OHBM 2015
HONOLULU HAWAII

PROGRAM

21ST ANNUAL MEETING OF THE
ORGANIZATION FOR HUMAN BRAIN MAPPING

June 14-18, 2015 | Hawaii Convention Center

WELCOME

Thank you for joining us for the Organization for Human Brain Mapping's Annual Meeting in beautiful Honolulu, Hawaii!

William James said, "Man lives for science as well as bread." Many of you have attended this meeting over the past 20 years and have not only witnessed, but have also participated in the tremendous growth and evolution of our discoveries. So it will come as no surprise that our 21st meeting, as in years past, will offer a rich and varied menu of science delights for your intellectual palate. To whet your appetites, the program will be launched by Amy Arnsten's Talairach Lecture on "*What Lies Within: Cautionary Tales from Cortical Physiology*". Throughout the next few days, we will feast upon a series of outstanding keynote lectures presented by BJ Casey, Christian Büchel, Bruce Fischl, Michael Breakspear, Sabine Kastner, Susan Whitfield-Gabrieli, and Terry Sejnowski. And a rich scientific smorgasbord — literally hundreds of talks, scientific posters, and networking opportunities — will surely stimulate important discussion and debate, and nourish new insights and excitement about the work you do.

One of the highlights of this year's meeting will be the Town Hall Forum where the OHBM Council will present information regarding the future direction of OHBM based on a recent strategic planning meeting. Members will also have a chance to weigh in on a white paper prepared by OHBM's Committee on Best Practice in Data Analysis and Sharing (COBIDAS) to be shared with the brain mapping community. Attending the Town Hall Forum on Wednesday, June 17 from 17.15 to 18.15 is your chance to weigh in on the future of OHBM.

Other items on the menu to enhance your meeting experience include:

- Attending one of many educational courses offered on Sunday.
- Learning from the scientific education offered throughout the four days of the meeting including three member-initiated symposia, a Local Organizers Committee symposium, oral sessions and morning workshops.
- Hearing the results from this year's OHBM Hackathon and participating in the ongoing dialogue throughout the meeting. **Learn more about the OHBM Hackathon on the Annual Meeting website.**
- Engaging in conversation with over 2,900 poster presenters sharing the latest research in a variety of disciplines.
- Visiting with our knowledgeable exhibitors to learn about the latest products and services available for the brain mapping community.
- Taking time to build new relationships during one of several networking events, including the Welcome Reception on Sunday; Club Night on Wednesday at the Hilton Hawaiian Village; and poster wine/beer receptions being held on Tuesday and Thursday after programming.
- During and after the meeting, utilize OHBM resources including:
  - **The Annual Meeting mobile app**
  - The Onsite Career Resource room where job seekers can connect with employers **Onsite Career Resource**
  - The **Online Library**, which contains program presentations from this and past OHBM meetings.
  - E-Posters, which contain hundreds of posters that you may have missed. http://ww4.aievolution.com/hbm1501.

We thank each of you for joining us here in Honolulu. It has been a distinct privilege for us to contribute to the meeting, and we look forward to your involvement. Working together, our spectacular OHBM scientific community is the haute cuisine of our scientific field, so we know that you will find the superb fare at the 21st Annual Meeting of the Organization for Human Brain Mapping memorable, scientifically exciting, and intellectually satisfying. Oh, and don't forget to feast at the Opening Reception!

Sincerely,

Karen F. Berman
Chair, Council

John Darrell Van Horn
Chair, Program Committee

Thomas Ernst & Linda Chang
Co-Chairs, Local Organizing Committee

TABLE OF CONTENTS

OHBM 2015 PROGRAM-AT-A-GLANCE

Sunday, June 14

Educational Courses

Full Day Courses: 8:00 – 16:30
Advanced fMRI Course Physics, Physiology, Models, & Inference
Ballroom ABC

Anatomy and Its Impact on Structural and Functional Imaging
Room 315

Electromagnetical Neuroimaging and Multimodal Integration
Room 311

MR Diffusion Imaging: Getting Your Measures Right
Room 323 ABC

Pattern Recognition for NeuroImaging - PR4NI
Room 316 AB

Morning Courses 8:00 – 12:00
Introduction to Imaging Genetics
Room 324

The Art and Pitfalls of fMRI Preprocessing
Room 316 C

Tools to Parcellate the Brain and its Relation to Function
Room 314

Afternoon Courses 13:00 – 16:30
Computational Neuroscience and Modelling of Neurodynamics
Room 314

Neuroimaging Meta-Analysis
Room 324

Reproducible Neuroimaging
Room 316 C

HACKATHON EVENT 8:00 – 16:30
Open Science Collaboration and Community: HBM Hackathon Project Outcomes
There is no charge to attend this course
Room 317 A

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

Talairach Lecture: Dr. Amy Arnsten
What Lies Within:
Cautionary Tales from Cortical Physiology

19:30 – 21:00
Welcome Reception
Rooftop Garden Hawaii Convention Center

Monday, June 15

8:00 – 9:15
Morning Workshops
Neuroimaging-based Multivariate Classification Algorithms for Acute and Chronic pain
Room 311

The Emergence of Cognition
Room 316 AB

From Mapping Functions to Functional Mapping
Room 323 ABC

Genetics of the Connectome
Ballroom ABC

15 minute break

9:30 – 10:15
Keynote Lecture: Susan Whitfield-Gabrieli
Connectomic Insights into Psychiatric Disorders
Ballroom ABC

15 minute break

10:30 – 11:45
LOC Symposium
Neuroimaging Studies in Substance Use Disorders
Ballroom ABC

11:45 – 12:45
Lunch

12:45 – 14:45
Poster Session: Poster Numbers #1000 – 2451
Authors with even numbered posters will present their posters today.
Exhibit Hall 2 and 3

14:45 – 16:00
Symposium
Anatomical and Functional Mapping of Subcortical Structures with ultra-high-field MRI
Ballroom ABC

15 minute break

16:15 – 17:00
Keynote Lecture: Bruce Fischl
Computational Analysis of Functional, Connectional and Architectonic Properties of the Human Brain
Ballroom ABC

17:15 – 18:30
Oral Sessions

O-M1: Motor Behavior-Multimodal Mapping of Motor Systems
Room 316 AB

O-M2: Psychiatric Disorders
Room 315

O-M3: Mechanisms of Memory and Learning
Room 323 ABC

O-M4: Dynamic Electro-physiological Mapping
Room 311

O-M5: Neuroanatomy
Ballroom ABC

Tuesday, June 16

8:00 – 9:15
Morning Workshops
Tracking Disease Trajectories and Identifying Brain-Based Markers to Characterize Mental Illness
Room 323 ABC

Novel Approaches to Decode the Distributed Neural Representation of Emotions and their Components
Room 316 AB

A New Look at the Data: Non-traditional Approaches to fMRI Data Analysis
Room 311

Toward a Bigger Brain: Noninvasive Characterization of Brain Microstructure
Ballroom ABC

15 minute break

9:30 – 10:15
Keynote Lecture: Michael Breakspear
Brain Waves
Ballroom ABC

15 minute break

10:30 – 11:45
Oral Sessions

O-T1: Neurological Disorders
Room 323 ABC

O-T2: Emotion and Motivation
Room 316 AB

O-T3: Systems Analysis of Language Processes
Room 311

O-T4: White Matter Imaging Methods
Ballroom ABC

O-T5: Physiology, Metabolism and Neurotransmission
Room 315

11:45 – 12:45
Lunch

12:45 – 14:45
Poster Session
Poster Numbers #1000 – 2451
Authors with odd numbered posters will present their posters today.
Exhibit Hall 2 and 3

14:45 – 16:00
Symposium
Multilevel Social Neuroscience
Ballroom ABC

15 minute break

16:15 – 17:00
Keynote Lecture: BJ Casey
The Adolescent Brain: "Arrested" or Adaptive Development
Ballroom ABC

17:00 – 18:30
Poster Reception
Exhibit Hall 2 and 3

Wednesday, June 17

8:00 – 9:15
Morning Workshops
State-of-the-Science: Neuroimaging of Autism
Ballroom ABC

Investigating Neuronal Computation in Cortical Laminae using Layer-resolved fMRI & Electrophysiology
Room 323 ABC

Statistical Assessment of MVPA Results
Room 316 AB

Time is of the Essence: The Role of EEG and MEG in Mapping the Human Brain
Room 311

15 minute break

9:30 – 10:15
Keynote Lecture: Sabine Kastner
Neural Network Dynamics For Attentional Selection in the Primate Brain
Ballroom ABC

15 minute break

10:30 – 11:45
Oral Sessions

O-W1: Resting-State fMRI Methods
Ballroom ABC
O-W2: Development
Room 323 ABC
O-W3: Perception and Attention
Room 311
O-W4: Genetics
Room 316 AB
O-W5: MRI Acquistion
Room 315

11:45 – 12:45 **Lunch**

11:45 – 12:45
Meet The Editors Roundtable
Room 316 C

12:45 – 14:45
Poster Session: Poster Numbers #3000 – 4463
Authors with even numbered posters will present their posters today.
Exhibit Hall 2 and 3

14:45 – 16:00
Symposium
Understanding the Emerging Complexity of the Developing Brain
Ballroom ABC

15 minute break

16:15 – 17:00
Keynote Lecture: Christian Büchel
Pain and pain regulation: from spinal to cortical processing
Ballroom ABC

15 minute break

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

19:30 – 1:00 **Club Night**
Coral Ballroom Hilton Hawaiian Village

Thursday, June 18

8:00 – 9:15
Morning Workshops
Statistics for Comparing Brain Networks with Applications in Brain Disease
Ballroom ABC

New Developments and Horizons for Spinal Cord fMRI
Room 323 ABC

Estimating Time Varying Connectivity
Room 316 AB

Neuroimaging Applications of Simultaneous Multi-Slice Imaging
Room 311

15 minute break

9:30 – 10:15
Keynote Lecture: Terrence J. Sejnowski
Delay Differential Analysis of Human LFP, EEG and ECoG
Ballroom ABC

15 minute break

10:30 – 11:45
Oral Sessions

O-TH1: Cognitive and Executive Function
Room 311
O-TH2: Social Functioning and Autism
Room 315
O-TH3: Aging and Dementia
Ballroom ABC
O-TH4: Brain Stimulation Methods
Room 323 ABC
O-TH5: Classification, Prediction, Machine Learning & Informatics
Room 316 AB

11:45 – 12:45
Lunch

11:45 – 12:45
OHBM Research Funding Roundtable
Room 316 C

12:45 – 14:45
Poster Session: Poster Numbers #3000 – 4463
Authors with odd numbered posters will present their posters today.
Coral Ballroom Hilton Hawaiian Village

14:45 – 16:00
Closing Comments and Meeting Highlights
Ballroom ABC

16:00 – 17:30
Farewell Poster Reception
Exhibit Hall 2 and 3

GENERAL INFORMATION

CONFERENCE VENUE

Hawaii Convention Center
1801 Kalakaua Avenue
Honolulu, HI 96815
808-943-3500

All events will take place at the Hawaii Convention Center unless otherwise noted.

REGISTRATION HOURS

Main Lobby, Level 1

Saturday, June 13: 15:00 – 18:00
Sunday, June 14: 7:00 – 19:30
Monday, June 15: 7:30 – 17:00
Tuesday, June 16: 7:30 – 17:00
Wednesday, June 17: 7:30 – 17:00
Thursday, June 18: 7:30 – 15:00

EXHIBIT HOURS

Exhibit Hall 2 and 3

Monday, June 15: 8:00 – 16:00
Tuesday, June 16: 8:00 – 18:30
Wednesday, June 17: 8:00 – 16:00
Thursday, June 18: 8:00 – 17:30

WELCOME RECEPTION

Sunday, June 14, 19:00 – 21:00
Rooftop Garden

Join us for the 2015 Annual Meeting Welcome Reception. The reception will be held at the Hawaii Convention Center immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 14. **Please make sure to wear your name badge, which will serve as your ticket to the event.** Additional guest badges are $50.00 USD.

TOWN HALL FORUM

Wednesday, June 17, 17:15 – 18:15
Ballroom ABC

The Town Hall Forum is the top source for the latest breaking news and commentary on issues impacting the neuroimaging community and your member organization. It is also an opportunity for you to voice your opinions and questions to the Council — which helps shape future agendas. **If you have never attended the Forum before, this is the year to participate!** Member input will be sought on several topical issues including a report by Chair on OHBM's recent strategic planning meeting and new initiatives under development; a draft white paper created by the Committee on Best Practice in Data Analysis and Sharing (COBIDAS); and discussions on ways to bridge regional and special interests. The new elected leadership will be announced as well as dates and venues for future Annual Meetings.

CLUB NIGHT

Wednesday, June 17, 19:30 – 1:00
Conveniently located at the Hilton Hawaiian Village, over 50,000 square feet of space will be transformed into OHBM's Annual Club Night. The Hilton Hawaiian Village is located at 2005 Kalia Road Honolulu. Club night will be in in the Coral Ballroom and lounge which is in the Pacific Conference Center.

There will be a DJ that will play dance music throughout the evening. The party is complimentary to registrants. **Please make sure to bring your ticket to Club Night.** Additional guest tickets are $50.00 and must be purchased at the conference registration desk.

SPEAKER READY ROOM

Room 319 AB

Saturday, June 13: 15:00 – 18:00
Sunday, June 14: 7:00 – 19:30
Monday, June 15: 7:00 – 19:45
Tuesday, June 16: 7:00 – 18:00
Wednesday, June 17: 7:00 – 18:00
Thursday, June 18: 7:00 – 16:00

INTERNET CAFE

Exhibit Hall Lobby Level

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

Saturday, June 13: 15:00 – 18:00
Sunday, June 14: 7:00 – 19:30
Monday. June 15: 7:30 – 17:00
Tuesday, June 16: 7:30 – 17:00
Wednesday, June 17: 7:30 – 17:00
Thursday, June 18: 7:30 – 15:00

OHBM ART EXHIBIT / CROSSING FIBERS: A NEURORETROSPECTROSCOPIC VIEW

Main Lobby / Open During Registration Hours

Since 2011, the brain-art competition at the OHBM annual meeting has provided an active interface between art and science. Hundreds of submissions in multiple categories have showcased the beauty of the brain from diverse perspectives. This year's exhibit celebrates this tradition by bringing together past and present works in a 5-year retrospective. The exhibition will be on display at the main entrance lobby in the Hawaii Convention Center throughout the conference. Please come by and enjoy the view through the neuroretrospectroscope!

For more information: www.neurobureau.org/galleries

Support by: ERNST SCHERING FOUNDATION

2015 OHBM HACKATHON

June 14 – 18, 2015

Room 317 A

The 2015 HBM Hackathon engages OHBM community members in open neuroscience initiatives through participation in "hacking" activities that range from data analysis and tool building to educational workshops. Brain imaging researchers come together to apply their technical, methodological, and scientific skills to topics of their choice in the days preceding OHBM. The 2015 event in Hawaii started three days prior to the Annual Meeting. On Sunday, June 14, 2015 all OHBM attendees are invited to attend the Open Science Collaboration and Community: HBM Hacakathon Project Outcomes from 13:00-16:30 in room 317 A. *The Hack Room is available June 15-18 from 8:00-17:00 in room 317 A.*

MOBILE APP

The 2015 Mobile App, powered by EventLink and created by Core-Apps LLC, is a native application for smartphones (iPhone and Android), a hybrid web-based app for Blackberry, and there's also a web-based version of the application for all other web browser-enabled phones.

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

For All Other Phone Types (including BlackBerry and all other web browser-enabled phones): While on your smartphone, point your mobile browser to http://m.core-apps.com/ohbm2015. From there you will be directed to download the proper version of the app for your particular device, or, on some phones, you simply bookmark the page for future reference.

ONSITE CAREER RESOURCES

Back by popular demand! OHBM has created an electronic board at www.humanbrainmapping.org/2015Career where PIs can post positions available notices (under "Labs Looking for People") and trainees can post CVs (under "People Looking for Jobs") before and during the meeting. OHBM has reserved room 325 B in the Hawaii Convention Center from Sunday, June 14 through Thursday, June 18 for job seekers to meet and network with job providers and gather and discuss employment opportunities.

SOCIAL MEDIA

Twitter: @OHBM, hash tag **#OHBM2015**
Facebook: Organization for Human Brain Mapping
Facebook Student Post Doc: Organization for Human Brain Mapping — Student and Postdoc Section
LinkedIn: Organization for Human Brain Mapping

E-POSTERS

All poster presenters are encouraged to upload an electronic version of their poster (E-poster) as a pdf. To access E-Posters, please go to http://ww4.aievolution.com/hbm1501/.

GENERAL INFORMATION

WIRELESS CONNECTION

To connect to the conference Wifi, please connect your device to the network "OHBM2015." **No password is required**.

EVALUATIONS ONLINE!

New in 2015, we have eliminated the lengthy evaluation surveys! We ask that you utilize the rating system located on the mobile app. You can rate a session by selecting the clipboard icon on the left menu of an event. An overall Educational Course and Annual Meeting evaluation will be sent in the daily emails. It is only through attendee's feedback that we can continue to improve the content, format, and schedule of the meeting.

ACCME ACCREDITATION

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

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

EDUCATIONAL COURSES	CREDITS
Anatomy and its impact on structural and functional imaging (Full Day)	7.00
Advanced fMRI Course Physics, physiology, models, & inference (Full Day)	7.00
Pattern Recognition for NeuroImaging (or PR4NI) (Full Day)	7.00
MR Diffusion Imaging: Getting Your Measures Right (Full Day)	7.00
Electromagnetical Neuroimaging and Multimodal Integration (Full Day)	7.00
The Art and Pitfalls of fMRI Preprocessing (Half Day)	3.50
Tools to parcellate the brain and its relation to function (Half Day)	3.50
Introduction to Imaging Genetics (Half Day)	3.50
Computational Neuroscience and Modelling of Neurodynamics (Half Day)	3.50
Neuroimaging Meta-Analysis (Half Day)	3.50
Reproducible Neuroimaging (Half Day)	3.50
Maximum number of possible credits earned at Educational Courses	**7.00**

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

Advanced fMRI Course Physics, Physiology, Models, & Inference

Full Day Course / 8:00 – 16:30
Ballroom ABC

Organizers:
Tor Wager, *Department of Psychology and Neuroscience, University of Colorado at Boulder, Boulder, CO, United States*

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

Functional magnetic resonance imaging (fMRI) has taken a central role in the study of human brain function. fMRI is inherently trans disciplinary, 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. The first part of the course covers the physics and physiology of fMRI, and the relationship between neuronal and BOLD activity patterns. The second part focuses on pattern—information analyses and how they can be used to learn about neuronal population codes and to test computational theories of brain information processing.

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

1. The physics and physiology underlying fMRI, and the resulting potential and limitations of fMRI.
2. Pattern decoding, representational similarity analysis, and voxel-receptive-field modelling.
3. Computational modelling of brain information processing and its integration into the analysis of fMRI data.

Target Audience:
This course is intended for an audience of research scientists with intermediate to advanced knowledge of fMRI techniques, who wish to extend the breadth and depth of their understanding of the current state of the art.

Course Schedule

8:00 – 8:30
Introduction to MRI and fMRI physics
Lawrence Wald, PhD, *Massachusetts General Hospital, Charlestown, MA, United States*

8:30 – 9:00
Basic physiology of fMRI: signal and noise
Rasmus Birn, *University of Wisconsin-Madison, Madison, WI, United States*

9:00 – 9:30
The physiology of fMRI and its relation to brain information processing
Amir Shmuel, *Montreal Neurological Institute, Montreal, Canada*

9:30 – 10:00
Dynamic network models for fMRI data
Sarah Muldoon, *University of Pennsylvania and US Army Research Laboratory Aberdeen Proving Ground, MD, United States*

BREAK
10:00 – 10:30

10:30 – 11:00
Inferential Brain Mapping
Cyril Pernet, *Centre for Clinical Brain Sciences (CCBS), Neuroimaging Sciences, The University of Edinburgh, Edinburgh, Scotland*

11:00 – 11:30
Causal inference in fMRI analysis
Martin Lindquist, *Johns Hopkins University, Baltimore, MD, United States*

11:30 – 12:00
Network modeling in fMRI analysis
Eugene Duff, *FMRIB Centre, Oxford, United Kingdom*

LUNCH
12:00 – 13:00

13:00 – 13:30

Dynamic causal modeling

Klaas Enno Stephan, *Translational Neuromodeling Unit, Inst. for Biomedical Engineering, Univ. of Zurich & ETH Zurich, Zurich, Switzerland*

13:30 – 14:00

Representations and patterns in translational neuroimaging

Tor D. Wager, *Department of Psychology and Neuroscience, University of Colorado at Boulder, Boulder, CO, United States*

14:00 – 14:30

Pattern decoding analysis for fMRI: basic steps and advanced techniques

Yukiyasu Kamitani, *MRC Cognition and Brain Sciences Unit, Cambridge, United Kingdom*

BREAK

14:30 – 15:00

15:00 – 15:30

Representational similarity analysis

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

15:30 – 16:00

A tutorial on voxel-wise modeling (VM)

Jack Gallant, *University of California, Berkeley, CA, United States*

Wrap Up and Discussion

16:00 – 16:30

Anatomy and Its Impact on Structural and Functional Imaging

Full Day Course / 8:00 – 16:30

Room 315

Organizers:

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

Katrin Amunts, *Research Center Jülich, Jülich, Germany*

Results of neuroimaging studies cannot be understood without knowing the anatomy of the brain, and the way how brain structure influences the interpretation of the results through interaction with image acquisition, processing and analysis. The course will provide an introduction and critical overview of classical and modern approaches for studying the anatomy of the brain using neuroimaging techniques and anatomical methods. It is aimed at a multidisciplinary audience, and will provide an introduction to gross anatomical landmarks, the microstructural organization of the brain including cortical segregation and its intersubject variability, the representation of visual functions as well as brain development as assessed by MR techniques. Neuroimaging methods will be discussed with respect to their advantages, disadvantages and potential pitfalls as it concerns anatomy. The relevance of anatomical knowledge for the interpretation of structural and/or functional imaging data will be made explicit. Part one will consist of talks introducing anatomical concepts and developmental aspects and shows, how MRI contributes. Part two will focus on organizational principles of the brain's microstructure (cyto-, receptor- and myeloarchitecture), and critically reflects the perspectives and limits of MR imaging with respect to brain organization. Part 3 will demonstrate the complex relationships between neuroimaging and the anatomical and microscopical structure using the visual cortex as a concrete example.

Learning Objectives:

The course is designed to develop participants' understanding of:

1. Understand the organizational principles of the human brain on a macroscopic and microscopic level, and their changes during development.
2. Understand the relationships between neuroimaging data and anatomical structures, or the structural ground truth behind models, parameters and terms widely used in neuroimaging.
3. Give examples of applications of structural MRI for understanding brain function.
4. Understand the structure of the visual cortex and its meaning as an example for the interpretation of neuroimaging data.

Target Audience:

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

Course Schedule

8:00 – 8:30
Introduction to the course: Aims, goals and why these talks and this course structure
Karl Zilles, *Research Center Jülich, Jülich, Germany*

8:30 – 9:00
Development of the cerebral cortex
David Van Essen, *Washington University, St. Louis, MO, United States*

9:00 – 9:30
MRI and cortical thickness: What does it mean?
Alan Evans, *McConnell Brain Imaging Centre, Montreal Neurological Institute, McGill University, Montreal, Quebec, Canada*

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

BREAK
10:00 – 10:30

10:30 – 11:00
Cytoarchitecture of the human cerebral cortex
Katrin Amunts, *Research Center Jülich, Jülich, Germany*

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

11:30 – 12:00
Cortical diffusion imaging
Alard Roebroeck, *Maastricht University, Maastricht, The Netherlands*

LUNCH
12:00 – 13:00

13:00 – 13:30
Anatomical landmarks and functionally defined visual areas
Kevin Weiner, PhD, *Stanford University, Stanford, CA, United States*

13:30 – 14:00
Myeloarchitecture, probability maps and retinotopy of the visual cortex
Matthew Glasser, *Washington State University, St. Louis, MO, United States*

14:00 – 14:30
High-resolution fiber tract visualization in human occipital cortex
Svenja Caspers, *Institute of Neuroscience and Medicine, INM-1, Research Center Jülich, Jülich, Germany*

BREAK
14:30 – 15:00

15:00 – 15:30
High-resolution functional imaging and anatomy of the visual cortex
Rainer Goebel, *Maastricht University, Maastricht, The Netherlands*

15:30 – 16:00
Integration of post-mortem anatomy and in-vivo imaging
Simon Eickhoff, *Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Düsseldorf, Germany*

Wrap Up and Discussion
16:00 – 16:30

Electromagnetical Neuroimaging and Multimodal Integration

Full Day Course / 8:00 – 16:30
Room 311

Organizers:
Thomas Koenig, *University Hospital of Psychiatry, University of Bern, Department of Psychiatric Neurophysiology, Bern, Switzerland*

Petra Ritter, *Charité Universitaetsmedizin, Berlin, Germany*

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

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

1. Understand the effect of volume conduction on quantitative measures of EEG and MEG.
2. Know the main types of EEG and MEG modelling.
3. Know the essentials of integrating EEG and MEG data with data from other modalities such as fMRI.

Target Audience:
People interested in using EEG and MEG in combination with other imaging modalities and as a standalone method.

Course Schedule

8:00 – 8:45
Scalp field dynamics of evoked and spontaneous EEG
Thomas Koenig, *University Hospital of Psychiatry, University of Bern, Department of Psychiatric Neurophysiology, Bern, Switzerland*

8:45 – 9:30
Scalp field dynamics of evoked and spontaneous EEG
Professor Christoph Michel, *Department of Fundamental Neurosciences, University of Geneva, Geneva, Switzerland*

9:30 – 10:15
Blind Source Separation of Electrophysiological Data
Scott Makeig, *Swartz Computational Center for Neuroscience, La Jolla, CA, United States*

BREAK
10:15 – 10:30

10:30 – 11:15
Baselines and state dependent processing
Daniel Brandeis, *University of Zurich, CIMH Mannheim, Zürich and Mannheim, Switzerland*

11:15 – 12:00
Event related brain dynamics with EEG and fMRI
Petra Ritter, *Charité Universitaetsmedizin, Berlin, Germany*

LUNCH
12:00 – 13:00

13:00 – 13:45
Confronting noninvasive measures to intracerebral EEG
Christian G. Bénar, *INSERM, Marseille, France*

13:45 – 14:30
Estimation of cortical connectivity in the source space: general principles, practical considerations and future perspectives
Laura Astolfi, *University of Rome, Rome, Italy*

BREAK
14:30 – 14:45

14:45 – 15:30
EEG/MEG inverse problem and integration with fMRI: The role of biophysical models
Jorge Riera, PhD, *Florida International University, Miami, FL, United States*

15:30 – 16:15
Multimodal Databases and EEG—the key to translational Brain Mapping
Pedro A. Valdes-Sosa, *Cuban Neuroscience Center, Ciudad Habana, Ciudad Habana, Cuba*

Wrap Up and Discussion
16:15 – 16:30

MR Diffusion Imaging: Getting Your Measures Right

Full Day Course / 8:00 – 16:30
Room 323 ABC

Organizer:
Flavio Dell'Acqua, *King's College London, London, United Kingdom*

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

By following an ideal diffusion imaging pipeline, lectures in the morning will review the current state of the art of diffusion imaging methods and possible pitfalls and limitations that need to be taken in account before getting to the final results. In the afternoon, lectures will focus on how we can apply these methods to study individual subjects and group differences in clinical research applications, in pre-clinical settings or in human post mortem datasets. Special attention will be also given to the validation and the biological interpretation of current diffusion imaging indices. Finally, to stimulate a discussion with the participants of this course a final lecture will offer the opportunity to review the main messages of this one-day course by looking at the past, the present and the future of diffusion imaging and tractography.

Learning Objectives:
The course is designed to develop participants' understanding of:
1. To learn the optimal acquisition strategies available today for diffusion imaging and how to process and quality control diffusion data.
2. To learn which diffusion models and tractography methods are available and how they can be applied in neuroimaging and neuroscience research to study e.g. individual subject and group differences.
3. To understand what is the biological meaning of current diffusion indices, what are the challenges of diffusion imaging today and the risks behind each step of the diffusion pipeline.

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

Course Schedule

8:00 – 8:45
Diffusion MRI data acquisition
Karla Miller, *University of Oxford, Oxford, UK*

8:45 – 9:30
Data Processing and Quality Control of DTI data
Alexander Leemans, *Image Sciences Institute – UMC Utrecht, Utrecht, The Netherlands*

9:30 – 10:15
Diffusion Imaging Models 1: from DTI to HARDI models
Flavio Dell'Acqua, *King's College London, London, United Kingdom*

BREAK
10:15 – 10:30

10:30 – 11:15
Diffusion Imaging Models 2: from DTI to microstructure quantification
Gary Zhang, *University College London, London, United Kingdom*

11:15 – 12:00
Introduction to Diffusion Tractography
Tim Dyrby, *Danish Research Centre for Magnetic Resonance, Copenhagen, Denmark*

LUNCH
12:00 – 13:00

13:00 – 13:45
Group Comparison using Diffusion Imaging
Konstantinos Arfanakis, *Illinois Institute of Technology, Chicago, IL, United States*

13:45 – 14:15
Tract analysis and connectomics
Eleftherios Garyfallidis, *Université de Sherbrooke, Sherbrooke, Québec, Canada*

BREAK
14:15 – 14:30

14:30 – 15:15
Pre-Clinical and Post Mortem Diffusion Imaging
Manisha Aggarwal, *Johns Hopkins University, Baltimore, MN, United States*

15:15 – 16:00
Biological Interpretation of the Diffusion Signal
Matthew Budde, *Medical College of Wisconsin, Milwaukee, WI, United States*

Wrap Up and Discussion
16:00 – 16:30

Pattern Recognition for NeuroImaging - PR4NI
Full Day Course / 8:00 – 16:30
Room 316 AB

Organizers:
Christophe Phillips, Jr, PhD, *Cyclotron Research Centre, University of Liege, Liege, Belgium*

Janaina Mourao-Miranda, *Department of Computer Science, University College London, London, United Kingdom*

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

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

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

Learning Objectives:
The course is designed to develop participants' understanding of:
1. The various pattern recognition tools available and how to make statistical inferences with these.
2. The "dos and don'ts" of the technique in neuroimaging and how to interpret their results.

3. The application of these methods on different modalities such as fMRI, sMRI, PET and M/EEG.

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

Course Schedule

8:00 – 8:10
Introduction and Motivation
Christophe Phillips, Ir, PhD, *Cyclotron Research Centre, University of Liege, Liege, Belgium* and Janaina Mourao-Miranda, *Department of Computer Science, University College London, London, United Kingdom*

8:10 – 8:50
Pattern recognition in neuroimaging: principles & tools
Janaina Mourao-Miranda, *Department of Computer Science, University College London, London, United Kingdom*

8:50 – 9:30
Validation & inference
Jonas Richiardi, *Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland*

9:30 – 10:00
Interpreting predictive models in terms of anatomically labelled regions
Jessica Schrouff, *Stanford University, Stanford, CA, United States*

BREAK
10:00 – 10:30

10:30 – 11:00
Machine learning for disease prediction: from anatomical to multimodal imaging
Oliver Colliot, *Centre de recherche de l'institut du cerveau et de la moelle épiniére (UPMC, CNRS, INSERM), Paris, France*

11:00 – 11:30
Brain maps from machine learning? Spatial regularizations
Gaël Varoquaux, *INRIA, Saclay, France*

Questions and Discussion
11:30 – 12:00

LUNCH
12:00 – 13:00

13:00 – 13:30
Mapping activation pattern across individuals
Georg Langs, *Medical University of Vienna, Vienna, Austria*

13:30 – 14:00
Decoding and predicting intentions
Carsten Allefeld, *Charité – Universitätsmedizin Berlin, Bernstein Center for Computational Neuroscience, Berlin, Germany*

14:00 – 14:30
PET based classification for clinical diagnosis
Christophe Phillips, Jr, PhD, *Cyclotron Research Centre, University of Liege, Liege, Belgium*

14:30 – 15:00
Network based predictive models
Irina Rish, machine learning in neuroscience and biology, *T. J. Watson Research Center, New York, NY, United States*

BREAK
15:00 – 15:30

15:30 – 16:00
M/EEG classification and brain computer interfacing
Moritz Grosse-Wentrup, *Max Planck Institute for Intelligent Systems, Tübingen, Germany*

Closing Comments and Discussion
16:00 – 16:30

Introduction to Imaging Genetics

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

Room 324

Organizers:

Jason Stein, *University of California, Neurology, Los Angeles, CA, United States*

Jean Baptiste Poline, *Helen Wills Neuroscience Institute, University of California at Berkeley, Berkeley, CA, United States*

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

This course will introduce the fundamentals of "Imaging Genetics," the process of modeling and understanding how genetic variation influences the structure and function of the human brain as measured through brain imaging. The course begins with a lecture on the fundamentals of genetics, including the types of variation observed in the human, the mechanism by which that variation develops, and understanding how to relate genetic variation to a measured phenotype. We will then delve more into applications of genetics to neuroimaging phenotypes with an overview of imaging phenotypes. We will provide the student with modern tools to perform associations to both common and rare variation, conduct imputation and meta-analysis, and interpret significant findings. Overall this course will provide the neuroimager who is not familiar with genetics techniques both theoretical and practical understanding of the genetics field when exploring neuroimaging phenotypes.

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 how to conduct association analyses.
3. Understand the relative strengths & weaknesses of each different type of brain imaging phenotype used to find genetic association.

Target Audience:

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

Course Schedule:

8:05 – 8:35

Structure, Measurement & Analysis of Genetic Variation

Sven Cichon, *Research Center Jülich, Jülich, Germany*

8:35 – 9:15

Neuroimaging Phenotypes & Heritability

Roberto Toro, *CNRS URA 2182 'Genes, synapses and cognition', Paris, France*

9:15 – 9:30

Reproducibility of Imaging Genetics Findings: Power, candidate genes and other issues

Jean-Baptiste Poline, *Helen Wills Neuroscience Institute, University of California at Berkeley, United States*

9:30– 10:00

Searching for common variants

Derrek Hibar, *University of Southern California, Los Angeles, CA, United States*

BREAK

10:00 – 10:30

10:30 – 11:00

Imputation & Meta-analysis

Sarah Medland, *Queensland Institute of Medical Research, Brisbane, Australia*

11:00 – 11:30

Rare variant discovery using family based studies

John Blangero, *Texas Biomedical Foundation, San Antonio, TX, United States*

11:30 – 12:00

After the association: Functional and Biological Validation of Variants

Jason Stein, *University of California, Los Angeles, Los Angeles, CA, United States*

The Art and Pitfalls of fMRI Preprocessing

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

Room 316 C

Organizers:

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

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

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

Learning Objectives:

Having completed this course, participants will be able to; Concrete learning objectives we hope to achieve for the audience will include, but not be limited to: (1) an understanding of the kinds of artifacts that affect the recorded fMRI signal and current state-of-the-art algorithms, and their software implementations, to correct these artifacts; (2) an appreciation of the interaction of different processing modules, possible ordering effects, and the need for an optimization of the pre-processing pipeline as a whole; (3) the ability to follow, and possibly initiate, methodological investigations that deal with the assessment and optimization of pipeline dependence in task-based and resting-state fMRI, using both real-world and simulated data.

Target Audience:

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

Course Schedule:

8:00 – 8:30

Introductory remarks: the problem of pre-processing pipeline dependence for task-based and resting-state fMRI

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

8:30 – 9:00

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

Blaise Frederick, *McLean Hospital, Belmont, MA, United States*

9:00 – 9:30

Spatial Preprocessing (Spatial Alignment, Normalization, and Smoothing)

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

9:30 – 10:00

Artefact Removal (motion-related)

Christian Windischbeger, *MR Center, Medical University of Vienna, Vienna, Austria*

BREAK
10:00 – 10:30

10:30 – 11:00
Artefact Removal (Physiological)
Rasmus Birn, *University of Wisconsin-Madison, Madison, WI, United States*

11:00 – 11:30
FSL Pre-Processing Pipeline
Mark Jenkinson, *University of Oxford, Oxford, United Kingdom*

11:30 – 12:00
An SPM Perspective on fMRI Preprocessing
Lars Kasper, *University of Zurich & ETH Zurich, Translational Neuromodeling Unit (TNU), Institute for Biomedical Engineering, Zurich, Switzerland*

Tools to Parcellate the Brain and its Relation to Function
Half Day Morning Course / 8:00 – 12:00
Room 314

Organizers:
Michel Thiebaut de Schotten, *Natbrainlab-Brain and Spine Institute, Paris, France*

Marco Catani, *Institute of Psychiatry, London, United Kingdom*

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

The challenge now facing neuroscience is to define boundaries for functionally responsive areas at the group and the individual level. Many approaches parcellating the brain in areas with different features became recently available including post-mortem and in vivo architectonics, tractography-based connectivity, functional coactivation, and resting state functional connectivity. However, what these methods really measure and what conclusion can be drawn, are not yet fully clear to the scientific community. This course addresses this need and is intended for a large audience of research scientist (e.g. from beginner to advanced level).

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

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

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

8:45 – 9:30
PART I Parcellate the brain using anatomical features: Myelin mapping in vivo
Matthew Glasser, *Washington University of St. Louis, St. Louis, MO, United States*

9:30 – 10:15
PART I Parcellate the brain using anatomical features: Tractography based subdivision
Michel Thiebaut de Schotten, *Natbrainlab-Brain and Spine Institute, Paris, France*

BREAK
10:15 – 10:30

10:30 – 11:15
PART II Parcellate the brain using functional features: Functional MRI coactivation parcellation.
Danilo Bzdok, *Research Center Jülich, Jülich Germany*

11:15 – 12:00
PART II Parcellate the brain using functional features: Resting state functional connectivity subdivision.
Carl Hacker, *Washington University School of Medicine, St. Louis, MO, United States*

Computational Neuroscience and Modelling of Neurodynamics

Half Day Afternoon Course / 13:00 – 16:30
Room 314

Organizers:
Stefan Kiebel, *Technische Universität Dresden, Dresden, Germany*

Jean Daunizeau, ICM, *Paris, France and TNU, Zurich, Switzerland*

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

Computational neuroscience is a rapidly growing field that seeks to understand the principles of neuronal dynamics and how these underpin cognition. Computational neuroscience offers fresh perspectives on the design, analysis and interpretation of functional neuroimaging data, moving beyond static designs and phenomenological heuristics.

Desired learning outcome: Having completed this course, participants will be able to summarize the use of dynamic systems theory in modelling neuroscience phenomena, ranging from single neuron models to macroscopic modelling of networks.

Learning Objectives:
Having completed this course, participants will be able to:
1. Summarize new developments and research questions in dynamic models of the brain.
2. Understand the link between models of cortical activity and theories of brain function.
3. Understand computational models of behavioural and neuroimaging data.

Target Audience:
This course is designed to guide both cognitive neuroscientists and modellers through a variety of computational approaches. 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.

Course Schedule:

13:00 – 13:30
Introduction to Computational Neuroscience
Michael Breakspear, *Queensland Institute of Medical Research, Brisbane, Australia*

13:30 – 14:00
Models for Dynamics from the Neural Microcircuit to Cortical Regions
Peter Robinson, *University of Sydney, Australia*

14:00 – 14:30
Models of Behaviour and Neuroimaging Data
Christoph Mathys, *Wellcome Trust Centre for Neuroimaging, UCL, London, UK*

14:30 – 15:00
Dynamic Causal Modelling and Neurophysiology
Rosalyn Moran, *Virginia Tech Carilion Research Institute, Roanoke, VA, USA*

BREAK
15:00 – 15:30

15:30 – 16:00
Models of Perceptual Decision Making
Stefan Kiebel, *Technische Universität Dresden, Dresden, Germany*

16:00 – 16:30
A Guided Tour of the Virtual Brain
Petra Ritter, *Charité Universitaetsmedizin, Berlin, Germany*

15:30 – 16:00
Models of Perceptual Decision Making
Stefan Kiebel, *Technische Universität Dresden, Dresden, Germany*

16:00 – 16:30
Platforms for Large-Scale Brain Simulations
Viktor Jirsa, *Université Aix-Marseille, Marseille , France*

Neuroimaging Meta-Analysis

Half Day Afternoon Course / 13:00 – 16:30
Room 324

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

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

Functional neuroimaging has provided a wealth of information on the cerebral localization of mental functions. In spite of its success, however, several limitations restrict the knowledge that may be gained from each individual experiment. These include a usually rather small sample size, limited reliability of an indirect signal like BOLD fMRI and the need to base inference on relative contrasts between conditions. Such limitations have raised some concerns on the interpretability and validity neuroimaging results, but have also encouraged the development of quantitative meta-analysis approaches. Neuroimaging meta-analysis is used to summarize a vast amount of research findings across a large number of participants and diverse experimental settings. Such integration then enables statistically valid generalizations on the neural basis of psychological processes in health and disease. They also permit comparisons of different tasks or processes to each other and the modeling of interacting networks. Quantitative meta-analysis therefore represents a powerful tool to gain a synoptic view of distributed neuroimaging findings in an objective and impartial fashion, addressing some of the limitations raised above. The purpose of this course is to review the theory and practice of meta-analytic modeling and database-driven syntheses. In order to provide a comprehensive overview, this course spans both basic and advanced topics and addresses practical tips and tools to conduct meta-analytic studies in psychological and clinical applications. This broad coverage will thus provide both a deeper understanding of the methodological underpinnings as well as concrete ideas for how to apply meta-analytic techniques to advance brain science.

Learning Objectives:
Having completed this course, participants will better understand:
1. The conceptual and technical foundations of neuroimaging meta-analyses.
2. The main software tools and resources available to the community.
3. Methods for data-mining and the meta-analytic investigation of brain networks.
4. The potential contribution of these approaches to understand brain organization.

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

Course Schedule:

13:00 – 13:20
Overview: Foundations and potential of meta-analyses
Peter Fox, *UTHSCSA, San Antonio, TX, United States*

13:20 – 13:40
How to Plan and Prepare a Meta-Analysis
Felix Hoffstaedter, *Institute of Neuroscience and Medicine at the Research Center Jülich, Jülich, Germany*

13:40 – 14:00
Overview on Meta-Analysis methods
Thomas Nichols, *University of Warwick, Dept. of Statistics, Coventry, United Kingdom*

14:00 – 14:20
ALE and BrainMap
Angela Laird, *Florida International University, Miami, FL, United States*

14:20 – 14:40
SVD-Based Discriminant Meta-Analysis
Anjali Krishnan, *Institute of Cognitive Science, University of Colorado, Boulder, CO, United States*

14:40 – 15:00
Practical Intensity Based Meta-Analysis
Camille Maumet, *University of Warwick, Coventry, United Kingdom*

BREAK
15:00 – 15:30

15:30 – 15:50
Co-activation mapping and parcellation
Veronika Müller, *Heinrich Heine University. Institute of Clinical Neuroscience and Medical Psychology, Düsseldorf, Germany*

15:50 – 16:10
Inferring mental states from imaging data: OpenfMRI and the Cognitive Atlas
Russell Poldrack, *UT Austin, Austin, TX, United States*

Questions and Discussion
16:10 – 16:30

Reproducible Neuroimaging
Half Day Afternoon Course / 13:00 – 16:30
Room 316 C

Organizers:
Martin Lindquist, *Johns Hopkins University, Baltimore, MD, United States*

Victor Solo, *University of New South Wales, Sydney, Australia*

Replication is the cornerstone of science. Its absence reduces any scientific endeavor to a set of unverified beliefs. Recently a number of high profile articles (e.g. Button 2013; Ionnidis 2005) have claimed that the lack of reproducibility is reaching epidemic levels. The recent release of high quality human connectome data with its multiple sessions per subject and large subject numbers provides researchers with the ability to critically assess the reproducibility of imaging studies. This educational course discusses key issues involved with ensuring results are reproducible and will teach researchers how to critically evaluate scientific results in this context.

Desired Outcomes:
1. Attendees will learn that the reliability, validity and reproducibility of neuroimaging data analyses depend upon a series of analysis choices.
2. A framework to help critically evaluate neuroimaging studies and avoid stumbling blocks that can effect the validity and reproducibility of the results.
3. An understanding of limitations of pre-processing, statistical inference, prediction and meta-analysis in neuroimaging.

Learning Objectives:
Having completed this course, participants will better understand:
1. To learn to critically evaluate the results of a neuroimaging study and understand how analysis choices impact the validity and reproducibility of these results.
2. To learn how meta analysis can be used to increase knowledge, but also how it can be misused.
3. To understand how reliability of results relates to sample size, pre-processing pipelines, analysis choices and research questions.

Target Audience:
PhD students, Post doctoral fellows and junior faculty in all neuroimaging subdisciplines.

Course Schedule:
13:00 – 13:25
fMRI Reliability
Gary Glover, *Stanford University, Radiology, Stanford, CA, United States*

13:25 – 13:50
Exploration, Confirmation, Algorithm, and Model
Martin Lindquist, *Johns Hopkins University, Baltimore, MD, United States*

13:50 – 14:15
Encoding and Decoding in fMRI
Jack Gallant, *University of California, Berkeley, CA, United States*

14:15 – 14:40
Reproducibility and Power
Thomas Nichols, *University of Warwick, Dept. of Statistics, Coventry, United Kingdom*

BREAK
14:40 – 15:00

15:00 – 15:25

The negative effects of common image processing and analysis pipeline choices

Stephen Strother, *Baycrest and University of Toronto, The Rotman Research Institute, Toronto, Ontario, Canada*

15:25 – 15:50

Neuroimaging meta-analysis: Pitfalls and emerging solutions

Tor Wager, *Department of Psychology and Neuroscience, University of Colorado at Boulder, Boulder, CO, United States*

15:50 – 16:15

The informatics revolution in neuroimaging

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

Questions and Discussion

16:15 – 16:30

OPEN TO ALL OHBM ATTENDEES

HACKATHON 2015 OPEN SCIENCE COLLABORATION AND COMMUNITY: HBM HACKATHON PROJECT OUTCOMES

Full Day Course / 8:00 – 16:30

Room 317 A

9:00 – 10:00 Brain Hacking 101

13:00 – 16:30 Hackathon Results

Organizers:

Nolan Nichols, *Stanford University, Stanford, CA United States*

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

Human brain imaging is an interdisciplinary field that requires competences in domains ranging from neuroanatomy and neurophysiology to statistics and physics. Over the past ten years, brain imaging emerged as a computational field with an increasing demand for open source scientific tools that enables researchers to conduct rich analyses. Just as the genetics and molecular biology communities came to rely on bioinformatics, today neuroinformatics is addressing comparable challenges in brain imaging. The complexity of "Big Data" in neuroimaging is driving a growing community of researchers to embrace open science and to develop neuroinformatics tools and resources that are now available to the OHBM community. In this course, we will describe important open source projects and data resources that are active in the field of brain imaging.

Upon completion attendees will know the scope and capacities of important open source projects in the field of brain imaging and will be introduced to the goals and outcomes of the HBM Hackathon. Some demonstration of some of the software will also be provided.

SUNDAY, JUNE 14, 2015

OPENING CEREMONIES

17:30 – 19:30

Ballroom ABC

The Opening Ceremonies is the official kick-off where attendees can gather together to celebrate the start of the 21st Annual Meeting! Here we will honor the accomplishments of our colleagues receiving special recognition during the Awards Program for OHBM's Glass Brain Award recognizing a lifetime of achievement; Wiley's Young Investigator Award, Wiley's "Editor's Choice Award"; NeuroImage "Editor's Choice Awards" and a NEW OHBM Education in Neuroimaging Award.

TALAIRACH LECTURE

What Lies Within: Cautionary Tales from Cortical Physiology

Dr. Amy Arnsten, *Professor of Neurobiology, Patricia Goldman-Rakic at Yale University, New Haven, CT, United States*

Dr. Arnsten will describe the unique molecular signaling pathways that dynamically alter the strength of network connections in the most highly evolved cognitive circuits in the primate cortex. As more primitive, (e.g. sensory-driven) neurons are often modulated differently, averaged measures such as the BOLD response can obscure key changes in cognitive circuits.

WELCOME RECEPTION

19:00 – 21:00

Hawaii Convention Center / Rooftop Garden

Join us for the 2015 Annual Meeting Welcome Reception. The reception will be held at the rooftop garden at the Hawaii Convention Center immediately following the Opening Ceremonies and Talairach Lecture on Sunday, June 8. Please make sure to wear your badge as that will serve as your ticket to the event. Additional guest badges are $50.00.

MORNING WORKSHOP

Neuroimaging-based Multivariate Classification Algorithms for Acute and Chronic Pain

8:00 – 9:15

Room 311

Organizer:

Jennifer Labus, *Center for Neurobiology of Stress, UCLA, Los Angeles, CA, United States*

Assessment of acute and chronic pain states and individual response to treatment is currently hindered by the inherent biases of patient self-report measures. Utilization of neuroimaging based measures to assist in drug development, prediction of pain state and diagnostic classification of patients has been rapidly advancing, primarily due to advances in the statistical methods and computing power now being applied using "big data" approaches such as multivariate pattern analysis and classification algorithms from machine-based learning This approach is particularly useful for making sense out of the enormous data sets generated by neuroimaging based on functional, structural, and diffusion tensor imaging.

In particular, classification algorithms such as linear support vector machines and sparse partial least squares-discriminant analysis are important statistical tools for assessing pain state (diagnosis, perception) without dependence on patient self-report. Classification algorithms applied to predict acute pain state, chronic pain diagnosis, and pharmacological and non-pharmacological treatment outcomes based on functional, structural, and anatomical neuroimaging data. Classification algorithms provide important information regarding pathophysiological mechanisms in acute and chronic pain. This information will be important in future identification of therapeutic targets and in development of tailored patient treatment.

During this symposium, Dr. Tor Wager will describe progress towards understanding the representations necessary and sufficient for predicting the intensity of pain and negative emotional experiences. Dr. Sean Mackey will present work using support vector machines to assess acute and chronic pain state with fMRI data. Dr. Jennifer Labus will present work predicting diagnosis of chronic pain compared to healthy and disease controls by applying sparse partial least square regression-discriminate analysis to multimodal neuroimaging data. Dr. Eugene Duff will discuss work using multivariate pattern analysis to predict pain perception in healthy controls as well as analgesic and placebo responses (including patients) using functional Magnetic Resonance Imaging(fMRI)-based data.

Learning Objectives:

This morning workshop is designed to develop participants' understanding of:

1. Be able to describe how neuroimaging may allow objective detection of the subjective experience of pain.
2. Understand the importance of predictive classification algorithms for tailoring pharmacological and nonpharmacological treatments.
3. Understand the role of brain imaging based classification algorithms for identifying pathophysiological mechanisms in acute and chronic pain

Target Audience:

The workshop is targets a broad audience ranging from the beginning student to the experienced researcher interested in the utility and current application of machine learning and multivariate projection techniques to large-scale neuroimaging data. Individuals with an interest in using multiple MRI methods to study drug effects and pathophysiological mechanisms in disease will find this workshop particularly useful.

Distinct brain representations underlying pain and negative emotion

Tor Wager, *Department of Psychology and Neuroscience, University of Colorado at Boulder, Boulder, CO, United States*

Identification of brain imaging biomarkers for pain

Sean Mackey, Stanford University, Palo Alto, CA, United States

Application of classification algorithms in chronic pain

Jennifer Labus, *Center for Neurobiology of Stress, UCLA, Los Angeles, CA, United States*

Multivariate pattern analyses in pharmacological studies

Eugene Duff, *FMRIB Centre, Oxford, United Kingdom*

MORNING WORKSHOP
The Emergence of Cognition

8:00 – 9:15
Room 316 AB

Organizer:
Rhodri Cusack, *Western University, London, Ontario, Canada*

There is growing evidence that many of the brain networks seen in adults have emerged by the typical age of birth. This includes not just sensory and motor networks, but those associated with higher-level cognition, such as the language, task-positive and task-negative networks. Establishing when these networks emerge, and their properties and initial functions, will enhance understanding of their roles throughout the lifespan. Furthermore, knowing the healthy trajectory of development is a prerequisite for early detection and characterization of the abnormalities that lead to developmental disabilities, which will in turn facilitate more effective earlier interventions.

This workshop brings together four methodologies that have recently yielded exciting advances. We report the structural emergence of networks using diffusion tractography and graph theory, revealing early network organisation already present in the preterm brain. With resting-state fMRI, we find these structural networks are active around the normal time of birth. The functions of two networks are then studied using auditory and visual stimulation with fMRI and EEG, showing that complex sound classification, and an elementary form of conscious-level processing, are operative in the first months. Taken together, these converging results reveal that a rich set of neurocognitive functions has emerged in young infants, which was largely inaccessible to investigation before infant neuroimaging.

Our aim is that attendees of the workshop will be able to summarize the emergence of cognition in young infants, the relevance of this to cognitive and clinical neuroscience, and the methodological advances that have made infant neuroimaging possible.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:

1. Enhanced understanding the ontogenesis of cognitive functions in the human brain.
2. Enhanced understanding of the emergence of networks in the developing brain and their potential role in neurodevelopmental outcomes.
3. Improved knowledge of techniques for testing cognitive functions using neuroimaging in non-verbal and non-compliant subjects.

Target Audience:
Our target audience comprises those interested in cognitive neuroscience, neurodevelopmental outcomes, or methods for neuroimaging acquisition and analysis in non-compliant populations.

Structural Connectivity and Network Development in the Preterm Brain
Gareth Ball, *King's College London, London, United Kingdom*

Resting fMRI During Infancy: Exploring the Emerging Functional Organization of the Developing Brain
Christopher Smyser, *Washington University, St Louis, MO, United States*

The Emergence of Auditory-Language Function from Birth to Nine Months
Rhodri Cusack, *Western University, London, Ontario, Canada*

Hierarchical Processing in the Infant Brain
Ghislaine Dehaene-Lambertz, *Neurospin, Gif/Yvette, France*

MORNING WORKSHOP
From Mapping Functions to Functional Mapping

8:00 – 9:15
Room 323 ABC

Organizers:
Simon Eickhoff, *Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Düsseldorf, Germany*

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

A regional specialization into distinct cortical areas is one of the fundamental organizational principles of the human cerebral cortex. Mapping the regional organization of the human brain has long been the domain of post-mortem anatomy, whereas functional neuroimaging primarily focused on localizing the neuronal correlates of mental functions. This dichotomy has started to change dramatically less than a decade after the initial demonstration that parcellations based on structural connectivity may reveal distinct modules in the human brain.

Not only have the concepts of connectivity-based parcellation subsequently been transferred to functional connectivity analyses and subsequently refined, but rather they have also been complemented by new methods specifically developed to identify functional boundaries. Together with formal approaches to assigning mental functions to the identified modules via quantitative forward and reverse inference, these tools now enable a new perspective for the functional mapping of the human cerebral cortex. This symposium aims at providing an overview on several of the emerging methods for the functional mapping of the human brain. We will furthermore discuss how these can be integrated with other modalities such as structural neuroimaging and outline the potential of these emerging approaches for both regional and whole-brain mapping.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:

1. The distinction between "classical" mapping of functions and functional brain mapping.
2. The heterogeneity of methods used to for functional parcellation of the human brain.
3. The benefit of multi-modal integration in the context of functional brain mapping.
4. The role of quantitative functional decoding in the context of brain parcellations.

Target Audience:
The human brain mapping community. As this symposium combines methodological and neurobiological aspects it should be of interest to people focused on methods for functional connectivity analysis and parcellation as well as neurobiologists interested in the potential applications.

Connectivity-based Brain Parcellation: Toward the Brainnetome Atlas
Lingzhong Fan, *Institute of Automation, Chinese Academy of Sciences, Beijing, China*

Regional mapping of cortical modules, their connectivity and function based on task-activation data
Simon Eickhoff, *Institute of Clinical Neuroscience and Medical Psychology, Heinrich Heine University, Düsseldorf, Germany*

Functional Specialization and Flexibility in Human Cerebral Cortex Estimated From a Large-Scale Cognitive Ontology
BT Thomas Yeo, *National University of Singapore, Singapore*

Generation and evaluation of a cortical area parcellation from resting state correlations
Evan Gordon, *Washington University School of Medicine, Neurology, St. Louis, MO, United States*

MORNING WORKSHOP
Genetics of the Connectome

8:00 – 9:15
Ballroom ABC

Organizers:
Thomas Nichols, *University of Warwick, Department of Statistics, Coventry, United Kingdom*

David Glahn, PhD, *Yale University, New Haven, CT, United States*

The study of the genetic architecture of brain structure and function has largely progressed through the study of associations between common genetic variants and neuroimaging signals. Recent work has demonstrated reliable genome-wide associations with brain structure, but this approach is fundamentally challenging due to the need for very large sample sizes (in the tens of thousands). In addition, genome-wide associations studies in a number of domains have shown that common variants are generally associated with very small effect sizes, and thus the identification of a significant association is difficult to translate into mechanistic neurobiological insights. In this symposium we will discuss several new approaches to studying the genetic basis of variation in brain function.

In the first talk, Dr. Nichols will review the tools used for genetic analyses of related individuals and how they can be scaled up to massive connectomic data. Then Dr. Glahn will show how quantitative genetic analyses can be used to understand the shared genetic structure of structural and functional connectivity. Next Dr. Poldrack will present how to link gene expression data to brain imaging phenotypes. Finally, Dr. Blangero will show how large pedigree studies are essential for discovering associations with rare variants that explain connectivity.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:

1. How to account for dependence induced by studying related subjects, whether that dependence is of interest (to estimate heritability) or a nuisance.
2. The use of polygenic models to estimate the common genetic variation that links two distinct phenotypes, such as structural and functional connectivity measures.
3. How gene expression data from blood cells can be linked to functional connectivity measures in the brain.

Target Audience:
A key target audience will be researchers interested in "imaging genetics," i.e. those looking to understand the role that genetics has in explaining variation brain measures. However, other attendees interested in connectivity data in general, may also be interested, to expand their base of knowledge.

Fast, accurate methods for heritability and association high-dimensional connectomics data
Thomas Nichols, *University of Warwick, Department of Statistics, Coventry, United Kingdom*

Shared and Unique Influences on Structural and Functional Connectivity
David Glahn, PhD, *Yale University, New Haven, CT, United States*

Peripheral gene expression and brain function
Russell Poldrack, *UT Austin, Austin, TX, United States*

Impact of Highly Deleterious Functional Genetic Variants on Human Brain Connectivity
John Blangero, *Texas Biomedical Foundation, San Antonio, TX, United States*

BREAK
9:15 – 9:30

KEYNOTE LECTURE
9:30 – 10:15
Ballroom ABC

Connectomic Insights into Psychiatric Disorders
Susan Whitfield-Gabrieli, *McGovern Institute for Brain Research, MIT, Cambridge, MA, United States*

Connectomics provide new perspectives on brain variation associated with psychiatric diseases. Intrinsic networks can reveal mechanisms of pathophysiology associated with specific diagnoses and can reveal variation within diagnoses relevant to treatment outcome. Such neuromarkers may support personalized medicine that guides patients to optimal treatments, and translate neuroimaging into medical practice.

BREAK
10:15 – 10:30

LOC SYMPOSIUM:
Neuroimaging Studies in Substance Use Disorders
10:30 – 11:45
Ballroom ABC

Moderators:
Andrew Stenger, *University of Hawaii, Honolulu, HI, United States*

Thomas Ernst, *University of Hawaii, University of Hawaii, Honolulu, HI, United States*

Speakers:
Edythe D. London, PhD, *University of California, Los Angeles, CA, United States*

Stimulant Abuse and Dopamine Signaling: Impact on Self-Control and Decision-making
Molecular and functional neuroimaging studies have revealed deficits in dopaminergic circuits and in top-down control mechanisms associated with stimulant abuse. Our laboratory has used a combination of imaging modalities, including PET, task-based and resting-state fMRI, and structural MRI, to explore the links between dopaminergic signaling, systems-level brain function and structure, and behavioral phenotypes that can influence the course of addiction and recovery. We have shown that striatal D2-type receptor signaling is linked to behavioral and neural measures of self-control and risky decision-making in the laboratory, that stimulant users exhibit enhanced intrinsic activity of the mesocorticolimbic system in the resting state, and a negative association of mesocorticolimbic resting-state connectivity with responsivity of dorsolateral prefrontal cortex to risk during decision-making. Moreover, we have provided evidence that midbrain D2-type receptors influence the neurotoxic effects of methamphetamine, as indicated by negative associations between D2-type receptor availability and structural deficits in striatum and cortex. These studies show the utility of multi-modal neuroimaging in extending knowledge of how psychostimulants produce profound effects on adaptive behavior.

Brain Imaging Studies in Alcoholism
Adolf Pfefferbaum, MD, *Stanford University School of Medicine, Stanford, CA, United States*

Alcoholism follows a dynamic course, involving development, maintenance, recovery, and relapse. In vivo brain imaging studies have enabled the tracking of this course and has revealed evidence for disruption of selective macrostructural and microstructural brain tissue in Alcohol Use Disorder with evidence for improvement with sustained sobriety. Features of brain dysmorphology have been modeled in rodents under controlled conditions exposed to high levels of alcohol with reversal of damage after a week free of alcohol. These studies demonstrate the strength of longitudinal study using noninvasive MR imaging.

Brain changes associated with marijuana use
Linda Chang, *John A. Burns School of Medicine, University of Hawaii, Honolulu, HI, United States*

Marijuana is the most common illicit drug abused in the world, and is used medically under legal jurisdictions in almost half of the United States. Preclinical studies suggest the psychoactive

ingredient of marijuana, delta-9-tetrahydrocannabinoid (THC), is anti-inflammatory which may be beneficial for the treatments of neuroinflammatory disorders and for pain. However, marijuana contains many other cannabinoids and clinical data are somewhat controversial regarding marijuana's therapeutic effects. Brain imaging studies showed re-organized brain networks, and alterations in brain metabolites and brain structures in chronic marijuana users. Similarly, neurocognitive studies consistently showed deficits in learning and memory, although some of these deficits may be reversible with abstinence. Furthermore, age of first use of marijuana may lead to greater brain alterations. Given the high prevalence of use by the youth, and the impending legalization of marijuana in many regions, more studies are needed to clarify how marijuana use impacts the brain across the lifespan, in order to better inform the public and guide its medicinal use.

Imaging Biomarkers of Addiction Status and Treatment Outcome

Elliott Stein, PhD, *Intramural Research Program, National Institute on Drug Abuse, Bethesda, MD, United States*

Nicotine dependence remains a large public health problem with individual recidivism rates exceeding 90%. In part, the poor understanding of the neurobiological mechanisms of nicotine (and other drug) dependence and the absence of quantifiable, brain based biomarkers of treatment outcome contribute to such high relapse. This talk will include data based on anatomical, physiological and genetic analyses of nicotine dependence and, together with prediction outcome data from a recent cocaine treatment protocol, will provide a proposed pathway in the development of multimodal imaging biomarkers that may be used as part of comprehensive treatment interventions.

LUNCH

11:45 – 12:45

POSTER SESSION

12:45 – 14:45

Exhibit Hall 2 and 3

Poster Numbers #1000 – 2451

Authors with even numbered posters will present their posters today.

Disorders of the Nervous System: Anxiety Disorders, Bipolar Disorder, Depressive Disorders, Other Psychiatric Disorders, Parkinson's Disease and Movement Disorders, Research Domain Criteria studies (RDoC), Schizophrenia and Psychotic Disorders, Sleep Disorders, Stroke and Traumatic Brain Injury

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

Higher Cognitive Functions: Decision Making, Higher Cognitive Functions Other, Imagery, Music and Space, Time and Number Coding

Imaging Methods: Anatomical MRI, BOLD fMRI, Diffusion MRI, EEG, Imaging Methods Other, Imaging of CLARITY, MEG, MR Spectroscopy, Multi-Modal Imaging, NIRS, Non-BOLD fMRI, Optical coherence tomography (OCT), PET and Polarized light imaging (PLI)

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

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

Modeling and Analysis Methods: Bayesian Modeling, Diffusion MRI Modeling and Analysis, EEG/MEG Modeling and Analysis, Other Methods, PET Modeling and Analysis and Task-Independent and Resting-State Analysis

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

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

SYMPOSIUM

Anatomical and Functional Mapping of Subcortical Structures with ultra-high-field MRI

14:45 – 16:00
Ballroom ABC

Organizers:
Michelle Moerel, *CMRR, University of Minnesota, Minneapolis, MN, United States*

Essa Yacoub, *CMRR, University of Minnesota, Minneapolis, MN, United States*

Subcortical structures are fundamental to brain processing, functioning to actively gate sensory information, merge signals across modalities, participate in thalamocortical loops, and regulate emotion. Due to their small size, these structures have been largely inaccessible to non-invasive physiological explorations. Ultrahigh magnetic field scanners have the potential to improve spatial resolution and contrast specificity of functional imaging far beyond the possibilities at lower field strengths. Recent fMRI studies at 7 Tesla have used these advantages to explore the human midbrain and thalamic nuclei at sub-millimeter resolution. These studies revealed detailed organizations, including the presence of sensory topographic maps, in accordance with results obtained from animal studies using microelectrode recordings. These research efforts represent the beginning of investigations aiming to unravel the functional organizational and modulation of subcortical structures. In combination with high resolution anatomical studies, these advances in non-invasive parcellation of subcortical nuclei of individual subjects have the potential to ultimately provide a deeper understanding of the brain processes hidden underneath the human neocortex.

Learning Objectives:
This symposium is designed to develop participants' understanding of:

1. Provide an overview of relevant subcortical structures and their anatomical identification in individual human brains.
2. Describe recent high-field fMRI studies revealing detailed organizations of human midbrain and thalamic nuclei.
3. Discuss fMRI acquisition methods and limitations related to obtaining high-resolution functional images of subcortical structures.

Target Audience:
Neuroscientists working with, or interested in, subcortical brain processing. Topics addressed will range from MRI acquisition methods to identification of anatomical structures, brainstem sensory processing, and clinical applications.

Visualization of human brainstem substructures using gray matter nulling 3D-MPRAGE at 7 Tesla
Michael Wyss, *University of Zurich, Zurich, Switzerland*

Imaging the anatomical and functional connectivity of the human brainstem in vivo at 7 Tesla
Lawrence Wald, PhD, *Massachusetts General Hospital, Charlestown, MA, United States*

High-field mapping of the magnocellular and parvocellular subdivisions of human LGN
Rachel Denison, *New York University, New York, NY, United States*

Encoding sound features in auditory brainstem and thalamus
Federico De Martino, *Maastricht University, Maastricht, The Netherlands*

BREAK
16:00 – 16:15

KEYNOTE LECTURE
16:15 – 17:00
Ballroom ABC

Computational Analysis of Functional, Connectional and Architectonic Properties of the Human Brain

Bruce Fischl, *Athinoula A Martinos Center for Biomedical Imaging, Massachusetts General Hospital and Harvard Medical School, Boston, MA, United States*

Magnetic Resonance Imaging technology has progressed at an astonishing rate in the last decade, with an array of new image contrasts available at higher resolution, higher SNR and/or reduced imaging time. In this talk I will discuss ongoing work at MGH with the goal of automatically extracting information from these images for the purposes of quantifying normal brain structure, function and connectivity as well as detecting departures from normal trajectories. This includes the construction and use of surface-based models of the human cerebral cortex, the modeling of major white matter fascicles from diffusion-weighted MRI. Finally, I will describe work using ex vivo MRI and optical imaging to directly resolve structures that are far smaller than can be seen in vivo, with resolutions approaching 1 micron, that enables us to probe stereological, laminar and architectonic properties of the human brain with minimal distortion and large fields of view. These properties can then be predicted from macroscopic geometry that can be observed in vivo, making them available for neuroscientific and clinical research.

BREAK
17:00 – 17:15

ORAL SESSIONS

17:15 – 18:30

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

O-M1: Motor Behavior - Multimodal Mapping of Motor Systems

Room 316 AB

Chair: Virginia Penhune, *Concordia University, Montreal, Quebec, Canada*

17:15 – 17:30

1875: The Dynamic Recruitment of Resting State Sub-networks

George O'Neill, *University of Nottingham, Nottingham, United Kingdom*

17:30 – 17:45

2399: The SMA and cingulate cortex sustain premovement activity in readiness for action: An EEG-fMRI study

Ross Cunnington, *University of Queensland, Brisbane, Australia*

17:45 – 18:00

3550: Impact of aging on motor control networks underlying movement selection and initiation

Jochen Michely, *Cologne University Hospital, Cologne, Germany*

18:00 – 18:15

2358: Predicting and Interrupting Movement Intentions with a Closed Loop BCI

Matthias Schultze-Kraft, *Berlin Institute of Technology, Berlin, Germany*

18:15 – 18:30

4127: Motor skill acquisition promotes human brain myelin plasticity

Bimal Lakhani, *Univerity of British Columbia, Vanouver, British Columbia, Canada*

O-M2: Psychiatric Disorders

Room 315

Chair: Perry Renshaw, *Professor of Psychiatry, University of Utah, Salt Lake City, UT, United States*

17:15 – 17:30

1193: Connectome-wide association study reveals dysconnectivity in youth with psychosis-spectrum symptoms

Theodore Satterthwaite, *UPenn, Philadelphia, PA, United States*

17:30 – 17:45

1095: Aberrant functional connectivity of anterior versus posterior putamen in ADHD

Marianne Oldehinkel, Donders Institute for Brain, Cognition and Behaviour, Nijmegen, The Netherlands

17:45 – 18:00

1026: A comprehensive probabilistic tractography study in sibling pairs discordant for bipolar disorder

Emma Sprooten, *Yale University, Hartford, CT, United States*

18:00 – 18:15

1038: Hippocampal subfield analysis to compare the depression and neurodegeneration spectrum

Philipp Sämann, *Max Planck Institute of Psychiatry, Munich, Germany*

18:15 – 18:30

1037: Nucleus Accumbens Responses to Gain and Loss Revealed Symptom Subtypes of Major Depressive Disorder

Masaya Misaki, *Laureate Institute for Brain Research, Tulsa, OK, United States*

O-M3: Mechanisms of Memory and Learning

Room 323 ABC

Chair: Michael Greicius, *Stanford University, Stanford, CA, United States*

17:15 – 17:30

1534: Human markers of grid cell coding of non-spatial cognition

Alexandra Constantinescu, *University of Oxford, Oxford, United Kingdom*

17:30 – 17:45

2121: Resting state network reorganization in hemiplegic cerebral palsy treated with constraint therapy

Kathryn Manning, *Robarts Research Institute, London, Ontario, Canada*

17:45 – 18:00

2098: Sleep Reorganizes Memory-related Plasticity Processes in Children

Charline Urbain, *The Hospital for Sick Children (SickKids), Toronto, Ontario, Canada*

18:00 – 18:15

2020: Timing the Impact of Literacy in Visual Processing

Felipe Pegado, *KU Leuven University, Leuven, Belgium*

18:15 – 18:30

3359: Brain response to a working memory intervention in survivors of childhood cancer

Matthew Scoggins, *St. Jude Children's Research Hospital, Memphis, TN, United States*

O-M4: Dynamic Electrophysiological Mapping

Room 311

Chair: *Christoph Michel, University of Geneva, Geneva, Switzerland*

17:15 – 17:30

3750: Frequency-Specific ECoG Correlations Underlie fMRI Resting State Networks

Carl Hacker, *Washington University School of Medicine, St. Louis, MO, United States*

17:30 – 17:45

3044: In-vivo MRI mapping of electrical current of transcranial Direct Current Stimulation (tDCS)

Mayank V Jog, *University of California Los Angeles, Los Angeles, CA, United States*

17:45 – 18:00

2231: Spatiotemporal Dynamic Models of Brain Activity Could Dramatically Improve MEG/EEG Source Imaging

Camilo Lamus, *Massachusetts Institute of Technology, Cambridge, MA, United States*

18:00 – 18:15

2181: Short-term plasticity of laminar synaptic connections in Alzheimer's disease - An MEG study

Peng Wang, *mpi cbs, Leipzig, Germany*

18:15 – 18:30

1855: Direct detecting optogenetically evoked oscillating neural current in rats using SLOE sequence

Yuhui Chai, *Peking University, Beijing, China*

O-M5: Neuroanatomy

Ballroom ABC

Chair: Bruce Fischl, *Harvard University, Cambridge, MA, United States*

17:15 – 17:30

1856: High resolution MRI neuroanatomy in whole human brains post mortem with a specialized 9.4T RF-coil

Alard Roebroeck, *Dept. of Cognitive Neuroscience, Faculty of Psychology & Neuroscience, Maastricht University, Maastricht, The Netherlands*

17:30 – 17:45

1740: Improved tract identification of post-mortem human brain with high-resolution DTI at 7T

Sean Foxley, *University of Oxford, Oxford, United Kingdom*

17:45 – 18:00

4102: Population maps of axonal MRI g-ratio

Siawoosh Mohammadi, *University Medical Center Hamburg-Eppendorf, Hamburg, Germany*

18:00 – 18:15

1957: Ex vivo human brain by optical coherence tomography: from cortical layers to the individual neurons

Caroline Magnain, *Athinoula A. Martinos Center for Biomedical Imaging, MGH, Charlestown, MA, United States*

18:15 – 18:30

3501: Ultrahigh Resolution 3-D Volumetric Atlas of the Human Basal Ganglia

Ayca Altinkaya, *Montreal Neurological Institute, Montreal, Quebec, Canada*

MORNING WORKSHOP

Tracking Disease Trajectories and Identifying Brain-based Markers to Characterize Mental Illness

8:00 – 9:15

Room 323 ABC

Organizers:

Lucina Uddin, *University of Miami, Coral Gables, FL, United States*

Jessica Damoiseaux, *Wayne State University, Detroit, MI, United States*

Over the past decade, increasingly sophisticated insights into human brain function have been obtained from functional neuroimaging analyses. As methods for analyzing functional brain connectivity become more standardized and consensus grows in the field, so does the potential for clinical utility. Here we highlight how functional connectivity approaches have been leveraged in recent years to provide insights into the neural architecture of neurodevelopmental, neuropsychiatric, and neurodegenerative disorders. In particular, it has now consistently been shown that not only do functional connectivity metrics differ between patient and control groups in reproducible ways, but that these metrics can be used to track disease progression, target regions for therapeutic brain stimulation, predict clinical outcomes, and even identify biological markers that can help us redefine or confirm clinical categories that are thus far defined using only manifested symptoms. The speakers will discuss several key strategies using unique data covering conditions that occur across the lifespan in a variety of patient populations, or which span multiple difficult-to-characterize patient populations. Using this approach, we aim to widen the discourse around developmental/age-related disease and symptom-based categorization of mental illness, and offer the opportunity to think about psycho- or neuropathology in a way that is broader than one condition or one brain system. This session will provide examples of the power of incorporating lifespan changes and/or incorporating brain imaging to inform a discussion of somewhat clinically controversial categories like schizoaffective disorder in an attempt to discover linkages in basic mechanisms and/or disease specific processes, and provide a forum for discussion of clinical implications.

Learning Objectives:

This morning workshop is designed to develop participants' understanding of:

1. Provide an overview of clinical applications of functional connectivity studies.
2. Widen the discourse on brain development across ages and diseases and thereby creating an opportunity for thinking beyond one condition or mechanism.
3. Illustrate the applicability of functional connectivity analyses to non-invasively examine brain function in challenging study populations such as psychiatric and neurological patients.

Target Audience:

Cognitive neuroscientists and clinicians interested in lifespan functional brain organization, with an emphasis on clinical translation.

Neuroimaging of typical and atypical development: Insights from autism, attention-deficit/hyperactivity disorder, and hemispherectomy

Lucina Uddin, *University of Miami, Coral Gables, FL, United States*

Data-driven approaches for characterizing bipolar, schizophrenia, and schizoaffective patients from resting fMRI data

Vince Calhoun, *Mind Research Network & University of New Mexico, Albuquerque, NM, United States*

Predicting Treatment Outcome in Anxiety and Depression

Satrajit Ghosh, PhD., *MIT, Cambridge, MA, United States*

Resting state fMRI as a biomarker for preclinical Alzheimer's disease

Jessica Damoiseaux, *Wayne State University, Detroit, MI, United States*

MORNING WORKSHOP

Novel Approaches to Decode the Distributed Neural Representation of Emotions and Their Components

8:00 – 9:15

Room 316 AB

Organizer:

Patrik Vuilleumier, *University of Geneva, Geneva, Switzerland*

The goal of the symposium is to present an overview of novel approaches used to study emotions with neuroimaging and neurophysiology measures, including multivariate classification and dynamic network analysis. Human brain imaging played a key role in the development of research on emotions and affective neuroscience in general in the last two decades, because it allowed scientists to link emotion phenomena, typically characterized by subjective and private mental states, to observable changes in the activity of specific brain structures and circuits. This work yielded many important insights, but also raised new questions that now need be addressed with new methodologies in order to uncover how emotions are represented in the brain. Early brain imaging research generally focused on mapping basic emotion categories (e.g. fear, disgust) or dimensions (e.g. valence, arousal) onto specific brain structures (e.g., amygdala, insula), but it is now becoming evident that many different emotions recruit similar brain structures, including many outside the "limbic" system traditionally associated with emotion processing. These data support an emerging view of emotions in terms of activity patterns that are distributed across widespread and overlapping brain networks. This framework calls for novel methods of analysis to dissect how emotions are coded in the brain and better understand the multidimensional neural space underlying their differentiation into distinct categories. The 4 speakers during the symposium will present several different approaches aiming at identifying brain activity patterns that are associated with various categories of emotions and their underlying components, at different scales of brain organization. Topics covered in the symposium will include multivariate pattern classification of neural and physiological data, small world network and graph theory, dynamic resting state analysis, and inter-subject synchronization. These approaches will not only illustrate the power of innovative imaging methodologies but also how imaging results can be used, under appropriate conditions, to test the classic theoretical accounts of emotions and provide new conceptual perspectives.

Comparing brain activation patterns distributions within and between areas may allow researchers to identify the "building blocks" of emotion processes in ways that could not be fully elucidated by traditional theories proposing either categorical or bi/tri-dimensional representations. Therefore, we believe that our field is entering a new era where applying new imaging methodologies to the study of emotions will make the field move forward and help resolve long-standing debates.

All speakers are experts in the neuroimaging of emotions and have published pioneer work on the neural substrates of emotion processing with multivariate classification analysis and other innovative methods. They come from 4 different countries, with equal representation of North America and Europe. Their research is highly complementary and should be of interest to a wide audience of researchers and clinicians even outside the field of emotion research.

Learning Objectives:

This morning workshop is designed to develop participants' understanding of:

1. To gain better knowledge about advanced analysis methods using multivariate and pattern classification approaches, including diversity, advantages, and limitations of these methods.
2. To highlight the variety and complementary of modern neuroimaging tools available to investigate emotions in humans, with a particular focus on fMRI. Different levels of analysis will be presented, which can be applied to understand emotions and asses their links with neural substrates, including local patterns of neural activity, network measures, and functional connectivity of individual brains, but also inter-subject comparison based on temporal correlation and cross-subject classification methods, as well as decoding and integration of peripheral physiological measures.
3. To learn about current theoretical accounts and open issues concerning emotion processes and their neurobiological instantiation in the human brain, and to demonstrate how neuroimaging data can be used to inform, challenge, and/or constrain theories of emotions.

Target Audience:

The workshop will be of interest to a wide audience, including researchers with primary interest in methods and those with interest in emotion research, but also others whose own work might be enriched by the approaches presented during the symposium, as well as more clinically oriented researchers or practitioners with interest in affective disorders and psychiatry diseases.

Neural representations of external events and their internal affect
Adam Anderson, Professor, *Department of Human Development and Human Neuroscience, Cornell University, Ithaca, NY, United States*

Multivariate pattern classification reveals biomarkers of distinct emotional states in the central and autonomic nervous systems
Kevin LaBar, Professor, *Center for Cognitive Neuroscience, Duke University, Durham, NC, United States*

Neural mechanisms of emotional contagion
Lauri Nummenmaa, *AMI Centre and Brain Research Unit, Low Temperature Laboratory, Aalto University School of Science, Espoo, Finland*

Emotions, network dynamics, and brain states
Patrik Vuilleumier, *University of Geneva, Geneva, Switzerland*

MORNING WORKSHOP

A New Look at the Data: Non-traditional Approaches to fMRI Data Analysis

8:00 – 9:15
Room 311

Organizers:
Vince Calhoun, *Mind Research Network & University of New Mexico, Albuquerque, NM, United States*

Tor Wager, Professor, *Department of Psychology and Neuroscience, University of Colorado at Boulder, Boulder, CO, United States*

fMRI has benefitted greatly from the introduction of analysis and acquisition approaches borrowed from other disciplines to examine brain function in new ways. The examples of now-familiar techniques are many. Some of the earliest include statistical parametric mapping using the general linear model and functional connectivity using seed-based maps, clustering, and multivariate component analysis approaches. More recently, pattern-based classification approaches, graph theoretic approaches, and time-varying whole-brain connectivity have gained prominence and are increasingly becoming established methods. With each new successful analytic approach, new sources of valuable information have been revealed by uncovering 'hidden' variation that is ignored by traditional approaches. In this symposium, we have asked the speakers to discuss approaches that are new to the brain imaging community, whether that be transferring an approach developed in another field to fMRI data or an approach which focuses on sources of variation that have been typically ignored or underemphasized in traditional fMRI approaches.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:

1. To step back a bit from traditional analysis approaches and look at some new ways to view fMRI data that might provide useful, but are overlooked with traditional approaches.
2. To encourage consideration of the underlying assumptions that we are making with a specific analytic choice and to try to 'think outside the box' with respect to what currently widely adopted approaches can and cannot provide.

Target Audience:
Talks will be structured to be accessible to both beginners to fMRI who have taken the preconference course, as well as to more advanced users who are interested in thinking in new ways about analysis including what do existing analysis approaches miss.

New fMRI observations using novel acquisition, paradigm, and processing approaches
Peter Bandettini, *SFIM, Bethesda, MD, United States*

Incorporating spatial frequency patterns into fMRI analysis
Robyn Miller, *The Mind Research Network, Albuquerque, NM, United States*

Deep neural network-based feature extraction and classification for fMRI data
Jong-Hwan Lee, *Korea University, Brain and Cognitive Engineering, Seoul, Republic Of Korea*

Bayesian modeling approaches to the study of Dynamic Functional Connectivity Networks in fMRI data
Michele Guidani, *Department of Biostatistics, UT MD Anderson Cancer Center, Houston, TX, United States*

MORNING WORKSHOP

Toward a Bigger Brain: Non-invasive Characterization of Brain Microstructure

8:00 – 9:15

Ballroom ABC

Organizers:

Nikola Stikov, *McGill University, Montreal, Quebec, Canada*

Aviv Mezer, *Stanford University, Stanford, CA, United States*

Measuring tissue microstructure is essential for understanding many physiological processes associated with development, aging and disease progression. A non-invasive approach to performing histological measurements will revolutionize the way we observe the effects of disease, exercise, and injuries on the human brain. As microstructural changes often precede the manifestation of symptoms, non-invasive tissue characterization has the potential to provide faster diagnosis, closer disease monitoring and better prognosis.

Over the last ten years we have seen tremendous advances in the fields of diffusion and myelin imaging, enabling us to glean microstructural information on a scale that is orders of magnitude smaller than the native MRI resolution. Advances in hardware and pulse sequence design have enabled us to ask specific questions about the distribution of axons and myelin in the brain, but the answers will have to come from an interdisciplinary approach that combines multi-modal imaging and sophisticated biophysical models of brain microstructure.

This symposium aims to highlight the most recent advances in microstructural imaging and discuss the challenges associated with developing, testing and validating novel MRI biomarkers. The program will begin with an overview of brain microstructure by Dr. Karla Miller, with a particular focus on post-mortem imaging. Dr. Aviv Mezer will follow up with discussing proton density measurements and the relationship between water and macromolecular content during development and disease. Dr. Ivana Drobnjak will give an overview of diffusion models and their relationship to axon distributions and orientations. Finally, Dr. Nikola Stikov will talk about myelin imaging and the advantages of combining the above techniques to provide a more complete picture of the myelin microstructure.

Learning Objectives:

This morning workshop is designed to develop participants' understanding of:

1. Explain the basics of diffusion and myelin imaging with MRI.
2. Describe the challenges associated with developing and validating tissue microstructure biomarkers.
3. Discuss the benefits and limitations of state-of-the-art microstructural imaging techniques.

Target Audience:

Basic and clinical neuroscientists with an understanding of introductory MRI physics. We anticipate that the symposium will also attract methodology researchers interested in multi-modal brain imaging.

Probing brain microstructure with magnetic resonance imaging

Karla Miller, *University of Oxford, Oxford, United Kingdom*

Quantifying water and macromolecular content in the brain

Aviv Mezer, *Stanford University, Stanford, CA, United States*

Diffusion MRI techniques for axon diameter estimation

Gary Zhang, *University College London, London, United Kingdom*

Characterizing the myelin microstructure with multimodal MRI

Nikola Stikov, *McGill University, Montreal, Quebec, Canada*

BREAK

9:15 – 9:30

KEYNOTE LECTURE

9:30 – 10:15

Ballroom ABC

Brain Waves

Michael Breakspear,
Systems Neuroscience Group, Queensland, Australia

Unifying theories of natural phenomena, expressed in mathematical form, have had enormous success in science, essentially "solving" the problems of electromagnetism, gravity, thermodynamics and particle physics. Could the processes that prescribe the dynamics of the brain's physical states be governed by a closed set of equations that could be discovered and written down? What might the equations for the brain look like, how will they be obtained, and will they "solve" neuroscience?

BREAK

10:15 – 10:30

ORAL SESSIONS

10:30 – 11:45

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

O-T1: Neurological Disorders

Room 323 ABC

Chair: Andrei Irimia, *Neuroimaging and Informatics at the University of Southern California, Los Angeles, CA, United States*

10:30 – 10:45

3549: Cerebellar gray matter reduction is a neurologic signature for physical frailty

Chen-Yuan Kuo, *Brain Science, Taipei, Taiwan*

10:45 – 11:00

1123: Functional Connectivity of the aMCC and its Relation to Akinesia in Parkinson's Disease

Lukas Hensel, *Research Center Jülich, Jülich, Germany*

11:00 – 11:15

1124: Chronic Cortical and Subcortical Recordings Reveal Narrowband 70 Hz Activity During Dyskinesias

Nicole Swann, *University of California, San Francisco, CA, United States*

11:15 – 11:30

1245: Recovery of abnormal sleep slow-wave activity after dopamine treatment in Restless legs syndrome

Jeong Woo Choi, *Yonsei University, Wonju, Korea*

11:30 – 11:45

1252: Dynamic resting-state fMRI connectivity reflects behavioral measures in stroke patients

Niels Schwaderlapp, *Medical Physics, University Medical Center Freiburg, Freiburg, Germany*

O-T2: Emotion and Motivation

Room 316 AB

Chair: Patrik Vuilleumier, *University of Geneva, Geneva, Switzerland*

10:30 – 10:45

1000: Modeling effective connectivity in the extended emotion processing network using DCM at 7T

Ronald Sladky, *Center for Medical Physics and Biomedical Engineering, Medical University of Vienna, Vienna, Austria*

10:45 – 11:00

1368: Imagined Extinction Reduces Real-life Threat Expression

Marianne Reddan, *University of Colorado, Boulder, CO, United States*

11:00 – 11:15
1415: Cognitive Neurostimulation: Learning to Volitionally Sustain Ventral Tegmental Area Activation
Kathryn Dickerson, *Duke University, Durham, NC, United States*

11:15 – 11:30
1416: Parsing Reward: Spatiotemporal Analysis Reveals Distinct Striatal Responses to Reward
David Smith, *Rutgers University, Newarkk, NJ, United States*

11:30 – 11:45
3211: Rewarding speech elicits reduced accumbens & amygdala activity and connectivity in children with ASD
Daniel Abrams, *Stanford University, Stanford, CA, United States*

O-T3: Systems Analysis of Language Processes

Room 311
Chair: William Graves, *Department of Psychology, Rutgers University, Newark, NJ, United States*

10:30 – 10:45
1980: Activation to Manipulable Nouns in Naturalistic Reading
Rutvik Desai, *University of South Carolina, Columbia, SC, United States*

10:45 – 11:00
1809: Tracking dynamics of functional brain networks using dense EEG
Mahmoud Hassan, *Université de Rennes, Rennes, France*

11:00 – 11:15
1981: The Role of Syntax in Semantic Processing: a Study of Active and Passive Sentences
Nicole Rafidi, *Carnegie Mellon University, Pittsburgh, PA, United States*

11:15 – 11:30
2021: A DTI study of structural connectivity within the reading network of young struggling readers
Anna Romanowska-Pawliczek, *University of Texas Health Science Center at Houston, Houston, TX, United States*

11:30 – 11:45
1478: Dual-stream speech processing signified by directed connectivity markers
Jeong-Sug Kyong, *Department of Neurology, Seoul National University Hospital, Seoul, Korea*

O-T4: White Matter Imaging Methods

Ballroom ABC
Chair: Jennifer McNab, *Stanford University, Stanford, CA, United States*

10:30 – 10:45
2195: Combining ex vivo diffusion imaging with CLARITY in human hippocampus
Kristi Clark, *USC, Los Angeles, CA, United States*

10:45 – 11:00
1874: MRI evaluation of the CLARITY method for lipid removal from brain tissue
Christoph Leuze, *Stanford University, Stanford, CA, United States*

11:00 – 11:15
2196: In Vivo Observation of Time-dependent Diffusion in Human White Matter
Els Fieremans, *New York University School of Medicine, New York, NY, United States*

11:15 – 11:30
4103: Fiber dispersion in the corpus callosum revealed with postmortem diffusion weighted imaging and PLI
Jeroen Mollink, *Nuffield Department of Clinical Neurosciences, University of Oxford, Oxford, United Kingdom*

11:30 – 11:45
1966: Large-scale Fiber Orientation Models Derived From 3D Polarized Light Imaging
Markus Axer, *Research Centre Juelich, Juelich, Germany*

O-T5: Physiology, Metabolism and Neurotransmission

Room 315

Chair: Amir Shmuel, *Montreal Neurological Institute, Montreal, Quebec, Canada*

10:30 – 10:45

2425: Application of a new physiological forward fMRI signal model on experimental multimodal imaging

Martin Havlicek, *Maastricht University, Maastricht, The Netherlands*

10:45 – 11:00

2439: Neuronal and Physiological Correlation of Hemodynamic Resting-State Fluctuations and Connectivity

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

11:00 – 11:15

2281: Lag threads organize the brain's intrinsic activity

Anish Mitra, *Washington University School of Medicine, St. Louis, MO, United States*

11:15 – 11:30

1911: A Spontaneous Neurophysiological Event Underlying Spontaneous fMRI Signal Changes

Xiao Liu, *NIH, Bethesda, MD, United States*

11:30 – 11:45

2438: The relation between oscillatory EEG activity and the laminar specific BOLD signal

Rene Scheeringa, *Radboud University Nijmegen, Nijmegen, The Netherlands*

LUNCH

11:45 – 12:45

POSTER SESSION

12:45 – 14:45

Exhibit Hall 2 and 3

Poster Numbers #1000 – 2451

Authors with odd numbered posters will present their posters today.

Disorders of the Nervous System: Anxiety Disorders, Bipolar Disorder, Depressive Disorders, Other Psychiatric Disorders, Parkinson's Disease and Movement Disorders, Research Domain Criteria studies (RDoC), Schizophrenia and Psychotic Disorders, Sleep Disorders, Stroke and Traumatic Brain Injury

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

Higher Cognitive Functions: Decision Making, Higher Cognitive Functions Other, Imagery, Music and Space, Time and Number Coding

Imaging Methods: Anatomical MRI, BOLD fMRI, Diffusion MRI, EEG, Imaging Methods Other, Imaging of CLARITY, MEG, MR Spectroscopy, Multi-Modal Imaging, NIRS, Non-BOLD fMRI, Optical coherence tomography (OCT), PET and Polarized light imaging (PLI)

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

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

Modeling and Analysis Methods: Bayesian Modeling, Diffusion MRI Modeling and Analysis, EEG/MEG Modeling and Analysis, Other Methods, PET Modeling and Analysis and Task-Independent and Resting-State Analysis

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

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

SYMPOSIUM

Multilevel Social Neuroscience

14:45 – 16:00

Ballroom ABC

Organizers:

Jamil Zaki,*Stanford University, Stanford, CA, United States*

Leonhard Schilbach, *Max Planck Institute of Psychiatry, Munich, Germany*

Social neuroscience represents a young and burgeoning field of research devoted to understanding the mechanisms that underlie social behavior. This session highlights the broad, "multilevel" approach that scientists take towards this endeavor, with an eye towards theoretical and methodological advances that have pushed social neuroscience forward in recent years. With respect to content, this work spans neural mechanisms that underlie ecologically valid, real-time social encounters (Hasson), strategic and cooperative social behavior (Platt), social intelligence and neural computation (Wheatley) and shifts in neural bases of social behavior through development (Mills). The work represented here also includes various methodologies, from single unit recordings to manipulation of neurohormones to naturalistic multi-person neuroimaging paradigms. Together, the speakers in this session will highlight both the diverse and broad approaches currently being employed in social neuroscience, and the promise of these new methods to more deeply uncover the cognitive structure of social cognition and behavior.

Learning Objectives:

This symposium is designed to develop participants' understanding of:

Attendees will learn about the state-of-the-art in social neuroscience, new topics examined in this field, and the varied, "multilevel" neuroscientific methods currently being used to understand the bases of social behavior. The session will also include a structured perspectives on challenges and opportunities each speaker believes social neuroscience as a domain will face in the coming years.

Target Audience:

This session will be of broad appeal to scientists interested in social behavior, as well as the methodologies (e.g., single unit recording, inter-subject correlation of BOLD data) employed in the neuroscientific study of such behaviors. The session will also interest neuroscientists with expertise in development, communication, and cross-species commonalities in behavior.

Adolescence as a sensitive period of social brain development

Kate Mills, *University College London, London, United Kingdom*

The Neurobiology of Strategic Social Behavior

Michael Platt, *Duke University, Durham, NC, United States*

Social intelligence as repurposed neural computation

Thalia Wheatley, *Dartmouth College, Hanover, NH, United States*

Face to Face, Brain to Brain: Exploring the Mechanisms of Dyadic Social Interactions

Uri Hasson, *Department of Psychology and Neuroscience Institute, Princeton University, Princeton, NJ, United States*

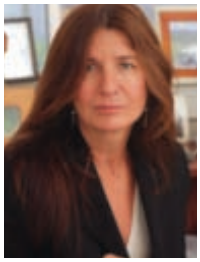
BREAK

16:00 – 16:15

KEYNOTE LECTURE

16:15 – 17:00

Ballroom ABC



The Adolescent Brain: "Arrested" or Adaptive Development

B.J. Casey, *The Sackler Institute for Developmental Psychobiology, Weill Cornell Medical College, Cornell University, New York, NY, United States*

Adolescence is the transition from childhood to adulthood that begins around the onset of puberty and ends with relative independence from the parent. This developmental period is one when an individual is probably stronger, of higher reasoning capacity, and more resistant to disease than ever before, yet when mortality rates increase by 200%. These untimely deaths are not due to disease but to preventable deaths associated with adolescents putting themselves in harm's way (e.g., accidental fatalities). We present evidence that these alarming health statistics are in part due to diminished self-control—the ability to inhibit inappropriate desires, emotions, and actions in favor of appropriate ones. Findings of adolescent-specific changes in self-control and underlying brain circuitry are considered in terms of how evolutionarily based biological constraints and experiences shape the brain to adapt to the unique intellectual, physical, sexual, and social challenges of adolescence.

POSTER RECEPTION

17:00 – 18:30

Exhibit Hall 2 and 3

Poster Numbers #1000 – 2451

MORNING WORKSHOP

State-of-the-Science: Neuroimaging of Autism

8:00 – 9:15

Ballroom ABC

Organizers:

Kevin Pelphrey, *Yale University, New Haven, CT, United States*

John Van Horn, *University of Southern California, Institute of Neuroimaging and Informatics, Los Angeles, CA, United States*

Neuroimaging techniques are rapidly advancing our understanding of the pathophysiology of autism spectrum disorder (ASD) by providing critical diagnostic markers of ASD risk in infant siblings of children with ASD and identifying neural mechanisms underlying positive response to behavioral and pharmacological treatments. Genes play a major role in ASD, but it is unknown how genetic effects are implemented in the brain to shape ASD. To bridge this gap, researchers are combining neuroimaging and molecular genetics to identify genetic biotypes of ASD that are validated in brain and cognition. We have assembled a team of field-leading scientists, each of whom has worked in one or more of these areas of major progress, to lead a "state-of-the-science" workshop on neuroimaging and ASD. In addition to being timely and addressing an important crosscutting topic, our workshop will serve to educate a diverse group of scientists.

Learning Objectives:

This morning workshop is designed to develop participants' understanding of:

1. The latest findings from neuroimaging studies of ASD.
2. How investigators are implementing novel techniques for examining structural and functional connectivity across typical and atypical development.
3. How researches are combining genetics and neuroimaging techniques to uncover the diverse etiology of ASD.

Target Audience:

Our target audience includes: 1) pre- and post-doctoral trainees, with some background in neuroimaging, who wish to enter the field of ASD; 2) seasoned investigators interested in learning about the latest findings in ASD; 3) all who are interested in brain development.

Using EEG to Predict Response to Intervention and Elucidate Treatment Mechanisms in Autism

Sara Webb, *University of Washington, Seattle, WA, United States*

Towards a Developmental Neurogenomics of Autism

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

A Developmental Perspective on Neuroimaging Biomarkers for Autism Risk

Mirella Dapretto, PhD, *UCLA, Los Angeles, CA, United States*

The Promise of Structural and Functional Connectomics to Advance Understanding of Heterogeneous Etiology in Autism

John Van Horn, *University of Southern California, Institute of Neuroimaging and Informatics, Los Angeles, CA, United States*

MORNING WORKSHOP

Investigating Neuronal Computation in Cortical Laminae using Layer-Resolved fMRI & Electrophysiology

8:00 – 9:15

Room 323 ABC

Organizers:

Christian Doeller, *Donders Institute for Brain, Cognition and Behaviour, Radboud University, Nijmegen, The Netherlands*

Ole Jensen, *Donders Institute for Brain, Cognition and Behaviour, Nijmegen, The Netherlands*

The layers of the cortex are fundamental processing units of the brain. Layers show characteristic cytoarchitectonic and connectivity profiles and enable communication and interaction between brain regions through ascending (feedforward) and descending (feedback) processing. Work on cortical layers is almost exclusively based on invasive approaches in animal models but how layer-specific computations drive cognitive processes such as perception, attention, memory and decision making in humans remains largely elusive. This is mainly due to the limited spatial resolution of fMRI at conventional field strengths and poor spatial localization of human neurophysiological measures obtained from M/EEG. Recent advances in high-resolution, high-field fMRI technologies and

new source-localization methods for M/EEG provide exciting novel tools to start exploring the fine-grained neural basis of cognition. This symposium will summarize this advance and provide examples of how laminar computations underlying various cognitive functions can now be studied non-invasively in humans. These examples will focus on novel data from experiments using layer-resolved fMRI at 7T, combined EEG-fMRI and individual 3D head-casts during MEG recordings. We will highlight how this meso-level approach allows us to describe neural processing in sensorimotor regions, and coding of memories and space in the hippocampal-entorhinal system at an unprecedented level of detail. Finally, we will outline how mapping laminar-level circuitries can advance our understanding of the neural mechanisms supporting human cognition.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:

1. Receive an overview of different neuroimaging methods targeting neural mechanisms at the laminar level such as high-resolution fMRI and electrophysiology.
2. Getting familiar with novel analysis techniques including layer-resolved fMRI analysis, connectivity analysis, combined fMRI-EEG analysis and MEG source localization techniques.
3. Getting insights into the relationship between cognitive functions and laminar computations.

Target Audience:
We believe that this symposium could be of high relevance for the whole breadth of cognitive neuroimaging as well as methods-oriented researchers working on high-resolution fMRI, combined fMRI-EGG and MEG source localization techniques.

The coordination of neuronal activity by alpha oscillations in deep layers and gamma activity in superficial layers
Ole Jensen, *Donders Institute for Brain, Cognition and Behaviour, Nijmegen, The Netherlands*

Non-invasive electrophysiology of human cortical laminae
Sven Bestmann, *IoN, London, United Kingdom*

Inferring the directionality of neural activity during encoding by using layer-specific fMRI
Emrah Düzel, *German Center for Neurodegenerative Diseases (DZNE), Magdeburg, Germany*

Layer-specific grid cell representations in humans underpin spatial cognition
Christian Doeller, *Donders Institute for Brain, Cognition and Behaviour, Radboud University, Nijmegen, The Netherlands*

MORNING WORKSHOP
Statistical Assessment of MVPA Results

8:00 – 9:15
Room 316 AB

Organizers:
Joset Etzel, *Washington University in St. Louis, St. Louis, MO, United States*

Yaroslav Halchenko, *Dartmouth College, Hanover, NH, United States*

Multivariate pattern analysis (MVPA) techniques have entered the mainstream for fMRI, EEG, and MEG-based neuroimaging studies. They encompass a spectrum of methodologies — unsupervised learning methods, supervised decoding, representational similarity analysis (RSA) — to address a wide range of hypotheses and experimental questions. The collection of frameworks and toolboxes to facilitate MVPA is constantly growing, thus facilitating ever wider adoption of these "brain reading" methods. However, results of such analyses are subject to an equally wide range of techniques for their statistical evaluation, and methodological details of those approaches are often neither transparent nor completely understood. This workshop will focus on reviewing and discussing existing approaches for performing statistical evaluation of MVPA results, their potential pitfalls, and limitations for results interpretation.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:

1. Understand the reasons why neuroimaging studies in general, and MVPA studies in particular, require robust statistical procedures, and the main classes of these procedures.
2. Understand the different statistical procedures available and appropriate for within-subjects and group-level analysis, for both ROI-based and searchlight analyses.

Target Audience:
Our target audience is researchers (fMRI, EEG, MEG), particularly those reading or performing neuroimaging studies involving MVPA (multivariate pattern analysis) techniques.

MVPA Permutation Testing: considerations, complications, schemes, and solutions
Joset Etzel, *Washington University in St. Louis, St. Louis, MO, United States*

Nonparametric methods for correcting the multiple comparisons problem in classification-based fMRI
Johannes Stelzer, *MPI for Human Cognitive and Brain Sciences, Leizig, Germany*

Inference on computational models from predictions of representational geometries
Nikolaus Kriegeskorte, *MRC Cognition and Brain Sciences Unit, Cambridge, United Kingdom*

Overview of statistical evaluation techniques adopted by publicly available MVPA toolboxes
Yaroslav Halchenko, *Dartmouth College, Hanover, NH, United States*

MORNING WORKSHOP

Time is of the Essence: The Role of EEG and MEG in Mapping the Human Brain

8:00 – 9:15
Room 311

Organizers:
Laura Marzetti, *Department of Neuroscience and Imaging, University "G. d'Annunzio" Chieti Pescara, Chieti, Italy*

Jorge Riera, *Department of Biomedical Engineering, Florida International University, Miami, FL, United States*

Noninvasive electrophysiological techniques, such as electroencephalography (EEG) and magnetoencephalography (MEG), offer a unique opportunity to investigate human brain dynamics on a time scale relevant to behavior, i.e., corresponding to frequencies in the 1- 1000 Hz range. Indeed, a major shortcoming of fMRI approaches is that brain activity at fast timescales is not captured. For many years, peoples in the EEG and MEG community have tried to transform time series representing the voltages and magnetic fluxes captured by the sensors into brain current sources. The resulting technique, named Electrophysiological source imaging, has been infrequently used in the human brain mapping community due to several challenges that the neuroscientists must face to reliably recover brain activity, including a) valid assumptions about the type of current sources, b) accurate models about how these sources are reflected in the sensors, and, more important, c) the inevitable use of prior information to constraint non-physiological situations. Several strategies have been suggested to overcome these problems, thus allowing for revisiting the role of EEG/MEG in mapping the human brain. The workshop will cover the breakthroughs in estimating brain activity as a function of time and frequency from EEG/MEG, with emphasis on the abovementioned aspects. By means of the use of biophysical models and data-mining approaches, speakers in this workshop will also discuss the contribution that EEG and MEG will bring to the already established functional MRI technique.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:

1. Understand the advances in Electrophysiological source imaging by EEG and MEG;
2. Understand the impact of non invasively accessing high temporal resolution information and the potentialities of multimodal integration of electrophysiological and hemodynamic signals for a more comprehensive approach to brain functioning and its alterations;
3. Understand the role of multi-scale biophysical modeling based on the integration of different imaging modalities.

Target Audience:
All neuroimagers (primers and more experienced), especially those who have mainly an fMRI based approach to brain functioning and would like to understand the benefits of advanced multimodal integration.

The Conceptual Basis of Electrophysiological source imaging (ESI)
Pedro Valdes Sosa, *Cuban Neurosciences Center, Ciudad Habana, Cuba*

Electrophysiological signatures relevant for hemodynamic changes: revisiting the contribution of brain rhythms
Dante Mantini, *University of Oxford, Oxford, United Kingdom*

Temporal variability in electrophysiological signals: implications for function and disease
Georg Northoff, *Institute of Mental Health Research (IMHR), University of Ottawa, Ottawa, Canada*

Interrelating EEG, fMRI, Networks, and Criticality: Multiscale Modeling and the Role of Brain Eigenmodes
Peter Robinson, *School of Physics, University of Sydney, Sydney, Australia*

BREAK
9:15 – 9:30

KEYNOTE LECTURE
9:30 – 10:15
Ballroom ABC

Neural Network Dynamics for Attentional Selection in the Primate Brain
Sabine Kastner, *Princeton University, Princeton, NJ, United States*

Selective attention refers to a set of mechanisms that route behaviorally relevant information through large-scale cortical networks. I will discuss studies performed in two primate brain models, the human and the macaque, using an integrated approach of fMRI, ECoG and single-cell physiology to elucidate the network dynamics and local neural mechanisms that underlie the selection process.

BREAK
10:15 – 10:30

ORAL SESSIONS
10:30 – 11:45
Oral session presentations are chosen by the Program Committee from submitted abstracts using criteria of quality and timeliness; a wide spectrum of investigation is represented.

O-W1: Resting-State fMRI Methods
Ballroom ABC
Chair: Vince Calhoun, *Mind Research Network & University of New Mexico, Albuquerque, NM, United States*

10:30 – 10:45
3749: A variational Bayes hidden Markov model for discovering dynamical functional brain networks
Srikanth Ryali, *Stanford University School of Medicine, Stanford, CA, United States*

10:45 – 11:00
3746: Early meta-level: deeper understanding of connectivity-states and consequences for state definition
Markus Goldhacker, *University of Regensburg, Regensburg, Germany*

11:00 – 11:15
1599: Robust estimation of dynamic functional connectivity using a novel functional coupling analysis
Mac Shine, *The University of Sydney, Sydney, Australia*

11:15 – 11:30
4000: Large-scale Probabilistic Functional Modes from resting state fMRI
Samuel Harrison, *FMRIB, Oxford, United Kingdom*

11:30 – 11:45
3747: Resting-state disentangled by innovation-driven coactivation patterns overlapping in space and time
Fikret Isik Karahanoglu, *MGH/HST Anthinoula A. Martinos Center for Biomedical Imaging, Charleston, MA, United States*

O-W2: Development

Room 323 ABC

Chair: Jay N. Giedd, *University of California and Rady Children's Hospital-San Diego, San Diego, CA, United States*

10:30 – 10:45

3620: Olfactory perception in newborns using fMRI

Alexandra Adam-Darque, *Geneva University Hospital, Geneva, Switzerland*

10:45 – 11:00

4083: Cortical Maturation and Myelination in Healthy Toddlers and Young Children

Sean Deoni, *Children's Hospital Colorado, Denver, CO, United States*

11:00-11:15

3622: Predicting school-age cognitive capacities from the connectome at birth

Martijn van den Heuvel, *University Medical Center Utrecht, Utrecht, The Netherlands*

11:15 – 11:30

3621: Emergence of System Roles in Normative Neurodevelopment

Danielle Bassett, *University of Pennsylvania, Philadelphia, PA, United States*

11:30 – 11:45

4054: A Dynamically Growing Domain Model of Cortical Folding Pattern Formation

Monica Hurdal, *Florida State University, Tallahassee, FL, United States*

O-W3: Perception and Attention

Room 311

Chair: Lars Muckli, *University of Glasgow, Glasgow, United Kingdom*

10:30 – 10:45

2048: Top-down signals during speech processing modulate the phase of oscillations in auditory cortex

Hyojin Park, *University of Glasgow, Glasgow, United Kingdom*

10:45 – 11:00

4299: Decoding the time course of visual perception in humans using MEG: beyond evidence accumulation?

Jean-Rémi King, *CEA. Paris, France*

11:00 – 11:15

4300: Retinotopy not hierarchy underlies the large-scale organization of human occipitotemporal cortex

Edward Silson, *NIMH, Bethesda, MD, United States*

11:15 – 11:30

4150: How bottom-up and top-down factors shape representation in word- and face-selective cortex

Kendrick Kay, *Washington University in St. Louis, Saint Louis, MO, United States*

11:30 – 11:45

3676: Computer-Vision Neural Networks Map the Architecture of the Human Visual System

Michael Eickenberg, *Inria, Gif-sur-Yvette, France*

O-W4: Genetics

Room 316 AB

Chair: Neda Jahanshad, *University of Southern California, Los Angeles, CA, United States*

10:30 – 10:45

3748: Genetic bases of functional brain networks

Jonas Richiardi, *University of Geneva, Geneva, Switzerland*

10:45 – 11:00

3398: Identification of common and low-frequency genetic variants associated with gyrification in humans

Thomas Mühleisen, *Institute of Neuroscience and Medicine (INM-1), Jülich, Germany*

11:00 – 11:15

3440: Differential expression of SLC6A4 and SLC6A2 in cytoarchitectonic areas of the human frontal pole

Sebastian Bludau, Thomas Mühleisen, *Institute of Neuroscience and Medicine (INM-1), Jülich, Germany*

11:15 – 11:30

3609: ERBB4 Polymorphism and Family History of Psychiatric Disorders on Typical Brain Development.

Vanessa Douet, *University of Hawaii, Honolulu, HI, United States*

11:30 – 11:45

1741: Reciprocal alterations of white matter microstructure in 16p11.2 deletion vs duplication carriers

Yi-Shin Chang, *University of California in San Francisco, San Francisco, CA, United States*

O-W5: MRI Acquistion

Room 315

Chair: Junqian Xu, *Icahn School of Medicine at Mount Sinai, New York, NY, United States*

10:30-10:45
3728: De-Noising of fMRI Time Series using NMR Field Probes for Physiology Recording
Lars Kasper, *University of Zurich & ETH Zurich, Zurich, Switzerland*

10:45 – 11:00
1598: Improved Stability in 3D Multi-Shot EPI fMRI by Navigator Echo Based Physiological Noise Reduction
Oliver Josephs, *UCL, London, United Kingdom*

11:00 – 11:15
1857: ASL Contrast Optimization in Multiphase STAR Labeling using Variable Flip Angle
Fernando Paiva, *University of Sao Paulo, Sao Carlos, Brazil*

11:15 – 11:30
1597: Single-Echo vs Multi-Echo Acquisition for Simultaneous Multiband fMRI at 7T in the Basal Ganglia
Saskia Bollmann, *The University of Queensland, Brisbane, Australia*

11:30 – 11:45
2197: Measuring the pulsation of the brain using a phase sensitive reconstruction of DWIs
Tim Sprenger, *Technical University, Munich, Germany*

MEET THE EDITORS ROUNDTABLE

11:45 – 12:45

Room 316 C

Here, a panel of editors from journals that publish neuroimaging papers will be discussing pertinent issues, what kind of papers they are looking for, and and answering audience questions. It should be a lively one-hour session!

LUNCH

11:45 – 12:45

POSTER SESSION

12:45 – 14:45

Exhibit Hall 2 and 3

Poster Numbers #3000 – 4463
Authors with even numbered posters will present their posters today.

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

Disorders of the Nervous System: Addictions, Alzheimer's Disease and Other Dementias, Autism, Disorders of the Nervous System Other, Eating Disorders, Epilepsy, Medical illness with CNS impact (e.g. chemotherapy, diabetes, hypertension), Obsessive-Compulsive Disorder and Tourette Syndrome

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

Higher Cognitive Functions: Executive Function, Reasoning and Problem Solving

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

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

Modeling and Analysis Methods: Classification and Predictive Modeling, Exploratory Modeling and Artifact Removal, fMRI Connectivity and Network Modeling, Image Registration and Computational Anatomy, Methods Development, Motion Correction and Preprocessing, Multivariate Modeling, Segmentation and Parcellation and Univariate Modeling

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

Perception and Attention: Attention: Visual, Chemical Senses: Olfaction, Taste, Consciousness and Awareness,

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

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

SYMPOSIUM

Understanding the Emerging Complexity of the Developing brain

14:45 – 16:00

Ballroom ABC

Organizer:

Veronika Schöpf, *Institute of Psychology, Section Neurpsychology, University of Graz | Department of Biomedical Imaging and Image-guided Therapy, Medical University of Vienna, Viennaz, Austria*

Observing the fetal and infant brain offers unique insights into early development of cerebral structures. Furthermore, research progress in this area will pave the way for defining imaging biomarkers as reference points for disease progression or therapeutic success. Recently, we begin to be able to integrate functional and structural information from imaging modalities such as magnetic resonance imaging and magnetoencephalography data of fetuses and infants. In addition to image acquisition and multiple layers of physiological artifacts, we face a number of challenges specific to studying the developing brain such as rapid development over time and corresponding variability not only in space but also with regard to tissue properties and individual timing. Due to those reasons preprocessing strategies, computational models and paradigm designs cannot be transferred directly from adult studies. This symposium will explore methodologies that contribute to capturing and understanding the fetal and infant brain, the emerging connectome, pre-processing strategies and modeling approaches.

Learning Objectives:

This symposium is designed to develop participants' understanding of:

1. State of the art structural and functional neuroimaging of the fetal and infant brain.
2. Understanding the approaches applicable to research questions that tackle fetal and infant brain development.
3. Expand the discussion on how knowledge of normal brain development can help to provide information on pathologies or malformations to offer therapeutic options at the earliest point possible.

Target Audience:

Neuroscientists and clinicians interested in computational methods for fetal MRI/MEG and infant MRI and acquisition of such images. Computer scientists working on methods for analyzing neuroimaging data.

An overview of the Developing Human Connectome Project

Daniel Rückert, *Department of Computing, Imperial College London, United Kingdom*

Image processing tools for infant brain MRI

Lilla Zöllei, *Martinos Center, Harvard Medical School, Boston, MA, United States*

Perturbations as a tool to investigate the fetal brain

Hubert Preissl, *MEG Center, Tuebingen, Germany*

Linking the development of fetal brain morphology and function

Georg Langs, *Medical University of Vienna, Vienna, Austria*

BREAK

16:00 – 16:15

KEYNOTE LECTURE

16:15 – 17:00
Ballroom ABC

Pain and Pain Regulation: from spinal to cortical processing

Christian Büchel, *Systems Neuroscience and Head of the Department of Systems Neuroscience, University Medical Center Hamburg- Eppendorf, Hamburg, Germany*

This presentation will focus on the neurobiological mechanisms of pain perception and pain modulation investigated in humans using functional magnetic resonance imaging (fMRI). The presentation will cover the neuronal mechanisms of placebo analgesia, a prominent example of how cognition can modulate pain perception, but also show the opposite namely nocebo hyperalgesia. As placebo analgesia has been shown to be mediated by endogenous opioids, a study using the opioid antagonist (naloxone) will also be presented. Using high resolution fMRI of the human spinal cord we could further show that decreased pain responses under placebo were paralleled by strongly reduced pain-related activity in the spinal cord under placebo, providing direct evidence for spinal inhibition as one mechanism of placebo analgesia. Finally, studies will be presented in which other expectations are used to alter pain perception. In this particular example we have used stereotypic gender roles to create expectations regarding pain tolerance.

BREAK

17:00 – 17:15

TOWN HALL MEETING

17:15 – 18:15
Ballroom ABC

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

CLUB NIGHT @ HILTON HAWAIIAN VILLAGE

19:30 – 1:00

Conveniently located at the Hilton Hawaiian Village, over 50,000 square feet of space will be transformed into OHBM's Annual Club Night. The Hilton Hawaiian Village is located at 2005 Kalia Road, Honolulu, Hawaii 96815. Club night will be in in the Coral Ballroom and lounge which is in the Pacific Conference Center

There will be a DJ that will play dance music throughout the evening. The party is complimentary to registrants. Please make sure to bring your ticket to Club Night. Additional guest tickets are $50.00 and must be purchased at the conference registration desk.

MORNING WORKSHOP

Statistics for Comparing Brain Networks with Applications in Brain Disease

8:00 – 9:15

Ballroom ABC

Organizers:

Andrew Zalesky, *Melbourne Neuropsychiatry Centre, The University of Melbourne, Victoria, Australia*

Alex Fornito, *Monash Clinical and Imaging Neuroscience, School of Psychological Sciences and Monash Biomedical Imaging, Monash University, Melbourne, Australia*

Alterations in brain connectivity have been associated with many disorders. Identifying which of the thousands of connections typically mapped are associated with a between-group difference is a statistical challenge that has received little treatment. This symposium brings together four internationally recognized experts in statistical connectomics and its application to the understanding of altered brain connectivity in disease. Our speakers will discuss key issues that arise when comparing brain networks between groups. These issues include the multiple testing problem of many connections to test with possibly only a few associated with an effect; the violation of independence among connections mapped with the correlation coefficient and most other measures of functional brain connectivity; and, the highly non-normal distribution of structural connectivity measures such as the streamline count. Cutting-edge approaches for dealing with these issues will be discussed and examples of their use in clinical brain connectivity mapping studies will be presented. Focus will also be given to the formulation of appropriate null network models.

Why this topic is timely: Neuroimaging data is increasingly used to test for differences in brain connectivity. Informing the neuroimaging community about the key statistical issues in comparing brain networks in health and disease is therefore timely and pertinent to the growing number of researchers testing hypotheses about the human connectome.

Desired learning outcomes: To provide attendees with a critical understanding of the key statistical issues that arise when performing between-group comparisons of functional and/or structural brain connectivity mapped across the whole brain using neuroimaging data, and to inform attendees about cutting-edge methods developed to deal with these issues.

Learning Objectives:

This morning workshop is designed to develop participants' understanding of:

1. Understand the key statistical issues and assumptions associated with performing between-group comparisons of functional and/or structural brain connectivity, including the multiple testing problem, violation of independence in functional (i.e. correlational) brain networks and non-normality of structural connectivity measures.
2. Understand how to generate appropriate network null models and appreciate the pros and cons of competing methods for performing statistical inference on brain networks mapped using neuroimaging data.
3. Give examples from clinical neuroscience demonstrating the value of identifying differences in brain connectivity in disease.

Target Audience:

Our target audience is researchers using neuroimaging data to map differences in whole-brain functional and/or structural networks associated with disease, pharmacological intervention, etc. The breadth of talks will ensure the symposium has appeal to those without experience in statistics and network modelling as well as advanced network modellers.

Statistics for Brain Networks

Andrew Zalesky, *Melbourne Neuropsychiatry Centre, The University of Melbourne, Victoria, Australia*

Genetic influences on hub connectivity of the brain

Alex Fornito, *Monash Clinical and Imaging Neuroscience, School of Psychological Sciences and Monash Biomedical Imaging, Monash University, Melbourne, Australia*

Connectomics in health and disease - Brain networks as tools to analyse and predict

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

Learning connectome-based predictive biomarkers

Gaël Varoquaux, *INRIA, Saclay, France*

MORNING WORKSHOP

New Developments and Horizons for Spinal Cord fMRI

8:00 – 9:15
Room 323 ABC

Organizers:
Christine Law, *Department of Anesthesiology, Pain and Perioperative Medicine, Stanford University, Stanford, CA, United States*

Gary Glover, *Radiology, Stanford University, Stanford, CA, United States*

Sean Mackey, *Stanford University, Stanford, CA, United States*

Functional magnetic resonance imaging, using blood oxygenation level dependent (BOLD) contrast, has been well established as one of the most powerful methods for mapping human brain function over the past twenty years. But most studies have left out an important part of the central nervous system: the spinal cord. Due to challenges in data acquisition and post-processing, spinal cord imaging has been limited by poor signal to noise and distortion. Recent technological advances have conferred significant momentum to the science of spinal cord imaging.

Our lecture series will impart state-of-the-art advances in spinal cord imaging and analysis regarding:
(1) challenges of spinal cord imaging, and superior analysis techniques using the Spinal Cord Toolbox,
(2) simultaneous brain and spinal cord acquisition – the holy grail of central nervous system analysis,
(3) brain and spinal cord resting-state connectivity and its relevance to neuroscientists and clinicians,
(4) cutting edge technology for spinal cord imaging at 7T; challenges and advantages over lower fields.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:
1. Understand the challenges of spinal cord fMRI and obtain knowledge of the tools and techniques available for spinal cord fMRI data analysis.
2. Gain knowledge of the current status of simultaneous brain and spinal cord fMRI imaging and how to acquire and analyze combined brain and spinal cord fMRI data.
3. Acquire the ability for potential and integration of spinal cord imaging into current protocols.

Target Audience:
Neuroscientists interested in spinal cord fMRI. Clinical researchers imaging the entire central nervous system. Biomedical engineers challenged by simultaneous brain/spine imaging.

Template-based analysis using the Spinal Cord Toolbox
Julien Cohen-Adad, *Polytechnique Montreal, Genie Electrique, Montreal, Quebec, Canada*

Combined fMRI of the brain and the spinal cord
Christian Sprenger, *Department of Systems Neuroscience, University Medical Center Hamburg-Eppendorf, Hamburg, Germany*

What can we learn about resting-state connectivity from simultaneous brain/spine imaging?
Katherine Martucci, PhD., *Anesthesia, Stanford University, Stanford, CA, United States*

Spinal cord imaging at 7T: challenges, solutions, and future directions
Robert Barry, *Vanderbilt University, Nashville, TN, United States*

MORNING WORKSHOP

Estimating Time Varying Connectivity

8:00 – 9:15
Room 316 AB

Organizer:
Ivor Cribben, *Alberta School of Business, University of Alberta, Department of Finance and Statistical Analysis, Edmonton, Alberta, Canada*

Many methods for estimating connectivity (directed and undirected) assume that the data is stationary over time, that is, the interactions between brain regions or voxels remains constant over the experimental time course. However, while this assumption is convenient for estimation and computation purposes, it presents a simplified version of a highly integrated and dynamic phenomenon. Recently, evidence of a time-varying behavior has been observed in high temporal resolution EEG data, task based fMRI experiments, and even prominently in resting state data. This has led to a surge in activity in developing new statistical methods for estimating the time-varying nature of connectivity. To date, many techniques investigate the non-stationary behavior of connectivity using a sliding window

approach. However, there are limitations to the approach. In these talks, we make a timely intervention in the field by introducing state-of-the-art statistical models that consider alternatives to the sliding window approach.

In particular, our four confirmed speakers will present their latest results on (a) how to model the dynamic behavior of pair-wise correlations between two ROI time courses for a test-retest resting state fMRI data and the limitations of the sliding window technique; (b) how to estimate time-varying connectivity that smoothly changes over time and how to estimate dynamic clusters of brain regions by their connectivity for a resting state fMRI data set; (c) how to estimate neuronal responses (from local field potentials and electroencephalograms) that are evolving over the course of a learning associative experiment and on a motor skill acquisition experiment; and (d) how to estimate Bayesian time series models for measuring time-varying effective connectivity in a resting-state fMRI experiment. The talks highlight the limitations of past techniques and the advantages of the new models, and also discuss the many unsolved open methodological problems in estimation of functional brain dynamics.

Learning Objectives:
This morning workshop is designed to develop participants' understanding of:

1. Show the limitations of the sliding window technique for estimating time-varying connectivity for functional brain imaging data.
2. Introduce new time-varying connectivity estimation methods for several time-varying connectivity problems and different imaging modalities.
3. Discuss the limitations and computation challenges of modelling functional brain dynamics, as well as the current open problems in this area.

Target Audience:
Our target audience is all researchers working with functional brain imaging data who are interested in learning about estimating time-varying connectivity

Evaluating Dynamic Bivariate Correlations in Resting-state fMRI
Martin Lindquist, *Johns Hopkins University, Baltimore, MD, United States*

Time varying connectivity models for brain imaging data
Ivor Cribben, *Alberta School of Business, University of Alberta, Edmonton, Alberta, Canada*

Statistical Models for the Evolution of Brain Responses
Hernando Ombao, *University of Irvine, Irvine, CA, United States*

Modelling Time-varying effective Brain Connectivity using Multiregression Dynamic Models
Thomas Nichols, *University of Warwick, Coventry, United Kingdom*

MORNING WORKSHOP

Neuroimaging Applications of Simultaneous Multi-Slice Imaging
8:00 – 9:15
Room 311

Organizers:
Sheeba Arnold Anteraper, *Athinoula A. Martinos Imaging Center at the McGovern Institute for Brain Research, Massachusetts Institute of Technology, Cambridge, MA, United States*

V Andrew Stenger,*University of Hawaii, Honolulu, Hawaii, United States*

Simultaneous Multi-Slice (SMS) acquisition with parallel imaging was proposed over a decade ago and has recently gained much interest due to a series of innovations that combine to provide dramatic improvement to the method. More recently, the blipped-CAIPI (Controlled Aliasing In Parallel Imaging) method, along with the Slice-GRAPPA reconstruction, has enabled reliable MB8 (MB=Multi-band) acquisition at 3T using 32-channel receiver coil, as was used for the protocol to acquire fMRI data in the Human Connectome Project. Further, the combined use of blipped-CAIPI acquisition and 64-channel receiver coil has enabled reliable MB12 acquisition at 3T. At such a high MB factor, a temporal sampling rate of 350ms can be achieved for 2.5 mm whole-brain fMRI acquisition. SMS imaging with blipped-CAIPI has also been successfully applied to diffusion acquisition. When synergistically combined with dictionary-based compressed sensing (CS) techniques, beyond 10-fold acceleration in diffusion acquisition becomes possible. Further refinement of SMS technique using PINS (Power Independent of Number of Slices) pulses permits highly accelerated Turbo Spin Echo (TSE) imaging at MB factor 15,

with whole-brain T2-weighted data (1 mm isotropic resolution) under 90 seconds. Combined with the novel Wave-CAIPI trajectory that spreads the SMS aliasing evenly over three dimensions, the maximum g-factor penalty at such high MB factor remains below 30%. The application of MultiPINS refocusing and Wave-CAIPI acquisition thus promises to speed up clinical imaging by 15-fold at substantially reduced SNR and SAR specifications. In this morning workshop we aim to provide a thorough introduction to the perks and issues arising from using SMS acquisition. In addition, comparison will be provided regarding the stages at which SMS imaging and ultra-high fields (>3T) go together and where specialized techniques will need to be employed. Finally, specific examples will be provided to educate the audience about the advantages of SMS imaging in neuroimaging applications.

Desired learning outcomes:

1. To gain an enhanced understanding of the most recent developments in SMS acquisition.
2. To gather insights towards novel neuroimaging applications, both in clinical and research domain, by capitalizing on the benefits offered by SMS methods, including superior temporal sampling and fMRI statistical power enhancements.

Learning Objectives:

This morning workshop is designed to develop participants' understanding of:

1. To understand the basic physics principles of simultaneous multi-slice imaging including the advantages and disadvantages of the methods. Details of pulse sequences and image reconstructions will be described as well as artifacts present in the images.
2. To learn about the neuroimaging applications that benefit from increased temporal and spatial resolution provided by simultaneous multi-slice methods. The specific applications to functional connectivity, diffusion, and ultra high fields will be presented.

Target Audience:

The target audience are students and researchers who are interested in fMRI and DTI methods and applications. In particular those that are interested in fast imaging pulse sequence design for improving temporal resolution in functional connectivity and diffusion applications will benefit.

Simultaneous Multi-Slice acquisition for rapid neuroimaging

Berkin Bilgic, *Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown, MA, United States*

Reducing Signal Loss in Simultaneous Multi-Slice fMRI

V Andrew Stenger, *University of Hawaii, Honolulu, Hawaii, United States*

Simultaneous Multi-Slice Imaging at Ultra High Fields

Cornelius Eichner, *Athinoula A. Martinos. Center for Biomedical Imaging, Charlestown, MA, United States*

Neuroimaging Applications of Simultaneous Multi-Slice Imaging

Sheeba Arnold Anteraper, *Athinoula A. Martinos Imaging Center at the McGovern Institute for Brain Research, Massachusetts Institute of Technology, Cambridge, MA, United States*

BREAK

9:15 – 9:30

KEYNOTE LECTURE

9:30 – 10:15

Ballroom ABC

Delay Differential Analysis of Human LFP, EEG and ECoG

Terrence J. Sejnowski, *Howard Hughes Medical Institute, Salk Institute for Biological Studies University of California, San Diego, CA, United States*

A new time-domain model for brain recordings is introduced based on nonlinear delay-differential equations (DDEs). Rather than reduce the dimensionality of the data using PCA or ICA, DDEs fit local waveforms with high accuracy using only a few parameters that reflect cortical dynamics. Delay Differential Analysis (DDA) uses DDEs to discriminate different brain states with higher temporal resolution and increased frequency and phase coupling information compared with frequency-based

methods such as Fourier transforms and cross-spectral analysis. In addition, DDA is robust to noise and allows an easy and straightforward implementation of higher-order spectra across time.

DDA can be applied to many types of brain recordings to detect shifts in cortical states in normal and diseased brains: DDA accurately separates sleep states, detects sleep spindles, discriminates Parkinson's and schizophrenia patients from normal subjects and predicts seizures in epilepsy patients. In addition to serving as a new tool for analyzing human brain recordings, DDA can be used to validate cortical models by comparing the DDA of LFP simulations with LFP recordings from cortex.

BREAK

10:15 – 10:30

ORAL SESSIONS

10:30 – 11:45

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

O-TH1: Cognitive and Executive Function

Room 311

Chair: Dr. Jin Fan, *Queens College, New York, NY, United States*

10:30 – 10:45

3485: Investigating Associations between IQ and Functional Connectivity with Sparse Multiresponse Models

Bernard Ng, *Stanford University, Palo Alto, CA, United States*

10:45 – 11:00

1125: Altered connectivity and gray matter atrophy in the Multiple-Demand Network in Parkinson's disease

Christian Mathys, *Dusseldorf University, Medical Faculty, Institute for Diagnostic and Interventional Radiology, Dusseldorf, Germany*

11:00 – 11:15

3433: Complementary roles of cortical oscillations in automatic and controlled processing

Silvia Isabella, *University of Toronto, The Hospital for Sick Children, Toronto, Ontario, Canada*

11:15 – 11:30

3358: Integrity of DLPF connections and Association with Executive Function in Childhood ALL

Wilburn Reddick, *St. Jude Children's Research Hospital, Memphis, TN, United States*

11:30 – 11:45

3444: Multi-voxel pattern analysis reveals translation of instruction knowledge into task sets

Paul Muhle-Karbe, *Ghent University, Ghent, Belgium*

O-TH2: Social Functioning and Autism

Room 315

Chair: Dr. Aina Puce, *Indiana University, Bloomington, IN, United States*

10:30 – 10:45

3208: Towards autism subtypes? Unsupervised machine learning using fcMRI features

Colleen Chen, *San Diego State University, San Diego, CA, United States*

10:45 – 11:00

4375: Deficits in the neural mechanisms underpinning social prediction errors in Autism Spectrum Disorder

Joshua Balsters, *ETH Zurich, Zurich, Switzerland*

11:00 – 11:15

3209: Altered Cortical Trajectories in Autism Spectrum Disorders: Relation to Symtomatology

Budhachandra Khundrakpam, *Montreal Neurological Institute, Montreal, Canada*

11:15 – 11:30

2232: Neural Basis of Cooperative Behavior by Simultaneous Multisubject EEG Recordings during Joint Action

Laura Astolfi, *University of Rome 'Sapienza', Rome, Italy*

11:30 – 11:45
3210: Neural substrates of emotional face processing in children with autism spectrum disorder
Rachel Leung, *University of Toronto, The Hospital for Sick Children, Toronto, Canada*

O-TH3: Aging and Dementia

Ballroom ABC
Chair: Rik Henson, Deputy Director, *MRC Cognition & Brain Sciences Unit, Cambridge, United Kingdom*

10:30 – 10:45
3547: Functional connectivity dynamics in the aging brain
Linda Geerligs, *Cambridge Centre for Ageing and Neuroscience, Cambridge, United Kingdom*

10:45 – 11:00
3548: Cognitive Training Modified Age-related Brain Changes in Elderly with Subjective Memory Complaints
Juan Li, *Institute of Psychology, Chinese Academy of Sciences, Beijing, China*

11:00 – 11:15
3136: CSF markers of neural injury predict longitudinal brain Aβburden in preclinical Alzheimer's disease
Annie Racine, *University of Wisconsin-Madison, Madison, WI, United States*

11:15 – 11:30
3135: Brain Network Activity in Rest and Task Differentially Predicts Alzheimer's Risk and Cognition
Yang Jiang, *University of Kentucky College of Medicine, Lexington, KY, United States*

11:30 – 11:45
3546: Predicting progression outcomes in healthy aging and Alzheimer's disease based on BrainAGE
Katja, Franke, *Structural Brain Mapping Group, Jena University Hospital, Jena, Germany*

O-TH4: Brain Stimulation Methods

Room 323 ABC
Chair: Vince Clark, *University of New Mexico, Albuquerque, NM, United States*

10:30 – 10:45
3000: Surgical Target Selection for Subcallosal Cingulate Region DBS Based on Structural Connectivity
Ki Sueng Choi, *Emory University, Atlanta, GA, United States*

10:45 – 11:00
3058: Boosting the sensitivity of concurrent TMS/fMRI in motor cortex using a dedicated MR coil array
Lucia Navarro de Lara, *Medical University of Vienna, Vienna, Austria*

11:00 – 11:15
3021: Effect of Rhythmic Electrical Stimulation on the BOLD Signal and Functional Connectivity
Yuranny Cabral Calderin, *University Medical Center, Univ. of Goettingen; German Primate Center, Leibniz Inst for Primate Res., Göttingen,Germany*

11:15 – 11:30
4186: Modulating Conscious Movement Intention with Noninvasive Brain Stimulation
Brian Maniscalco, *National Institutes of Health, Bethesda, MD, United States*

11:30 – 11:45
3258: Fatigue relief in multiple sclerosis by bilateral somatosensory cortex neuromodulation
Franca Tecchio, *LET'S-ISTC-CNR, Roma, Italy*

O-TH5: Classification, Prediction, Machine Learning & Informatics

Room 316AB

Chair: Chris Gorgolewski, *Department of Psychology, Stanford University, Stanford, CA, United States*

10:30 – 10:45

3983: Clustering cortical searchlights based on shared representational geometry

Samuel Nastase, *Dartmouth College, Hanover, NH, United States*

10:45 – 11:00

3982: Finding associations between neuroimaging and clinical variables using orthogonal Sparse PLS

Joao Monteiro, *University College London, London, United Kingdom*

11:00 – 11:15

3981: Inverse Probability Weighting for Confounding Adjustment

Kristin Linn, *University of Pennsylvania, Philadelphia, PA, United States*

11:15 – 11:30

3980: SpaceNet: Multivariate brain decoding and segmentation

Elvis Dohmatob, *Parietal, INRIA, Gif/Yvette, France*

11:30 – 11:45

3999: BigBrain: Automated Cortical Parcellation and Comparison with Brodmann Atlas

Marc Fournier, *McConnell Brain Imaging Centre, Montreal Neurological Institute, McGill University, Montreal, Canada*

OHBM RESEARCH FUNDING ROUNDTABLE

Thursday, June 18, 11:45 – 12:45

Room 316 C

Moderator:

Dr. Gary Egan, *Monash University, Australia*

Bring your lunch and spend an hour with the representatives from leading international funding agencies getting answers to the questions about grant funding that you have always wanted answered! This Research Funders Roundtable will include program officers from the National Institutes of Health, the National Science Foundation, the Brain Mapping by Integrated Neurotechnologies for Disease Studies (Brain/MINDS) in Ministry of Education, Sports, Science and Technology in Japan program, and the European Union's Human Brain Project. What funding trends in brain research can be expected as government agency budgets get tighter? What major brain mapping initiatives are on the horizon? What scope is there for international partnerships in brain mapping? What are grant reviewers actually thinking, anyway? Find out at this unique event!

Speakers:

Michelle Freund, *National Institute of Mental Health (USA)*

Patrick Bellgowan, *National Institute of Neurological Disorders and Stroke (USA)*

Tetsuya Matsuda, *Tamagawa University Brain Science Institute (Japan)*

Sean Hill, *International Neuroinformatics Coordinating Facility (Switzerland)*

Alumit Ishai, *National Science Foundation (USA)*

LUNCH

11:45 – 12:45

POSTER SESSION

12:45 – 14:45
Exhibit Hall 2 and 3
Poster Numbers #3000 – 4463
Authors with odd numbered posters will present their posters today.

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

Disorders of the Nervous System: Addictions, Alzheimer's Disease and Other Dementias, Autism, Disorders of the Nervous System Other, Eating Disorders, Epilepsy, Medical illness with CNS impact (e.g. chemotherapy, diabetes, hypertension), Obsessive-Compulsive Disorder and Tourette Syndrome

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

Higher Cognitive Functions: Executive Function, Reasoning and Problem Solving

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

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

Modeling and Analysis Methods: Classification and Predictive Modeling, Exploratory Modeling and Artifact Removal, fMRI Connectivity and Network Modeling, Image Registration and Computational Anatomy, Methods Development, Motion Correction and Preprocessing, Multivariate Modeling, Segmentation and Parcellation and Univariate Modeling

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

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

Social Neuroscience: Self Processes, Social Cognition, Social In

CLOSING COMMENTS AND MEETING HIGHLIGHTS

14:45 – 16:00
Ballroom ABC
Karl Zilles, *Research Center Jülich, Jülich, Germany*

FAREWELL POSTER RECEPTION

16:00 – 17:30
Exhibit Hall 2 and 3
Poster Numbers #3000 – 4463

OHBM 2015 MERIT ABSTRACT AWARDS

Congratulations to the following 2015 Merit Abstract Awardees

Altinkaya, Ayca
Apps, AJ , Matthew
Bollmann, Saskia
Brigadoi, Sabrina
Cabral Calderin, Yuranny
Cao, Miao
Chai, Yuhui
Chen, Colleen
Ching, R.K., Christopher
Choi, Ki Sueng
Colclough, Giles
Constantinescu, O., Alexandra
Dean, Derek
Faraco, Carlos
Fournier, Marc
Ge, Tian
Geerligs, Linda
Goldhacker, Markus
Gorgolewski, Krzysztof
Harding, H., Ian
Harrison, Samuel
Havlicek, Martin
Hensel, Lukas
Hofstetter, Shir
Hsu, Ai-Ling
Ianni, Angela
Isabella, Silvia
Jeon, Seun
Jog, Mayank V.
Karahanoglu, Fikret Isik
Kazan, Samira
Koster-Hale, Jorie
Kuo, Chen-Yuan
Kwok, Sze Chai
Lakhani, Bimal
Li, Sufang
Maillet, Audrey
Manning, Y., Kathryn
Michely, Jochen
Misic, Bratislav
Mitra, Anish
Monteiro, Joao
Nastase, Samuel
Navarro de Lara, Lucia
O'Neill, George
Oldehinkel, Marianne
Ossenkoppele, Rik
Pan, Tiffany
Park, Hyojin
Pegado, Felipe
Poole, N., Victoria
Racine, M., Annie
Rafidi, Nicole
Rohe, Tim
Ryun, Seokyun
Schmidt, Timo Torsten
Schultze-Kraft, Matthias
Schwaderlapp, Niels
Sladky, Ronald
Smith, V., David
Sprenger, Tim
Sprooten, Emma
Swann, Nicole
Tik, Martin
Tsang, Tawny
Urbain, Charline
Varentsova, Anna
Völker, Martin
Wang, Ying
Xu, Ting
Yang, Zhen
Zhong, Jidan

OHBM 2015 TRAVEL STIPEND RECIPIENTS

Congratulations to the following 2015 Travel Stipend Awardees

Góngora, Daylín/Cuba
Gracia, Zeus/Mexico
Hernandez-Castillo, Carlos/Mexico
Jimenez, Jesus/Mexico
Kamalian, Aida/Iran
Marrufo Melendez, Oscar René/Mexico
Mendoza Quiñones, Raul/Cuba
Ontivero-Ortega, Marlis/Cuba
Reyes-Aguilar, Azalea/Mexico
Sepulveda, Pradyumna/Chile
Valdes-Hernandez, Pedro Antonio/Cuba
Vega-Hernández, Mayrim/Cuba
Wilke, Circe/Mexico

2015 ABSTRACT REVIEW COMMITTEE

A'arabi, Mohammad Hadi
Abbott, David
Abdullah, Jafri
Achim, Amelie
Adapa, Ram
Adhimoolam, Babu
Ai, Hui
Alaerts, Kaat
Alcauter, Sarael
Allendorfer, Jane
Altinkaya, Ayca
Altmann, Andre
Amemiya, Shiori
Anders, Silke
Anderson, Afrouz
Andoh, Jamila
Aquino, Kevin
Astolfi, Laura
Atlas, Lauren
Axer, Markus
Özkurt, Tolga Esat
Babajani-Feremi, Abbas
Bae, Jihye
Baete, Steven
Baker, Travis
Balderston, Nicholas
Baldwin, Philip
Barkan, Helen
Barlaam, Fanny
Barrios, Fernando
Bashir, Shahid
Bastin, Christine
Batalle, Dafnis
Battista, Christian
Baudracco, Irene
Bauer, Clemens
Baumgarten, Thomas
Beall, Erik
Beckmann, Christian
Behan, Brendan
Behen, Michael
Beissner, Florian
Bellec, Pierre
Beltz, Adriene
Benuzzi, Francesca
Bernard, Jessica
Bernardi, Giulio
Bernhardt, Boris
Bertoldo, Alessandra
Betts, Matthew
Biazoli Junior, Claudinei
Eduardo
Bijsterbosch, Janine
Bilgic, Berkin
Bjornsdotter, Malin
Blagoveshchensky, Evgeny
Blazejewska, Anna
Bode, Stefan
Bodison, Stefanie
Boller, Benjamin
Bollmann, Steffen
Bora, Samudragupta
Borich, Michael
Boulanouar, Abdel-Kader
Bouton, Sophie
Bowyer, Susan
Braga, Rodrigo
Brauer, Jens
Brecheisen, Ralph
Bridwell, David
Brier, Matthew
Brigadoi, Sabrina
Bringas, Maria
Brouwer, Rachel
Buchweitz, Augusto
Buchy, Lisa
Budisavljevic, Sanja
Budnik, Ursula
Burgess, Gregory
Burggren, Alison
Butler, Russell
Caballero Gaudes, Cesar
Cai, Fengqin
Calderoni, Sara
Cao, Miao
Carbonell, Felix
Caspers, Svenja
Chakravarty, Mallar
Chan, Yu-Chen
Chanes, Lorena
Chao, Yi-Ping
Charest, Ian
Charlet, Katrin
Chen, David Qixiang
Cheng, Kang
Cherbuin, Nicolas
Chikara, Rupesh
Choi, In-Young
Christov-Moore, Leonardo
Chung, Chun Kee
Cichy, Radoslaw
Civier, Oren
Coito, Ana
Cole, David
Colliot, Olivier
Coppin, Geraldine
Corbetta, Maurizio
Cordes, Dietmar
Cortese, Filomeno
Coste, Clio
Cousijn, Janna
Cox, Daniel
Coynel, David
Cramer, Steven
Cremers, Henk
Crespo Garcia, Maite
Cribben, Ivor
Cristea, Ioana
Cui, Jiaolong
Cummine, Jacqueline
Cunnington, Ross
Curado, Marco
Dagher, Alain
Damoiseaux, Jessica
D'Anna, Lucio
Datta, Ritobrato
Davenport, Nicholas
de Borst, Aline
De Sanctis, Teresa
Debowska, Weronika
del Gratta, Cosimo
Deligianni, Fani
Dell'Acqua, Flavio
Demarchi, Gianpaolo
Deng, Weiran
Derntl, Birgit
Deserno, Lorenz
Di, Xin
Di Martino, Adriana
Diaconescu, Andreea
Oliviana
Ding, Xiaoyu
Dinh, Thuy
Dobryakova, Ekaterina
Donishi, Tomohiro
Dormal, Valerie
Douet, Vanessa
Doyon, Julien
Drottar, Marie
Droutman, Vita
Duann, Jeng-Ren
Dubois, Julien
Duff, Eugene
Duncan, Niall
Dunlop, Katharine
Eggebrecht, Adam
Eickhoff, Simon
Eisenberg, Daniel
El Mendili, Mohamed-
Mounir
Ellmore, Timothy
Emerson, Robert
Engemann, Denis A.
Eqlimi, Ehsan
Erk, Susanne
Esposito, Fabrizio
Etzel, Jo
Evans, Jennifer
Fan, Li-Ying
Fang, Jiliang
Fedota, John
Feis, Delia-Lisa
Fellah, Slim
Fennema-Notestine,
Christine
Figley, Chase
Fischmeister, Florian
Fishman, Inna
Flandin, Guillaume
Florin, Esther
Foldes, Stephen
Forkel, Stephanie
Franco, Alexandre
Frank, Guido
Franke, Katja
Freiherr, Jessica
Freund, Patrick
Gabitov, Ella
Gaglianese, Anna
Ganjgahi, Habib
Gao, Lei
Garcia, Javier
Garg, Amanmeet
Garrison, Kathleen
Garza-Villarreal, Eduardo
Gautam, Prapti

2015 ABSTRACT REVIEW COMMITTEE, CONTINUED

Ge, Tian
Geerts, Liesbeth
Genc, Erhan
Gentile, Giovanni
Gentili, Claudio
Ghosh, Satrajit
Giessing, Carsten
Gilbert, Jessica
Giordano, Bruno
Glatard, Tristan
Goerlich-Dobre, Katharina Sophia
Goghari, Vina
Gohel, Suril
Golestani, Ali
Gollub, Randy
Gomez, David
Gonzalez, Karen
Gonzalez-Castillo, Javier
Grefkes, Christian
Gregory, Michael
Greicius, Michael
Greve, Douglas
Gu, Feng
Guidotti, Roberto
Guo, Christine
Gutman, Boris
Haaker, Jan
Hahn, Andreas
Handwerker, Daniel
Hanson, Russell
Hantjis, Andrea
Harding, Ian
Harezlak, Jaroslaw
Hashmi, Javeria
Hassan, Mahmoud
Haut, Kristen
Havlicek, Martin
Hawco, Colin
Hayashi, Takuya
Hayes, Dave
He, Huiguang
Helfrich, Randolph
Helmer, Karl
Herzmann, Charlotte
Hill, Holger
Hirano, Yoji
Hiura, Mikio
Ho, Tiffany
Hodaie, Mojgan
Hoffman, William
Hoffstaedter, Felix
Homae, Fumitaka
Hong, Yun Jeong
Hope, Thomas
Horovitz, Silvina
Hou, Jiancheng
Howells, Henrietta
Hsieh, Chang-Wei
Hu, Jon-Fan
Huang, Bingsheng
Hunter, Michael
Hurley, Robert
Huster, René
Hwang, Kai
Lannilli, Emilia
Inglese, Matilde
Ito, Ayahito
Ivanov, Dimo
Iwaki, Sunao
Jahanshad, Neda
Janssen, Joost
Jee, Sungju
Jelescu, Ileana
Jiang, Yang
Jin, Yan
Jo, Hang Joon
Joa, Kyung-Lim
Johnson, Curtis
Joshi, Anand
Juhasz, Csaba
Jung, Minyoung
Kang, Hyejin
Kapogiannis, Dimitrios
Karahanoglu, Fikret Isik
Karmonik, Christof
Karunakaran, Keerthana Deepti
Karunanayaka, Prasanna
Kasper, Lars
Kavounoudias, Anne
Kawaguchi, Atsushi
Kay, Kendrick
Kazan, Samira
Keilholz, Shella
Kellermann, Tanja
Kelsey, Matthew
Kennedy, David
Khalili-Mahani, Najmeh
Khan, Ali
Khundrakpam, Budhachandra
Kikuchi, Yoshiaki
Kilpatrick, Lisa
Kilroy, Emily
Kim, Hosung
Kimura, Takahiro
Kinno, Ryuta
Kinnunen, Kirsi
Kinoshita, Masashi
Kipping, Judy
Kiran, Swathi
Kirilina, Evgeniya
Kiviniemi, Vesa
Kleinnijenhuis, Michiel
Knapen, Tomas
Knosche, Thomas
Knowles, Emma
Knutson, Kris
Koban, Leonie
Koenig, Katherine
Koike, Takahiko
Koschutnig, Karl
Kota, Srinivas
Koyama, Maki
Koyejo, Oluwasanmi
Krach, Sören
Krafnick, Anthony
Krauel, Kerstin
Kriegeskorte, Nikolaus
Kroemer, Nils
Kucyi, Aaron
Kullmann, Stephanie
Kwok, Sze Chai
Kyong, Jeong-Sug
Labus, Jennifer
LaConte, Stephen
Laird, Angela
Lakhani, Bimal
Lambert, Christian
Langdon, James
Langer, Nicolas
Larson-Prior, Linda
Laufs, Helmut
Lee, Gregory
Lefebvre, Stephanie
Legon, Wynn
Lei, Xu
Leith, Cameron
Lenartowicz, Agatha
Leo, Andrea
Lesage, Elise
Leung, Albert
Lewis, Laura
Li, Chia-Wei
liang, xia
Liberati, Giulia
Liebenthal, Einat
Lim, Poay Hoon
Lin, Chun-Yu
Liu, Bing
Lloyd, William
Lo, Chun-Yi Zac
Long, Xiaojing
Lu, Su
Lubrano, Vincent
Luetzkendorf, Ralf
Luh, Wen-Ming
Lui, Fausta
Luo, Cheng
Lv, Bin
Mühleisen, Thomas
Mackey, Scott
Madsen, Sarah
Mahajan, Yatin
Maillet, Audrey
Majeed, Waqas
Majerus, Steve
Manning, Janessa
Mansfield, Karen
Mareckova, Klara
Marenco, Stefano
Marinazzo, Daniele
Markett, Sebastian
Marrufo Melendez, Oscar René
Martin, Jason
Martinez-Montes, Eduardo
Martuzzi, Roberto
Marzetti, Laura
Mathys, Christoph
Maumet, Camille
Mazerolle, Erin
Maziero, Danilo
McGonigle, John
McGuire, Joseph

McLaren, Donald
Melnik, Natalia
Melzer, Tracy
Mendola, Janine
Meng, Chun
Mennes, Maarten
Meskaldji, Djalel-Eddine
Meunier, David
Meyer, Benjamin
Michael, Andrew
Michels, Lars
Min, Paul
Mincic, Adina
Miotto, Eliane
Mohamed, Ismail
Mohammadi, Siawoosh
Molfese, Peter
Moody, Teena
Moore, Eileen
Morelli, Maria Sole
Moreno-Lopez, Laura
Mousavi, Seyed Reza
Mu, Yan
Muhlert, Nils
Mumford, Jeanette
Murphy, Kevin
Muthuraman, Muthuraman
Mutihac, Radu
Nair, Veena
Nakai, Toshiharu
Nakanishi, Masaki
Nakano, Yasushi
Nandy, Rajesh
Narayana, Shalini
Naseer, Noman
Nasrallah, Fatima
Nastase, Samuel
Nathan, Dominic
Nelissen, Koen
Newsome, Mary
Nguyen, Vinh
Nichols, Nolan
Nickerson, Lisa
Nickl-Jockschat, Thomas
Nigri, Anna
Niu, Haijing
Nordahl, Christine
Normandin, Marc
Novikov, Dmitry
Nugent, Allison
Ocklenburg, Sebastian
Oedekoven, Christiane
Ofen, Noa
Ogawa, Akitoshi
O'Muircheartaigh, Jonathan
Onur, Oezguer
Operto, Grégory
Opitz, Alexander
Orban, Pierre
Orr, Joseph
Ossandon, Tomas
Ossenkoppele, Rik
Ouchi, Yasuomi
Oya, Hiroyuki
Paiva, Fernando
Pan, Wen-Ju
Pannek, Kerstin
Pantazis, Dimitrios
Pardo, Jose
Parisot, Sarah
Park, Min Tae
Parlatini, Valeria
Pascarella, Annalisa
Paton, Bryan
Paul, Subhadip
Paulesu, Eraldo
Pavlidou, Anastasia
Pavlova, Marina
Pavlovic, Dragana
Pegado, Felipe
Peltier, Scott
Pelz, Patricia
Peng, Syu-Jyun
Perani, Suejen
Perdue, Katherine
Pereira, Fabricio
Peter, Varghese
Peters, Henning
Pfannmöller, Jörg
Phillips, Christophe
Piccirelli, Marco
Pienaar, Rudolph
Pietrini, Pietro
Pizzagalli, Fabrizio
Pizzorni Ferrarese, Francesca
Plomp, Gijs
Poline, Jean Baptiste
Pomares, Florence
Pool, Eva-Maria
Portugal, Liana
Poser, Benedikt
Posse, Stefan
Poston, Kathleen
Poudel, Govinda
Prasad, Gautam
Preti, Maria Giulia
Prevost, Charlotte
Prior, Fred
Provost, Jean-Sebastien
Puckett, Alexander
Qi, Li
Qin, Pengmin
Quan, Meina
Quandt, Fanny
Raamana, Pradeep Reddy
Radke, Sina
Rafidi, Nicole
Rao, Hengyi
Ray, Kimberly
Razi, Adeel
Reddick, Wilburn
Reding, Katherine
Redolar-Ripoll, Diego
Reid, Andrew
Renvall, Ville
Retico, Alessandra
Ricciardi, Emiliano
Richards, Todd
Rizzo, Gaia
Roberts, James
Robertsson, Naianna
Robinson, Jennifer
Rodriguez-Raecke, Rea
Roe, Anna
Rogalsky, Corianne
Rogers, Baxter
Rogowska, Jadwiga
Roijals-Miras, Ivan
Rokem, Ariel
Romagno, Domenica
Romanczuk-Seiferth, Nina
Romanowska-Pawliczek, Anna
Rose, Emma
Rosenblatt, Jonathan
Ross, Erika
Rossi, Alejandra
Roux, Frederic
Rueckert, Daniel
Ruiter, Michiel
Russo, Michael
Saad, Ziad
Saggar, Manish
Sai, Sun
Saiote, Catarina
Sakreida, Katrin
Salat, David
Saleem, Kadharbatcha
Salmeron, Betty Jo
Sammler, Daniela
Sandrone, Stefano
Sankar, Tejas
Santhanam, Priya
Santosa, Hendrik
Saproo, Sameer
Sato, Naoyuki
Savoy, Robert
Saygin, Zeynep
Schöpf, Veronika
Scharinger, Mathias
Scheeringa, Rene
Schira, Mark
Schmidt-Samoa, Carsten
Schmithorst, Vincent
Schneider, Torben
Schwarzkopf, Dietrich Samuel
Schweizer, Renate
Seminowicz, David
Senda, Joe
Senjem, Matt
Seo, Youngseob
Shannon, Benjamin
Shao, Chunhong
Sharma, Harish
Shaw, Marnie
Shemyakina, Natalia
Shen, Kelly
Shi, Da
Shin, Wanyong
Shine, Mac
Shinkareva, Svetlana

2015 ABSTRACT REVIEW COMMITTEE, CONTINUED

Shinozaki, Jun
Shou, Guofa
Silk, Timothy
Silson, Edward
Silva, Stein
Simmonds, Anna
Simonyan, Karen
Sinanaj, Indrit
Sittiprapaporn, Wichian
Siugzdaite, Roma
Sladky, Ronald
Smith, David
Solano-Castiella, Eugenia
Solis-Escalante, Teodoro
Sollfrank, Teresa
Sotiras, Aristeidis
Sours, Chandler
Sprooten, Emma
Stamatakis, Emmanuel
Stecker, G. Christopher
Steele, Christopher
Stegmayer, Katharina
Stephan, Klaas Enno
Stoffers, Diederick
Straub, Joana
Strother, Stephen
Su, Yi
Sudre, Gustavo
Suo, Chao
Sutherland, Matthew
Szymanski, Caroline
Tabelow, Karsten
Tacikowski, Pawel
Tae, Woo-Suk
Tailby, Chris
Tak, Sungho
Takemura, Hiromasa
Tan, Hao Yang
Tanabe, Hiroki
Tang, Yi-Yuan
Tanskanen, Topi
Tartaro, Armando
Tavabi, Kambiz
Taylor, Paul
Terrier, Louis
Tesche, Claudia
Thiebaut de Schotten, Michel
Thomas, Adam
Thompson, Abigail
Tijms, Betty
Tittgemeyer, Marc
Tohka, Jussi
Tona, Klodiana Daphne
Tong, Yunjie
Torrisi, Salvatore
Touroutoglou, Alexandra
Toussaint, Paule
Troiani, Vanessa
Tsao, Sinchai
Tseng, Yi-Li
Tu, Cheng-Hao
Turken, And
Turner, Robert
Tzourio-Mazoyer, Nathalie
Valdes-Hernandez, Pedro Antonio
van der Meer, Johan
van der Zwaag, wietske
van Ettinger-Veenstra, Helene
Van Schependom, Jeroen
Vandenbroucke, Annelinde
Vanderauwera, Jolijn
Vassena, Eliana
Vecchiato, Giovanni
Veit, Ralf
Veraart, Jelle
Vettel, Jean
Vezoli, Julien
Victor, Teresa
Vilares, Iris
Violante, Ines
Visscher, Kristina
Vo, Loan
Vogelstein, Joshua
Votinov, Mikhail
Vu, An
Waggoner, Allen
Wang, Bao
Wei, Dong-Tao
Weickert, Thomas
White, Tonya
Wijeakumar, Sobanawartiny
Wilson, Stephen
Windischberger, Christian
Wink, Alle Meije
Winkler, Anderson
Witt, Suzanne
Wolf, Varina
Woo, Choong-Wan
Wrobel, Nathalie
Wu, Changwei
Xia, Mingrui
Xiao, Yaqiong
Xu, Duan
Xue, Feng
Yan, Zhi-Xiong
Yang, Hongdian
Yao, Ye
Yasuda, Clarissa
Yeo, BT Thomas
Yoo, Woo-Kyoung
You, Xiaozhen
Yu, Ping
Yuan, Han
Yum, Yen Na
Yun, Je-Yeon
Zang, Yu-Feng
Zaretskaya, Natalia
Zaytseva, Yuliya
Zemmoura, Ilyess
Zeng, Ling-Li
Zhan, Liang
Zhang, Fengqing
Zhao, Ling
Zhong, Jidan
Zhou, Dongming
Zhu, Dajiang
Zielinski, Brandon
Zilles, Karl
Zou, Ping
Zuo, Nianming

ACKNOWLEDGEMENTS

The Organization for Human Brain Mapping wishes to thank the following companies for their generous non-educational grants for the OHBM 2015 Program:

Gold Level Sponsor
Siemens Healthcare

Bronze Level Sponsors
Electrical Geodesics, Inc

Philips Healthcare

GE Healthcare

Industry Supported Symposia
Electrical Geodesics, Inc

GE Healthcare

Siemens Healthcare

2015 Annual Meeting Website Development
USC Institute For Neuroimaging and Informatics

Awards and Recognition
Elsevier

Wiley Blackwell

NIH

EXHIBITOR LIST

ANT North America

Booth #225
437 S. Yellowstone Dr., Ste 216
Madison, WI 53719
United States
Web: www.ant-neuro.com
Email: infous@ant-neuro.com

ANT Neuro provides cutting edge hardware and software for neuroscience research including tools for high density EEG acquisition and analysis, TMS navigation, and MEG analysis. Using ANT Neuro products, functional and anatomical data can be fused to gain insight into the working mechanisms of cognition and a variety of brain disorders.

BESA GmbH

Booth #209
Freihamer Str. 18
Grafelfing 82166
Germany
Web: www.besa.de
Email: tobias.scherg@besa.de

BESA GmbH was founded in 1995 by Professor Michael Scherg. BESA Research is the leading commercial software package for EEG and MEG data analysis. Analysis options range from pre-processing to advanced source analysis, coherence, and statistical analysis. BESA Research is used in more than 1500 universities and hospitals world-wide.

BIOPAC Systems

Booth #119
42 Aero Camino
Goleta, CA 93117
United States
Web: www.biopac.com
Email: info@biopac.com

BIOPAC lets you measure physiology anywhere with innovative, compatible solutions that can be used by anyone for meaningful discovery. We make high-quality scientific tools for physiology measurement and interpretation with superior compatibility and world-class customer service and support and empower cutting edge tools that inspire endless discovery in MRI, lab, and real-world environments.

Brain Innovation bv

Booth #116
Oxfordlaan 55, PO Box 1142
Maastricht 6229 EV
The Netherlands
Web: www.brainvoyager.com
Email:sales@brainvoyager.com

Brain Innovation provides leading commercial software for brain imaging analysis and visualization that scales from mobile devices (iOS, Android) to high performance GPGPU workstations. The BrainVoyager product family includes "BrainVoyager" for multi-modal data analysis (MRI/fMRI/DWI/EEG/MEG), "Turbo-BrainVoyager" for real-time fMRI analysis, which is the leading tool for fMRI neurofeedback and BCI applications, and the "TMS Neuronavigator" supporting image guided TMS.

Brain Products GmbH

Booth #108
Zeppelinstrasse 7
Gilching 82205
Germany
Web: www.brainproducts.com
Email: sales@brainproducts.com

Brain Products is a leading manufacturer of solutions for neurophysiological research. We have more than 15 years of experience in developing state-of-the-art solutions for the following fields:

- EEG / ERP / EP
- EEG co-registrations with fMRI, TMS, etc.
- BCI & Bio-/Neurofeedback
- Sleep & Behavioral Research

Brain Vision, LLC

Booth #112
2500 Gateway Centre Blvd
Morrisville, NC 27560
United States
Web: www.brainvision.com
Email: travel@brainvision.com

Brain Vision LLC offers market-leading hardware and software for EEG/ERP/BCI and NIRS research. We offer solutions for research on infants and adults that include wired and wireless system with passive, active or dry electrodes. Our solutions include integrations with other modalities like fMRI-compatible equipment and brain stimulation devices (TMS, tDCS, tACS). We are looking forward to advancing neurophysiological research with you!

BrainMap.org/Research Imaging Institute

Booth #220
University of Texas Health Science Center, Mail Code 6240
7703 Floyd Curl Dr.
San Antonio, TX 78229
United States
Web: www.brainmap.org

BrainMap maintains a structural and functional database of published neuroimaging studies, reporting coordinate-based results. Created and developed at the Research Imaging Institute at University of Texas Health Science Center in San Antonio, BrainMap has purposefully supported large-scale data-sharing and analysis via its tools and programs since its conception in 1988.

Brainnetome Atlas

Booth #223
95 Zhong Guan Cun East Rd.
Beijing 100190
China
Web: www.brainnetome.org
Email: nmzuo@nlpr.ia.ac.cn

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

Compumedics Neuroscan

Booth #126
5015 West WT Harris Blvd, Ste D
Charlotte, NC 28269
United States
Web: www.compumedicsneuroscan.com
Email: sales@neuroscan.com

Compumedics Neuroscan provides complete research and clinical systems that integrate virtually all modalities of neuroimaging data. Systems are centered around the Curry Neuroimaging Suite, which seamlessly combines data acquisition with advanced signal processing, statistical analysis of individual or group ERP data, as well as dipole and current density source analysis

Cortech Solutions, Inc.

Booth #222
1409 Audubon Blvd, Unit B1
Wilmington, NC 28403
United States
Web: www.cortechsolutions.com
Email: sales@cortechsolutions.com

Our capabilities include the most advanced MRI-safe EEG/ERP, high-resolution video displays, eye-tracking, audio stimulation /communication and functional near-infrared spectroscopy (fNIRS). We are also the developer of the EMSE Suite software for ElectroMagnetic Source Estimation and integration of EEG/ MEG signals with structural and functional MRI and other modalities.

Current Designs, Inc.

Booth #123

3850 Haverford Ave.
Philadelphia, PA 19104
United States
Web: www.curdes.com
Email: sales@curdes.com

Current Designs' fORP offers the best solution for computer response in MR/MEG research. Our fiber optic systems include many response options including 10-button, joystick, trackball, gripforce and pedal devices. Our response devices and connector bundles are 100% plastic, non-electronic, and non-magnetic, so the fORP will not add noise or raise safety concerns in the MR/MEG room.

Electrical Geodesics, Inc. (EGI)

Booth #109

500 East 4th Avenue, Suite 200
Eugene, OR 97401
United States
Web: www.egi.com
Email: info@egi.com

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

Elekta

Booth #124

Siltasaarenkatu 18-20 A
Helsinki 00530
Finland
Web: www.elekta.com
Email: info.europe@elekta.com

Elekta is global leader in advanced, wholecortex magnetoencephalography (MEG) instrumentation, now with zero helium boil-off technology. MEG is a completely non-invasive, mapping activity within the human brain with millimeter-millisecond resolution. Clinically, MEG is finding acceptance for presurgical planning, especially for epilepsy. In neuroscience, it continues to offer unique insights.

Elsevier BV

Booth #218

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

Elsevier is a publisher of leading-edge neuroscience content from global experts, including books, journals, major reference works, and more. Our publications cover a wide range of sub-disciplines, and are ideal for researchers, instructors, and students. Stop by our booth to check out the wide collection of neuroscience content.

Flywheel, LLC.

Booth #212

227 Colfax Ave. N., Suite 148
Minneapolis, MN 55405
United States
Web: www.flywheel.io
Email: info@flywheel.io

A young and innovative company, we are building a software platform to enable scalable and effective data and algorithm sharing between scientific research groups worldwide. We help scientists do great work together by allowing them to concentrate on the science, not the IT.

Hitachi High-Technologies Corporation

Booth #221

24-14, Nishi-shimbashi 1 chome, Minato-kui
Toyko 105-8717
Japan
Web: http://www.hitachi-hightech.com/jp/products/lind_solutions/ict/human/brain/index.html/
Email: kiyoshi.hasegawa.ev@hitachi-hightech.com

Hitachi High-Technologies, Corp. is providing Wearable Optical Topography(fNIRS), which is light-weight and measurable in the daily life environment. Real time and simultaneous measurement is possible up to 4 persons.

Human Connectome Project (HCP)

Booth #114

MS 8108, 660 S. Euclid
St. Louis, MO 63110
United States
Web: humanconnectome.org
Email: elam@wustl.edu

The Human Connectome Project (HCP) is using advanced neuroimaging , plus extensive behavioral and heritability measures, to comprehensively map region-to-region brain connections and variability in 1,200 healthy adults. All data, methods, and tools for acquisition, processing, analysis, and visualization are being freely released to the scientific community.

INCF

Booth #215

Nobelsvag 15a
Stockholm 17177
Sweden
Web: www.incf.org
Email: lotta@incf.org

The International Neuroinformatics Coordinating Facility (INCF), together with its 18 member countries, coordinates collaborative informatics infrastructure for neuroscience data integration and manages scientific programs to develop standards for data sharing, analysis, modeling and simulation in order to catalyze insights into brain function in health and disease.

Localite GmbH

Booth #227

Schloss Birlinghoven
Sankt Augustin 53757
Germany
Web: www.localite.de
Email: info@localite.de

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

Magstim

Booth #113

Spring Gardens, Whitland
Carmarthenshire SA34 0HR
United Kingdom
Web: www.magstim
Email: john.leedham@magstrim.com

Magstim, a world leader in magnetic stimulation, is pleased to be exhibiting at this year's conference. Magstim has a complete line of magnetic stimulators and coils to meet your research requirements.

MRC Systems GmbH

Booth #111

Hans-Bunte-Str. 10
Heidelberg 69123
Germany
Web: www.mrc-systems.de
Email: info@mrc-systems.de

MRC Systems from Heidelberg, Germany, offers MRI compatible video cameras since more than 10 years. The cameras can be used inside the bore of MRI scanners without artifacts and interference. Main applications are monitoring of subjects or devices, eye-tracking and motion tracking. MRC exhibits new high-speed and high-resolution cameras

Neuro Device Group

Booth #210

Plowiecka 1
Warsaw 04-501
Poland
Web: www.neurodevice.pl
Email: kontakt@neurodevice.pl

The Neuro Device Group (Pty. Ltd.) offers custom R&D solutions in the field of design and building prototypes of medical and research devices. We have been manufacturing our own devices and custom-made designs for our clients since 2004. We are experienced in fMRI, psychophysiology, ET, EEG, NIRS research and medical diagnostics

Neuroelectrics

Booth #211

Av. Tibidabo, 47 bls
Barcelona 08035
Spain
Web: www.neuroelectrics.com
Email: info@neuroelectrics.com

Neuroelectrics, a Starlab spin-off, has developed brain measurements (EEG) and neuromodulation (tCS) systems that will open a new window for the observation of the human brain and enable effective, innovative treatments for a number of pathologies. Our mission is to reinvent the way we observe and treat the human brain.

NITRC - Neuroinformatics Tools & Resources Clearinghouse

Booth #122

306 Florida Ave. NW
Washington D.C. 20001
United States
Web: www.nitrc.org
Email: info@nitrc.org

For MR, EEG, MEG, PET/SPECT, CT, optical or genomic imaging, clinical neuroinformatics and computational neuroscience, NIH's NeuroInformatics Tools and Resources Clearinghouse is the "go to" place to find and download open-source software, community-generated data, a compute environment, as well as use a commercial cloud pay-as-you-go storage and compute at www.nitrc.org

Optoacoustics Ltd.

Booth #213

17 Hanotea St.
Mazor 73160
Israel
Web: http://www.optoacoustics.com
Email: yuvi@optoacoutics.com

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

EXHIBITOR LIST, CONTINUED

Psychology Software Tools

Booth #117

311 23rd St Ext, Ste 200
Sharpsburg, MD 15215
United States
Web: www.pstnet.com
Email: info@pstnet.com

Psychology Software Tools, Inc. is a world leader in stimulus presentation software with their flagship product E-Prime®. Their hardware product line includes advanced solutions for behavioral, fMRI, and eye tracking research. Their customer base is comprised of over 5,000 research institutions and laboratories in more than 60 countries.

Resonance Technology, Inc.

Booth #118

18121 Parthenia St. Unit A
Northridge, CA 91325
United States
Web: www.mrivideo.com
Email: sales@mrivideo.com

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

Rogue Research, Inc.

Booth #214

4398 St. Lanrent, Ste 206
Montreal H2W 1Z5
Canada
Web: www.rogue-research.com
Email: diane@rogue-research.com

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

Rogue Resolutions

Booth #115

Sophia House, 28 Cathedral Road
Cardiff CF11 9LJ
United Kingdom
Web: www.rogue-resolutions.com
Email: info@rogue-resolutions.com

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

Shimadzu Corporation

Booth #219

1-3, Kanda-Nishikicho, Chiyoda-Ku
Tokyo 101-8448
Japan
Web: www.shimadzu.com
Email: a_yama@shimadzu.co.jp

SHIMADZU contribute to society through science and technology. We provide wide possibility for brain science with functional Near-Infrared Spectroscopy: LABNIRS. Application range has grown in response to rapidly expanding needs. In SHIMADZU booth we will introduce the advantage, features and variety of applications of LABNIRS. We hope SHIMADZU's LABNIRS will be helpful for your research and also contribute to the further development of brain science.

Siemens Healthcare

Booth #208

HC CG 64, Henkestrasse 127
Erlangen 91052
Germany
Web: www.siemens.com/healthcare
Email: medg.gms@siemens.com

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

SMRT IMAGE

Booth #121

3459 Motor Avenue
Los Angeles, CA 90034
United States
Web: www.smrtimage.com
Email: transform@smrtimage.com

SMRT IMAGE™ was founded by leading scientists, clinicians and technology experts to deliver state of the art neuroimaging capabilities to universities, imaging centers, and hospitals world wide.

SMRT's Lumica™ MRI and fMRI Projection System helps both researchers and clinicians streamline their neuroimaging work, while working seamlessly interfacing with nearly any MRI machine and coil. Lumica's award winning design streamlines fMRI stimulus presentation, while improving patient comfort, and improving overall scan throughput.

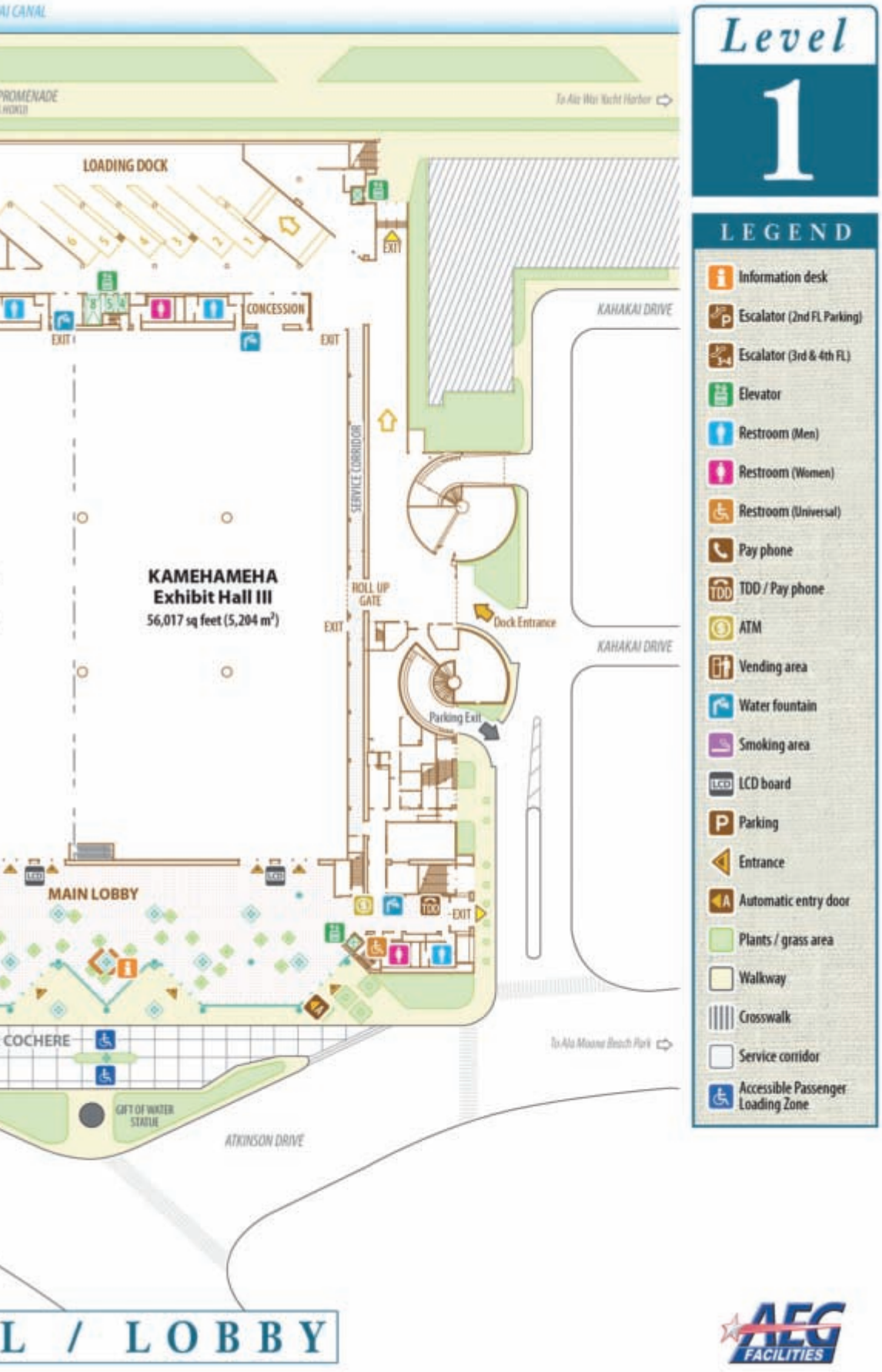
VPixx Technologies Inc.

Booth #217

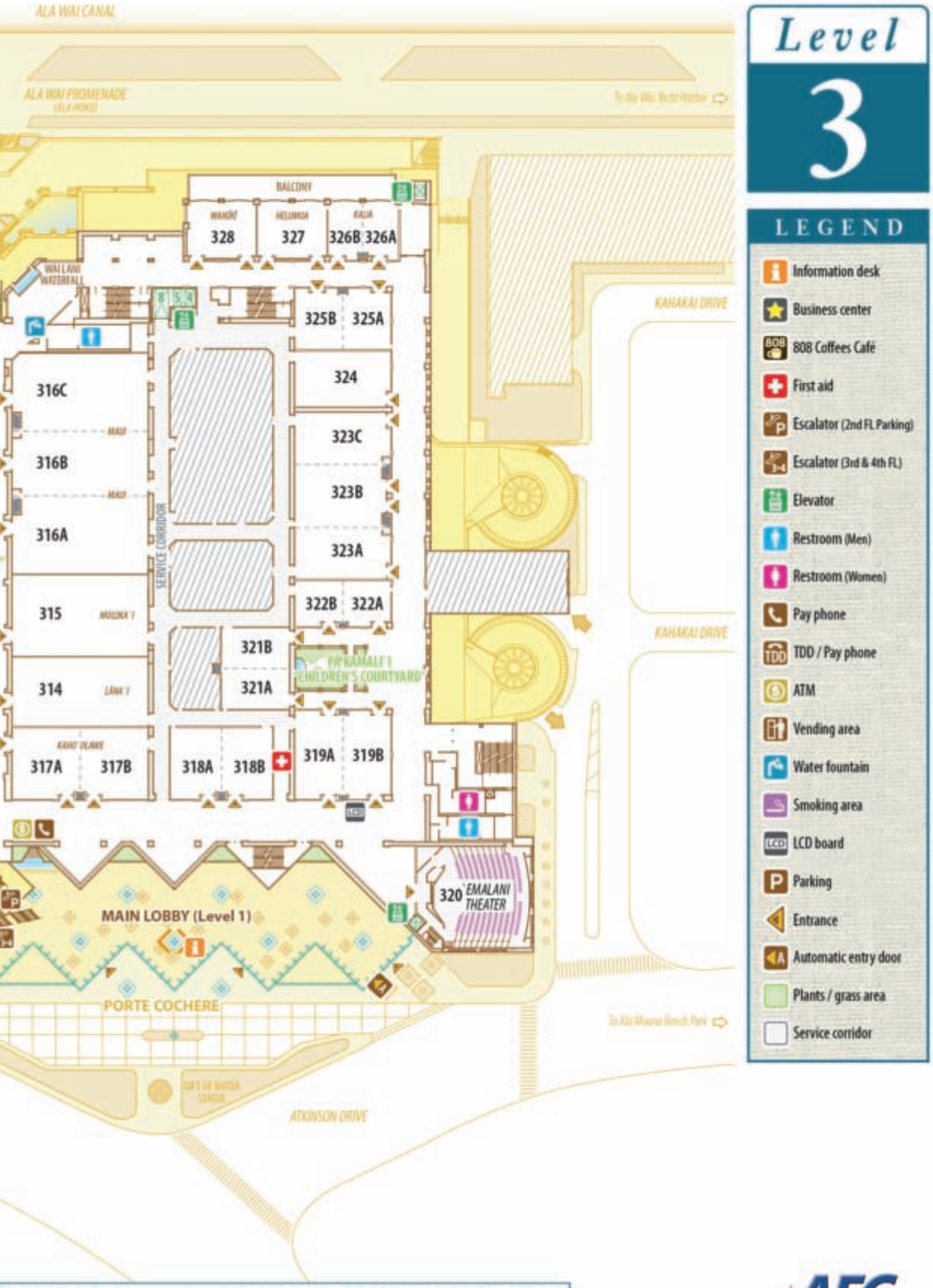
1494 Montarville, Suite 206
St. Bruno 3V 3T5
Canada
Web: www.vpixx.com
Email: accounting@vpixx.com

VPixx Technologies is demonstrating the PROPixx DLP projector, now running at refresh rates up to 1440Hz. The PROPixx includes 3D, synchronized digital analog and audio I/O, and can be setup inside or outside the MRI magnet room. Fiber-optic response boxes, and the SOUNDPixx audio stimulator will also be displayed.

EXHIBIT LAYOUT


Level
1
LEGEND
Information desk
Escalator (2nd FL Parking)
Escalator (3rd & 4th FL)
Elevator
Restroom (Men)
Restroom (Women)
Restroom (Universal)
Pay phone
TDD / Pay phone
ATM
Vending area
Water fountain
Smoking area
LCD board
Parking
Entrance
Automatic entry door
Plants / grass area
Walkway
Crosswalk
Service corridor
Accessible Passenger Loading Zone
LOADING DOCK
CONCESSION
EXIT
SERVICE CORRIDOR
KAMEHAMEHA
Exhibit Hall III
56,017 sq feet (5,204 m²)
ROLL UP GATE
Dock Entrance
Parking Exit
KAHAKAI DRIVE
MAIN LOBBY
COCHERE
GIFT OF WATER STATUE
ATKINSON DRIVE
To Ala Moana Beach Park
L / LOBBY

LEVEL 3 LAYOUT



Level 3

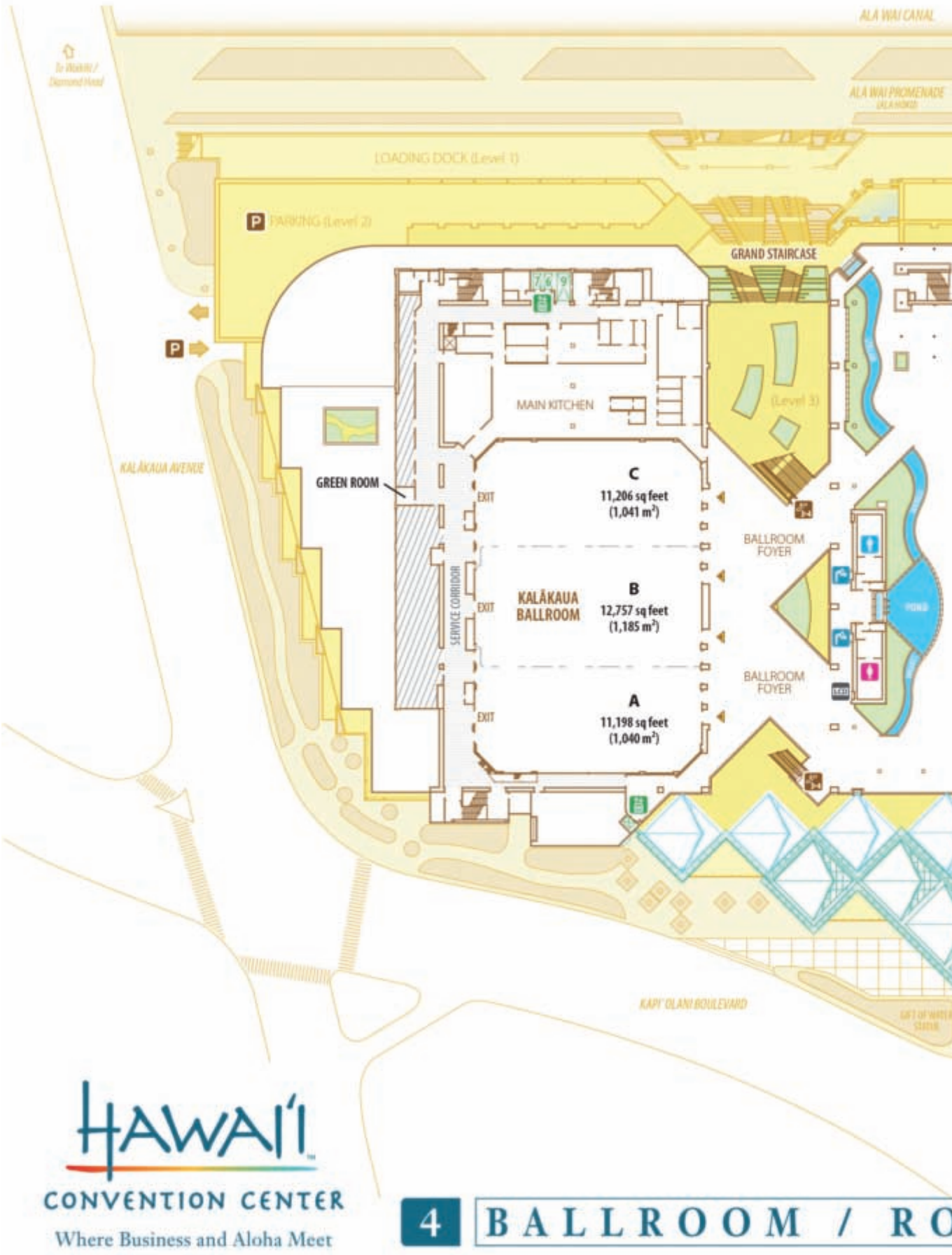
LEGEND

- Information desk
- Business center
- 808 Coffees Café
- First aid
- Escalator (2nd FL Parking)
- Escalator (3rd & 4th FL)
- Elevator
- Restroom (Men)
- Restroom (Women)
- Pay phone
- TDD / Pay phone
- ATM
- Vending area
- Water fountain
- Smoking area
- LCD board
- Parking
- Entrance
- Automatic entry door
- Plants / grass area
- Service corridor

OOM / THEATERS

AEG FACILITIES

BALLROOM AND ROOFTOP GARDEN LAYOUT



HAWAI'I CONVENTION CENTER
Where Business and Aloha Meet

4 BALLROOM / RO

OOF TOP GARDEN

2015 COUNCIL AND COMMITTEES

Council
Karen Berman, Chair
Karl Zilles, Chair Elect
Steve Smith, Past Chair
Jeanette Mumford, Treasurer
Kevin Murphy, Treasurer Elect
Jia-Hong Gao, Past Treasurer
Doug Greve, Secretary
Tonya White, Secretary Elect
Simon Eickhoff, Past Secretary
Jack Van Horn, Program Chair
Andreas Kleinschmidt, Program Chair Elect
Pedro Valdes Sosa, Past Program Chair
Niko Kriegeskorte, Education Chair
Martin Lindquist, Education Chair Elect

Program Committee
Jack Van Horn, Program Chair
Andreas Kleinschmidt, Program Chair Elect
Pedro Valdes Sosa, Past Program Chair
Niko Kriegeskorte, Education Chair
Martin Lindquist, Past Education Chair
Karen Berman
Christian Büchel
Linda Chang
Vince Clark
Simon Eickhoff
Randy Gollub
Thomas Grabowski
Christian Grefkes
Yang Jiang
Angie Laird
Christoph Michel
Janaina Mourao Miranda
Thomas Nichols
Steve Smith
Arno Villringer

2015 Local Organizing Committee
Linda Chang, Co-Chair
Thomas Ernst, Co-Chair
Susan Bookheimer
George Fein
Andy Stenger
Jack Van Horn

2015 Hackathon Task Force
Pierre Bellec
Cameron Craddock
Thomas Grabowski
Sean Hill
Arno Klein
Niko Kriegeskorte
Daniel Margulies
Nolan Nichols
JP Poline
Jack Van Horn

Executive Office
5841 Cedar Lake Road, Suite 204
Minneapolis, MN, USA 55416
Telephone: (952) 646-2029
Fax: (952) 545-6073
Email: info@humanbrainmapping.org
Web: www.humanbrainmapping.org

JoAnn Taie, Executive Director
Kayla Stidger, Director of Meetings and Events
Anne Beauclaire, Administrative and Meeting Coordinator

DISCLOSURES

OHBM 2015 Disclosure Statements

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

NOTES

NOTES

Organization for Human Brain Mapping

Please join us at our future meetings!

Organization for
Human Brain Mapping

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

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