Program

OHBM2012
Beijing, China

June 10-14, 2012

China National Convention Center (CNCC)

18th Annual Meeting
of the Organization for Human Brain Mapping

OHBM2012 *Beijing, China*

Organization for Human Brain Mapping

www.humanbrainmapping.org/OHBM2012

"Once you have traveled, the voyage never ends, but is played out over and over again in the quiestest chambers. The mind can never break off from the journey."

— Pat Conroy

WELCOME

Welcome to the 18th Annual Meeting of the Organization for Human Brain Mapping in Beijing, China. This year, the OHBM tradition of exciting scientific programs and social events combines with the stimulating atmosphere of Beijing.

Beijing's long history leaves it with an abundance of historical and cultural heritage that represents treasures from the city's civilizations. It has been the heart and soul of politics and society throughout its long history and consequently there is an unparalleled wealth of discovery to delight and intrigue travelers as they explore Beijing's ancient past and enjoy its exciting modern development.

This year's program features the Talairach Lecture given by Mortimer Mishkin, and Keynote Lectures by Leslie Ungerleider, Peter Fox, Karl Zilles, Lin Chen, Michael Merzenich, Alan Evans and Andreas Engel.

The Annual Meeting program will feature an exciting combination of scientific programs that include:

- Six full-day educational courses on Sunday will be offered: Advanced fMRI, The Connectome, Introduction to Imaging Genetics, Anatomy, Brain-Computer Interfaces and Real-Time fMRI (NEW), and Resting-State Brain Networks (NEW).
- Four parallel oral sessions will be offered each day, Monday through Thursday, which will allow for discussion of original work and encourage the participation of younger investigators.
- Four morning workshop sessions will be presented each morning, Monday through Thursday, from 8:30 – 9:45.
- Three member-initiated symposia will be presented throughout the conference, along with a symposium by the Local Organizing Committee.
- Over 2200 posters will be presented at the meeting. Posters will be displayed for two days, with 2 hours of dedicated poster viewing time each day.
- InteractiveP oster Sessions (I-Posters) will be offered each day during poster sessions. A total of 24 top ranked posters will be presented as I-posters.

Please be sure to visit the exhibit booths located in the Exhibit Hall and thank the representatives for their support of the OHBM meeting.

A Board of Councilors, elected by the membership, governs the OHBM and will be present at this year's meeting. We welcome and encourage those researchers who are attending this meeting for the first time, and are not yet members, to join the organization and participate in its future growth. One characteristic of the organization is a desire to include a geographically and scientifically broad base of members. This year's meeting reflects this philosophy by including member-proposed workshops and three member-initiated symposia.

The 18th Annual Meeting of the Organization for Human Brain Mapping promises to be a memorable event from both a scientific and social perspective. We are glad you have joined us and look forward to your involvement.

Sincerely,

Maurizio Corbetta
Chair, OHBM Council

Katrin Amunts
Chair, OHBM Program Committee

Jia-Hong Gao
Chair, Local Organizing Committee

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Organization for Human Brain Mapping

OHBM 2012 PROGRAM AT A GLANCE

Sunday, June 10

8:00 - 17:00
All Day Educational Courses

Advanced fMRI
Ballroom AB, Level 1

Anatomy and Its Impact on Structural and Functional Imaging
Function Hall C, Level 1

Brain-Computer Interfaces and Real-Time fMRI
Ballroom C, Level 1

The Connectome
Function Hall A, Level 1

Introduction to Imaging Genetics
Function Hall B, Level 1

Resting-State Brain Networks
Auditorium, Level 4

17:30 - 19:00
Opening Ceremonies and Talairach Lecture: Mortimer Mishkin

Speech and Auditory Memory: How Deep is Their Connection?

Ballroom AB, Level 1

19:00 - 21:00
Welcome Reception

China National Convention Center (CNCC), 4th Floor, North Lobby

Monday, June 11

8:30 - 9:45
Morning Workshops

Attaining fMRI-Resolution on the Scale of Cortical Columns and Layers
Ballroom AB, Level 1

Moving from Correlation to Prediction in Clinical Neuroscience
Ballroom C, Level 1

Why Believe in Multivariate Pattern Analysis? The Skeptical Neuroimager's View
Function Hall B, Level 1

Assessing Network (dys-) Function in Development, At-Risk States and Psychiatric Disorders
Function Hall A, Level 1

10:00 - 11:30
LOC Symposium:

Imaging the Sociocultural Brain

Ballroom AB, Level 1

11:45 - 12:30
Keynote Lecture: Leslie Ungerleider

Functional Architecture of Face Processing in the Primate Brain

Ballroom AB, Level 1

12:30 - 13:30
Lunch

13:30 - 14:15
I-Poster Session

Function Hall B, Level 1

13:30 - 15:30
Poster Standy-By Session

Exhibit and Poster Hall Plenary Hall AB, Level 4 (Exhibits open until 16:00)

15:45 - 17:00
Symposium:

What Can Brain Imaging Tell Us About Motor Learning?

Ballroom AB, Level 1

17:15 - 18:00
Keynote Lecture: Andreas Engel

Spectral Fingerprints of Cognitive Processing

Ballroom AB, Level 1

18:15 - 19:45
Oral Sessions

O-M1: Disorders 1
Ballroom C, Level 1

O-M2: Emotion and Motivation
Function Hall B, Level 1

O-M3: Language
Function Hall A, Level 1

O-M4: Resting State Networks
Ballroom AB, Level 1

Tuesday, June 12

8:30 - 9:45
Morning Workshops

Brain Graphs: Recent Advances in Graph Analysis of Neuroimaging Data
Function Hall A, Level 1

Quantitative Anatomical MRI
Ballroom AB, Level 1

From Static to Dynamic Descriptions: Non-Stationarity in Functional and Effective Brain Connectivity
Ballroom C, Level 1

Big Science Comes to Imaging Genetics
Function Hall B, Level 1

10:00 - 10:45
Keynote Lecture: Lin Chen

The Topological Definition of Perceptual Objects: Theory, Behavioral Evidence, and Neural Representation

Ballroom AB, Level 1

11:00 - 12:30
Oral Sessions

O-T1: Modeling and Analysis Methods
Ballroom AB, Level 1

O-T2: Motor Behavior, Learning & Disorders
Function Hall B, Level 1

O-T3: Neuroanatomy
Ballroom C, Level 1

O-T4: Perception and Attention
Function Hall A, Level 1

12:30 - 13:30
Lunch

13:30 - 14:15
I-Poster Session

Function Hall B, Level 1

13:30 - 15:30
Poster Stand-By Session

Exhibit and Poster Hall Plenary Hall AB, Level 4 (Exhibits open until 19:30)

15:45 - 17:00
Symposium:

Relationships Between Functional Networks Assessed by fMRI and EEG/MEG/ECoG

Ballroom AB, Level 1

17:15 - 18:00
Keynote Lecture: Karl Zilles

Structural and Functional Architecture of the Human Cerebral Cortex: Multiscale and Multimodal Maps

Ballroom AB, Level 1

18:00 - 19:30
Wine and Beer Reception in the Poster Hall

Exhibit and Poster Hall Plenary Hall AB, Level 4

Wednesday, June 13

8:30 - 9:45
Morning Workshops

Near InfraRed Spectroscopy Sheds Light on the Development of Brain Networks: The Case of Speech Perception
Function Hall A, Level 1

Neural Repair as Changes in Network Connectivity
Function Hall B, Level 1

Pitfalls and Progress in the Analysis of Longitudinal Structural MRI
Ballroom C, Level 1

Ultra-High Speed fMRI: Methods, Sensitivity Increases and Applications
Ballroom AB, Level 1

10:00 - 10:45
Keynote Lecture: Michael Merzenich
Brain Plasticity-Based Therapeutics
Ballroom AB, Level 1

11:00 - 12:30
Oral Sessions

O-W1: Disorders 2
Ballroom AB, Level 1

O-W2: Higher Cognitive Functions & Social Neuroscience
Function Hall B, Level 1

O-W3: Imaging Genetics and Informatics
Ballroom C, Level 1

O-W4: Physiology, Metabolism and Neurotransmission
Function Hall A, Level 1

12:30 - 13:30
Lunch

13:30 - 14:15
I-Poster Session
Function Hall B, Level 1

13:30 - 15:30
Poster Stand-By Session
Exhibit and Poster Hall Plenary Hall AB, Level 4 (Exhibits open until 16:00)

15:45 - 17:00
Symposium:

Cracking the Columnar-Level Code in the Visual Cortex with Ultra-High Field fMRI
Ballroom AB, Level 1

17:15 - 18:00
Keynote Lecture: Alan Evans
Networks of Anatomical Covariance
Ballroom AB, Level 1

18:15 - 18:45
Town Hall Meeting
Ballroom AB, Level 1

21:00 - 1:00
Club Night
LAN Club

Thursday, June 14

8:30 - 9:45
Morning Workshops

The Unbearable Inseparability of Brain and Body: Peripheral Physiology in Functional Neuroimaging
Function Hall A, Level 1

Connecting Consciousness and Connectivity
Function Hall B, Level 1

Where's Your Signal? Explicit Spatial Models to Improve Interpretability and Sensitivity of Neuroimaging Results
Ballroom AB, Level 1

Attention and Expectation in Human Visual Perception
Ballroom C, Level 1

10:00 - 10:45
Keynote Lecture: Peter Fox
Meta-Analytic Modeling of Human Neural Systems: Data-Driven Hypothesis Generation
Ballroom AB, Level 1

10:45 - 11:30
I-Poster Session
Function Hall B, Level 1

10:45 - 12:45
Poster Stand-By Session
Exhibit and Poster Hall Plenary Hall AB, Level 4 (Exhibits open until 14:00)

12:45 - 13:45
Lunch

14:00 - 15:30
Oral Sessions

O-Th1: Brain Stimulation Methods
Function Hall B, Level 1

O-Th2: Imaging Methods
Ballroom AB, Level 1

O-Th3: Learning and Memory
Ballroom C, Level 1

O-Th4: Lifespan Trajectories
Function Hall A, Level 1

15:45 - 16:45
Closing Comments and Meeting Highlights
Ballroom AB, Level 1

OHBM2012
Beijing, China

GENERAL INFORMATION

CONFERENCE VENUE

China National Convention Center (CNCC)
No.7 Tianchen East Road
Chaoyang District, Beijing, China, 100105

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

REGISTRATION HOURS

Main Lobby, Level 1

Saturday, June 9: 15:00 – 18:00
Sunday, June 10: 7:00 – 19:30
Monday, June 11: 7:30 – 19:45
Tuesday, June 12: 8:00 – 18:00
Wednesday, June 13: 8:00 – 18:00
Thursday, June 14: 8:00 – 16:00

EXHIBIT HOURS

Plenary Hall AB, Level 4

Monday, June 11: 12:30 – 16:00
Tuesday, June 12: 12:30 – 19:30
Wednesday, June 13: 12:30 – 16:00
Thursday, June 14: 10:45 – 14:00

TOWN HALL MEETING

Wednesday, June 13, 18:15 – 18:45

Ballroom AB, Level 1

All OHBM meeting attendees are encouraged to participate in this open forum where you will have an opportunity to ask questions and give feedback to OHBM leadership. Updates on future meeting sites and Council elections will be presented.

WELCOME RECEPTION

Sunday, June 10, 19:00 – 21:00

China National Convention Center (CNCC)
4th Floor, North Lobby

Join us for the 2012 Annual Meeting Welcome Reception. The reception will be held at the CNCC immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 10th. **Please make sure to wear your name badge, which will serve as your ticket to the event.** Additional guest badges are $50.00 USD.

CLUB NIGHT

Wednesday, June 13, 21:00 – 1:00

LAN Club | 4/F Twin Tower, B12 Jianguomen Waidajie, Beijing, China

The LAN Club Beijing is located at Twins Plaza on Chang'an St. near the Wangfujing Shopping and Business area in the west. The open design of the LAN Club is very functional, and includes a luxurious central dining hall, elegant wine corridor, comfortable cigar bar, dazzling oyster bar, Four-country area full of colorful diversity, a distinct banquet hall and romantic VIP rooms. The entire space is filled with an artistic soul, giving people an exclusive experience with a strong artistic appeal. There will be a band and a DJ that will play dance music throughout the evening. The party is complimentary to registrants. **Please make sure to bring your ticket to the LAN Club.** Additional guest tickets are $50.00.

Please note that transportation will be provided to Club Night. Buses will start departing from the CNCC main entrance at 8:00 pm, with the last bus departing at 10:00 pm. We do advise getting on the transportation early, it can take an hour to get to the LAN Club. Buses will start departing the LAN Club at 11:00 pm with the last bus departing at 1:00 am. Buses will drop off at the OHBM group hotels. If you choose to take the subway, please stop at the registration desk for subway directions.

A LA CARTE CAFETERIA

4th Floor North Lobby

Sunday, June 10: 11:00 – 14:00
Monday, June 11: 7:30 – 8:30 and 12:00 – 14:00
Tuesday, June 12: 7:30 – 8:30 and 12:00 – 14:00
Wednesday, June 13: 7:30 – 8:30 and 12:00 – 14:00
Thursday, June 14: 7:30 – 8:30 and 12:00 – 14:00

SPEAKER READY ROOM

Room 405, Level 4

Saturday, June 9, 2012: 15:00 – 19:00
Sunday, June 10, 2012: 6:30 – 19:30
Monday, June 11, 2012: 7:30 – 19:45
Tuesday, June 12, 2012: 7:30 – 18:00
Wednesday, June 13, 2012: 7:30 – 18:00
Thursday, June 14, 2012: 7:30 – 16:00

INTERNET CAFE

Level 4, East Foyer

A limited number of complimentary terminals will be available. Please limit your time at a terminal to 15 minutes.

Sunday, June 10: 7:30 – 19:30
Monday, June 11: 8:00 – 19:30
Tuesday, June 12: 8:00 – 19:30
Wednesday, June 13: 8:00 – 19:30
Thursday, June 14: 8:00 – 17:00

MOBILE APP – NEW THIS YEAR!

The Organization for Human Brain Mapping (OHBM) is pleased to announce a new mobile application for the 2012 Annual Meeting in Beijing, China. The 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/ohbm2012**. 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.

We hope this new mobile application makes it even easier for you to make the most out of your Annual Meeting experience!

TWITTER HASH TAG

Join the conversation on Twitter – #OHBM2012

E-POSTERS

New this year, all posters at the conference have been encouraged to upload an electronic version of their poster (E-Poster). To access E-Posters, please go to **http://ww4.aievolution.com/hbm1201/**.

WIRELESS CONNECTION

A wireless connection will be available throughout the CNCC. To connect, join the wireless network "WIFI-OHBM." The password to access the network is "OHBM 2012."

EVALUATIONS ONLINE!

Conference evaluations will be conducted online only at **www.humanbrainmapping.org/2012Evaluations**. It is only through attendee's feedback that we can continue to improve the content, format, and schedule of the meeting. Your input is very important to us, and we urge you to fill out these quick surveys.

ACCME ACCREDITATION

CME CREDIT: This live 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 live activity for a maximum of 40.50 ***AMA PRA Category 1 Credit(s)™***. Physicians should claim only credit commensurate with the extent of their participation in the activity.
CME forms will only be available online at www.humanbrainmapping.org/CME2012.

EDUCATIONAL COURSES

	Credits
Advanced fMRI (Full Day)	7.00
Anatomy (Full Day)	7.00
The Connectome (Full Day)	7.00
Introduction to Imaging Genetics (Full Day)	7.00
Brain-Computer Interfaces and Real Time fMRI (Full Day)	7.00
Resting-State Brain Networks (Full Day)	7.00
Maximum number of possible credits earned at Educational Courses	**7.00**

ANNUAL MEETING CREDITS

	Credits
Talairach Lecture	0.75
Keynote Lectures	0.75 each
Morning Workshops	1.25 each
Oral Sessions	1.50 each
Poster Sessions (includes I-Poster Sessions)	1.00 per hour
Tuesday Evening Wine and Poster Reception	1.00
Symposia	1.25 each
LOC Symposia	1.50
Meeting Highlights	1.00
Total number of possible credits earned at Annual Meeting	**33.50**
TOTAL NUMBER OF POSSIBLE CREDITS	**40.50**

Advanced fMRI

Ballroom AB, Level 1

Organizers:

Tor Wager, University of Colorado, Boulder, USA

Nikolaus Kriegeskorte, MRC Cognition and Brain Sciences Unit, Cambridge, UK

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

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

Learning Objectives: The course is designed to develop participants' understanding of:

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

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

Course Schedule

8:00 – 8:45 **Intro to Advanced fMRI: Promise and Pitfalls**
Nikolaus Kriegeskorte, MRC Cognition and Brain Sciences Unit, Cambridge, UK

Physics, Physiology, and Basic Principles

8:45 – 9:30 **Assessing and Correcting for Physiological Noise in fMRI Analysis: Procedures, Benefits, and Limitations**
Gary H. Glover, Stanford University, Stanford, USA

9:30 – 10:15 **MR Physics: Basic Concepts and the Current State of the Art**
Lawrence L. Wald, MGH Martinos Center for Biomedical Imaging, Harvard University, Charlestown, USA

10:15 – 10:30 **Break**

10:30 – 11:15 **Inference on Statistic Images — A Critical Review & Guidelines for Best Practice**
Thomas E. Nichols, University of Warwick, Coventry, UK

11:15 – 12:00 **Functional Connectivity, Effective Connectivity and Causality**
Martin Lindquist, Columbia University, New York, USA

12:00 – 13:00 **Lunch — Cafeteria Open**

13:00 – 13:45 **Analyzing the Neuronal Population-Code Information in fMRI Patterns**
Yukiyasu Kamitani, ATR Computational Neuroscience Laboratories, Kyoto, Japan

13:45 – 14:30 **On Pathways and Patterns: Using Multivariate Linear Models to Predict Behavior**
Tor Wager, University of Colorado, Boulder, USA

14:30 – 15:15 **Effective Connectivity and Dynamic Causal Modeling**
Klaas Enno Stephan, University of Zurich & Swiss Federal Institute of Technology, Zurich, Switzerland

15:15 – 15:30 **Break**

15:30 – 16:15 **How to Apply Reinforcement Learning Models to FMRI: A Guide and Discussion of Promises and Pitfalls**
Erie Boorman, Oxford University, Oxford, UK

16:15 – 17:00 **Basics of Joint EEG-fMRI Data Recordings and Advance Source Modeling for Functional Co-Localization**
Phan Luu, Electrical Geodesics, Inc., Eugene, USA

Anatomy and Its Impact on Structural and Functional Imaging

Function Hall C, Level 1

Organizers

Katrin Amunts, Institute of Neuroscience and Medicine, Jülich, Germany

Karl Zilles, Institute of Neuroscience and Medicine, Jülich, Germany

Results of neuroimaging studies cannot be understood without knowing the anatomy of the brain, and the way how brain structure influences the interpretation of the results through interaction with image acquisition, processing and analysis. The course will provide an introduction and critical overview of classical and modern approaches for studying the anatomy of the brain using neuroimaging techniques. It is aimed at a multidisciplinary audience, and will provide an introduction to brain macroscopy, gross anatomical landmarks and its intersubject variability, the microstructural organization of the brain including cortical segregation, and the representation of cognitive functions with respect to organization principles. 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 anatomical concepts and developmental aspects and show, how MRI contributes. Part two will focus on organizational principles of the brain's microstructure, and critically reflect the perspectives and limits of MR imaging with respect to microstructure. Part 3 will elucidate the relationship between microstructure and brain function, and provide an overview of some widely distributed neuroimaging tools in this field.

Learning Objectives: Having completed this course, participants will be able to:

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

Target Audience: The prime target audience is researchers with an interest in understanding the relationship between brain structure and function. This includes researchers with limited previous anatomical knowledge. Prior experience of neuroimaging is expected. Background will be provided for those without special anatomical knowledge but some talks will address advanced issues that would be of interest to people with experience in this field.

Course Schedule

Part 1: Introduction: Neuroanatomy, Development and MRI

8:00 – 8:30 **Surface Anatomy of the Brain and Landmarks**
Peter Kochunov, Maryland Psychiatric Research Center, University of Maryland, Baltimore, USA

8:30 – 9:00 **Development of the Cerebral Cortex**
David van Essen, Washington University, St. Louis, USA

9:00 – 9:30 **MRT Imaging of Brain Development**
Alan Evans, McGill University, Montreal, Canada

9:30 – 10:00 **High Resolution Imaging and Anatomy**
Noam Harel, University of Minnesota, Minneapolis, USA

10:00 – 10:30 **Break**

Part 2: Microstructure and Its Interpretation in MRI

10:30 – 11:00 **Cytoarchitecture of the Human Cerebral Cortex — Challenges for MRI**
Katrin Amunts, Institute of Neuroscience and Medicine, Research Center Jülich, Jülich, Germany

11:00 – 11:30 **Myeloarchitecture — A Window for MRI**
Robert Turner, Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany

11:30 – 12:00 **Receptorarchitecture and Neural Systems**
Karl Zilles, Institute of Neuroscience and Medicine, Jülich, Germany

12:00 – 13:00 **Lunch — Cafeteria Open**

Part 3: Structure, Function and Tools for Analysing Their Relationship

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

13:30 – 14:00 **Tools to Combine Structural MRI with Cytoarchitecture and Function**
Simon Eickhoff, Institute of Neuroscience and Medicine, Research Center Jülich, Jülich, Germany

14:00 – 14:30 **Structural and Functional Segregation of the Cortex**
Jean-Francois Mangin, Neurospin, CEA, Gif sur Yvette, France

14:30 – 15:00 **Anatomical Conditions and MR-Morphometry**
Christian Gaser, University of Jena, Jena, Germany

15:00 – 15:30 **Break**

15:30 – 16:00 **Anatomical Background of Dynamic Causal Modelling and Connectivity**
Klaas Enno Stephan, Laboratory for Social and Neural Systems Research, University of Zurich, Zurich, Switzerland

16:00 – 17:00 **Question and Answer Panel Discussion**

Brain-Computer Interfaces and Real-Time fMRI

Ballroom C, Level 1

Organizers

Rainer Goebel, Maastricht University, Maastricht, The Netherlands

Stephen LaConte, Virginia Tech Carilion Research Institute, Roanoke, USA

Brain-Computer Interfaces (BCIs) are important applications of neuroimaging methods that are increasingly used to help patients with severe motor impairments and also for entertainment. While BCI devices based on electro-encephalography (EEG) have been actively developed for over two decades, recent years have seen new BCI approaches that are based on hemodynamic measurement technologies including functional magnetic resonance imaging (fMRI) and functional near infrared spectroscopy (fNIRS). Progress has also been made in recent years with intracranial electrical recordings (eCog). Furthermore, all approaches use increasingly sophisticated methods, such as multivariate machine learning approaches, that aim to let the technology adapt to the subject as opposed to requiring the subject adapt to the technology. The goal of this course is to provide a broad introduction on the methods, techniques and applications of BCIs. Much of the course will focus on exciting recent developments and applications of real-time fMRI, but other modalities will also be covered.

Learning Objectives: Having completed this course, participants will be able to:

1. Have an understanding of the methods, techniques and applications of BCIs;
2. Describe exciting recent developments and applications of real-time fMRI.

Target Audience: The course is intended for a broad audience of research scientists and medical professionals with basic knowledge in one or more relevant neuroimaging techniques, who wish to obtain a detailed overview of the current state of the art of brain-computer interface research.

Course Schedule

Part I: rtfMRI Approaches and Software Platforms

8:00 – 8:30 **Real-Time fMRI with Turbo-BrainVoyager**
Rainer Goebel, Maastricht University, Maastricht, The Netherlands

8:30 – 9:00 **Real-time fMRI Using Echo-Volumar-Imaging**
Stefan Posse, University of New Mexico School of Medicine, Albuquerque, USA

9:00 – 9:30 **Real-Time fMRI with AFNI**
Robert Cox, National Institute of Mental Health, Bethesda, USA

9:30 – 10:00 **Real-Time fMRI and its Application to Neurofeedback**
Nikolaus Weiskopf, University College London, London, UK

10:00 – 10:30 **Break**

10:30 – 11:00 **Multivoxel Pattern-Based rtfMRI**
Stephen LaConte, Virginia Tech Carilion Research Institute, Roanoke, USA

Part II: Artifacts and Physiology Considerations for rtfMRI

11:00 – 11:30 **Task-Related BOLD Signal Artifact in a Real-Time fMRI Feedback**
Xiaochu Zhang, University of Science & Technology of China, Hefei, China

11:30 – 12:00 **Physiological Noise and rtfMRI**
Jerzy Bodurka, Laureate Institute for Brain Research, Tulsa, USA

12:00 – 13:00 **Lunch — Cafeteria Open**

Part III: Human and Animal BCI Models

13:00 – 13:30 **Combined EEG and fNIRS BCI in Humans**
Thomas Emmerling, Maastricht University, Maastricht, The Netherlands

13:30 – 14:00 **Invasive Motor Brain Machine Interfaces in Primates**
Yiwen Wang, Qiushi Academy for Advanced Studies, Hangzhou, China

14:00 – 14:30 **Event Related Potential Based Brain Computer Interface**
Hong Bo, Tsinghua University, Beijing, China

14:30 – 15:00 **Real-Time Detection and Manipulation of Neuronal Assemblies in Primates**
Matthias Munk, Max Planck Institute for Biological Cybernetics, Tübingen, Germany

15:00 – 15:30 **Break**

Part IV: New Approaches to Real-Time fMRI

15:30 – 16:00 **Rehabilitation, Robotics, and Real-Time fMRI**
James Sulzer, Swiss Federal Institute of Technology, Zurich (ETHZ), Zurich Switzerland

16:00 – 16:30 **Arterial Spin Labeling-Based Real-Time fMRI**
Luis Hernandez, University of Michigan, Ann Arbor, USA

16:30 – 17:00 **Tracking Resting State Networks in Real Time**
Cameron Craddock, Virginia Tech Carilion Research Institute, Roanoke, USA

The Connectome

Function Hall A, Level 1

Organizers

Heidi Johansen-Berg, University of Oxford, Oxford, UK

Ed Bullmore, University of Cambridge, Cambridge, UK

This course provides an introduction to the emerging science of brain 'Connectomics', the study of large-scale networks of structural and functional brain connections. Brain imaging data can provide powerful information for building maps of the 'Human Connectome'. The morning session, 'Building Connectomes', will provide methodological introductions to the types of data that can be used to define the connectome, including diffusion MRI, resting state FMRI, EEG and MEG. This session will also introduce methods for modelling distributed brain networks, progressing from introductory concepts to more advanced discussions of challenging issues such as defining network nodes, integrating across modalities and grouping across individuals. The afternoon session, 'Modelling and Mining Connectomes', will include talks highlighting approaches to mining and visualising these complex datasets and will review how the connectomics approach has already provided novel insights into human brain organisation and its breakdown in disease. Dedicated discussion slots have been scheduled at the end of each session.

Learning Objectives: Having completed this course, participants will be able to:

1. Understand methods for acquisition and analysis of diffusion MRI, resting state FMRI, EEG and MEG data;
2. Understand network modelling methods for connectomics;
3. Give examples of approaches to visualising connectomes; and
4. Give examples of applications of connectomics to understanding brain function and dysfunction.

Target Audience: The target audience is researchers with an interest in using human imaging data for studying the connectome. Prior experience of human neuroimaging is expected. Background will be provided for those without experience of network modelling but some talks will address advanced methodological issues that would be of interest to people with experience in this field.

Course Schedule

I. Building Connectomes

8:00 – 8:30 **Introduction to Connectomics and Overview of the Course**
Heidi Johansen-Berg, University of Oxford, Oxford, UK

8:30 – 9:00 **MRI Acquisition and Analysis Strategies for Connectomics**
Lawrence L. Wald, MGH Martinos Center for Biomedical Imaging, Harvard University, Charlestown, USA

9:00 – 9:30 **Diffusion Tractography and Structural Measures**
Donald Tournier, Brain Research Institute, Melbourne, Australia

9:30 – 10:00 **Overview of Intrinsic Connectivity Networks**
Vince Calhoun, University of New Mexico, Albuquerque, USA

10:00 – 10:30 **Break**

10:30 – 11:00 **EEG/MEG and Brain Networks**
Johanna Zumer, Radboud University Nijmegen, Netherlands

11:00 – 11:30 **Overview of FMRI Network Modelling Methods in Task and Rest**
Ed Bullmore, University of Cambridge, Cambridge, UK

11:30 – 12:00 **Discussion and Q+A**

12:00 – 13:00 **Lunch — Cafeteria Open**

II. Modelling and Mining Connectomes

13:00 – 13:30 **Advanced Network Modelling I: Dynamic Models; Multimodal Integration**
Mark Woolrich, University of Oxford, Oxford, UK

13:30 – 14:00 **Advanced Network Modelling II**
Gael Varoquaux, INSERM, Neurospin, Gif-sur-Yvette, France

14:00 – 14:30 **Neuroinformatics for Connectomics**
David Van Essen, Washington University, St Louis, USA

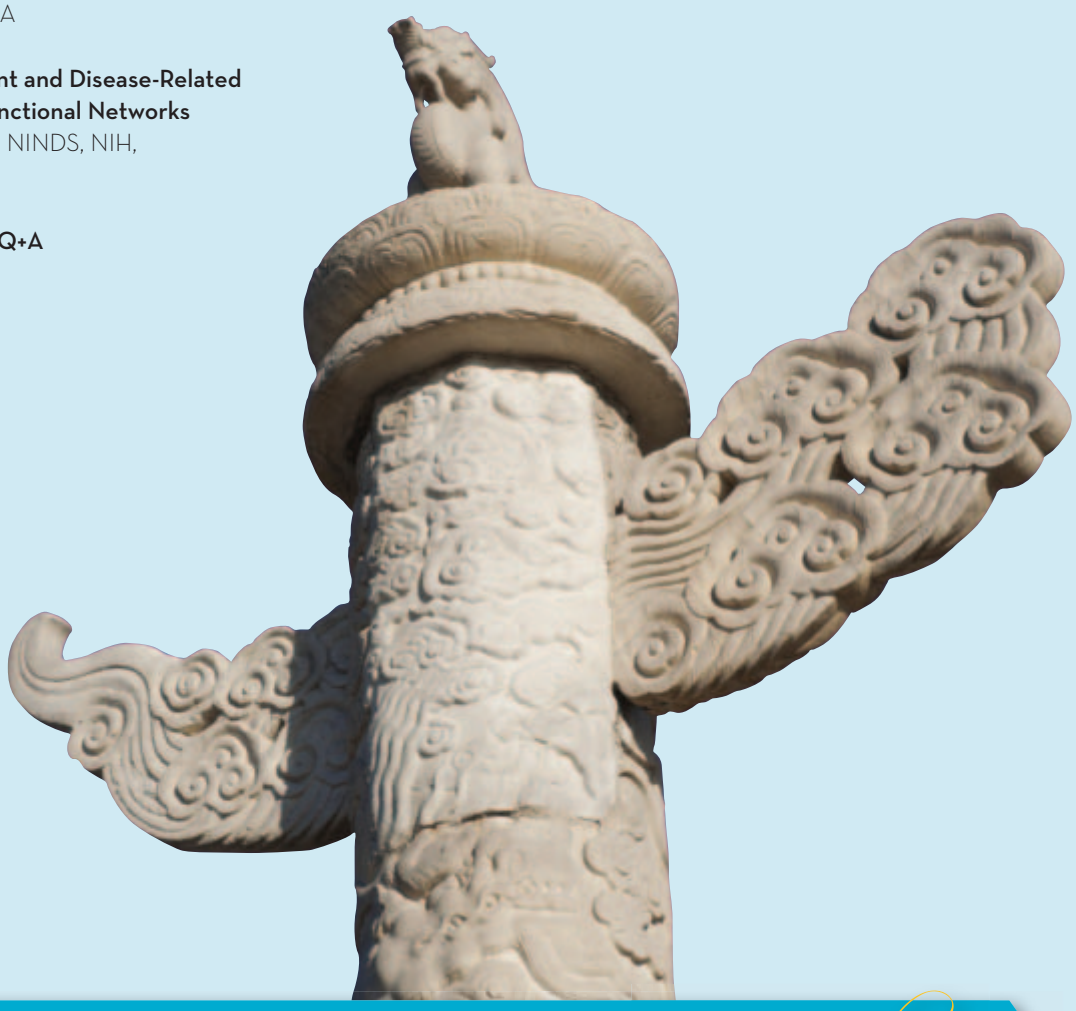
14:30 – 15:00 **Brain Networks in Health and Disease**
Ed Bullmore, University of Cambridge, Cambridge, UK

15:00 – 15:30 **Break**

15:30 – 16:00 **Data Mining and Visualisation**
Angie Laird, University of Texas, San Antonio, USA

16:00 – 16:30 **State-Dependent and Disease-Related Variations in Functional Networks**
Silvina Horovitz, NINDS, NIH, Bethesda, USA

16:30 – 17:00 **Discussion and Q+A**



Introduction to Imaging Genetics

Function Hall B, Level 1

Organizers

Thomas Nichols, University of Warwick, Coventry, UK

Jean-Baptiste Poline, Neurospin, I2BM, CEA, France & UC Berkeley

This course will introduce the fundamentals of "Imaging Genetics," the process of modeling and understanding genetic variation in brain image data. The course begins with a three-lecture genetics tutorial in the morning, designed to give imaging practitioners a quick overview of key genetics concepts and terminology. The remainder of the course covers how imagers can use genetic variables in their analyses. Specific topics include voxel-wise genome-wide models, joint multivariate modeling of imaging and genetic data, and heritability analyses of cortical surface and thickness data. The course concludes with two case studies highlighting current imaging genetics research.

Learning Objectives: Having completed this course, participants will be able to:

1. Understand the fundamentals of the molecular basis of genetic variation, and how that variation is modeled in traditional genetics studies.
2. Understand the difference between linkage, association and heritability analyses.
3. Understand the relative strengths & weaknesses of each different type of brain imaging phenotype used to find genetic association.
4. Understand how imaging genetics can be applied to areas like schizophrenia or Williams's syndrome.

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

Course Schedule

8:00 – 8:05	**Introduction** **Jean-Baptiste Poline**, Neurospin, I2BM, CEA, France
8:05 – 8:45	**Molecular Basis of Genetic Variation** **Elliot Hong,** University of Maryland, Baltimore, USA
8:45 – 9:30	**Structure and Analysis of Genetic Variation** **Sven Cichon**, Bonn University, Bonn, Germany
9:30 – 10:15	**Quantitative Traits: Heritability, Linkage & Association** **Eric J Schmitt,** University of Pennsylvania, Philadelphia, USA
10:15 – 10:30	**Break**
10:30 – 11:15	**Overview of Neuroimaging Phenotypes** **Roberto Toro**, Institute Pasteur, Paris, France
11:15 – 12:00	**Univariate Approaches: Multiple Testing & Voxelwise WGA** **Derek Hibar**, University of California, Los Angeles, Los Angeles, USA
12:00 – 13:00	**Lunch — Cafeteria Open**
13:00 – 13:45	**Multivariate Approaches: Joint Modeling of Imaging & Genetic Data** **Giovanni Montana**, Imperial College, London, UK
13:45 – 14:30	**Multivariate Phenotypes for Association and Linkage** **Peter Kochunov,** Maryland Psychiatric Research Center, University of Maryland, Baltimore, USA
14:30 – 15:15	**ENIGMA & Large Scale Imaging Association** **Jason Stein**, University of California, Los Angeles, Los Angeles, USA
15:15 – 15:30	**Break**

15:30 – 16:15 **Case Study: Translating Between Genes, Brain, and Behavior with Neuroimaging: Neural Mechanisms in Williams Syndrome**
Karen Berman, National Institutes of Health, Bethesda, USA

16:15 – 17:00 **Case Study: Genetics of Inhibition and Error Processing – Implications for ADHD and Schizophrenia**
Mark Bellgrove, University of Queensland, Australia

Resting State Brain Networks

Auditorium, Level 4

Organizers

Bharat Biswal, UMDNJ-New Jersey Medical School, Newark, USA

Yu-Feng Zang, Hangzhou Normal University, China

This course is designed to teach users how to design, analyze, and interpret resting state brain connectivity. Due to its increasing popularity, a large number of investigators are collecting MRI data from healthy and clinical subjects during rest. A novelty of this course will be that actual data from a large study will be used to show the user, all points of the study. In the first part of the course, users will be taught how to design an experiment for a resting state study. The importance of initial instruction given and the subject's behavioral and physiological parameters including satiety, and emotional state on the baseline signal will be discussed. In the second part, pre-processing and post-processing steps their relative advantages and disadvantages will be demonstrated. During this process, their software implementation will also be demonstrated. In the third part, data integration with other clinical and connectivity measures including DTI will also be shown.

Learning Objectives: Having completed the course, participants will be able to:

1. Design a resting state study, with full knowledge as to how the various behavioral or physiological states would affect RSFC;
2. Understand the sources of variation both within and between subjects. Also, they will be aware of the various pre-processing methods used, including their advantages and dis-advantages;
3. Generate various measures of connectivity, including seed-based, data driven approached including ICA/PCA, aggregate properties including ALFF, small world, etc. Different software implementation including AFNI, FSL, REST, GIFT and CONN will be covered;
4. Methods to integrate the RSFC results with other measures including DTI, EEG, and other measures will also be covered; and
5. Analyzing Single subject and Group level analysis will be performed.

Target Audience. This course is designed for neuroimaging practitioners interested in resting state fMRI studies.

Course Schedule

8:00 – 8:05 **Introduction**
Yu-Feng Zang, Hangzhou Normal University, China

8:05 – 8:40 **Biophysical Mechanisms and Artifactual Signals**
Bharat Biswal, UMDNJ-New Jersey Medical School, Newark, USA

8:40 – 9:15 **Pre-Processing Steps and Considerations**
Christian Windischberger, Medical University of Vienna, Vienna, Austria

9:15 – 9:50 **Analysis: ICA**
Christian Beckmann, NL Donders Institute for Brain, Cognition and Behavior Radboud University Nijmegen, Nijmegen, Netherlands

9:50 – 10:25 **Analysis: Seed-Based Correlation and Other Novel Developments**
Ziad Saad, National Institute of Health, Bethesda, USA

10:25 – 10:35 **Break**

10:35 – 11:10 **Analysis: Granger Causality and Other SEM**
Xiaoping Hu, Georgia Institute of Technology, Atlanta, USA

11:10 – 11:45 **Analysis: Network Approaches**
Yong He, Beijing Normal University, Beijing, China

11:45 – 12:25 **Applications: Overview**
Mike Milham, Child Mind Institute, New York, USA

12:25 – 13:25 **Lunch — Cafeteria Open**

13:25 – 14:00 **Applications: Development**
Vinod Menon, Stanford University, Stanford, USA

14:00 – 14:35 **Applications: Imaging Genetics**
Yu-Feng Zang, Hangzhou Normal University, China

14:35 – 15:10 **Multimodal Integration: Combining DTI and fcMRI**
Ching-Po Lin, National Yang-Ming University, Taipei

15:10 – 15:25 **Break**

15:25 – 16:00 **Multimodal Integration: Integrating Intracranial Electrodes and Diffusion Tractography to Study Resting State Networks**
Timothy Ellmore, University of Texas Health Science Center at Houston, Houston, USA

16:00 – 16:45 **Case Study: Single Subject and Group Analysis**
Suril Gohel and Xin Di, UMDNJ-New Jersey Medical School, Newark, USA

16:45 – 17:00 **Limitation of Resting State Studies**
Bharat Biswal, UMDNJ-New Jersey Medical School, Newark, USA

17:30 – 19:00
Ballroom AB, Level 1

Opening Ceremonies

Please join us for the OHBM Scientific Program Opening Ceremonies. The Wiley Young Investigator Award will be presented, as well as the presentation of the "Editor's Choice Awards."

Talairach Lecture: Speech and Auditory Memory: How Deep is Their Connection?

Mortimer Mishkin, Bethesda, USA

This talk revolves around two seemingly unrelated findings. The first is the momentous discovery of the FOXP2 gene, essential for oromotor articulation, an ability that likely evolved within the hominid line in just the last 300,000 years. The second finding, less momentous but more puzzling, is that, unlike humans, monkeys seem unable to store long-term memories in audition, even though they are easily able to do so in vision and touch. Together, these two pieces of evidence suggest that speech and long-term auditory memory may be indissolubly linked. An initial test provides this suggestion with some preliminary support

19:00 – 21:00

Welcome Reception

China National Convention Center (CNCC), 4th Floor, North Lobby

Join us for the 2012 Annual Meeting Welcome Reception. The reception will be held at the China National Convention Center immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 10th. **Please make sure to wear your name badge, which will serve as your ticket to the event.** Additional guest badges are $50.00.

8:30 – 9:45
Ballroom AB, Level 1

Morning Workshop

Attaining fMRI-Resolution on the Scale of Cortical Columns and Layers

Chair: **Amir Shmuel,** MNI, McGill University, Montreal, QC, Canada; CMRR, University of Minnesota, Minneapolis, USA

Motivation: 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 and connectivity properties are similar for neurons within a column but are known to vary between columns. It can therefore be argued, that the optimal spatial scale for studying the relationship between brain function and behavior is that of cortical columns (and layers, for similar reasons).

Theme: Hardware advancements and optimization of acquisition techniques at high fields have pushed the spatial resolution of fMRI from voxel edges of 3 mm to 0.5 mm. As has been demonstrated in recent studies, fMRI at high-magnetic field is capable of reaching the resolution of cortical columns and layers in humans. The symposium will focus on methods of functional imaging at this resolution, and studies that demonstrate their successful implementations. In addition, it will present the spatial specificity of the BOLD response relative to neurophysiological recordings.

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

Learning Objectives: Having completed this workshop, participants will be able to:

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

Studying Columnar Architectures in Human Visual Cortex Using High-Resolution Functional Magnetic Resonance Imaging

Kang Cheng, RIKEN Brain Science Institute, Wako, Saitama, Japan

Spatial Specificity of the Hemodynamic Response Relative to Neurophysiological Activity

Amir Shmuel, MNI, McGill University, Montreal, QC, Canada; CMRR, University of Minnesota, Minneapolis, USA

Surface-Based Cortical Depth Analyses of BOLD Spatial Specificity in Human Visual Cortex at 7 T

Jonathan R. Polimeni, Athinoula A. Martinos Center for Biomedical Imaging, Department of Radiology, Harvard Medical School, Massachusetts General Hospital, Charlestown, USA

8:30 – 9:45
Ballroom C, Level 1

Morning Workshop

Moving From Correlation to Prediction in Clinical Neuroscience

Chair: **Nick Ward,** Sobell Department of Motor Neuroscience & Movement Disorders, London, UK

Uncertainty over outcomes in neurological disease is a major concern to patients, carers and clinicians. Attempts to design simple and effective models to predict outcomes have been largely unsuccessful. The use of brain imaging data has in the past been limited to crude metrics such as lesion volume. However, there are clear correlations between changes in structural and functional brain organisation on the one hand and severity of impairment after stroke on the other, indicating the presence of potentially useful predictive biological information. In this session, we will explore the rationale for prediction in neurological disease and in particular stroke, and show how recent advances in methodology have allowed us to move away from simple correlation towards prediction of clinically meaningful endpoints. We will provide examples of how both structural and functional imaging data can be used to predict outcomes in individual patients in the language and motor domains. Finally, we will explore the theoretical framework of novel hierarchical neurocomputational modelling approaches which shows great promise in forming the basis of future predictive tools.

Learning Objectives: Having completed this workshop, participants will:

1. Have an understanding of why prediction of outcome is important;
2. Be aware of how both structural and functional imaging data can be used to predict outcome after stroke in a domain specific (motor, languuage, cognitive) manner; and
3. Be familiar with current and future modelling approaches that can be used in generating predictive models in neurological and psychiatric disease.

Prediction After Stroke – What Do We Want to Know?

Nick Ward, Sobell Department of Motor Neuroscience & Movement Disorders, London, UK

Predicting Language Outcome and Recovery After Stroke Using Structural MRI Brain Scan

Alex Leff, Institute of Cognitive Neuroscience, London, UK

Using fMRI to Predict Non-Recoverers From Recoverers After Stroke

John Krakauer, Center for the Study of Motor Learning and Brain Repair, Johns Hopkins University, Baltimore, USA

Translational Neuromodeling: Inferring Individual Pathophysiology and Predicting Treatment Response

Klaas Enno Stephan, Laboratory for Social and Neural Systems Research, University of Zurich, Zurich, Switzerland

8:30 – 9:45
Function Hall B, Level 1

Morning Workshop

Why Believe in Multivariate Pattern Analysis? The Skeptical Neuroimager's View

Chair: Bertrand Thirion, INRIA Saclay-Île-de-France, Parietal team, Neurospin, Gif sur Yvette, France

Multivariate pattern analysis has been used quite intensively in neuroimaging studies during the last few years, because it provides a very sensitive assessment of the link between brain images or brain signals and some stimulus or behavioral variable reflecting the subject's mental state. This approach is sometimes called decoding. Its success is fueled by the active and continuous development of powerful machine learning tools in the last decades, in particular in the field of supervised classification and regression. It is motivated by the neuroscientific idea that mental representations utilize population codes, i.e. the information is combinatorially encoded in patterns of activity. Even within a collection of noisy data, multivariate pattern analysis tools can detect signals linked to the target variable (i.e. carrying information on this variable), and use it to achieve above-chance classification of mental states. In practice, sensitivity gains have been central to the success of these approaches in neuroimaging. It can be noted that machine learning tools used for decoding have come with a more systematic use of cross-validation procedures, which yields a more compelling assessment of the informative content of brain images than analytical criteria. More importantly, pattern analysis has opened the possibility to generalize predictions across experimental conditions, sometimes providing new insights on brain function. The success of pattern analysis is also related to its ability to obtain graded measures of similarity/differences of brain states, stimuli or percepts.

This successful paradigm nevertheless faces several challenges, namely i) the lack of modeling behind most successful brain reading analyses, ii) the non-uniqueness, or degeneracy of patterns that actually convey information on the variable of interest, iii) the lack of consistency of the discriminative patterns used by the classifier, and iv) the difficulty of analyzing the geometry of multivariate representational spaces.

Challenge 1: How to test computational theories of brain information processing? The most frequently used approach in Multivariate pattern analysis (MVPA) consists in training a classifier on a the signals from a set of brain regions, possibly cascading several processing steps to improve the classifier's performance. All these procedures are agnostic to brain mechanisms, and just provide a statistical measurement on the shared information between stimulus or behavioral variables and activity patterns. While the same criticism holds both for univariate activation analysis and MVPA approaches, sophisticated MVPA approaches can in some cases provide more insights when they incorporate computational models of brain information processing (e.g. by introducing explicit priors on the stimulus organization or by introducing latent factors that model the similarity between brain processes).

Challenge 2: How to localize information and understand the spatial organization of neuronal codes? Due to the large size of brain images used in MVPA, a common observation is that equally powerful classifiers trained on one dataset can be based on completely different spatial patterns. More generally, brain signal classifiers rely on distributed rather than focal information, they cannot inform the neuroimager about the precise localization of this information; only the searchlight approach is well suited for such purpose; but even in that case, the spatial encoding of the information remains implicit.

Challenge 3: Do the discriminating patterns provide a consistent estimate of the truly informative regions? Classifiers are instantiated and optimized to yield an optimal response to a prediction problem, and not to recover the ground truth of an activation pattern. For instance, the discriminating pattern inferred from an Support Vector Machines algorithm provide no principled evidence to accurately delineate task-related regions: elementary simulations show indeed that it will fail to do so in simplistic cases. In general, one should not expect from a good classifier to convey the true model of brain activation pattern. Still, embedded variable selection approaches (i.e., variable selection combined with model learning, such as various sparse approaches), have some potential for recovering relevant regions of brain activity. We wish to provide theoretical and experimental evidence of correct recovery of the underlying spatial structure of the discriminating pattern.

Challenge 4: How to analyze the geometry of multivariate representational spaces? As the space spanned by the activity patterns are intrinsically high-dimensional, their understanding is not easy: beside the traditional issues regarding visualization of multi-dimensional information, the comparison of patterns across individuals, conditions or protocols remains a challenging task.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Discuss the success and pitfalls of pattern analysis techniques applied to neuroimaging, carefully considering the ultimate goal of learning procedures used as tools for classification purpose.
2. Review the existing results on the consistency of the recovered spatial patterns, i.e. under which conditions some pattern analysis procedures can give access to the underlying activation pattern.
3. Describe alternative efforts that address the challenges described above: the incorporation of computational models of brain-information processing, the generalization of classification rules across tasks, the construction and characterization of the latent stimulus space from activation data.
4. Understand the use and interpretation of pattern analysis approaches in neuroimaging, based on technical and statistical considerations, as well as our experience on using MVPA on neuroimaging data.

Feature Selection and Feature Extractions in Multivariate Prediction: Promises and Limitations

Irina Rish, IBM T.J. Watson Research Center, Computational Biology Center, New York, USA

Can We Recover Meaningful Spatial Information from Multivariate Pattern Analysis?

Bertrand Thirion, INRIA Saclay-Île-de-France, Parietal team, Neurospin, Gif sur yvette, France

Why We Should Believe in Pattern Analysis and How to Meet the Challenges Ahead

Nikolaus Kriegekorte, MRC Cognition and Brain Sciences Unit, Cambridge, UK

Multi-Voxel Pattern Analysis as a Tool to Look Inside the Modules of the Brain

Hans Op de Beeck, Laboratory of Biological Psychology, Leuwen, Belgium

8:30 – 9:45
Function Hall A, Level 1

Morning Workshop

Assessing Network (dys-) Function in Development, At-Risk States and Psychiatric Disorders

Chair: Simon B. Eickhoff, Institute for Clinical Neuroscience, HHU Düsseldorf, Düsseldorf, Germany

Multiple theories emphasize the role genetic influences and disordered development playin for aberrant configuration of brain networks characterizing neuro-psychiatric illnesses. While localizing dysfunction may thereforebe insufficient for pathophysiological insight into psychiatric disorders and their precursors, application of advanced modeling techniques to the study of network function in vivo may enable a better understanding of mental illness. The study of brain networks in normal development and in phenotypically (still) healthy at-risk populations should provide particular insight into the normative and aberrant shaping of functional interactions. The recent development of a variety of computational approaches to model network (dys-) function in the human brain allow this symposium to represent a timely integration of the motivation to study aberrant maturation of networks, the techniques to do so and the insight being gained from their application.

We will address these emerging issues with the overarching objective of understanding the role of development and genes on network (dys-)function. First, we will discuss the application of Granger Causality Mapping and Graph Analyses in a normative sample as a basis for elucidating physiological and pathological development of cognitive control networks (Luna). Next, we will demonstrate with DTI and resting-state functional MRI, the influence of genetic factors on network function and the relevance for affective disorders (Glahn). We will then provide evidence from Dynamic Causal Modeling demonstrating network dysfunction during affective and attentional processing evident in healthy adolescents at risk for psychiatric illness (Diwadkar). Finally, we will present a novel neuro-computational modeling framework for inferring on disease mechanisms in psychosis by Dynamic Causal Models of neuronal physiology (Stephan).

Learning Objectives: Having completed this workshop, participants will:

1. Have an overview of analyses techniques for fMRI data that allow the study of network dys-function;
2. Understand the importance of genetic and developmental aspects for brain networks and the relevance of network dysfunction for psychiatric disease; and
3. Discuss characteristics of network dysfunction in illnesses including schizophrenia and mood disorders and relate it to pathophysiological mechanisms

The Maturation of Top-Down Frontal Cognitive Control Through Adolescence

Beatriz Luna, Laboratory of Neurocognitive Development, University of Pittsburgh Medical Center, Pittsburgh, USA

Genetic Control Over Brain Connectivity: Implications for Affective Disorders

David C. Glahn, Department of Psychiatry, Yale University, Hartford, USA

Networks at Risk: Dynamic Causal Modeling Reveals Mechanisms of Dysfunction in Adolescents Vulnerable to Psychiatric Illness

Vaibhav A. Diwadkar, Dept of Psychiatry & Behavioral Neuroscience, Wayne State University School of Medicine, Detroit, USA

Imaging Brain Networks in the "Grey-Zone" Between Health and Disease

Simon B. Eickhoff, Institute for Clinical Neuroscience, HHU Düsseldorf, Düsseldorf, Germany

10:00 – 11:30
Ballroom AB, Level 1

LOC Symposium

Imaging the Sociocultural Human Brain

Chair: Jia-Hong Gao, Peking University, Beijing, China; University of Chicago, Chicago, USA

We live in a very sophisticated social world. How our brain processes inputs generated from different sociocultural contexts and hence mediate appropriate social interactions has been a hot topic of research in neuroscience. Brain imaging studies during the last few years have made considerable advancement in the understanding of the neural substrates engaged in processing of social information, and how neural mechanisms subserved by these substrates are shaped by sociocultural experiences.

In this symposium, Dr. Tatia Lee will present her work on emotion recognition and regulation. Men and women, when being exposed to similar affective stimuli, engage different patterns of neural activity when they attempt to understand the socio-affective world as well as regulate their affective states. Abnormal emotional control may relate to the interplay of the affective processing-regulatory mechanisms. Since emotion regulation is extremely important for adaptive social functioning and mental well-being, experience-induced neuroplastic changes and the potential beneficial effect of these changes on emotion regulation will be explored.

The second speaker, Dr. Sheng He, will describe his work on observers' processing of facial expressions in the absence of visual awareness. He will show that specialized neural mechanisms for facial expression analysis could be better identified when observers were made unconscious of the visual input through interocular suppression, and he will also discuss the temporal dynamics as well as individual differences in processing facial expression information.

The third speaker, Dr. Gui Xue, will then present his study in examining the interaction of cognition and emotion during adaptive and maladaptive decision making. In particular, he will provide convergent evidence from behavioral, neuroimaging and brain stimulation studies to demonstrate that social and affective mechanisms play a critical and constructive role in adaptive decisions, while the cognitive system could sometime contribute to maladaptive decisions.

Finally, Dr. Shihui Han will review his work on how the neurocognitive processes involved in self-reflection on personality traits and self-face recognition are shaped by long-term and short-term sociocultural experiences, and how the cultural influences on the human brain are constrained by biological factors such as genes. He will also discuss the biosocial nature of the functional organization of the human brain.

Learning Objectives: Having completed this symposium, participants will be able to

1. Understand normal and abnormal neural processing of affective stimuli;
2. Understand the distributed representation of different social information in the human brain;
3. Understand the effect of sociocultural experiences on shaping the neural mechanisms underlying social communication and interaction; and
4. Understand the value of functional neuroimaging methods in examining the sociocultural processes in human brain.

Neural Processing Underlying Emotion Recognition and Regulation

Tatia Lee, The University of Hong Kong, Hong Kong

Unconscious Processing of Facial Expressions-Cortical Sites, Dynamics, and Individual Differences

Sheng He, Institute of Biophysics, Chinese Academy of Sciences, China; University of Minnesota, Minneapolis, USA

The Cognitive-Affective Architecture of Adaptive and Maladaptive Decision Making

Gui Xue, Beijing Normal University, Beijing, China

Neural Representation of the Self in Sociocultural Contexts

Shihui Han, Peking University, Beijing, China

11:45 – 12:30

Ballroom AB, Level 1

Keynote Lecture

Functional Architecture of Face Processing in the Primate Brain

Leslie Ungerleider, Laboratory of Brain & Cognition, NIMH, Bethesda, USA

Face recognition is a remarkable ability, given the tens of thousands of different faces we can recognize, sometimes even many years later after a single encounter. This unique ability likely depends on specialized neural machinery dedicated to face processing. This talk will focus on the network dynamics among regions mediating the recognition of both face identity and facial expression in the primate brain.

12:30 – 13:30

Lunch – Cafeteria Open

13:30 – 14:15
Function Hall B, Level 1

Interactive Poster (I-Poster) Presentations

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts in a short, "datablitz" format. The objective of the I-Poster session is to arrive at a hybrid of posters and oral sessions.

Moderator: **Peter Bandettini,** National Institutes of Health, Bethesda, USA

13:30 - 13:35
711 WTh: Investigating the Frequency Composition of Resting State Networks in MEG using ICA
Henry Luckhoo, University of Oxford, Oxford, UK

13:35 - 13:40
892 WTh: Using fMRI and TMS to Study Interactions of the Motor System and Working Memory
Diana A. Liao, Johns Hopkins University, Baltimore, USA

13:40 - 13:45
821 MT: Blindness Decreases Cross-Hemisphere Striate Resting-State Functional Connectivity
Omar Hameed Butt, University of Pennsylvania, Philadelphia, USA

13:45 - 13:50
1007 MT: The Spatiotemporal Pattern of Brain Responses During Mechanical Pain
Franco Cauda, Università degli Studi di Torino, Turin, Italy

13:50 - 13:55
1011 MT: Functional Brain Networks that Predict Transition from Sub Acute to Chronic Back Pain
Javeria Hashmi, Northwestern University, Chicago, USA

13:55 - 14:00
1053 MT: Layer Specific fMRI Correlates of Motion Processing in Human Cortical Areas V1 and MT
Denis Chaimow, MPI for Biological Cybernetics, Berlin, Germany

14:00 – 14:15
Discussion

13:30 – 15:30
Plenary Hall AB, Level 4

Poster Session

Poster #'s 2-1112 MT: Even numbered posters stand-by

Disorders of the Nervous System: Alzheimer's Disease and Other Dementias, Epilepsy, Stroke, Traumatic Brain Injury

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

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

Modeling and Analysis Methods: Bayesian Modeling, Classification and Predictive Modeling, Diffusion MRI Modeling and Analysis, EEG/MEG Modeling and Analysis, Exploratory Modeling and Artifact Removal, fMRI Connectivity and Network Modeling, Image Registration and Computational Anatomy, Motion Correction and Preprocessing, Multivariate Modeling, Other Methods, PET Modeling and Analysis, Segmentation and Parcellation, Task-Independent and Resting-State Analysis, Univariate Modeling

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

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

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

Perception: Visual, Sleep and Wakefulness

Social Neuroscience: Social Cognition

15:45 – 17:00
Ballroom AB, Level 1

Symposium

What Can Brain Imaging Tell Us About Motor Learning?

Chair: Joern Diedrichsen, Motor Control Group, Institute of Cognitive Neuroscience, University College London, London, UK

What happens in the human brain when we learn new motor skills? Human neuroimaging should play a key role in answering this question. However, despite hundreds of published studies, we have learned disappointingly little about the neuronal processes underlying learning. In this symposium we will try to point out the pitfalls in the study of motor learning, and to identify the most promising lines of recent research. We believe that there are 3 future challenges that will be the key to novel discoveries in motor learning. First, it will be necessary to tightly integrate anatomical, functional and neuro-chemical imaging methods to understand the underlying neuronal changes. Secondly, we believe it is time to develop linking theories that tell us which neuronal changes to expect with learning and how these changes should become manifest in the measured signals. Finally, to test such theories, we need to progress from a simple description of signal changes to an approach, in which we are able to predict future behavioral performance from current neuronal measures. We will show how white and gray matter structures change under the influence of expertise, how learning can be influenced through transcranial stimulation, and how difference in the responsiveness of certain neurotransmitter systems can predict inter-individual differences in learning. For functional MRI, we will investigate how learning changes neuronal representation and network connectivity. Our discussant, John W. Krakauer will then challenge the speakers to identify the main theoretical questions for future research.

Learning Objectives: Having completed this symposium, participants will be able to:

1. Learn about anatomical and functional brain changes induced by motor learning;
2. Recognize the problems and challenges of studying learning using brain imaging; and
3. Identify novel research strategies that address these problems.

Dynamic Brain Correlates of Dexterity and Motor Skill Acquisition Traced with Structural Magnetic Resonance Imaging

Hartwig Roman Siebner, Danish Research Center for Magnetic Resonance, Department of MR (DRCMR), Copenhagen University, Hospital Hvidovre, Hvidovre, Denmark

Dynamic Changes in Neurochemistry and Brain Structure with Learning and Brain Stimulation

Heidi Johansen-Berg, Oxford Centre for Functional MRI of the Brain (FMRIB), Nuffield Department of Clinical Neurosciences, Oxford, UK

Predicting Learning Based on Large-Scale Network Dynamics in fMRI

Scott T. Grafton, UCSB Brain Imaging Center and the Department of Psychological & Brain Sciences, University of California, Santa Barbara, USA

Motor Learning: A Change in Neuronal Representation, Rather than in Activation

Joern Diedrichsen, Motor Control Group, Institute of Cognitive Neuroscience, University College London, London, UK

17:15 - 18:00
Ballroom AB, Level 1

Keynote Lecture

Spectral Fingerprints of Cognitive Processing

Andreas Engel, Dept. of Neurophysiology and Pathophysiology University Medical Center Hamburg-Eppendorf, Hamburg, Germany

Cognition results from large-scale interactions among functionally specialized but widely distributed brain regions. The talk will focus on recent studies that exploit correlated neuronal oscillations to characterize such large-scale cortical interactions in the human brain. It will be argued that large-scale oscillatory coupling provides a level of description that is particularly fruitful for identifying unifying principles underlying cognitive processing.

18:15 – 19:45

Oral Sessions

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: Disorders 1

Ballroom C, Level 1

Chair: Cornelius Weiller, University Medical Center Freiburg, Freiburg, Germany

18:15 – 18:30
90 MT: EEG-fMRI Using the Ultra-fast MREG Sequence Allows the Single-trial Localization of Epileptic Spikes

Pierre LeVan, University Medical Center Freiburg, Freiburg, Germany

18:30 – 18:45
142 MT: Mapping Associations Between Kidney Biomarkers, Brain Atrophy and Cognition in ADNI: An N=701 Study

Priya Rajagopalan, Laboratory of Neuro Imaging, Department of Neurology, UCLA School of Medicine, Los Angeles, USA

18:45 – 19:00
119 WTh: Children with Fetal Alcohol Spectrum Disorders Undergo Less Developmental Cortical Thinning

Sarah Treit, University of Alberta, Edmonton, Canada

19:00 – 19:15
145 MT: The Pattern of Regional Homogeneity Determining Outcome of Hand Function after Subcortical Stroke

Dazhi Yin, Key Laboratory of Brain Functional Genomics, Shanghai Key Laboratory of Magnetic Resonance, ECNU, Shanghai, China

19:15 – 19:30
24 MT: C9ORF72 Gene MutationIncreases Functional Connectivity in FTLD

Vesa Kiviniemi, Department of Diagnsotic Radiology, Oulu University Hospital, Oulu, Finland

19:30 – 19:45
109 MT: Structural Substrates for Resting Network Disruption in Temporal Lobe Epilepsy

Natalie Voets, University of Oxford, Oxford, UK

O-M2: Emotion and Motivation

Function Hall B, Level 1

Chair: Alumit Ishai, University of Zurich, Zurich, Switzerland

18:15 – 18:30
226 MT: Heart Rate Deceleration Predicts BOLD Activity in Default Mode Regions during Emotion Processing

Xiao-Fei Yang, University of Southern California, Los Angeles, USA

18:30 – 18:45
233 MT: Loss Aversion is Under the Control of Dopaminergic Signaling

Alain Dagher, McGill University, Montreal, Canada

18:45 – 19:00
219 MT: Oxytocin Enhances Encoding of Emotional Faces Under Conditions of Limited Awareness

Manuela Sibold, University of Freiburg, Freiburg, Germany

19:00 – 19:15
232 MT: Dopamine-dependent Cortico-subcortical Network Functional Connectivity: Association with Impulsivity

David Cole, Imperial College London, London, UK

19:15 – 19:30
1053 WTh: Connectivity-based Parcellation of the Human Right 'Temporoparietal Junction Area' (TPJ)

Rogier Mars, University of Oxford, Oxford, UK

19:30 – 19:45
242 MT: Reward Risk Coding in the Orbitofrontal Cortex: An Intracranial Recording Study in Humans

Yansong Li, CNRS, Lyon, France

O-M3: Language

Function Hall A, Level 1

Chair: Nina Dronkers, VA Northern California Health Care System/UC Davis Center for Aphasia and Related Disorders, USA

18:15 – 18:30
252 WTh: Functional Changes in Language Areas of Brain Tumor Patients Revealed by fMRI and Group ICA

Hui Mao, Emory University, Atlanta, USA

18:30 – 18:45
359 MT: Representational Similarity Analysis Reveals Heterogeneous Networks Supporting Speech Motor Control

Zane Zheng, Queen's University, Kingston, Canada

18:45 – 19:00
352 MT: Auditory-motor Interactions During Speech Production in Monolingual and Bilingual Speakers

Oiwi Parker Jones, Wellcome Trust Centre for Neuroimaging, London, UK

19:00 – 19:15
299 MT: Electrophysiological Correlate of Pre-literate Print Sensitivity – A Predictor for Reading Outcome?

Silvia Brem, Department of Child and Adolescent Psychiatry, University of Zürich, Zürich, Switzerland

19:15 – 19:30
330 MT: Distinct Cortical Representations for Intact Audiovisual Speech and the McGurk Effect

Laura Erickson, Georgetown University, Washington, DC, USA

19:30 – 19:45
346 MT: GABAergic Function During Speech Production

Arash Fazl, Mount Sinai Medical School, New York, USA

O-M4: Resting State Networks

Ballroom AB, Level 1

Chair: Michael Greicius, Stanford University, Stanford, USA

18:15 – 18:30
665 MT: Edge Aelection Preserving the Topological Features of Brain Network

Hyekyoung Lee, SNUH, Seoul, Republic of Korea

18:30 – 18:45
80 WTh: The Autism Brain Imaging Data Exchange (ABIDE) Consortium: Open Sharing of Autism Resting State fMRI

Adriana Di Martino, NYU Child Study Center, New York, USA

18:45 – 19:00
554 MT: Network Analysis Could Reveal Local And Global Intelligence Fingerprint In Resting State fMRI Data

Emiliano Santarnecchi, Department of Neurological and Sensorial Sciences, Siena, Italy

19:00 – 19:15
739 MT: Resting state networks are Characterized by High Frequency BOLD Fluctuations

Erik van Oort, MIRA Institute, University of Twente, Donders Institute, Radboud University Nijmegen, Nijmegen, Netherlands

19:15 – 19:30
476 MT: Tracking Whole-brain Connectivity Dynamics in the Resting-state

Elena Allen, The Mind Research Network, Albuquerque, USA

19:30 – 19:45
795 WTh: Establishing Homotopic Inter-hemispheric Regional Correspondences via Rest Functional Connectivity

Marc Joliot, UMR5296, Université Bordeaux Segalen, CNRS, CEA, Bordeaux, France

8:30 – 9:45
Function Hall A, Level 1

Morning Workshop

Brain Graphs: Recent Advances in Graph Analysis of Neuroimaging Data

Chairs: Alex Fornito[1,2,3], Ed Bullmore[4,5]
[1]Centre for Neural Engineering, The University of Melbourne, Parkville, Victoria, Australia
[2]NICTA Victorian Research Laboratory, The University of Melbourne, Parkville, Victoria, Australia
[3]Melbourne Neuropsychiatry Centre, Department of Psychiatry, The University of Melbourne and Melbourne Health, Parkville, Victoria, Australia
[4]Brain Mapping Unit, Behavioural and Clinical Neurosciences Institute, University of Cambridge, Cambridge, UK, CB2 3EB.
[5]GSK Clinical Unit Cambridge, Addenbrooke's Hospital, Cambridge, UK

The human brain is an extraordinarily complex network, comprising billions of neurons interconnected by trillions of fibers. Mapping the structure and function of this connectivity web, termed the human connectome, has become a central goal of neuroscience. Neuroimaging has assumed a central role in such attempts by enabling rapid, non-invasive measurements of neural anatomy and functional dynamics across the entire brain. In recent years, the burgeoning field of imaging connectomics has greatly benefited from the application of concepts and methods adapted from complex network science. Principal among these has been the use of graph analytic techniques, which enable the succinct representation of brain connectivity as a graph of nodes connected by edges. Such an approach has led to new insights into the organization of functional and structural brain networks, including observations that the brain conforms to a small-world topology characterized by cost-efficient connectivity and a hierarchical, modular architecture; that many of these organizational properties are disturbed by psychiatric and neurologic disease; that they adapt in accordance with changing task demands; and that they may, in part, be genetically inherited. This symposium will highlight recent developments in the graph analysis of MRI data, focusing on innovative methodologies and applications to the study of human connectome structure and function in health and disease. An update on these developments is both timely and essential, given the rapid pace of progress in this area. The talks will provide a detailed overview of the current status of the field and novel frontiers for future research.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Understand key concepts, advantages and limitations in imaging connectomics; and
2. Understand how imaging connectomics can advance the study of psychiatric and neurologic disorders

Dynamic Network Organization in the Human Brain

Danielle S. Basset, Complex Systems Group, Santa Barbara, USA

Structure of the Brain Network and Its Link to Cognition

Martijn van den Heuvel, Rudolf Magnus Institute of Neuroscience, University Medical Center Utrecht, Utrecht, Netherlands

Multiple Comparisons and Null Models in Connectivity Mapping

Andrew Zalesky, Melbourne Neuropsychiatry Centre, The University of Melbourne, Carlton South, Victoria, Australia

Structural Brain Connectomics in Neurodegenerative Diseases

Yong He, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, Beijing, China

8:30 – 9:45
Ballroom AB, Level 1

Morning Workshop

Quantitative Anatomical MRI

Chair: Nikolaus Weiskopf, Wellcome Trust Centre for Neuroimaging, UCL Institute of Neurology, University College London, London, UK

Quantitative structural magnetic resonance imaging (MRI) advances current non-invasive approaches to studying the human brain anatomy. So far, morphometric studies are mostly based on conventional T1-weighted (T1w) imaging, which are difficult to compare across sites due to their non quantitative nature. The interpretation of results is not straightforward, since T1w images exhibit a mixed contrast, which does not solely depend on T1 (longitudinal relaxation time) but also on T2* (apparent transverse relaxation time) and radio-frequency (RF) field inhomogeneities. The symposium/workshop will introduce quantitative multi-parameter mapping (MPM), which maps T1, T2*, proton density (PD) and magnetization transfer (MT) saturation. It will provide an overview over data acquisition, biophysical modelling, adapted data analysis and neuroscience applications.

The presentation by G. Helms will explain how MPM data are acquired and quantitative parameter maps are estimated from the data. The underlying contrast mechanisms will be discussed. The talk by C. Hutton will introduce morphometry and voxel-based quantification (VBQ) for analysing the MPM data. The introduction of the methodology will be complemented by presentations on different novel applications in basic and clinical neuroscience. B. Draganski will present different applications of VBQ to studying normal ageing and neurodegenerative disease. M. Sereno will demonstrate how the high accuracy and precision of quantitative T1 mapping can be used for in-vivo myelinography and parcellation of the human cortex.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Understand basic principles of acquisition and processing of multi-parametric quantitative MRI data;
2. Recognize the additional possibilities of studying brain anatomy using quantitative structural MRI compared to conventional T1w MRI; and
3. Describe applications of quantitative structural MRI for basic and clinical neuroscience.

Gradient-Echo–Based Acquisition of Quantitative Multi-Parameter Maps and Basic Contrast Mechanisms in Brain Tissue

Gunther Helms, MR-Research in Neurology and Psychiatry, Dept. of Cognitive Neurology, Göttingen University Medical Center, Goettingen, Germany

Voxel-Based Analysis of Quantitative Multi-Parameter Mapping (MPM) Brain Data for Studying Tissue Microstructure, Macroscopic Morphology and Morphometry

John Ashburner, Wellcome Trust Centre for Neuroimaging, UCL Institute of Neurology, University College London, UK

A Quantitative Perspective on Degenerative Processes in the Brain

Bogdan Draganski, LREN - DNC, CHUV, Lausanne, Switzerland

In Vivo Parcellation of the Human Cortical Surface Using Quantitative T1 Mapping and Retinotopy

Martin Sereno, Birkbeck/UCL Neuroimaging Centre, London, UK

8:30 – 9:45
Ballroom C, Level 1

Morning Workshop

From Static to Dynamic Descriptions: Non-Stationarity in Functional and Effective Brain Connectivity

Chair: Christian Beckmann, NL Donders Institute for Brain, Cognition and Behavior Radboud University Nijmegen, Nijmegen, Netherlands

'Brain Connectivity' has emerged as a major research area in clinical and cognitive imaging neurosciences. Current approaches to both functional and effective connectivity typically characterise the interactions between brain regions in static terms e.g. by using temporal correlation or global data decompositions. Such techniques collapse data across the temporal domain and in doing so ignore the transient and non-stationary nature of interactions in the brain. This inherently limits the ability to more fully understand the spatio-temporal dynamics of connected regions in terms of e.g. transient resource allocations and the dependencies of connectivity in the brain on experimental contexts. Such dynamics can exist at short and long temporal scales, so a more dynamic view on functional and effective connectivity requires not only advances in the ability to link haemodynamic measurements to electrophysiological ones, but also the ability to obtain a more complete view on spatial and temporal non-stationarities as part of the computational models.

In this workshop we will feature recent methodological developments aimed at investigating the non-stationary nature of both functional and effective connectivity. The first speaker Mark Woolrich will focus on resting-state functional connectivity in electrophysiological recording. Steve Smith will describe a full spatio-temporal decomposition approach for estimating functionally distinct dynamics from BOLD recordings and Catie Chang will focus on the relevance of state-dependent non-stationarities. Finally, Jason Smith will discuss approaches for embedding non-stationarity across space and time in models for effective connectivity.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Discuss the importance of a dynamic view on functional and effective connectivity;
2. Describe approaches for estimating patterns of functional connectivity from different data modalities; and
3. Identify the appropriate modelling strategy for characterising non-stationarity in models of brain connectivity.

Measuring Electrodynamic Connectivity: Observations Using Magnetoencephalography

Mark Woolrich, Univ Of Oxford, FMRIB Centre, John Radcliffe Hospital, Oxford, UK

Functionally-Distinct Spatially-Overlapping Brain Modes

Stephen M. Smith, Oxford University Centre for Functional MRI of the Brain (FMRIB), John Radcliffe Hospital, Oxford, UK

Dynamics of Resting-State BOLD Signal Connectivity

Catie Chang, Advanced MRI Section, NINDS, NIH, Bethesda, USA

Temporal and Spatial Non-Stationarity in Effective Connectivity Networks Using Switching Linear Dynamic Systems

Jason F. Smith, Brain Imaging and Modeling Section, NIDCD, National Institutes of Health, Bethesda, USA

8:30 – 9:45
Function Hall B, Level 1

Morning Workshop

Big Science Comes to Imaging Genetics

Chair: Gunter Schumann, MRC-SGDP Centre, Institute of Psychiatry, King's College London, London, UK

Large scale gene x neuroimaging studies offer the unprecedented possibility to investigate the interrelatedness of genetic function, neurophysiological activation and behaviour in humans. To date gene x neuroimaging studies have mainly analysed the association of single regions of interest with few, well validated genetic variations in selected genes. They aimed to explore and evaluate the functional impact of brain-relevant genetic polymorphisms with the potential to understand their impact on behaviour, but were not designed to reflect the complexity of neurobiological mechanisms underlying human behaviour. Small sample sizes, which limit the number of multiple comparisons in each individual study, as well as the use of non-standardised tasks, which render comparisons across studies, including meta-analyses, difficult have precluded a more comprehensive gene x neuroimaging approach in the past.

However, the ascertainment of several large neuroimaging datasets, together with an increasing collaboration within the neuroimaging community have allowed researchers to tackle some of the major conceptual and methodical challenges awaiting the field, which we aim to comprehensively address in a symposium or educational workshop.

We will present studies on environmental, and specifically epidemiological influences on neurobiological functioning, and studies aiming to elucidate the molecular mechanisms underpinning brain activity using systemic and translational approaches. We report findings derived from multivariate and systems-based approaches as well as meta-analyses of existing datasets. Analysing these and other emerging large gene x neuroimaging datasets holds the promise to identify markers for neurobiological clusters, which represent specific pathological processes for targeted treatment.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Understand cutting-edge techniques for combining complex neuroimaging and genetic datasets including meta-analyses and large sample datasets;
2. Understand the interactive effects of genes and environmental factors; and
3. Understand translational research methods.

Specifying Neural Mechanisms Underlying Environmental Risk and GxE: From Epidemiological Association to Neurobiology

Kathrin Morgen, Central Institute of Mental Health, Mannheim, Germany

Neuroimaging and Genetic Relationships Underlying Cognitive Control in a Large Sample of Adolescents

Hugh Garavan, Department of Psychiatry, University of Vermont, Burlington, USA

Translational Gene x Neuroimaging Analysis of Rasgrf2-Related Genes in Reinforcement Behaviour and Alcohol Drinking: Results from the IMAGEN Study

Gunter Schumann, MRC-SGDP Centre, Institute of Psychiatry, King's College London, London, UK

Meta-Analytic Genome-Wide Association of Hippocampal, Brain, and Intracranial Volumes via the ENIGMA Consortium

Jason Stein, Neurogenetics Program, Department of Neurology, University of California, Los Angeles, Los Angeles, USA

10:00 - 10:45
Ballroom AB, Level 1

Keynote Lecture

The Topological Definition of Perceptual Objects: Theory, Behavioral Evidence, and Neural Representation

Lin Chen, State Key Laboratory of Brain and Cognitive Science, Institute of Biophysics, Chinese Academy of Sciences, Beijing, China

What is a perceptual object? Intuitively, it is the holistic identity preserved over shape-changing transformations. According to the global-first topological approach, this core intuitive notion of an object can be characterized as topological invariants, such as holes. Behavioral experiments demonstrated that changes in topological properties disturbed object continuity, leading to the perception of an emergence of a new object; and fMRI experiments showed that the topological changes activated the anterior temporal lobe and amygdale.

11:00 – 12:30

Oral Sessions

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: Modeling and Analysis Methods

Ballroom AB, Level 1

Chair: Niko Kriegeskorte, MRC Cognition and Brain Sciences Unit, Cambridge, UK

11:00 – 11:15
648 MT: Real-time Tracking and Biofeedback of the Default Mode Network

R. Cameron Craddock, Virginia Tech Carilion Research Institution, Blacksburg, USA

11:15 – 11:30
625 MT: Model-Based Clustering Using Generative Embedding

Kay H. Brodersen, ETH Zurich, Zurich, Switzerland

11:30 – 11:45
386 MT: Hierarchical Tree-Guided Brain Disease Classification

Manhua Liu, Department of Radiology and BRIC, Chapel Hill, USA

11:45 – 12:00
760 MT: Fast and Accurate Modelling of Longitudinal Neuroimaging Data

Bryan Guillaume, University of Warwick, Coventry, UK

12:00 – 12:15
499 MT: Estimating BOLD Signals of Deep Brain Networks From EEG Using Canonical Correlation Analysis

Lavi Shpigelman, IBM, Haifa, Israel

12:15 – 12:30
632 MT: Capturing High-order Interactions in Neuroimaging Data

Sergey Plis, The Mind Research Network, Albuquerque, USA

O-T2: Motor Behavior, Learning & Disorders

Function Hall B, Level 1

Chair: Geneviève Albouy, C.R.I.U.G.M., Montreal, Canada

11:00 – 11:15
786 MT: Neuronal Network Coherent with the Kinematics of Observed Hand Movement

Xavier De Tiège, Université Libre de Bruxelles, Brussels, Belgium

11:15 – 11:30
784 MT: Estimation of Three-dimensional Movement Trajectory from MEG Signals

Hong Gi Yeom, Seoul National University, Seoul, Republic of Korea

11:30 – 11:45
814 MT: Ventral and Dorsal Stream Dissociation During Action Recognition in the Human Brain

Giacomo Handjaras, Laboratory of Clinical Biochemistry and Molecular Biology, University of Pisa, Pisa, Italy

11:45 – 12:00
873 WTh: Differential Contribution of BA4a and BA4p to Motor Learning

Nikhil Sharma, NINDS, Bethesda, USA

12:00 – 12:15
866 WTh: Motor Learning and Offline Processes of Consolidation Associated with Rapid GABA Modulation
Christel Gudberg, University of Oxford, Oxford, UK

12:15 – 12:30
279 WTh: Basal Ganglia-cortical Interactions in Parkinsonian Patients
Andre Marreiros, University of Oxford, Oxford, UK

O-T3: Neuroanatomy
Ballroom C, Level 1
Chair: Christian Lambert, Wellcome Trust Centre for Neuroimaging, London, UK

11:00 – 11:15
884 MT: Two New Cytoarchitectonic Areas of the Human Frontal Pole
Sebastian Bludau, Institute of Neuroscience and Medicine, INM-1, Jülich, Germany

11:15 – 11:30
920 MT: The Pathway of the Middle Longitudinal Fasciculus in the Human Brain
Yibao Wang, The First Affiliated Hospital of China Medical University, ShenYang, China

11:30 – 11:45
823 MT: Receptor-based Parcellation of the Human Inferior Parietal Lobule and its Implication for Function
Sveja Caspers, Institute of Neuroscience and Medicine, INM-2, Research Center Jülich, Jülich, Germany

11:45 – 12:00
889 MT: Surface Gradient Comparison of Myelin and fMRI: Architectonic and Functional Border Co-localization
Matthew Glasser, Washington University in St. Louis, St. Louis, USA

12:00 – 12:15
870 MT: A Cross-modal, Cross-species Comparison of Connectivity Analyses in the Primate Cortex
Andrew Reid, Montreal Neurological Institute, Montreal, Canada

12:15 – 12:30
917 MT: Damage to White Matter Pathways in Chronic Visuospatial Neglect
Michel Thiebaut de Schotten, Institute of Psychiatry, London, UK

O-T4: Perception and Attention
Function Hall A, Level 1
Chair: Yanchao Bi, Beijing Normal University, Beijing, China

11:00 – 11:15
940 MT: Efficient Visual Search Elicits Sustained Broadband Gamma Activity in the Dorsal Attention Network
Tomas Ossandon, INSERM U1028, CNRS UMR5292, Lyon Neuroscience Research Center, Brain Dynamics and Cognition Team, Ly, Lyon, France

11:15 – 11:30
1056 MT: Individually Unique Representations of Particular Objects in Human Inferior Temporal Cortex
Ian Charest, MRC-CBSU, Cambridge, UK

11:30 – 11:45
928 MT: Right Temporo-parietal Junction and Attentional Reorienting
Chi-Fu Chang, National Central University, Taoyuan, Chinese Taipei

11:45 – 12:00
1066 MT: Callosal Connections and Surface Area of V1 Predict Subjective Experience of Binocular Rivalry
Erhan Genc, Max Planck Institute for Brain Research, Frankfurt am Main, Germany

12:00 – 12:15
1072 MT: Is the Domain Organization of Ventral Visual Pathway Independent of Visual Experience and Modality?
Chenxi He, State Key Laboratory of Cognitive Neuroscience and Learning, Beijing Normal University, Beijing, China

12:15 – 12:30
1069 MT: A Developmental Study of Face Identity Processing Using FMRI Adaptation
Frank Haist, University of California – San Diego, La Jolla, USA

12:30 – 13:30

Lunch – Cafeteria Open

13:30 – 14:15
Function Hall B, Level 1

Interactive Poster (I-Poster) Presentations

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts in a short, "datablitz" format. The objective of the I-Poster session is to arrive at a hybrid of posters and oral sessions.

Moderator: Marco Catani, Institute of Psychiatry, King's College London, London, UK

13:30 – 13:35
1070 WTh: The culturally situated brain: Self-construal priming modulates the default mode activity

Chenbo Wang, Peking University, Beijing, China

13:35 – 13:40
1105 WTh: Intense vicarious social pain is linked to higher-order somatosensory cortex activation

Stefan Westermann, Philipps-University Marburg, Marburg, Germany

13:40 – 13:45
1015 WTh: Facing the Voice: Neural Correlates of Explicit Social Judgments on Vocal Stimuli

Lukas Hensel, Research Center Jülich, Aachen, Germany

13:45 – 13:50
1057 WTh: Social closeness modulates vicarious embarrassment related neural activation

Laura Müller-Pinzler, Psychiatry, University of Marburg, Marburg, Germany

13:50 – 13:55
1069 WTh: Culture Shapes Inter-brain Synchronization During Human Goal Decoding

Luca Vizioli, University of Glasgow, Centre for Cognitive Neuroimaging, Institute of Neuroscience & Psychology, Glasgow, UK

13:55 – 14:00
1087 WTh: Regulation Benefits: fMRI of Negative Emotions Induced by Repeated Interactive Ultimatum Bargaining

Gadi Gilam, Tel Aviv University, Tel Aviv, Israel

14:00 – 14:15
Discussion

13:30 – 15:30
Plenary Hall AB, Level 4

Poster Session

Poster #'s 1-1113 MT: Odd numbered posters stand-by.

Disorders of the Nervous System: Alzheimer's Disease and Other Dementias, Epilepsy, Stroke, Traumatic Brain Injury

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

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

Modeling and Analysis Methods: Bayesian Modeling, Classification and Predictive Modeling, Diffusion MRI Modeling and Analysis, EEG/MEG Modeling and Analysis, Exploratory Modeling and Artifact Removal, fMRI Connectivity and Network Modeling, Image Registration and Computational Anatomy, Motion Correction and Preprocessing, Multivariate Modeling, Other Methods, PET Modeling and Analysis, Segmentation and Parcellation, Task-Independent and Resting-State Analysis, Univariate Modeling

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

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

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

Perception: Visual, Sleep and Wakefulness

Social Neuroscience: Social Cognition

15:45 – 17:00
Ballroom AB, Level 1

Symposium

Relationships Between Functional Networks Assessed by fMRI and EEG/MEG/ECoG

Chairs: Todd S. Woodward, Department of Psychiatry, University of British Columbia, Vancouver, British Columbia, Canada

Jennifer C. Whitman, Department of Psychiatry, University of British Columbia, Vancouver, British Columbia, Canada

Functional connectivity studies using functional magnetic resonance imaging (fMRI) have reliably observed both resting state activity and task-related activity in functionally connected networks. However, characterization of the time-course of activity within these networks has been limited by the time-scale of the fMRI BOLD response. Multimodal imaging methods are capable of measuring those time-courses by combining the spatial resolution of fMRI with the high temporal resolution of EEG, MEG, and Electrocorticography (ECoG). One approach involves simultaneous EEG and fMRI recordings, such that the time-course of oscillatory activity in an EEG component can be related to the time-course of activity within a given fMRI network. Another approach involves recording fMRI and MEG data in separate sessions from the same individuals. The MEG data can be localized to cortical regions via a variety of algorithms such as beamformers and minimum norm estimates. A third approach involves the sequential acquisition of fMRI and direct electrophysiological recordings from the cortical surface (ECoG) in patients with epilepsy. Functional connectivity analyses can then be performed separately on the fMRI data and the EEG/MEG/ECoG data, and overlap between different measures can be assessed through various statistical frameworks. Converging results from these diverse methods describe spatial redundancies between fMRI and MEG/EEG data. They also describe how oscillations at various frequencies form functional networks across brain regions. As EEG/MEG/ECoG data are real-time measures of neural activity, these methods allow us to describe with high resolution the time-course of activity within the networks identified via fMRI.

Learning Objectives: Having attended to this symposium, participants will be able to:

1. Understand the importance of using brain networks as a framework for examining brain function;
2. Understand how multimodal imaging can describe brain activity with high spatial and temporal resolution; and
3. Understand how different frequencies of oscillatory signals in different brain regions can underlie a given network identified in the BOLD signal.

Spatial Correspondence Between Networks of Oscillatory Activity Identified in MEG Data and the Dorsal Attention and Default Mode Networks Identified in fMRI Data

Jennifer C. Whitman, Department of Psychiatry, University of British Columbia, Vancouver, Canada

Investigating the Spatial-Temporal Dynamics of Functional Networks with Simultaneous EEG-fMRI

Rene Scheeringa, Donders Institute for Brain, Cognition and Behaviour, Centre for Cognitive Neuroimaging, Nijmegen, Netherlands

Investigating the Electrophysiological Origin of Brain Networks Using Magnetoencephalography

Matthew Brookes, Sir Peter Mansfield Magnetic Resonance Centre, School of Physics and Astronomy, University of Nottingham, Nottingham, UK

A Frequency-Specific Mechanism that Links Human Brain Networks During Task Performance

Maurizio Corbetta, Departments of Neurology, Radiology, Anatomy & Neurobiology, Washington University School of Medicine, St. Louis, USA

17:15 – 18:00
Ballroom AB, Level 1

Keynote Lecture

Structural and Functional Architecture of the Human Cerebral Cortex: Multiscale and Multimodal Maps

Karl Zilles, Institute of Neuroscience and Medicine, Jülich, Germany

The contribution of "tedious anatomy" for understanding brain structures underlying various types of neuroimaging data will be demonstrated. Localization beyond the common misuse of so-called "Brodmann maps", multiscale (from molecules to circuits) and multimodal (cyto- and receptorarchitecture) mapping strategies, as well as an ultra-high resolution approach to structural connectivity will be discussed.

18:00 – 19:30
Plenary Hall AB, Level 4

Wine and Beer Reception in the Poster Hall

There will be a wine reception held in the poster hall on Tuesday, June 12 from 18:00-19:30. If you have a poster being presented that day, you are welcome to stand by your poster and present.

8:30 – 9:45
Function Hall A, Level 1

Morning Workshop

Near InfraRed Spectroscopy Sheds Light on the Development of Brain Networks: The Case of Speech Perception

Chair: Alejandrina Cristia, Max Planck Institute for Psycholinguistics, Nijmegen, Netherlands

Near InfraRed Spectroscopy (NIRS) measures regional changes in hemoglobin concentration, thus yielding an index of local activation on the surface of the brain. It is inexpensive, non-invasive, portable, and relatively robust to movement artifacts, which makes it ideal to test mobile, awake infants. Most recently, connectivity analyses on NIRS data have been used to highlight the emergence of functional networks over the course of development, taking advantage of a relatively higher temporal resolution than fMRI (about 10 Hz) and more precise localization than EEG (about 1 cm). The present session showcases how NIRS can be utilized to map the very early development of brain structures, and their interaction, by focusing on speech perception by preterm and fullterm newborns. In the first talk, Jacques Mehler, one of the pioneers in the application of NIRS to language development, documents that the newborn brain is more responsive to cross-linguistically preferred patterns, even in the absence of extensive language exposure. Yasuyo Minagawa-Kawai underlines the interaction between maturation and experience, presenting connectivity and activation patterns found in premature infants in response to different speech sound contrasts. Hellmuth Obrig combines ERP and NIRS to describe infants' processing of speech in comparison with complex non-linguistic auditory stimuli. Finally, Fumitaka Homae argues that the development of multi-scale brain networks facilitates and constrains language acquisition in infancy, and vice versa, on the basis of network analyses on multi-channel NIRS data.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Describe how NIRS can be used for both activation and connectivity analyses in young infants; and
2. Describe the early brain networks involved in speech perception shortly after birth

How Infants' Brain Shapes Language

Jacques Mehler, SISSA, Trieste, Italy
David Gómez, SISSA, Trieste, Italy

Preterm and Fullterm Newborns' Responses to Vowel and Intonation Changes

Yasuyo Minagawa-Kawai, Keio University, Tokyo, Japan

Combining NIRS and EEG to Map Early Language Development

Hellmuth Obrig, Max Planck Institute for Human Cognitive and Brain Science, Leipzig, Germany

The Multi-Scale Bootstrapping Development Hypothesis for Language Acquisition

Fumitaka Homae, Tokyo Metropolitan University, Tokyo, Japan

8:30 – 9:45
Function Hall B, Level 1

Morning Workshop

Neural Repair as Changes in Network Connectivity: Using Computational Models of Brain Connectivity to Characterize Recovery from Injury and the Effects of Specific Interventions

Chair: Steven L. Small, University of California, Irvine, Departments of Neurology, Neurobiology & Behavior, and Cognitive Sciences Biological Sciences III, Irvine, USA

The motor functions of the hand and mouth are important for the vast majority of human social and cognitive functions, including communication and activities of the workplace. Human evolution supporting these skills has been accompanied by an enormous increase in the neuropil of the brain, the substrate for the massive connectivity that comprises the complex neural circuits supporting cognition, language, and complex motor behavior. These integrative circuits incorporate a variety of cerebral cortical regions, with circuit structure reflected by interregional relationships (internal neural context) and the nature of external stimulation (external context). Neural context, a term coined by R. McIntosh, reflects the dynamic reorganization of neural relationships to perform different functions with portions of the same underlying substrate. External context reflects the factors in the world that can influence overall network functioning. The importance of stimulation in affecting neural plasticity, and on the specific relationship between the type of stimulation and the type of effect, are reflected in this

concept. In this Symposium, all four speakers delve into these types of context effects in understanding recovery from brain injury at a network level. On one hand, we discuss a number of computational models of network connectivity and their disruption after neurological damage, thus emphasizing the role of network function and neural context in recovery. On the other hand, we discuss the use of network connectivity models to aid in the development of therapeutic interventions, to determine therapeutic targets, and to gauge their specific effects on neural remodeling. We anticipate that future research in brain repair, and ultimately the clinical field of brain repair, will require significant attention to network function and to the methods presented here.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Understand the role of networks in characterizing brain function;
2. Understand the importance of neurobiology in understanding recovery from brain injury and in developing treatments; and
3. Understand the role of functional and effective connectivity modeling in characterizing both normal brain function and recovery from disease.

Network Recovery after Stroke: Dynamic Functional Reorganization of the Motor Execution Network after Stroke

Chaozhe Zhu, Beijing Normal University, Beijing, China

Effects of Prenatal Focal Brain Injury on Reading-Related Functional Connectivity and Modular Organization

Anjali Raja Beharelle, Rotman Research Institute, University of Toronto, Toronto, Canada

New Insights into the Pathophysiology Underlying Motor Deficits and Recovery Thereof Using Models of Effective Connectivity

Christian Grefkes, Department of Neurology, University of Cologne, Köln, Germany

Network Recovery after Stroke: Building Hand Motor and Aphasia Therapy on Physiological Data and Anatomical Connectivity

Ana Solodkin, Departments of Anatomy & Neurobiology and Neurology, University of California, Irvine, Irvine, USA

8:30 – 9:45
Ballroom C, Level 1

Morning Workshop

Pitfalls and Progress in the Analysis of Longitudinal Structural MRI

Chair: Gerard R. Ridgway, Wellcome Trust Centre for Neuroimaging, UCL Institute of Neurology, London, UK

This session addresses a topic of recent concern and controversy: the risk of bias in longitudinal analysis of MRI for tracking progression of neurodegenerative diseases, and the consequent focus on statistical practices and renewed impetus for methodological advances.

Measurement of structural brain changes over time using serial MRI has enabled key insights into healthy development and neurodegenerative disease. Ageing populations and increasing global prevalence of Alzheimer's disease (AD) have created particular interest in using imaging to aid diagnosis and to track disease progression. Of major importance to clinicians and to pharmaceutical companies is the ability of MRI to provide biomarkers for the evaluation of candidate disease-modifying treatments. Longitudinal image processing pipelines using within-subject rigid or non-rigid registration have great potential to reduce measurement variability, with consequent reductions in required sample sizes and trial costs. However, the trade-off with these more powerful methods is their greater risk of introducing biases; if all of a subject's images are registered to their first, this systematic difference in processing can create structural differences where there were none or over-estimate true changes.

In this session, researchers at the forefront of this area will present their distinct perspectives on these problems and their different approaches to ameliorating them. Measurements ranging from total brain volume, through cortical thickness and subcortical volumes, down to subfields of the hippocampus will be considered, alongside cross-cutting statistical issues. Attendees will gain valuable insights into subtle methodological pitfalls, and learn how to take advantage of recent (and on-going) progress in this field.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Appreciate the merits of longitudinal analysis techniques for structural MRI;
2. Recognise the potential for different forms of bias to arise in these methods; and
3. Gain insight into recent and on-going work aimed at reducing bias and variability.

Statistical Issues and Recommendations for Best Practice

Wesley K. Thompson, Department of Psychiatry, University of California, San Diego, La Jolla, USA

Unbiased Longitudinal Processing of Structural MRI in FreeSurfer

Martin Reuter, A.A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown, USA

Consistent Multi-Time-Point Brain Atrophy Estimation from the Brain Boundary Shift Integral

Kelvin K. Leung, Dementia Research Centre, UCL Institute of Neurology, London, UK

Hippocampal Atrophy Rate Measurements from Longitudinal MRI Using Deformation-Based Morphometry: Sources of Bias and Prospects for Subfield-Specific Biomarkers

Paul Yushkevich, Department of Radiology, University of Pennsylvania, Philadelphia, USA

8:30 – 9:45
Ballroom AB, Level 1

Morning Workshop

Ultra-High Speed fMRI: Methods, Sensitivity Increases and Applications

Chair: Stefan Posse, University of New Mexico, Albuquerque, USA

This morning workshop brings together leading experts who are at the forefront of developing ultra-high speed fMRI data acquisition and statistical analysis. This workshop aims to explain the basis of ultra-high speed fMRI for the non-expert audience and characterize the physiological processes underlying the observable signals.

Recent advances in ultra-fast spatial encoding and inverse reconstruction using large-scale RF array coils have increased temporal resolution of fMRI to time scales on the order of 100 ms and faster. This unprecedented temporal resolution has been shown to significantly increase BOLD sensitivity, in part due to non-aliased sampling of physiological noise and increased statistical power as a result of the high sampling rate, resulting in improved detection of single trial task activation and resting state networks.

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

Learning Objectives: Having completed this symposium, participants will be able to:

1. Understand the capabilities and limitations of different ultra-high speed fMRI methods, and their hardware requirements;
2. Learn about advantages of high sampling rate for mapping task-induced brain activity, resting state networks and physiological noise; and
3. Have an awareness of statistical analysis approaches that take into consideration autocorrelations in the data and high-frequency physiological noise.

Highly Parallel, High Speed EPI Based Sequences for Improved fMRI and Diffusion Imaging

Lawrence L. Wald, MGH Martinos Center for Biomedical Imaging, Harvard University, Charlestown, USA

Exploring Neuronal Dynamics with Ultrafast MREG

Juergen Hennig, Medical Physics, Department of Radiology, University Hospital Freiburg, Freiburg, Germany

Ultra-Fast Magnetic Resonance Inverse Imaging of the Human Brain: Methodology and Applications

Fa-Hsuan Lin, Institute of Biomedical Engineering, National Taiwan University, Taipei

Simultaneous Multiplexed EPI for Improved FMRI and Diffusion Imaging

David A. Feinberg, Advanced MRI Technologies, University of California, Berkeley and University of California San Francisco, Sebastopol, USA

The Statistical Analysis of Ultra Fast fMRI Data

Martin Lindquist, Department of Statistics Columbia University, New York, USA

10:00 – 10:45
Ballroom AB, Level 1

Keynote Lecture

Brain Plasticity-Based Therapeutics

Michael Merzenich, University of California – San Francisco, San Francisco, USA

Neuroplasticity-based therapeutics strongly rely on the neurophysiological and brain imaging-based descriptions of neurological abnormalcy as it applies to specific clinical indications. It also provides us with a powerful basis for confirming that a specific therapeutic approach is driving appropriate neurological 'corrections'. A consideration of some of the basic principles guiding this therapeutic approach shall be a lead-in to a specific example (schizophrenia) for which this approach is being applied.

11:00 – 12:30

Oral Sessions

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: Disorders 2

Ballroom AB, Level 1

Chair: Mirella Dapretto, UCLA, Los Angeles, USA

11:00 – 11:15
90 WTh: Widespread brain hyper-connectivity in children with autism

Kaustubh Supekar, Stanford University School of Medicine, Stanford, USA

11:15 – 11:30
78 WTh: Robust prediction of autism diagnosis from brain responses to biological motion

Malin Bjornsdotter, Yale Child Study Center, New Haven, USA

11:30 – 11:45
342 WTh: The neural bases of reversal learning deficits in unmedicated schizophrenia patients

Florian Schlagenhauf, Charité Universitätsmedizin Berlin, Berlin, Germany

11:45 – 12:00
76 WTh: Underconnectivity of STS predicts socio-cognitive deficits in Autism

Kaat Alaerts, Katholieke Universiteit Leuven, Leuven, Belgium

12:00 – 12:15
334 WTh: Aberrant inter-network connectivity reflects anterior insula activity and psychosis in schizophrenia

Andrei Manoliu, Maryland Psychiatric Research Center, University of Maryland, Baltimore, USA

12:15 – 12:30
133 WTh: Altered Resting State Functional Connectivity in the Limbic System in Social Anxiety Disorder

Sheeba Anteraper, MIT, Cambridge, USA

O-W2: Higher Cognitive Functions & Social Neuroscience

Function Hall B, Level 1

Chair: Jennifer Beer, University of Texas at Austin, Austin, TX

11:00 – 11:15
496 WTh: Is it time to say goodbye to the general intelligence factor 'g'?

Adam Hampshire, University of Western Ontario, London, Canada

11:15 – 11:30
405 WTh: Neural Substrate for Adaptive Learning in Dynamic Environments

Chaohui Guo, Zurich University, Zurich, Switzerland

11:30 – 11:45
1100 WTh: Neural Mechanisms of Human Communicative Innovations

Arjen Stolk, Donders Institute, Nijmegen, Netherlands

11:45 – 12:00
421 WTh: Resting State Functional Connectivity Predicts Impulsivity in Economic Decision-making

Nan Li, University of Science and Technology of China, Hefei, China

12:00 – 12:15
451 WTh: The Functional Neuroanatomic Bases of Bilingual Cognitive Control Advantages in Aging

Brian Gold, University of Kentucky, Lexington, USA

12:15 – 12:30
1032 WTh: Functional and Structural Correlates of Social Influence in the Human Brain
Daniel Campbell-Meiklejohn, Aarhus University, Aarhus, Denmark

O-W3: Imaging Genetics and Informatics

Ballroom C, Level 1

Chair: Henrik Walter, Charité – Universitätsmedizin Berlin, Germany

11:00 – 11:15
369 WTh: Increasing Power for Voxel-wise Genome-wide Association Studies
Tian Ge, Fudan University and The University of Warwick, Shanghai, China

11:15 – 11:30
483 MT: A Novel Meta-analytic Approach: Mining Frequent Activation Patterns in Neuroimaging Databases
Julian Caspers, Research Center Jülich, Jülich, Germany

11:30 – 11:45
360 WTh: Genome-wide Association Analysis of Working Memory Brain Activation in a Population-based Sample
Gabriella Blokland, Queensland Institute of Medical Research, Brisbane, Australia

11:45 – 12:00
388 WTh: Relationship of Human Brain Anatomy and Gene Expression: Analysis of Allen Human Brain Atlas Data
Elaine Shen, Allen Institute for Brain Science, Seattle, USA

12:00 – 12:15
386 WTh: Stem-cell Signaling Pathways and Cerebral Aging: Transcriptome-wide Analysis
Peter Kochunov, Maryland Psychiatric Research Center, Baltimore, USA

12:15 – 12:30
826 MT: High Resolution Reference Atlases of Pre-natal Human Brain
John Hohmann, Allen Institute for Brain Science, Seattle, USA

O-W4: Physiology, Metabolism and Neurotransmission

Function Hall A, Level 1

Chair: Biyu Jade He, NIH/NINDS, Bethesda, USA

11:00 – 11:15
1001 WTh: Low Frequency Oscillations Measured in the Periphery are Strongly Correlated with Cerebral Signals
Yunjie Tong, Mclean Hospital, Harvard University, Belmont, USA

11:15 – 11:30
729 WTh: Reduced GABA in the Visual Cortex of Patients with NF1 — A New Perspective on the Disease Mechanism
Ines Violante, University of Coimbra — Ibili, Portugal

11:30 – 11:45
986 WTh: Energetic Basis of Spontaneous Fluctuations in Neuronal Activity and Neuroimaging Signals
Fahmeed Hyder, Yale University, New Haven, USA

11:45 – 12:00
719 MT: Metabolic and Hemodynamic Differences Among Resting-State Brain Networks
Ai-Ling Lin, University of Texas Health Science Center at San Antonio, San Antonio, USA

12:00 – 12:15
990 WTh: Spatiotemporal Characteristics of Cortical Column-specific and -nonspecific BOLD and CBV fMRI Signal
Chan Hong Moon, University of Pittsburgh, Pittsburgh, USA

12:15 – 12:30
994 WTh: Acute and Chronic Effects of Glucose on Brain Metabolism
Hao Huang, University of Texas Southwestern Medical Center, Dallas, USA

12:30 – 13:30

Lunch – Cafeteria Open

13:30 – 14:15
Function Hall B, Level 1

Interactive Poster (I-Poster) Presentations

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts in a short, "datablitz" format. The objective of the I-Poster session is to arrive at a hybrid of posters and oral sessions.

Moderator: Nathalie Tzourio-Mazoyer, CEA – CNRS – Université Bordeaux Ségalen 6, Bordeaux, France

13:30 – 13:35
8 MT: Tract-Specific Study of Semantic, NonFluent and Logopenic Variants of Primary Progressive Aphasia
Caroline Brun, University of Pennsylvania, Philadelphia, USA

13:35 – 13:40
83 WTh: Neural Correlates of Empathy for Social Pain in Autism
Soeren Krach, Philipps-University, Marburg, Germany

13:40 – 13:45
239 WTh: Changes on Gray Matter Density and Cortical Thickness in Postlingual Deaf by CCA and jICA
Eunkyung Kim, Seoul National University, Seoul, Republic of Korea

13:45 – 13:50
223 WTh: Negative Affect and Neural Response to Taste in Bulimia Nervosa: Activation and Connectivity
Cara Bohon, University of California – Los Angeles, Los Angeles, USA

13:50 – 13:55
265 WTh: Neuromelanin MR Imaging: Detection of Locus Coeruleus Using T1 Weighted Gradient Echo Imaging
Sinyeob Ahn, Georgia Institute of Technology/Emory University, Atlanta, USA

13:55 – 14:00
343 WTh: Aberrant Intrinsic Networks in Schizophrenia and Bipolar Disorder in An Auditory Oddball Task
JING SUI, The Mind Research Network, Albuquerque, USA

14:00 – 14:15
Discussion

13:30 – 15:30
Plenary Hall AB, Level 4

Poster Session

Poster #'s 2-1106 WTh: Even numbered posters stand-by

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

Disorders of the Nervous System: Addictions, Autism, Developmental Disorders, Mood and Anxiety Disorders, Obsessive-Compulsive Disorder and Tourette Syndrome, Other Disorders, Parkinson's Disease and Movement Disorders, Schizophrenia and Psychotic Disorders, Sleep Disorders

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

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

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

Informatics: Atlases, Databasing and Data Sharing, Pipelines

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

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

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

Social Neuroscience: Self Processes, Social Cognition, Social Interaction

15:45 – 17:00
Ballroom AB, Level 1

Symposium

Cracking the Columnar-Level Code in the Visual Cortex with Ultra-High Field fMRI

Chair: Rainer Goebel, Maastricht Brain Imaging Center, Maastricht University, Maastricht, Limburg, Netherlands

In many regions of the cortex, neuronal response properties remain relatively constant as one moves perpendicular to the surface of the cortex, while they vary in a direction parallel to the cortex. Such columnar organization is particularly evident in the visual system subdividing cortical territory in basic functional units reflecting essential feature representations. Understanding these detailed functional organizations at sub-millimeter resolution is at the heart of understanding human behavior and cognition. Ultra-high magnetic field scanners (7 Tesla and higher) have the potential to improve spatial resolution and contrast specificity of functional brain imaging far beyond the possibilities at lower field strengths. This allows unprecedented investigation of functional properties and organizations of the human brain at the level of cortical columns and cortical layers. Recent human fMRI studies at 7 Tesla have indeed been able to reveal columnar-level organizations in the visual areas V1 and V5 that match results obtained in animal studies using optical imaging and electrode recordings. These studies are the beginning of an attempt to unravel the specific columnar-level feature representations in many specialized areas of the human cortex. In combination with high-resolution structural and functional connectivity studies, columnar-level mapping may eventually reveal how complex representations emerge from combinations of more simple features along the visual hierarchy. Besides ultra-high field scanners, the decoding of hitherto unknown columnar-level feature representations requires special experimental paradigms, modeling and advanced analysis methods. If successful, this approach will lead to a deeper understanding of how mind emerges from simpler units in the brain.

Learning Objectives: Having completed this symposium, participants will have:

1. Learned why revealing columnar-level feature representations is essential for a deeper understanding of brain function;
2. Learned essential information about methodological approaches that push the limits of ultra-high field MRI towards columnar-level, sub-millimeter functional imaging; and
3. Detailed knowledge about recent ultra-high field fMRI studies revealing columnar-level organizations in early and mid-level human visual cortex.

Columnar Organization of Object Features in Monkey Inferior Temporal Cortex

Keiji Tanaka, Riken, Cognitive Brain Mapping Laboratory, Saitama, Japan

Sub-Millimeter Functional MRI at 7 Tesla: Possibilities and Challenges

David Norris, Donders Centre for Cognitive Neuroimaging, Nijmegen, Netherlands

Mapping Columnar-Level Organizations in Human Early Visual Areas with Ultra-High Field fMRI

Essa Yacoub, Center for Magnetic Resonance Research, Department of Radiology University of Minnesota Medical School, Minneapolis, Minnesota, USA

Strategies for Mapping Unknown Feature Representations in Specialized Mid-Level Areas of the Human Visual Cortex

Rainer Goebel, Maastricht Brain Imaging Center, Maastricht University, Maastricht, Limburg, Netherlands

17:15 – 18:00
Ballroom AB, Level 1

Keynote Lecture

Networks of Anatomical Covariance

Alan Evans, McGill University, Montreal, Canada

The investigation of brain connectivity using either functional (fMRI,PET) or white matter (DTI, DSI) metrics is now widespread. This talk will explore the potential for revealing brain connectivity via covariance of grey matter metrics (cortical thickness, cortical volume, grey matter density) in human development, disease and in rodent models.

18:15 – 18:45
Ballroom AB, Level 1

Town Hall Meeting

All OHBM meeting attendees are encouraged to participate in this open forum; where you will have an opportunity to ask questions and give the OHBM leadership feedback. Updates on future meeting sites and Council elections will be presented.

21:00 - 1:00

Club Night: LAN Club

4/F Twin Tower, B12 Jianguomen Waidajie, Beijing, China

The LAN Club Beijing is located at Twins Plaza on Chang'an St. near the Wangfujing Shopping and Business area in the west. The open design of the LAN Club is very functional, and includes a luxurious central dining hall, elegant wine corridor, comfortable cigar bar, dazzling oyster bar, Four-country area full of colorful diversity, a distinct banquet hall and romantic VIP rooms. The entire space is filled with an artistic soul, giving people an exclusive experience with a strong artistic appeal. There will be a band and a DJ who will play dance music throughout the evening. The party is complimentary to registrants. **Please make sure to bring your ticket to the LAN Club.** Additional guest tickets are $50.00.

Please note that transportation will be provided to Club Night. Buses will start departing from the CNCC main entrance at 8:00 pm, with the last bus departing at 10:00 pm. We do advise getting on the transportation early, it can take an hour to get to the LAN Club. Buses will start departing the LAN Club at 11:00 pm with the last bus departing at 1:00 am. Buses will drop off at the OHBM group hotels. If you choose to take the subway, please stop at the registration desk for subway directions.

8:30 – 9:45
Function Hall A, Level 1

Morning Workshop

The Unbearable Inseparability of Brain and Body: Peripheral Physiology in Functional Neuroimaging

Chair: Richard D. Lane, University of Arizona, Department of Psychiatry, Tucson, USA

When peripheral physiological measures are incorporated in neuroimaging research, they are typically used to eliminate physiological artifact or validate experimental tasks. However, the brain is the critical organ that regulates autonomic, endocrine, and immune function in the body based on environmental demands, and functional neuroimaging represents an unprecedented opportunity to understand the mechanisms underlying brain-body interactions in health and disease. The four presenters highlight unique, complementary aspects of this emerging area of study. The first talk will address brain systems for translating conceptual meaning into physiological responses, using social evaluative threat and cardiovascular activity as a model paradigm. The second talk will focus on decision making, demonstrating that cardiovascular responses in the context of uncertainty are represented in the brain and that bodily responses are modulated based on the results of previous decisions. The third talk will draw upon functional neuroimaging and lesion data in temporal lobe epilepsy to demonstrate the role of emotional arousal (as measured by electrodermal activity) and valence (as measured by EMG startle) in hippocampal-amygdala interactions during emotional memory encoding. The fourth talk will demonstrate a reversal in the correlation between medial prefrontal activity and cardiac vagal tone as depressed patients improve with antidepressant treatment, suggesting a normalization of medial visceromotor network dysfunction associated with depression. Although research of this type is relatively new, the range of methods, varied contexts of research and convergence of findings support the bidirectional nature of brain-body interactions and the importance of more broadly considering peripheral physiology in functional neuroimaging research.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Describe how peripheral physiology expands understanding of the neural basis of threat evaluation, decision making during uncertainty, emotional memory encoding and treatment of clinical depression; and
2. Become acquainted with the variety of peripheral recording methods and data analytic strategies available in the neuroimaging context.

The Brain's Meaning System: Cortical-Brainstem Pathways for Translating Conceptual Information into Autonomic Arousal

Tor Wager, University of Colorado, Boulder, USA

Brain-Body Interactions in Emotional Decision Making

Hideki Ohira, Nagoya University, Department of Psychology Furo-cho, Chikusa-ku, Nagoya, Aichi, Japan

Brain-Body Interactions in Emotional Memory

Mats Fredrikson, Upsala University, Department of Psychology, Uppsala, Sweden

Medial Visceromotor Network Dysfunction in Major Depression Is Normalized with Sertraline Treatment

Richard D. Lane, University of Arizona, Department of Psychiatry, Tucson, USA

8:30 – 9:45
Function Hall B, Level 1

Morning Workshop

Connecting Consciousness and Connectivity

Chair: Eus J.W. Van Someren, Department Sleep & Cognition, Netherlands Institute for Neuroscience, Amsterdam, The Netherlands

After having been confined to the realm of philosophy for long, the most remarkable property of the human brain, consciousness, has recently entered the arena of neuroimaging. Supported by theoretical and computational foundations, the study of consciousness is no longer taboo in neuroscience. On the contrary, scholars with an interest in consciousness now reach top-ranking scientific journals with human brain imaging studies that demonstrate how network connectivity determines consciousness. The symposium integrates several brain imaging modalities, theory, health and disease. Giulio Tononi introduces the theoretical, computational and functional anatomical considerations that underlines the necessity of studying brain network connectivity in order to understand consciousness. Steven Laureys shows how slow oscillations of the BOLD fMRI signal in intrinsic connectivity networks determines whether awareness is directed inward or to the environment. He moreover discusses how structural and functional connectivity determines the remaining level of consciousness in non-communicative brain-damaged patients. Eus Van Someren discusses how brain network connectivity during sleep determines what is accessible to conscious memory the next day. The lecture includes a recent MEG study that for the first time in humans demonstrates memory trace reactivation to occur during sleep, in coupling of neuronal oscillations over distant cortical areas. Marcello Massimini shows how TMS in combination with HD-EEG can be applied to step up from analyses of functional connectivity to the essential experimental studies on effective connectivity in order to understand consciousness. Topics of all other lectures converge in this concluding lecture, including theoretical models, disease and vigilance states.

Learning Objectives:

1. To provide a theoretical background on the neural correlates consciousness;
2. To illustrate how different human brain imaging modalities now allow us to address the neural correlates of consciousness; and
3. To demonstrate how state-of-the-art brain network connectivity analyses help us understand consciousness in healthy and disordered vigilance states ranging from alert wakefulness to lapses of attention, sleep and the vegetative state.

Connecting Consciousness and Connectivity

Melanie Boly, University of Liege, Liege, Belgium

Connectivity Reflects Consciousness in Brain-Damaged Patients

Andrea Soddu, University of Liege, Liege, Belgium

Memory Traces of Wake Connectivity in the Sleeping Human Brain

Eus Van Someren, Dept. Sleep & Cognition, Netherlands Institute for Neuroscience, Amsterdam, The Netherlands

Effective Connectivity Throughout Vigilance States

Marcello Massimini, Department of Clinical Sciences, Universita degli Studi di Milano, Ospedale Luigi Sacco, Milan, Italy

8:30 – 9:45
Ballroom AB, Level 1

Morning Workshop

Where's Your Signal? Explicit Spatial Models to Improve Interpretability and Sensitivity of Neuroimaging Results

Chair: Thomas E. Nichols, Dept of Statistics, Warwick Manufacturing Group, Warwick University, Coventry, UK

A typical fMRI study is a massive endevour: 100's of man-hours to prepare paradigms and train subjects; costly scanner time; and laborious data analysis to process gigabytes of image data. Yet the crucial result of a study is a list of x,y,z atlas coordinates of activation, a dataset that can be recorded on a Post-it note. Indeed, this coordinate list is the only information incorporated into a typical meta-analysis. Given the vital importance of these x,y,z coordinates, why are they never reported with confidence intervals? Wouldn't we expect some tasks to produce activation with greater spatial variability than others types of tasks? The problem is that, until very recently, there simply were no methods to quantify the uncertainty in the spatial location of activations.

The purpose of this workshop is to review the emerging work in the explicit spatial modeling of neuroimaging data. Thomas Nichols will provide a short overview, itemizing the limitations of standard mass univariate models and reviewing the potential of spatial models. Alexis Roche will then discuss a model selection approach to fMRI that uses a hierarchical spatial generative model, resulting in inference on a network of regions while accounting for uncertainty in location. Timothy Johnson will a present point process model for meta-analysis and multiple sclerosis lesion data; in addition to be more interpretable, this model provide superior classification performance relative to univariate (Naive Bayes) methods. Finaly, Sam Gershman will show how cognitive scientists are using spatial models with fMRI, with work that uses latent topographic sources to decode semantic representations during a memory task.

Learning Objectives: Having completed this workshop, participants will be able to:

1. Have an understanding of the limitations of mass-univariate modeling, the types of inferences they cannot deliver, and how spatial models can overcome some of these shortcomings; and
2. Identify neuroimaging data that is comprised of point patterns (instead of images), and the type of model best suited for point pattern data.

What the Mass Univariate Model Doesn't Tell You

Thomas E. Nichols, Dept of Statistics, Warwick Manufacturing Group, Warwick University, Coventry, UK

Bayesian Model Selection Under Spatial Uncertainty for Functional Imaging Studies

Alexis Roche, CIBM-Siemens, Ecole Polytechnique Fédérale (EPFL), Lausanne, Switzerland

Bayesian Spatial Point Process Modeling of Neuroimaging Data

Timothy D. Johnson, Department of Biostatistics, University of Michigan, Ann Arbor, USA

New Tools for Tracking the Dynamics of Mental Representations

Sam Gershman, Department of Psychology, Princeton University, Princeton, USA

8:30 – 9:45

Ballroom C, Level 1

Morning Workshop

Attention and Expectation in Human Visual Perception

Chair: Floris de Lange, Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

Perception is not merely a passive process of accumulation of sensory evidence, but rather is strongly influenced by the 'top-down' influence of internal brain states, incorporating our goals, expectations, and knowledge about the world.

Research into the neural mechanisms by which top-down information shapes perception has expanded rapidly over past decades. However, many conceptual issues still remain open. One of the most pressing of these concerns the interrelationship between two important concepts: attention, relating to the relevance of a stimulus for the task at hand, and expectation, relating to the likelihood that it will occur. These two concepts are often conflated and confounded, such as when spatial attention is guided with a probabilistic cue. Nevertheless, in real life both expected and unexpected events may be task-relevant. Recently, empirical findings have emerged that characterize the complex relationship between attention and expectation. In this symposium we review these recent developments, which are rooted in computational modeling, neuroimaging (EEG/MEG and fMRI), and psychophysics.

We will provide a variety of perspectives, each based on novel conceptual frameworks and experimental approaches. Peelen will illustrate the richness of attentional mechanisms that facilitate visual perception of naturalistic scenes. Muckli will describe expectation-related contextual top-down signals in the primary visual cortex. Then, de Lange will report a neural dissociation between the top-down effects of expectation and attention, in terms of sharpening of sensory responses. Finally, Summerfield will address how relevance and probability may have different effects on brain and behavior, using novel signal detection and reverse correlation techniques.

Learning Objectives: This workshop will:

1. Review novel insights into the working mechanisms of top-down influence on perception and cognition; and
2. Explain how attention and expectation, which are traditionally conflated, are conceptually, behaviorally and neurally, distinct.

The Neural Basis of Attentional Selection from Natural Scenes

Marius Peelen, CIMeC, Rovereto, Italy

Context Feeding Back to V1

Lars Muckli, Glasgow University, Psychology Department, Glasgow, UK

Dissociable Influences of Prior Probability and Relevance on Visual Detection Sensitivity

Chris Summerfield, Oxford University, Wadham College, Oxford, UK

Expectation Sharpens Representations in Early Sensory Cortex

Floris de Lange, Radboud University Nijmegen, Donders Institute for Brain, Cognition and Behavior, Nijmegen, Netherlands

10:00 – 10:45
Ballroom AB, Level 1

Keynote Lecture:

Meta-Analytic Modeling of Human Neural Systems: Data-Driven Hypothesis Generation

Peter Fox, University of Texas Health Science Center at San Antonio, San Antonio, USA

Stereotactic coordinates provide a standard framework for reporting structural and functional neuroimaging results. Widespread adoption of this standard has created an extensive, diverse literature uniquely well-suited for large-scale data mining. In response, a family of statistical methods for coordinate-based meta-analysis (CBMA) have been developed. Collectively, CBMA methods provide data-driven hypothesis generation and neural system modeling, including emergent properties (e.g., meta-analytic connectivity maps). A particularly powerful application of CMBA is creation of models for constrained exploration of new primary data sets.

10:45 – 11:30
Function Hall B, Level 1

Interactive Poster (I-Poster) Presentations

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts in a short, "datablitz" format. The objective of the I-Poster session is to arrive at a hybrid of posters and oral sessions.

Moderator: Nathalie Tzourio-Mazoyer, CEA – CNRS – Université Bordeaux Ségalen 6, Bordeaux, France

10:45 – 10:50
170 WTh: COMT Val158Met and Life Stress Load Interact with Hippocampal Volume and Connectivity
Ulrich Rabl, Medical University of Vienna, Vienna, Austria

10:50 – 10:55
330 WTh: Less Efficiency of Information Transfer in Cys-allele Carriers of DISC1: A DMRI Brain Network Study
Yonghui Li, Queensland Brain Institute, Brisbane, Australia

10:55 – 11:00
432 WTh: Optimal Experimental Design for Economic Decision Making
Kerstin Preuschoff, Laboratory of Computational Neuroscience, Lausanne, Switzerland

11:00 – 11:05
402 WTh: Beta-band Modulation and Motor-Related Decision Making in the Human Brain: Correlation and Causation
Ian Gould, University of Oxford, Oxford, UK

11:05 – 11:10
472 WTh: Surprise and Error: Common Neuronal Architecture for the Processing of Errors and Novelty
Jan R. Wessel, University of California, San Diego, La Jolla, USA

11:10 – 11:15
490 WTh: Hippocampus Size Predicts Fluid intelligence in Musically Trained People
Mathias S. Oechslin, FPSE, Geneva, Switzerland

11:15 – 11:30
Discussion

10:45 – 12:45
Plenary Hall AB, Level 4

Poster Session

Poster #'s 1-1107 WTh: Odd numbered posters stand-by

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

Disorders of the Nervous System: Addictions, Autism, Developmental Disorders, Mood and Anxiety Disorders, Obsessive-Compulsive Disorder and Tourette Syndrome, Other Disorders, Parkinson's Disease and Movement Disorders, Schizophrenia and Psychotic Disorders, Sleep Disorders

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

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

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

Informatics: Atlases, Databasing and Data Sharing, Pipelines

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

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

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

Social Neuroscience: Self Processes, Social Cognition, Social Interaction

12:45 – 13:45

Lunch – Cafeteria Open

14:00 – 15:30

Oral Sessions

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: Brain Stimulation Methods

Function Hall B, Level 1

Chair: Peter Dechent, MR-Research in Neurology and Psychiatry, Department of Cognitive Neurology, University Medicine, Goettingen, Germany

14:00 – 14:15
25 WTh: Role of Interhemispheric Connectivity in the auditory network: a combined TMS and fMRI study
Jamila Andoh, Montreal Neurological Institute, Montreal, Canada

14:15 – 14:30
4 WTh: Default Mode Network Functional Structure Predicts Treatment Response of Deep Brain Stimulation
Alexandre Franco, Pontifícia Universidade Católica do Rio Grande do Sul, Porto Alegre, Brazil

14:30 – 14:45
16 WTh: Modulation of resting state and task-related activity induced by dual motor cortex stimulation
Robert Lindenberg, Charite University Medicine, Berlin, Germany

14:45 – 15:00
33 WTh: MEP predicts motor recovery in chronic stroke patients undergoing 4-weeks of daily physical therapy
Fabricio Lima Brasil, Max Planck Research School – University of Tübingen, Tübingen, Germany

15:00 – 15:15
119 MT: Daily tDCS induces persistent functional and structural cortical changes in chronic stroke patients
Ugwechi Amadi, University of Oxford, Oxford, UK

15:15 – 15:30
12 WTh: Transcranial Direct Current Stimulation (tDCS) Modulates Connectivity in Human Attention Networks
Peter Dechent, MR-Research in Neurology and Psychiatry, Department of Cognitive Neurology, University Medicine, Goettingen, Germany

O-Th2: Imaging Methods

Ballroom AB, Level 1

Chair: Timothy Q. Duong, University of Texas Health Science Center at San Antonio, San Antonio, USA

14:00 – 14:15
706 WTh: 'Investigating the Temporal Dynamics of Resting State Connectivity with MEG'
Adam Baker, University of Oxford, Oxford, UK

14:15 – 14:30
534 WTh: Human Cortical Layers Detected with High Resolution Diffusion MRI at 9.4T
Alard Roebroeck, Maastricht University, Maastricht, Netherlands

14:30 – 14:45
665 WTh: In Vivo Human Brain Measurements of Axon Diameter Using 300 mT/m Maximum Gradient Strengths
Jennifer McNab, A.A. Martinos Center for Biomedical Imaging, Charlestown, USA

14:45 – 15:00
792 WTh: Quantification of Dopamine in the Human Striatum in Anatomical and Connectivity Derived Subdivisions
Andri Tziortzi, University of Oxford, Oxford, UK

15:00 – 15:15
653 WTh: Automatic HARDI White Matter Tract Labeling with Multiple Atlas Fusion
Yan Jin, University of California, Los Angeles, Los Angeles, USA

15:15 – 15:30
595 WTh: Resting State fMRI Predicts Task Activation of Individual Subjects
Prantik Kundu, NIMH, Bethesda, USA

O-Th3: Learning and Memory

Ballroom C, Level 1

Chair: Susan Bookheimer, University of California – Los Angeles, Los Angeles, USA

14:00 – 14:15
845 WTh: Increased Functional Connectivity Between Hippocampus and Striatum During Memory Consolidation
Daniel Woolley, KU Leuven, Leuven, Belgium

14:15 – 14:30
836 WTh: Sub-Regions in Human Entorhinal Cortex are Domain-Sensitive
Heidrun Schultz, Department of Systems Neuroscience, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

14:30 – 14:45
887 WTh: Influence of Acute Bouts of Submaximal Exercise on Working Memory: An fMRI – Study
Karl Koschutnig, Karl-Franzens University, Graz, Austria

14:45 – 15:00
829 WTh: The Role of Classical Speech Areas in Auditory Long-term Memory
Anke Karabanov, Danish Research Center for Magnetic Imaging, Copenhagen, Denmark

15:00 – 15:15
870 WTh: Hippocampal and Prefrontal Reorganization is Associated with the Maturation of Fact Retrieval
Shaozheng Qin, Stanford University, Stanford, USA

15:15 – 15:30
842 WTh: Posterior Hippocampus and Fornix Contributes to Long-Term Memory Consolidation of Contextual Memory
Sicong Tu, Neuroscience Research Australia, Sydney, Australia

O-Th4: Lifespan Trajectories

Function Hall A, Level 1

Chair: Simon Eickhof, Institute for Clinical Neuroscience, HHU Düsseldorf, Düsseldorf, Germany

14:00 – 14:15
915 WTh: Responsiveness to Missed Chances in Successful Aging

Stefanie Brassen, University Medical Center Hamburg-Eppendorf, Hamburg, Germany

14:15 – 14:30
956 WTh: Individual Change Patterns in Elderly and the Structural Covariance of Decline

Gabriel Ziegler, Jena University Hospital, Jena, Germany

14:30 – 14:45
955 WTh: Differential Lifespan Trajectories and Associations of Human Brain Structure and Function

Juan Zhou, Duke-NUS Graduate Medical School, Singapore, Singapore

14:45 – 15:00
945 WTh: Supervisory Experience in Midlife Slows Rate of Hippocampal Atrophy in Late Life

Chao Suo, UNSW, Randwick, Australia

15:00 – 15:15
922 WTh: Sex and Age Effects on Grey Matter Loss in Late Life – A Longitudinal Study of 1172 Healthy Elderly

Fabrice Crivello, GIN, UMR5296 CNRS-CEA-Bordeaux University, Bordeaux, France

15:15 – 15:30
919 WTh: Dopamine Modulates Episodic Memories in Old Age

Rumana Chowdhury, Institute of Cognitive Neuroscience, London, UK

15:45 – 16:45
Ballroom AB, Level 1

Closing Comments and Meeting Highlights

Heidi Johansen-Berg, University of Oxford, Oxford, UK

ACTIVITIES DISCLOSURE STATEMENTS

CME ACTIVITIES SPEAKER DISCLOSURE STATEMENTS

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

NAME	COMMERCIAL INTEREST	WHAT WAS RECEIVED	FOR WHAT ROLE?
Ed Bullmore	Glaxo Smith Kline	Salary, Stock	Employee
Alan Evans	1. Biospective 2. Pfizer 3. J&J	1. Salary 2. Honorarium 3. Honorarium	1. Consulting 2. Speaking 3. Consulting
Bryan Guillaume	GlaxoSmithKline	Salary	Employment
Heidi Johansen-Berg	Elsevier	Royalties	Book editor
John Krakauer	Forrest Pharmaceuticals/Tibion	Honorarium/Honorarium	Consultant/Speaker
Michael Merzenich	Posit Science Corporation and Brain Plasticity Institute	Stockholder	Founder
Alexis Roche	1. Siemens 2. Human Genome Sciences, Inc. 3. AMGEN	Salary	Employee
Hartwig Roman Siebner	NeuroImage (Elsevier Publishers)	Honorarium	Handling Editor
Bertrand Thirion	Sanofi-Aventis	Salary	Employee
Giulio Tononi	Philips Respironics	Consulting, Grant	PI Grant, Consultant
Robert Turner	Siemens AG	Honorarium	Speaker
Andri Tziortzi	GlaxoSmithKline	BBSRC/GSK industrial case studentship	DPhil student at the University of Oxford
Lawrence Wald	Siemens Healthcare	Research Support	Contract Research
Nikolaus Weiskopf	Siemens Healthcare	n/a	Institutional Research Agreement

CME ACTIVITIES PROGRAM PLANNING MEMBERS DISCLOSURE STATEMENTS

Please note: Program Planning Members not listed below have nothing to disclose.

NAME	COMMERCIAL INTEREST	WHAT WAS RECEIVED	FOR WHAT ROLE?
Heidi Johansen-Berg	Elsevier	Royalties	Book editor
Andreas Meyer-Lindenberg	1. Alexza Pharmaceuticals, Inc. 2. Astra Zeneca 3. Bristol-Myers Squibb 4. H. Lundbeck A/S 5. Hoffmann-La-Roche 6. Janseen Cliag 7. Lilly Deutschalnd GmbH 8. Outcome Europe Sarl 9. Pfizer Pharma GmbH 10. Servier	All Honorarium	1. Consultant 2. Speaker, Advisory Board 3. Speaker 4. Speaker 5. Advisory Board 6. Speaker 7. Speaker 8. Advisory Board 9. Speaker 10. Speaker

ABSTRACT DISCLOSURE STATEMENTS

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

POSTER #	FIRST AUTHOR DISCLOSURE STATEMENT	CO-AUTHOR DISCLOSURE STATEMENT
11 MT	NIH grant 5-K23-AG-028018-0 NIH grant 5-P30-AG-010124-20 NIH grant K25 AG027785 Penn-Pfizer Alliance grant 10295 NIH grant 1R01-AG037376-01	No Disclosure
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19 MT	This study was supported in part by research grants from the National Science Council (NSC100-2218-E-010-002).	No Disclosure
33 MT	National Science Foundation of China under grants 30970770 and 60831004 and by the Hundred Talents Programs, Chinese Academy of Sciences	The co-author give me grants and research support
40 MT	SANDRA ROTMAN CHAIR NEUROPSYCHIATRY UNIVERSITY OF TORONTO DEAN'S FUND SCOTTISH RITE CHARITABLE FOUNDATION OF CANADA	No Disclosure
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164 MT	NIH R21DC011074	MBS is supported by NIDCD R01DC000191
183 MT	This research was supported by the Natural Science Foundation of China [grant numbers 31070902] to Qin Zhang.	No Disclosure
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200 MT	National Research Foundation of Korea	No Disclosure
205 MT	National Research Foundation of Korea (NRF)	No Disclosure
208 MT	This work is supported by NSERC and MMSF	No Disclosure

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216 MT	Oxford Centre for Computational Neuroscience, Oxford, UK	No Disclosure
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264 MT	We thank the National Science Council of Taiwan for funding this study, through projects on standard stimuli and normative emotional responses in Taiwan (NSC-97-2420-H-002-220-MY3.The work was also supported by the Ministry of Education, Taiwan, under the Aiming for the Top University Plan at National Taiwan Normal University.	No Disclosure
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357 MT	TThis research was supported by Grants from the National Natural Science Foundation of China (30870761, 31170977) and Excellent Young Scientist Foundation in Institute of Psychology (09CX232023) to Qingfang Zhang.	No Disclosure
358 MT	This work was supported by NIDCD R21DC011074 and R01DC000191.	No Disclosure
364 MT	Financial support by the German Federal Ministry for Education and Research (BMBF) via the Bernstein Focus Neurotechnologie (BFNT) Göttingen (Grant No. 01GQ0812) is gratefully acknowledged.	No Disclosure
367 MT	DIUV 46/2009 and ANILLO ACT79 grants	DIUV 46/2009
370 MT	NSFC (No. 20670530, 60875079, 81070762)	No Disclosure
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395 MT	No Disclosure	This research was supported by NSF IIS-1117335, NIH UL1 RR025761, U01 AG024904, NIA RC2 AG036535, NIA R01 AG19771, and NIA P30 AG10133-18S1 at IU.
396 MT	No Disclosure	This research was supported by NSF IIS-1117335, NIH UL1 RR025761, U01 AG024904, NIA RC2 AG036535, NIA R01 AG19771, and NIA P30 AG10133-18S1 at IU; and by NSF CCF-0830780, CCF-0917274, DMS-0915228, and IIS-1117965 at UTA.
410 MT	The project is funded by InvestNI.	No Disclosure
411 MT	Grant from Neurospin, Paris, France	Grant from Neurospin, Paris, France
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435 MT	UCB Pharma, Dutch Epilepsy Foundation. These sponsors were not involved in data acquisition, analysis, or writing of the results.	No Disclosure
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473 MT	No Disclosure	Ed Bullmore is employed half-time by the University of Cambridge and half-time by GSK.
507 MT	A. Hahn is recipient of a DOC-fellowship of the Austrian Academy of Sciences	This research was funded by grants from the Austrian National Bank (P11468) and Austrian Science Fund (P 23021) to R. Lanzenberger.
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675 MT	All authors are employees of icoMetrix, Belgium.	All authors are employees of icoMetrix, Belgium.
680 MT	This work is supported by NIH grants R01EB009756 and P50NS035902.	No Disclosure
684 MT	This work was supported by the National Basic Research Program of China (973 program, 2011CB707801)	No Disclosure
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890 MT	This work was supported by The Wellcome Trust. The Wellcome Trust Centre for Neuroimaging has a research agreement with Siemens Healthcare	No Disclosure
896 MT	This work was supported by the Wellcome Trust and The Wellcome Trust Centre for Neuroimaging has a research agreement with Siemens Healthcare	For NW please note that The Wellcome Trust Centre for Neuroimaging has a research agreement with Siemens Healthcare
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127 WTh	This research was supported by Basic Science Research Program through the National Research Foundation of Korea(NRF) funded by the Ministry of Education, Science and Technology (2009-0089481)	Co-author, Yoon Ghil Park and Young-Chul Choi was supported by same research fund described above.
134 WTh	Please, see below.	Prof Deakin has carried out consultancy and speaking engagements for Bristol Myers Squibb, AstraZeneca, Eli Lilly, Schering Plough, Janssen-Cilag, and Servier. All fees are paid to the University of Manchester to reimburse them for the time taken. He has share options in P1vital. Prof Anderson has received grant support from AstraZeneca and Servier, consultancy fees/ honoraria for speaking/support to attend conferences from Wyeth, Servier, Eli Lilly, Lundbeck, Prof. Williams receives grant funding from AstraZeneca and has had research grant support from Pfizer and Servier in recent years. Dr Elliott has received consultancy fees from Cambridge Cognition. Dr Arnone has received travel grants from Servier and Jannsen-Cilag. Drs Downey, Juhasz, McKie, Thomas report no relevant financial interest.
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640 WTh	Employed by Siemens Medical Solutions USA Inc., Charlestown, MA, USA.	Keith Heberlein is employed by Siemens Medical Solutions USA Inc., Charlestown, MA, USA.
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Web: www.alltechmed.com

With operations in Cleveland (USA) and Chengdu (China), AllTech Medical Systems (AMS) designs, manufactures, and distributes medical diagnostic Magnetic Resonance Imaging (MRI) products. As a provider of medical imaging technology and product solutions, AMS serves the global MRI market with a state-of-the-art superconducting product family. AMS systems are equipped with multi-channel real-time data acquisition systems, integrated coil solutions, advanced clinical applications, and an intelligent, operator-friendly, graphical user interface and workflow design.

ANT Neuro

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Netherlands
Email: info@ant-neuro.com
Web: www.ant-neuro.com

ANT Neuro – Inspiring technology for the human brain.
ANT Neuro is specialized in the development of cutting-edge yet user-friendly solutions for brain research and diagnostics applications using EEG, MRI, TMS and MEG technology.

Artinis Medical Systems b.v.

Booth #306
St. Walburg 4
Zetten 6671 AS
The Netherlands
Email: askforinfo@artinis.com
Web: www.artinis.com

Artinis makes optical imaging and oxygenation measurements easy and affordable with fit to purpose solutions. Artinis produces flexible, versatile and easily upgradeable equipment like the multichannel Oxymon and also wireless NIRS systems, the PortaMon and PortaLite. These have the size of a cell-phone and can be used inside and outside.

Australasian Cognitive Neuroscience Society

Booth #208
Queensland Brain Institute, University of Queensland
Brisbane, Queensland 4072
Australia
Email: r.cunnington@uq.edu.au
Web: www.acns.org.au

ICON-2014 International Conference on Cognitive Neuroscience will be hosted in Brisbane, Austraila, 28-31 July 2014, organizes by the Australasian CognitiveNeuroscience Society (www.acns.org.au). Hope to see you there!!

Avotec, Inc.

Booth #201
603 MW Buck Hendry Way
Stuart, Florida 34994
USA
Email: paul@avotecinc.com
Web: www.avotecinc.com

Avotec is introducing a new line of Silent Vision fiber optic glasses that provide coverage for all types of head coils. We will also be introducing our mini projector system MP-1001. The MP-1001 accepts direct VGA (800x600) or NTSC/PAL inputs for a truly affordable visual presentation system.

Beijing Psyche-Ark 1, Science Technology Development Co. Ltd

Booth #106
Floor 5, Unit 1, Section 4, Xianfeng Plaza, No. 7 Kaituo Road,
Shangdi, Haidian District
Beijing 100085
China
Email: duanhf@xlfz.cn
Web: www.xlfz.cn

Psyche-Ark is a software company, which offers innovative and convenient softwares for domestic users in the field of psychology.

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BESA GmbH

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Web: www.besa.de

BESA Research, BESA Statistics and BESA MRI are products of the BESA GmbH, the leading innovators in digital EEG and MEG software for research and clinical applications. BESA offers data analysis from preprocessing to source coherence, advanced imaging and coregistration with individual MRI data as well as cross-subject statistics.

Brain Innovation BV

Booth #100;102
Universiteitssingel 40
Maastricht, Limburg 6229 ER
The Netherlands
Email: sales@BrainVoyager.com
Web: www.BrainVoyager.com

Brain Innovation fulfills all your needs for multi-modal – fMRI/MRI, DTI, TMS, EEG/MEG, NIRS – brain imaging research. The comprehensive and user-friendly neuroimaging software tools of the BrainVoyager Family are running on many computer platforms ranging from mobile devices up to powerful multi-processor workstations. Visit our exhibition on OHBM2012 conference.

Brain Products

Booth #301;303
Zeppelinstrasse 7
Gilching 82205
Germany
Email: office@brainproducts.com
Web: www.brainproducts.com

Brain Products is a leading manufacturer of solutions (amplifier systems, sensors, electrode caps, software & accessories) for neurophysiological research. Served applications: BCI, EEG & fMRI, ERP/EP, EEG & MEG, EEG & TMS and Sleep. At HBM we present e.g. the new actiCHamp research amplifier and a wireless EEG system.

Cambridge Research Systems

Booth #103
80 Riverside Estate, Sir Thomas Longley Road
Rochester, Kent ME24BH
United Kingdom
Email: enquiries@crsltd.com
Web: www.toolsforfmri.com

Cambridge Research Systems works collaboratively with academic partners to offer a single source solution for all your functional MRI requirements. Our products include: BOLDscreen LCD Monitors, Video Eye Tracking Equipment, Behavioural Response Devices, Goggles, Glasses, Memory Foam Pads for Patient Comfort and Analysis/Visualisation Tools (BrainVoyager).

Cedrus Corporation

Booth #210
PO Box 6309
San Pedro, CA 90734
USA
Web: www.cedrus.com

Cedrus Corporation sells SuperLab stimulus presentation software for Mac and PC. We also offer fMRI response pads which are compatible with SuperLab, E-Prime, and Presentation. SuperLab and Lumina were developed to satisfy the requirements of both clinical and research fields. Please stop by our booth for a free demo see the different Lumina response pad models.

Compumedics Neuroscan

Booth #202
30-40 Flockhart St, Abbotsford
Melbourne, Victoria 3067
Australia
Email: marketing@compumedics.com.au
Web: www.compumedics.com

Established in 1987, Compumedics is a global technology leader in computer-based patient monitoring and diagnostic systems. Compumedics Neuroscan provides complete solutions for a wide range of Neuroscience applications. Neuroscan is dedicated to developing the most sophisticated tools for the investigation of the central nervous system. Compumedics has direct offices in Australia, USA, Asia and Germany and a global network of distributors.

Electrical Geodesics, Inc. (EGI)

Booth #311;309
1600 Millrace Drive, Suite 307
Eugene, OR 97403
USA
Email: info@egi.com
Web: www.egi.com

EGI offers products for neuroscience research, clinical neurology, and neurosurgery applications for neonates through adults. Products include standard desktop and portable sysmtes with 32, 64, 128, or 256 channels, EEG/fMRI recording, BCI research, sensor registration physiology measures, eye tracking, integrated EEG/ERP analysis, and electrical source estimation.

Elekta Oy

Booth #105
Siltasaarenkatu 18-20
Helsinki 00530
Finland
Web: www.elekta.com

Elekta Neuromag is the global leader in advanced, whole-cortex magnetoencephalography (MEG) instrumentation. MEG is the only completely non-invasive technology to map activity within the human brain with millimeter-millisecond resolution. Clinically, MEG is finding broad acceptance for presurgical planning, especially for epilepsy. In neuroscience, it continues to offer unique insights.

Elsevier

Booth #112
Radarweg 29
Amsterdam 1043 NX
The Netherlands
Web: www.elsevier.com

Elsevier/Academic Press publishes innovative book, journal, and solutions for neuroimaging research. Stop by our booth and demo our new MRI Atlas NeuroApp for iPad! Or browse our new and bestselling books and enjoy a 20% meeting discount.

g.tec Guger Technologies OG

Booth #305
Sierningstrasse 14
Schiedlberg 4521
Austria
Email: office@gtec.at
Web: www.gtec.at

g.tec is a growing enterprise that developed the first commercially BCI system and a 256 channel biosignal amplifier for invasive and non-invasive measurements of brain functions and sells these systems in more than 60 countries worlwide.

GE Healthcare

Booth #200
NO.1 Yongchang North Road Beijing Economic & Technology
Beijing 100176
China
Web: www.gehealthcare.com

GE Healthcare provides transformational medical technologies and services that are shaping a new age of patient care. Our expertise in medical imaging and diagnostics is helping clinicians around the world re-imagine new ways for their patients.

Hitachi Medical Corporation

Booth #209
18F, Akihabara UDX, 4-14-1 Soto-Kanda
Chiyoda-hu, Toyko 101-0021
Japan
Web: www.hitachi-medical.co.jp/english/index.html

Hitachi's Optical Topography System measures and visualizes changes in hemoglobin levels in the cerebral cortex during functional activity. This system illuminates the surface of the brain with near-infrared light and detects changes in oxy-/deoxyhemoglobin concentrations by calculating the specific absorption of near-infrared light. This technology opens a new way to assessing the brain.

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Human Connectome Project (HCP)

Booth #206
Box 8108, 660 S. Euclid Ave
Saint Louis, MO 63110
USA
Web: humanconnectome.org

The Human Connectome Project (HCP) aims to comprehensively map long-distance brain connections and variability in 1,200 healthy adults. Using cutting-edge neuroimaging and extensive behavioral and heritability measures, the HCP will provide freely available data and tools for analysis, data mining, and visualization to advance understanding of brain circuitry in humans.

Institute of Automation, CAS

Booth # 204
Beijing
China
Web: www.ccm.org.cn

To promote the Brainnetome project, including the goal, methodology, toolkits and state of the art progress, and appeal more comprehensive collaborations from multidisciplinary fields.

John Wiley & Sons

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Wiley-Blackwell, the scientific, technical, medical, and scholarly publishing business of John Wiley & Sons, is the world's leading society publisher and offers peer-reviewed primary research across thousands of online journals, books, reference works, and databases.

LOCALITE GmbH

Booth #111
Schloss Birlinghoven
Sankt Augustin D-53757
Germany
Email: info@localite.de
Web: www.localite.de

LOCALITE was spin off from the Fraunhofer Institute FIT in 1999 and has since established itself as a strong supplier of medical navigation systems all over the world. The LOCALITE TMS Navigator helps to position the coil very precisely in reference to the subjects brain shown in MR datasets.

The Magstim Company

Booth #211
Spring Gardens
Whitland SA34 0HR
UK
Email: info@magstim.com
Web: www.magstim.com

The leading provider of TMS neurostimulation products. Magstim TMS products and services allow researchers to pursue a vast array of Neuromodulation studies utilizing the very latest TMS techniques.

Magventure A/S

Booth #111
Lucernemarken 15 Rheinstrasse 7
Farum DK-3520
Denmark
Email: info@magventure.com
Web: www.magventure.com

MagVenture has introduced several "first mover" features in response to leading researchers' ideas and requests. The MagPro product line was first introduced in 1992. With 6 different magnetic stimulators and 24 different coils, the MagPro series addresses a wide range of clinical and research applications.

Mega Electronics Ltd.

Booth #109
Hakalahdentie 17
Kuopio FI-70460
Finland
Email: mega@megaemg.com
Web: www.megaemg.com

Mega Electronics Ltd presents NeurOne EEG/ERP system, MRI compatible NeurOne Tesla EEG system and launches new HRV measurement solution and surface EMG measurement system for Parkinson research (www.megaemg.com).

NIRx Medical Technologies

Booth #101
15 Cherry Lane
Glen Head, NY 11545
USA
Email: info@nirx.net
Web: www.nirx.net

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

NordicNeuroLab

Booth #300
Mollendalsveien 65C
Bergen N-5009
Norway
Email: info@nordicneurolab.com
Web: www.nordicneurolab.com

With over a decade of experience, NordicNeuroLab (NNL) provides products and solutions that define the field of functional MRI imaging. NNL offers state of the art fMRI software and hardware used around the world by researchers and clinicians alike.

Psychology Software Tools, Inc.

Booth #307
311 23rd St Ext. Suite 200
Sharpsburg, PA 15215
USA
Email: sales@pstnet.com
Web: www.pstnet.com

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

Resonance Technology, Inc.

Booth #212
18121 Parthenia St, Unit A
Northridge, CA 91325
USA
Email: sales@mrivideo.com
Web: www.mrivideo.com

Resonance Technology offers a complete modular state-of-the-art fMRI solution combining functional imaging task presentation with fully automated data processing, eliminating complex, time-intensive manual analysis. VisuaStim Digital with advanced Eye-tracker provides true stereoscopic display with 500,000 pixels per 0.25 square-inch, combined with ultra-realistic digital sound.

Rogue Research Inc.

Booth #312
4398 St. Laurent. 5206
Montreal, Quebec H2W 125
Canada
Email: info@rogue-research.com
Web: www.rogue-research.com

Rogue Research develops the Brainsight family of neuronavigation products. Brainsight TMS was the first neuronavigation system designed specifically for TMS and is the most used image-guided TMS system in the world. Brainsight 2 supports TMS, EEG and NIRS-DOT imaging. Brainsight Vet enables you to reach previously unattainable targets with a cannula, electrode or chamber using non-orthogonal paths reliably.

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Booth #308;310
28 Cathedral Road
Cardiff CF11 9LJ
UK
Email: info@rogue-resolutions.com
Web: www.rogue-resolutions.com

Rogue Resolutions offers the complete line of products from our partner companies, Rogue Research and neuroConn GmbH. These include the Brainsight line of neuronavigation systems for TMS, EEG and NIRS as well and the DC-Stimulator and neuroPrax EEG line of products. Rogue Research will also demonstrate Brainsight Vet for neurosurgery.

Shenzen Sinorad Medical Electronics, Inc.
Booth #107
B Unit,3/F, 8 Block, Xinghua Industrial Building, Nanhai Road
Shekou, Shenzhen 518067
China
Email: webmaster@sinorad.com
Web: www.sinorad.com

Shenzhen Sinorad Medical Electronic Inc. dedicate to medical image technical related product development and manufacturing, such as Visual & Audio Stimulation System for fMRI, MR CCTV, MR compatible intercom etc. By our strong ability in product development and fine after-sale service, we had become third party parts supplier for multiple international MR manufacturers such as GE, Siemens, and Philips.

Shimadzu Corporation
Booth #302;304
3, Kanda-Nishikicho 1-Chome
Chiyoda-ku, Tokyo 101-8448
Japan
Web: www.shimadzu.com

SHIMADZU contributes to society through science and technology. We provide wide possibilities for brain science with functional Near Infrared Spectroscopy (fNIRS). SHIMADZU's booth will introduce the advantage features of fNIRS systems and applications.

Siemens Healthcare
Booth #113
Henkestrasse 127
Erlangen 91052
Germany
Email: medg.gms@siemens.com
Web: www.siemens.com/healthcare

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

SR Research Ltd
Booth #207
150 – A1 Terence Matthews
Kanata, Ontario K2M 1X4
Canada
Email: info@sr-research.com
Web: www.sr-research.com

SR Research, makers of world leading EyeLink High-Speed eye tracker line, have been developing advnaced eye tracking technologies and serving world class support to our research user base since 1992.

Suzhou Anke Medical System Co., Ltd.
Booth #104
Building K, 128 Xingpu Road, Suzhou Industrial Park
Suzhou, Jiangsu 215126
China
Email: ankemri@ankemri.com
Web: www.ankemri.com

Suzhou Anke Medical System Co., Ltd. is specialized in R&D, production and service of medical MRI products. Two types of MRI product – SuperVan 1.5T (regular type) and SuperNova 1.5T (advanced type) are available. The core technologies with proprietary intellectual property rights are adopted in the console, RF, SC magnet, gradient system, etc.

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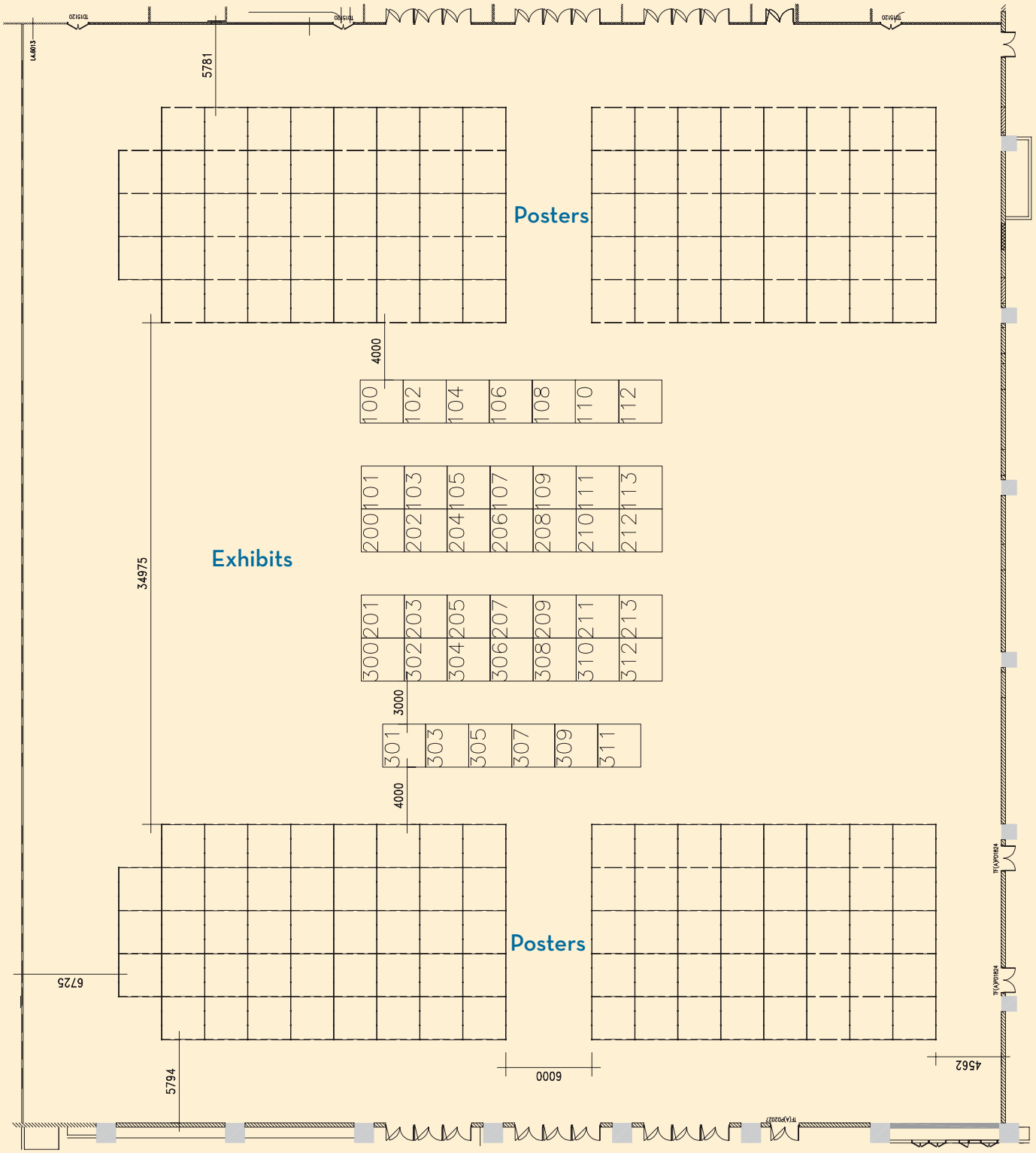

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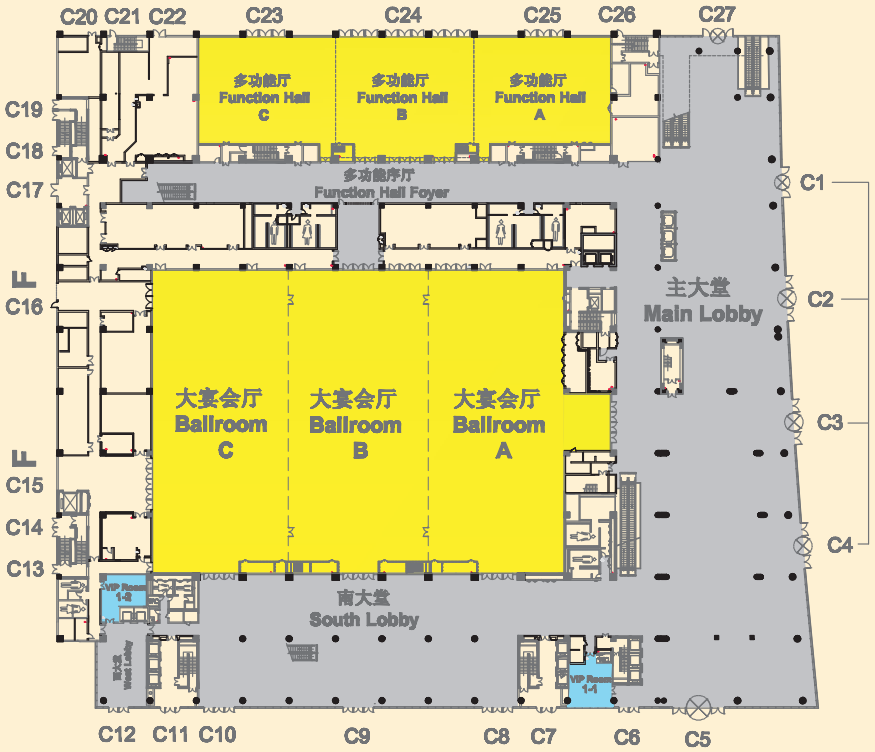

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June 16 – 20, 2013

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June 15 – 19, 2014

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Messedamm 22 | Berlin, Germany 14055

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