HBM 2011 Québec City, Canada

17th Annual Meeting
of the Organization on Human Brain Mapping

Centre des Congrès de Québec
June 26-30, 2011

»program

Organization for
Human Brain Mapping

www.humanbrainmapping.org/hbm2011

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welcome

Organization for Human Brain Mapping

Welcome to the 17th Annual Meeting of the Organization for Human Brain Mapping in Quebec City, Canada. This year, the OHBM tradition of exciting scientific programs and social events combines with the charming atmosphere of Quebec City. Québec City is filled with history, and offers a European ambience in a North American setting. A fortified city bustling with activity and culture, Québec City will charm you with its boutiques, landscapes, people and culinary delights. Surrounded by natural beauty, Quebec City is safe and boasts an exceptional quality of life.

This year's program features the Talairach Lecture given by Karl Deisseroth from Stanford University as well as Keynote Lectures by Marlene Behrmann, Ed Bullmore, Ghislaine Dehaene-Lambertz, Ernst Fehr, Matthew Rushworth, Michael Petrides and Mriganka Sur.

The Annual Meeting will feature parallel oral sessions that will allow for discussion of original work and encourage the participation of younger investigators. Four morning workshop sessions will be presented from 8:30 – 9:45 Monday through Thursday. In addition, three member-initiated symposia and one symposia organized by the Local Organizing Committee will be featured at the meeting. On Sunday, six full-day educational courses will also be offered: Advanced fMRI, Anatomy, The Connectome, Computational Neuroscience and Modeling of Neurodynamics, Imaging Genetics, EEG/MEG.

Over 2000 posters will be presented throughout the meeting. This year we have increased poster viewing time to two and a half hours each day, with each poster being displayed for two full days. Tuesday and Thursday will conclude with a 90-minute poster reception, where authors from both of the day's sessions will be present to answer questions. New this year, OHBM will highlight top ranked abstracts through Interactive Posters (I-Poster) in the poster hall.

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 17th 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,

Heidi Johansen-Berg
Chair, OHBM Council

Alain Dagher
Chair, OHBM Program Committee

Julien Doyon
Chair, Local Organizing Committee

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»program at a glance

Sunday, June 26

All Day Educational Courses

Advanced fMRI
8:00 – 18:00
200 ABC

Anatomy
8:15 – 17:00
301 AB

The Connectome
8:00 – 17:00
205 ABC

Computational Neuroscience and Modeling of Neurodynamics
8:00 – 18:00
300 AB

Imaging Genetics
8:00 – 17:00
303 AB

EEG/MEG
8:00 – 17:00
202

18:00 – 19:30
Opening Ceremonies and Talairach Lecture

Optogenetics: Development and Application
Karl Deisseroth
200 ABC

19:30 – 21:30
Welcome Reception
Centre des Congres de Quebec
2000 ABCD

Monday, June 27

8:30 – 9:45
Morning Workshops

Diffusion and Functional MRI of the Spinal Cord: Methods and Clinical Application – *2000 A*

How To Be a Skeptical Neuroimager: Functional Connectivity & Causal Modeling – *200 ABC*

Understanding Attentional Lapses and Errors: Feeling The Elephant? – *2000 B*

Parkinson's Disease: Imaging the Disorder of Action and Inhibition – *2000 C*

10:00 – 11:30
LOC Symposium:
Imaging the Aging Human Brain
200 ABC

11:30 – 12:00
Keynote Lecture:
A Common Distributed Neural Circuit, Optimized Over Development, Mediates Both Face and Word Recognition
Marlene Behrmann – *200 ABC*

12:00 – 13:00
Lunch

13:00 – 15:30
Poster Session

Traditional Posters
and
Interactive Posters (I-Posters)

Exhibit and Poster Hall
400 ABC

15:30 – 16:45
Symposium:
Imaging the Relevance of Sleep for Brain Function
200 ABC

16:45 – 17:15
Keynote Lecture:
Human Brain Graphs and Other Networks
Ed Bullmore – *200 ABC*

17:30 – 19:00
Oral Sessions

O-M1: Brain MRI: Exploring Spatial Resolution, Temporal Resolution and Contrast – *2000 C*

O-M2: Decision Making – *2000 B*

O-M3: Disorders of the Nervous System: Methods – *200 ABC*

O-M4: Modeling and Analysis Methods: Multivariate Approaches – *2000 A*

Tuesday, June 28

8:30 – 9:45
Morning Workshops
Magnetic Resonance Spectroscopy: A Re-Emerging Tool for Neuroscience – *2000 A*

Workshop in Computational Social Neuroscience – *200 ABC*

The Next Generation of Human Digital Brain Atlases for the HBM Community – *2000 B*

Multimodal Functional Neuroimaging Integrating EEG, MEG and fMRI: Why and How – *2000 C*

10:00 – 10:30
Keynote Lecture:
The Functional Basis of Hemodynamic Brain Imaging: Role of Astrocytes
Mriganka Sur – *200 ABC*

10:45 – 12:15
Oral Sessions

O-T1: Disorders of the Nervous System: Psychiatry – *200 ABC*

O-T2: High-Resolution and Functional Neuroanatomy – *2000 B*

O-T3: Language – *2000 C*

O-T4: Learning and Memory – *2000 A*

12:15 – 13:15
Lunch

13:15 – 15:45
Poster Session

Traditional Posters
and
Interactive Posters (I-Posters)

Exhibit and Poster Hall
400 ABC

16:00 – 17:15
Symposium:
Novel Approaches to Image MultiSensory Body Self-Perception
200 ABC

17:15 – 17:45
Keynote Lecture:
The Neurobiology of Social Norm Compliance
Ernst Fehr – *200 ABC*

18:00 – 19:30
Poster Reception
Exhibit and Poster Hall
400 ABC

Wednesday, June 29

8:30 – 9:45
Morning Workshops

Multi-Modal Mapping of the Aging Brain in Health and in Disease – *2000 B*

Magnetic Susceptibility Imaging of the Human Brain – *2000 A*

The Hippocampus – *2000 C*

Group Inference for On-Going Activity: How to Compare Intrinsic Functional Connectivity Between Subjects – *200 ABC*

10:00 – 10:30
Keynote Lecture:
The Anterior Prefrontal Cortex and the Representation of Counterfactual Choices
Matthew Rushworth – *200 ABC*

10:45 – 12:15
Oral Sessions

O-W1: Brain Structure and Function Across the Lifespan – *2000 C*

O-W2: Emotion, Motivation and Action – *200 ABC*

O-W3: Genetics and Informatics – *2000 B*

O-W4: Physiology of Neuroimaging Signals – *2000 A*

12:15 – 13:15
Lunch

13:15 – 15:45
Poster Session

Traditional Posters
and
Interactive Posters (I-Posters)

Exhibit and Poster Hall
400 ABC

16:00 – 17:15
Symposium:
Glimpsing at Neuronal Connectivity Through the Hemodynamic Veil?
What We Can and Cannot do with Biophysical Dynamic Models of fMRI Connectivity
200 ABC

17:15 – 17:45
Keynote Lecture:
Lateral Prefrontal and Parietal Contributions to Working Memory: Monitoring and Manipulation Michael Petrides – *200 ABC*

17:45 – 18:15
Town Hall Meeting
200 ABC

20:00 – 1:00
Club Night
Espaces Dalhousie

Thursday, June 30

8:30 – 9:45
Morning Workshops

Imaging Genetics: Multivariate Analyses for Neural and Genetic Circuitry – *200 ABC*

MRI of Tissue Micro-Structure and Connectivity – *2000 A*

The Physiology and Pathology of the Parietal Lobe in Visuomotor Integration – *2000 B*

Scale-Free Dynamics and Critical Phenomena in Cortical Activity – *2000 C*

10:00 – 10:30
Keynote Lecture:
Brain Imaging and the Developing Brain
Ghislaine Dehaene-Lambertz- *200 ABC*

10:30-13:00
Poster Session

Traditional Posters
and
Interactive Posters (I-Posters)

Exhibit and Poster Hall
400 ABC

13:00 – 14:00
Lunch

14:00-15:30
Oral Sessions

O-Th1: Disorders of the Nervous System: Neurology – *200 ABC*

O-Th2: Modeling and Analysis Methods: Brain Connectivity – *2000 C*

O-Th3: Perception – *2000 B*

O-Th4: Social Neuroscience – *2000 A*

16:00 – 17:00
Closing Comments and Meeting Highlights
Russ Poldrack
200 ABC

17:00 – 18:30
Farewell Poster Reception
Exhibit and Poster Hall
400 ABC

general information

Conference Venue
Centre des Congrès de Québec
1000, boul. René-Lévesque Est
Québec (Québec) G1R 2B5
Canada
http://www.convention.qc.ca/
All events will take place in the Centre des Congrès de Québec unless otherwise noted.

Registration Hours
Registration Area located Level 4 (Main Entrance)

Saturday, June 25:	15:00 – 18:00
Sunday, June 26:	7:00 – 19:30
Monday, June 27:	7:30 – 19:00
Tuesday, June 28:	8:00 – 18:00
Wednesday, June 29:	8:00 – 18:15
Thursday, June 30:	8:00 – 17:00

Exhibit Hours
Exhibit and Poster Hall 400 ABC, Level 4

Monday, June 27:	12:00 – 16:00
Tuesday, June 28:	12:00 – 19:30
Wednesday, June 29:	12:00 – 16:00
Thursday, June 30:	10:00 – 18:30

Town Hall Meeting
Wednesday, June 29, 17:45 – 18:15
200 ABC
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 the OHBM leadership. Updates on future meeting sites and council elections will be presented.

Welcome Reception
Sunday, June 26, 19:30 – 21:30
Centre des Congrès de Québec – 2000 ABCD
Join us for the 2011 Annual Meeting Welcome Reception. The reception will be held in Hall 2000 ABCD immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 26. Reception will include beer, wine, food stations, and unique entertainment registrants receive one complimentary ticket. Additional guest tickets are $50.00.

Club Night
Wednesday, June 29, 20:00 – 1:00
Espaces Dalhousie
Spend an evening at Espaces Dalhousie. Located inside the Terminal de croisières de Pointe-à-Carcy, a brand-new building with a unique architectural design, Espaces Dalhousie provides a magnificent view of the St. Lawrence River. The Terminal's own architecture, along with its many windows, make it a place that is full of life and light, a window on the beauty of Quebec City's scenery. Entertainment features live music by a DJ, Ernst Meyer's Synaptic FunKtion, and JoSH. The party is complimentary to registrants. Additional guest tickets are $50.00. Directional maps are available at the registration desk.

A La Carte Cafeteria
4th Floor Foyer
Hours:

Sunday, June 26:	11:00 – 14:00
Monday, June 27:	7:30 – 14:00
Tuesday, June 28:	8:00 – 14:00
Wednesday, June 29:	8:00 – 14:00
Thursday, June 30:	8:00 – 14:00

Speaker Ready Room
Room 203
Hours:

Saturday, June 25:	15:00 – 18:00
Sunday, June 26:	6:30 – 19:30
Monday, June 27:	7:30 – 19:00
Tuesday, June 28:	8:00 – 18:00
Wednesday, June 29:	8:00 – 18:00
Thursday, June 30:	8:00 – 16:00

Internet Cafe
3rd Floor Foyer
A limited number of complimentary terminals will be available. Please limit your time at a terminal to 15 minutes.
Hours:

Sunday, June 26:	7:30 – 19:30
Monday, June 27:	8:00 – 19:30
Tuesday, June 28:	8:00 – 19:30
Wednesday, June 29:	8:00 – 19:30
Thursday, June 30:	8:00 – 17:00

Interactive Posters (I-Posters) – NEW THIS YEAR!

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts to small groups at computer kiosks located in the poster hall. Daily I-Poster schedules will be posted outside the computer kiosks and can also be found on the 2011 Itinerary Planner.

E-Posters

Abstracts presented in Oral Sessions and Interactive Poster (I-Poster) Sessions will be available for viewing online as Electronic Posters (E-Posters). To access E-Posters, please go to http://ww4.aievolution.com/hbm1101/ or stop by the kiosks located in the exhibit hall.

Wireless Connection

Wireless connections will be available throughout the Centre des Congrès de Québec. You will need to enter a code the first time you connect. The access code will be added to the HBM 2011 conference website.

Evaluations Online!

Conference evaluations will be conducted online only at www.humanbrainmapping.org/2011Evaluations. 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.

Twitter Hash Tag

Join the conversation on Twitter — #HBM2011

ACCME Accredidation

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

The Organization for Human Brain Mapping designates this educational activity for a maximum of 41.5 PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity. **CME forms will only be available online** at www.humanbrainmapping.org/CME2011.

Educational Courses

Advanced fMRI (Full Day)	8.00
Anatomy (Full Day)	7.75
The Connectome (Full Day)	8.00
Computational Neuroscience and Modeling of Neurodynamics (Full Day)	8.00
Imaging Genetics (Full Day)	8.50
EEG/MEG (Full Day)	7.50
Maximum number of possible credits earned at Educational Courses	**8.00**

Annual Meeting Credits

Talairach Lecture	0.75
Keynote Lectures	0.50 each
Morning Workshops	1.25 each
Oral Sessions	1.50 each
Poster Sessions	1.00 per hour
Poster Receptions	1.00 each
Symposia	1.25 each
LOC Symposia	1.50
Closing Comments	1.00
Total # of possible credits earned at Annual Meeting	**33.5**

TOTAL NUMBER OF POSSIBLE CREDITS 41.50

sunday, june 26

Educational Courses

Advanced fMRI

200 ABC

Organizers

Tor D. Wager, *University of Colorado, Boulder, CO, 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 special theme is computational modeling of brain information processing. Statistical modeling of brain-activity data and computational modeling of brain information processing have traditionally been quite separate endeavors pursued by different communities, with connections being drawn only at the level of verbal theory. Recent years have brought new methods of directly testing computational models with fMRI data. The computational models are presented with the experimental stimuli and simulate how participants' brains process information. This yields detailed predictions of either the information represented in regional population codes or the time courses of regional activation.

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

Part I: Introduction

8:00 – 8:30 **Introduction to the Special Theme of Testing Computational Models with fMRI**
Nikolaus Kriegeskorte, *MRC Cognition and Brain Sciences Unit, Cambridge, UK*

Part II: Physics and Physiology Underlying fMRI

8:30 – 9:00 **MRI Physics**
Larry Wald, *Massachusetts General Hospital/Harvard University, Boston, MA, USA*

9:00 – 9:30 **What Information on Brain Function and Physiology Can Be Extracted Using fMRI?**
Peter Bandettini, *National Institutes of Mental Heath, Bethesda, MD, USA*

9:30 – 10:00 **Functional Imaging and the Underlying Neural Responses: Complementary Windows on the Neural Basis of Perception?**
Christoph Kayser, *University of Tuebingen, Germany*

10:00 – 10:30 **Break**

10:30 – 11:00 **Finding Activations: Power, Specificity, and Selection Bias in Brain Mapping**
Thomas E. Nichols, *University of Warwick, Coventry, UK*

Part III: Connectivity, Causality, and Pattern Information

11:00 – 11:30 **Resting-State Functional Connectivity — Low-TR Resting Connectivity and Nonstationarities**
Steve Smith, *Oxford University, Oxford, UK*

11:30 – 12:00 **Statistical Approaches for Studying Causality**
Martin Lindquist, *Columbia University, New York, NY, USA*

12:00 – 12:30 **Introduction to Pattern Recognition in fMRI & Clinical Applications**
Janaina Mourao-Miranda, *University College London, London, UK*

12:30 – 13:30 **Lunch**

13:30 – 14:00 **Pattern-Based Prediction of Pain and Emotion from fMRI Data**
Tor D. Wager, *University of Colorado, Boulder, CO, USA*

14:00 – 14:30 **Connectivity and Pattern-Based Analyses of Individuals with ADHD**
Damien Fair, *Oregon Health and Science University, Portland, OR, USA*

14:30 – 15:00 **Decoding the Structure of High-Level Visual Representations**
Dwight Kravitz, *National Institutes of Health, Bethesda, MD, USA*

15:00 – 15:30 **Break**

Part IV: Testing Computational Models with fMRI

15:30 – 16:00 **Predicting fMRI Activity Patterns with Computational Models of Brain Information Processing**
Tom Mitchell, *Carnegie Mellon University, Pittsburgh, PA, USA*

16:00 – 16:30 **Tracking Problem Solving by Multivariate Pattern Analysis and Hidden Markov Model Algorithms**
John Anderson, *Carnegie Mellon University, Pittsburgh, PA, USA*

16:30 – 17:00 **Testing Theories of Learning and Memory Using Multivariate Pattern Analysis**
Ken Norman, *Princeton University, Princeton, NJ, USA*

17:00 – 17:30 **Integrating fMRI with Computational Models of Cognitive Control**
David Badre, *Brown University, Providence, RI, USA*

17:30 – 18:00 **Building and Testing Hierarchical Models of the Ventral Stream**
Jeremy Freeman, *New York University, New York, NY, USA*

Anatomy and Its Impact on Structural and Functional Imaging

301 AB

Organizers

Katrin Amunts, *Institute of Neuroscience and Medicine, Juelich, Germany*
Karl Zilles, *Institute of Neuroscience and Medicine, Juelich, Germany*

Results of neuroimaging studies cannot be understood without knowing the anatomy of the brain, and the way how brain structure influences, through interaction with image acquisition, processing and analysis, the interpretation of the results. 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 some basic introduction of 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 such 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. Session I will consist of talks introducing anatomical concepts and developmental aspects. Session II will focus on organizational principles of the brain's microstructure. Session III will elucidate the relationship of microstructure with brain function. Session IV, finally provides a critical overview of the anatomical background of widely distributed neuroimaging methods such as voxel-based morphometry, diffusion tensor imaging and dynamic causal modelling.

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 classical techniques for neuroanatomy including, receptor mapping, and cytoarchitectonics;
3. Understand methods for design and analysis of structural and functional MRI data, discuss interpretation of the measures they provide and their limitations; and
4. Give examples of applications of structural MRI to 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 human 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 I: Introduction: Neuroanatomy and MRI

8:15 – 8:45	**Surface Anatomy of the Brain and Landmarks** Thomas P. Naidich, *Mount Sinai Medical Center, New York, NY, USA*
8:45 – 9:15	**Parcellation Schemes of the Cerebral Cortex and Their Relevance to Function** Michael Petrides, *McGill University, Montreal, Quebec, Canada*
9:15 – 9:30	**Break**
9:30 – 10:00	**Development of the Cerebral Cortex: Macroscopy and Microscopy** Ivica Kostovic, *Croatian Institute for Brain Research, School of Medicine, University of Zagreb, Croatia*
10:00 – 10:30	**MRT Imaging of Brain Development** Alan Evans, *McGill University, Montreal, Quebec, Canada*
10:30 – 10:45	**Break**

Part II: Microstructure and its Interpretation in MRI

10:45 – 11:15 **Cortical Structure, Thickness and its Impact on Imaging**
Karl Zilles, *Institute of Neuroscience and Medicine, Juelich, Germany*

11:15 – 11:45 **Cyto- and Receptorarchitecture of the Human Cerebral Cortex**
Katrin Amunts, *Institute of Neuroscience and Medicine, Juelich, Germany*

11:45 – 12:15 **High Resolution Imaging and Anatomy**
Tarek Yousry, *UCL Institute of Neurology, Academic Neuroradiological Unit, London, UK*

12:15 – 13:30 **Lunch**

Part II: Relationship of the Brain's Functional Segregation With its Structure

13:30 – 14:00 **Functional and Architectonic Segregation, Borders and Landmarks**
Bruce Fischl, *Harvard Medical School, Charlestown, MA, USA*

14:00 – 14:30 **Structural and Functional Segregation of the Visual Cortex**
Rainer Goebel, *Maastricht University, Department of Neurocognition, Maastricht, The Netherlands*

14:30 – 14:45 **Break**

Part IV: Structural Image Analysis and Interpretation

14:45 – 15:15 **Anatomical Background of VBM**
Christian Gaser, *University of Jena, Jena, Germany*

15:15 – 15:45 **Anatomical Background of DTI Signals and Parameters**
Christian Beaulieu, *University of Alberta, Edmonton, Alberta, Canada*

15:45 – 16:15 **Anatomical Background of Dynamic Causal Modelling and Connectivity**
Klaas Enno Stephan, *University of Zürich, Zürich, Switzerland*

Part V: Question and Answers

16:15 – 17:00 **Panel Discussion**

sunday, june 26

Educational Courses

The Connectome

205 ABC

Organizers

Heidi Johansen-Berg, *University of Oxford, Oxford, UK*
Randy McIntosh, *Rotman Research Institute, Toronto, Canada*

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 first part of the course, 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. Session II, Processing Connectomes, will 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. Connectomics raises new challenges for informatics and visualisation and Session III will include talks highlighting approaches to mining and visualising these complex datasets. Finally, Session IV will review how the connectomics approach has already provided novel insights into human brain organisation and its breakdown in disease.

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

8:00 – 8:10 **Welcome**

Part I: Building Connectomes

8:10 – 8:35 **Diffusion Tractography and Structural Measures**
Saad Jbabdi, *University of Oxford, Oxford, UK*

8:35 – 9:00 **Overview of Intrinsic Connectivity Networks**
Vince Calhoun, *MIND Research Network/University of New Mexico, Albuquerque, NM, USA*

9:00 – 9:25 **EEG/MEG and Brain Networks**
Robert Oostenveld, *Radboud University Nijmegen, Nijmegen, The Netherlands*

9:25 – 9:50 **MRI Acquisition and Analysis Strategies for Connectomics**
Bruce Fischl, *Harvard Medical School, Charlestown, MA, USA*

9:50 – 10:20 **Break**

Part II: Processing Connectomes

10:20 – 10:45 **Overview of fMRI Network Modelling Methods in Task and Rest**
Randy McIntosh, *Rotman Research Institute, Toronto, Canada*

10:45 – 11:10 **Defining Network Nodes: Data-Driven Approaches**
Steve Petersen, *Washington University, St Louis, MO, USA*

11:10 – 11:35 **Advanced Network Modelling I: Dynamic Models; Multimodal Integration**
Mark Woolrich, *University of Oxford, Oxford, UK*

11:35 – 12:00 **Advanced Network Modelling II: Group Analysis, Connectivity Measures**
Gael Varoquaux, *INSERM, Neurospin, Gif-sur-Yvette, France*

12:00 – 12:30 **Panel Discussion**

12:30 – 13:30 **Lunch**

Part III: Mining and Visualising Connectomes

13:30 – 13:55 **Complex Network Approaches to the Human Connectome**
Olaf Sporns, *Indiana University, Bloomington, IN, USA*

13:55 – 14:20 **Data Mining and Visualisation**
Angie Laird, *The University of Texas Health Science Center, San Antonio, TX, USA*

14:20 – 14:45 **Neuroinformatics for Connectomics**
David Van Essen, *Washington University, St Louis, MO, USA*

14:45 – 15:15 **Break**

Part IV: What Can Connectomics Tell Us About the Brain?

15:15 – 15:40 **State-Dependent and Disease-Related Variations in Functional Networks**
Silvina Horovitz, *NINDS, NIH, Bethesda, MD, USA*

15:40 – 16:05 **Brain Networks in Health and Disease**
Ed Bullmore, *University of Cambridge, Cambridge, UK*

16:05 – 16:30 **The Future of Connectomics**
Patric Hagmann, *Lausanne University Hospital, Lausanne, Switzerland*

16:30 – 17:00 **Panel Discussion**

Computational Neuroscience and Modeling of Neurodynamics

302 AB

Organizers

Michael Breakspear, *Queensland Institute of Medical Research, Brisbane, Australia*
Stefan Kiebel, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

This course is designed to guide both cognitive neuroscientists and modellers through a variety of computational approaches. The talks introduce and motivate dynamic systems theory and other mathematical concepts as tools for modelling various neuroscience phenomena, ranging from the single neuron to the macroscopic network level. The participants do not require an explicit mathematical background to follow the course but need to bring a healthy interest in how ubiquitous neuroscience phenomena can be explained mechanistically. Examples will be given of how such approaches lead to the design and analysis of cognitive neuroscience experiments.

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

1. Summarize the use of dynamic systems theory in modelling neuroscience phenomena, ranging from single neuron models to macroscopic modelling of networks;
2. Summarize new developments and research questions in dynamic models of the brain;
3. Understand the link between models of cortical activity and theories of brain function;
4. Understand the meaning and significance of stochastic processes in cortical systems; and
5. Discuss how such computational approaches can lead to the design and analysis of cognitive neuroscience experiments.

Course Schedule

Part I: Dynamic Systems Approach

Chair: Stefan Kiebel, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

8:00 – 8:10 **Introduction: Dynamical Modelling in Systems Neuroscience**
Michael Breakspear, *Queensland Institute of Medical Research, Brisbane, Australia*

8:10 – 9:00 **Neuronal and Neural Ensemble Dynamics**
Michael Breakspear, *Queensland Institute of Medical Research, Brisbane, Australia*

9:00 – 9:10 **Discussion**

9:10 – 9:55 **Multiscale Models of Brain Dynamics: From the Microscale to the Whole Brain**
Peter Robinson, *University of Sydney, Sydney, NSW, Australia*

9:55 – 10:05 **Discussion**

10:05 – 10:20 **Break**

Part II: From Dynamics to Computational Neuroscience

Chair: Michael Breakspear, *Queensland Institute of Medical Research, Brisbane, Australia*

10:20 – 11:05 **Complex Brain Networks: Dynamics and Structure**
Olaf Sporns, *Indiana University, Bloomington, ID, USA*

11:05 – 11.15 **Discussion**

11:15 – 12:00 **Computational fMRI Modelling**
Wako Yoshida, *Wellcome Trust Centre for Neuroimaging, UCL, London, UK*

12:00 – 12:10 **Discussion**

12:10 – 13:20 **Lunch**

Part III: Bayesian-Based Methods

Chair: Karl Friston, *Wellcome Trust Centre for Neuroimaging, UCL, London, UK*

13:20 – 14:05 **Dynamic Causal Modelling (Bayesian Inference, Model Selection)**
Jean Daunizeau, *University of Zürich, Zürich, Switzerland*

14:05 – 14:15 **Discussion**

14:15 – 15:00 **Model-Based Inference on (Patho) Physiological Brain Connectivity and Synaptic Plasticity**
Klaas Enno Stephan, *University of Zürich, Zürich, Switzerland*

15:00 – 15:10 **Discussion**

15:10 – 15:25 **Break**

Part IV: Integrative Models

Chair: Peter Robinson, *University of Sydney, Sydney, NSW, Australia*

15:25 – 16:10 **Temporal Scales in the Brain**
Stefan Kiebel, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

16:10 – 16:20 **Discussion**

16:20 – 17:05 **Computational Principles of Cortical Rhythms**
Xiao-Jing Wang, *Yale University School of Medicine, New Haven, CT, USA*

17:05 – 17:15 **Discussion**

17:15 – 18:00 **Summary, Discussion, and Farewell**
Karl Friston, Michael Breakspear, Stefan Kiebel

sunday, june 26

Educational Courses

Introduction to Imaging Genetics

303 AB

Organizers

Thomas Nichols, *University of Warwick, Coventry, UK*
Jean-Baptiste Poline, *Neurospin, I2BM, CEA, Gif sur Yvette, France*

Description

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 four-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; and
4. Understand how imaging genetics can be applied to areas like schizophrenia or Alzheimer's disease.

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, Gif sur Yvette, France*

8:05 – 8:45 **Molecular Basis of Genetic Variation**
Thomas Nichols, *University of Warwick, Coventry, UK*

8:45 – 9:30 **Structure and Analysis of Genetic Variation**
Fabio Macciardi, *University of California Irvine, CA, USA*

9:30 – 10:15 **Quantitative Traits: Heritability, Linkage & Association**
David Glahn, *Yale University, New Haven, CT, USA*

10:15 – 10:30 **Break**

10:30 – 11:00 **Motivation for Imaging Genetics**
Stephen Potkin, *University of California Irvine, CA, USA*

11:00 – 11:30 **Overview of Neuroimaging Phenotypes**
Roberto Toro, *Institut Pasteur, Paris, France*

11:30 – 12:00 **Univariate Approaches: Multiple Testing & Voxelwise WGA**
Jason Stein, *University of California Los Angeles, CA, USA*

12:00 – 13:00 **Lunch**

13:00 – 13:30 **Multivariate Approaches: Joint Modeling of Imaging & Genetic Data**
Giovanni Montana, *Imperial College London, London, UK*

13:30 – 14:00 **Multivariate Phenotypes for Association and Linkage**
Peter Kochunov, *The University of Texas Health Science Center, San Antonio, TX, USA*

14:00 – 14:30 **Case Study I: Imaging Genetics of Schizophrenia**
Ty Cannon, *University of California Los Angeles, CA, USA*

14:30 – 14:45 **Break**

14:45 – 15:15 **Case Study II: Imaging Genetics of Alzheimer Disease: The ADNI Experience**
Andrew Saykin, *Indiana University School of Medicine, Indianapolis, IN, USA*

15:15 – 16:45 **Case III: Cognition**
TBA

16:45 – 17:00 **Panel Discussion**
All speakers

EEG/MEG: Practical Tools for Advanced Analysis

202

Organizers

Ole Jensen, *Donders Institute for Brain, Cognition and Behavior, Nijmegen, The Netherlands*
Joachim Gross, *Centre for Cognitive Neuroimaging, University of Glasgow, UK*

Given the richness of the EEG/MEG data sets there is an unlimited number of possibilities for analysis. While this provides a challenge for both new and experienced users of EEG/MEG some techniques have proven more useful than others. In the first part of the course we will introduce advanced tools for EEG/MEG analysis that currently are applied in cognitive research; i.e. tools that have proven to work. The combination of EEG with fMRI and TMS has now matured to a degree that these techniques now contribute important insight into the physiological substrate of cognition. The recent advances and application of these tools will be introduced. The second part of the course will focus on how to analyze EEG/MEG from a practical point of view. There are a number of non-commercial toolboxes being made available to the research community which are becoming increasingly important in cognitive neuroscience research. After the developers briefly have introduced the toolboxes, there will be parallel hands-on demonstrations in smaller groups. The developers will be encouraged to describe how the tools can be used to assess network properties of the working brain.

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

1. Understand the recent but established MEG/EEG analysis techniques applied in cognitive neuroscience. This includes: frequency domain analysis, distributed source modeling, statistical considerations;
2. Understand possibilities and limitations applying measures of functional connectivity;
3. Gain new insight into the possibilities and limitations of multi-model techniques, i.e. combining EEG with respectively fMRI and TMS; and
4. Make an informed choice when selecting non-commercial software toolboxes for data analysis.

Target audience: This course targets cognitive neuroscientists with an applied focus; this includes researchers new to EEG/MEG but with some background in brain imaging as well as somewhat experienced EEG/MEG researchers with an interest in learning advanced analysis and emerging techniques.

Course Schedule

8:00 – 8:15	**Introduction** Ole Jensen, *Donders Institute for Brain, Cognition and Behavior, Nijmegen, The Netherlands* Joachim Gross, *Centre for Cognitive Neuroimaging, University of Glasgow, Glasgow, UK*
8:15 – 9:00	**Distributed Source Modeling in Cognitive Neuroscience** Brady Riedner, *University of Wisconsin, Madison, WI, USA*
9:00 – 9:45	**Oscillatory Brain Activity: From Raw Data to Group Averages Using Beamformer Approaches** Saskia Haegens, *Donders Institute for Brain, Cognition and Behavior, Nijmegen, The Netherlands*
9:45 – 10:15	**Break**
10:15 – 11:00	**Assessing Functional Connectivity by EEG and MEG: From Methodology to Interpretation** Joachim Gross, *Centre for Cognitive Neuroimaging, University of Glasgow, UK*
11:00 – 11:45	**Combining EEG and fMRI in Cognitive Neuroscience** Tom Eichele, *University of Bergen, Bergen, Norway*
11:45 – 12:30	**Combining EEG and TMS in Cognitive Neuroscience** Gregor Thut, *University of Glasgow, Glasgow, UK*

continued on next page

sunday, june 26

Educational Courses

12:30 – 14:00 **Lunch**

14:00 – 14:45 **Non-Commercial Software Toolboxes for EEG/MEG Analysis**

FieldTrip
Robert Oostenveld, *Radboud University Nijmegen, Nijmegen, The Netherlands*

BrainStorm
Sylvain Baillet, *Medical College Wisconsin, Milwaukee, WI, USA*

MNE-suite
Matti S. Hamalainen, *Massachusetts General Hospital, Charlestown, MA, USA*

EEGlab
Scott Makeig, *University of California San Diego, La Jolla, CA, USA*

Nutmeg
Sarang Dalal, *INSERM, Lyon, France*

SPM
Marta Garrido, *University College London, London, UK*

14:45 – 15:00 **Break**

15:00 – 17:00 **Rotating Workshop Where Toolboxes are Presented**

Breakout Rooms:
FieldTrip - 202
BrainStorm - 304 A
MNE-suite - 304 B
EEGlab - 204 A
Nutmeg - 204 B
SPM - 202

Opening Ceremonies

18:00 – 19:30
200 ABC

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." The Talairach Lecture will follow the award presentations.

Talairach Lecture: Optogenetics: Development and Application

Karl Deisseroth, *Stanford University, Stanford, CA, USA*

In the study of complex biological systems, it is important to control well-defined events occurring in specified cellular populations, while these populations still remain embedded within larger intact-tissue systems. To target this challenge, we have developed and applied a technology that we named optogenetics. Optogenetics is the combination of genetic and optical methods to achieve gain- or loss-of-function of well-defined events within specific cells of living tissue, including freely moving mammals. For the study of neural systems; this control must be applicable at the speed (millisecond) and precision (cell type-specific) of normal neural processing. In August of 2005, we delivered single-component light-activated regulators of ion flow from microbial organisms into mammalian neurons and showed control functionality with the required speed and precision. We then developed fiberoptic/laser diode devices and molecular targeting strategies with which cells can be turned on or off with millisecond precision within freely moving mammals, and showed that application of genomics and molecular engineering principles can enhance and expand the optogenetic repertoire. Finally, we have applied this technology to probe the dynamics of circuits relevant to schizophrenia, autism, narcolepsy, Parkinson's disease, depression, addiction, and anxiety. This microbial opsin approach has now been adopted by thousands of scientists around the world; in 2010 optogenetics was named Method-of-the-Year across all fields of science and engineering by ***Nature Methods***, and headlined the Breakthroughs-of-the-Decade in ***Science***. The talk will focus on both recently published and unpublished new optogenetic technologies, which among other applications have enabled the first optogenetic loss-of-function behavioral results in freely-moving mammals (complementing earlier gain-of-function work). Among other findings, this recent set of investigations has resulted in identifying a causal role for nucleus accumbens cholinergic neurons in cocaine conditioning (Witten et al., ***Science*** 2010), and allowed us to map out a specific amygdala projection causally involved in anxiety (Tye et al., ***Nature*** 2011), the most common of the psychiatric diseases.

www.stanford.edu/group/dlab/papers/deisserothnature2010.pdf
www.stanford.edu/group/dlab/papers/breakthroughscience2010.pdf
www.stanford.edu/group/dlab/optogenetics/sciam.html

Welcome Reception:

Centre des Congrès de Québec

19:30 – 21:30
2000 ABCD

Join us for the 2011 Annual Meeting Welcome Reception. The reception will be held in Hall 2000 ABCD immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 26. Reception will include beer, wine, food stations, and unique entertainment. Registrants receive one complimentary ticket. Additional guest tickets are $50.00.

Scientific Program

8:30 – 9:45
2000 A

Morning Workshop

Diffusion and Functional MRI of the Spinal Cord: Methods and Clinical Application

Chair: Julien Cohen-Adad, *Martinos Center for Biomedical Imaging, MGH, Harvard Medical School, Charlestown, MA, USA*

Despite the importance of imaging the spinal cord in neurodegenerative diseases and acute traumas, diffusion and functional MRI of the spinal cord remain challenging. Notably, acquisition and processing are the decisive steps that can make the difference in the interpretation of images. Here we would like to share the latest methodological and clinical developments in diffusion and functional MRI of the spinal cord. Teaching goals include strategies to obtain high spatial resolution and to minimize susceptibility-related distortions in echo planar imaging, modeling of functional MRI time series and methods to perform tract-based spatial statistics of white matter pathways using diffusion MRI. Speakers will also demonstrate the benefits of these advanced imaging techniques to study the sensorimotor pathway and evaluate spinal cord damage in chronic spinal cord injury and in multiple sclerosis patients.

Learning Objectives: Having completed this workshop, participants will be able to:
1. Reduce and correct susceptibility-related distortions in EPI;
2. Tract-based spatial statistics of spinal pathways; and
3. Reduce physiological-related noise in functional MRI.

DTI of the Spinal Cord: Acquisition, Processing and Results in Spinal Cord Injured Patients
Julien Cohen-Adad, *Martinos Center for Biomedical Imaging, MGH, Harvard Medical School, Charlestown, MA, USA*

Q-Space Imaging and Axon Diameter Measurements in the Healthy and Pathological Spinal Cord
Claudia Wheeler-Kingshott, *Institute of Neurology, Department of Neuroinflammation, UCL, London, UK*

Functional MRI Potential for Clinical Assessment of the Injured Human Spinal Cord
Patrick Stroman, *Centre for Neuroscience Studies, Queen's University, Kingston, Ontario, Canada*

Turbo Spin Echo Versus Gradient-Echo EPI in Spinal Cord fMRI and Angiography of Spinal Cord Vasculature
Walter H. Backes, *Department of Radiology, Maastricht University Medical Center, Maastricht, The Netherlands*

Physiological Noise Modelling in Spinal Cord fMRI with Application to the Study of Pain States
Jonathan Brooks, *PaIN Group & FMRIB Centre, University of Oxford, John Radcliffe Hospital, Headington, Oxford, UK*

8:30 – 9:45
200 ABC

Morning Workshop

How To Be a Skeptical Neuroimager: Functional Connectivity & Causal Modeling

Chair: Thomas Nichols, *University of Warwick, Coventry, UK*

Despite the surge in graphical modeling for functional and structural brain imaging data, often researchers only consider one method and just a pair of competing network models. The purpose of this workshop is to educate neuroimaging users about the "Network of Network Methods" that exists, and show the relationships between the different methods used in imaging and in other disciplines. We also will discuss how to choose the appropriate method for the data and the question at hand, and how to search large space of models that can be fit to your data.

Dr. Martin Lindquist, after reviewing the Network of Network Methods, will present a case study showing how causal inference provides a framework for determining the assumptions required for making causal statements from a Structural Equation Model

Dr. Victor Solo will discuss when and how Granger Causality (GC) should be used, focusing on particular example that demonstrate that, while GC can be successful with EEG and MEG, it has serious limitations with fMRI.

Dr. Steve Smith will report on exhaustive FMRI timeseries simulations that measure the accuracy of 12 different classes of network modelling methods, with 28 different parameter settings.

Dr. Joeseph Ramsey will describe model selection and why searching for a single best model is not only impractical, but often impossible.

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

1. Discuss the relationship between SEM, DCM, Bayes Net, the Rubin Causal model and other graphical methods;
2. Identify the appropriate network model for their data and the research question at hand, considering issues like modality (EEG vs fMRI), need for directional inferences on the graph, and use of task or task-free experimental design; and
3. Describe the problem posed Markov-equivalent graphs, leading to a family of graphs (instead of a single graph) identified as having the best fit to the data.

The Network of Network Methods, and a Case Study of SEM
Martin Lindquist, *Columbia University, Department of Statistics, New York, NY, USA*

The Dangers of Granger: What They Didn't Tell You About Granger Causality
Victor Solo, *University of New South Wales, School of Electrical Engineering, Sydney, NSW, Australia*

Don't Fall In Love with your Method: Practical Issues for Modeling Networks in Resting BOLD Timeseries
Stephen Smith, *FMRIB Centre, Oxford University, Oxford, UK*

Don't Fall In Love with your Model: Model Selection for Graphical Models
Joseph Ramsey, *Carnegie Mellon University, Department of Philosophy, Pittsburgh, PA, USA*

8:30 – 9:45
2000 B

Morning Workshop

Understanding Attentional Lapses and Errors: Feeling The Elephant?
Chair: Michael Chee, *Duke-NUS Graduate Medical School, Singapore, Singapore*

Being able to respond in a consistently accurate and timely manner is a highly valued capability. Understanding how attention and cognitive control are established and sustained is complemented by investigations into why these transiently fail, even in healthy persons. Each speaker will present contemporary findings regarding the genesis and consequences of lapses and errors with a view to stimulate the integration of data obtained at different timepoints (before stimulus appears, following stimulus appearance), across different contexts (well rested, following sleep deprivation) using different methodologies (task related BOLD activation, functional connectivity, ERP, EEG) that probe different networks (task-positive, default mode, cross sensory cortical connections). Presenters will give a view of what happens on a trial-by-trial level as well as how these changes affect overall performance. In short, we seek to discern the elephant underlying different accounts of transient attentional failure.

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

1. Understand how neural correlates of learning and cognition during wakefulness are modulated by specific sleep states, acute sleep loss and insomnia;
2. Discuss how brain activity during sleep is modulated by previous wake activity; and
3. Illustrate how insomnia might account for some of the structural deviations in psychiatric disease.

Maladaptive Changes in Brain Activity Predicting Erroneous Behavior
Markus Ullsperger, *Donders Institute for Brain, Cognition and Behaviour, Nijmegen, The Netherlands*

Delayed Responses are Linked to Altered Functional Connectivity Involving the Attentional and Default-Mode Networks
Daniel Weissman, *Department of Psychology, University of Michigan, Ann Arbor, MI, USA*

continued on next page

Morning Workshop, continued

Alpha Waves, Top-Down Control, and the Modulation of Attention
Gabriele Gratton, *Department of Psychology and Beckman Institute, Urbana, IL, USA*

Faltering Attention in Sleep Deprived Persons
Michael Chee, *Duke-NUS Graduate Medical School, Singapore, Singapore*

8:30 – 9:45
2000 C

Morning Workshop

Parkinson's Disease – Imaging the Disorder of Action and Inhibition
Chair: James B. Rowe, *MRC Cognition and Brain Science Unit, Cambridge, UK*

Parkinson's disease is often described as a movement disorder, but it profoundly affects many other aspects of cognition and behaviour. In this workshop, we will show how structural and functional imaging has radically changed our understanding of the behavioural changes in Parkinson's disease. With a workshop in mind, the four complementary presentations have been chosen to illustrate powerful combinations of neuroimaging with computational models, genetics and psychopharmacology. They also show how imaging can go beyond descriptive studies to develop and test theoretical frameworks in the context of disease, with direct relevance to nosology and therapeutics. Several themes link across the four presentations.These include: (1) Brain imaging has revealed both dopamine-dependent and dopamine-independent compensatory mechanisms that maintain movement and action decisions, especially in pre-symptomatic and young patients. (2) Although dopaminergic therapy improves akinetic-rigidity or tremor, it may further impair reward and action decisions and impulse control in patients (3) The contributions of the striatum and frontal cortex to inhibition differ – although dopamine agonists may deregulate action-reward associations in both.

Learning Objectives: Having completed this workshop, participants will be able to:
1. Understand the major structural and functional changes underlying behavioural change in Parkinson's disease;
2. Understand the coexistent abnormalities in the selection and inhibition of actions; and
3. Understand the principles of integration of fMRI with computational models, genetics and other imaging modalities.

Too Much of a Good Thing: fMRI studies of Dopamine and Behaviour in PD
Valerie Voon, *Behavioural and Clinical Neuroscience Institute, Cambridge University, Dept. Experimental Pcyhology, Cambridge, UK*

Tonic Dopaminergic Stimulation Alters the Orbitofrontal Cortex Response to Behavioural Consequences: A Contributory Mechanism to Pathological Gambling in PD
Antonio P. Strafella, *Division of Brain Imaging & Behaviour Systems – Neuroscience, Toronto Western Research, Toronto, Ontario, Canada*

Imaging Genomics and Motor Compensation in PD Sub Groups
Hartwig Siebner, *Danish Research Centre for Magnetic Resonance, Hvidovre Hospital, Copenhagen, Denmark*

Prefrontal-Premotor Interactions for Action in PD: Effects of Dopamine and Age Revealed by fMRI
James Rowe, *MRC Cognition and Brain Sciences Unit, Cambridge, UK*

10:00 – 11:30
200 ABC

LOC Symposium

Imaging the Aging Human Brain

Chair: Julien Doyon, *University Of Montreal, Department Of Psychology, Functional Neuroimaging Unit, Montreal, Canada*

In the past two decades we have learned much about how growing older affects the brain. Some of the most exciting findings emerging from this work indicate that brain physiology parameters such as cerebral blood flow and resting metabolism, structure and function at the network level as well as cognition are altered in both normal and pathological aging. In this symposium, Dr. Hoge will first describe a series of studies in cohorts of young and older subjects where he is using quantitative methods such as arterial spin-labeling and MRI calibration procedures in order to explore changes in brain physiological responses that are related to aging. Second, Dr. Grady will review her work on how the functional connectivity of brain networks, such as the default network (DN), are influenced by aging and affect cognition across multiple domains (e.g., perception, attention, memory). She will then discuss a new avenue of research based on brain variability and show that variability of the BOLD signal is associated with

optimal cognitive performance, but is reduced with aging. Finally, Dr. Weiner will describe the use of MRI and PET imaging to detect changes associated with brain aging including brain atrophy, amyloid accumulation, changes associated with cerebrovascular disease, and structural and functional connectivity.

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

1. Understand key factors affecting BOLD response amplitude, how these can influence outcomes in neuroimaging studies of aging, and strategies to control for age-related physiological differences;
2. Gain exposure to new methods of understanding brain function and how age differences in brain activity can underlie reduced cognitive processing in older adults; and
3. Appreciate the utility of various imaging techniques to quantify brain aging that account for the neuropsychological changes associated with aging, and to demonstrate the value of using imaging modalities together in a multivariate approach for investigating the aging brain.

Functional Neuroimaging of Vascular and Metabolic Factors in Cognitive Aging
Rick Hoge, *Unité de Neuroimagerie Fonctionnelle, Montréal, QC, Canada*

Neural Mechanisms of Cognitive Aging: Functional Connectivity and Brain Noise
Cheryl Grady, *Rotman Research Institute, Baycrest Centre, Toronto, Ontario, Canada*

Multimodality MRI of Neurodegenerative Disease: The Alzheimer's Disease Neuroimaging Initiative
Michael Weiner, *University of California San Francisco, San Francisco, CA, USA*

Making the connection: EEG and fMRI in cognitive research

Lunch Symposium sponsored by Philips Healthcare

Prof. Dr. Klaas Enno Stephan
Psychiatric diseases: Towards models of individual mechanisms
Laboratory for Social & Neural Systems Research, Dept. of Economics, University of Zurich

Dr. Karen Mullinger
Tips & Tricks: Combining EEG and fMRI
Sir Peter Mansfield Magnetic Resonance Centre, University of Nottingham

Philips Lunch symposium
Monday June 27th 12:15pm – 1:45pm
Room 205 ABC
Lunch will be provided for first 200 attendees

PHILIPS
sense and simplicity

»monday, june 27

Scientific Program

11:30 – 12:00
200 ABC

Keynote Lecture

A Common Distributed Neural Circuit, Optimized Over Development, Mediates Both Face and Word Recognition
Marlene Behrmann, *Carnegie Mellon University, Pittsburgh, PA, USA*

Marlene Behrmann will present behavioral and neural (BOLD, structural/functional connectivity analyses and resting state data) evidence from normal and neuropsychological individuals revealing that complex visual recognition is subserved by a common distributed circuit that becomes tuned, over development, to be optimized for orthography and for faces in the left and right hemispheres, respectively.

12:00 – 13:00
Lunch — Cafeteria Open

13:00 – 15:30
400 ABC

Poster Session

Poster #'s 1-1117 MT: Even numbered posters stand-by

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

Disorders of the Nervous System: Alzheimer's Disease and Other Dementias**,** Autism, Developmental Disorders, Epilepsy, Mood and Anxiety Disorders, Traumatic Brain Injury

Emotion and Motivation: Reward and Punishment, Sexual Behavior

Higher Cognitive Functions: Executive Function**,** Imagery, Music

Imaging Methods: Anatomical MRI, BOLD fMRI, Diffusion MRI, Non-BOLD fMRI

Modeling and Analysis Methods: Image Registration and Computational Anatomy**,** Motion Correction and Preprocessing

Multivariate Modeling: PET Modeling and Analysis**,** Segmentation and Parcellation**,** Task-Independent and Resting-State Analysis**,** Univariate Modeling**,** Other Methods

Language: Language Acquisition, Language Comprehension and Semantics

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

Lifespan Development: Aging

Neuroanatomy: Anatomy and Function**,** White Matter Anatomy, Fiber Pathways and Connectivity

Perception and Attention: Attention: Auditory/Tactile/Motor, Attention: Visual**,** Chemical Senses: Olfaction, Taste, Consciousness and Awareness**,** Sleep and Wakefulness

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

Social Neuroscience: Self Processes**,** Social Cognition**,** Social Interaction

13:00 – 15:30
400 ABC

Interactive Posters (I-Posters)

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts to small groups at computer kiosks located in the poster hall.

13:00 – 13:30

15 MT: Baboon Validations of the Cortical Column Cosine Aiming Model of TMS Induced Brain Activations — Salinas (Computer #1)

37 MT: Superior Performance of a Multi-Stage PET Classifier for the Alzheimer's Disease Cascade — Strother (Computer #3)

99 MT: Altered Functional Deactivation and Connectivity in the "Resting Brain" in Autism — Murdaugh (Computer #4)

101 MT: Vibrotactile Phase-Locking in First-Degree Relatives of Persons with Autism Spectrum Disorders — Rojas (Computer #5)

13:30 – 14:00

129 MT: Functional Connectomics in ADHD: Insights from the ADHD-200 Sample — Mennes (Computer #1)

177 MT: Functional Activation Patterns in Hippocampal Subfields in Temporal Lobe Epilepsy — Das (Computer #2)

179 MT: Preoperative EEG-Correlated fMRI Analyses with Electrocorticographic Validation — van Houdt (Computer #3)

181 MT: Functional Connectivity in Patients with Generalized Epilepsy — Maneshi (Computer #4)

225 MT: Associations Between Thyroid Hormone Transporter Gene Variants and Grey Matter Volume Changes — Dixson (Computer #5)

14:00 – 14:30

359 MT: FMRI Task Parameters Influence Hemodynamic Activity in Regions Implicated in Cognitive Set-Shifting — Witt (Computer #2)

865 MT: The Effects of the Training of Multi Tasks on Brain Structures — Takeuchi (Computer #5)

14:30 – 15:00

615 MT: Model-Driven Conformal Parameterization of the Cortical Surface — Auzias (Computer #1)

647 MT: Group Information Guided ICA for Analysis of Multi-Subject fMRI Data — Du (Computer #2)

769 MT: Inferring Brain Activation from Spatial Modulations of fMRI BOLD Distribution — Ng (Computer #3)

945 MT: Standardized Parieto-Frontal Connectivity Map Obtained with Cortico-Cortical Evoked Potentials — Matsumoto (Computer #5)

15:00 – 15:30

1063 MT: Effects of a Reattribution Training on Neural Correlates of Feedback Processing in Children — Özyurt (Computer #2)

1071 MT: Political Orientation Relates to Structural Brain Volume Differences – van der Leij (Computer #3)

1103 MT: Development of Real-Time Mapping System for Interpersonal Synchrony During Hyperscan fMRI — Jang (Computer #4)

15:30 – 16:45

200 ABC

Symposium

Imaging the Relevance of Sleep for Brain Function

Chair: Julie Carrier, *Université de Montréal; Center of Advanced Research in Sleep Medicine, Hopital du Sacre-coeur de Montreal, Montreal, QC, Canada*

Recent sleep studies using a multi-modal brain imaging approach (structural and functional MRI, PET, MRS, TMS and high-density EEG) made significant advancement in understanding the role of sleep in brain functions and cerebral plasticity. These studies demonstrate important reciprocal interactions between sleep and wakefulness on regional brain function. In this symposium, we will present emerging data on neural correlates of cognition during a normal waking day and during sleep loss. We will show that dynamic changes in brain responses evolve across the sleep-wake and circadian cycles in a regionally-specific manner. We will also demonstrate that even a single night of total sleep deprivation affects decision making and its neural correlates. Importantly, we will discuss neural correlates of non rapid eye movement (NREM) sleep oscillations and how regional brain activity during sleep is modified by previous waking experience. The role of sleep and of specific sleep stages on neural correlates of motor learning consolidation will also be presented. Finally, we will illustrate the value of using the arsenal of brain imaging tools that have been developed in human cognitive neuroscience to tackle the underlying mechanisms of insomnia. Intriguingly, some of the results suggest that part of the structural deviations that have been reported in psychiatric diseases might in fact relate also to the disturbed sleep that most of these patients have, not necessary only to the psychiatric illness in itself. This symposium will provide insights on the interaction between sleep and waking activity, and their influence on regional brain activity in humans.

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

1. Understand how neural correlates of learning and cognition during wakefulness are modulated by specific sleep states, acute sleep loss and insomnia;
2. Discuss how brain activity during sleep is modulated by previous wake activity; and
3. Illustrate how insomnia might account for some of the structural deviations in psychiatric disease.

Reciprocal Interactions Between Sleep and Wakefulness

Pierre Maquet, *Cyclotron Research Centre, University of Liège, Liège, Belgium*

continued on next page

Symposium, continued

Sleep and Motor Memory Consolidation
Julien Doyon, *University Of Montreal, Department of Psychology, Functional Neuroimaging Unit, Montreal, Canada*

Sleep Deprivation and its Effects on Risky Decision Making and Evaluation
Michael Chee, *Duke-NUS Graduate Medical School, Singapore, Singapore*

Imaging Causes and Consequences of Insomnia
Eus JW Van Someren, *Head Dept. Sleep & Cognition, Netherlands Institute for Neuroscience, VU University Amsterdam and Leiden University Medical Center, Amsterdam, The Netherlands*

16:45 – 17:15
200 ABC

Keynote Lecture

Human Brain Graphs and Other Networks
Ed Bullmore, *University of Cambridge, Cambridge, UK*

In recent years, graph theory has been used increasingly to measure topological properties of human brain networks derived from various modalities of neuroimaging data. Here I will review what we have learnt about the organization of human brain networks by mapping them in the form of graphs. In particular, I will highlight the concept that complex brain networks may represent a trade-off between physical connection cost and topological efficiency. I will also show how human brain networks can be compared to other information processing networks and how we might be able to use this way of looking at the human brain connectome to provide diagnostic markers of neuropsychiatric disorders and to support development of new drugs for their treatment.

17:30 – 19:00

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.

2000 C

O-M1: Brain MRI: Exploring Spatial Resolution, Temporal Resolution and Contrast
Chair: Karla Miller, *FMRIB Centre, Oxford University, John Radcliffe Hospital Headington, Oxford, UK*

17:30
555 MT: K-Space and q-Space: Combining Ultra-High Spatial and Angular Resolution in Diffusion Imaging at 7T
Robin M. Heidemann, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

17:45
444 MT: Dependence of T2* Relaxation of Brain White Matter on B0 Orientation
Jongho Lee, *Department of Radiology, University of Pennsylvania, Philadelphia, PA, USA*

18:00
608 MT: Comparison of DfMRI, SE- and GRE-BOLD fMRI responses using group analysis
Toshihiko Aso, *Human Brain Research Center, Kyoto University Graduate School of Medicine, Kyoto, Japan*

18:15
475 MT: Ultra-Fast Functional Imaging of Human Visuomotor Cortex Using Echo-Shifted MR Inverse Imaging
Wei-Tang Chang, *Institute of Biomedical Engineering, National Taiwan University, Taipei, Taiwan, Republic of China*

18:30
477 MT: Microvascular Temporal Dynamics Using the Spin Echo Hemodynamic Impulse Response at 7 T
Jeroen C. W. Siero, *Rudolf Magnus Institute, Utrecht, Netherlands*

18:45
556 MT: Histological Validation of DW-MRI Tractography in Human Post-Mortem Tissue
Arne Seehaus, *Department of Biology, Technical University Darmstadt, Darmstadt, Germany*

2000 B

O-M2: Decision Making
Chair: David Zald, *Vanderbilt University, Nashville, TN, USA*

17:30
368 WTh: Intra-Parietal Sulcus Links Decisions to Actions and Receives Value-Modulated Inputs from vmPFC
Miriam Klein-Flügge, *Sobell Department, Institute of Neurology, UCL, London, UK*

17:45
357 MT: Fronto-Parietal Connections are Modulated by Cognitive Control and Working Memory: A DCM Study
Ian Harding, *University of Melbourne, Melbourne, Australia*

18:00
431 MT: Artificial Grammar Learning in Music: The Role of White Matter in the Right Hemisphere
Psyche Loui, *Harvard Medical School, Boston, MA, USA*

18:15
369 WTh: The Amygdala Becomes Reward-Sensitive When an Outcome Cannot Be Assigned to the Correct Decision
Kay H. Brodersen, *ETH Zurich, Zurich, Switzerland*

18:30
358 MT: Competition and Inhibition in Human Voluntary Action Selection
Jiaxiang Zhang, *MRC cognition and brain science unit, Cambridge, UK*

18:45
372 WTh: Led Into Temptation? Subliminally Presented Reward Cues Bias Incidental Economic Decisions
Stefan Bode, *Psychological Sciences, The University of Melbourne, Melbourne, Victoria*

200 ABC

O-M3: Disorders of the Nervous System: Methods
Chair: Michael Milham, *Phyllis Green and Randolph Cōwen Institute for Pediatric Neuroscience, NYU Langone Medical Center, New York, NY, United States*

17:30
220 MT: Cingulate MRspectroscopy is Related to Abnormal Graph Metrics in the Salience Network in Depression
Dorothea Irene Horn, *Otto-von-Guericke University, Magdeburg, Germany*

17:45
953 WTh: Connectome Classification: Statistical Graph Theoretic Methods for Analysis of MR-Connectome Data
Joshua Vogelstein, *Johns Hopkins University, Baltimore, USA*

18:00
175 MT: Epilepsy: Multifocality is Based on Pathological Increased Connectivity in the Default Mode Network
Michael Siniatchkin, *Clinic for Neuropaediatrics, UK-SH Kiel, Kiel, Germany*

18:15
222 MT: FcMRI Study of the Default Mode Network in School Age Children with History of Preschool Depression
Michael S. Gaffrey, *Washington University School of Medicine, St. Louis, USA*

18:30
994 WTh: Surface-Based TBM Boosts Power to Detect Disease Effects on the Brain: An N=804 ADNI Study
Yalin Wang, *School of Computing, Informatics, Decision Systems Engineering, Arizona State University, Tempe, AZ*

18:45
371 WTh: Trait Impulsivity and Interindividual Differences in the Neural Mechanisms Underlying Self Control
Esther Diekhof, *Center for Translational Research in Systems Neuroscience and Psychiatry, Georg August University, Göttingen, Germany*

2000 A

O-M4: Modeling and Analysis Methods: Multivariate Approaches
Chair: Bertrand Thirion, *INRIA Saclay, Gif sur Yvette, France*

17:30
545 WTh: Generative Embedding for Model-Based Classification of fMRI Data
Kay H. Brodersen, *ETH Zurich, Zurich, Switzerland*

17:45
666 WTh: Linked ICA of Multiple WM and GM Measures Reveals Multimodal Components with Distinct Age Profiles
Adrian R. Groves, *FMRIB Centre, University of Oxford, Oxford, UK*

18:00
547 WTh: Multivariate Mapping of fMRI Data Using Kernel Regression with Multiple Predictors
Giancarlo Valente, *Maastricht University, Maastricht, Netherlands*

18:15
548 WTh: Inter-Subject Hyperalignment of Neural Representational Spaces in the Auditory Cortex
J. Swaroop Guntupalli, *Dartmouth College, Hanover, NH, USA*

18:30
549 WTh: Mechanisms of Hemodynamic-Based Decoding of Information Conveyed in Orientation Columns
Zeshan Yao, *McGill University, Montreal, Canada*

18:45
768 MT: Volumetric Computational Model for Neurovascular Coupling and BOLD fMRI
Zikuan Chen, *Mind Research Network, Albuquerque, NM, USA*

tuesday, june 28

Scientific Program

8:30 – 9:45
2000 A

Morning Workshop

Magnetic Resonance Spectroscopy: A Re-Emerging Tool for Neuroscience

Chairs: Charlotte Stagg, *FMRIB, University of Oxford, John Radcliffe Hospital, Oxford, UK* and Paul Matthews, *FMRIB, University of Oxford, John Radcliffe Hospital, Oxford, UK*

Magnetic Resonance Spectroscopy (MRS) is the original MR technique but it has, to some extent, been overtaken by the now more familiar MR imaging methods. However, although MRS has until now been mostly confined to clinical applications, recent advances in sequence development and the advent of ultra-high field MR have increased the sensitivity of MRS, thereby extending its utility. MRS allows quantification of neurochemicals within localised regions of the brain, allowing assessment of neuronal and glial function, metabolic activity and neuronal degeneration. Perhaps of particular interest are the ongoing developments that allow the use MRS to quantify the neurotransmitters GABA and glutamate, allowing a window into synaptic activity and plasticity.

This symposium aims to explain the basis of MRS for the non-expert audience, and provide some data on the biochemical and physiological processes underlying the observable signals. We will then go on to discuss the functional relevance of these findings and the utility of the technique to study plasticity before highlighting the potential advances with ultra-high field.

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

1. Understand the possibilities and limitations of MRS as a neuroscience tool;
2. Appreciate the relationships between neurotransmitter concentrations and behaviour in a range of brain regions; and
3. Have an awareness of the potential neuroscience applications of MRS at ultra-high field.

What Are We Actually Measuring with MRS?
Douglas Rothman, *Yale University School of Medicine, Magnetic Resonance Research Center John Radcliffe Hospital, New Haven, CT, USA*

What MRS Can Tell Us About Behaviour
Krish Singh, *CUBRIC, School of Psychology University of Cardiff, Cardiff, Wales, UK*

MRS – Providing a Window on Plasticity?
Charlotte Stagg, *FMRIB, University of Oxford John Radcliffe Hospital, Oxford, UK*

Ultra-High Field Spectroscopy – The Next 10 Years
Jeroen van der Grond, *Leiden University Medical Centre, Leiden University, Leiden, The Netherlands*

8:30 – 9:45
200 ABC

Morning Workshop

Workshop in Computational Social Neuroscience

Chair: George Christopoulos, *Computational Psychiatry Unit, Baylor College of Medicine, Houston, TX, USA*

Computational approaches in neuroscience and psychology have been successful in explaining behavioral and neural dynamics underlying fundamental perceptual and cognitive processes. More recently, the application of computational models has begun to inform behavioral and neural underpinnings of socio-psychological phenomena. From a basic science perspective, methodological tools for studying the neural dynamics of social behavior are important for understanding biological mechanisms that have evolved to solve challenges faced by creatures living within social environments. From a clinical perspective, their importance is highlighted by the need to address the multiple and diverse social deficits evident across different psychiatric illnesses. The scarcity of both diagnostic and modeling tools to adequately describe and quantify the dynamics underlying pathological social behavior underscores the importance of a computational social neuroscience approach. In this workshop / workshop attendees will be exposed to the most recent theoretical and applied advances in computational social neuroscience. The workshop will first provide an overview of the field, and demonstrate the ability of these approaches to identify computations implemented in neural structures previously associated with social cognition. In a second talk, novel paradigms investigating social perception using naturalistic stimuli will be presented. This will be followed by specific illustrations of the significance of combining fMRI and diffusion weighted imaging techniques in both humans and macaques for understanding social computations common across species. Finally, the workshop will illustrate how computational methods take into account the apparent, but often ignored, heterogeneity of social behavior within the population.

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

1. Understand the methodology and the prospects of fusing computational approaches, cognitive neuroscience and the analysis of social behavior;
2. Explore solutions to problems in social behavior research, such as heterogeneous populations, and understanding neural computations supporting social behavior across species; and
3. Identify challenges and opportunities for future research in social neuroscience.

Computational Model-Based fMRI of Social Inference and Learning
Jeff Cooper, *California Institute of Technology, Pasadena, CA, USA*

A Parametric Approach to Studying Empathy and Person Perception
Kevin Ochsner, *Social Cognitive Neuroscience Laboratory Department of Psychology Columbia University, New York City, NY, USA.*

The Medial Frontal Cortex in Social Cognition in Humans and Macaques
Matthew FS Rushworth, *Decision and Action Laboratory, University of Oxford, Oxford, UK*

Adding the Principle of Inhomogeneity to Social Computational Neuroscience
Brooks King-Casas, *Virginia Tech Carilion Research Institute; Department of Psychology, Virginia Polytechnic Institute and State University; Salem VA Medical Center, Roanoke, VA, USA*

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8:30 – 9:45

2000 B

Morning Workshop

The Next Generation of Human Digital Brain Atlases for the HBM Community

Chairs: Gary Egan, *Monash University, Melbourne, Victoria, Australia* and Katrin Amunts, *Institute of Neuroscience and Medicine, Juelich, Germany*

The integration of human brain expression maps and whole brain atlases with in vivo brain imaging data will have a profound impact on the field of human brain mapping research. The speakers include George Paxinos, from the Australian Mouse Brain Mapping Consortium and Neuroscience Research Australia, Sydney who will speak on Evolution, ontologies and segmentations – the next generation of ultra high resolution MRI brain atlases. The second speaker is Michael Hawrylycz from the Allen Brain Institute, Seattle who will speak on the development of neuroinformatics platforms for using human brain gene expression maps with human brain imaging data. The final speaker is Jan Bjaalie from the Institute of Biomedical Sciences, Oslo and formerly the director of the International Neuroinformatics Coordinating Facility (INCF). He will discuss how combining gene expression maps with brain imaging data is leading to significant advances in understanding the human brain.

Learning Objectives: The objective of the workshop is to present:

1. The next generation of MRI human brain atlases obtainable at ultrahigh field MRI;
2. The first whole human brain gene expression maps (being developed at the Allen Brain Institute);
3. The neuroinformatics systems (online databases, ontologies, 3D image visualisers, etc) for using these maps and atlases; and
4. How the neuroimaging and neuroanatomy communities will benefit from these developments.

Evolution, Ontologies and Segmentations in the Next Generation of Ultra High Resolution MRI Brain Atlases

George Paxinos, *Neuroscience Research Australia, Sydney, NSW, Australia*

Neuroinformatics Platforms for Using Human Brain Gene Expression Maps with Neuroimaging Data

Michael Hawrylycz, *Allen Brain Institute, Seattle, WA, USA*

Will Human Gene Expression Maps Revolutionize Human Brain Mapping Research? A View from the INCF Digital Atlasing Community

Jan Bjaalie, *Institute of Basic Medical Sciences, University of Oslo, Oslo, Norway*

8:30 – 9:45

2000 C

Morning Workshop

Multimodal Functional Neuroimaging Integrating EEG, MEG and fMRI: Why and How

Chairs: Bin He, *University of Minnesota, Minneapolis, MN, USA* and Christoph M. Michel, *Functional Brain Mapping Laboratory, Dept. of Fundamental Neurosciences, University Medical School, University of Geneva, Geneva, Switzerland*

Noninvasive functional neuroimaging, as an important tool for basic neuroscience research and clinical diagnosis, continues to face the need of improving the spatial and temporal resolution. While existing neuroimaging modalities might approach their limits in imaging capability mostly due to fundamental as well as technical reasons, it becomes increasingly attractive to integrate multiple complementary modalities in an attempt to significantly enhance the spatiotemporal resolution that cannot be achieved by any modality individually. Electrophysiological and hemodynamic signals reflect distinct but closely coupled aspects of the underlying neural activity. Combining fMRI and EEG/MEG data allows us to study brain function from different perspectives. Leading scientists from four centers in three countries will present recent advances in multimodal functional neuroimaging integrating EEG, MEG and fMRI. Proposed lectures include combination of EEG and MEG to enhance electromagnetic source imaging, integration of fMRI with EEG to achieve EEG-informed fMRI analysis in epilepsy, combination of EEG source imaging with simultaneously recorded fMRI, and dynamic integration of EEG with fMRI in both event related paradigm and resting states. This workshop is aimed at providing a timely review of significant recent advances in multimodal functional neuroimaging studying both healthy subjects and patients suffering from epilepsy.

Learning Objectives: Participants in this workshop will:

1. Learn basic concepts and applications of integrating electrophysiological and hemodynamic signals; and
2. Learn state of the art of multimodal functional neuroimaging integrating EEG, MEG and fMRI.

EEG-Informed fMRI Analysis in Epilepsy

Jean Gotman, *Montreal Neurological Institute, Montreal, Quebec, Canada*

Combination of MEG and EEG: From Sensor-Level Analysis to Source Modeling
Matti S. Hämäläinen, *Massachusetts General Hospital, Charlestown, MA, USA*

Combining EEG Source Imaging with fMRI in Simultaneous Recordings
Christoph M. Michel, *Functional Brain Mapping Laboratory, Dept. of Fundamental Neurosciences, University Medical School, University of Geneva, Geneva, Switzerland*

Dynamic Integration of EEG with fMRI in Event Related Paradigms and Resting States
Bin He, *University of Minnesota, Minneapolis, MN, USA*

10:00 – 10:30
200 ABC

Keynote Lecture

The Functional Basis of Hemodynamic Brain Imaging: Role of Astrocytes
Mriganka Sur, *Massachusetts Institute of Technology (MIT), Cambridge, MA, USA*

Our work provides direct evidence that astrocytes regulate hemodynamic signals that are critical for noninvasive brain imaging. By two-photon imaging of calcium signals in the visual cortex in vivo, we have shown that astrocytes, like neurons, have very specific responses to stimuli. Intrinsic mapping signals are highly sensitive to astrocyte activation but are surprisingly independent of neuronal activity.

10:45 – 12:15

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.

200 ABC
O-T1: Disorders of the Nervous System: Psychiatry
Chair: Hao Yang Tan, *National Institute of Mental Health, Bethesda, MD, USA*

10:45
78 WTh: A Disrupted Affective Pathway in Adolescent Schizophrenia Offspring Evidenced using fMRI and DCM
Sunali Wadehra, *Wayne State University School of Medicine, Detroit, MI, USA*

11:00
79 WTh: Abnormal Prediction Error Signaling and Dopamine Levels in Subjects at Ultra-High Risk of Psychosis
Christopher A. Chaddock, *King's College London, Institute of Psychiatry, London, UK*

11:15
1 WTh: Dissecting Frontal Lobe Contributions to Drug Craving with fMRI and TMS
Takuya Hayashi, *Montreal Neurological Institute, McGill University, Montreal, Canada*

11:30
221 MT: Dissociable Patterns of Hippocampal Functional Connectivity Distinguish Between Anxiety Disorders
Ashley Chen, *Stanford University, Stanford, CA, USA*

11:45
679 WTh: Impaired Short-Range Functional Connectivity in Schizophrenia Disrupts Organization of rfMRI Network
Aaron Alexander-Bloch, *NIMH Child Psychiatry Branch, Bethesda, MD, USA and University of Cambridge Brain Mapping Unit, Cambridge, UK*

12:00
128 MT: Using Resting-State fcMRI to Characterize the Developmental Course of Subjects with ADHD
Damien Fair, *Oregon Health & Science University, Portland, OR, USA*

2000 B
O-T2: High-Resolution and FunctionalNeuroanatomy
Chair: Karl Zilles, *Institute of Neuroscience and Medicine, Research Center Juelich, Germany*

10:45
472 MT: Advances in High-Resolution Functional Imaging of Hippocampal Subregions at 7 Tesla
Nanthia Suthana, *University of California-Los Angeles, Los Angeles, USA*

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Scientific Program

Oral Sessions, continued

11:00
925 MT: Task-Based Functional Connectivity of Two Cytoarchitectonic Visual Areas on the Human Fusiform Gyrus
Julian Caspers, *C.&O. Vogt Institute for Brain Research, University of Düsseldorf, Düsseldorf, Germany*

11:15
557 MT: Isotropic Sub-Millimeter Diffusion MRI in Humans at 7T
Alfred Anwander, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

11:30
949 MT: Functional Zones within the Human Subthalamic Nucleus
Christian Lambert, *Wellcome Trust Centre for Neuroimaging, London, UK*

11:45
995 WTh: DTI of the Human Thalamus: Hemispheric and Gender Variability
Sarah Mang, *German Cancer Research Center, Heidelberg, Germany*

12:00
955 WTh: Connectional Anatomy of the Middle Temporal Gyrus
And Umit Turken, *US Dept of Veterans Affairs, Research Service, Martinez, USA*

2000 C
O-T3: Language
Chair: Pascale Tremblay, *Center for Mind & Brain Sciences (CIMeC), University of Trento, Mattarello (TN), Italy*

10:45
793 WTh: Language Discrimination in the Infant Brain
Alejandrina Cristia, *LSCP, EHESS, ENS-DEC, CNRS, Paris, France*

11:00
805 MT: The Multimodal Cortex of the Superior Temporal Sulcus: A Hotspot of Language Evolution?
Patricia Morosan, *Institute of Neuroscience and Medicine, Research Centre Juelich, Juelich, Germany*

11:15
794 WTh: The Functional Organization of the Left STS: A Large Scale Meta-Analysis of PET and fMRI Studies
Einat Liebenthal, *Medical College of Wisconsin Neurology, Milwaukee, USA*

11:30
806 MT: Tracking Neural Coding of Perceptual and Semantic Attributes During Word Comprehension
Gustavo Sudre, *Carnegie Mellon University, Pittsburgh, PA, USA*

11:45
816 WTh: Identifying Regions of the Auditory Cortex Responsible for Sensory Voice Control
Amy Parkinson, *University of Texas Health Science Center, San Antonio, TX, USA*

12:00
807 MT: Developmental Changes in Audiovisual Integration of Speech and Accompanying Gestures
Susan Lee, University of Rochester School of Medicine & Dentistry, Rochester, NY, USA

2000 A
O-T4: Learning and Memory
Chair: Scott Grafton, *Department of Psychological & Brain Sciences, University of California, Santa Barbara, Santa Barbara, CA, USA*

10:45
366 WTh: Orbitofrontal Cortex Distributes Reinforcement to the Decision That Caused It
Kay H. Brodersen, *ETH Zurich, Zurich, Switzerland*

11:00
829 WTh: Greater Integration of a Cortico-Striatal Network Following Consolidation of Motor Sequence Learning
Karen Debas, *University of Montreal, Montreal, Canada*

11:15
841 MT: Image-Invariant Neural Priming of Faces is Associated with Changes in Functional Connectivity of FFA
W. Dale Stevens, *Harvard University, Cambridge, MA, USA*

11:30
864 MT: Transient Neural Plasticity in Human Motor Cortex
Hanzhang Lu, *University of Texas Southwestern Medical Center, Dallas, TX, USA*

11:45
831 WTh: Functional Reorganization of Visuo-Motor Cortical Networks in Formula 1 Pilots Versus Naive Drivers
Giulio Bernardi, *Laboratory of Clinical Biochemistry and Molecular Biology, University of Pisa, Pisa, Italy*

12:00
843 MT: Retrieving Out-of-Body Experiences: Hippocampus Activity Depends on the Encoded Visual Perspective
Loretxu Bergouignan, *Karolinska Institute, Stockholm, Sweden*

12:15 – 13:15
Lunch — Cafeteria Open

13:15 – 15:45
400 ABC
Poster Session
Poster #'s 1-1117 MT: Odd numbered posters stand-by.

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

Disorders of the Nervous System: Alzheimer's Disease and Other Dementias**,** Autism, Developmental Disorders, Epilepsy, Mood and Anxiety Disorders, Traumatic Brain Injury

Emotion and Motivation: Reward and Punishment, Sexual Behavior

Higher Cognitive Functions: Executive Function**,** Imagery, Music

Imaging Methods: Anatomical MRI, BOLD fMRI, Diffusion MRI, Non-BOLD fMRI

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Scientific Program

Poster Sessions, continued

Modeling and Analysis Methods: Image Registration and Computational Anatomy, Motion Correction and Preprocessing

Multivariate Modeling: PET Modeling and Analysis, Segmentation and Parcellation, Task-Independent and Resting-State Analysis, Univariate Modeling, Other Methods

Language: Language Acquisition, Language Comprehension and Semantics

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

Lifespan Development: Aging

Neuroanatomy: Anatomy and Function, White Matter Anatomy, Fiber Pathways and Connectivity

Perception and Attention: Attention: Auditory/Tactile/Motor, Attention: Visual, Chemical Senses: Olfaction, Taste, Consciousness and Awareness, Sleep and Wakefulness

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

Social Neuroscience: Self Processes, Social Cognition, Social Interaction

13:15 – 15:45
400 ABC

Interactive Posters (I-Posters)

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts to small groups at computer kiosks located in the poster hall.

13:15 – 13:45

16 MT: FMRI and Concurrent Paired Pulse TMS at M1 — Schmidt-Samoa (Computer #1)

36 MT: Concurrent Analysis of Structural MRI and Proteomics Data Using Parallel ICA in Alzheimer's Disease — Ganjgahi (Computer #2)

98 MT: Multivariate Classification of Structural MRI in Children with Autism — Uddin (Computer #3)

100 MT: Canonical Correlation Analysis of Cortical Thickness in Adolescents with Autism Spectrum Disorders — Misaki (Computer #4)

176 MT: Activelets Decomposition and Sparse Representation of Epileptic Activity in fMRI — Lopes (Computer #5)

13:45 – 14:15

180 MT: A Multimodal Analysis of Thalamocortical Dysfunction in Juvenile Myoclonic Epilepsy — O'Muircheartaigh (Computer #1)

224 MT: Altered Ventral Anterior Cingulate Connectivity in Young People with Major Depressive Disorder — Davey (Computer #2)

226 MT: Cortical Thickness Correlates of Anxious/Depressed Symptoms in a Large Cohort of Heathy Children — Ducharme (Computer #3)

430 MT: Musical Practice Induces Hippocampal Plasticity: A VBM study — Groussard (Computer #5)

14:15 – 14:45

474 MT: Fine Segregation of the Visual System During Resting-State — Mesmoudi (Computer #1)

476 MT: Multi-Echo EPI with Parallel Transmission Z-Shimming for Increased Sensitivity in BOLD fMRI — Poser (Computer #2)

478 MT: Breathing Gas Calibration for MR CMRO2 Mapping: Comparative Effects on Functional Brain Networks — Ivanov (Computer #3)

480 MT: Event-Related Real-Time fMRI at 3 Tesla using Echo-Volumar-Imaging — Posse (Computer #4)

14:45 – 15:15

616 MT: Whole Brain Diffeomorphic Mapping via the Integration of Sulcal Curves, Cortical Surfaces and Images — Zhong (Computer #1)

646 MT: Gaussian Processes for Whole-Brain Feature Selection and Classification in fMRI — Lomakina (Computer #2)

770 MT: Utilization, Congestion and Blocking in Large-Scale Brain Networks — Misic (Computer #3)

700 MT: Rehabilitation in Chronic Stroke Normalizes Motor System Resting State Connectivity — Wittenberg (Computer #4)

702 MT: Combined fMRI/EEG to Map Non-Genomic Effects of Exogeneous Cortisol — Kiem (Computer #5)

15:15 – 15:45

926 MT: Structure and Function of the Subthalamic Nucleus — Forstmann (Computer #1)

946 MT: FIBRATLAS: A Method for Cerebral White Matter Tracts Dissection Monitoring and 3D Reconstruction — Zemmoura (Computer #2)

948 MT: TBSS of the Neonatal Brain: Depiction of Specific Neural Phenotypes — Ceschin (Computer #3)

1048 MT: Induced Visual Gamma Amplitude Increases Monotonically with Stimulus Size — Singh (Computer #4)

1062 MT: "Increased Connectivity of Emotional Brain Systems after Criticism in Neurotic Women" — Servaas (Computer #5)

16:00 – 17:15

200 ABC

Symposium

Novel Approaches to Image Multisensory Body Self-Perception

Chair: Henrik Ehrsson, *Department of Neuroscience, Retzius väg 8, Stockholm, Sweden*

This symposium brings together four leading experts that use a combination of novel imaging and behavioral approaches to study the multisensory mechanisms of body perception. Dr. Amedi uses multi frequency fMRI spectral analysis and fMRI adaptation approaches to map multiple somatotopical representations of the body in the parietal and frontal lobes activated by imagination, illusions and physical multisensory stimulation. Dr. Beauchamp uses TMS and model based fMRI to identify parietal mechanisms for the integration of visual and tactile signals. Dr. Ehrsson uses MRI-compatible virtual reality technology to create novel illusions of owning entire artificial bodies to characterize the multisensory mechanisms of body self-perception. Finally, Dr. Serino uses a combination of behavioral, TMS and fMRI experiments to study the integration of multisensory information between self and others. The topic of this symposium is timely as body-self perception has recently become a hot topic in cognitive neuroscience, and a number of state-of-the-art imaging analysis tools have recently been employed in this area.

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

1. Understand the multisensory mechanisms of body self-perception; and
2. Learn about novel analysis approaches to map multiple body representations in the cortex.

A Brain Full of Body Maps: Cortical Mapping of the Somatosensory, Visual, Motor and Mental Imagery Representations of Our Body Scheme using fMRI

Amir Amedi, *Dept. of Physiology – Faculty of Medicine & Program of Cognitive Science, The Hebrew University of Jerusalem Ein Karem, Jerusalem*

Reliability-Weighted Multisensory Integration

Michael S. Beauchamp, *Department of Neurobiology and Anatomy, University of Texas Health Science Center at Houston, Houston, TX, USA*

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Symposium, continued

Illusion of Owning an Entire Artificial Body Reveals the Multisensory Mechanism of Body Self-Perception
Henrik Ehrsson, *Department of Neuroscience, Retzius väg 8, Stockholm, Sweden*

Sharing Visuo-Tactile Experience Between Self and Other
Andrea Serino, *Dipartimento di Psicologia, ALMA MATER STUDIORUM – Università di Bologna, Bologna, Italy*

17:15 – 17:45
200 ABC

Keynote Lecture

The Neurobiology of Social Norm Compliance
Ernst Fehr, *University of Zurich, Zurich, Switzerland*

All known human societies establish social order by punishing cheaters and norm violators. In recent years, neuroeconomists have discovered important components of the neural circuitry underlying human norm obedience and norm enforcement. The lecture will document that the dorsolateral prefrontal cortex — a brain area particularly well developed in humans – is key in this human ability. Non-invasive down-regulation of neural activity in prefrontal cortex reduces norm compliance despite the fact that individuals are still able to distinguish between "right" and "wrong". Neuroeconomic research on young children – whose prefrontal cortex is not yet well developed – shows similar patterns. These results thus indicate dissociation between the ability to obey social norms and the knowledge of the content of the social norms, which complicates the attribution of responsibility for norm violations.

18:00 – 19:30
400 ABC

Poster Reception

Poster #'s 1-1117 MT: All Posters

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

Disorders of the Nervous System: Alzheimer's Disease and Other Dementias**,** Autism, Developmental Disorders, Epilepsy, Mood and Anxiety Disorders, Traumatic Brain Injury

Emotion and Motivation: Reward and Punishment, Sexual Behavior

Higher Cognitive Functions: Executive Function**,** Imagery, Music

Imaging Methods: Anatomical MRI, BOLD fMRI, Diffusion MRI, Non-BOLD fMRI

Modeling and Analysis Methods: Image Registration and Computational Anatomy**,** Motion Correction and Preprocessing

Multivariate Modeling: PET Modeling and Analysis**,** Segmentation and Parcellation**,** Task-Independent and Resting-State Analysis**,** Univariate Modeling**,** Other Methods

Language: Language Acquisition, Language Comprehension and Semantics

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

Lifespan Development: Aging

Neuroanatomy: Anatomy and Function**,** White Matter Anatomy, Fiber Pathways and Connectivity

Perception and Attention: Attention: Auditory/Tactile/ Motor, Attention: Visual**,** Chemical Senses: Olfaction, Taste, Consciousness and Awareness**,** Sleep and Wakefulness

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

Social Neuroscience: Self Processes**,** Social Cognition**,** Social Interaction

8:30 – 9:45
2000 B

Morning Workshop

Multi-Modal Mapping of the Aging Brain in Health and in Disease

Chairs: David H. Salat, *A. A. Martinos Center for Biomedical Imaging/MGH, Harvard Medical School, Charlestown, MA, USA* and J. Jean Chen, *A. A. Martinos Center for Biomedical Imaging/MGH, Harvard Medical School, Charlestown, MA, USA*

Older adults undergo complex neural changes as part of the typical aging process, which are greatly exacerbated by age-related neurological illnesses such as cerebrovascular disease and dementia. These neural changes contribute to the well-documented cognitive and functional decline in older adults; an increasing epidemic on society given the rapidly expansion of this population as well as the prevalence of detrimental age-associated illnesses across the globe.

The past decade has seen the burgeoning of neuroimaging research, providing unprecedented power to elucidate mechanisms healthy aging and age-associated disease across a range of domains, including brain morphometry, neural tissue microstructure, cerebral hemodynamics and dynamic neural processes. We propose to bring together four leading scientists in the areas of structural, functional, vascular and cognitive aging, applying the most current and innovative brain mapping techniques to the study of brain aging and disease. Given the goal of the OHBM to provide education on groundbreaking research across imaging modalities, we have focused on domains that we believe to be the most prominent and active in aging research. This workshop features imaging applications in aging, but also involves investigators developing cutting-edge neuroimaging techniques. We expect that this format will therefore a) provide a timely overview of brain mapping in aging to individuals new to the field; b) introduce novel techniques to veteran aging researchers; and c) underscore the need for multi-modal integration in attaining a more complete, unbiased view of aging and age-associated neurological diseases.

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

1. Acquire basic understanding of neuroimaging markers of aging/dementia and associated cognitive evidence;
2. Develop high-level understanding of commonly used neuroimaging techniques and image processing procedures for studying aging and dementia; and
3. Establish an understanding of current and future challenges in neuroimaging of aging and dementia.

Anatomical Mapping: Structural Network Analysis in the Aging Brain

Alan C. Evans, *McConnel Brain Imaging Centre/Montreal Neurological Institute, Montreal, QC, Canada*

Micro-Structural Mapping: Diffusional Kurtosis Imaging (DKI) for the Assessment of Brain Tissue Microstructure in Aging

Joseph A. Helpern, *South Carolina Medical Center/New York University, New York, NY, USA*

Neurovascular Factors in fMRI of Aging: Problems and Solutions

Thomas T. Liu, *UCSF Center for Functional MRI, La Jolla, CA, USA*

Multi-Modal Mapping in Pathology: Neuroimaging Predictors of Cognitive Decline and Resilience in the Baltimore Longitudinal Study of Aging

Susan Resnick, *Laboratory of Personality and Cognition/National Institute on Aging, Biomedical Research Center, Baltimore, MD, USA*

8:30 – 9:45
2000 A

Morning Workshop

Magnetic Susceptibility Imaging of the Human Brain

Chair: Karla Miller, *FMRIB Centre, Oxford University, John Radcliffe Hospital Headington, Oxford, UK*

Magnetic susceptibility has been long known to provide rich information about brain structure and function. Susceptibility forms the basis of both functional MRI and MR venography, based on the BOLD effect. These established techniques have had an enormous impact on clinical and basic neuroscience. In recent years, however, the evolution to higher field strengths (7T and higher) has prompted a renaissance in susceptibility-based imaging techniques. Beyond the cerebro-vasculature, magnetic susceptibility is now understood to reflect iron content, myelination and even white matter fibre geometry. Despite focusing largely on results obtained in the brain, the resurgence of interest in susceptibility has primarily remained within the MRI physics community. This workshop aims to raise discussion and interest in these techniques within the broader neuroimaging community, which has much gain from and to contribute to the development of these techniques. The program will begin with an overview of this rapidly-evolving field by one of its pioneers, Prof. Mark Haacke, and then move on to cutting-edge techniques and recent advances in our understanding of this important contrast mechanism.

Morning Workshop, continued

Learning Objectives: Having completed this workshop, participants will be able to:
1. Explain how magnetic susceptibility has enabled scientists to study the cerebrovasculature;
2. Describe the fundamental techniques and challenges for detecting and quantifying tissue susceptibility, and potential clinical applications of this information; and
3. Discuss recent advances in our understanding of the numerous sources of susceptibility contrast in the brain.

Susceptibility-Weighted Imaging: History, Successes and Future Potential
E. Mark Haacke, *Wayne State University, Detroit, MI, USA*

Beyond Venography: Sources of Phase Contrast in White and Gray Matter
Jongho Lee, *Department of Radiology, University of Pennsylvani, Philadelphia, PA, USA*

Quantitative Susceptibility Imaging and Its Clinical Potential
Richard Bowtell, *University of Nottingham, Sir Peter Mansfield Magnetic Resonance Centre School of Physics and Astronomy, Nottingham, UK*

Beyond Phase: Mining the Riches of Magnetic Susceptibility
Karla Miller, *FMRIB Centre, Oxford University, John Radcliffe Hospital Headington, Oxford, UK*

8:30 – 9:45
2000 C

Morning Workshop

The Hippocampus
Chair: Simon Duchesne, *Centre de recherche Université Laval Robert-Giffard, Québec, QC, Canada*

The hippocampus is known to be involved in virtually all aspects of memory, learning, and emotion. Unsurprisingly then, it is implicated in a range of neurological and neuropsychiatric disorders ranging from Alzheimer's disease to Zunich-Kaye syndrome. Thus, precise and accurate measurement of hippocampal anatomy, physiology and function rests at the heart of many research endeavors. This is evidenced by the more than 6,000 new articles per year being added to the already large body of knowledge related to this subcortical structure. In the Hippocampus workshop we wish to relay some of these advances, specifically as they pertain to human hippocampal neuroanatomy in vivo. The Hippocampus workshop brings together leading experts in neuroanatomical imaging (Dr. Giovanni B. Frisoni, Brescia, Italy), aging processes (Dr. Jens C. Pruessner, Montreal, Canada), diffusion tensor imaging and high-field MRI (Dr. Susumu Mori, Baltimore, USA), and neurological diseases (Dr. Clifford R. Jack, Rochester, USA). The aim is to provide audience members with state of the art coverage of recent findings and methodological advances towards an harmonized neuroanatomical definition of the hippocampus (Dr. Frisoni); hippocampal volumetry and atrophy rates throughout aging (Dr. Pruessner); hippocampal connectivity and subfield imaging (Dr. Mori); and major pathological processes affecting the hippocampus, especially Alzheimer's disease (Dr. Jack).

Learning Objectives: Having completed this workshop, participants will be able to:
1. Describe human hippocampal neuroanatomy and connectivity;
2. Conceptualize issues and limitations involved in the structural assessment of the human hippocampus in vivo; and
3. Evaluate hippocampal volumes and atrophy rates in the context of normal aging and diseases.

Towards a Harmonized Protocol for Hippocampal Segmentation
Giovanni B. Frisoni, *LENITEM, IRCCS San Giovanni di Dio, Brescia, Italy*

Hippocampal Volumes Throughout the Ages
Jens C. Pruessner, *McGill University, McGill Centre for Studies in Aging , Verdun, Quebec, Canada*

Hippocampal Connectivity
Susumu Mori, *John Hopkins University, School of Medicine, Department of Radiology, Baltimore, Maryland, USA*

Hippocampal Pathology
Clifford R. Jack, *Mayo Clinic, Rochester, Minnesota, USA*

8:30 – 9:45

200 ABC

Morning Workshop

Group Inference For On-Going Activity: How to Compare Intrinsic Functional Connectivity Between Subjects

Chair: Gael Varoquaux, *Neurospin/INRIA, CEA Saclay, Gif-sur-Yvette, France*

Ongoing processes account for a large fraction of the brain activity observed in functional imaging. The study of this intrinsic, or spontaneous, activity is currently a major field of research in neuroscience, as it opens the door to fundamental insights on brain architecture and can be applied to severely impaired patients for the study of pathologies. However, unlike with evoked activity, there is no universally-accepted standard analysis framework for group inference. This workshop will present latest progress in statistically-principled methods for inter-subject comparisons of ongoing activity. It will feature different approaches used to test for differences in spontaneous brain activity between subjects or populations with neuroscientifically-relevant results, such as ICA or graphical models, and will focus on the statistics and interpretation issues raised by the inter-subjects comparisons.

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

1. Understand and apply different state-of-the-art modeling strategies for group inference on ongoing activity;
2. Interpret the differences detected by various methods in terms of functional connectivity; and
3. Devise and carry out functional-imaging experiments to highlight differences in on-going activity.

Robust and Unbiased Multi-Subject RSN Analysis Using ICA and Dual Regression

Christian Beckmann, *Department of Medicine, Imperial College London, London, UK*

Graph Theoretical Analysis of Brain Networks in Clinical States

Ed Bullmore, *University of Cambridge, Cambridge, UK*

Comparison of Multi-Subject ICA Methods for Analysis of fMRI Data: Consistency and Variability of Intrinsic Networks in the Healthy and Diseased Brain

Vince Calhoun, *MIND Research Network/University of New Mexico, Albuquerque, NM, USA*

Functional-Connectivity Group Inference on Correlation Matrices with Application to Strokes

Gael Varoquaux, *Neurospin/INRIA, CEA Saclay, Gif-sur-Yvette, France*

10:00 – 10:30

200 ABC

Keynote Lecture

The Anterior Prefrontal Cortex and the Representation of Counterfactual Choices

Matthew Rushworth, *University of Oxford, Oxford, UK*

The representation of counterfactual choices, the choices that we could take, but do not, may depend on lateral anterior prefrontal cortex (aPFC). An aPFC circuit may be particularly well developed in humans. The aPFC tracks the relative advantage in favour of switching to an alternative choice and it has a signal that could guide learning about counterfactual options even in the absence of direct experience of those options.

10:45 – 12:15

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.

2000 C

O-W1: Brain Structure and Function Across the Lifespan

Chair: Heather Bortfeld, *Department of Psychology, University of Connecticut, Storrs, CT, USA*

10:45

863 WTh: Detection of Hemispheric Asymmetries during Early Folding by Surface-Based Analysis of Fetal MRI

Piotr A. Habas, *University of California San Francisco, San Francisco, CA, USA*

11:00

875 MT: *CACNA1C* Polymorphism Modulates Age-Related Changes in Brain Circuitry During Memory Retrieval

Michael White, *National Institute of Mental Health, National Institutes of Health, Bethesda, MD, USA*

11:15

876 MT: Regional Reduction in Fractional Anisotropy as an Early Marker of Glucose-Related Brain Damage

Heike Wersching, *Institute of Epidemiology and Social Medicine, University of Münster, Münster, Germany and Department of Neurology, University of Münster, Münster, Germany*

Scientific Program

Oral Sessions, continued

11:30
877 MT: Executive Function is Associated with White Matter Integrity of the Prefrontal Cortex During Aging
Paul Borghesani, *University Of Washington, Seattle, WA, USA*

11:45
878 MT: Reduced Organization of the Default Mode Network in the Aging Brain: Association with Cognition
Tyler Triggs, *MGH Neurology/MGH/MIT/HMS Athinoula A. Martinos Center for Biomedical Imaging, Charlestown , MA, USA*

12:00
879 MT: Impact of Lifestyle Parameters on Accelerated Brain Aging in Healthy Elderly Subjects
Katja Franke, *Structural Brain Mapping Group, Department of Psychiatry, University of Jena, Jena, Germany*

200 ABC
O-W2: Emotion, Motivation and Action
Chair: Dana Small, *The John B. Pierce Laboratory, Yale University School of Medicine, Yale University*

10:45
236 WTh: Effects of (Nor)Adrenergic and HPA Axis Blockade on Stress-Related Large-Scale Network Connectivity
Erno Hermans, *Radboud University Nijmegen, Donders Institute, Centre for Cognitive Neuroimaging, Nijmegen, Netherlands*

11:00
319 MT: Striatal Activity During Initial Processing of Novel Music Predicts Subsequent Reward Value
Valorie Salimpoor, *Montreal Neurological Institute, McGill, CIRMMT, BRAMS, Montreal, QC, Canada*

11:15
919 WTh: Functional Connectivity Reveals the Mid-Cingulate Cortex as Center Axis of Intentional Motor Control
Felix Hoffstaedter, *Department of Psychiatry and Psychotherapy, Aachen, Germany*

11:30
237 WTh: Overnight Therapy? Sleep De-Potentiates Emotional Brain Reactivity
Els van der Helm, *University of California Berkeley, Berkeley, CA, USA*

11:45
238 WTh: Emotional Contagion Facilitates Social Interaction by Synchronizing Brains Across Individuals
Lauri Nummenmaa, *Aalto University School of Science and Technology, Espoo, Finland and Turku PET Centre, Turku, Finland*

12:00
914 WTh: The Search for the Neural Mechanisms of the Set Size Effect
Trenton Jerde, *New York University, New York, NY, USA*

2000 B
O-W3: Genetics and Informatics
Chair: David Glahn, *Yale University, New Haven, CT, USA*

10:45
341 WTh: Establishing Datasharing Standards in Neuroimaging
Standards for Neuroimaging Datasharing Task Force, *International Neuroinformatics Coordinating Facility, Stockholm, Sweden*

11:00
342 WTh: Towards Large-Scale Automated Synthesis of the Human Neuroimaging Literature
Tal Yarkoni, *University of Colorado at Boulder, Boulder, CO, USA*

11:15
316 WTh: Bridging the Gap Between Imaging and Genetics: A Multivariate Statistical Investigation
Edith Le Floch, *CEA Neurospin, Saclay, France*

11:30
295 WTh: Shared Molecular Architecture of Craniofacial and Brain Development
M. Mallar Chakravarty, *Rotman Research Institute – Baycrest, Toronto, Ontario, Canada*

11:45
294 WTh: Genetic Associations of Brain Structure to Serum Transferrin: An MRI and DTI Analysis (N=615)
Neda Jahanshad, *Laboratory of Neuro Imaging, Dept. of Neurology, UCLA School of Medicine, Los Angeles, CA, USA*

12:00
MeCP2 Affects Frontal Structure and Metabolism Differentially in Healthy Subjects and Depression
Philipp Sämann, *MPI of Psychiatry, Munich, Germany*

2000 A

O-W4: Physiology of Neuroimaging Signals

Chair: Kamil Uludag, *Department of Cognitive Neuroscience, Maastricht Brain Imaging Centre (MBIC), Maastricht University, Maastricht, The Netherlands*

10:45

1047 MT: Variability of the Electro-Physiologic Hemodynamic Relationship Across Cortical Regions in Humans

Christopher Conner, *University of Texas Medical School at Houston, Houston, TX, USA*

11:00

1039 MT: The BOLD MRI Post-Stimulation Undershoot in Human Primary Motor Cortex is Not Caused By Elevated CBV

Peter Dechent, *MR-Research in Neurology and Psychiatry, Universitymedicine Goettingen, Goettingen, Germany*

11:15

370 WTh: Sub-Second Measurements of Dopamine Release in Human Striatum During a Sequential Investment Game

Kenneth Kishida, *Virginia Tech Carilion Research Institute, Roanoke, VA, USA*

11:30

1040 MT: Alteration in Cerebral Blood Flow During a Change in Glycemic State

Peter Kochunov, *University of Texas Health Science Center at San Antonio, San Antonio, TX, USA*

11:45

1041 MT: Cortical Depth-Dependent Temporal Dynamics of the BOLD Response in the Human Brain

Jeroen C. W. Siero, *Rudolf Magnus Institute, Utrecht, Netherlands*

12:00

17 MT: How do Gyral Orientation and White Matter Anisotropy Affect the Electric Field Induced by TMS?

Alexander Opitz, *Max Planck Institute for Biological Cybernetics, Tuebingen, Germany*

12:15 – 13:15

Lunch — Cafeteria Open

13:15 – 15:45

400 ABC

Poster Session

Poster #'s 1-1115 WTh: Even numbered posters stand-by

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

Emotion and Motivation: Emotional Learning**,** Emotional Perception

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

Informatics: Atlases**,** Databasing and Data Sharing**,** Pipelines

Higher Cognitive Functions: Decision Making, Reasoning and Problem Solving, Space, Time and Number Coding

Imaging Methods: EEG, MEG, MR Spectroscopy, Multi-Modal Imaging, Optical Imaging/NIRS**,** PET

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

Language: Reading and Writing**,** Speech Perception, Speech Production**,** Learning and Memory**,** Skill Learning**,** Working Memory

Lifespan Development: Normal Brain Development: Fetus to Adolescence

Motor Behavior: Basal Ganglia/Brainstem/Spinal Cord Function, Brain-Machine Interface, Cerebellar Function**,** Eye Movements/ Visuomotor System Function**,** Motor-Premotor Cortical Functions

Neuroanatomy: Brain Networks**,** Cortical Anatomy and Segregation**,** Subcortical Structures

Perception and Attention: Perception: Auditory/ Vestibular, Perception: Multisensory and Crossmodal, Perception: Pain and Visceral, Perception: Tactile/Somatosensory, Perception: Visual

wednesday, june 29

Scientific Program

13:15 – 15:45
400 ABC

Interactive Posters (I-Posters)

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts to small groups at computer kiosks located in the poster hall.

13:15 – 13:45

3 WTh: Methamphetamine Dependent and Control Subjects Use Different Neural Strategies for Delay Discounting — Hoffman (Computer #1)

185 WTh: Abnormalities in the Microstructure of the Attention Network in Adults with ADHD — Wu (Computer #2)

187 WTh: Cognitive Processing of Food Stimuli in Chronically Ill and Recovered Women with Anorexia Nervosa — Smeets (Computer #3)

43 WTh: Mechanisms of Perseveration of Action in Parkinson's Disease — Hughes (Computer #4)

45 WTh: Mapping Connectivity in the Cortical-Subcortical Motor Circuits of Parkinson's Disease Patients — Sharman (Computer #5)

13:45 – 14:15

47 WTh: Dopamine Synthesis and Resting Brain Activity in Parkinsonism Associated with Gaucher Disease — Masdeu (Computer #1)

81 WTh: Source Based Morphometry Analysis of Group Differences in Fractional Anisotropy in Schizophrenia — Abbott (Computer #2)

239 WTh: DCMs of Cortical and Subcortical Pathways for Salient Stimuli — Garrido (Computer #3)

367 WTh: Automatic Processing of Political Preferences in the Human Brain — Tusche (Computer #4)

14:15 – 14:45

445 WTh: M/EEG Source Localization with Sparse Time-Frequency Priors in Source Space — Gramfort (Computer #1)

447 WTh: The Default Mode Network is a Core for MEG Power Correlation with Other Networks in the Beta Band — de Pasquale (Computer #2)

533 WTh: Imaging Dopamine Neurotransmission During Response Selection and Inhibition — Badgaiyan (Computer #3)

795 WTh: Do Elderly Hear with Their Premotor Cortices? — Tremblay (Computer #4)

14:45 – 15:15

797 WTh: New Evidence for a Fronto-Parietal Network in Processing Intelligible Speech — Abrams (Computer #1)

843 WTh: Pre-Chemotherapy Differences in Working Memory in Breast Cancer Patients Compared to Controls — Scherling (Computer #3)

593 WTh: Enhanced Localization in Deterministic Tractography Analyses with Along-Tract Statistics — Colby (Computer #4)

15:15 – 15:45

595 WTh: Influence of Image Reconstruction from Multichannel Diffusion MRI on Fibre Orientation Estimation — Sotiropoulos (Computer #1)

683 WTh: T2*-Dependence Distinguishes Functional Networks from Artifact Components in Individual-Subject ICA — Kundu (Computer #2)

1023 WTh: Reduced Occipital Alpha Power Indexes Enhanced Excitability Rather than Improved Visual Perception — Lange (Computer #3)

1039 WTh: Multivariate Decoding of Pain and the Quest for Legal Evidence — Brodersen (Computer #4)

16:00 – 17:15
200 ABC

Symposium

Glimpsing at Neuronal Connectivity through the Hemodynamic Veil? What We Can and Cannot Do with Biophysical Dynamic Models of fMRI Connectivity
Chair: Pedro A. Valdes-Sosa, Cuban Neuroscience Center, Cubanacan, Playa, Ciudad Habana, Cuba

In spite of solid advances in modeling effective connectivity with fMRI, there has been much recent discussion about whether HRF convolution and coarse sampling place hard limits on what can be inferred. In fact, it has even be questioned whether any type of neuronal lag information is perceivable through the hemodynamics, as illustrated in the failure of many popular methods in extensive computer simulations. Many of these failures are due to the indiscriminate use of off-the-shelf procedures uninformed by the biophysics of fMRI. The symposium audience will get an overall picture on the differing approaches to connectivity modeling by proponents of al sides of recent discussions. Dr. Steve Smith will present evidence from exhaustive simulations that many popular methods as currently used are unable to detect lagged information in neuronal dynamics. Dr. Alard Roebroeck will discuss basic theory of fMRI model identifiability and present results on the robustness of these models to HRF convolution and coarse sampling Dr. Karl Friston will extend DCM with stochastic formulations and model search techniques which overcome limitations of both Granger and Bayes Net formulations of causality Dr. Valdes-Sosa will present new techniques for causal discovery with continuous space / continuous time neural models that shows how lag information is actually conserved in discrete models Discussion of 1) Neuronal Lags & hemodynamic variability, 2) Stochastic dynamic models and 3) Model search, will point to future directions for better fMRI connectivity modeling.

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

1. Better identify the assumptions and limitations of methods biophysical dynamical fMRI connectivity methods;
2. Understand the differences between and communalities among SEM, DCM and Granger causality models – Appreciate the research opportunities' that created by these methods; and
3. Identify the open development opportunities created by the unsolved problems.

Lag-Based Causality from FMRI Data?
Steve Smith, *Oxford University Centre for Functional MRI of the Brain, Radcliffe Building University Hospital, Oxford, UK*

What Can We Estimate That We Can't See? Unique Connectivity Identification with fMRI
Alard Roebroeck, *Maastricht Brain Imaging Center, Dept. of Psychology & Neuroscience, Maastricht University , Netherlands*

Dynamic Causal Modeling of Endogenous Fluctuations
Karl Friston, *The Wellcome Trust Centre for Neuroimaging, Institute of Neurology, UCL, UK*

You Can't Recover Lag Information from Lagless fMRI Models!
Pedro A. Valdes-Sosa, *Cuban Neuroscience Center, Cubanacan, Playa, Ciudad Habana, Cuba*

12:00 – 12:30
200 ABC

Keynote Lecture

Lateral Prefrontal and Parietal Contributions to Working Memory: Monitoring and Manipulation
Michael Petrides, *McGill University, Montreal, Quebec, Canada*

Macaque monkey and human lesion studies have shown that the mid-dorsolateral prefrontal cortex is critical for the monitoring of information in working memory. Functional neuroimaging studies show that this prefrontal region is in close interaction with the posterior parietal cortex for the manipulation of information in working memory. The parietal cortex appears to play the major role in the manipulation of information.

17:45 – 18:15

200 ABC

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 feedback to the OHBM leadership. Updates on future meeting sites and council elections will be presented.

Club Night: *Espaces Dalhousie*

84, rue Dalhousie, C.P. 80, Succ. Haute-Ville, Québec
Québec, Canada, G1R 4M8

20:00 – 1:00

Spend an evening at Espaces Dalhousie. Located inside the Terminal de croisières de Pointe-à-Carcy, a brand-new building with a unique architectural design, Espaces Dalhousie provides a magnificent view of the St. Lawrence River. The Terminal's own architecture, along with its many windows, make it a place that is full of life and light, a window on the beauty of Quebec City's scenery. Entertainment features live music by a DJ, Ernst Meyer's Synaptic FunKtion, and JoSH. The party is complimentary to registrants. Additional guest tickets are $50.00. Directional maps are available at the Registration Desk.

8:30 – 9:45
200 ABC

Morning Workshop

Imaging Genetics: Multivariate Analyses for Neural and Genetic Circuitry
Chair: Jessica Turner, *Mind Research Network, Albuquerque, NM, USA*

Large datasets of neuroimaging data and genome-wide scan (GWS) data are coming together in multiple disorders. The univariate analyses of imaging and genetic data in combination has produced evidence of genetic effects on brain structure and function in schizophrenia, Alzheimer's Disease, autism, and others. The presentations in this panel will build upon previous symposia and workshops on imaging genetics, and present current applications of multivariate analyses of structural and functional neuroimaging and GWS data. Multivariate approaches are particularly well-suited to extracting the patterns of covarying functional or structural signal in imaging, and genetic patterns in GWS data, while improving sensitivity and reducing the number of corrections for multiple statistical tests. Dr. Nichols will present an overview of the issues in both the imaging and genetic analyses from univariate to multivariate, including examples from canonical correlate methods as applied to Alzheimer's Disease. Dr. Glahn addresses the complexity that applying multivariate methods brings to family studies in contrast to the case-control analyses, and how that affects both identification and interpretation of the results. Dr. Poline will present the application of the partial least squares (PLS) technique to European imaging genetics datasets, including multi-block methods for the inclusion of clinical or other variables in the larger analysis. Dr. Calhoun will review the variations of independent component analysis (ICA) as applied to multimodal imaging genetic analyses, including SNP data, CNV analyses, and epigenetics.

Learning Objectives: Having completed this workshop, participants will be able to:
1. Recognize a variety of multivariate methods in imaging genetics analyses, and the flexibility of their approaches, their underlying assumptions and implications;
2. Identify key issues in interpreting multivariate imaging genetics results, both from a statistical and biological point of view; and
3. Discuss examples of multivariate imaging genetics analyses in a variety of experimental designs.

From Univariate to Multivariate Imaging Genetic Analyses
Thomas Nichols, *University of Warwick, Coventry, UK*

Determining the Optimal Imaging Phenotype
David C. Glahn, *Yale University, New Haven, Connecticut, USA*

Data Analysis Strategy for Large Imaging Genetics Study Using Exploratory Multivariate Methods
Jean-Baptiste Poline, *Neurospin, I2BM, CEA, Gif sur Yvette, France*

From Basepairs to Epigenetics: An ICA Framework for Identifiying Genetic Effects on Brain Imaging Measures
Vince D. Calhoun, *MIND Research Network/University of New Mexico,Albuquerque, NM, USA*

8:30 – 9:45
2000 A

Morning Workshop

MRI of Tissue Micro-Structure and Connectivity
Chair: Yaniv Assaf, *MRI, Dept. of Neurobiology Tel Aviv University, Tel Aviv, Israel*

"Nothing defines the function of a neuron better than it's connections" (Mesulem)

The last two decades of neuroimaging have been dominated by assessment of function, but to fully understand the brain, it is important to characterize its structure and connections. The recent development of non-invasive methods for mapping tissue macrostructure and microstructure, have lead to a renaissance in assessing connectivity in vivo.

The aim of this workshop is to provide an overview of current methods for elucidating tissue micro-structure with MRI. A special emphasis will be given to the relation between micro-structure and connectivity in the human brain.

Learning Objectives: Having completed this workshop, participants will:
1. Become familiarized with new diffusion based MRI methods for studying tissue micro-structure;
2. Learn how to assess tissue integrity and brain connectivity features using micro-structural measures; and
3. Discuss what the histological correlates of diffusion MRI measurements are.

Diffusion MRI of Tissue Micro-Structure
Yaniv Assaf, *MRI, Dept. of Neurobiology Tel Aviv University, Tel Aviv, Israel*

continued on next page

Morning Workshop, continued

Measuring Connectivity with Diffusion Imaging — State of the Art and Future Directions
Heidi Johansen-Berg, *Oxford of University, Oxford, UK*

Brain Tumor Invasion and Clinical Relevance of Induced Changes in Microstructure and Connectivity
Alberto Bizzi, *Dept. of Neuroradiology, Fondazione IRCCS Istituto Neurologico Carlo Besta, Milano, Italy*

Diffusion MRI in the Developing Brain from Animal Models to Humans
Petra Huppi, *Pediatrics, Division of Child Development & Growth University of Geneva, Geneva, Switzerland*

8:30 – 9:45
2000 C

Morning Workshop

Scale-Free Dynamics and Critical Phenomena in Cortical Activity
Chair: Tjeerd Boonstra, *School of Psychiatry, University of New South Wales, Sydney, Australia, NSW, Australia*

The brain is composed of many highly interconnected neurons that form a complex self-organizing system, from which emerge thought, behavior and creativity. By studying the dynamics of this network, some basic motifs can be identified. Recent technological and computational advances have led to rapidly accumulating empirical evidence that spontaneous cortical activity exhibits scale-free behavior. Multiple experiments have identified neural processes without a preferred timescale in the spatial propagation of avalanches in cortical slice activity and in time series of local field potentials. Even at the largest scale, scale-free behavior can be observed in the power distributions of brain rhythms as observed by electroencephalography (EEG) and functional magnetic resonance imaging (fMRI). These findings may indicate that brain dynamics are close to a critical state, which has important consequences for how the brain organizes computation. By drawing analogies between collective activities of interacting neurons and complex dynamics in natural systems, we can apply some concepts from the physical sciences to the setting of the brain. In particular, the theory of phase transitions and criticality can be used to characterize and interpret collective neuronal dynamics in a new light. Despite converging support for scale-free dynamics in cortical activity, the implications for cognitive functions are still largely to be determined. The aim of this workshop is to facilitate the discussion by specifically addressing the interpretation and applications of such motifs in neural activity. What does this new perspective tell us about the brain and how is it relevant for the cognitive functions it performs?

Learning Objectives: Having completed this workshop, participants will be able to:
1. Understand the implication of power law distributions in cortical activity;
2. Learn how to accurately detect and characterize scale-free and critical behavior in neuroimaging data; and
3. Assess the relevance of critical behavior for cognitive (dys)function.

The Criticality Hypothesis: How Cortical Networks Might Optimize Information Processing
John M. Beggs, *Department of Physics, Biocomplexity Institute, Indiana University, Bloomington, IN, USA*

The Temporal Structures and Functional Significance of Scale-Free Brain Activity
Biyu J. He, *National Institute of Neurological Disorders and Stroke (NINDS), NIH, Bethesda, MD, USA*

Scaling Behavior of Neuronal Oscillations in Health and Disease
Klaus Linkenkaer-Hansen, *Center for Neurogenomics and Cognitive Research (CNCR), VU University Amsterdam, Amsterdam, The Netherlands*

Neurobiologically Realistic Determinants of Self-Organized Criticality in Large Networks of Spiking Neurons
Michael Breakspear, *Queensland Institute of Medical Research, Brisbane, Australia*

8:30 – 9:45
2000 B

Morning Workshop

The Physiology and Pathology of the Parietal Lobe in Visuomotor Integration
Chairs: Ferdinand Binkofski, *Division for Neurological Cognition Research, RWTH Aachen University, Aachen, Germany* and Pieter Medendorp, *Donders Institute for Brain, Cognition and Behaviour, Radboud University Nijmegen, Nijmegen, Netherlands*

Optic ataxia (OA) is classically defined as a deficit of visually guided movements that follows lesions of the posterior part of the posterior parietal cortex (PPC). Since the formalization of the

double stream of visual information processing and the use of OA as an argument in favor of the involvement of the posterior parietal cortex (dorsal stream) in visually guided movements, research on the spatio-temporal mechanisms underlying visuomotor processing in this structure has intensified. With the advent of new imaging techniques, analysis methods, and modeling frameworks, research has also begun to decode the human PPC and its neuropsychology. This workshop brings together researchers who study parietal cortex function from different, but complementary perspectives, addressing the motoric and cognitive control of finger, hand, arm or eye movements in monkeys, humans and patients, using neuroimaging (fMRI, MEG), computational, and neuropsychological approaches.

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

1. Gained a deep insight into the computational and physiological architecture of the posterior parietal lobe, and how these relate to clinical deficits; and
2. Learned how novel imaging techniques and advanced analysis methods can be applied to investigate sensorimotor integration and coordination.

Topographic Organization and Functional Response Properties of the Human Posterior Parietal Cortex
Sabine Kastner, *Princeton Neuroscience Institute, Princeton University, Princeton, New Jersey, NJ, USA*

Integration of Sensory and Motor Signals by Population of Parietal Neurons Within and Across Reference Frames
Pieter Medendorp, *Donders Institute for Brain, Cognition and Behaviour, Radboud University Nijmegen, Nijmegen, Netherlands*

Coding of Hand Actions in Human Parietal Cortex
Jody Culham, *Culham Lab, Neuroimaging of Action and Perception, The University of Western Ontario, London, Ontario, Canada*

Parietal Modules for Coding Limb Position and Space
Ferdinand Binkofski, *Division for Neurological Cognition Research, RWTH Aachen University, Aachen, Germany*

10:00 – 10:30
200 ABC

Keynote Lecture

Brain Imaging and the Developing Brain
Ghislaine Dehaene-Lambertz, *INSERM U 562 Paris, France*

Not only humans present a long developmental period, but also the different cortical regions have a particular time-course producing physical constraints on information processing. In order to understand the remarkable capacities of learning in humans, we should thus consider the particular organization of the human brain from the early days on. Brain imaging offers a unique tool to realize this goal and I will illustrate my point by showing how the infant brain organization promotes language learning in our species.

10:30 – 13:00
400 ABC

Poster Session

Poster #'s 1-1115 WTh: Odd numbered posters stand-by

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

Emotion and Motivation: Emotional Learning**,** Emotional Perception

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

Informatics: Atlases**,** Databasing and Data Sharing**,** Pipelines

Higher Cognitive Functions: Decision Making, Reasoning and Problem Solving, Space, Time and Number Coding

Imaging Methods: EEG, MEG, MR Spectroscopy, Multi-Modal Imaging, Optical Imaging/NIRS**,** PET

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

Language: Reading and Writing**,** Speech Perception, Speech Production**,** Learning and Memory**,** Skill Learning**,** Working Memory

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Poster Session, continued

Lifespan Development: Normal Brain Development: Fetus to Adolescence

Motor Behavior: Basal Ganglia/Brainstem/Spinal Cord Function, Brain-Machine Interface, Cerebellar Function, Eye Movements/ Visuomotor System Function, Motor-Premotor Cortical Functions

Neuroanatomy: Brain Networks, Cortical Anatomy and Segregation, Subcortical Structures

Perception and Attention: Perception: Auditory/ Vestibular, Perception: Multisensory and Crossmodal, Perception: Pain and Visceral, Perception: Tactile/Somatosensory, Perception: Visual

10:30 – 13:00
400 ABC

Interactive Posters (I-Posters)

I-Poster presentations highlight top ranked submitted abstracts. Authors will present their abstracts to small groups at computer kiosks located in the poster hall.

10:30 – 11:00

2 WTh: OFC Depicts Approach Preferences for Alcohol Stimuli in Alcohol Dependence — Ernst (Computer #1)

30 WTh: Increased Intrinsic Connectivity of the Orbitofrontal Cortex in Obsessive-Compulsive Disorder — Beucke (Computer #2)

186 WTh: Evaluating Diffusion Abnormalities in Sickle Cell Disease with Tract-Based Spatial Statistics — Sun (Computer #3)

44 WTh: Effects of Parkinson's Disease and Treatment on Cortico-Subcortical Network Functional Connectivity — Cole (Computer #5)

46 WTh: Why Spasmodic Dysphonia Affects Speech – An Interventional Structural and Functional MRI Study — Kell (Computer #6)

11:00 – 11:30

48 WTh: Motor Performance in Friedreich Ataxia Correlates with Diffusion Changes of the Dento-Rubral Tract — Akhlaghi (Computer #1)

82 WTh: Gene Dosage and Default Mode Network in Schizophrenia — Huang (Computer #3)

160 WTh: The Role of the Cortico-Rubro-Spinal Tract in Motor Recovery After Stroke – A DTI-Study — Ruber (Computer #4)

240 WTh: Common Representation of Pain and Negative Emotion in the Midbrain Periaqueductal Gray — Buhle (Computer #5)

314 WTh: Multi-SNP Effects on Temporal Lobe Structure Replicated in ADNI (N=738) and Queensland Twins (N=568) — Kohannim (Computer #6)

11:30 – 12:00

326 WTh: Lovastatin Normalizes the Brain Spontaneous Low-Frequency Fluctuations in Children with nf1 — Chabernaud (Computer #1)

446 WTh: Listening to Rhythmic Sound Modulates Coherence of Neuromagnetic Sensorimotor Beta Oscillation — Ross (Computer #2)

448 WTh: Localization of Oscillatory MEG Activity Combing Time-Frequency Analysis and Entropic Inference — Lina (Computer #3)

500 WTh: Time-Resolved Measurements of Cerebral Hemoglobin Concentrations During a Modified Stroop Task — Leclerc (Computer #5)

534 WTh: Serotonin Transporter Genetic Variants Predict Rostral Anterior Cingulate Dopamine Synthesis — Zhang (Computer #6)

12:00 – 12:30

796 WTh: Why Do Blind People Engage the Visual Cortex During Listening to Ultra-Fast Speech? — Ackermann (Computer #1)

842 WTh: Differentiated Parietal Connectivity of Frontal Regions for "What" and "Where" Memory — Rottschy (Computer #2)

844 WTh: Functional and Anatomical Correlates to the Performance of an Auditory Short-Term Memory Task — Bermudez (Computer #3)

538 WTh: Inferring the Individual Nature of Bayesian Learning under Multiple Forms of Uncertainty — Mathys (Computer #4)

546 WTh: Mixed-Effects Inference on Classification Performance in Group Studies — Brodersen (Computer #5)

594 WTh: Selecting the Number of Fibers in a Multi-Fiber Model from CUbe and SPhere (CUSP) Diffusion Imaging — Scherrer (Computer #6)

12:30 – 13:00

684 WTh: Dynamic Causal Modelling of EEG-fMRI Data of Epileptic Seizures — Murta (Computer #1)

954 WTh: Graph-Theory Analysis of Functional Brain Connectivity During Bimanual Coordination in the Elderly — Heitger (Computer #2)

1084 WTh: A Salience Network Supports the Processing of Unseen Faces — Troiani (Computer #4)

13:00 – 14:00

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.

200 ABC

O-Th1: Disorders of the Nervous System: Neurology

Chair: Stephane Lehericy, *Department of Neuroradiology, Head of the Center for NeuroImaging Research – CENIR, PARIS Cedex 13, France*

14:00

43 MT: Insulin Resistance Impacts Brain and Cognition and is Modulated by TOMM40 in Middle-Aged Adults

Auriel Willette, *Wisconsin Alzheimer's Disease Research Center, Department of Medicine, University of Wisconsin, Madison, WI, USA*

14:15

174 MT: Distinct Patterns of Brain Abnormalities in Different Idiopathic Generalized Epilepsy Syndromes

Donald Gross, *University of Alberta, Edmonton, Canada*

14:30

184 WTh: Involvement of Spinal Sensory Pathway in Amyotrophic Lateral Sclerosis Detected with DTI and MT

Mohamed-Mounir EL MENDILI, *UMR-678, INSERM-UPMC, Pitié-Salpêtrière Hospital, Paris, France*

14:45

1016 MT: Measuring Intracortical Communication in Non-Communicating Patients

Mario Rosanova, *University of Milan, Milan, Italy*

15:00

159 WTh: Cortical Activation Changes Underlying Stimulation-Induced Functional Improvements in Chronic Stroke

Charlotte Stagg, *University of Oxford, Oxford, UK*

15:15

178 MT: Longitudinal Changes in White Matter and Language Outcome After Anterior Temporal Lobe Resection

Mahinda Yogarajah, *UCL Institute of Neurology, London, UK*

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Oral Sessions, continued

2000 C

O-Th2: Modeling and Analysis Methods: Brain Connectivity
Chair: Mark Woolrich, *FMRIB, John Radcliffe Hospital, Headington, Oxford, UK*

14:00
669 MT: Persistent Network Homology from the Perspective of Dendrograms
Hyekyoung Lee, *Seoul National University, Seoul, Korea, Republic of*

14:15
678 WTh: Stable Clusters of Brain Regions Associated with Distinct Motor Task-Evoked Hemodynamic Responses
Pierre Orban, *Functional Neuroimaging Unit, CRIUGM, University of Montreal, Montreal, Canada*

14:30
681 WTh: Connectome-Wide Association Studies (CWAS): A Multivariate Distance-Based Approach
Zarrar Shehzad, *Department of Psychology, Yale University, New Haven, USA*

14:45
682 WTh: Complex Network Decoding: Towards an Integration of Graph Theory and Multivariate Pattern Analysis
Matthias Ekman, *Nijmegen, Netherlands*

15:00
625 WTh: Biophysical Mechanisms of Multistability in Resting State Cortical Rhythms
Frank Freyer, *Charite University Medicine Berlin, Berlin, Germany*

15:15
680 WTh: Spontaneous Fluctuations in End-Tidal PCO2 and Apparent Resting State Functional Connectivity
Cecile Madjar, *CRIUGM, Montreal, Quebec, Canada*

2000 B

O-Th3: Perception
Chair: Jody Culham, *Culham Lab, Neuroimaging of Action and Perception, The University of Western Ontario, London, Ontario, Canada*

14:00
1082 WTh: Columnar Organization for Motion Directions in Human MT Complex Revealed by High-Resolution fMRI
Mauro Costagli, *RIKEN Brain Science Institute, Wakoshi, Saitama, Japan and University of Pisa, Pisa, Italy*

14:15
473 MT: Identifying Direction Selective Computations in Human Area MT Using Ultra High Field fMRI
Jan Zimmermann, *Maastricht University, Maastricht, Netherlands*

14:30
990 MT: Category-Specific Preparatory Bias in Lateral Occipital Complex Facilitates Rapid Target Detection
Chun Siong Soon, *Duke-NUS Graduate Medical School, Singapore, Singapore*

14:45
1083 WTh: Disentangling Visual Imagery and Perception of Real-World Objects Across the Ventral Visual Cortex
Sue-Hyun Lee, *LBC/NIMH/NIH, Bethesda, MD, USA*

15:00
924 MT: Clear Tonotopic Maps in Human Auditory Cortex measured with 7T fMRI
Sandra Da Costa, *LREN Neuroimaging Research Lab, Centre Hospitalier Universitaire Vaudois (CHUV), Lausanne, Switzerland*

15:15
1021 WTh: Occipital Cortical Thickness in Blind Individuals Predicts Performance in Auditory Tasks
Patrice Vos, *McGill University, Montreal, Canada*

2000 A

O-Th4: Social Neuroscience

Chair: Brooks King-Casas, *Virginia Tech Carilion School of Medicine, Virginia Tech University, Roanoke, VA, USA*

14:00

1060 MT: Experienced Meditators Reveal State And Trait Changes In Default-Mode Activity And Connectivity

Judson, Brewer, *Yale University School of Medicine, New Haven, CT, USA*

14:15

1100 MT: Decoding Inter-Individual Relations from Spatial Similarity of Brain Activity

Silke Anders, *University of Luebeck, Luebeck, Germany*

14:30

1070 MT: The Effects of Oxytocin on the Neural Correlates of Paternal Attachment

Dina M. Schardt, *Institute of Neuroradiology, Hannover Medical School, Hannover, Germany and NICA – Neuroimaging and Clinical Applications, Hannover, Germany*

14:45

97 MT: Auditory Cortical Structure is Related to Enhanced Pitch Processing in Autism Spectrum Disorder

Nicholas E.V. Foster, *Faculty of Medicine, Montreal Children's Hospital, McGill University, Montreal, Canada*

15:00

1061 MT: A 7T fMRI Study on Primary Somatosensory Cortex Activity During Observed Touch of Self and Others

Esther Kuehn, *Max Planck Institute for Human Cognitive and Brain Sciences, Leipzig, Germany*

15:15

1102 MT: Imaging the Social Brain: A Simultaneous Multi-Subject EEG Hyperconnectivity Study

Laura Astolfi, *University of Rome " Sapienza" and Fondazione Santa Lucia IRCCS, Rome, Italy*

17:30 – 18:30

200 ABC

Closing Comments and Meeting Highlights

Russ Poldrack, *University of Texas at Austin, Austin, TX, USA*

18:30 – 19:30

400 ABC

Farewell Poster Reception

Posters #1-1115 WTh: All posters

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Wang, Ze
Weickert, Thomas
Weisenfeld, Neil
Weiskopf, Nikolaus
Welsh, Robert
Weng, Hsu-Huei
Westerhausen, Rene
White, Corey
Willette, Auriel
Williams, Patrick
Windischberger, Christian
Wink, Alle Meije
Winkler, Anderson
Witt, Suzanne
Witte, Veronica
Wittenberg, George
Wittfoth, Matthias
Wolf, Robert Christian
Wu, Qizhu
Xu, Benjamin
Xu, Dongrong
Yacoub, Essa
Yan, Xiaodan
Yao, Bing
Yotter, Rachel
Yu, Rongjun
Yun, Kyongsik
Zahn, Roland
Zang, Yu-Feng
Zhang, Jiaxiang
Zhang, Lijun
ZHENG, WEI
Zhou, Dongming
Zhou, Juan
Zhou, Renlai
Zhou, Yuan
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Zumer, Johanna
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2011 exhibitor list

Allen Institute
Booth # 308
551 North 34th Street
Seattle 98103
USA
Phone: 206-548-7093
Email: info@alleninstitute.org
Web: www.alleninstitute.org

The Allen Institute for Brain Science, a nonprofit medical research organization, accelerates understanding of the human brain by fueling discovery across the global scientific community. To this end, the Institute generates innovative public resources and drives technological and analytical advances. The Institute's data and tools are publicly available at www.brain-map.org.

Avotec Inc.
Booth # 314
603 NW Buck Hendry Way
Stuart, FL 34994
USA
Phone: 772-692-0750 Ext. 106
Email: smccreary@avotecinc.com
Web: http://avotecinc.com/

Over nearly two decades, Avotec innovations have introduced new tools for the rapidly changing MR world; the world's only inert in-bore visual system, fiber optic subsystems, calibrated audio and visual systems, integrated patient communication, eye monitoring, affordable audio and visual solutions... Avotec's design philosophy has resulted in the only MR systems that are indistinguishable from background noise. Avotec's products are renowned for their reliability. And Avotec's technical support system is a standard for a busy and imperfect world.

BESA GmbH
Booth # 205
Freihamer Str. 18
Gräfelfing 82166
Germany
Phone: 49-89-9901-8899
Web: www.besa.de

BESA Research 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. Coming soon: BESA Statistics and FEM models.

Brain Image Analysis
Booth # 208
1341 Southview Circle
Coralville, IA 52241
USA
Phone: 319-530-2698
Email: ronald@brainimageanalysis.com
Web: www.brainimageanalysis.com

Brain Image Analysis, LLC provides image processing services for neuroscience researchers. Our methods are based on over 20 years of software development in BRAINS. We provide accurate, reliable and affordable panels of brain measures including cerebral lobes, amygdala, caudate, putamen, globus pallidus, nucleus accumbens, thalamus, hippocampus and parcellated cerebellum.

Brain Innovation
Booth # 100/102
Universiteitssingel 40
Masstricht, Limburg 6229ER
Netherlands
Phone: +31-43-3884064
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 most computer platforms ranging from mobile phones (e.g. iPhone) up to powerful multi-processor workstations. Visit our exhibition on OHBM2011 conference.

Brain Products GmbH
Booth # 300/302
Zeppelinstrasse 7
Gilching 82205
Germany
Phone: +49810573384-0
Email: sales@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 are: BCI, EEG & fMRI, ERP/EP, EEG & MEG, EEG & TMS, Behavioral Science and Sleep. At the HBM we are introducing a new amplifier system, a wireless EEG system and our BCI package.

Brain Research Center (BRC), NCTU
Booth # 105
1001 Ta-Hsueh Road
Hsinchu City 30010
Taiwan
Phone: 886-3-5712121
Web: http://brc.nctu.edu.tw/

Brain Research Center of National Chiao Tung University devotes to integrate bio-sensing technology, and cognitive neuroscience into basic neural engineering research. Mindo, this product is a novel modality of Mobile & Wireless EEG system with dry electrodes, miniaturized circuit and real-time signal processing, and this EEG device can assess neural activities of unconstrained, freely-moving participants performing ordinary tasks in natural positions and situations.

Cambridge Research Systems
Booth # 204
80 Riverside
Rochester, Kent ME2 4BH
United Kingdom
Phone: 00-44-1634-720-707
Email: sales@crsltd.com
Web: www.crsltd.com

BOLDscreen is the new high brightness, high contrast, high resolution, MRI-compatible LCD monitor from Cambridge Research Systems. LiveTrak AV is our new, affordable 60Hz MRI-compatible eye tracker. We also provide a range of response devices (button boxes and joysticks), plus accessories like MediGoggle MRI-compatible spectacles and NoMoCo head restraints.

Compumedics Neuroscan, Inc
Booth # 207
6605 West W.T. Harris Blvd, Suite F
Charlotte, NC 28269
USA
Phone: 704-749-3200
Web: www.neuroscan.com

The Neuroscan division of Compumedics has developed the CURRY software for multi-modal neuroimaging. The latest generation of CURRY incorporates the Acquisition and Signal Processing tools formally in SCAN software. CURRY supports all Compumedics EEG and ERP amplifiers and has unprecedented features to ensure a more thorough understanding of your data is achieved.

Cortech Solutions, Inc.
Booth # 213
1409 Audubon Blvd., Unit B1
Wilmington, NC 28403
USA
Phone: 910-362-1143
Web: www.cortechsolutions.com

We're known as the ERP experts, but we also offer the most advanced whole-head fNIRS systems, integrated EEG / fNIRS solutions, brain-computer interface prototyping tools (EEG and ECoG) and more! Stop by to see the latest advancements in each of these neuroimaging techniques.

Current Designs, Inc.
Booth # 307
3950 Haverford Ave
Philadelphia, PA 19104
USA
Phone: 215-387-5956
Web: www.curdes.com

Current Designs: fiber optic response devices for fMRI and MEG at over 1000 sites since 1996. Combines handheld choice (button boxes, joystick, trackball) and software flexibility, with safe, all plastic construction. Stop by Booth 307 to see our newest response devices, including the low-cost 904 and 905 Packages.

Electrical Geodesics
Booth # 201/203
1600 Millrace Drive, Suite 307
Eugene, OR 97403
USA
Phone: 541-687-7962
Email: info@egi.com
Web: www.egi.com

EGI features the (32-256 channel) Geodesic EEG/ERP System 300 for EEG research (for neonates through adults). Products include standard desktop and portable EEG configurations, the GES300MR for simultaneous EEG/fMRI recording, real-time data access for HCI research, 3D sensor registration, physiological measures, eye tracking, integrated EEG/ERP analysis, and electrical source estimation.

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Elekta Oy
Booth # 113/115/212/214
Siltasaarenkatu 18-20
Helsinki 00530
Finland
Phone: +358-9-756-2400
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 # 114/116
360 Park Ave
New York, NY 10010
USA
Phone: 212-989-5800
Web: www.elsevier.com

Academic Press/Elsevier publishes high quality books, journals, and solutions products for the neurosciences. Visit our booth to browse our new and bestselling books and learn about BrainNavigator, our 2D and 3D online tool that makes visualizing and understanding the brain easier.

fNIR Devices
Booth # 210
10801 Pleasant Hill Drive
Potomac, MD 20854
USA
Phone: 202-368-1216
Email: info@fnirdevices.com
Web: www.fnirdevices.com

fNIR 1100 is a portable functional NIRS imaging research tool capable of monitoring subject's cognitive state:

- The only stand-alone and field-deployable technology able to determine localized brain activity.
- Can be readily integrated with other physiological and neurobehavioral measures including eye tracking, respiration.
- Can effectively monitor attention and working memory.

Hitachi Medical Corporation
Booth # 215
18f, Akihabara UDX, 4-14-1 Soro-Kanda
Chiyoda-ku, Tokyo 101-0021
Japan
Phone: +81-3-3526-8426
Web: http://www.hitachi-medical.co.jp/english/index.html

Hitachi's Optical Topography® System is to measure and image dynamically changes of hemoglobin level in the brain during functional activity. The system beans near-infrared light into the head, and picks up the reflected light penetrating through the cerebral cortex. It opens a new way of assessing the brain.

Human Connectome Project, WU-Minn Consortium
Booth # 107
660 South Euclid Avenue, Campus Box 8108
St. Louis, MO 63110
USA
Web: www.humanconnectome.org

The Human Connectome Project (HCP; http://humanconnectome.org) aims to comprehensively map structural and functional connections using noninvasive neuroimaging of 1,200 healthy adults. The resultant datasets plus a set of connectivity analysis tools developed by the HCP will be made freely available via the ConnectomeDB database and Connectome Workbench visualization platform.

International Neuroinformatics Coordinating Facility
Booth # 104
Karolinska Institutet, Nobels väg 15a
Stockholm 171 77
Sweden
Phone: +46-8-524-86919
Email: janis@incf.org
Web: www.incf.org

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Mag Design and Engineering
Booth # 312
206 Jackson St
Sunnyvale, CA 94086
USA
Phone: 650-283-4410
Web: www.magconcept.com

Since its founding in 2002, Mag Design and Engineering has consistently met its goal of providing custom stimulus-delivery and response-collection hardware to the neuroimaging field. The company has produced dozens of unique, high-quality devices such as fMRI-compatible eyetracking cameras, tactile stimulus mechanisms, joysticks, musical interfaces, response pads and many others.

Magstim
Booth # 209
Spring Gardens, Whitland
Carmarthenshire, Wales SA34 OHR
UK
Phone: 011-44-1994-240798
Email: sales@magstim.com
Web: www.magstim.com

The Magstim Company Ltd is engaged in the research, development, manufacture and marketing of medical and research devices within the neurological and surgical fields. Through our products, we enable researchers and clinicians to assess, protect and improve the functioning of the nervous system in various applications.

Magventure, Inc.
Booth # 211
303 Perimeter Center North, Suite 300
Atlanta, GA 30346
USA
Phone: 888-624-7764
Email: infousa@magventure.com
Web: www.magventure.com

MagVenture is the manufacturer of MagPro magnetic stimulators for Transcranial Magnetic Stimulation (TMS). MagPro stimulators along with Localite neuro-navigation systems provide an accurate means to non invasively stimulate the brain and capture the important parameters of the stimulation for research applications in Neuroscience and Brain Mapping

Mary Ann Liebert Inc., publishers
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USA
Phone: 914-740-2100
Email: info@liebertpub.com
Web: www.liebertpub.com

Mary Ann Liebert, Inc., known for establishing authoritative peer-reviewed journals in promising areas of science/biomedical research, proudly announces the groundbreaking new journal Brain Connectivity (www.liebertpub.com/brain) exploring critical advances in brain connections. Features systems neuroscience perspective, human/animal studies, connections between regions, grey/white connections, broad modality and technique coverage, and more!

Mega Electronics Ltd
Booth # 311
Microkatu 1
Kuopio
Finland
Email: megaemg@megaemg.com
Web: www.megaemg.com

Mega Electronics Ltd is a well known manufacturer of surface EMG equipments and systems worldwide. With NeurOne EEG/ERP system Mega entered the field of EEG research offering 24 bits resolution, up to 80 kHz sampling /channel and AC/DC mode recording. Our new development includes TMS/EEG and fMRI/EEG.

NeuroDebian
Booth # 108
Hinman Box 6207, Dartmouth College
Hanover, NH 03755
USA
Phone: 603-646-9834
Email: team@neuro.debian.net
Web: neuro.debian.net

NeuroDebian (http://neuro.debian.net) tracks the latest developments of neuroscientific software and integrates them into the Debian operating system and its derivatives (e.g. Ubuntu). It delivers a complete software platform with a comprehensive set of computational tools freeing up scientists from time-consuming system maintenance.

2011 exhibitor list, *continued*

NIRx Medical Technologies, LLC
Booth # 305
15 Cherry Lane
Glen Head, New York 11545
USA
Phone: 516-676-6479
Email: info@nirx.net
Web: www.nirx.net

NIRx Medical Technologies, LLC is a world-leader in providing integrated solutions for NIRS tomographic imaging. In 1988 we introduced the concept of tomographic imaging in dense scatting media based on diffusely scattered light. We have since consistently pushed this technology forward with scientific development and product innovation. We provide custom technology solutions to the investigative community for a wide range of NIRS imaging applications. Our systems are used in the fields of neuroscience (infants to adults), breast cancer, peripheral vascular disease and the study of small animals.

NITRC-Neuroimaging Informatics Tools and Resources Clearinghouse
Booth # 106
TCG, 306 Florida Ave., NW
Washington, DC 20001
USA
Phone: 202-742-8470
Email: nitrcinfo@nitrc.org
Web: www.nitrc.org

Funded by the NIH Blueprint for Neuroscience Research, Neuroimaging Informatics Tools and Resources Clearinghouse (NITRC) is the "go to" place to find and compare functional and structural MR tools and resources. NITRC also provides test data and pre-processed, community-generated data sets (1000 Functional Connectomes, ADHD200) and is located at www.nitrc.org.

NordicNeuroLab
Booth # 303
234 W Florida St., Suite 210
Milwaukee, WI 53204
USA
Phone: 262-337-1448
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 MR imaging. We understand the growing need for reliable and innovative tools in this growing field. As a result, we closely collaborate with research and clinical teams from both academic and medical centers, MR system manufacturers, and third party vendors to develop and manufacture hardware and software solutions that meet the needs of very experienced centers while developing training programs to make fMRI easy to adopt for more novice users. From state of the art post-processing and visualization software for BOLD, Diffusion/DTI, and Perfusion/DCE imaging to fMRI hardware for audio and visual stimulation, eye tracking, and patient response collection, NNL's products are used around the world by researchers and clinicians alike. Ultimately, we are dedicated to bringing the most advanced neuro-imaging tools to market while making functional MRI programs easy to implement.

Osmic Enterprises, Inc.
Booth # 304
4242 Airport Road
Cincinatti, OH 45226
USA
Phone: 513-826-2283
Email: info@osmicenterprises.com
Web: www.osmicenterprises.com

Osmic Enterprises, Inc. produces and distributes the OLFACT Test Battery series of computerized tests to assess olfactory function. Our fMRI olfactometer can generate up to eight different odors for neuroimaging studies. Software is available for standard protocols; custom applications can be developed.

Oxford University Press
Booth # 110
198 Madison Ave
New York, NY 10016
USA
Phone: 1-800-451-7556
Email: custserv.us@oup.com
Web: www.oup.com/us

Visit our booth for discounts on Eidelberg: Imaging in Movement Disorders; Jones: Diffusion MRI; Johnson: Neuroimaging in Ophthalmology; Chugani: Neuroimaging in Epilepsy, and the rest of Oxford's prestigious list, as well as free sample copies of Brain and Cerebral Cortex!

Psychology Software Tools, Inc.
Booth # 200/202
311 23rd St Ext, Suite 200
Sharpsburg, PA 15215
USA
Phone: 412-449-0078
Email: sales@pstnet.com
Web: www.pstnet.com

Psychology Software Tools, Inc. maintains the vision of creating innovative and affordable technologies and solutions that improve the efficacy of human behavioral research, assessment, and education. Their goal is to consistently provide products and services to customers to increase productivity, effectiveness, and confidence in addressing the challenges faced in these diverse disciplines. Psychology Software Tools is a world leader in stimulus presentation software with their flagship product E-Prime®. They provide solutions to more than 3,000 research institutions and laboratories throughout the world.

Resonance Technology, Inc.
Booth # 101/103
18121 Parthenia Street, 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
Booth # 313/315/317
206-4398 boul. St-Laurent
Montreal Quebec, H2W 1Z5
Canada
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.

Shimadzu Corporation
Booth # 310
3 Kanda-Nishikicho 1-chome, Chiyoda-ku
Tokyo 101-8448
Japan
Phone: +81-3-3219-5644
Web: www.shimadzu.com

SHIMADZU contribute to society through science and technology. We provide wide possibility for brain science with functional Near Infrared Spectroscopy: FOIRE-3000. In SHIMADZU booth (310) we will introduce the advantage features of FOIRE-3000 and variety of applications. We are looking forward to see you in our booth.

Siemens
Booth # 301
Henkestr. 127
Erlangen D-91052
Germany
Phone: +49 (0)9131/84-0
Email: medg.gms@siemens.com
Web: www.siemens.com/healthcare

As a business unit of Siemens Healthcare, Magnetic Resonance offers the most innovative and comprehensive imaging portfolio for users around the world – powered by Tim 4G (Total imaging matrix) technology and Dot (Day optimizing throughput) for more productivity. The field strength of Siemens MAGNETOM systems range from 0.35 up to 3 Tesla. www.siemens.com/magnetic-resonance

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Booth # 309
1a Fieldside
East Hagbourne, Didcot, Oxfordshire OX11 9LQ
UK
Email: paul@springsolutions.co.uk
Web: www.springsolutions.co.uk

Spring Solutions presents Calpendo – intelligent software for booking shared equipment. Designed primarily to address the problems faced in a research environment, Calpendo takes the stress out of scheduling and maximises efficient use of your precious resources. It will save you time, hassle and money.

SR Research
Booth # 306
150-A1 Terence Mathews Crescent
Ottawa, Ontario K2M1X4
Canada
Phone: 613-271-8686 ext 224
Email: info@sr-research.com
Web: www.sr-research.com

SR Research, maker of the world leading EyeLink High-Speed eye tracker line, have been developing advanced eye tracking technologies and serving world class support to our researcher user base since 1992. Please visit our booth and http://www.sr-research.com for details on our eye tracking hardware and software products.

VPixx Technologies, Inc.
Booth # 206
1494 Montarville suite 206
Saint-Bruno, QC J3V 3T5
Canada
Phone: 514-328-7499
Email: sales@vpixx.com
Web: www.vpixx.com

VPixx Technologies welcomes the research community to HBM 2011 in Quebec City, and is excited to demonstrate our new VIEWPixx LCD display and data acquisition system. The VIEWPixx has been designed specifically for the brain sciences, and features precise stimulus presentation and microsecond-accurate I/O timing.

Wiley-Blackwell
Booth # 112
111 River Street, Mailstop 4-02
Hoboken, NJ 07030
USA
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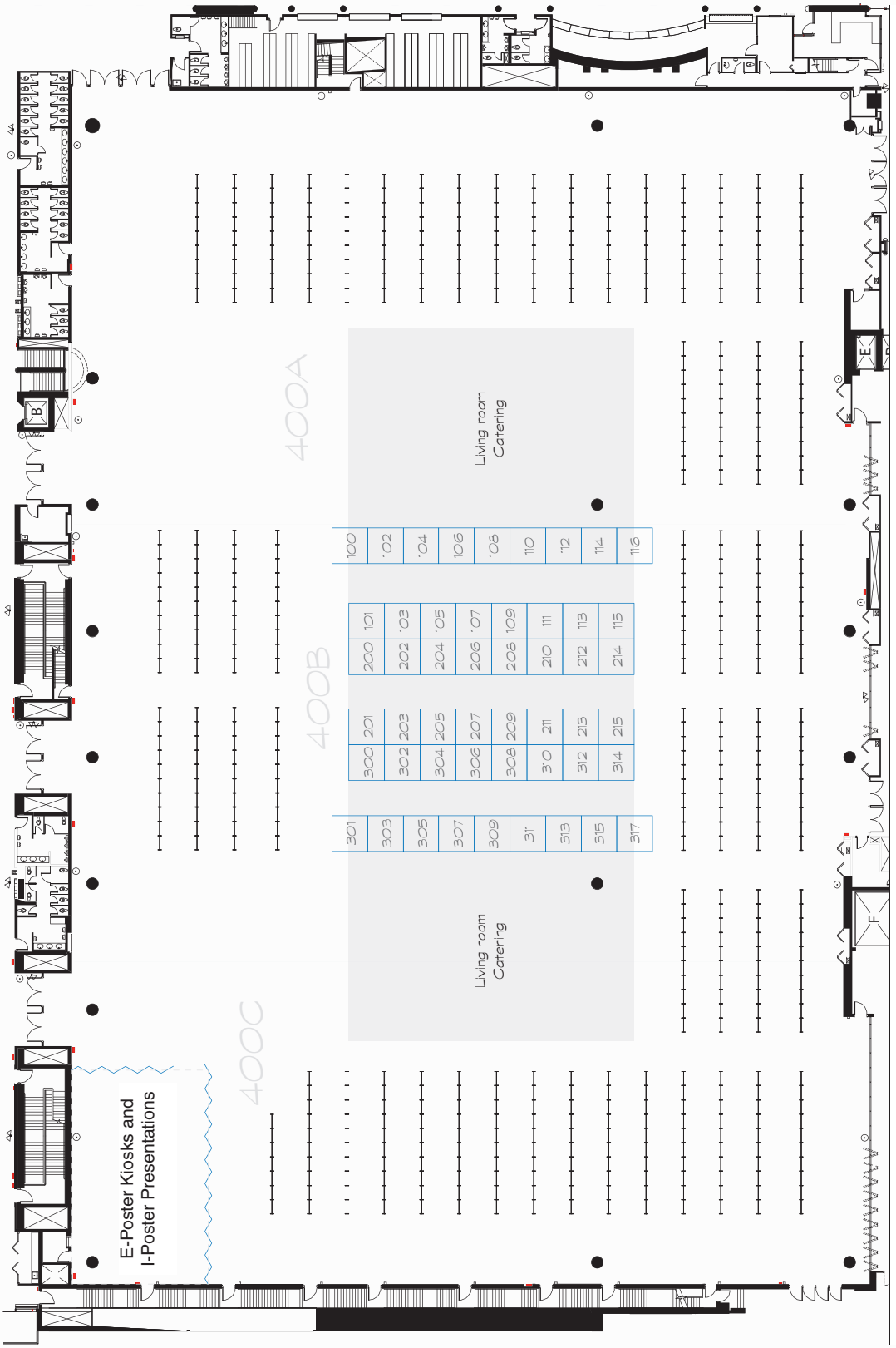

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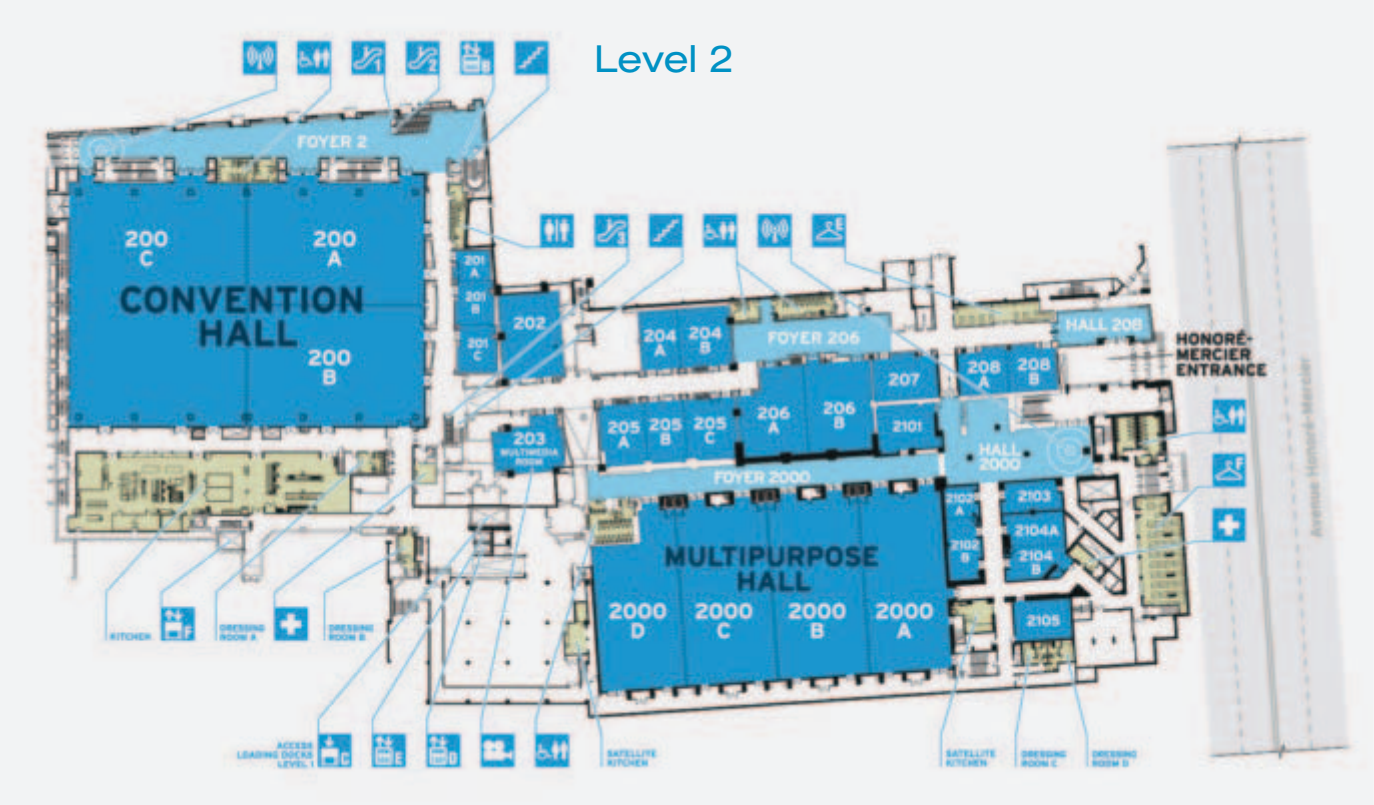

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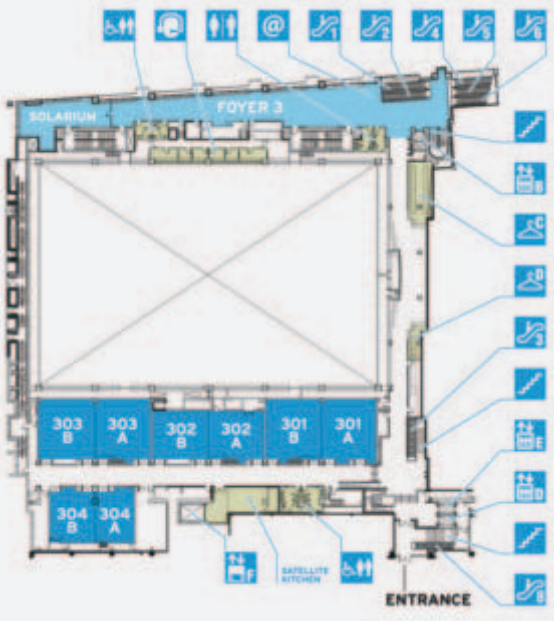

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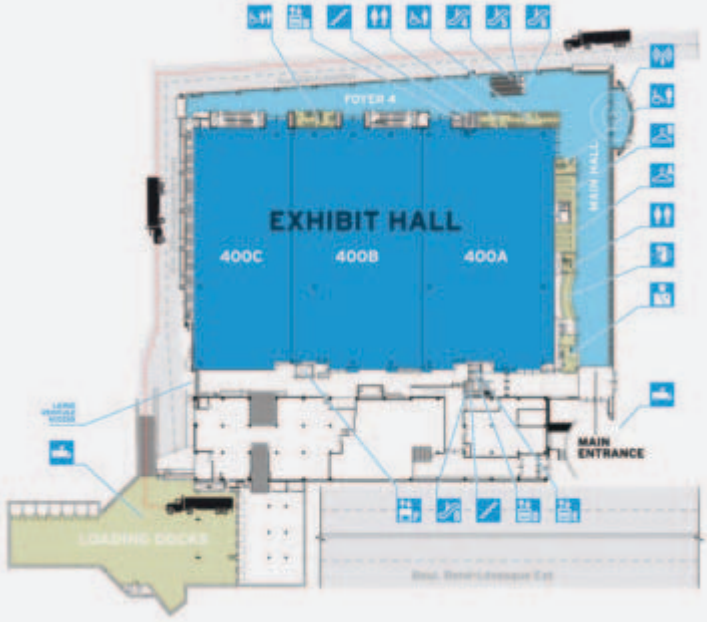

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