially available BCI system in 1999: It is now sold in more than 60 countries. Our products work with all major BCI approaches (MI, P300, SSVEP and SCP). We are active members in several national and international research projects and is active in scientific publishing.

Exhibitor List

Human Connectome Project
BOOTH #8

660 South Euclid Avenue
St. Louis, MO 63110
http://humanconnectome.org
elam@wustl.edu

The Human Connectome Project (HCP) is comprehensively mapping region-to-region brain connections and variability in 1,200 healthy adults using cutting-edge neuroimaging and extensive behavioral and heritability measures. All data and tools for analysis, data mining, and visualization are being made freely available by HCP to advance discovery of brain circuitry in humans.

LOCALITE GmbH
BOOTH #17

Schloss Birlinghoven
St Augustin 53757
Germany
www.localite.de
info@localite.de

Localite is a german manufacturer of unique medical navigation systems for research and therapy and supporting leading researchers all over the world.
In this year's exhibition Localite presents the new TMS Navigator 3.0. Among the exciting features are support for brain mapping, robotic assisted coil positioning and MRI compatibility.

Mega Electronics Ltd
BOOTH #34

Pioneerinkatu 6
Kuopio 70800
Finland
www.megaemg.com
mega@megaemg.com

Mega Electronics Ltd is a medical technology company specialized in biosignal monitoring since 1983. Mega Electronics Ltd presents NeurOne Tesla family for EEG/ERP/TMS-EEG/MRI-EEG and new Brain Storm technology enabling EEG systems up to 1200 channels. New Faros product family allows ambulatory and online ECG/HRV research up to several days.

MES Forschungssysteme GmbH
BOOTH #38

Zeppelinstrasse 7
Gilching 82205
Germany
www.mesmed.de
office@mesmed.de

Brain Products is a leading manufacturer of solutions for neurophysiological research. MES Forschungssysteme GmbH is Brain Products' distributor in Germany and Switzerland.

We have more than 15 years of experience in developing state-of-the-art solutions for the following fields:

- EEG / ERP / EP
- EEG & fMRI, EEG & TMS, EEG & MEG
- BCI & Bio-/Neurofeedback
- Sleep & Behavioral Research

At HBM 2014 we will launch our new product developments. Visit us at our booth and discover new solutions for your research. We are looking forward to meeting you!

MRC Systems GmbH
BOOTH #10

Hans Bunte Ste 10
Heidelberg 69123
Germany
www.mrc.systems.de
info@mrc-systems.de

MRC Systems of Heidelberg, Germany, offers MRI compatible video cameras since 2004. The cameras can be used without artifacts and interference inside the bore of MRI scanners for applications like monitoring of subjects or instruments, eye-tracking, motion tracking, MRI diagnostics in pediatrics and room monitoring.

Neuro Device
BOOTH #30

Plowiecka 1
Warsaw04-501
Poland
www.neurodevice.pl
kontakt@neurodevice.pl

Since 2004, the Neuro Device Group offers outsource R&D services for research equipment & medical devices. Having great technical facilities at our disposal, we can design and manufacture custom-made devices. Our team consists of engineers, designers, developers and usability experts. Our primary focus are: MRI imaging and neuroscience research.

Exhibitor List

NIRx Medical Technologies
BOOTH #32

7083 Hollywood Blvd Fl 4
Los Angeles, CA 90028
www.nirx.net
info@nirx.net

NIRx Medical Technologies, LLC. is a world-leader in providing integrated fNIRS neuroimaging systems to the research market. Our global team is constantly working to provide comprehensive technology solutions for the most demanding applications.

NITRC — Neuroinformatics Tools & Resources Clearinghouse
BOOTH #7

306 Florida Ave NW
Washington DC 20001
www.nitrc.org
nitrcinfo@nitrc.org

NITRC.org is an award-winning, user-friendly collaboration environment for the neuroinformatics community, giving neuroinformatics researchers around the world easy access to software tools and resources, imaging data, and a cloud-based computational environment pre-configured with popular neuroimaging software. Most of the resources are free with communities of interest associated with them.

Exhibitor List

Optoacoustics Ltd
BOOTH #28

17 Hanotea St
Mazor 73160
Israel
www.optoacoustics.com
info@optoacoustics.com

Optoacoustics is the leader in high performance optical fiber-based sound and measurement solutions for functional, interventional and clinical MRI and MEG. Optoacoustics MR-safe microphones and headphones provide crisp, clear two-way communications. Our FOMRI-III noise cancelling microphone is today's standard for recording speech in fMRI. We've recently introduced OptoACTIVE slim headphones that actively/passively reduce >95% of EPI gradient noise and deliver high fidelity audio, enabling MR research that could not be done before.

Oxford University Press
BOOTH #9

Great Clarendon Street
Oxford, Ox2 0BD
United Kingdom
www.oup.com
gab.exhibitions.uk@oup.com

Oxford University Press is a division of the University of Oxford and publishes some of the most renowned and respected brain science books in the world. Visit our stand to pick up free journal copies and to browse and buy books at a discount.

Psychology Software Tools
BOOTH #13, 14

311 23rd Street Ext. Suite 200
Pittsburgh, PA 15215
www.pstnet.com
emily.austin@pstnet.com

Psychology Software Tools, Inc. is a world leader in stimulus presentation software with their flagship product E-Prime®. Their hardware product line includes advanced solutions for fMRI and eye tracking research. Their customer base is comprised of more than 3,000 institutions in over 50 countries.

Rogue Research Inc.
BOOTH #24, 25

4398 St-Laurent, Suite 206
Montreal, Quebec H2W 1Z5
Canada
www.rogue-research.com
diane@rogue-research.com

Rogue Research develops the industry leading Brainsight family of neuronavigation-based products used in human TMS, EEG and NIRS as well as in veterinary neurosurgery. Brainsight NIRS is our new functional brain imaging device that is designed for multi-modality NIRS including NIRS-EEG, NIRS-TMS and NIRS-MEG.

Rogue Resolutions
BOOTH #12

Sophia House
Cardiff CF11 9LJ
United Kingdom
http://www.rogue-resolutions.com
andrea@rogue-resolutions.com

Rogue Resolutions provides integrated solutions for neuroscience, specialising in neuromodulation, neuronavigation and neuroimaging applications. These solutions include brain stimulation using TMS and tDCS / tACS / tRNS; neuronavigation for TMS, EEG and NIRS; neuroimaging using EEG, NIRS and MRI-compatible systems; and Eye Tracking, Stimulus Software and Image Analysis Software.

Shimadzu Europa GmbH
BOOTH #22

Albert-Hahn-Str 6-10
Duisburg47269
Germany
www.shimadzu.com
shimadzu@shimadzu.eu

"SHIMADZU contribute to society through science and technology. We provide wide possibility for brain science with functional Near Infrared Spectroscopy (fNIRS). At the SHIMADZU booth, we will introduce the advantage features of fNIRS system: LABNIRS and variety of applications. We are looking forward to see you in our booth.

Siemens AG Healthcare Sector
BOOTH #40

Henkestr 127
Erlangen 91052
Germany
www.siemens.com/healthcare
medg.gms@siemens.com

The Siemens Healthcare Sector is one of the world's largest suppliers to the healthcare industry and a trendsetter in medical imaging, laboratory diagnostics, medical information technology and hearing aids. Siemens offers its customers products and solutions for the entire range of patient care from a single source — from prevention and early detection to diagnosis, and on to treatment and aftercare.

Exhibitor List

Smart Eye AB
BOOTH #11

Forsta Langgatan 28 B
Gothenburg 41327
Sweden
www.smarteye.se
info@smarteye.se

SMART EYE provides ROBUST 3D Binocular Eye Tracking systems for psychology research or usability tests — among others. It is fully integrated with EEG nets that monitor brain activity. The systems provide REAL-TIME 3D information on gaze direction, head position and angles, eyelid opening, pupil size and many more.

The BrainMap Project
BOOTH #39

7703 Floyd Curl Drive
San Antonio, TX 78229-6240
United States
http://www.brainmap.org/fox@uthscsa.edu

The goal of the BrainMap Project to develop software and tools to share neuroimaging results and enable meta-analysis of studies of human brain function and structure in health and diseased. BrainMap is supported by NIH/NIMH R01 MH074457.

Vpixx Technologies, Inc.
BOOTH #6

1494 Montarville Suite 206
St Bruno J3V 3T5
Canada
www.vpixx.com
sales@vpixx.com

VPixx Technologies welcomes the research community to OHBM 2014. We are excited to demonstrate our lineup of MRI-compatible solutions including our PROPixx 500Hz DLP LED projector, 400Hz 3D polarizer with passive 3D glasses, the SHIELDPixx Faraday cage, and our MRI-compatible audio stimulator and response pads.

Wiley
BOOTH #18

New Era Estate, Oldlands Way, Bognor Regis
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United Kingdom
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Nonprofit Table Top

NeuroDebian
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team@neuro.debian.net

NeuroDebian (http://neuro.debian.net) tracks the latest developments of neuroscientific software and integrates them within Debian operating system and its derivatives (e.g. Ubuntu). It delivers a complete stable and versatile software platform for scientists to carry out everyday research routines, while minimizing necessary involvement in system maintenance.

neuGRID/N4U
Via Pilastroni 4
Brescia 25125
Italy
www.neugrid4you.eu
vcavaliere@fatebenefratelli.it

NeuGRID is an image processing and data mining service infrastructure, providing researchers, clinicians, algorithm developers, and pharmaceutical companies with an innovative online functional environment, where to securely upload, use, share brain feature extraction algorithms paired with access to computational power, large image datasets and specialized support & training. neuGRID4you has received funding from the EC 7FP (grant agreement 283562).

PLOS
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PLOS is a leading Open Access publisher — with a suite of influential journals — providing tens of thousands of research articles, which are immediately free to access online, distribute and reuse. PLOS publishes neuroscience and brain mapping research in PLOS ONE, PLOS Biology, PLOS Computational Biology, and PLOS Genetics.

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Disclosures

OHBM 2014 Program Planning Member Disclosure Statements

Please note: Program Planning Members not listed below have no disclosures to report.

NAME	COMMERCIAL INTEREST(S)	WHAT WAS RECEIVED	FOR WHAT ROLE(S)?
Arno Villringer	Bayer, Brains Unlimited	Honorarium, Consulting Fee	Member of Supervisory Board
Christian Buchel	Janssen Pharma	Honorarium	Speaker
Klaas Enno Stephan	Elsevier	Honorarium	Editorship
Simon Eickhoff	Elsevier	Honorarium	Editorship
Steve Smith	SBGneuro, Oxford University, Elsevier	Stipend/Shares, Royalties, Honorarium	Part-owner/ consultant, FSL Originator, Editorship

OHBM 2014 Speaker Disclosure Statements

The OHBM Program Committee reviewed all financial disclosures and detemined there were no conflicts of interest relevant to their talks.

Please note: Speakers not listed below have nothing to disclose.

NAME	COMMERCIAL INTEREST(S)	WHAT WAS RECEIVED	FOR WHAT ROLE(S)?
David Feinberg	Advanced MRI Technologies	Ownership	President
Agnes Flöel	Schwabe, Novartis Böhringer-Ingelheim and Souvenaid, Schattauer GmbH	Fees, Honoraria, Book Royalties	Consulting, Presentations, Author of Alzheimer-Unabwendbares Schicksal?
Richard Frackowiak	Astra Zeneca, Sanofi Aventis	Honorarium paid to hospital	Speaker
Xavier Golay	Philips Medical Systen	grant funding	extramural research and development
Matthias Gunther	siemens medical systems	funding for research and development and intellectual property royalties	development of 3D GRASE ASL
Thomas Liu	GE Medical Systems	Research proposal is pending (not yet awarded or may not be awarded)	PI
Paul M. Matthews	GlaxoSmithKline Research, Development Biogen IDEC Novartis	partial salar Stocks and options, Honoraria	Part Time Employee, Speaker
Lucas Parra	Soterix commercializes electric stimulation technology with IP with myself of co-inventor and owned by my academic institution.		
Stefan Posse	NeurInsight LLC	Ownership	Founder
Alberto Priori	Newronika, Italy	intellectual property rights, ownership interest	President
Gholamreza Salimi-Khorshidi	ConnectomeX, AIG, The University of Oxford	intellectual property rights and ownership interest @ ConnectomeX, I lead the machine learning research at AIG, I am an adjunct researcher at the University of Oxford	CEO I founded ConnectomeX, Director
Hartwig R. Siebner	Lundbeck A/S, Elsevier Publishers, Springer Publishing, Biogen Idec, Genzyme, MagVenture	Honorarium	Scientific Advisory Board, Editor, Speaker, Travel Support

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Ground Level

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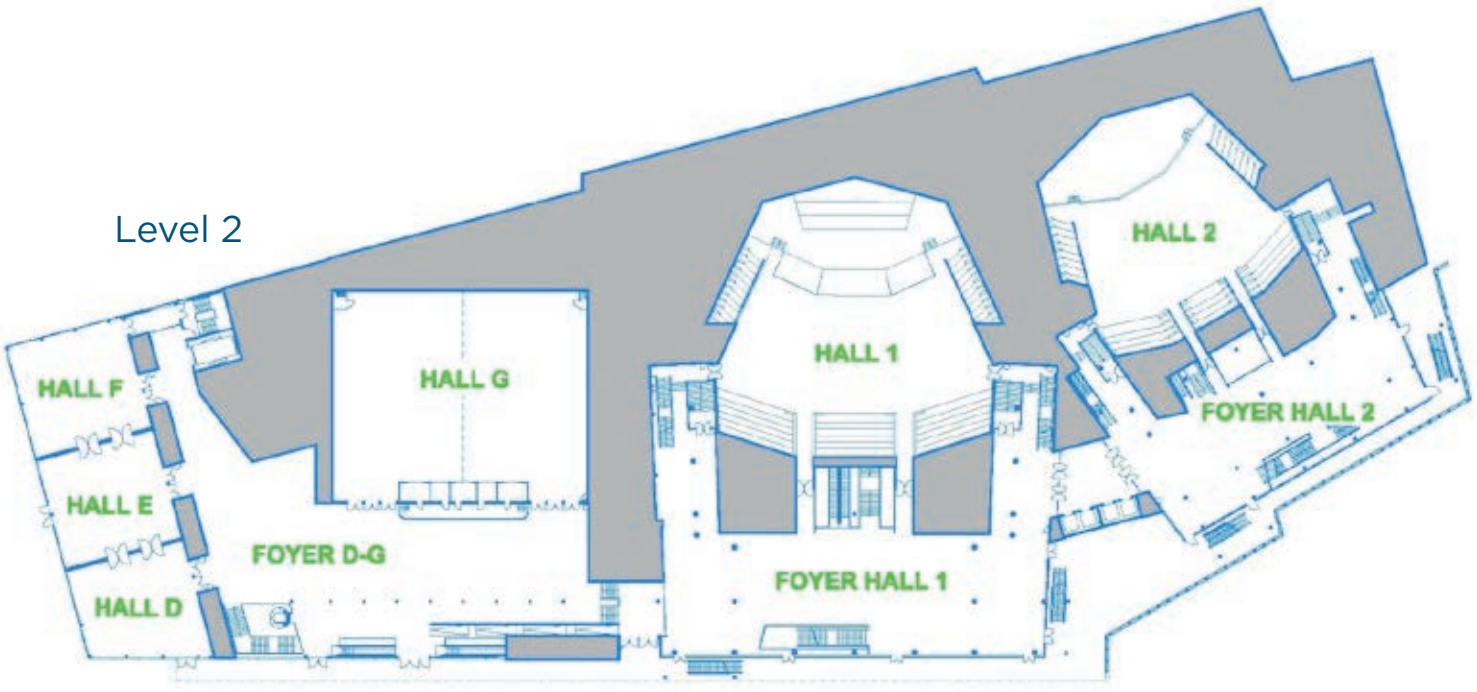
Level 1

Level 2



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