2016 OHBM GENEVA

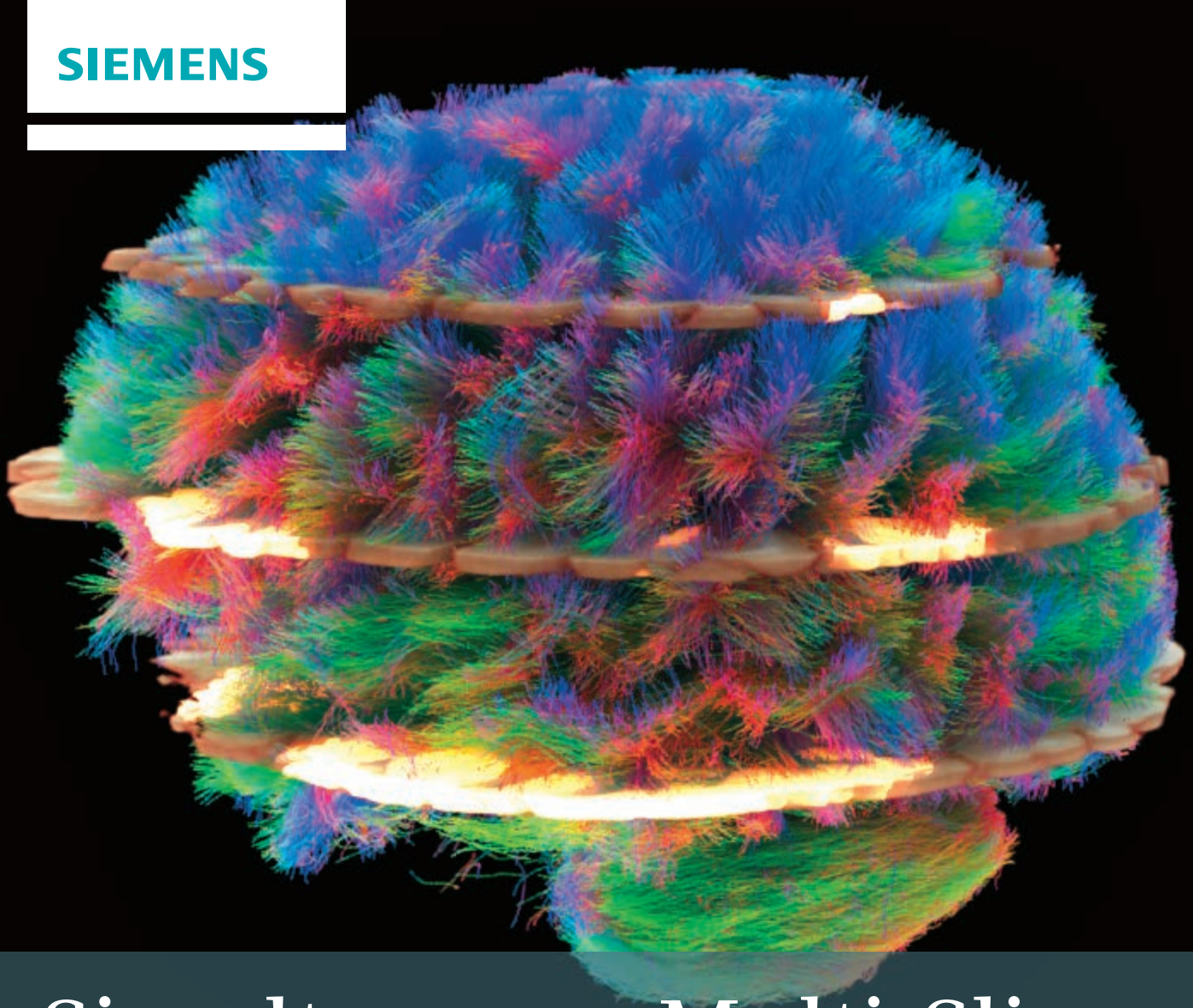
22ND ANNUAL MEETING OF THE
ORGANIZATION FOR HUMAN BRAIN MAPPING

PROGRAM

June 26-30, 2016

Palexpo Exhibition and Congress Centre | Geneva, Switzerland

SIEMENS



Simultaneous Multi-Slice

Accelerate advanced neuro applications for clinical routine

siemens.com/sms

Simultaneous Multi-Slice is a paradigm shift in MRI acquisition – helping to drastically cut neuro DWI scan times, and improving temporal resolution for BOLD fMRI significantly.

[1] MAGNETOM Prisma, Head/Neck 64

Simulataneous Multi-Slice helps you to:

- reduce imaging time for diffusion MRI by up to 68%[1]
- bring advanced DTI and BOLD into clinical routine
- push the limits in brain imaging research with acceleration factors up to 8[1]

WELCOME

We would like to personally welcome each of you to the 22nd Annual Meeting of the Organization for Human Brain Mapping! The world of neuroimaging technology is more exciting today than ever before, and we'll continue our tradition of bringing inspiration to you through the exceptional scientific sessions, poster presentations and networking forums that ensure you remain at the cutting edge.

Here is but a glimpse of what you can expect and what we hope to achieve over the next few days.

- Talairach Lecture presenter Daniel Wolpert, Univ. Cambridge UK, who will share his work on how humans learn to make skilled movements covering probabilistic models of learning, the role and content in activating motor memories and the intimate interaction between decision making and sensorimotor control.
- Keynote lecturers including Anissa Abi-Dargham, Columbia Univ. USA, Tim Behrens, Oxford Univ. UK, Susan Bookheimer, UCLA USA, Fernando Lopes Da Silva, Univ. Amsterdam Netherlands, David Poeppel, MPI Frankfurt Germany, William W. Seeley, UCSF USA and Nora D. Volkow, NIDA at NIH USA offering a diversity of topics discussing major themes in neuroimaging science and applications.
- 25 stimulating morning and afternoon symposia that will spur active audience discussion and participation.
- The popular LOC Symposium on Monday from 10:50 to 12:00 covering Disorders of Self-Awareness and Dissociative States
- A first-ever joint symposium with OHBM and the World Health Organization on Thursday afternoon designed to raise awareness among the participants of OHBM to the need of current research projects that impact upon the staggering burden of disease of brain disorders.
- Social and Networking opportunities with our exhibitors, sponsors, mentors and peers including the Student/Post Doc SIG social on Monday evening, Wednesday's legendary Club Night, and Tuesday and Thursday evening poster receptions. Additionally, local students have arranged a get-together headquarters to meet and socialize each night of the meeting. Learn more about this at **Brainmeout.com**.
- An expansion of the Hackathon through the newly formed Open Science SIG with special programming offered throughout the meeting.

We would like to thank each of you for attending the OHBM meeting and bringing your expertise to our gathering. You, as leaders in human brain mapping, have the vision, the knowledge, and the experience to help us pave our way into the future. Throughout this meeting, we ask you to stay engaged and provide feedback that can continue to help us shape the future of OHBM.

Sincerely,

Karl Zilles
Chair, Council

Andreas Kleinschmidt
Chair, Program Committee

Christoph Michel
Co-Chair, Local Organizing Committee

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OHBM 2016 PROGRAM-AT-A-GLANCE

Sunday, June 26

Educational Courses

Full Day Courses: 8:00 – 16:30
MR Diffusion Imaging: From the Basics to Advanced Applications
Room ABC

Anatomy and Its Impact on Structural and Functional Imaging
Room W

Graph Theoretic Models of Brain Networks
Room V

Pattern Recognition for NeuroImaging
Room X

Electromagnetical Neuroimaging
Room K, Level 2

Morning Courses: 8:00 – 12:00
The Art and Pitfalls of fMRI Preprocessing
Room E, Level 2

Tools to Parcellate the Brain and Its Relation to Function
Room F, Level 2

Introduction to Imaging Genetics
Room G, Level 2

Afternoon Courses: 13:00 – 16:30
Neuroimaging Meta-Analysis
Room E, Level 2

Practicalities for Reproducible Neuroimaging
Room F, Level 2

Real-time fMRI: Fundamental Principles for Clinical Applications
Room G, Level 2

8:00 – 16:30
Open Science Special Interest Group
Hackathon Room: 1, 2, 3

17:30 – 19:30
Opening Ceremonies and Talairach Lecture
Room ABC

Talairach Lecture: Daniel Wolpert, FMedSci FRS
Probabilistic models of sensorimotor control and decision making

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19:00 – 21:00
Welcome Reception
Outside the Palexpo Entrance in the Garden Area, Level 1

Monday, June 27

8:00 – 9:15
Morning Symposia:
What Neuroimaging Can Tell Us? From Correlation to Causation and Cognitive Ontologies
Room ABC

Creating a Social Experience in the Scanner: A Taxonomy of Interactive Paradigms
Room VW

New prospects for imaging the developing brain: opportunities and challenges
Room X

Clinical Language Mapping by Multimodal Neuromagnetic Methods: a Joint Symposium of ISACM and OHBM
Room K, Level 2

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15 minute break

9:30 – 10:15
Keynote Lecturer: William Seeley
Network-based Neurodegeneration
Room ABC

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10 minute break

10:25 – 10:50
Best Paper Award Presentations
Room ABC

10:50 – 12:00
LOC Symposium
Disorders of Self-Awareness and Dissociative States
Room ABC

12:00 – 12:45 Lunch Break

12:00 – 14:430
GE Healthcare Lunch Symposium
Room X

12:45 – 14:45
Poster Session: Poster Numbers #1000-2412
Authors with even numbered posters will present their posters today.
Hall 1

14:45 – 16:00
Afternoon Symposia:
Imaging Brain Plasticity
Room ABC

The behavioral relevance of time-varying functional connectivity
Room VW

Ex vivo approaches for investigating the brain's circuitry: The what, the how & the why
Room X

16:15 – 17:00
Keynote Lecture: David Poppel
New Directions in the Neurobiology of Language
Room ABC

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15 minute break

17:15 – 18:30
Oral Sessions

O-M1: Early Brain Development
Room K, Level 2
O-M2: Neurodegenerative Diseases
Room VW
O-M3: Acquisition Methods
Room X
O-M4: Perceptual representations
Room ABC

Tuesday, June 28

8:00 – 9:15
Morning Symposia:
The added value of simultaneous multimodal recordings in neurosciences
Room X

Social Neuroscience and Neuroimaging: Perspectives and Open questions
Room K, Level 2

Effects of Head Motion on Structural and Functional MRI Studies
Room VW

Skeptical Connectivity: Time for Something Completely Different
Room ABC

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15 minute break

9:30 – 10:15
Keynote Lecturer: Nora Volkow
Mapping Addiction in the Human Brain
Room ABC

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15 minute break

10:30 – 11:45
Oral Sessions

O-T1: Parcellation & Informatics
Room K, Level 2
O-T2: Learning and Memory
Room W
O-T3: Higher Cognitive Functions
Room X
O-T4: Neuropsychiatric Disorders
Room V
O-T5: Acquisition and Pre-Processing Methods
Room ABC

11:45 – 12:45 Lunch Break

12:00 – 13:00
LABMAN Meeting
Secretariat 2

12:00 – 14:30
EGI Lunch Symposium
Room X

Philips Lunch Symposium
Room K

12:45 – 14:45
Poster Session: Poster Numbers #1000-2412
Authors with odd numbered posters will present their posters today.
Hall 1

14:45 – 16:00
Afternoon Symposia:
Revealing Fine-Scale Representations and Processing with High-Resolution fMRI and MVPA
Room ABC

Early Developmental Studies of Autism Spectrum Disorder
Room X

Modulating functional brain systems with non-invasive brain stimulation
Room VW

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15 minute break

16:15 – 17:00
Keynote Lecture: FernandoLopes da Silva
Functional and causal relationships based on EEG/MEG signals
Room ABC

17:00 – 18:30
Poster Reception: Poster Numbers #1000-2412
Hall 1

Wednesday, June 29

8:00 – 9:15
Morning Symposia:
Neuroimaging pain-related circuitries in the human brainstem with functional MRI
Room K, Level 2

Neural Nets to Neural Nets: Deep Learning Approaches to Neuroimaging
Room VW

Functional Connectivity or Causality in the Brain: How Do We Know
Room ABC

Shapes of the Language Network: From Primates to Second Language Acquisition
Room X

15 minute break

9:30 – 10:15
Keynote Lecture: Susan Bookheimer
The Uniquely Human Hippocampus
Room ABC

15 minute break

10:30 – 11:45
Oral Sessions

O-W1: Predictive and Statistical Modelling
Room W
O-W2: Emotion, Motivation, & Social Neuroscience
Room ABC
O-W3: Genetics
Room K, Level 2
O-W4: Motor Action and Stimulation
Room V
O-W5: Language
Room X

11:45 – 13:30
Meet The Editors Round Table
(Bring your own lunch)
Room W

11:45 – 12:45 Lunch Break

12:00 – 13:30
Siemens Lunch Symposium
Room X

12:45 – 14:45
Poster Session: Poster Numbers #3000-4391
Authors with even numbered posters will present their posters today.
Hall 1

14:45 – 16:00
Afternoon Symposia:
Pediatric neuroimaging grows up: Large scale imaging initiatives to study the developing brain
Room VW

Using connectivity imaging to guide therapeutic brain stimulation
Room X

Imaging Decision-Making: How the brain weights different sources of information
Room ABC

16:15 – 17:00
Keynote Lecture: Tim Behrens
Storing, using and updating knowledge for behavioural control
Room ABC

15 minute break

17:15 – 18:15
Town Hall Meeting
Room ABC

20:00 – 2:00
Club Night
Espace Hippomène

Thursday, June 30

8:00 – 9:15
Morning Symposia:
From mapping to modulation: using neuroimaging to guide brain stimulation treatment for addiction
Room VW

Executive Function and Brain Connectivity
Room ABC

Multi-Echo fMRI and its Applications in Neuroscience and Neuropsychiatry
Room X

Scientific and clinical applications of EEG and fMRI neurofeedback
Room K, Level 2

15 minute break

9:30 – 10:15
Keynote Lecture: Anissa Abi-Dargham
The Topography of Dopamine Dysfunction in Schizophrenia
Room ABC

15 minute break

10:30 – 11:45
Oral Sessions

O-TH1: Connectivity Modeling
Room ABC
O-TH2: Focal Neurological Disorders
Room W
O-TH3: The Aging Brain
Room X
O-TH4: Neuroanatomy and Physiology
Room V

11:45 – 12:45 Lunch Break

12:00 – 14:30
OHBM - WHO Symposium
(Bring your own lunch)
Room ABC

12:45 – 14:45
Poster Session:
Poster Numbers #3000-4391
Authors with odd numbered posters will present their posters today.
Hall 1

14:45 - 16:00
Closing Comments and Meeting Highlights
Room ABC

16:00 - 17:30
Farewell Poster Reception: Poster Numbers #3000-4391
Hall 1

GENERAL INFORMATION

CONFERENCE VENUE

Palexpo Exhibition and Congress Centre
Route François-Peyrot 30
1218 Le Grand-Saconnex, Geneva, Switzerland

All events will take place at the Palexpo unless otherwise noted.

REGISTRATION HOURS

Main Lobby, Level 1

Saturday, June 23: 15:00 – 18:00
Sunday, June 24: 7:00 – 19:30
Monday, June 25: 7:30 – 17:00
Tuesday, June 26: 7:30 – 17:00
Wednesday, June 27: 7:30 – 17:00
Thursday, June 28: 7:30 – 15:00

EXHIBIT HOURS

Hall 1

Monday, June 27: 11:00 – 16:00
Tuesday, June 28: 11:00 – 18:30
Wednesday, June 29: 11:00 – 16:00
Thursday, June 30: 11:00 – 17:30

NEW IN 2016! EXHIBITOR RAFFLE

Each attendee will have a chance to win a $300 CHF cash prize by participating in the Exhibitor Raffle! Raffle cards can be picked up at the Onsite Materials Table which you will use to collect stickers as you visit each exhibitor. Once you have completed the raffle card, please return it to the submission box near the registration desk and you name will be entered into the cash drawing. The drawing will be held during the final poster reception on **Thursday, June 30th. You must be present to win.**

WELCOME RECEPTION

Sunday, June 25, 19:00 – 21:00
Outside the Palexpo Entrance in the Garden Area, Level 1

Join us for the 2016 Annual Meeting Welcome Reception featuring typical swiss beer, wine, food and entertainment. The reception will be held at the Palexpo Center immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 25. **Please make sure to wear your name badge, which will serve as your ticket to the event.** Additional guest badges are $50.00 USD.

INDUSTRY SPONSORED LUNCH SYMPOSIA

Monday, June 27
GE Healthcare
12:00 – 14:30
Room X

Advanced quantitative MR imaging tools for Neuroscience

Tuesday, June 28
EGI
12:00 – 14:30
Room X

Dense Array Transcranial Electrical Neuromodulation

Phillips
12:00 – 14:30
Room K, Level 2

Discover new clinical pathways with confidence within your daily research

Wednesday, June 29
Siemens
12:00 – 14:30
Room X

Driving personalized imaging with quantitative radiology

TOWN HALL FORUM

Wednesday, June 29, 17:15 – 18:15
Room ABC

The Town Hall 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. Member input will be sought on several topical issues including a report by the Chair on OHBM's recent strategic planning meeting and new initiatives under development and a report by the newly formed Communications Committee on ways members of the OHBM community can remain engaged even after the meeting. The newly elected leadership will be announced as well as dates and venues for future Annual Meetings.

CLUB NIGHT

Wednesday, June 29, 20:00 – 1:30

Housed in an exceptional building, the Espace Hippomène is a multidimensional concept located on a historically significant industrial site that is designed to host all types of unique events. The venue occupies a strategic location in Geneva, close to the airport, railway station, the city center and international organizations.

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 Club Night. Additional guest tickets are $50.00 and must be purchased at the conference registration desk.
Address: Avenue de Châtelaine 7 – CH-1203 Geneva
t +41 22 560 00 70 – f +41 22 560 00 80

ABSTRACT / POSTER LISTING BOOK

You can locate the abstract / poster listing book only on **www.humanbrainmapping.org/2016abstracts**.
Posters are searchable by author and category in the mobile app.

SPEAKER READY ROOM

Office O

Hours:
Saturday, June 25: 15:00 – 18:00
Sunday, June 26: 7:00 – 19:00
Monday, June 27: 7:00 – 19:05
Tuesday, June 28: 7:00 – 18:00
Wednesday, June 29: 7:00 – 18:00
Thursday, June 30: 7:00 – 16:00

INTERNET CAFÉ / CHARGING STATION

ABC Foyer

A limited number of complimentary terminals will be available. Please limit your time at a terminal to 15 minutes.
Hours:
Saturday, June 25: 15:00 – 18:00
Sunday, June 26: 7:00 – 19:30
Monday. June 27: 7:30 – 17:00
Tuesday, June 28: 7:30 – 17:00
Wednesday, June 29: 7:30 – 17:00
Thursday, June 30: 7:30 – 15:00

GENERAL INFORMATION

OHBM ART EXHIBIT / CAN'T YOU SEE?

Currently in its sixth year, the Brain-Art Exhibition aims to provide an active interface between neuroscience and the arts at annual meeting of OHBM. This year we address the theme of hallucinations with the exhibition title: "Can't you see?". The exhibition is organized by the Neuro Bureau in collaboration with the Association of Neuroesthetics, and the content was developed by Natacha Mendes, Glad Mihai, and Elena Agudio. More information is available at:
www.neurobureau.org/exhibitions

2016 OHBM OPEN SCIENCE SPECIAL INTEREST GROUP HACKATHON – JUNE 23-26, 2016

The 2016 OHBM Open Science Special Interest Group Hackathon took place June 23 - 25 at the Univercité hackerspace in Lausanne, Switzerland. The goal of the hackathon was to bring together researchers with disparate backgrounds from the OHBM community to collaborate on open science projects in neuroimaging. The spirit of the hackathon will also be continuing into the OHBM meeting in Geneva from June 26-30, where a collaboration space (Room 1,2,3) will be available in the conference venue. This space will be open to all OHBM attendees to discuss, present, and continue working on hackathon projects. The hackathon was made possible by the generous support of The Ludmer Center for Neuroinformatics and Mental Health, The Wellcome Center, OpenfMRI, and the Organization for Human Brain Mapping.

OHBM ONDEMAND

OHBM OnDemand is an online portal designed to provide you with access to educational resources dedicated to those using neuroimaging to discover the organization of the human brain. Access videos, audio and PPT presentations from the quality scientific educational offerings during this year's meeting (as well as from the 2013-2015 OHBM Annual Meetings). OHBM OnDemand is provided at no charge to those that attended the meeting: **www.humanbrainmapping.org/OnDemand**. 2016 Annual Meeting materials will be posted within **three weeks** after the conclusion of the meeting. An announcement will be sent to all attendees announcing its availability. Meeting attendees will receive an announcement when the information is available.

MOBILE APP

The 2016 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/ohbm2016**. 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 board at **www.humanbrainmapping.org/2016Career** where PIs can post positions available notices (under "Job Openings") and individuals can post CVs (under "People Looking for Jobs") before and during the meeting. We recommend using the main lobby and foyer areas to meet with prospective employers or employees.

SOCIAL MEDIA

Twitter: @OHBM, hash tag #OHBM2016
Facebook: Organization for Human Brain Mapping
Facebook Student Post Doc: Organization for Human Brain Mapping –Student and Postdoc Section
LinkedIn: Organization for Human Brain Mapping
Website: BrainMeOut Local Student Group

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 **https://ww5.aievolution.com/hbm1601/**

WIRELESS CONNECTION

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Connect to OHBM2016. **No password is required.**

EVALUATIONS

Please take a moment to utilize the rating system located on the mobile app. You can rate a session by selecting the clipboard icon on the left menu of an event. Individual evaluations will be sent for the Educational Courses and an overall Annual Meeting evaluation will be sent on June 30, 2016. 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 rate the sessions and complete the quick survey.

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 onsite or online on the OHBM website.**

EDUCATIONAL COURSES	**CREDITS**
MR Diffusion Imaging: From the Basics to Advanced Applications (Full Day)	7.00
Anatomy and Its Impact on Structural and Functional Imaging (Full Day)	7.00
Graph Theoretic Models of Brain Networks (Full Day)	7.00
Pattern Recognition for NeuroImaging (Full Day)	7.00
Electromagnetical Neuroimaging (Full Day)	7.00
The Art and Pitfalls of fMRI Preprocessing (Half Day)	3.50
Tools to Parcellate the Brain and Its Relation to Function (Half Day)	3.50
Introduction to Imaging Genetics (Half Day)	3.50
Neuroimaging Meta-Analysis (Half Day)	3.50
Practicalities for Reproducible Neuroimaging (Half Day)	3.50
Real-time fMRI: Fundamental Principles for Clinical Applications (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 Symposia	1.25 each
Oral Sessions	1.25 each
Afternoon 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**

MR Diffusion Imaging: From the Basics to Advanced Applications

Full Day Course / 8:00 – 16:30

Room ABC

Organizers:

Flavio Dell'Acqua, King's College London, London, United Kingdom

Anton L. Beer, Universität Regensburg, Regensburg, Germany

Alfred Anwander, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

Diffusion weighted imaging (DWI) is a non-invasive MRI technique that is sensitive to the micro-structure and the structural connectivity of the brain. Recent technological advancements in commercially available MR scanners has enabled a large number of neuroscientists and clinicians to acquire advanced diffusion-weighted data of very high quality but has made also this a very fast evolving field of neuroimaging. To fully exploit all the opportunities given by these new technologies it is therefore essential to fully understand what are the main strategies to acquire, process and analyse diffusion imaging data. By following an ideal diffusion imaging pipeline, all lectures will review the current state of the art of diffusion imaging methods and the possible pitfalls and limitations that need to be taken into account before getting to the final results. Examples will be provided on how advanced analysis methods benefit from the technological advancements in data acquisition and how these analysis methods help to address relevant clinical and scientific questions ranging from brain plasticity, development, brain disorders or neurodegeneration. The course will also present techniques for investigating the microstructure properties in white and gray matter tissue within and across brains. At a systems level, the course will demonstrate techniques for diffusion-based connectomics analyses and parcellations of the human cortex. Finally, the course will try to link structural connectivity with functional MRI and quantitative MRI. Each technique will be presented by practical examples and dedicated time will be allocated for discussion with the audience.

Course Schedule

8:00 – 8:40

Diffusion MRI data acquisition

Karla Miller, University of Oxford, Oxford, United Kingdom

8:40 – 9:20

Methodological considerations on analyzing diffusion MRI data

Alexander Leemans, Image Sciences Institute – UMC Utrecht, Netherlands

9:20 – 10:00

Diffusion imaging models 1: from DTI to HARDI models

Flavio Dell'Acqua, King's College London, London, United Kingdom

10:00 – 10:30

BREAK

10:30 – 11:10

Diffusion imaging models 2: from DTI to microstructure quantification

Gary Zhang, University College London, London, United Kingdom

11:10 – 11:50

Diffusion tractography

Maxime Descoteaux, Université de Sherbrooke, Sherbrooke, Canada

11:50 – 12:00

QUESTION AND ANSWER

12:00 – 13:00

LUNCH

13:00 – 13:40

Preclinical and Post-Mortem Diffusion Imaging

Tim Dyrby, Danish Research Centre for Magnetic Resonance, Copenhagen, Denmark

13:40 – 14:20

Group comparison with diffusion imaging and application to brain plasticity

Anton Beer, Universität Regensburg, Regensburg, Germany

14:20 – 15:00

Connectomics analysis and Parcellation of the brain based on diffusion-weighted fiber tractography

Alfred Anwander, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

15:00 – 15:10

BREAK

15:10 – 15:50

Combining quantitative MRI measures to model brain development

Jason Yeatman, University of Washington, Seattle, United States

15:50 – 16:30

Track-weighted functional connectivity: structure meets function

Fernando Calamante, The Florey Institute of Neuroscience and Mental Health, Melbourne, Australia

Anatomy and Its Impact on Structural and Functional Imaging

Full Day Course / 8:00 – 16:30

Room W

Organizers:

Karl Zilles, Research Centre Juelich, Juelich, Germany

Katrin Amunts, Research Centre Juelich, Juelich, 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 and anatomical methods. It is aimed at a multidisciplinary audience, and will provide an introduction to gross anatomical landmarks, the microstructural organization of the brain including cortical segregation and its intersubject variability, the representation of auditory and language 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. Part one will consist of talks introducing general anatomical concepts and developmental aspects and shows, how MRI contributes. Part two will focus on organizational principles of the brain's microstructure (cyto-, receptor- and myeloarchitecture), and critically reflects the perspectives and limits of MR imaging with respect to brain organization. Part 3 will demonstrate the complex relationships between neuroimaging and the anatomical and microscopical structure using the auditory and language systems as concrete examples. Aim of this part is to provide an integrated view of the anatomy and functions of these systems based on neuroimaging, anatomical and physiological methods.

Course Schedule

8:00 – 8:30

Development of the cerebral cortex

David Van Essen, Washington University, St. Louis, MO, United States

8:30 – 9:00

Cortical folds: landmarks and plasticity

Svenja Caspers, Institute of Neuroscience and Medicine, INM-1, Research Centre Jülich, Jülich, Germany

9:00 – 9:30

MRI and cortical thickness: What does it mean?

Alan Evans, McGill Centre for Integrative Neuroscience, Montreal, 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, Juelich, Germany

11:00 – 11:30

Receptorarchitecture and neural systems

Karl Zilles, Research Centre Juelich, Juelich, Germany

11:30 – 12:00

Cortical diffusion imaging

Alard Roebroeck, Maastricht University, Maastricht, Netherlands

12:00 – 13:00

LUNCH

13:00 – 13:30

High-resolution functional imaging and tonotopy of the auditory pathway and cortex

Elia Formisano, Maastricht University, Maastricht, Netherlands

13:30 – 14:00

Clinical anatomy of auditory cortex

Stephanie Clarke, University Lausanne, Lausanne, Switzerland

14:00 – 14:30

Functional anatomy and physiology of auditory cortex

Josef Rauschecker, Georgetown University, Washington, DC

14:30 – 15:00

Fiber tracts relevant for auditory and language processing

Stephanie Forkel, King's College London, London, United Kingdom

15:00 – 15:30

BREAK

15:30 – 16:00

Functional anatomy of the language system

Angela Friederici, Max Planck Institute, Leipzig, Germany

16:00 – 16:30

WRAP UP AND DISCUSSION

Graph Theoretic Models of Brain Networks

Full Day Course / 8:00 – 16:30

Room V

Organizers:

Alex Fornito, Monash Institute of Cognitive & Clinical Neurosciences, Melbourne, Australia

Andrew Zalesky, University of Melbourne, Melbourne, Australia

Edward T Bullmore, University of Cambridge, Cambridge, United Kingdom

Understanding neuronal connectivity has become a central focus of neuroscience in light of several unprecedented, large-scale international initiatives to comprehensively map wiring diagrams of nervous systems – so-called connectomes – at resolutions ranging from the microscopic (on the scale of a few nanometers) to macroscopic (on the scale of millimeters and centimeters). The diversity of the data produced by these efforts, which is collected using measurement techniques that include electron microscopy, tract tracing and magnetic resonance imaging, and in species such as the nematode worm, Drosophila fruit fly, mouse, macaque and human, pose a major challenge for systematic evaluation, comparison and integration across studies.

Graph theory – a branch of mathematics concerned with modeling systems of interacting elements – provides a unifying and powerful framework for characterizing these varied data. It rests on the assumption that any network can be represented in abstract form as a graph of nodes connected by edges. In connectomics, the nodes correspond to neurons or neuronal populations and the edges to structural or functional connections.

Graph theory has had a major impact on neuroscience, revealing new insights into the organizational properties of brain networks and their generative mechanisms. Many such properties are conserved across resolution scales, measurement technique and species, suggesting that they are fundamental aspects of neural structure and function. Graph theory has also provided a powerful platform for mapping, at a connectome-wide level, the effects of disease and other experimental manipulations.

This workshop provides an integrated overview of the field, covering both basic concepts and advanced applications in the graph theoretic analysis of brain networks. The first half of the workshop will focus on fundamentals such as how a network graph is constructed from neural connectivity data; the different types of graph models available for brain networks; key graph theoretic concepts and measures such as small-worlds, clustering, paths, diffusion processes, centrality, hubs, and modularity; statistical methods for connectome-wide analyses; and the clinical applications of graph theory. The second half of the workshop will consider advanced topics, including the integration of graph theoretic models across resolution scales and other kinds of 'omics data; the use of multilayer networks in modeling dynamic changes in brain connectivity and other applications; generative modeling of brain network organization; the analysis of high-resolution functional connectivity networks with magnetoencephalography; and the way in which graph theory can be used to understand how disease spreads through brain networks.

Graph theory will play an increasingly important role in attempts to understand the massive amounts of data generated by large collaborative projects such as the Human Connectome Project. An integrated and comprehensive educational workshop on the topic is thus timely and necessary to provide researchers with the knowledge required to make the most of such rich data. Attendees will leave this workshop with a detailed understanding of the fundamental principles of graph theory, the application of graph theoretic methods to neuroscientific data, and insight into emerging trends and advanced applications. Attendees will also understand the correct use and interpretation of core graph theoretic measures and the limitations of graph theoretic models.

Course Schedule

8:00 – 8:40

An Introduction to graph theory and connectomics

Alex Fornito, Monash Institute of Cognitive & Clinical Neurosciences, Melbourne, Australia

8:40 – 9:20

Efficiency in brain networks: from shortest-paths to random-walks through the lens of information

Joaquin Goni, Purdue University, West Lafayette, United States

9:20 – 10:00

Network infrastructure for integration: hubs and rich club

Martijn van den Heuvel, Rudolf Magnus Inst. of Neuroscience, Utrecht, Netherlands

10:00 – 10:30

BREAK

10:30 – 11:10

Applications of community detection to characterize brain systems in health and disease

Damien Fair, Oregon Health & Science University, Portland, OR, United States

11:10 – 11:50

Statistical connectomics and clinical applications

Andrew Zalesky, University of Melbourne, Melbourne, Australia

11:50 – 12:00

QUESTION AND ANSWER

12:00 – 13:00
LUNCH

13:00 – 13:40
Integrating analyses across scales of nervous systems: from micro to macro
Edward T Bullmore, University of Cambridge, Cambridge, United Kingdom

13:40 – 14:10
Multilayer and Dynamic Network Approaches to Understanding Human Brain Structure and Function
Danielle Bassett, University of Pennsylvania, Philadelphia, PA, United States

14:10 – 14:50
Generative models of brain networks
Richard Betzel, University of Pennsylvania, Philadelphia, United States

14:50 – 15:00
BREAK

15:00 – 15:50
High resolution functional networks measured with MEG
Mark Woolrich, University of Oxford, Oxford, United Kingdom

15:50 – 16:30
Network models of disease spread and neurodegeneration
Ashish Raj, Weill Cornell Medical College, New York, United States

Pattern Recognition for NeuroImaging

Full Day Course / 8:00 – 16:30
Room X
Organizers:
Christophe Phillips, University of Liège, Liège, 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 data 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 analyze 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 as well as how to draw reliable conclusions.

Course Schedule

8:00 – 8:30
Pattern Recognition Fundamentals
Christophe Phillips, University of Liège, Liège, Belgium

8:30 – 9:00
Strategies to improve the interpretability of whole-brain predictive patterns
Janaina Mourão-Miranda, University College London, London, United Kingdom

9:00 – 9:30
A primer on permutation tests (not only) for MVPA
Carsten Allefeld, Charité – Universitätsmedizin Berlin / Bernstein Center for Computational Neuroscience, Berlin, Germany

9:30 – 10:00
Learning from multimodal data for disease prediction
Olivier Colliot, ARAMIS Lab, Paris, France

10:00 – 10:30
BREAK

10:30 – 11:00
Mapping Patterns Across Individuals: Decoupling Function from Anatomy
Georg Langs, Medical University of Vienna, Vienna, Austria

11:00 – 11:30
Decoding cognitive concepts, not experimental artifacts
Bertrand Thirion, inria, Saclay, France

11:30 – 12:00
Population receptive field modeling
Marcel van Gerven, Donders Institute for Brain, Cognition and Behaviour, Nijmegen, Netherlands

12:00 – 13:00
LUNCH

13:00 – 13:30
Introduction to machine learning with brain graphs
Jonas Richiardi, University of Geneva, Geneva, Switzerland

13:30 – 14:00
Feature representations for anatomical MRI
John Ashburner, UCL Institute of Neurology, London, United Kingdom

14:00 – 14:30
M/EEG Decoding
Moritz Grosse-Wentrup, Max Planck Institute for Intelligent Systems, Tübingen, Germany

14:30 – 15:00
Machine learning and cognitive neuroimaging: new questions answered by new tools
Gael Varoquaux, INRIA, Gif-sur-Yvette

15:00 – 15:30
BREAK

15:30 – 16:00
Resources for practicing PR4NI — pragmatic cursory overview
Yaroslav Halchenko, Dartmouth College, Hanover, NH, United States

16:00 – 16:30
WRAP UP AND DISCUSSION

Electromagnetical Neuroimaging

Full Day Course / 8:00 – 16:30
Room K, Level 2
Organizers:
Thomas Koenig, University Hospital of Psychiatry Bern, Bern 60, Switzerland

Laura Astolfi, Department of Computer, Control, and Management Engineering, University of Rome "Sapienza," Rome, Italy

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 theories, models and methods to analyze multichannel electromagnetic data recorded from the human scalp in an unambiguous, explicit and coherent way.

Particular care is given to present methods that offer explicit junctions to other imaging modalities, allowing converging and/or complementary conclusions.

In addition, there is a rapidly increasing demand for non-invasive human neuroimaging tools to be applicable in translational research. Electromagnetic signals, and in particular the EEG, are exceptionally suitable to be used at the patients' bedside, in critical clinical conditions, or outside hospitals, and their low cost also makes them a prime instrument under economically constrained conditions. The teachers of the course and the content of their presentations will promote a sound methodological basis for the global audience attracted to the OHBM meeting to conduct neuroimaging where the usage of large and expensive scanners is not feasible.

Course Schedule

8:00 – 8:50
Basics of electromagnetic field mapping
Thomas Koenig, University Hospital of Psychiatry Bern, Bern 60, Switzerland

8:50 – 9:40
Scalp field dynamics of evoked and spontaneous EEG
Christoph Michel, Department of Neuroscience, University of Geneva, Switzerland

9:40 – 10:30
Blind Source Separation of Electrophysiological Data
Scott Makeig, Swartz Center for Computational Neuroscience, University of California San Diego La Jolla, CA, United States

10:30 – 11:00
BREAK

11:00 – 11:50
Baselines and state dependent processing
Daniel Brandeis, Department of Child and Adolescent Psychiatry, University of Zürich Zurich, Switzerland

11:50 – 12:00
QUESTION AND ANSWER

12:00 – 13:00
LUNCH

13:00 – 13:50
Confronting noninvasive measures to intracerebral EEG
Christian-G. Bénar, INSERM, Aix-Marseille Université, Marseille, France

13:50 – 14:40
Estimation of cortical connectivity in the source space: general principles, practical considerations and future perspectives
Laura Astolfi, Department of Computer, Control, and Management Engineering, University of Rome "Sapienza", Rome, Italy

14:40 – 15:30
Non-invasive imaging of cortical electric neuronal activity for the localization of function and for connectivity inference
Roberto Pascual-Marqui, Kansai Medical University, Osaka, Japan

15:30 – 15:40
BREAK

15:40 – 16:15
Multimodal Brain Databases and Model Driven Information Integration
Pedro Valdes-Sosa, Cuban Neuroscience Center, Havana, Cuba

16:15 – 16:30
WRAP UP AND DISCUSSION

2016 OHBM Open Science Special Interest Group Hackathon

8:00 – 16:30
Room 1, 2, 3
Organizers:
Pierre Bellec, Centre de recherche Institut universitaire de gériatrie de Montréal, Montreal, Quebec, Canada

Cameron Craddock, Nathan Kline Institute and Child Mind Institute, New York, United States

Daniel Margulies, Max Plank Institute for Cognitive and Brain Sciences, Leipzig, Germany

Nolan Nichols, Stanford University, Stanford, CA United States

Jean-Baptiste Poline, Helen Wills Neuroscience Institute, University of California, Berkley, CA, United States

Human brain imaging is an interdisciplinary field that requires competences in domains ranging from neuroanatomy and neurophysiology to statistics and physics. Over the past ten years, brain imaging emerged as a computational field with an increasing demand for open source scientific tools that enables researchers to conduct rich analyses. Just as the genetics and molecular biology communities came to rely on bioinformatics, today neuroinformatics is addressing comparable challenges in brain imaging. The complexity of "Big Data" in neuroimaging is driving a growing community of researchers to embrace open science and to develop neuroinformatics tools and resources that are now available to the OHBM community. In this course, we will provide tutorials on emerging computational tools and open science repositories that are available in the field of brain imaging. Upon completion attendees will have learned the basics for using software tools including Git and Python for performing high throughput and reproducible neuroimaging research. They will learn about the variety of data and information freely available through repositories such as the International Neuroimaging Datasharing Initiative, OpenfMRI, the Preprocessed Connectomes Project, and information repositories such as NeuroVault and NeuroSynth. The course will end with summaries of the projects performed during the OHBM Hackathon.

The Art and Pitfalls of fMRI Preprocessing

Half Day Morning Course / 8:00 – 12:00

Room E, Level 2

Organizer:

Christian Habeck, Columbia University, New York, NY, United States

Ray Razlighi, Columbia University, New York, NY, United States

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. Feedback from the previous 2 years when this course was held was incorporated: (1) practical aspects of familiarization with the three major software packages (SPM,AFNI, FSL) were incorporated; (2) an emphasis on pre-processing as an important, as yet "unfinished", area of methodological research of vital importance for the integrity of neuroscience at large.

Course Schedule:

8:00 – 8:10

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

8:10 – 8:35

Temporal Preprocessing (slice-timing, temporal filtering, spike removal)

Blaise Frederick, Harvard Medical School, McLean Hospital, Boston, MA, United States

8:35 – 9:00

Spatial Preprocessing (Spatial Alignment, Normalization, and Smoothing)

Ray Razlighi, Columbia University, New York, NY, United States

9:00 – 9:25

Artefact Removal (motion-related)

Christian Windischberger, Medical University Vienna, Vienna, Austria

9:25 – 9:50

Physiological noise removal

Rasmus Birn, University of Wisconsin, Madison, WI, United States

9:50 – 10:15

FSL pre-processing pipeline

Mark Jenkinson, Oxford University, Oxford, United Kingdom

10:15 – 10:25

BREAK

10:25 – 10:45

QUESTION AND ANSWER

10:45 – 11:10

An SPM perspective on fMRI pre-processing

Lars Kasper, University of Zurich and ETH Zurich, Zurich, Switzerland

11:10 – 11:35

AFNI Pre-Processing – Outline, Recommendations, New Stuff

Robert Cox, NIMH Intramural Program, Bethesda, MD, United States

11:35 – 12:00

WRAP UP AND DISCUSSION

Tools to Parcellate the Brain and Its Relation to Function

Half Day Morning Course / 8:00 – 12:00

Room F, Level 2

Organizers:

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

Matthew Glasser, Washington University in St. Louis, St. Louis, MO, United States

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 what 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).

Course Schedule:

8:00 – 8:45
PART I Parcellate the brain using anatomical features: Histological and neurochemical architecture
Claudia Eickhoff, Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Duesseldorf, Germany

8:45 – 9:30
PART I Parcellate the brain using anatomical features: Tractography based subdivision
Michel Thiebaut de Schotten, Brain and Spine Institute, Paris, France

9:30 – 10:15
PART II Parcellate the brain using functional features: Functional MRI coactivation parcellation
Danilo Bzdok, Research Center Jülich, Jülich Germany

10:15 – 10:30
BREAK

10:30 – 11:15
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

11:15 – 12:00
PART III Multi-modal parcellation of the human cerebral cortex
Matthew Glasser, Washington University of St. Louis, St. Louis, MO, United States

Introduction to Imaging Genetics

Half Day Morning Course / 8:00 – 12:00
Room G, Level 2
Organizers:
Jason Stein, UNC-Chapel Hill, Chapel Hill, NC, United States

Jean-Baptiste Poline, *University of California at Berkeley, Berkeley, CA, United States*

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 a lecture 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. We will provide the student with modern tools to perform associations to both common and rare variation, conduct imputation and meta-analysis, and interpret significant 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.

Course Schedule:

8:00 – 8:30
Structure, Measurement & Analysis of Genetic Variation
Sven Cichon, Research Center Jülich, Germany

8:30 – 9:00
Neuroimaging Phenotypes & Heritability
Roberto Toro, Institut Pasteur, Paris, France

9:00 – 9:30
Reproducibility of Imaging Genetics Findings: Power, candidate genes and other issues
Jean-Baptiste Poline, *University of California at Berkeley, Berkeley, CA, United States*

9:30 – 10:00
Searching for common variants
Derrek Hibar, University of Southern California, Los Angeles, CA, United States

10:00 – 10:30
BREAK

10:30 – 11:00
Imputation & Meta-analysis
Alexander Teumer, Universitätsmedizin Greifswald, Greifswald, Germany

11:00 – 11:30
Rare variant discovery using family based studies
David Glahn, Yale University, Hartford, CT, United States

11:30 – 12:00
After the association: Functional and Biological Validation of Variants
Jason Stein, UNC-Chapel Hill, Chapel Hill, NC, United States

Neuroimaging Meta-Analysis

Half Day Afternoon Course / 13:00 – 16:30

Room E, Level 2

Organizers:

Thomas Nichols, University of Warwick, Coventry, United Kingdom

Simon Eickhoff, Institute of Clinical Neuroscience and Medical Psychology, Duesseldorf, Germany

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 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. Such limitations have raised some concerns on the interpretability and validity neuroimaging results, but have also encouraged the development of quantitative meta-analysis approaches. Neuroimaging meta-analysis is used to summarize a vast amount of research findings across a large number of participants and diverse experimental settings. Such integration then enables statistically valid generalizations on the neural basis of psychological processes in health and disease. They also permit comparisons of different tasks or processes to each other and the modeling of interacting networks. Quantitative meta-analysis therefore represents a powerful tool to gain a synoptic view of distributed neuroimaging findings in an objective and impartial fashion, addressing some of the limitations raised above. The purpose of this course is to review the theory and practice of meta-analytic modeling and database-driven syntheses. In order to provide a comprehensive overview, this course spans both basic and advanced topics and addresses practical tips and tools to conduct meta-analytic studies in psychological and clinical applications. This broad coverage will thus provide both a deeper understanding of the methodological underpinnings as well as concrete ideas for how to apply meta-analytic techniques to advance brain science.

Course Schedule:

13:00 – 13:25

Foundations and potential of meta-analyses

Peter Fox, The University of Texas Health Science Center, San Antonio, TX, United States

13:25 – 13:50

How to Plan and Prepare a Meta-Analysis

Felix Hoffstaedter, Research Center Jülich, Jülich, Germany

13:50 – 14:15

Overview on Meta-Analysis methods

Thomas Nichols, University of Warwick, Coventry, United Kingdom

14:15 – 14:40

ALE and BrainMap

Angie Laird, Florida International University, Miami, FL, United States

14:40 – 15:00

MKDA and Neurosynth

Tal Yarkoni, University of Texas at Austin, Austin, TX, United States

15:00 – 15:15

BREAK

15:15 – 15:40

Practical Intensity Based Meta-Analysis

Camille Maumet, University of Warwick, Coventry, United Kingdom

15:40 – 16:05

Co-activation mapping and parcellation

Veronika Müller, Research Centre Jülich, Jülich, Germany

16:05 – 16:30

Inferring mental states from imaging data: OpenfMRI and the Cognitive Atlas

Russell Poldrack, Stanford University, Stanford, CA, United States

Practicalities for Reproducible Neuroimaging

Half Day Afternoon Course / 13:00 – 16:30

Room F, Level 2

Organizer:

Cyril Pernet, *University of Edinburgh, Edinburgh, United Kingdom*

For the last few years, many articles have been describing issues of reproducibility in science and neuroimaging is likely to be affected by the same problems. The goal of this course is to present practical solutions that have been developed, allowing any researchers (not just programmers) to conduct experiments, analyze data and publish results in a reproducible manner.

Course Schedule:

13:00 – 13:40

The ins and outs of study pre-registration

Pia Rotshtein, University of Birmingham, Birmingham, United Kingdom

13:40 – 14:20

Statistical challenges for reproducibility

Cyril Pernet, *University of Edinburgh, Edinburgh, United Kingdom*

14:20 – 15:00

Making analyses reproducible with limited programming skills

Pierre Bellec, Institut universitaire de gériatrie de Montréal, Montréal, Canada

15:00 – 15:10

BREAK

15:10 – 15:50
How to organize and share data easily and at low cost.
Chris Gorgolewski, Stanford University, Stanford, CA, United States

15:50 – 16:30
What needs to be reported for reproducible studies?
Tonya White, Erasmus MC-Sophia, Rotterdam, Netherlands
Real-time fMRI: Fundamental Principles for Clinical Applications

Real-time fMRI: Fundamental Principles for Clinical Applications

Half Day Afternoon Course / 13:00 – 16:30
Room G, Level 2
Organizer:
Stephen LaConte, Virginia Tech, Roanoke, VA, United States

Rainer Goebel, *Maastricht University, Netherlands*

While there is a large interest in real-time fMRI (rtfMRI), its potential as a clinical neurotheraputic tool has remained largely un-realized. Part of the problem is there is still a relatively small number of groups who have access to rtfMRI capabilities and a framework for designing clinically focused experiments. The aim of this course is to increase the community of rtfMRI researchers by decreasing the learning curve required for entry into clinically-focused use of rtfMRI. This research area is inherently appealing, but knowing how to get started can be overwhelming. This course will cover the fundamental technical requirements and approaches for rtfMRI. Additionally we will focus on the potential that rtfMRI has to be used as a clinical neuroimaging tool in diagnosis, monitoring of disease, tracking of therapeutic response, and as a neurofeedback treatment. This will include a discussion of potential psychiatric and neurological targets, the experimental flexibility provided by rtfMRI (within the biophysical constraints of BOLD fMRI), as well as pitfalls and limitations of existing studies, including control conditions and sample sizes.

Course Schedule:

13:00 – 13:30
Technical Aspects of Real-Time fMRI
Nikolaus Weiskopf, Department of Neurophysics, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

13:30 – 14:00
Real-time processing and analysis of fMRI data
Rainer Goebel, *Maastricht University, Netherlands*

14:00 – 14:30
Multivoxel pattern-based real-time fMRI
Stephen LaConte, Virginia Tech, Roanoke, VA, United States

14:30 – 15:00
Learning control over brain networks using connectivity-based neurofeedback
Yury Koush, EPFL, Lausanne, Switzerland

15:00 – 15:30
BREAK

15:30 – 16:00
Clinical applications of real-time fMRI neurofeedback
David Linden, Cardiff University, Cardiff, United Kingdom

16:00 – 16:30
fMRI neurofeedback and its potential for stroke rehabilitation
Cassandra Sampaio-Baptista, FMRIB, University of Oxford, Oxford, United Kingdom

17:30 – 19:30
Room ABC
OPENING CEREMONIES

The Opening Ceremonies is the official kick-off where attendees can gather together to celebrate the start of the 22nd Annual Meeting! Here we will honor the accomplishments of our colleagues receiving special recognition during the Awards Program for OHBM's Glass Brain Award recognizing a lifetime of achievement; OHBM Young Investigator Award and the Education in Neuroimaging Award.

TALAIRACH LECTURE

Probabilistic models of sensorimotor control and decision making

Daniel Wolpert, FMedSci FRS, University of Cambridge, Cambridge, United Kingdom

Professor Wolpert will speak on the effortless ease with which we move our arms, our eyes, even our lips when we speak masks the true complexity of the control processes involved. He will review our work on how humans learn to make skilled movements covering probabilistic models of learning, including Bayesian and structural learning, the role of context in activating motor memories and the intimate interaction between decision making and sensorimotor control.

19:00 – 21:00
WELCOME RECEPTION

Outside the Palexpo Entrance in the Garden Area, Level 1

Join us for the 2016 Annual Meeting Welcome Reception. The reception will be held at the Palexpo Centre immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 26th. **Please make sure to wear your badge as that will serve as your ticket to the event.** Additional guest badges are $50.00.

MORNING SYMPOSIA

What Neuroimaging Can Tell Us? From Correlation to Causation and Cognitive Ontologies

8:00 – 9:15

Room ABC

Organizer:

Moritz Grosse-Wentrup, Max Planck Institute for Intelligent Systems, Tübingen, Germany

Neuroimaging techniques allow to measure brain functions and to establish associations with cognitive functions. Yet, associations per se do not inform about the causal mechanisms that govern how brain functions give rise to cognitive functions. To advance our understanding of the human brain, it is essential to move beyond associational studies and identify the causal mechanisms that form the basis of cognition. This symposium presents the current state of research in this endeavour and charts open research directions for the neuroimaging community.

The opening talk by Russell Poldrack will argue that understanding the brain is to know the causal mechanisms of brain and cognitive functions (Poldrack and Farah, Nature, 2015). To achieve this goal a systematic terminology of cognitive functions needs to be developed (Poldrack et al., Frontiers in neuroinformatics, 2011). Thus, advancing neuroimaging is to research ways to establish cause-effect relationships between brain functions and cognitive ontologies. In striving for this goal, Martin Lindquist will discuss both the potential and current limitations for causal inference in neuroimaging, which is crucial for informing the design of subsequent studies (Lindquist, Statistical Science, 2008; Sobel and Lindquist, Journal of the American Statistical Association, 2014). Sebastian Weichwald will move this idea forward and present new ready-to-use methods that allow to derive causal hypotheses from observational data alone (Weichwald et al., NeuroImage, 2015; Grosse-Wentrup et al., NeuroImage, 2015). These hypotheses yield testable predictions on the effects of interventions. However, only interventional studies can validate the hypothesized cause-effect relationships. Validation can be accomplished by stimulation techniques that will be presented by Christoph Herrmann (Helfrich et al., Current Biology, 2014; Herrmann et al., International Journal of Psychophysiology, 2015; Vosskuhl et al., NeuroImage, 2015).

What is it that we are mapping onto the brain?
Russell Poldrack, Stanford University, Stanford, CA, United States

Establishing causal relationships in neuroimaging: Pitfalls and promises
Martin Lindquist, Johns Hopkins University, Baltimore, MD, United States

How to obtain causal hypotheses from neuroimaging studies?
Sebastian Weichwald, Max Planck Institute for Intelligent Systems, Tübingen, Germany

How can we validate causal hypotheses by brain stimulation?
Christoph Herrmann, European Medical School, Oldenburg, Germany

Creating a Social Experience in the Scanner: A Taxonomy of Interactive Paradigms

8:00 – 9:15

Room VW

Organizer:

Laura Harrison, California Institute of Technology, University of Southern California, United States

Rooted in the simple premise that cognition differs when we are interacting with another person instead of a representation of a person, the call has been made to study social neuroscience in interaction. More naturalistic methods promise to advance many fields, especially social and affective neuroscience and investigation of disorders of social cognition. While the benefit of using interactive paradigms is clear, how to develop such paradigms is less clear. Especially challenging is the need to develop appropriate analytical methods.

We present four researchers' responses to this call. Their work spans a range of scientific questions and methodological and analytical techniques. Prochazkova measures pupil mimicry to a virtual agent to address two competing hypotheses about this form of emotional contagion. Stepping up from the virtual agent approach, Harrison demonstrates that neural sensitivity to the actual presence of another person (versus a video of that person) dissociates adults with autism from healthy controls. Complementing Harrison's work, Jasmin also studies interaction differences in autism, but with a focus on conversation, which is highly dynamic and idiosyncratic. As we pursue more naturalistic tasks, designs will become less constrained. Keysers reviews analysis methods that allow us to gain traction when experimental control is relinquished in exchange for naturalism.

Together, our speakers provide a taxonomy of methods available. This should provide attendees with a clearer picture of what is possible, including the strengths and limitations of each approach, and will hopefully inspire more rapid development of methods in this relatively nascent field.

Pupil Mimicry with a Virtual Agent Predicts Trust Behavior and Activates Mentalizing Rather than Affective Brain Regions
Eliska Prochazkova, Leiden University, Leiden, Netherlands

Using Live Face-to-Face fMRI to Investigate the Social Brain in Autism
Laura Harrison, California Institute of Technology, University of Southern California, United States

FMRI of Two-Person Vocal Interaction
Kyle Jasmin, University College London, United Kingdom / National Institutes of Health, Bethesda, MD, United States

Brain to Brain Analyses as a Route to Explore Complex Social Interactions
Christian Keysers, Netherlands Institute for Neuroscience, Amsterdam, Netherlands

New prospects for imaging the developing brain: opportunities and challenges

8:00 – 9:15

Room X

Organizers:

Eugene Duff, FMRIB Centre, University of Oxford, Oxford, United Kingdom

J-Donald Tournier, Centre for the Developing Brain, King's College London, London, United Kingdom

Sarah Parisot, Department of Computing, Imperial College London, London, United Kingdom

Emma Robinson, Imperial College London, London, United Kingdom

The brain undergoes rapid development during the fetal and neonatal period with lifelong consequences, presenting a critical window for investigations using structural and functional imaging. A number of high-profile projects are currently underway to acquire high quality data in the perinatal age range and make them available to the community. These include the developing Human Connectome Project and the Washington Fetal Brain MRI Database, amongst others.

These resources are expected to lead to high impact discoveries. However, data acquisition and analysis is challenging in the developing brain, and users should be aware of the constraints as well as the possible benefits and opportunities inherent in the data. Many, if not all, imaging characteristics change dramatically during development, including brain size, image contrast and artefacts, physiological signals and behavioural features such as head motion. This symposium will review the technical challenges that arise from imaging these complex changes, identify leading strategies, and describe approaches to address key unresolved challenges.

This programme will cover a range of aspects, including the biological differences in the developing brain compared to the adult brain, their impact on the acquired data, the practical issues of scanning small subjects prone to motion, and the adaptations needed in both the imaging protocol and the associated post-processing and analysis techniques to handle these issues. State of the art methods will be presented, and outstanding problems and questions that remain to be satisfactorily answered will be discussed.

The practical challenges of perinatal imaging

Manon Benders, University Medical Centre Utrecht, Utrecht, Netherlands

Imaging the perinatal brain – developments in acquisition and reconstruction

Joseph Hajnal, Centre for the Developing Brain, King's College London, London, United Kingdom

Acquisition and reconstruction in fetal imaging: Building the University of Washington Fetal Brain MRI Database

Colin Studholme, Biomedical Image Computing Group, Department of Pediatrics, University of Washington, Seattle, WA, United States

Unanswered questions in perinatal imaging: looking to the future

Petra Huppi, University Hospital, University of Geneva, Geneva, Switzerland

Clinical Language Mapping by Multimodal Neuromagnetic Methods: a Joint Symposium of ISACM and OHBM

8:00 – 9:15

Room K, Level 2

Organizer:

Nobukazu Nakasato, Tohoku University, Sendai, Miyagi, Japan

The first speaker (Susan Bookheimer) will outline the role of fMRI in preoperative mapping of language and memory. The second speaker (Andrew Papanicolaou) will focus on how to optimize language mapping with MEG. The third speaker (Shalini Narayana) emphasizes clinical utility of TMS in functional presurgical mapping. The last speaker (Masaki Iwasaki) will comment on the combined uses of fMRI and MEG for pre-surgical mapping and on their impact in the practice of neurosurgery.

Role of fMRI in preoperative mapping of language and memory

Susan Bookheimer, University of California Los Angeles, Los Angeles, CA, United States

Optimization of presurgical language mapping with MEG

Andrew Papanicolaou, The University of Tennessee Health Science Center, Memphis, TN, United States

Clinical utility of TMS in functional presurgical mapping: current state and future directions

Shalini Narayana, The University of Tennessee Health Science Center, Memphis, TN, United States

Complementary use of functional MRI and MEG for language mapping in pre-surgical evaluation of epilepsy

Masaki Iwasaki, Tohoku University School of Medicine, Sendai , Japan

BREAK

9:15 – 9:30

KEYNOTE LECTURE

9:30 – 10:15

Room ABC

Network-based Neurodegeneration

William Seeley, UCSF Memory and Aging Center, San Francisco, California, United States

The anatomy of neurodegenerative disease can be understood in terms of two key aspects: onset and progression. Mechanisms controlling onset timing and location remain mysterious, and each disease features striking heterogeneity in its onset sites. Regarding progression, network analyses have revealed that each clinical syndrome reflects degeneration of a specific large-scale network. Each vulnerable network, in turn, is anchored by a pivotal "epicenter" whose functional-anatomical connections govern the vulnerability of other regions, perhaps because prion-like corruptive templating begets trans-synaptic disease protein spread. I will illustrate these principles with a focus on the behavioral variant of frontotemporal dementia (bvFTD). BvFTD begins within the "salience network," a system anchored by the anterior cingulate and frontoinsular cortices and specialized for social-emotional-autonomic processing. Patients with bvFTD lose the capacity for adaptive, real-time behavioral guidance, possibly in part because salience-driven viscero-autonomic cues and responses are late, degraded, or improperly modulated. Within the salience network hubs, Layer 5 von Economo neurons and fork cells show a particular predilection for disease protein aggregation and cell death, providing a cellular focus for bvFTD selective vulnerability research and a potential window into the neural computations that contribute to sophisticated human social-emotional functions.

BREAK

10:15 – 10:25

BEST PAPER AWARD PRESENTATIONS

10:25 – 10:50

Room ABC

The following awards will be announced:
The *Springer* Brain Topography's Editor's Choice Award
The *Wiley* Human Brain Mapping's Editor's Choice Awards
The *Elsevier* NeuroImage Best Paper Award

LOC SYMPOSIUM:

Disorders of self-awareness and dissociative states

10:50 – 12:00

Room ABC

Organizer:

Christoph Michel, University of Geneva, Geneva, Switzerland

Speakers:

Neural Principles of Bodily Self-Consciousness

Olaf Blanke, Swiss Federal Institute of Technology Lausanne, Switzerland

Brain circuits implicated in conversion disorders and hypnosis

Patrik Vuilleumier, University of Geneva, Geneva, Switzerland

Neural correlates of consciousness in coma and related states

Melanie Boly, University of Wisconsin, Madison, Wisconsin, United States

Questions about mechanisms underlying self-awareness and consciousness have fueled fascination and debates for centuries among both philosophers and scientists. Alterations in these processes also constitute a major cause of handicap in several common neurological and psychiatric diseases, associated with important personal suffering and social burden. These clinical conditions range from depersonalization and alien control delusions in schizophrenia, through to somatoform symptoms and functional non-organic deficits in hysterical conversion, as well as distortions of consciousness and personal identity subsequent brain damage or drugs. Brain mapping research in the last two decades has contributed to bring many new insights into these various phenomena. The symposium will illustrate three such conditions where neuroimaging has provided unprecedented opportunities to pinpoint neural substrates of impairments and dissociations in self-awareness. Olaf Blanke will talk about mechanisms integrating multisensory and interoceptive information to elaborate bodily representations of the self, whose disorganization by experimental manipulations or pathological conditions lead to striking phenomena such as out-of-body experience. Patrik Vuilleumier will describe brain circuits involved in motor or sensory deficits such as paralysis or anaesthesia that arise without organic neurological damage in patients with hysterical conversion, long associated to unconscious emotional stress factors in Freud's theory. Melanie Boly will discuss how changes in distributed network activity and connectivity are induced by drugs during anaesthesia and yield novel views on mechanisms of consciousness. Together, these presentations will showcase how neuroimaging findings may illuminate brain-mind relationships in new ways but also contribute to better understand neuropsychiatric disturbances that have hitherto remained poorly understood.

LUNCH

12:00 – 12:45

POSTER SESSION

12:45 – 14:45

Hall 1

Poster Numbers #1000 – 2412

Authors with even numbered posters will present their posters today.

Disorders of the Nervous System: Alzheimer's Disease and Other Dementias, Anxiety Disorders, Autism, Bipolar Disorder, Depressive Disorders, Disorders of the Nervous System Other, Medical illness with CNS impact (e.g. chemotherapy, diabetes, hypertension), Obsessive-Compulsive Disorder and Tourette Syndrome, Other Psychiatric Disorders, Parkinson's Disease and Movement Disorders, Traumatic Brain Injury

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

Imaging Methods: Anatomical MRI, BOLD fMRI, EEG, Imaging Methods Other, Imaging of CLARITY, Multi-Modal Imaging

Informatics: Brain Atlases, Databasing and Data Sharing, Informatics Other, Workflows

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

Lifespan Development: Lifespan Development Other and Normal Brain Development: Fetus to Adolescence

Modeling and Analysis Methods: Diffusion MRI Modeling and Analysis, Exploratory Modeling and Artifact Removal, Methods Development, Motion Correction and Preprocessing, Multivariate modeling, Other Methods, PET Modeling and Analysis, Segmentation and Parcellation, Univariate Modeling

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

AFTERNOON SYMPOSIUM

Imaging Brain Plasticity

14:45 – 16:00

Room ABC

Organizer:

Jason Lerch, University of Toronto/Hospital for Sick Children, Toronto, Ontario, Canada

The last 15 years have shown us that learning and experience modifies at the scale detectable by MRI. It is only very recently, however, that are obtaining the first evidence of the molecular underpinnings of MRI detectable plasticity. Similarly, we are beginning to understand the timing of when these changes in the brain are detectable - which turns out to be much faster than initially expected. It is thus a perfect time to provide an update to the community regarding what we know (and what we still do not know) about structural brain plasticity.

Imaging rapid plasticity in the sensorimotor system using high field MRI

Heidi Johansen-Berg, University of Oxford, Oxford, United Kingdom

Predispositions and Plasticity in Auditory Learning

Robert Zatorre, McGill University, Montreal, Quebec

The spatial and temporal dynamics of structural plasticity in the memory domain

Yaniv Assaf, Tel Aviv University, Tel Aviv, Israel

The cellular and molecular bases of structural brain plasticity

Jason Lerch, University of Toronto/Hospital for Sick Children, Toronto, Ontario, Canada

The behavioral relevance of time-varying functional connectivity

14:45 – 16:00

Room VW

Organizers:

Aaron Kucyi, Harvard Medical School, Massachusetts General Hospital, Athinoula A. Martinos Center for Biomedical Imaging Cambridge, MA, United States

Jessica Cohen, University of North Carolina at Chapel Hill, Chapel Hill, NC, United States

It is now well-established that brain functional connectivity during an awake, task-free state largely reflects 'intrinsic' operations that are independent of current behavioral state. Recent studies reveal that functional connectivity fluctuates spontaneously on short time-scales (e.g. seconds), spawning growing interest among neuroimaging researchers in characterizing time-varying connectivity in health and disease. These connectivity dynamics are on similar time scales as ongoing fluctuations in mental and behavioral states such as mind-wandering, sensory replay, vigilance and attention. Therefore it is important for researchers to understand which aspects of dynamic resting-state connectivity reflect purely intrinsic operations, and which reflect spontaneous fluctuations that directly encode or impact a subject's current behavior and experience. Demonstrating the behavioral relevance of time-varying functional connectivity is also a crucial step in establishing the validity of neuroimaging tools (e.g. fMRI) in assessing ongoing brain-network dynamics.

In these talks, we will introduce novel findings that demonstrate the relevance of spontaneous fluctuations in functional connectivity to ongoing behavior and experience. Using novel, diverse approaches, each speaker will describe how the monitoring of behavioral and cognitive processes in subjects at "rest" challenges the view that spontaneous network dynamics reflect purely intrinsic operations.

Dynamic changes in functional connectivity supporting memory consolidation
Arielle Tambini, University of California, Berkeley, CA, United States

Quasiperiodic patterns, infraslow brain activity and task performance
Shella Keilholz, Georgia Institute of Technology and Emory University School of Medicine, Atlanta, GA, United States

The role of intrinsic functional connectivity dynamics in perception
Sepideh Sadaghiani, University of Illinois Urbana-Champaign, Champaign, IL, United States

Tracking spontaneous attentional fluctuations in dynamic functional connectivity
Aaron Kucyi, Harvard Medical School, Massachusetts General Hospital, Athinoula A. Martinos Center for Biomedical Imaging Cambridge, MA, United States

Ex vivo approaches for investigating the brain's circuitry: The what, the how & the why
14:45 – 16:00
Room X
Organizers:
Svenja Caspers, C. and O. Vogt Institute for Brain Research, University of Dusseldorf, Dusseldorf and Institute of Neuroscience and Medicine, INM-1, Research Centre Juelich, Juelich, Germany

Alexander Leemans, Image Sciences Institute – UMC Utrecht, Utrecht, Netherlands

Diffusion MRI (dMRI) in vivo has proven to be a powerful technique for studying the anatomy of fiber bundles in the brain, with new developments aiming to overcome challenges in data resolution and to achieve higher fidelity in fiber orientation reconstruction techniques. With ex vivo dMRI being able to bridge the gap from the in vivo world to meso-scale configurations (in the range of 200 – 300 microns), histological techniques are able to go down even further to the micro-scale for reconstructing nerve fibers. In addition to ex vivo dMRI, we cover three other ex vivo methods, which are currently being used to further our understanding of the brain's microstructural and architectural tissue characteristics, i.e., optical coherence tomography (OCT), 3D-polarized light imaging (3D-PLI), and CLARITY. The complementary information from these four ex vivo methods may generate valuable insight into the underlying fiber architecture and could address many challenges these days in studying structural connections. The audience should learn about the potentials and pitfalls of each technique in light of particular research questions. This is particularly assured by a diversity of speakers who each focus on one of these techniques, while also considering potential links and complementarity between the approaches.

Post-mortem diffusion imaging for multi-scale neuroscience: Anatomical insights and links to microscopy
Karla Miller, FMRIB Centre, University of Oxford, Oxford, United Kingdom

Fiber tracts and intracortical fibers in parieto-occipital cortex using 3D-polarized light imaging
Svenja Caspers, C. and O. Vogt Institute for Brain Research, University of Dusseldorf, Dusseldorf and Institute of Neuroscience and Medicine, INM-1, Research Centre Juelich, Juelich, Germany

Visualization of the myeloarchitecture and the cytoarchitecture of the human brain by Optical Coherence Tomography
Caroline Magnain , Athinoula A. Martinos Center for Biomedical Imaging and Harvard Medical School, Boston, United States

Clearing, staining and imaging of intact brain specimen using CLARITY
Christoph Leuze, Stanford University, Stanford, CA, United States

BREAK
16:00 – 16:15

KEYNOTE LECTURE
16:15 – 17:00

Room ABC

New Directions in the Neurobiology of Language

David Poeppel, Max Planck Institute, Frankfurt, Germany & New York University, New York, New York, United States

The last twenty years have seen dramatic progress on the "where-is-language?" question. More recent developments, at the nexus of language research and neurophysiology, provide new views on "how?" questions. Professor Poeppel will discuss experiments on specialization for speech and structure for language that point towards mechanisms underpinning this foundational human ability.

BREAK
17:00 – 17:15

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: Early Brain Development

Room K, Level 2

Chair:

Moriah Thomason, Wayne State University, Detroit, MI, United States

17:15 – 17:27

3703: Prenatal Undernutrition and Precocious Brain Aging: BrainAGE in the Dutch Famine Birth Cohort

Katja Franke, University Hospital Jena, Jena, Germany

17:27 – 17:39

1992: Identification of cortical generators of spontaneous activity in the preterm brain with EEG-fMRI

Tomoki Arichi, King's College London, London, United Kingdom, Imperial College London, London, United Kingdom

17:39 – 17:51

1977: Different cortical morphologies in datasets of fetuses and preterm newborns at comparable ages

Julien Lefèvre, Aix-Marseille Université, Marseille, France

17:51 – 18:03

2014: Early Development of Functional Segregation Revealed by Network Analysis of the Preterm Human Brain

Miao Cao, Beijing Normal University, Beijing, China

18:03 – 18:15

1674: Functional interhemispheric connectivity in fetuses with corpus callosum agenesis

Andras Jakab, University Children's Hospital, Zürich, Switzerland

18:15 – 18:30

1843: Age-specific Gray and White Matter DTI Atlas for Human Brain at 33, 36 and 39 Postmenstrual Weeks

Lei Feng, Department of Radiology, Children's Hospital of Philadelphia, Philadelphia, PA, USA, Research Center for Sectional and Imaging Anatomy, Shandong University School of Medicine, Jinan, Shandong, China

O-M2: Neurodegenerative Diseases

Room VW

Chair:

Oliver Colliott, ARAMIS Lab, Paris, France

17:15 – 17:27

1318: Parkinson's disease: diagnostic utility of large-scale human brain structural covariance networks

Wei-Che Lin, Department of Diagnostic Radiology, Kaohsiung Chang Gung Memorial Hospital, Kaohsiung, Taiwan

17:27 – 17:39

1017: Relating CSF and PET measure of tau pathology

Brian Gordon, Washington University in St. Louis, St. Louis, MO, United States

17:39 – 17:51

1022: A new piece to the puzzle: Contributions of in vivo Tau to Neurodegeneration in Alzheimer's Disease

Gérard Bischof, Multimodal Neuroimaging Group, Department of Nuclear Medicine, University Hospital Cologne, Cologne, Cologne, Germany, Cognitive Neuroscience, Institute of Neuroscience and Medicine (INM-3), Research Center Jülich, Jülich, Germany

17:51 – 18:03
1906: Long-term memory scores in mild cognitive impairment can be predicted from resting-state fMRI
Djalel-Eddine Meskaldji, EPFL, Lausanne, Switzerland,

18:03 – 18:15
1347: Derivation of a Levodopa-related pattern from metabolic brain images in Parkinson's disease
Christian Dresel, The Feinstein Institute for Medical Research, Manhasset, NY, United States

18:15 – 18:30
1065: Regional and stage-specific association of multiple AD risk variants with brain amyloidosis
Liana Apostolova, IUPUI, Indianapolis, IN, United States

O-M3: Acquisition Methods

Room X
Chair:
Bruce Pike, Hotchkiss Brain Institute - University of Calgary, Calgary, Canada

17:15 – 17:27
1804: Caveats of miscalibration of myelin metrics for g-ratio imaging
Jennifer Campbell, McGill University, Montreal, Quebec, Canada

17:27 – 17:39
1547: Spiral Acquisition for High-Speed Structural MRI at 7 T
Lars Kasper, Translational Neuromodeling Unit, IBT, University of Zurich & ETH Zurich, Zurich, Switzerland, Institute for Biomedical Engineering, University of Zurich & ETH Zurich, Zurich, Switzerland

17:39 – 17:51
3493: Diffusion MRI using Single-Shot Spiral Acquisition with Magnetic Field Monitoring
Bertram Wilm, Institute for Biomedical Engineering, University of Zurich & ETH Zurich, Zurich, Switzerland, Skope Magnetic Resonance Technologies, Zurich, Switzerland

17:51 – 18:03
1819: Exploring the functional sensitivity of concurrent EEG-fMRI at 7T using simultaneous multislice EPI
João Jorge, École Polytechnique Fédérale de Lausanne, Lausanne, Switzerland, 2ISR-Lisboa/LARSyS and Department of Bioengineering, Instituto Superior Técnico, Lisbon, Portugal

18:03 – 18:15
1801: Looping Star: A new multi-gradient-echo, self-refocusing zero TE imaging technique
Ana Beatriz Solana, GE Global Research, Garching bei Muenchen, Germany

18:15 – 18:30
4200: Multi-Parameter Quantitative Brain Anatomy at 7 Tesla
Roy Haast, Maastricht University, Maastricht, Netherlands

O-M4: Perceptual Representations

Room ABC
Chair:
Marcel van Gervan, Donders Institute for Brain, Nijmegen, The Netherlands

17:15 – 17:27
2401: Explaining high-level visual object representations with weighted representational modeling
Kamila Maria Jozwik, University of Cambridge, MRC Cognition and Brain Sciences Unit, Cambridge, United Kingdom

17:27 – 17:39
2357: High-level scene information is transmitted to V1 & V2 by cortical feedback
Andrew Morgan, University of Glasgow, Glasgow, United Kingdom

17:39 – 17:51
2372: Decode Cortical fMRI Activity to Reconstruct Naturalistic Movie via Deep Learning
Haiguang Wen, Purdue University, West Lafayette, IN, United States

17:51 – 18:03
2382: Suppressed Image-Flicker Signals in Human Visual Cortex and Perceived Continuity Across Eye Blinks
Tal Golan, The Edmond & Lily Safra Center for Brain Sciences, The Hebrew University of Jerusalem, Jerusalem, Israel

18:03 – 18:15
2340: Revealing the neural fingerprints of a missing hand
Sanne Kikkert, University of Oxford, Oxford, United Kingdom

18:15 – 18:30
2361: Selective dynamic maintenance of seen and unseen sensory features in the human brain
Jean-Rémi King, NYU, New York, NY, United States

MORNING SYMPOSIA

The added value of simultaneous multimodal recordings in neurosciences

8:00 – 9:15

Room X

Organizers:

Christophe Grova, PERFORM Centre and Physics Dpt, Concordia University; Montreal Neurological Institute, McGill University (adjunct), Montreal, QC, Canada

Christian-G. Bénar, INSERM, Aix-Marseille Université, Marseille, France

Importantly, simultaneous recordings permit to have access to the exact same brain activity, which is not guaranteed with different sessions. Moreover, they open new venues in the analysis of data, in particular using spontaneous fluctuations of activity on one modality in order to inform the analysis of another modality, while offering the avenue of elegant and promising new data analysis strategy through multimodal fusion approaches. Simultaneous recordings, as for instance EEG/MEG, EEG/fMRI, EEG/fNIRS or PET/fMRI, offer unique perspectives to further understand neurovascular coupling processes in physiological and pathological conditions, functional network organization at different temporal and spatial scales, with the ability to shed light on quite promising and largely unknown processes such as resting state functional connectivity.

For this workshop, we aim at presenting the main rationale for choosing multimodal simultaneous recordings when addressing a specific question in neurosciences. What are the main advantages but also the inherent additional challenges associated to these approaches? We will provide an overview of some of the latest promising developments in this field of multimodal neuroimaging research, covering diverse modalities (EEG, MEG, NIRS, fMRI, PET), focusing on the additional value of simultaneous recordings to capture a global dynamic and multimodal understanding of brain activity.

Simultaneous recordings of MEG, EEG and intracerebral EEG
Christian-G. Bénar, INSERM, Aix-Marseille Université, Marseille, France

Mapping brain networks with high density EEG and fMRI
Serge Vulliémoz , Hôpitaux Universitaires de Genève, Genève, Switzerland

Monitoring of neurovascular coupling processes using simultaneous EEG/fNIRS recordings
Christophe Grova,PERFORM Centre and Physics Dpt, Concordia University; Montreal Neurological Institute, McGill University (adjunct), Montreal, QC, Canada

PET-fMRI: Analysis of brain connectivity on multiple scales
Hans Wehrl, Department of Preclinical Imaging and Radiopharmacy, Werner Siemens Imaging Centre, University of Tuebingen, Tubingen, Germany

Social Neuroscience and Neuroimaging: Perspectives and Open Questions

8:00 – 9:15

Room K, Level 2

Organizers:

Marina Pavlova, Biomedical Magnetic Resonance, University of Tübingen, Germany

Aina Puce, Psychological and Brain Sciences, Indiana University, Bloomington, IN, United States

With the advent of sophisticated new tools and techniques over the past decades, neuroimaging has contributed to substantial progress in the rapidly developing field of Social Neuroscience. Most previous work had been restricted to localization of isolated brain areas involved in social cognition. Recent work is beginning to focus on interactions between brain regions making up the social brain. Given this new focus, it appears timely and important to reflect and discuss open questions and current limitations in the investigation of the social brain. Major topics include: (i) Redefining the concept of functional brain network in both theoretical and experimental (operational) spheres; (ii) Studying neuronal communication across the entire social brain in healthy individuals and in individuals with aberrant social cognition; (iii) Combining advanced multimodal brain imaging tools to reveal neural communication in real time (MEG, EEG) and in high spatial resolution (standard and high-field fMRI); and (iv) Accounting for the relationship between behavior and brain activity. This symposium intends to provide a forum to stimulate discussion of these and other issues (such as complexity of social processes in realistic environments). Novel multimodal evidence from standard and ultra-high field fMRI, MEG, DTI, EEG, will be presented. Clinical implications will be highlighted, particularly with respect to sex differences in the social brain. In a nutshell, the symposium aims at providing up-to-date knowledge on the social brain. Learning outcomes include better understanding of the typically developing social brain and aberrant social cognition in a range of neurodevelopmental and neuropsychiatric disorders. Each presenter brings long-standing unique and complementary expertise to the table, making the sum greater than the parts. All presenters are also Editors for Social Neuroscience sections of such journals as NeuroImage, Plos One, and Frontiers in Emotion Science.

Social neuroscience: brain networks, sex differences and neural disorders
Marina Pavlova, Biomedical Magnetic Resonance, University of Tübingen, Germany

Social neuroscience in the wild. New approaches to understanding bodily communication in the dorsal stream
Beatrice de Gelder, University of Maastricht, Maastricht, Netherlands

Two putative modes of social information processing in the human brain
Aina Puce, Psychological and Brain Sciences, Indiana University, Bloomington, IN, United States

Brain networks for emotion and cognition: Implications for social neuroscience
Luiz Pessoa, Maryland Neuroimaging Center, University of Maryland, College Park, MD, United States

Effects of Head Motion on Structural and Functional MRI Studies

8:00 – 9:15
Room VW
Organizers:
Andre van der Kouwe, Massachusetts General Hospital, Charlestown, MA, United States

M. Dylan Tisdall, Massachusetts General Hospital, Charlestown, MA, United States

In the past few years, several papers have come out emphasizing the deleterious effects of head motion during MRI scanning on imaging data and the research conclusions drawn from these data. Many of these papers have highlighted the effects of motion on resting state fMRI studies, while a few have shown that motion affects brain morphometry studies and studies using diffusion imaging. The emerging consensus seems to be that motion introduces a systematic bias in all of these modalities. Even small motions may introduce small biases, so that merely removing data obviously contaminated by motion may not suffice to eliminate bias. It also seems to be the case that the spurious effects of motion are similar to the physical effects (anatomical or functional changes) expected in the study group relative to the controls, and it is typically the study group that tends to exhibit relatively more motion. It is therefore critical that the community be aware of possible biases in studies, the methods available for dealing with motion, and areas in which methods developers can contribute by developing new ways to deal with the effects of motion in brain studies.

Impact of Motion on Diffusion-Weighted MRI
Anastasia Yendiki, Massachusetts General Hospital, Charlestown, MA, United States

Impact of Motion on Resting State fMRI and Functional Connectivity
Cameron Craddock, Child Mind Institute, New York, NY, United States and Nathan S. Kline Institute for Psychiatric Research, Orangeburg, NY, United States

Impact of Motion on Brain Morphometry Studies
Joelle Sarlls, National Institutes of Health, Bethesda, MD, United States

Prospective Motion-Correction Methods in MRI
M. Dylan Tisdall, Massachusetts General Hospital, Charlestown, MA, United States

Skeptical Connectivity: Time for Something Completely Different

8:00 – 9:15
Room ABC
Organizers:
Victor Solo, University of New South Wales, Australia; MGH-Martinos Center for Biomedical Imaging, Harvard Medical School, Boston, MA, United States

DuBois Bowman, Columbia University, New York, NY, United States

The advent of high quality data from the human connectome project has given additional impetus to the study of brain connectivity; already a subject of intense interest for at least a decade. But existing approaches seem to have reached some kind of stasis. Typical analyses proceed as follows: summarise a set of cortical parcels by representative time series; thus compute a correlation matrix; then apply some kind of threshold to it; then draw some network related conclusions perhaps using graph analysis. Certainly, recently some more sophisticated methods have come into play such as: sparsity; a lumbering recognition that partial correlation should replace correlation; the recent concern with time-variant connectivity. But signs that all is not well are emerging: the big data aspect has largely been ignored i.e. the fact that the correlations are enormously noisy so that embarrassingly spurious results (e.g. in the small world network domain) have been 'obtained.' And very importantly the compelling potential to find biomarkers for disease has not so far eventuated. Clearly something new is needed.

In this workshop we pursue three angles. Firstly there is huge data wastage in reducing each parcel to a single time series. So we will exhibit a new multivariate conditional mutual information-based method that uses all the data. Secondly new methods are emerging in the physics/sociology/applied mathematics/statistics network sciences and we will highlight two of them. We will illustrate the use of emerging network methods from statistics and sociology based on so-called block models. We will also illustrate the use of the powerful new tool of topological data analysis for network comparison.

Without the use of all the data; without the use of more sophisticated methods of network science we cannot hope to realise the potential of biomarker discovery. Attendees will come away from the workshop with a clear understanding of the problems with current methods of brain connectivity analysis. They will gain a basic understanding of three powerful new approaches which tackle brain connectivity from very different directions while overcoming the weaknesses of current methods.

Discovering network structure with flexible, multi-subject stochastic block models
Thomas Nichols, Warwick University, Warwick, United Kingdom

Mapping heritability of large-scale brain network via persistent homology
Moo Chung, University of Wisconsin, Madison, WI, United States

Multivariate Mutual Information Finds the Secrets of Resting-State Functional Brain Networks
Victor Solo, University of New South Wales, Australia; MGH-Martinos Center for Biomedical Imaging, Harvard Medical School, Boston, MA, United States

BREAK
9:15 – 9:30

KEYNOTE LECTURE
9:30 – 10:15
Room ABC

Mapping Addiction in the Human Brain
Nora D. Volkow, Director, National Institute on Drug Abuse, National Institutes of Health, Bethesda, MD, United States

Studies pairing brain imaging technology with behavioral measurements, and more recently genetics, are revealing intricate details about neurochemical and functional changes that occur in an addict's brain. And understanding addiction-related disruptions in reward, motivation, memory and self-control brain circuits is transforming treatment development strategies.

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-T1: Parcellation and Informatics
Room K, Level 2
Chair:
Jessica Turner, Georgia State University, Atlanta, GA, United States

10:30 – 10:43
3890: Individual Cerebral Cortex Parcellation with Group-level Spatial and Connectivity Priors
Ru Kong, National University of Singapore, Singapore, Singapore

10:43 – 10:55
1838: Efficient Population-Representative Whole-Cortex Parcellation Based on Tractography
Guillermo Alejandro Gallardo Diez, INRIA, Sophia Antipolis, France

10:55 – 11:08
1854: The Brain Imaging Data Structure: a format for organizing and describing neuroimaging data
Chris Gorgolewski, Stanford University, Stanford, CA, United States

11:08 – 11:20
1855: DataLad – decentralized data distribution for consumption and sharing of scientific datasets
Yaroslav Halchenko, Dartmouth College, Hanover, NH, United States

11:20 – 11:32
1842: The Human Brainnetome Atlas: A New Brain Atlas Based on Connectional Architecture
Hai Li, CASIA, Beijing, China,

11:32 – 11:45
1877: UK Biobank Brain Imaging: Automated Processing Pipeline and Quality Control for 100,000 subjects
Fidel Alfaro-Almagro, FMRIB Centre, University of Oxford, Oxford, United Kingdom

O-T2: Learning and Memory
Room W
Chair:
Guillén Fernández, Donders Institute for Brain, Cogintion and Behaviour, Nijmegen, The Netherlands

10:30 – 10:43
1951: Neural Basis of Working Memory as Revealed by Voxel-Based Lesion Symptom Mapping
Maria Ivanova, National Research University Higher School of Economics, Moscow, Russian Federation

10:43 – 10:55
1953: Sequential activation in sub-second range during working memory task: A simultaneous EEG-fMRI study
Kengo Mizuno, Department of Radiological Sciences, Nagoya University Graduate School of Medicine, Nagoya, Japan

10:55 – 11:08
1881: Spatial and Temporal Signatures of Memorability in the Brain
Wilma Bainbridge, Massachusetts Institute of Technology, Cambridge, MA, United States

11:08 – 11:20
1747: Preceding working memory task may influence rational decision making: an EEG source imaging study
Jeong-Youn Kim, Hanyang University, Seoul, Korea

11:20 – 11:32
3025: Transcranial alternating stimulation (tACS) modulates connectivity in a phase-dependent manner
Ines Violante, Imperial College London, London, United Kingdom

11:32 – 11:45
1914: Pre-stimulus theta power in the dorsomedial thalamic nucleus predicts human memory formation
Catherine Sweeney-Reed, Otto-von-Guericke University, Magdeburg, Germany

O-T3: Higher Cognitive Functions

Room X
Chair:
Hauke Heekeren, Freie University Berlin, Berlin, Germany

10:30 – 10:43
1399: Neural Mechanisms underlying Bayesian Model Averaging
Philipp Schwartenbeck, Centre for Cognitive Neuroscience, Salzburg, Austria

10:43 – 10:55
4084: Intrinsic Functional Brain Dynamics Underlying Executive Function
Jason Nomi, University of Miami, Coral Gables, FL, United States

10:55 – 11:08
1406: The neurocognitive mechanisms of learning to expend effort
Tobias Hauser, Wellcome Trust Centre for Neuroimaging, University College London, London, United Kingdom, Max Planck University College London Centre for Computational Psychiatry and Ageing Research, London, United Kingdom

11:08 – 11:20
1771: Timing of prediction error signaling in reward learning: A computational trial-by-trial EEG analysis
Sara Tomiello, Translational Neuromodeling Unit (TNU), UZH & ETH Zurich, Zurich, Switzerland

11:20 – 11:32
4188: A novel approach for the investigation of the functional correlates of fronto-parietal networks
Valeria Parlatini, Institute of Psychiatry, KCL, London, London, United Kingdom

11:32 – 11:45
1528: Flexibility in brain module topology supports active reasoning and fluid intelligence
Luke Hearne, Queensland Brain Institute, Brisbane, Australia

O–T4: Neuropsychiatric Disorders

Room V
Chair:
Aysenil Belger / University of North Carolina at Chapel Hill, Chapel Hill, NC, United States

10:30 – 10:43
4367: Using Live Face-to-Face fMRI to Investigate the Social Brain in Autism
Laura Harrison, University of Southern California, Los Angeles, CA, California Institute of Technology, Pasadena, CA, United States

10:43 – 10:55
1173: Ketamine effects in resting state fMRI in major depression
Jennifer Evans, NIH, Bethesda, MD, United States

10:55 – 11:08
1083: Network Dysfunction in the Fronto-Limbic Circuit in Drug-Naive Social Anxiety Disorder
Jin Liu, State Key laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, Beijing, China

11:08 – 11:20
3245: Accelerated Aging of the Brain in Schizophrenia: a Longitudinal Pattern Recognition Study
Hugo Schnack, UMC Utrecht, Utrecht, Netherlands

11:20 – 11:32
3528: Cerebellar grey matter volume in schizophrenia: a multi-site study of 543 patients and 760 controls
Torgeir Moberget, NORMENT, KG Jebsen Centre for Psychosis Research, Oslo University Hospital, Oslo, Norway

11:32 – 11:45
1305: Two Brains Coupling in Real Social Interaction: An fMRI Hyperscanning Study with Borderline Patients
Gabriela Stößel, Central Institute of Mental Health, University of Heidelberg, Mannheim, Germany

O-T5: Acquisition and Pre-processing Methods

Room ABC

Chair:

Benedikt Poser / Maastricht University, Maastricht , The Netherlands

10:30 – 10:43

1802: Fiber orientation measurement using diffusion MRI and CLARITY on the same human brain tissue

Christoph Leuze, Stanford University, Stanford, CA, United States

10:43 – 10:55

1599: Distortion-matched T1-maps and unbiased T1w-images as anatomical reference for sub-millimetre fMRI

Wietske van der Zwaag, Spinoza Centre for Neuroimaging, Amsterdam, Netherlands,

10:55 – 11:08

1803: Effective Connectivity Measured with Layer-Dependent Resting-State Blood Volume fMRI in Humans

Laurentius Huber, National Institute of Mental Health, Bethesda, MD, United States,

11:08 – 11:20

4253: Post-mortem mapping of the inner connectivity of the human hippocampus using diffusion MRI at 11.7T

Justine Beaujoin, CEA NeuroSpin / UNIRS, Gif-sur-Yvette, France, Université Paris-Saclay, Orsay, France, FLI / Noeud Paris-Sud, Orsay, France,

11:20 – 11:32

1728: Improved tSNR of high-resolution fMRI with surface-based cortical ribbon smoothing

Anna Blazejewska, Department of Radiology, A.A. Martinos Center for Biomedical Imaging, MGH and Harvard Medical School, Charlestown, Boston, MA, United States

11:32 – 11:45

2056: Exploring fibre orientation dispersion in the corpus callosum: Comparison of dMRI, PLI and Histology

Jeroen Mollink, FMRIB centre, University of Oxford, Oxford, United Kingdom, Department of Anatomy, Radboud UMC, Nijmegen, Netherlands,

LABMAN MEETING

12:00 – 13:00

Secretariat 2

Neuroscience and neuroimaging research in Latin America is hindered by a lack of critical mass within any single country. LABMAN (www.labman.org) is an initiative intended to formalize disparate collaborative threads into a Latin American network via exchange of software, data, personnel, training and ideas through a coordinated network, both organizational and electronic. This meeting is intended at recruiting more LA laboratories and members into the network, discussing current and future collaborative projects in the region and share information regarding new developments at the national level.

POSTER SESSION

12:45 – 14:45

Hall 1

Poster Numbers #1000 – 2412

Authors with odd numbered posters will present their posters today.

Disorders of the Nervous System: Alzheimer's Disease and Other Dementias, Anxiety Disorders, Autism, Bipolar Disorder, Depressive Disorders, Disorders of the Nervous System Other, Medical illness with CNS impact (e.g. chemotherapy, diabetes, hypertension), Obsessive-Compulsive Disorder and Tourette Syndrome, Other Psychiatric Disorders, Parkinson's Disease and Movement Disorders, Traumatic Brain Injury

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

Imaging Methods: Anatomical MRI, BOLD fMRI, EEG, Imaging Methods Other, Imaging of CLARITY, Multi-Modal Imaging

Informatics: Brain Atlases, Databasing and Data Sharing, Informatics Other, Workflows

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

Lifespan Development: Lifespan Development Other and Normal Brain Development: Fetus to Adolescence

Modeling and Analysis Methods: Diffusion MRI Modeling and Analysis, Exploratory Modeling and Artifact Removal, Methods Development, Motion Correction and Preprocessing, Multivariate modeling, Other Methods, PET Modeling and Analysis, Segmentation and Parcellation, Univariate Modeling

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

LUNCH
12:00 – 12:45

AFTERNOON SYMPOSIUM

Revealing Fine-Scale Representations and Processing with High-Resolution fMRI and MVPA

14:45 – 16:00
Room ABC
Organizer:
Amir Shumel, MNI, McGill University, Montreal, QC, Canada

The uniformity of the mammalian cortex has led to the proposition that there exist elementary cortical units of operation, consisting of several hundred or thousand neurons that are repeated within and across cortical areas (Lorente de No', 1938). Cortical columns and layers of neocortex are prominent examples of such structurally and functionally specialized units. Functional properties and connectivity are similar for neurons within a column but are known to vary between columns. It can therefore be argued, based on information-theory, that the optimal spatial scale for studying the relationship between brain function and behavior is that of cortical columns (and layers, for similar reasons). The symposium will focus on cutting-edge methods and results of combining high-resolution functional imaging and multivariate pattern analysis (MVPA) for probing fine-scale cortical representations and processing. It will analyze the relationship between fine-scale neuronal patterns and fMRI response patterns. It will address the potential of pattern-information fMRI to capture columnar-scale representations. It will feature studies that successfully implemented these methods, and will emphasize correct interpretation of the results. It will critically assess the potential and limitations of different analysis techniques and present recent theoretical advances in understanding the processing of sensory information these methods have enabled. It will feature deep neural network models that put higher-level representations within the reach of computational modelling, but require detailed representational analyses to be empirically tested.

The symposium will expand the awareness among the OHBM community of the benefits and limitations of combining high-resolution functional imaging with MVPA for probing fine-scale cortical organizations and processing.

Multiple scales of representation in human cortex
Elisha Merriam, New York University, New York, NY, United States

Evaluating contributions of fine-scale irregularities, low-frequency organizations, macroscopic blood vessels and spatiotemporal responses to fMRI-based orientation decoding
Amir Shumel, MNI, McGill University, Montreal, QC, Canada

Layer specific brain imaging of top-down internal models induced by visual and auditory context
Lars Muckli, University of Glasgow, Glasgow, United Kingdom

Testing deep neural networks models of cortical processing with fMRI
Nikolaus Kreigeskorte, MRC Cognition and Brain Sciences Unit, Cambridge, United Kingdom

Early Developmental Studies of Autism Spectrum Disorder

14:45 – 16:00
Room X
Organizers:
Christine Wu Nordahl, University of California at Davis, Sacramento, CA, United States

Marie Schaer, University of Geneva, Geneva, Switzerland

Autism spectrum disorder (ASD) is a lifelong neurodevelopmental disorder that is typically diagnosed by 3 years of age. Despite the early age of clinical diagnosis, relatively few neuroimaging studies have focused on evaluating the neural basis of ASD in very young infants and children. The identification of imaging markers that precede clinical diagnosis could have profound impact in identifying infants at risk for ASD and initiating early interventions. Evaluating young children, at the time when ASD symptomatology emerges provides more direct evidence of the underlying neural basis of ASD because it precedes the onset of intensive behavioral interventions, which presumably alter brain structure and connectivity. This workshop brings together researchers from around the globe working on several large-scale studies aimed at evaluating neural development spanning the fetal period through the age of clinical diagnosis.

Applying MRI to Map Typical and Potentially Atypical Brain Development at Foetal, Neonatal and Infant Time-points
Grainne McAlonan, King's College London, London, United Kingdom

Atypical Early Brain Development in Infants at High Risk for Autism: Findings from the Infant Brain Imaging Study (IBIS)
Martin Styner, University of North Carolina at Chapel Hill, Chapel Hill, NC, United States

Examining the Potential of Eye-tracking and EEG to Quantify Trajectories of Early Development in Children with Autism Spectrum Disorder
Marie Schaer, University of Geneva, Geneva, Switzerland

Identifying Neural Phenotypes of Autism Spectrum Disorder: The Autism Phenome Project
Christine Wu Nordahl, University of California at Davis, Sacramento, CA, United States

Modulating functional brain systems with non-invasive brain stimulation

14:45 – 16:00
Room VW
Organizer:
Andrew Zalesky, University of Melbourne, Melbourne, Australia

Brain networks dynamically reconfigure across multiple timescales, both spontaneously and in response to non-invasive brain stimulation, to support cognition or due to brain injury and disease. In all these circumstances, functional neuroimaging combined with network science has become a popular approach to map changes in time-resolved functional connectivity. This symposium brings together four internationally recognised experts in the analysis of dynamic functional brain connectivity and network reconfiguration, as applied to investigate the neural mechanisms of non-invasive brain stimulation (Cocchi and Stagg), cognitive training (Bassett) or brain injury and disease (Zalesky). Our speakers will use the language of networks to describe how focal perturbations in brain activity (e.g., due to transcranial stimulation) can selectively propagate to distant but functionally related brain regions, demonstrate the utility of functional neuroimaging combined with network science as framework to map dynamic changes in functional connectivity and give examples of these approaches in neuroscience and clinical practice. Attendees will gain an understanding for the neural mechanisms thought to underpin popular non-invasive brain stimulation techniques and learn best practices for designing functional neuroimaging experiments and analyses to investigate dynamic changes in functional connectivity following brain stimulation, cognitive training or brain injury and disease. The focus of the symposium will be on whole-brain, data-driven approaches.

Why this topic is timely: Time-resolved analysis of functional neuroimaging data, particularly as a proof-of-mechanism for non-invasive brain stimulation techniques, has gained significant prominence in the last few years. Updating the neuroimaging community about recent advances in brain stimulation and best practices for mapping dynamic changes in functional brain connectivity resulting from stimulation is therefore timely and appeals to a broad cross-section of attendees. Our symposium appeals to both methodologists focussed on mapping network dynamics and neuroscientists interested in understanding recent developments in non-invasive brain stimulation and network plasticity.

Understanding and modulating long-range functional connectivity using MR imaging and non-invasive brain stimulation
Charlotte Stagg, University of Oxford, Oxford, United Kingdom

Using non-invasive brain stimulation to study the emergence of interactions across the visual hierarchy
Luca Cocchi, Queensland Brain Institute, Brisbane, Australia

Reconfiguration of brain networks in support of cognition
Danielle Bassett, University of Pennsylvania, Philadelphia, PA, United States

Reconfiguration of brain networks in support of cognition
Andrew Zalesky, University of Melbourne, Melbourne, Australia

BREAK

16:00 – 16:15

KEYNOTE LECTURE

16:15 – 17:00
Room ABC

Functional and causal relationships based on EEG/MEG signals

Fernando Lopes Da Silva, MD, PhD, University of Amsterdam

In this lecture I focus on the contention that biophysical models of the interactions between neural systems are necessary, although not sufficient, to obtain meaningful estimates of functional and effective relationships, including phase and time delays, and to be able to derive relevant causal relations, based on EEG/MEG signals.

POSTER RECEPTION

17:00 – 18:30
Hall 1
Poster Numbers #1000 – 2412

MORNING SYMPOSIA

Neuroimaging pain-related circuitries in the human brainstem with functional MRI

8:00 – 9:15

Room K, Level 2

Organizers:

Vitaly Napadow, Martinos Center for Biomedical Imaging, MGH, Harvard Medical School, Boston, MA, United States

Florian Beissner, Somatosensory and Autonomic Therapy Research, Institute of Neuroradiology, Hannover Medical School, Hannover, Germany

The brainstem acts as a relay and processing station between spinal cord, cerebellum, and neocortex, and its importance in processing nociceptive signals and in chronic pain disorders has been confirmed in multiple animal and human studies. Apart from pain-related centers it also contains important nuclei of many functional systems in the central nervous system, including the visual, auditory, gustatory, vestibular, somatic, and visceral senses, as well as the autonomic nervous system. Despite this indisputable importance, the brainstem has been scarcely studied in human neuroimaging research. One reason for this lies in the anatomical characteristics of the brainstem, namely, its proneness to physiological noise driven by cardiac pulsatility, its proximity to the steep magnetic susceptibility gradient of the air-tissue boundary with the oral cavity, and the small size of its anatomical constituents. All these present inherent challenges to neuroimaging analysis and make the brainstem a difficult region to study. Nevertheless, the field of brainstem neuroimaging has significantly advanced in recent years, largely due to the development of new investigation and analysis tools that facilitate studying this critical brain structure. Specifically for pain research, studies have focused attention on sensory as well as modulatory - both inhibitory and facilitatory- processing.

The talks in this session will overview novel and state-of-the-art methods for brainstem-specific image acquisition, pre-processing and data analysis, MR-compatible pain stimulation methods, combined measurement of fMRI and autonomic signals, as well as experimental approaches to identify pain-modulatory and pain-related autonomic nuclei within the brainstem. Finally, we will present applications of functional imaging techniques to chronic pain populations such as migraine, trigeminal neuralgia, and temporomandibular disorder.

How to measure brainstem activity with fMRI

Florian Beissner, Somatosensory and Autonomic Therapy Research, Institute of Neuroradiology, Hannover Medical School, Hannover, Germany

Brainstem processing in migraine: can the gateway to chronic pain be down-regulated?

Vitaly Napadow, Martinos Center for Biomedical Imaging, MGH, Harvard Medical School, Boston, MA, United States

Altered brainstem anatomy and resting rhythm in chronic orofacial pain

Luke Henderson, University of Sydney, Sydney, Australia

Combining heart rate variability and ultrahigh field (7T) fMRI to reveal the brainstem circuitry supporting cardiovagal response to pain

Roberta Sclocco, Department of Electronics, Information and Bioengineering, Politecnico di Milano, Milano, Italy

Neural Nets to Neural Nets: Deep Learning Approaches to Neuroimaging

8:00 – 9:15

Room VW

Organizers:

Vince D. Calhoun, The Mind Research Network, Albuquerque, NM, United States

Sergey Pils, The Mind Research Network, Albuquerque, NM, United States

Brain imaging provides a unique view of brain function albeit via indirect measurements that complicate the interpretation. Traditional approaches cope with this complication by fitting parameters of a model to observed data but such models of how the brain works are far from perfect. In this situation, researchers are left with studying interactions among many indirectly observed variables: a problem similar to representation learning in the fields of natural data processing that include speech, images, video and time series analysis. All of these fields have recently been disrupted by successes made possible thanks to deep learning approaches. Historically neuroimaging has benefitted greatly from the introduction of analysis and acquisition approaches borrowed from other disciplines to examine brain function in new ways. It is clear that a similar adoption is about to happen with deep learning approaches and this process can potentially affect multiple areas of brain imaging that rely on pattern analysis in high-dimensional data. In this symposium, we have asked the speakers to discuss deep learning approaches that are new to the brain imaging community and show their benefits in practical application to different modalities and their combinations. A particular focus is on differences in the main question of the already traditional application domains of deep learning (prediction) and brain imaging (understanding).

Deep learning: an introduction

Ruslan Salakhutdinov, Computer Science and Statistics, University of Toronto, Canada

Recurrent neural networks for decoding, diagnosis and dynamic functional connectivity estimation from fMRI data

Orhan Firat, Department of Computer Engineering, Middle East Technical University, Turkey

Deep feature learning for EEG recordings

Sebastian Stober, Research Focus Cognitive Sciences University of Potsdam, Potsdam, Germany

A deep-learning approach to translate between brain structure and functional connectivity
Devon Hjelm, The Mind Research Network, Albuquerque, NM, United States

Functional Connectivity or Causality in the Brain: How Do We Know?

8:00 – 9:15
Room ABC
Organizer:
Bin He, University of Minnesota, Minneapolis, United States

The past years have seen an escalation of interest in brain connectivity and causality. Numerous studies have been published on this topic using various modeling approaches including Granger Causality, Dynamic Causal Modeling, and Partial Correlation Mapping, etc. A Google Scholar search for "functional connectivity" returned over 100,000 publications since 2014. However, crucial methodological and conceptual issues remain unresolved. These include: (a) which modeling approach should be used for which data, (b) how can we validate connectivity/causality estimators, and (c) how can we reconcile functional connectivity data obtained from functional MRI and EEG/MEG, which reflect very different aspects of neuronal activity. This symposium will review the state of the art of functional/effective connectivity and causality mapping approaches, and discuss the key challenges ahead. Participants will learn the pros and cons of various modeling approaches for connectivity/causality estimation, experimental validation of connectivity estimates, and the complementary nature of estimates based on fMRI and EEG/MEG data.

Brain Modes and Network Discovery
Karl Friston, University College London, London, United Kingdom

Mapping Brain Electrophysiological Connectome
Bin He, University of Minnesota, Minneapolis, United States

Bicoherence - The Higher Harmonics Strike Back
Guido Nolte, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Methods for Estimating Brain Connectivity using MEG/EEG and Why There Are Contradictory Connectivity Findings?
Sheraz Khan, Harvard Medical School, Boston, United States

Shapes of the Language Network: From Primates to Second Language Acquisition

8:00 – 9:15
Room X
Organizers:
Alfred Anwander, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

Tomás Goucha, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

As most cognitive brain networks, the language network was considered as a static and universal circuit resulting from the genetic endowment that enabled humans to speak. In an age where neuroscience is moving to combining phylogeny and ontogeny with environmental influences, we have to acknowledge the dynamic properties of this network over lifetime and evolutionary scales. Starting with a phylogenetic perspective, we will approach the perisylvian network of non-human primates and its involvement in auditory processing. Not only do our closest relatives possess precursors of meaning retrieval from auditory input, but also of auditory sequence processing. The commonalities and evolutionary differences will help to trace the anatomical path to human language. Also in humans, the language network dynamically adapts to the tasks it has to perform. Its shape is differentially determined by linguistic properties of the mother tongue of each individual and also by its modality in the case of sign language. This puts into question the universality in brain wiring for language. Acquiring a second language is an ideal way to show these plastic changes at different time points from early bilingual children to adult language learners. The extent to which different circuits are recruited also provide insights on how the brain networks adapt to bilingual experience and in general to novel cognitive tasks. However, these studies investigating anatomical connectivity only infer the functions of these brain structures indirectly. That is why the in vivo intraoperative assessment of the brain connectivity can provide us crucial insights. It can also help us refine our knowledge about the detailed structure of these white matter structures. This symposium brings together basic neuroscience with clinical application, giving new insights in the brain circuitry that can be translated into improvements for the neurosurgical patients.

Primate precursors of the language network: Auditory sequence processing
Christoper Petkov, Laboratory of Comparative Neuropsychology, Newcastle University Medical School, Newcastle, United Kingdom

Shaping of the structural language network by the mother tongue
Alfred Anwander, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

Processing two languages in one brain: Specific and shared networks
Manuel Carreiras, Basque Center on Cognition, Brain and Language, Donostia-San Sebastián, Spain; IKERBASQUE, Basque Foundation for Science, Bilbao, Spain, University of the Basque Country, UPV/EHU Bilbao, Spain

The connectomal anatomy of language revisited: lessons from brain stimulation mapping
Hugues Duffau, Department of Neurosurgery, Gui de Chauliac Hospital, Montpellier University Medical Center, Montpellier, France; National Institute for Health and Medical Research (INSERM), U1051 Laboratory, Inst. f. Neuroscience, Montpellier, France

BREAK
9:15 – 9:30

KEYNOTE LECTURE
9:30 – 10:15

Room ABC

The Uniquely Human Hippocampus
Susan Bookheimer, PhD, UCLA School of Medicine

The human hippocampus is a highly conserved brain structure bearing close anatomical resemblance to that of the rat. Nonetheless, animal research into hippocampal function has focused primarily on neural populations coding memory for aspects of spatial navigation, while descriptions of human memory more often examine memory functions that are uniquely human (such as verbal and declarative memory for distinct learning episodes). This talk will present multi-modal, high-resolution studies of hippocampal structure, function, and connectivity to address two questions: How can a structure so similar across species give rise to such uniquely human memory capabilities? Why is a structure so fundamental to our functioning as humans so vulnerable to damage throughout the lifespan?

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-W1: Predictive and Statistical Modelling
Room W

Chair:
Carsten Allefeld, Bernstein Center for Computational Neuroscience, Berlin, Germany

10:30 – 10:43
3882: The cost of controlling the human connectome
Richard Betzel, University of Pennsylvania, Philadelphia, PA, United States

10:43 – 10:55
3772: Hierarchical Prediction Errors during Auditory Mismatch: A Computational Single-Trial EEG Analysis
Lilian Aline Weber, Translational Neuromodeling Unit, Institute for Biomedical Engineering, ETHZ & University of Zurich, Zurich, Switzerland

10:55 – 11:08
3777: A Bayesian Framework for Population Receptive Field (PRF) Modelling
Peter Zeidman, University College London, London, United Kingdom

11:08 – 11:20
3862: Learning Effects in Fast Transient Brain States During the Formation of Long-Term Memories
Andrew Quinn, University of Oxford, Oxford, United Kingdom

11:20 – 11:32
3813: Predicting Task-Based From Task-Free MRI in Individual Subjects
Ido Tavor, Oxford Centre for Functional MRI of the Brain, University of Oxford, Oxford, United Kingdom, Department of Diagnostic Imaging, Sheba Medical Center, Tel Hashomer, Israel

11:32 – 11:45
3829: Cross-validation to assess decoder performance: the good, the bad, and the ugly
Gael Varoquaux, INRIA, Gif-sur-Yvette, France

O-W2: Emotion, Motivation, & Social Neuroscience
Room ABC

Chair:
Alain Dagher, Montreal Neurological Institute McGill University, Montreal, Canada

10:30 – 10:43
3366: Dynamic brain networks engaged in positive emotion regulation
Yury Koush, EPFL, Lausanne, Switzerland

10:43 – 10:55
4336: Brain responses to free viewing of dynamic social and non-social object interactions
R.Matthew Hutchison, Harvard University, Cambridge, MA, United States

10:55 – 11:08
3092: A neurobiological pathway to smoking in adolescence: TTC12-ANKK1-DRD2 variants and reward response
Christine Macare, King's College London, London, UK

11:08 – 11:20
4382: The dynamic brain during interaction: A dual-fMRI investigation of the iterated Ultimatum Game
Daniel Shaw, CEITEC MU, Brno, Czech Republic

11:20 – 11:32
3419: Ghrelin Promotes Associative Learning of Food Odours
Jung Eun Han, Montreal Neurological Institute, McGill University, Montreal, Quebec, Canada

11:32 – 11:45
4362: Inter-species face processing in dogs: The role of frontal and temporal cortices
Laura Cuaya, Institute of Neurobiology, Queretaro, Mexico

O-W3: Genetics

Room K, Level 2
Chair:
Jonas Richiardi, University of Geneva, Geneva, Switzerland

10:30 – 10:43
3222: Cortical dysconnectivity and cortical thinning are associated with psychotic symptoms in 22q11DS
Corrado Sandini, Office Médico-Pédagogique, Department of Psychiatry, University of Geneva School of Medicine, Geneva, Switzerland

10:43 – 10:55
3440: Matrix Metalloproteinase-9 Genetic Variation Affects Brain Structure and Function in Healthy Adults
Michael Gregory, Section on Integrative Neuroimaging, Clinical & Translational Neuroscience Branch, NIMH/NIH, Bethesda, MD, United States

10:55 – 11:08
3518: FOXP2 polymorphism effects on the topological organization of human brain connectome
Suyu Zhong, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, Beijing, China, IDG/McGovern Institute for Brain Research, Beijing Normal University, Beijing, China

11:08 – 11:20
3250: Linking gene expression to white matter connectome alterations in schizophrenia
Ingrid Romme, Department of psychiatry, Brain Center Rudolf Magnus, University Medical Center Utrecht, Utrecht, Netherlands

11:20 – 11:32
1425: The Role of Dopamine during Learning under Uncertainty
Andreea Diaconescu, Translational Neuromodeling Unit, Institute for Biomedical Engineering, ETH and University of Zurich, Zurich, Switzerland

11:32 – 11:45
3699: Covariation of brain structure volumes is explained by structural connectivity and gene expression
Yohan Yee, Hospital for Sick Children, Toronto, Canada

O-W4: Motor Action and Stimulation

Room V
Chair:
Hartwig Siebner, Donders Institute for Brain, Cogintion and Behaviour, Nijmegen, Netherlands

10:30 – 10:43
3018: TACS-fMRI yields causal influence of power synchronized neural activity on resting fMRI connectivity
Marc Bächinger, ETH Zurich, Zürich, Switzerland

10:43 – 10:55
3056: Polarity-independent effects of tDCS on motor cortex plasticity - a challenging view
Hanna Faber, Department of Neurology & Stroke and Hertie-Institute for Clinical Brain Research, Tuebingen, Germany

10:55 – 11:08
4169: Brain responses to delayed visual hand movement feedback in a virtual reality tracking task
Jakub Limanowski, Freie Universität Berlin, Berlin, Germany

11:08 – 11:20
4242: Mapping the polar angle representation of saccades in human superior colliculus
Ricky Savjani, Baylor College of Medicine, Houston, TX, United States

11:20 – 11:32
3006: Thalamic stimulation with transcranial focused ultrasound in humans
Leo Ai, University of Minnesota, Minneapolis, MN, United States

11:32 – 11:45
3008: Changes in cerebral blood oxygenation induced by Subthalamic Nucleus high frequency stimulation
Michel Lefranc, Neurosurgery department, CHU Amiens Picardie, Amiens, France

O-W5: Language

Room X

10:30 – 10:43
3613: Angular Gyrus likes Episodic Retrieval, rather than all Internally-Directed thought (even Semantics)
Gina Humphreys, University of Manchester, Manchester, United Kingdom

10:43 – 10:55
3618: Lesion and fMRI data reveal the contribution of right-hemisphere regions to sentence comprehension
Andrea Gajardo Vidal, Wellcome Trust Centre for Neuroimaging, University College London, London, United Kingdom

10:55 – 11:08
3608: Whole-brain functional connectivity during acquisition of novel grammar
Olga Kepinska, Leiden University, Leiden, Netherlands

11:08 – 11:20
3653: The left frontal aslant tract is important for written communication irrespective of handedness
Henrietta Howells, Natbrainlab, King's College London, London, United Kingdom

11:20 – 11:32
3674: Lip movements during speech entrain observers' low-frequency brain oscillations
Hyojin Park, University of Glasgow, Glasgow, United Kingdom

11:32 – 11:45
3699: MEG Imaging of Logopenic and Nonfluent Variant Primary Progressive Aphasia
Megan Thompson, UC San Francisco-UC Berkeley Joint Graduate Group in Bioengineering, San Francisco, CA, United States

MEET THE EDITORS ROUNDTABLE

Wednesday, June 29th
11:45 – 13:30
Room W
Organizer:
Peter Bandettini, Editor-In-Chief NeuroImage

Grab your own lunch and join senior editors as well as journal publishers from a wide range of Neuroimaging journals will present short informal introductions to their respective journals and gave a brief summary of what they are looking for in submitted manuscripts. Then a spirited and highly informative question and answer panel discussion will follow.

LUNCH

11:45 – 12:45

POSTER SESSION

12:45 – 14:45
Hall 1
Poster Numbers #3000 – 4391
Authors with even numbered posters will present their posters today.

Brain Stimulation Methods: Deep Brain Stimulation, Direct Electrical/Optogenetic Stimulation, Invasive Stimulation Methods Other, Non-invasive Electrical/tDCS/tACS/tRNS, Non-invasive Magnetic/TMS, Non-Invasive Stimulation Methods Other, TDCS, TMS

Disorders of the Nervous System: Addictions, Eating Disorders, Epilepsy, Research Domain Criteria studies (RDoC), Schizophrenia and Psychotic Disorders, Sleep Disorders, Stroke

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

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

Imaging Methods: Diffusion MRI, MEG, MR Spectroscopy, NIRS, Non-BOLD fMRI, PET, Polarized light imaging (PLI)

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

Lifespan Development: Aging

Modeling and Analysis Methods: Bayesian Modeling, Classification and Predictive Modeling, EEG/MEG Modeling and Analysis, fMRI Connectivity and Network Modeling, Image Registration and Computational Anatomy, Task-Independent and Resting-State Analysis

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

Neuroanatomy: Anatomy and Functional Systems, Cortical Anatomy and Brain Mapping, Cortical Cyto- and Myeloarchitecture, Neuroanatomy Other, Normal Development, White Matter Anatomy, Fiber Pathways and Connectivity, Subcortical Structures

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

Social Neuroscience: Self Processes, Social Cognition, Social Interaction and Social Neuroscience Other

AFTERNOON SYMPOSIUM

Pediatric Neuroimaging Grows Up: Large Scale Imaging Initiatives to Study the Developing Brain

14:45 – 16:00

Room VW

Organizers:

Theodore Satterthwaite, University of Pennsylvania, Philadelphia, PA, United States

Michael Milham, Child Mind Institute, New York, NY, United States

Increasingly, major neuropsychiatric disorders ranging from schizophrenia to addiction are understood as disorders of brain development. Non-invasive multi-modal neuroimaging can provide insights regarding trajectories of normal brain development, how abnormal brain development may be associated with psychopathology, and how health behaviors such as substance use may impact developmental trajectories. Such work is a critical prerequisite for early identification of psychopathology, the development of targeted interventions, and also may have substantial implications for public health policy. Accordingly, this symposium provides an overview of four large-scale developmental neuroimaging initiatives. These datasets both accelerate research regarding brain development and also provide rich resources for development of novel "big data" analytics.

First, Ted Satterthwaite (University of Pennsylvania) will present data from the Philadelphia Neurodevelopmental Cohort, a single-site community-based study of 1,600 youth that integrates multimodal imaging and genomics with detailed assessment of psychopathology and cognition. Second, Michael Milham (Child Mind Institute) will describe the design and findings provided by the NKI-Rockland Sample, an epidemiologically-ascertained lifespan study of 1,000 children, adolescents, and adults. Third, Hugh Garavan (University of Vermont) will describe the work of the IMAGEN consortium, a longitudinal study of 2,000 adolescents investigating reinforcement-related behavior using imaging and genomics. Finally, Terry Jernigan (University of California, San Diego) will present data from the Pediatric Imaging, Neurocognition, and Genetics (PING) study, a multi-site study of over 1,000 youth ages 3-20. Additionally, Dr. Jernigan will describe plans for the ABCD study, a landmark effort to follow 10,000 youth longitudinally over 10 years.

The Philadelphia Neurodevelopmental Cohort: A resource for exploring normal and abnormal patterns of brain development

Theodore Satterthwaite, University of Pennsylvania, Philadelphia, PA, United States

The NKI-Rockland Sample: A Model for Accelerating the Pace of Discovery Science in Psychiatry.

Mike Milham, Child Mind Institute, New York, NY, United States

Risk factors for adolescent mental ill-health: Exploratory "Big Data" and hypothesis-driven approaches

Hugh Garavan, University of Vermont, Burlington, VT, United States

Large-scale, collaborative, multi-site imaging studies of brain development

Terry Jernigan, University of California, San Diego, San Diego, CA, United States

Using Connectivity Imaging to Guide Therapeutic Brain Stimulation

14:45 – 16:00

Room X

Organizer:

Michael Fox,Department of Neurology, Harvard University, Beth Israel Deaconess Medical Center, Boston, MA, United States

Worldwide there has been tremendous recent investment into understanding and imaging brain connectivity. The hope is that this human connectome data will translate into improved treatments for brain disease. One area in which this goal is closest to being realized is the field of therapeutic brain stimulation. Both invasive (e.g. deep brain stimulation) and noninvasive (e.g. transcranial magnetic stimulation) forms of brain stimulation propagate through anatomical connections to impact distributed brain networks. In this symposium, we will show how brain connectivity data is being used to understand the effects of therapeutic brain stimulation, predict therapeutic response, inform stimulation targets, and motivate new therapeutic approaches to neurological and psychiatric disease.

Network Targets of Invasive and Noninvasive Brain Stimulation Therapies

Michael Fox, Department of Neurology, Harvard University, Beth Israel Deaconess Medical Center, Boston, MA, United States

The circuits that underlie DBS targets for psychiatric disease

Suzanne Haber, Department of Pharmacology and Physiology, University of Rochester Medical Center, Rochester, NY, United States

7 Tesla MRI for Neuromodulation Applications

Noam Harel, Departments of Radiology and Neurosurgery, University of Minnesota, Minneapolis, MN, United States

Brain Connectivity in the Operating Room

Nadar Pouratian, Department of Neurosurgery, University of California Los Angeles School of Medicine, Los Angeles, CA, United States

Imaging Decision-Making: How the Brain Weights Different Sources of Information

14:45 – 16:00

Room ABC

Organizers:

Markus Ullsperger, Otto von Guericke University Magdeburg, Magdeburg, Germany

Hauke Heekeren, Freie Universität Berlin, Berlin, Germany

Decision making research has advanced dramatically in behavioral and systems neuroscience as well as economics. For more than a decade, many research programs have successfully studied this topic with various measures of neuronal activity at the systemic and microscopic level, and sophisticated computational models have revolutionized analysis approaches. With the topic's massive growth many subfields have evolved. It is time to re-integrate the mostly separated research lines and discuss how they can converge on common and generalizable models of decision making in humans. We will present some of the most important modeling, neuroimaging and analysis approaches and discuss how they can converge and complement each other to advance the mechanistic understanding of underlying neuronal mechanisms. This is also highly relevant for clinical research because many mental disorders are associated with dysfunctional decision making such as addiction, obsessive-compulsive and anxiety disorders.

Computational and representational analysis approaches to associative learning

Erie Boorman, University of Oxford, Oxford, United Kingdom

Trading immediate reward against information supporting long-term success

Markus Ullsperger, Otto von Guericke University Magdeburg, Magdeburg, Germany

Model based decisions and their interaction with informational influences

Hauke Heekeren, Freie Universität Berlin, Berlin, Germany

Model Based vs. Model Free Learning: Who's Controlling the Controller?

Christian Ruff, University of Zurich, Zürich, Switzerland

BREAK

16:00 – 16:15

KEYNOTE LECTURE

16:15 – 17:00

Room ABC

Storing, using and updating knowledge for behavioural control

Tim Behrens, Oxford Centre for Functional MRI of the Brain

I will present a number of studies where we have tried to look at how basic models of the world are stored in the brain to allow flexible control of behaviour. These studies try to investigate neural codes and mechanisms that are used to organise this knowledge in a form that can be used efficiently and flexibly. I will mostly focus on interactions between frontal cortex and the medial temporal lobe, but might occasionally stray into sensory cortices. The neuronal codes and mechanisms I will be talking about are often stolen from or related to studies in animal models, so there might also be some methodological interest in how we can go about measuring more mechanistic types of signals in humans.

TOWN HALL FORUM

Wednesday, June 29, 17:15 – 18:15

Room ABC

The Town Hall 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. Member input will be sought on several topical issues including a report by the Chair on OHBM's recent strategic planning meeting and new initiatives under development and a report by the newly formed Communications Committee on ways members the OHBM community can remain engaged even after the meeting. The new elected leadership will be announced as well as dates and venues for future Annual Meetings.

CLUB NIGHT

20:00 – 1:30

Espace Hippomène

Housed in an exceptional building, the Espace Hippomène is a multidimensional concept located on a historically significant industrial site that is designed to host all types of unique events. The venue occupies a strategic location in Geneva, close to the airport, railway station, the city center and international organizations.
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 Club Night. Additional guest tickets are $50.00 and must be purchased at the conference registration desk.

MORNING SYMPOSIA

From Mapping to Modulation: Using Neuroimaging to Guide Brain Stimulation Treatment for Addiction

8:00 – 9:15

Room VW

Organizers:

Colleen Hanlon, Medical University of South Carolina, Charleston, SC, United States

Elliot Stein, NIDA-IRP, Baltimore, MD, United States

Our understanding of the neural circuitry of addiction - from vulnerability to relapse- has never been greater - due in part to significant advances in clinical and preclinical neuroimaging. Our challenge now, however, is to take that knowledge and develop a neural circuit based treatment for addiction. Both the National Institute of Drug Abuse and the European Commission have designated brain stimulation as a target area for growth in the next 5 years. In order for these efforts to be fruitful however, neuromodulation strategies of the future must be grounded in our rich neural mapping data which continues to improve.

Specifically, through advances in imaging we know that drug taking behavior can be modified by selectively enhancing or attenuating activity in frontal-striatal circuits. We also know that it is possible to independently activate frontal-striatal circuits that govern executive control and arousal with non-invasive transcranial magnetic stimulation (TMS). Several weeks of repetitive TMS can have long term effects on frontal-striatal circuits and decrease clinical depression. We do not, however, know if repetitive TMS will be an effective therapeutic tool for substance dependent populations. We also do not know whether attenuating craving or amplifying cognitive control will likely be a more efficacious approach. Before the field of substance abuse research embarks on large, multisite trials of rTMS as a treatment option for addiction, it is wise to consider the appropriate location for stimulation and frequency of stimulation. This workshop will thematically be linked by two questions: "Where should we stimulate? (Raij)" & "Which frequency should we use at this location? (Lee)." It will begin with an introduction to the neural circuits and candidate neural biomarkers involved in substance dependence (Yang), and conclude with a summary of previous and new data on the efficacy of rTMS as a therapeutic tool in treatment seeking cocaine users, alcohol users, and smokers (Hanlon).

Both senior and junior investigators will be featured and will all use information from human neuroimaging studies to guide their presentations. Discussion from the audience will be encouraged at the end of each presentation as well as in an open forum at the end of the workshop.

Educational component: Searching for imaging biomarkers of cocaine addiction: implications for the target and efficacy of TMS treatment

Yihong Yang, NIDA-IRP, Baltimore, MD, United States

Choosing a location: "Where should we stimulate: Probabilistic cortical and network-level therapeutic atlases for the human brain"

Tommi Raij, Northwestern University, Chicago, IL, United States

Selecting a frequency: "How fast should we stimulate: measuring the effect of deep rTMS on task-based and resting state functional connectivity"

Mary Lee, NIH-NIAAA, Rockville, MD, United States

Emerging data from substance dependent populations: "The effect of medial PFC theta burst stimulation on frontal-striatal connectivity in cocaine users, alcohol users, and smokers"

Colleen Hanlon, Medical University of South Carolina, Charleston, SC, United States

Executive Function and Brain Connectivity

8:00 – 9:15

Room ABC

Organizer:

Marie Banich, University of Colorado, Boulder, CO, United States

It has been known for quite some time that the fronto-parietal network plays a critical role in executive function. All major theories of executive function assume that the fronto-parietal network implements control by modulating or modifying processing in other brain regions. As such, connectivity between brain regions is likely to play a crucial role in the ways in which the fronto-parietal network allows for executive function. Nonetheless, examining executive function from the perspective of brain connectivity has received relatively little investigation. This symposium serves to address this important and emerging issue from the perspective of both resting-state and task-based functional connectivity.

Individual differences in anatomical and functional aspects of brain connectivity that influence components of executive function

Marie Banich, University of Colorado, Boulder, CO, United States

Functional brain dynamics underlying individual differences in executive function

Lucina Uddin, University of Miami, Miami, FL, United States

It's about time: a dynamic functional connectivity approach to understanding the development of cognitive control

J. Bruce Morton, Western University, London, Ontario, Canada

Default and executive network interactivity involved in goal-directed cognition

R. Nathan Spreng, Cornell University, Ithaca, NY, United States

Multi-Echo fMRI and its Applications in Neuroscience and Neuropsychiatry

8:00 – 9:15

Room X

Organizers:

Benedikt Poser, Maastricht University, Maastricht, Netherlands

Jennifer Evans, NIH, Bethesda, MD, United States

We propose a session to present the new domains of fMRI study that are enabled by multi-echo fMRI (ME-fMRI), spanning functional brain organization, activation dynamics, and neuropsychiatric conditions such as addiction and impulsivity. Multi-echo fMRI has been shown to increase BOLD sensitivity compared to regular single echo fMRI and become popular at many labs. Furthermore, with ME-fMRI, NMR signal decay models can be used to validate BOLD signals at subject-level and identify a wide variety of non-BOLD artifacts for denoising - greatly decreasing confounds from artifacts and biases from preprocessing. This topic is timely since subject-level fMRI and the study of brain dynamics are emerging as new frontiers, and these and many other applications require higher fMRI signal fidelity than is afforded by currently standard techniques. The presentations in this educational session will cover a wide array of topics, from implementation of advanced ME acquisition and analysis strategies (Poser, Evans), the novel multiband multi-echo (MBME) technique and how it compares to state of the art fMRI acquisition protocols across field strengths (Boyacioglu), subcortical-cortical connectivity in impulsivity disorders (Voon), typical brain development, and ultraslow BOLD phenomena and cross-referenced to ME-fMRI-EEG (Evans). Next to their specific applications, the lecturers will take care to provide a balanced overview of published applications of multi-echo fMRI in human and animal imaging.

Multi-echo basics
Benedikt Poser, Maastricht University, Maastricht, Netherlands

Methods and Applications of Multi-band Multi-echo fMRI
Prantik Kundu, Icahn School of Medicine at Mount Sinai, Manhattan, New York, United States

Differentiating slow BOLD changes from baseline drifts
Jennifer Evans, NIH, Bethesda, MD, United States

Sub-cortical connectivity
Laurel Morris, University of Cambridge, United Kingdom

Scientific and clinical applications of EEG and fMRI neurofeedback

8:00 – 9:15

Room K, Level 2

Organizers:

Frank Scharnowski, University of Zürich, Zürich, Switzerland

Tomas Ros, University of Geneva, Geneva, Switzerland

In contrast to conventional neuroimaging experiments where behavioral task or sensory stimulation is the independent variable and brain activity the dependent variable, in neurofeedback (NFB) experiments brain activity is the independent variable. Similar to other interventional techniques (e.g. transcranial magnetic stimulation, deep brain stimulation, or psychopharmacology), NFB allows for establishing a causal link between brain activity and behavior. Neuroplasticity and behavioral effects following NFB training have been demonstrated in multiple modalities, meanwhile fMRI and EEG have experienced parallel technical advances. For example, reports have shown that homologous cortical regions (e.g. anterior cingulate, visual cortex) may be modulated via complementary NFB modalities such as real-time fMRI or EEG. Further advances include neurofeedback using magnetoencephalography and new applications using functional near-infrared spectroscopy. Hitherto, these fields have largely been developing without input from each other, yet we have now reached a point where modalities are beginning to fuse and complement each other. This symposium will present a state-of-the-art selection of multimodal NFB approaches (ultra-high field fMRI, EEG-fMRI, fNIRS, robotics) that share intersecting mechanisms of action and illustrate the diverse applications of NFB in scientific and clinical domains, including psychiatry and neurorehabilitation.

Methodological advances in real-time fMRI for high-speed, high-resolution clinical neurofeedback and brain-computer interface applications
Rainer Göbel, Maastricht University, Maastricht, Netherlands

fMRI- and EEG-Assisted Neurofeedback Training of Amygdala in Posttraumatic Stress and Major Depressive Disorder
Jerzy Bodurka, Laureate Institute for Brain Research, Tulsa, OK, United States

From fMRI to EEG and Back: validating a novel limbic-neurofeedback approach to emotional regulation
Talma Hendler, Faculty of Medicine, Sagol School of Neuroscience Tel-Aviv University, Tel-Aviv, Israel

EEG and Real Time fMRI Neurofeedback Recruits Emotion Regulation Regions in PTSD
Ruth A. Lanius, Department of Psychiatry, Western University, London, Ontario, Canada

BREAK
9:15 – 9:30

KEYNOTE LECTURE

9:30 – 10:15

Room ABC

The topography of dopamine dysfunction in schizophrenia

Anissa Abi-Dargham, Columbia University & New York Psychiatric Institute

The lecture will take an in-depth look at the cumulative knowledge gained from PET imaging studies of dopamine in schizophrenia including recent findings relating to cortical and extrastriatal regions. The translational and multimodal imaging studies designed to understand the functional impact and the mechanisms associated with the dopaminergic dysregulation will also be discussed.

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: Connectivity Modelling

Room ABC

Chair:

Janine Bijsterbosch, University of Oxford, Oxford, United Kingdon

10:30 – 10:43

4082: Dynamic multi-scale modes of resting state brain activity detected by entropy field decomposition

Lawrence Frank, UCSD, La Jolla, CA, United States

10:43 – 10:55

4088: Concordance Among Indices of Intrinsic Brain Function

Chao-Gan Yan, Institute of Psychology, Chinese Academy of Sciences, Beijing, China

10:55 – 11:08

3931: Identifying spatiotemporal patterns of functional connectivity using dictionary learning

Nicolas Farrugia, Institut Mines-Telecom, Brest, France

11:08 – 11:20

3941: The structural basis of large-scale functional connectivity in the mouse

Valerio Zerbi, Neural Control of Movement Lab, ETH Zurich, Zurich, Switzerland

11:20 – 11:32

3996: Multivariate distance correlation is a more reliable and robust measure of functional connectivity

Linda Geerligs, MRC Cognition and Brain Sciences Unit, Cambridge, United Kingdom

11:32 – 11:45

4028: Shape variability in the dynamics of resting-state functional network and relationship with age

Hyekyoung Lee, Seoul National University, Seoul, Korea, Republic of

O-TH2: Focal Neurological Disorders

Room W

Chair:

Maurizio Corbetta, Washington University, St. Louis, MO, United States

10:30 – 10:43

3135: In vivo mapping of gliosis in temporal lobe epilepsy using FLAIR intensity analysis

Sophie Adler, NeuroImaging of Epilepsy Laboratory, McConnell Brain Imaging Center, Montreal Neurological Institute, Montreal, Canada

10:43 – 10:55

3149: ENIGMA-Epilepsy: Worldwide brain structural comparisons in 1,738 epilepsy cases and 1,358 controls

Christopher Whelan, University of Southern California, Los Angeles, CA, United States

10:55 – 11:08

3164: Predicting outcome after surgery for temporal lobe epilepsy using Automated Fibre Quantification

Simon Keller, The University of Liverpool, Liverpool, United Kingdom

11:08 – 11:20

3326: Normalization or Reorganization: Evidence for different mechanisms of recovery in Neglect & Aphasia

Joshua Siegel, Department of Neurology, Washington University, Saint Louis, MO, United States

11:20 – 11:32

3327: Distinct signatures of remote longitudinal white matter alterations in neglect

Roza Umarova, Department of Neurology, University Medical Center, Freiburg, Germany,

11:32 – 11:45

3335: Integrity of cortico-cerebellar fibres is associated with residual motor function in chronic stroke

Robert Schulz, Department of Neurology, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

O-TH3: The Again Brain

Room X

Chair:

Joseph Masdeu, Houston Methodist Neurological Institute, Houston, TX, United States

10:30 – 10:43

4050: Effects of Physical Exercise on Brain Atrophy in Patients at Risk of Alzheimer's Disease

Benjamin Sinclair, Department of Radiology, University of Melbourne, Melbourne, Australia

10:43 – 10:55

1036 Distinct Modes of Brain Variability Across the Alzheimer's Disease Continuum

Nhat Trung Doan, NORMENT, Oslo University Hospital & University of Oslo, Oslo, Norway

10:55 – 11:08

3730: Discovering Heterogeneous Patterns of Advanced Brain Aging in Baltimore Longitudinal Study of Aging

Nicolas Honnorat, University of Pennsylvania, Philadelphia, PA, United States

11:08 – 11:20

3737: The morphology of the cortical surface in aging process

Hsin-Yu Lin, National Yang-Ming University, Taipei, Taiwan

11:20 – 11:32

3746: Aging-related changes in structural and functional interhemispheric connectivity

John Lewis, Montreal Neurological Institute, Montreal, Canada

11:32 – 11:45

3751: CSF NFL levels and hippocampal atrophy rate in cognitively healthy elderly individuals

Roser Sala-Llonch, University of Oslo, Oslo, Norway

O-TH4: Neuroanatomy and Physiology

Room V

Chair:

David Van Essen, Washington University, St. Louis, MO, United States

10:30 – 10:43

4306: Resting-state fMRI signals in the macaque are altered by transient inactivation of basal forebrain

Catie Chang, NINDS, NIH, Bethesda, MD, United States

10:43 – 10:55

4197: Tractography based parcellation of the frontal lobe: reproducibility & functional significance.

Michel Thiebaut de Schotten, Brain Connectivity and Behaviour Group, Paris, France

10:55 – 11:08

4261: Cytoarchitectonic similarity as a wiring principle of the human connectome

Alexandros Goulas, Dept. of Computational Neuroscience, Hamburg, Germany

11:08 – 11:20

4310: Comparison of Neuronal and Hemodynamic Dynamic Connectivity Calculated Using GCaMP Mice Data

Alberto Vazquez, University of Pittsburgh, Pittsburgh, PA, United States

11:20 – 11:32

4267: Frontal aslant tract and premotor connections underlying visuomotor processing in humans

Sanja Budisavljevic, Department of General Psychology, University of Padova, Padova, Italy,

11:32 – 11:45

4209: BigBrain: Automated analysis of laminar structure in the cerebral cortex

Konrad Wagstyl, University of Cambridge, Cambridge, United Kingdom

LUNCH

11:45 – 12:45

OHBM MEETS WHO SYMPOSIUM

The value of World Brain Initiatives for Public Health Gain

12:00 – 14:30

Room ABC

Chairs:

Shekhar Saxena, Director of the Department of Mental Health and Substance Abuse World Health Organization, Geneva, Switzerland

Karl Zilles, Research Centre Juelich, Juelich, Germany Council Chair, Organization for Human Brain Mapping

Organizers:

Pedro Valdes-Sosa, Cuban Neuroscience Center, Havana, Cuba

Christoph Michel, Department of Neuroscience, University of Geneva, Switzerland

Sean Hill, Swiss Federal Institute of Technology Lausanne (EPFL), Geneva, Switzerland

The purpose of this symposium is to raise awareness among the participants of OHBM especially that of young researchers to the need of current research projects that impact upon the staggering burden of disease of brain disorders. We also hope to stimulate discussion around this topic. Bring your own lunch.

Speakers:

Walter Koroshetz, BRAIN Initiative Director, NINDS, Office of The Director, Bethesda, MD, United States

Zhiqi Xiong, Chinese Brain Database Institute of Neuroscience, Shanghai Insitutues for Biological Sciences, Chinese Academy of Sciences

Katrin Amunts, European Human Brain Project Research Centre Juelich, Juelich, Germany

Tetsuro Yamamori, Japan Brain/MINDS Project, RIKEN Brain Science Institute/School of Medicine, Keio University, Tokyo, Japan

Valeria Della-Maggiore, Latin American Brain Mapping Network Director of the Physiology of Action Lab, University of Buenos Aires, Brazil

Alan Evans, Canadian Brain Initiative McGill Centre for Integrative Neuroscience, Montreal, Canada

POSTER SESSION

12:45 – 14:45

Hall 1

Poster Numbers #3000-4391

Authors with odd numbered posters will present their posters today.

Brain Stimulation Methods: Deep Brain Stimulation, Direct Electrical/Optogenetic Stimulation, Invasive Stimulation Methods Other, Non-invasive Electrical/tDCS/tACS/tRNS, Non-invasive Magnetic/TMS, Non-Invasive Stimulation Methods Other, TDCS, TMS

Disorders of the Nervous System: Addictions, Eating Disorders, Epilepsy, Research Domain Criteria studies (RDoC), Schizophrenia and Psychotic Disorders, Sleep Disorders, Stroke

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

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

Imaging Methods: Diffusion MRI, MEG, MR Spectroscopy, NIRS, Non-BOLD fMRI, PET, Polarized light imaging (PLI)

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

Lifespan Development: Aging

Modeling and Analysis Methods: Bayesian Modeling, Classification and Predictive Modeling, EEG/MEG Modeling and Analysis, fMRI Connectivity and Network Modeling, Image Registration and Computational Anatomy, Task-Independent and Resting-State Analysis

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

Neuroanatomy: Anatomy and Functional Systems, Cortical Anatomy and Brain Mapping, Cortical Cyto- and Myeloarchitecture, Neuroanatomy Other, Normal Development, White Matter Anatomy, Fiber Pathways and Connectivity, Subcortical Structures

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

Social Neuroscience: Self Processes, Social Cognition, Social Interaction and Social Neuroscience Other

CLOSING COMMENTS AND MEETING HIGHLIGHTS

14:45 – 16:00

Room ABC

Alan Evans, Chair, Council, McGill Centre for Integrative Neuroscience, Montreal, Canada

FAREWELL POSTER RECEPTION

16:00 – 17:30

Exhibit Hall 1

Poster Numbers #3000-4391

OHBM 2016 MERIT ABSTRACT AWARDS

Congratulations to the following 2016 Merit Abstract Awardees

Adler, Sophie
Ai, Leo
Alfaro-Almagro, Fidel
Arichi, Tomoki
Bächinger, Marc
Bainbridge, Wilma
Betzel, Richard
Bischof, Gérard
Budisavljevic, Sanja
Cao, Miao
Chou, Kun-Hsien
Doan, Nhat Trung
Faber, Hanna
Franke, Katja
Gajardo Vidal, Andrea
Gallardo Diez, Guillermo Alejandro
Geerligs, Linda
Golan, Tal
Gregory, Michael
Haast, Roy
Han, Jung Eun
Harrison, Laura
Hauser, Tobias
Hearne, Luke
Howells, Henrietta
Hutchison, R. Matthew
Jakab, Andras
Jorge, João
Jozwik, Kamila Maria
Kasper, Lars
Kepinska, Olga
Kikkert, Sanne
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Kong, Ru
Leuze, Christoph
Li, Hai
Limanowski, Jakub
Lin, Hsin-Yu
Liu, Jin
Meskaldji, Djalel-Eddine
Moberget, Torgeir
Mollink, Jeroen
Morgan, Andrew
Nomi, Jason
Park, Hyojin
Parlatini, Valeria
Savjani, Ricky
Schwartenbeck, Philipp
Wagstyl, Konrad
Weber, Lilian Aline
Wen, Haiguang
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Yee, Yohan
Zerbi, Valerio
Zhong, Suyu

OHBM 2016 TRAVEL STIPEND RECIPIENTS

Congratulations to the following 2016 Travel Stipend Awardees

Abbasi, Nooshin
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Hojjati, Seyed Hani
Kim, Chan-Mi
Kim, Ji Hee
Kwon, Moonyoung
Kyeong, Sunghyon
Reyes-Aguilar, Azalea
Rojas-Hortelano, Eduardo
Rojas-Lopez, Pedro Ariel
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ACKNOWLEDGEMENTS

The Organization for Human Brain Mapping wishes to thank the following companies for their generous financial support of the OHBM 2016 Program:

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Industry Supported Symposia

Siemens Healthcare
Wednesday, June 29 / 12:00 – 14:30

Electrical Geodesics, Inc
Tuesday, June 28 / 12:00 – 14:30

GE Healthcare
Monday, June 27/ 12:00 – 14:30

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Tuesday, June 28 / 12:00 – 14:30

EXHIBITOR LIST

ANT Neuro b.v.
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7521 PT
Netherlands
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Brain Products GmbH
Booth #6,16
Zeppelinstrasse 7
Gilching
82005
Germany
Web: www.brainproducts.com
49 0 8105 7338480
Email: sales@brainproducts.com

Brain Products dedicates itself to the research and understanding of the human brain and nervous system. The focus on positively impacting neuroscience made Brain Products the worldwide leading manufacturer of hard and software solutions for neurophysiological research. Our solutions cover the fields of: ERP, BCI, EEG/fMRI, EEG/TMS, as well as sports, sleep, behavioural sciences and similar disciplines. Since for us at Brain Products a solution is only solution if it covers all the researcher’s needs, we also provide caps, sensors, easily integrated stimulation software and much more.

Brainnetome Atlas
Booth #40
95 Zhong Guan Cun East Rd.
Beijing
100190
China
Web: www.brainetome.org
86 10 8254 4768
Email: nmzuo@nlpr.ia.ac.cn

Brainnetome Atlas is launched to provide a new human brain atlas which is essential for understanding brain functions and their disorders from a perspective of brain networks on different scales with various brain imaging technologies.

Cambridge Research Systems Limited
Booth #14
80 Riverside, Sir Thomas Longley Road
Rochester
ME2 4BH
United Kingdom
Web: www.crsltd.com
44 1634 720707
Email: carol.luscombe@crsltd.com

- Fully integrated fMRI package including audio-visual stimulation and motor response feedback, plus eye tracking option. ?
- Suitable for fMRI research applications, multi-modal paradigms and clinical detection of eloquent brain areas.
- Compatible with GE, Philips and Siemens, 1.5T, 3T and 7T scanners, even with tight fitting head coils.

Compumedics Ltd.
Booth #7
30-40 Hockhart Street
Abbotsford
3067
Australia
Web: www.compumedics.com
61384207300

Compumedics Neuroscan provides complete systems for acquiring and integrating neuroimaging data from all functional and structural data modalities including the CURRY Neuroimaging Suite software with advanced image processing and source localization capabilities. Products include SynAmpsRT digital amplifiers, Grael, and Neuvo Amplifiers, MicroMagLink RT for simultaneous EEG/fMRI data acquisition and soon to be released, CURRY MEG systems.

Current Designs
Booth #22
3950 Haverford Avenue
Philadelphia, PA
19104
United States
Web: www.curdes.com
215-387-5456
Email: office@curdes.com

Current Designs is a leader in fiber optic response systems for fMRI, MRI, EEG and MEG research. Designed and manufactured in Philadelphia, Pennsylvania, our fORP systems provide a range of options to fit the most innovative projects. All our response devices are 100% plastic, non-electronic and non-magnetic.

Electrical Geodesics, Inc. (EGI)
Booth #11,12
500 E 4th Avenue, Suite 200
Eugene, OR
97401
United States
Web: www.egi.com
541-687-7962
Email: psears@egi.com

Whole-head Geodesic EEG systems from 32 to 256 channels and multimodal integration with MR, TMS, MEG, NIRS, PET-MR. Advanced individual head modeling with new GeoSource 3. New hand-held 3D sensor registration. New GTEN tDCS/tACS neuromodulation, New Geodesic Sensor Nets in pre-term infant sizes from 32 to 128 channels.

Elsevier B.V.
125 London Wall
London
EC2Y 5AS
United Kingdom
Web: www.elsevier.com/neuroscience
442074244200

EXHIBITOR LIST, CONTINUED

Flywheel, LLC
Booth #31
227 Colfax Avenue N., Suite 148
Minneapolis, MN
55405
United States
Web: www.flywheel.io
612-223-7359
Email: info@flywheel.io

Flywheel is the image, algorithm, and scientific data management platform that makes research accessible, shareable, and reproducible. Flywheel simplifies the capture, organization, and analysis of multiple data types while enabling scalable, effective data sharing between scientific research groups worldwide. For more information, visit us at booth 31 or at **www.flywheel.io**.

g.tec medical engineering GmbH
Booth #39
Siemingstr. 14
Schiedlberg
4521
Austria
Web: www.gtec.at
43725122240
Email: office@gtec.at

g.tec medical engineering GmbH is an Austrian company that developed the first commercially available BCI system in 1999. Our products are compatible with all major BCI approaches (motor imagery, P300, SSVEP, slow cortical potentials). The hardware and software is used for biosignal processing, neurorehabilitation after stroke, conscious assessment of DOC patients and rapid functional brain mapping. Read more: **www.gtec.at**.

Localite GmbH
Booth #18
Schloss Birlinghoven
Sankt Augustin
53757
Germany
Web: www.localite.de
49 2241 14 2174
Email: info@localite.de

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

Mega Electronics Ltd
Booth #27
Pioneerinkatu 6
Kuopio
70800
Findland
Web: www.megaemg.com
358175817700
Email: mega@megaemg.com

Mega Electronics Ltd is a Finnish company specialized for development and manufacture of high quality medical devices for researchers and clinicians in the field of neuroscience, cardiology and rehabilitation. At meeting we present NeurOne EEG/ERP system, Faros ECG/HRV sensors and launch new 320 channels EEG product called NeurOne Tesla Station.

MES Forschungssyteme
Booth #17
Zeppelinstrasse 7
Gilching
82205
Germany
Web: www.medmed.de
49 0 8105 73384800
Email: office@medmed.de

MES is a leading provider of solutions for neurophysiological research. We have more than 30 years of experience in offering state-of-the-art tools for the following fields:
- EEG / ERP / EP
- Wearable and Wireless EEG
- Wearable and Wireless fNIRS
- EEG & fNIRS
- EEG & tACS/tDCS
- BCI & Bio-/Neurofeedback
- Behavioral Research

NDI
Booth #32
103 Randall Drive
Waterloo, Ontario
N2V 1C5
Canada
Web: www.ndigital.com
877-634-6340
Email: msci@ndigital.com

NDI is a leading innovator and manufacturer of 3D measurement solutions. Our Krios handheld digitizing scanner integrates with neurodiagnostic systems to measure, identify, and map sensor positions to streamline electrode localization and registration. The Krios improves setup accuracy and efficiency; the process from electrode scanning to labelling takes only minutes.

Neuroinformatics Hub

Booth #21
Norberls Vag 15A
Stockholm
171 77
Sweden
Web: www.incf.org
0046767423523
Email: info@incf.org

NITRC (NeuroInformatics Tools and Resources Clearinghouse) and INCF (International Neuroinformatics Coordinating Facility) offer you collaborative neuroinformatics projects, tools and resources; infrastructure, open source software, free downloadable data, and community forums. Read more about us at **www.nitrc.org** and **www.incf.org**.

NIRx Medical Technologies, LLC

Booth #8
5670 Wilshire Blvd., Suite 1800
Los Angeles, CA
90038
United States
Web: www.nirx.net
323-684-6682
Email: info@nix.net

NIRx Medical Technologies, LLC. is a world-leader in providing integrated solutions for NIRS tomographic imaging. Through our offices in Brooklyn, New York and Berlin, Germany our engineers and NIH funded investigators are providing a growing number of research teams world-wide with comprehensive technology solutions for the most demanding investigative applications.

NordicNeuroLab, Inc.

Booth #4
Mollendalsveien 65C
Bergen
N5009
Norway
Web: www.nordicneurolab.com
47 55 70 70 95
Email: info@nordicneurolab.com

With more than 15 years of experience, NordicNeuroLab provides products and solutions that define the field of functional MR imaging. From state-of-the-art post-processing and visualization software for BOLD, Diffusion/DTI and Perfusion imaging to fMRI hardware for audio and visual stimulation, eye tracking, and patient response collection, NordicNeuroLab products are used around the world by researchers and clinicians alike.

Optoacoustics LTD

Booth #23
17 Hanotea Street
Mazor
7316000
Israel
Web: www.optoacoustics.com
97236344488
Email: 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.

Psychology Software Tools

Booth #37
311 23rd Street Extension, Suite 200
Pittsburgh, PA
15215
United States
Web: www.pstnet.com
412-449-0078
Email: sales@pstnet.com

Psychology Software Tools, developers of E-Prime®, offers hardware and software solutions for fMRI research, including the Celeritas® fiber optic response system, the Hyperion® digital projection system, and an MRI Simulator. Their customer base is comprised of more than 5,000 labs in over 60 countries.

Resonance Technology, Inc.

Booth #5,15
18121 Parthenia Street, Unit A
Northridge, CA
91325
United States
Web: www.mrivideo.com
818-882-1997
Email: sales@mrivideo.com

EXHIBITOR LIST, CONTINUED

Rogue Research, Inc.
Booth #2,3
4398 St. Lanrent, Ste 206
Montreal, QC
H2W 1Z5
Canada
Web: www.rogue-research.com
514-284-3888
Email: diane@rogue-research.com

Rogue Research develops the Brainsight® family of neuronavigation products, including Brainsight TMS, the first and most popular neuronavigation system designed specifically for TMS. Brainsight NIRS is a unique fNIRS system designed specifically for multimodality applications, allowing fNIRS acquisition during TMS and simultaneous fNIRS acquisition along with EEG, fMRI

Rogue Resolutions
Booth #34
The Creative Quarter, 8a Morgan Arcade
Cardiff
CF10 1AF
United Kingdom
Web: www.rogue-resolutions.com
4.40292E+11
Email: info@rogue-resolutions.com

Rogue Resolutions is a provider of integrated solutions to academic researchers in the field of neuroscience. We bring together and combine technologies and techniques to enable customers to conduct robust, credible and cutting edge brain research. Our products include a range of "best-in-class" devices in neuronavigation, neuroimaging, neuromodulation and neurosensory.

SensoMotoric Instruments GmbH
Booth #29
Warthestr. 21
Teltow
1413
Germany
Web: www.smivision.com
49 03328395551O
Email: info@smi.de

SensoMotoric Instruments (SMI) is a globally respected technology firm with a reputation built on its pioneering role in the development of eye tracking. SMI has forged long and valued relationships with academics from leading universities and research institutions around the world. Find out more at **www.smivision.com**.

Siemens Healthcare GmbH
Booth #1
Henkestrasse 127, D-91052
Erlangen
91052
Germany
Web: www.siemens.com/healthcare
0049-91311840

Siemens Healthcare is one of the world's largest suppliers of technology to the healthcare industry and a leader in medical imaging, laboratory diagnostics and healthcare IT. All supported by a comprehensive portfolio of clinical consulting, training, and services available across the globe and tailored to customers' needs.

Skope Magnetic Resonance Technologies AG
Booth #13
Zschokkestrasse 18
Zurich
8037
Switzerland
Web: www.skope.ch
41435008060
Email: contact@skope.ch

Skope is a Swiss company that supports MR Scientists in bringing MR imaging to a whole new level with it's one of a kind instruments: Measure, characterize and calibrate your MR System with the Dynamic Field Camera or utilize the Clip-On camera for concurrent field measurements and image reconstruction.

Soterix Medical, Inc.
Booth #33
237 W. 35th Street
New York, NY
10001
United States
Web: www.soterixmedical.com
888-990-8327
Email: contact@soterixmedical.com

Soterix Medical Inc. (SMI) was formed to develop and deploy innovative medical treatments focused on neuropsychiatric and neurological disorders and rehabilitation. Founded in 2008, SMI is the world leader in clinical trials for non-invasive neuromodulation working with over 300 medical centers worldwide. SMI pioneered the first targeted non-invasive electrical stimulation platform called High-Definition transcranial Electrical Stimulation (HD-tES) and low-energy stimulation called Limited Total Energy tDCS (LTE-tDCS). From the most targeted non-invasive clinical systems to the most portable units, Soterix Medical provides researchers, clinicians and patients with unique and adaptable solutions.

SR-Research

Booth #9
35 Beaufort Drive, Kanata
Ontario
K2L 2B9
Canada
Web: www.sr-research.com
613-271-8686 ext 238
Email: kurt@sr-research.com

SR-Research: Manufacturers of the fast, accurate and reliable EyeLink eye tracking systems. Providing seamless integration with experiment creation and data analysis software. EyeLink eye trackers are used in world-leading labs for a wide variety of research applications.

VPixx Technologies

Booth #38
630 Clairevue O. Suite 301
Saint-Bruno, Quebec
J3V6B4
Canada
Web: www.vpixx.com
514-328-7499
Email: sales@vpixx.com

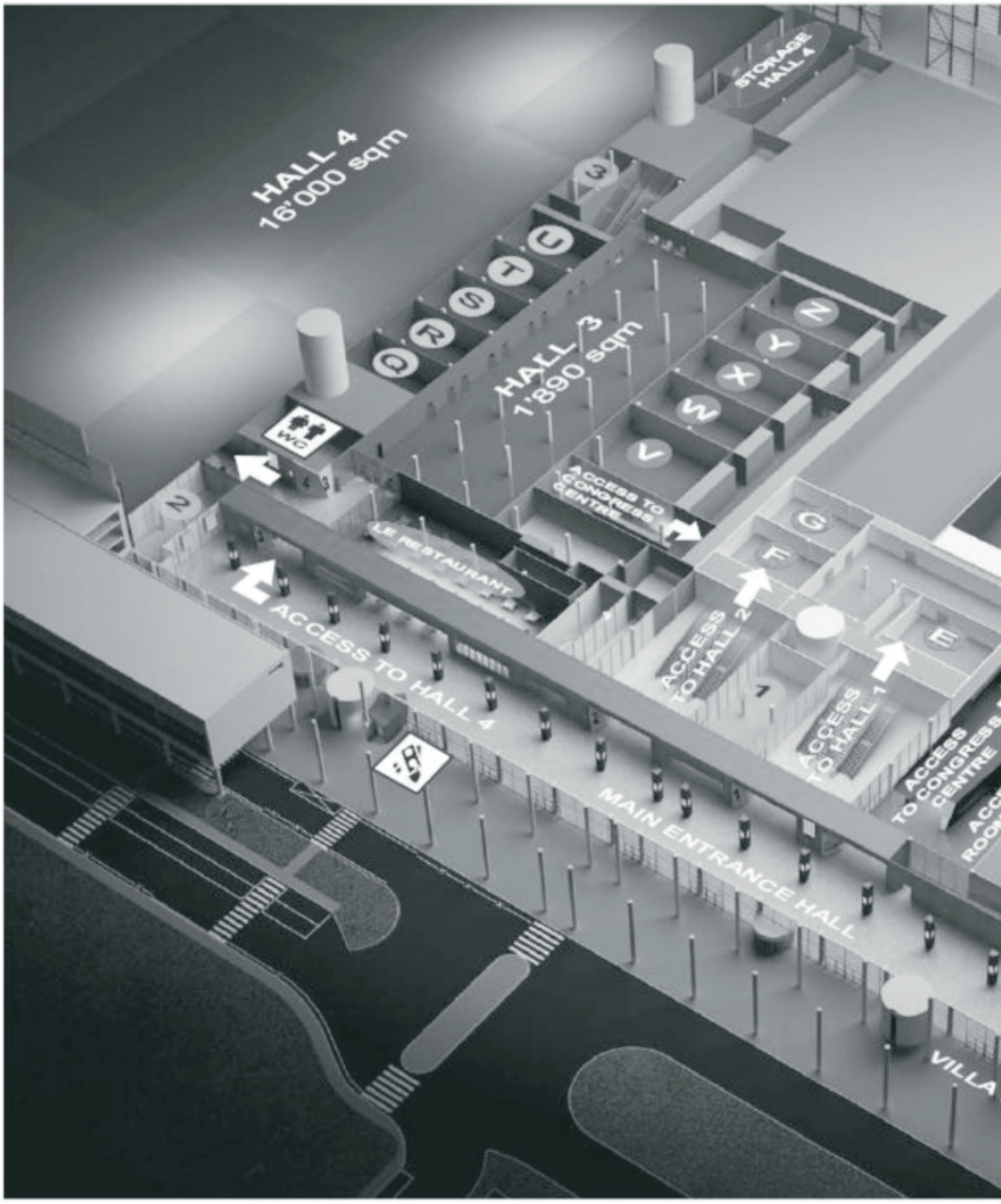
VPixx Technologies will be demonstrating our new TRACKPixx MRI-compatible 2kHz binocular eye tracker, alongside our PROPixx DLP projector which now supports refresh rates up to 1440Hz. Combine the two instruments to implement very low latency gaze-contingent paradigms.

Wiley

Booth #20
The Atrium, Southern Gate, Chichester
West Sussex
PO19 8SQ
United Kingdom
Web: www.wiley.com
44 1243 779777
Email: customer@wiley.com

Wiley is a global provider of research, professional practice and education, partnering with societies and supporting researchers to communicate discoveries. Our digital content, books and 1600 online journals, including Human Brain Mapping and the European Journal of Neuroscience, build on a 200 year heritage of quality publishing.

PALEXPO LAYOUT



CONGRESS CENTRE + ROO

ROOMS Q - R - S - T - U
Modular rooms
- *Room Q : 100 delegates*
- *Room R : 100 delegates*
- *Room S : 100 delegates*
- *Room T : 100 delegates*
- *Room U : 100 delegates*

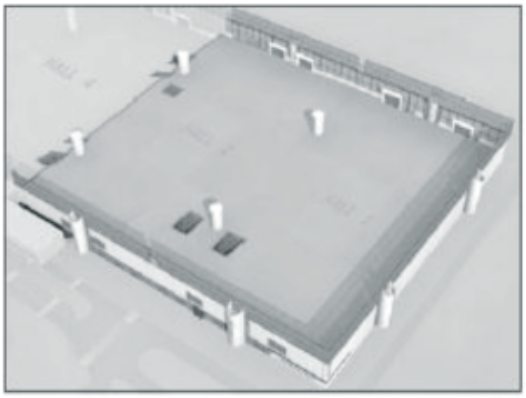
ROOMS V - W - X - Y - Z
Modular rooms
- *Room V : 252 delegates*
- *Room W : 168 delegates*
- *Room X : 168 delegates*
- *Room Y : 168 delegates*
- *Room Z : 168 delegates*

PLENARY ROOM - Modular rooms
ABC used combined
- *Room A : 650 to 800 delegates (theatre style)*
- *Room B : 650 to 1000 delegates (theatre style)*
- *Room C : 650 to 800 delegates (theatre style)*

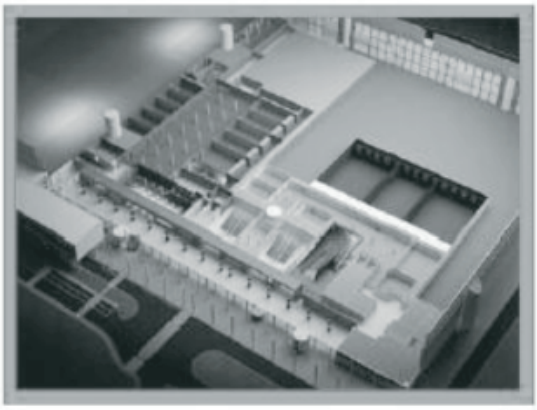
LE RESTAURANT

SECRETARIATS 1, 2 and 3

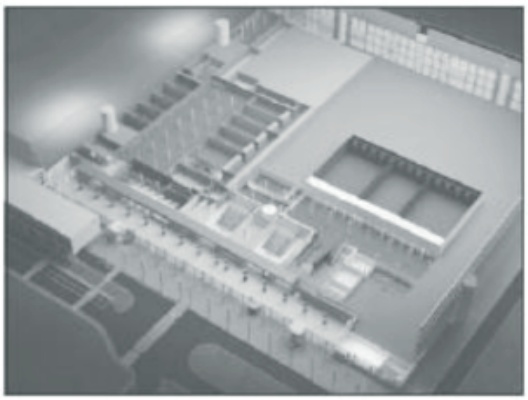
UPPER LEVEL



MEZZANINE LEVEL



LOWER LEVEL



MS E-F-G-K-L

ROOMS E-F-G-K-L
- *Room E : 120 delegates (theatre style)*
- *Room F : 120 delegates (theatre style)*
- *Room G : 120 delegates (theatre style)*
- *Room K : 230 delegates (theatre style)*
- *Room L : 100 delegates (theatre style)*

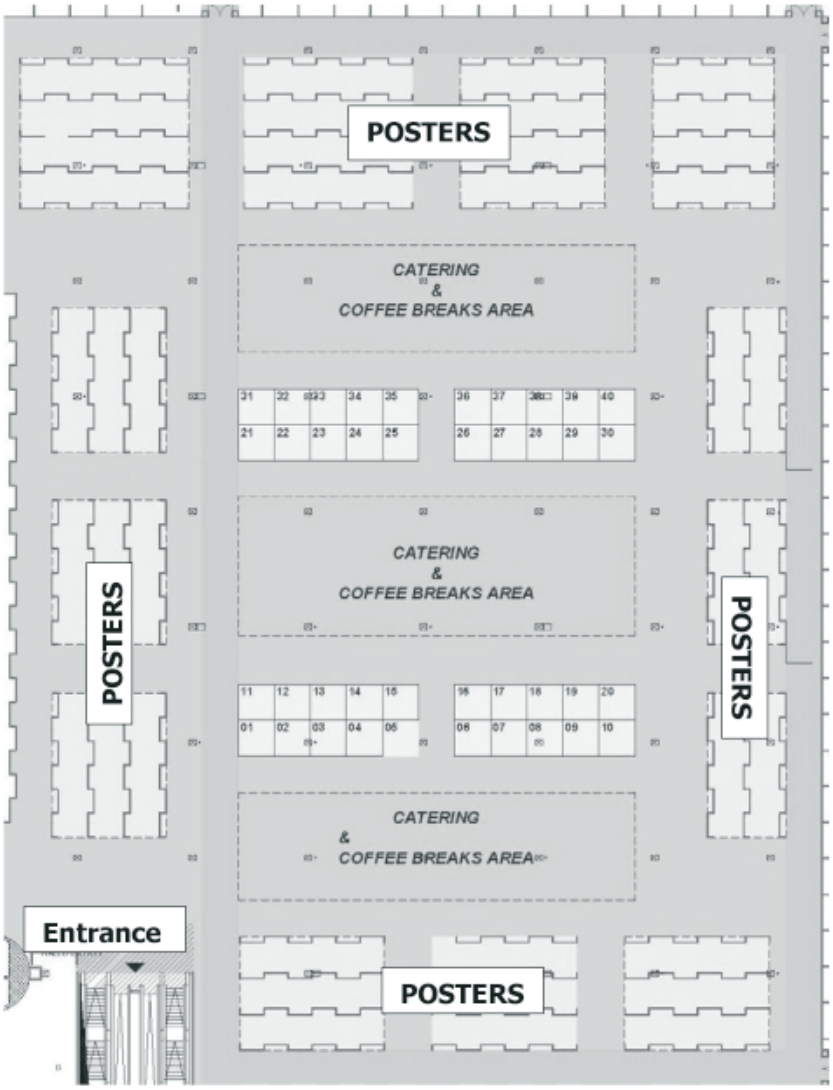
STORAGE HALL 4

OFFICES 5 & 6

palexpo

EXHIBITOR LAYOUT

2016 OHBM Annual Meeting Exhibitor Layout



Exhibitor Booth Locations:

1 – Siemens Healthcare GmbH
2 & 3 – Rogues Research, Inc.
4 – NordicNeuroLab, Inc.
5 & 15 – Resonance Technology, Inc.
6 & 16 – Brain Products GmbH
7 – Compumedics, Ltd.
8 – NIRx Medical Technologies, LLC.
9 – SR- Research
10 – BESA GmbH
11 & 12 – Electrical Geodesics, Inc. (EGI)
13 – Skope Magnetic Resonance Technologies AG
14 – Cambridge Research Systems Limited
17 – MES Forschungssyteme
18 – Localite GmbH
19 – BIOPAC Systems, Inc.
20 – Wiley
21 – Neuroinformatics Hub
22 – Current Designs
23 - Optoacoustics LTD
24 - Brain Innovation BV
27 - Mega Electronics Ltd
28- ANT Neuro b.v.
29- SensoMotoric Instruments GmbH
30- Artinis Medical Systems B.V.
31 – Flywheel, LLC
32 – NDI
33 – Soterix Medical, Inc.
34 - Rogue Resolutions
35 - Elsevier B.V.
37 - Psychology Software Tools
38 - VPixx Technologies
39 – g.tec medical engineering GmbH
40 - Brainnetome Atlas

Exhibitor Hours:
Monday, June 27: 11:00-16:00
Tuesday, June 28: 11:00-18:30
Wednesday, June 29: 8:00-16:00
Thursday, June 30: 8:00-17:30

Table Top Exhibitors:
- DataLad
- The Configurable Pipeline for the Analysis of Connectomes
- Diffusion Imaging in Python

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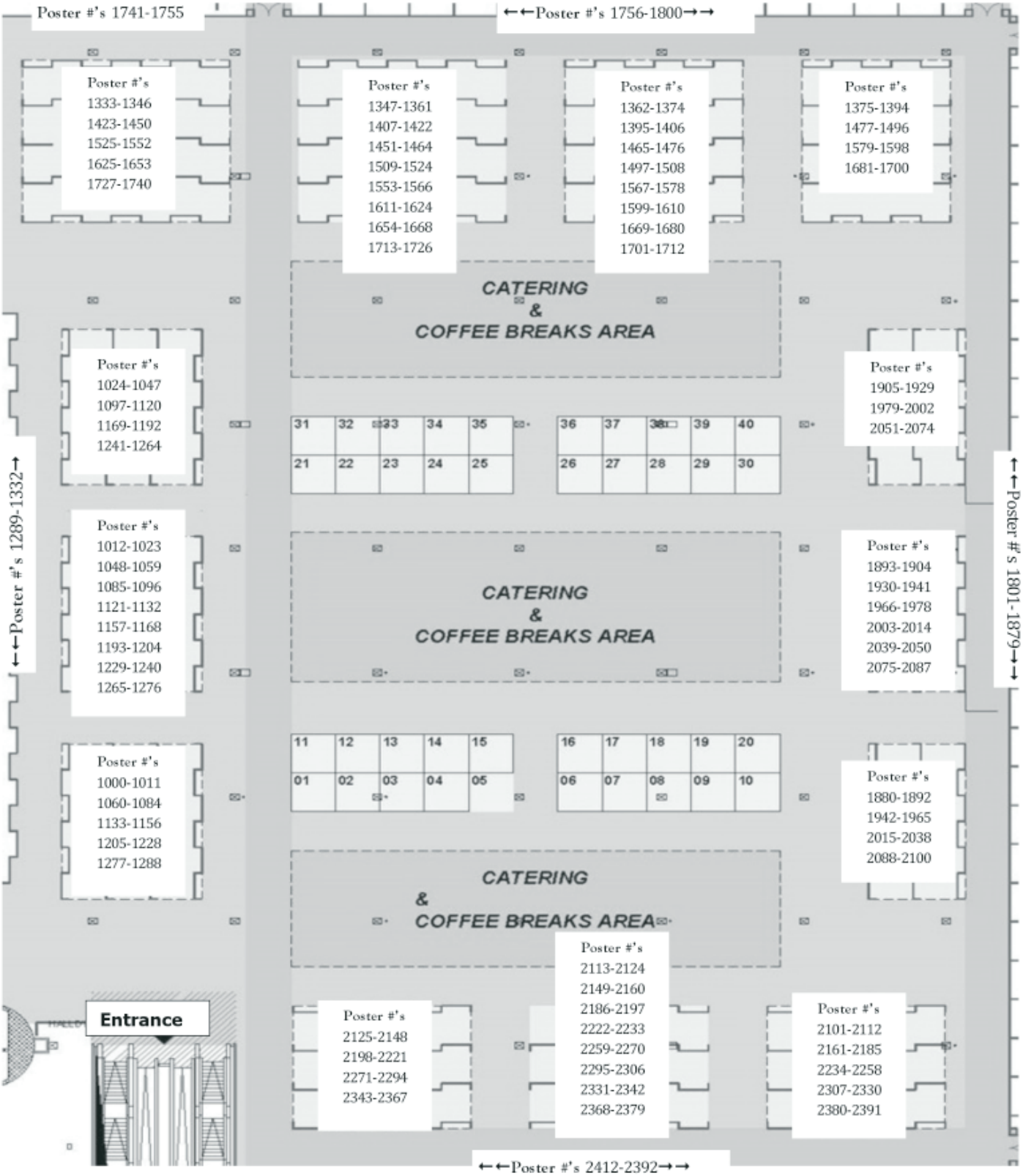
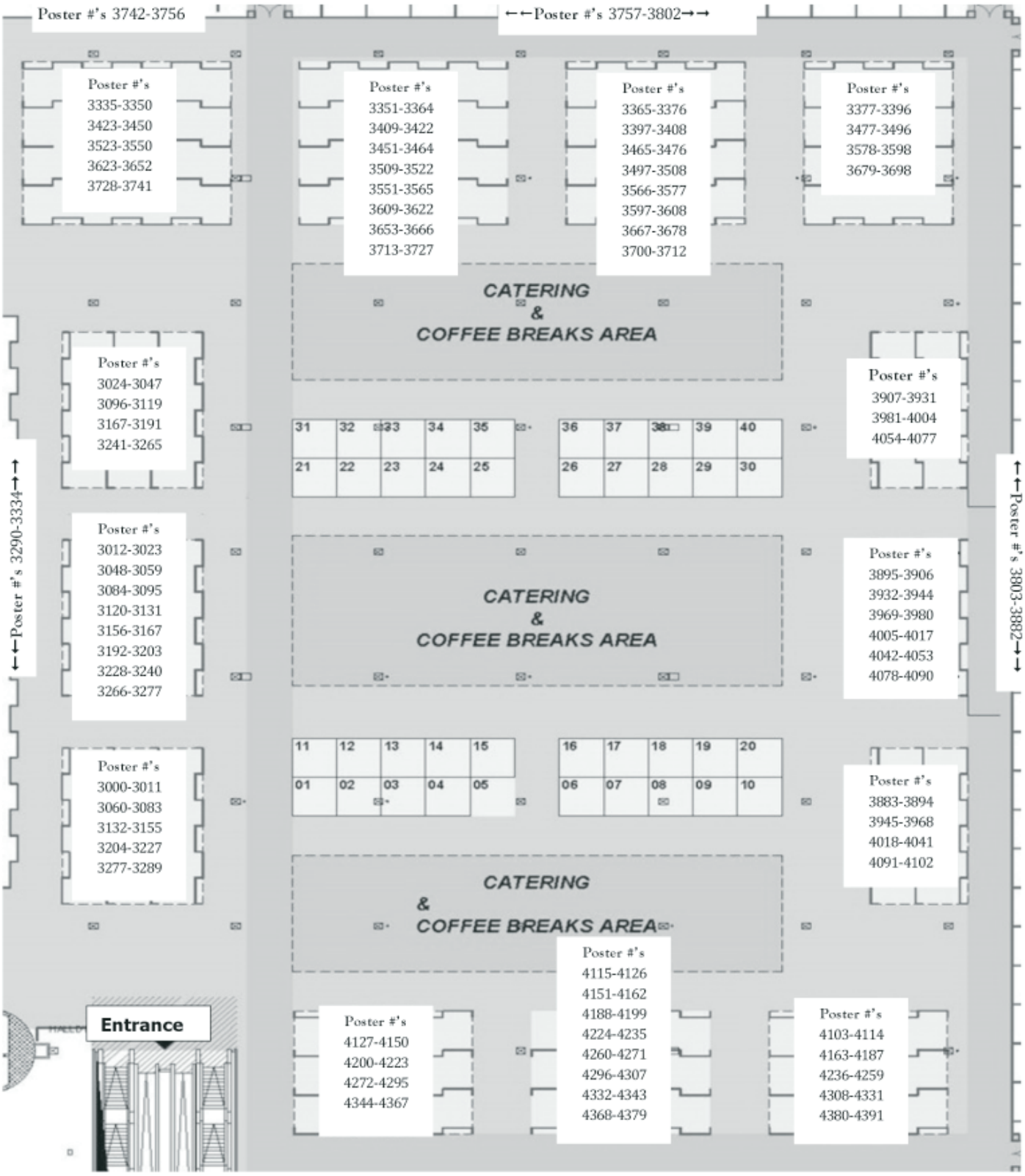
DISCLOSURES

OHBM 2016 Disclosure Statements
The OHBM Program Committee reviewed all financial disclosures for speakers presenting at the Annual Meeting and determined there were no conflicts of interest.

2016 OHBM Poster Listing Map
Monday (even) & Tuesday (odd)
1000-2412



2016 OHBM Poster Listing Map
Wednesday (even) & Thursday (odd)
3000-4391



Organization for Human Brain Mapping

Please join us at our future meetings!

Organization for
Human Brain Mapping

Phone: 952.646.2029
Fax: 952.545.6073
Email: info@humanbrainmapping.org

5841 Cedar Lake Road, Suite 204
Minneapolis, MN 55416 USA
www.humanbrainmapping.org