CAJAL Advanced Neuroscience Training Course on
Whole Brain Imaging
Bordeaux, September 8-28, 2019

Instructors

Jan Bjaalie, MD, PhD (University of Oslo, Norway)

Jan Bjaalie, M.D., Ph.D., is professor at the Institute of Basic Medical Sciences, University of Oslo, and Infrastructure Operations Director and leader of the Neuroinformatics Platform of the EU Human Brain Project. He was founding Executive Director of the International Neuroinformatics Coordinating Facility (INCF) and is currently head of the INCF Norwegian Node and member of the INCF Council for Training, Science, and Infrastructure. His research group has studied wiring patterns in the brain and developed data systems for organizing and managing heterogeneous neuroscience research data by use of a new generation of digital brain atlases. The group develops software and workflows for analysis of data integrated in the atlases ("Google maps of the brain"). Jan Bjaalie is Chief editor of Frontiers in Neuroinformatics and Section editor of Brain Structure and Function.

Selected Publications:
- Data integration through brain atlasing: Human Brain Project tools and strategies.
  Bjerke IE, Øvsthus M, Papp EA, Yates SC, Silvestri L, Fiorilli J, Pennartz CMA, Pavone FS, Puchades MA, Leergaard TB, Bjaalie JG. Eur Psychiatry. 2018 Apr;50:70-76.
- Brain-Wide Mapping of Axonal Connections: Workflow for Automated Detection and Spatial Analysis of Labeling in Microscopic Sections. Papp EA, Leergaard TB, Csucs G, Bjaalie JG
  Front Neuroinform. 2016 Apr 19;10:11.
- Feeding the human brain model. Tiesinga P, Bakker R, Hill S, Bjaalie JG. Curr Opin Neurobiol. 2015 Jun;32:107-14
- Addendum to "Waxholm Space atlas of the Sprague Dawley rat brain" [NeuroImage 97 (2014) 374-386]. Papp EA, Leergaard TB, Calabrese E, Johnson GA, Bjaalie JG. Neuroimage. 2015 Jan 15;105:561-2.

Timo Dickscheid, PhD (Institute of Neuroscience and Medicine, Germany)

Timo Dickscheid is heading the "Big Data Analytics" group at the Institute of Neuroscience and Medicine (INM-1), Forschungszentrum Jülich, Germany. He graduated in Computer Science at the University of Koblenz in 2006, and earned his PhD at the University of Bonn in 2011, where he worked on the 3D reconstruction of buildings from images under the supervision of Prof. Wolfgang Förstner. In 2010, he joined INM-1 as a post-doc to build high-resolution 3D models of the human brain from microscopic images. After accepting a position as the head of Information Technology at the German Federal Institute of Hydrology in Koblenz in 2012, Dickscheid returned back to Jülich in 2014 to build his own research group. His work now focuses on Machine Learning methods for microscopic image analysis, data management for high throughput imaging, and neuroinformatics solutions for brain atlasing. In the Human Brain Project (HBP), Dickscheid is co-

leading the neuroinformatics platform, and responsible for the development of a publicly accessible multi-level human brain atlas.

Selected publications:

- Spitzer H, Kiwitz K, Amunts K, Harmeling S, Dickscheid T (2018). Improving Cytoarchitectonic Segmentation of Human Brain Areas with Self-supervised Siamese Networks. Medical Image Computing and Computer Assisted Intervention (MICCAI'18)
- Spitzer H, Amunts K, Harmeling S, Dickscheid T (2018). Compact feature representations for human brain cytoarchitecture using self-supervised learning. Medical Imaging with Deep Learning (MIDL'18)
- Spitzer H, Amunts K, Harmeling S, Dickscheid T (2017). Parcellation of visual cortex on high-resolution histological brain sections using convolutional neural networks. IEEE International Symposium on Biomedical Imaging (ISBI)
- Amunts K, Lepage C, Borgeat L, Mohlberg H, Dickscheid T, Rousseau MÉ, Bludau S, Bazin PL, Lewis LB, Oros-Peusquens AM, Shah NJ, Lippert T, Zilles K, Evans AC (2013). BigBrain: an ultrahigh-resolution 3D human brain model. Science 340(6139):1472-5

## William Lefrançois (University of Bordeaux, France)

William Lefrançois (Assistant professor in Physics in the University of Bordeaux), works in the Centre de Résonance Magnétique des Systèmes Biologiques (UMR5536, CNRS/University of Bordeaux, www.rmsb.u-bordeaux.fr). He is involved in the methodological developments in cardiovascular MRI in small animals.

Selected Publications:

- Trotier AJ, Lefrançois W, Ribot EJ, Thiaudiere E, Franconi JM, Miraux S. *Time-resolved TOF MR angiography in mice using a prospective 3D radial double golden angle approach.*Magn Reson Med. 2015 Mar;73(3):984-94.
- Castets CR, Ribot EJ, Lefrançois W, Trotier AJ, Thiaudière E, Franconi JM, Miraux S. *Fast and robust 3D T1 mapping using spiral encoding and steady RF excitation at 7 T: application to cardiac manganese enhanced MRI (MEMRI) in mice.* NMR Biomed. 2015 Jul;28(7):881-9.
- Trotier AJ, Lefrançois W, Van Renterghem K, Franconi JM, Thiaudière E, Miraux S. *Positive contrast high-resolution 3D-cine imaging of the cardiovascular system in small animals using a UTE sequence and iron nanoparticles at 4.7, 7 and 9.4 T.* J Cardiovasc Magn Reson. 2015 Jul 7;17:53.
- Trotier AJ, Castets CR, Lefrançois W, Ribot EJ, Franconi JM, Thiaudière E, Miraux S. *USPIO-enhanced 3D-cine self-gated cardiac MRI based on a stack-of-stars golden angle short echo time sequence: Application on mice with acute myocardial infarction.* J Magn Reson Imaging. 2016 Aug;44(2):355-65. doi: 10.1002/jmri.25150. Epub 2016 Jan 18.

Aurélien Trotier (University of Bordeaux, France)
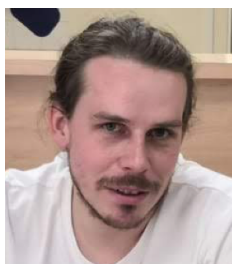
Aurélien J Trotier is a MRI Physicist/Engineer involved in sequence programming for clinical (Siemens MR IDEA) and preclinical (Bruker) MR systems and in reconstruction (Matlab, C/C++), acquisition strategies and experimental set-up.

His current interest involves the development, validation and application of novel MRI techniques based on non-Cartesian trajectories for parametric data and quantification of cardiac flow in small animals.

Selected Publications:

- Trotier AJ, Rapacchi S, Faller TL, Sylvain M, Ribot EJ. Compressed-Sensing MP2RAGE sequence: application to the detection of brain metastases in mice at 7T. Magn Reson Med. 2019: 81(1):551-559
- Trotier AJ, Castets CR, Lefrançois W, Ribot EJ, Franconi JM, Thiaudière E, et al. USPIO-enhanced 3D-cine self-gated cardiac MRI based on a stack-of-stars golden angle short echo time sequence: Application on mice with acute myocardial infarction. J Magn Reson Im. 2016; 44(2):355-65
- Ribot EJ, Trotier AJ, Castets CR, Dallaudière B, Thiaudière E, Franconi J-M, et al. Free-breathing 3D diffusion MRI for high-resolution hepatic metastasis characterization in small animals. Clin Exp Metastasis. 2016;33(2):167–78. Available from: http://link.springer.com/10.1007/s10585-015-9766-6
- Trotier AJ, Lefrançois W, Ribot EJ, Thiaudiere E, Franconi JM, Miraux S. Time-resolved TOF MR angiography in mice using a prospective 3D radial double golden angle approach. Magn Reson Med. 2015;73(3):984–94.

Sylvain Miraux, PhD (University of Bordeaux, France)

Sylvain Miraux (Director of Research CNRS), is leading the Centre de Résonance Magnétique des Systèmes Biologiques (UMR5536, CNRS/University of Bordeaux, www.rmsb.u-bordeaux.fr) and leading the facility Plateform d'Imagerie Biomédicale (UMS3767 CNRS/Université de Bordeaux, www.pibio-bordeaux.cnrs.fr). He has published more than 50 original peer-reviewed papers in MRI methodology and applications. His team has expertise in non-Cartesian MR sequence development at high magnetic field on preclinical small animal models. In particular, he has developed innovative approaches for time-resolved 3D cardiovascular imaging.

https://scholar.google.fr/citations?user=iuNgCsoAAAAJ&hl=fr&oi=ao

Selected Publications:

- Kérourédan O, Ribot EJ, Fricain JC, Devillard R, Miraux S. Magnetic Resonance Imaging for tracking cellular patterns obtained by Laser-Assisted Bioprinting. Sci Rep. 2018 Oct 25;8(1):15777. doi: 10.1038/s41598-018-34226-9.
- Castets CR, Lefrançois W, Wecker D, Ribot EJ, Trotier AJ, Thiaudière E, Franconi JM, Miraux S. Fast 3D ultrashort echo-time spiral projection imaging using golden-angle: A flexible protocol for in vivo mouse imaging at high magnetic field. Magn Reson Med. 2017 May;77(5):1831-1840. doi: 10.1002/mrm.26263.
- Trotier AJ, Castets CR, Lefrançois W, Ribot EJ, Franconi JM, Thiaudière E, Miraux S. USPIO-enhanced 3D-cine self-gated cardiac MRI based on a stack-of-stars golden angle short echo time sequence: Application on mice with acute myocardial infarction. J Magn Reson Imaging. 2016 Aug;44(2):355-65. doi: 10.1002/jmri.25150.

- Trotier AJ, Lefrançois W, Van Renterghem K, Franconi JM, Thiaudière E, Miraux S. Positive contrast high-resolution 3D-cine imaging of the cardiovascular system in small animals using a UTE sequence and iron nanoparticles at 4.7, 7 and 9.4 T. J Cardiovasc Magn Reson. 2015 Jul 7;17:53. doi: 10.1186/s12968-015-0167-4.

Gaelle Leroux, PhD (Université de Lyon, France)

I received my PhD in neurosciences in 2005 at the University of Caen Basse-Normandie, France. It was about a conservation-of-number task from Jean Piaget studied in young adults with psycho-experiments and using functional MRI, MEG and EEG techniques.

In 2006-07, I investigated the development of the numerical abilities and working memory in children and young adults using fMRI as a post-doc at Karolinska Institute in Stockholm, Sweden. I was then recruited on a tenure track position as a research engineer at Paris-Descartes University where I've been working on the cognitive development of executive functions, still using fMRI, with children aged from 5 to 10 years. In 2012, I moved to Bordeaux with the GIN team and my assignments were focused on the BIL&GIN database and the set-up of the NIRS system. Due to family reasons, I recently moved to the CRNL lab in Lyon to assist neuroimaging projects across teams.

Selected Publication:
- Mellet E., Mazoyer B., Leroux G., Joliot M. and Tzourio-Mazoyer N. (2016) Cortical Asymmetries during Hand Laterality Task Vary with Hand Laterality: A fMRI Study in 295 Participants. *Front Hum Neurosci* 10:628
- Mazoyer B., Mellet E., Perchey G., Zago L., Crivello F., Jobard G., Delcroix N., Vigneau M., Leroux G., Petit L., Joliot M. and Tzourio-Mazoyer N. (2016) BIL&GIN: A neuroimaging, cognitive, behavioral, and genetic database for the study of human brain lateralization. *NeuroImage*. 1;124(Pt B):1225-31
- Houdé O.[1], Pineau A.[1], Leroux G.[1], Poirel N.[1], Perchey G., Lanoë C., Lubin A., Turbelin MR., Rossi S., Simon G., Delcroix N., Lamberton F., Vigneau M., Wisniewski G., Vicet JR. and Mazoyer B. (2011) Functional MRI study of Piaget's conservation-of-number task in preschool and school-age children: a neo-piagetian approach. *Journal of Experimental Child Psychology*. 110: 332-346. ([1] equal contributions)
- Joliot M., Leroux G., Dubal S., Tzourio-Mazoyer N., Houdé O., Mazoyer B. and Petit L. (2009). Cognitive inhibition of number/length interference in a Piaget-like task: Evidence by combining ERP and MEG. *Clinical Neurophysiology*, 120, 1501-1513.

Susanne Weis, PhD (Institute of Neuroscience and Medicine, Germany)

Susanne Weis studied Mathematics and Computer Science at RWTH Aachen University and received her PhD in Medical Research from the Medical Department at Aachen University. After working at the University of Durham, UK for eight years, she returned to Germany in 2017 und is now the leader of the research group "Brain Variability" within the Institute of Neuroscience and Medicine, Brain and Behaviour (INM-7) at Research Center Jülich, Germany.

Her research focusses on the relation between individual differences in experience and behavior and variability of structural and functional brain organization. These individual differences include both "systematic variability" such as sex differences and age effects and the "individual variability" in

connection with personality traits, performance differences or cognitive impairments, as well as other influences like hormone fluctuations, time-of-day rhythms, motivation, and other internal and external factors.

At Research Centre Jülich, her research uses "big data" samples and machine learning approaches to make predictions about individual differences based on multi-modal brain imaging data.

Selected Publications:
- Weis S, Hodgetts S, Hausmann M. Sex differences and menstrual cycle effects in cognitive and sensory resting state networks. Brain Cogn. 2017, doi: 10.1016/j.bandc.2017.09.003.
- Alderson-Day B, Weis S, McCarthy-Jones S, Moseley P, Smailes D, Fernyhough C. The Brain's Conversation With Itself: Neural Substrates of Dialogic Inner Speech. Soc Cogn Affect Neurosci 2016, 11:110-120.
- Hodgetts S, Hausmann M, Weis S. High estradiol levels improve false memory rates and meta memory in highly schizotypal women. Psychiatry Research 2015, 229:708-714.
- Weis S, Hausmann M, Stoffers B, Sturm W. Dynamic changes in functional cerebral connectivity of spatial cognition during the menstrual cycle. Hum Brain Mapp 2011, 32:1544-1556.
- Weis S, Hausmann M, Kellermann T, Stoffers B, Vohn R, Sturm W. Estradiol modulates functional brain organization during the menstrual cycle: An analysis of interhemispheric inhibition. J Neurosci 2008; 28:13401-13410.

Svenja Caspers, PhD (Institut für Neurowissenschaften und Medizin, Germany)

Svenja Caspers is working in the field of systems neuroscience, with a particular focus on the brain's connectivity architecture in relation to its structure and function. For this, she combines state-of-the-art neuroimaging techniques, e.g. diffusion and resting-state magnetic resonance imaging, in-vivo and post-mortem, respectively, with high-resolution microscopic techniques for multi-level understanding of the fiber anatomy of the brain. A particular focus of her research is the variability of structure, function and connectivity in the aging brain in relation to environmental and genetic influences, investigated in large population-based cohorts such as 1000BRAINS and the German National Cohort, both of which she is responsibly involved in.

Svenja Caspers is full professor for Anatomy and is heading the Institute for Anatomy I of the Heinrich Heine University Düsseldorf (Germany). At the same time, she is deputy director and working group leader "Connectivity" at the Institute of Neuroscience and Medicine (INM-1) of the Research Centre Jülich (Germany). She has published around 50 publications and several book chapters and received several awards, among them the Young Investigator Award of the Anatomical Society. From 2013 to 2015, she was appointed member of the Young Seminar of the Northrhine-Westphalian Academy of Sciences and Arts (Germany).

Selected Publications:
- Bittner N, Jockwitz C, Mühleisen TW, Hoffstaedter F, Eickhoff SB, Moebus S, Bayen U, Cichon S, Zilles K, Amunts K, Caspers S. 2019. Combining lifestyle risks to disentangle brain structure and functional connectivity differences in older adults. Nat Commun 10: 621.
- Jockwitz C, Mérillat S, Liem F, Oschwald J, Amunts K, Caspers S*, Jäncke L*. 2019. Generalizing age effects on brain structure and cognition – a two-study approach. Hum Brain Mapp, epub ahead of print. *equal contribution*
- Richter M, Amunts K, Mohlberg H, Bludau S, Eickhoff SB, Zilles K, Caspers S. 2019. Cytoarchitectonic segregation of human posterior intraparietal and adjacent parieto-

occipital sulcus and its relation to visuomotor and cognitive functions. Cereb Cortex 29 (3): 1305-1327.
- Jockwitz C, Caspers S*, Lux S, Jütten K, Schleicher A, Eickhoff SB, Amunts K, Zilles K. 2017. Age- and function-related regional changes in cortical folding of the Default Mode Network in older adults. Brain Struct Funct 222: 83-99.

Alexandre Laurent (University of Bordeaux, France)

Alexandre studied applied mathematics and obtained a Master's degree in Statistical and Stochastic Modeling in 2012. Having a strong interest in programming, he has the ideal job profile to carry out the development of algorithms and computer software and statistics. He joined the GIN in January 2016. His first project focused on predicting hemispheric language specialization from functional data as well as resting-state data using Support Vector Machine. This resulted in a friendly-user program that allows the model to be easily launched on a distributed computing infrastructure such as the MCIA. After this and after a few weeks to manage the quality control and maintenance of the MRi-Share database acquisitions, he found himself involved in the WAIMEA project. The purpose of this project is to investigate brain anomalies such as white matter hyperintensities or dilated perivascular spaces that are potential early markers for late-life neurological disorders. To organize their collection and measurements, we need an automated procedure. The WAIMEA project aims to develop an algorithm for the automatic detection of these white matter anomalies.

Selected Publications:
- Zago, L., Hervé, P. Y., Genuer, R., Laurent, A., Mazoyer, B., Tzourio-Mazoyer, N., and Joliot, M. (2017) Predicting hemispheric dominance for language production in healthy individuals using support vector machine, Human brain mapping.
- Krol, A., Mauguen, A., Mazroui, Y., Laurent, A., Michiels, S., and Rondeau, V.(2017) Tutorial in joint modeling and prediction : A statistical software for correlated longitudinal outcomes, recurrent events and a terminal event, Journal of Statistical Software.
- Rondeau, V., Mauguen, A., Laurent, A., Berr, C., and Helmer, C. (2017) Dynamic prediction models for clustered and interval censored outcomes : Investigating the intra-couple correlation in the risk of dementia, Statistical methods in medical research.
- Mauguen, A., Rachet, B., Mathoulin-Pélissier, S., Lawrence, G. M., Siesling, S., MacGrogan, G., Laurent, A., and Rondeau,V.(2015). Validation of death prediction after breast cancer relapses using joint models, BMC Medical Research Methodology.

Laurent Petit, PhD (University of Bordeaux, France)

After a Ph.D. in Cognitive Sciences dealing with the anatomo-functional bases of the self-paced horizontal saccadic eye movements as revealed by Positron Emission Tomography in healthy humans (GIN, B. Mazoyer / LPPA, A. Berthoz), I made a first post-doctoral fellowship in 1995 in the Laboratory of Neurophysiology (A. Roucoux, Catholic University of Leuven, Belgium) and a second post-doctoral fellowship from 1996 to 1998 at NIMH in Bethesda (USA) in the Laboratory of Brain and Cognition (L. Ungerleider). Recruited at the CNRS in 1998 as a researcher in the GIN, today integrated in the IMN UMR 5293 in Bordeaux.

Specialist in cognitive neuroimaging, my early researches concerned the neural basis of eye movements (saccades, pursuit, fixation), and those of spatial attention and spatial working memory.My recent research focuses on the human hemispheric specialization and its anatomo-functional and cognitive underpinnings, a project ignited with the BIL&GIN cohort. The BIL&GIN database includes psychometric measurements, anatomical MRI, diffusion imaging (dMRI), neural bases of language and visuo-spatial functions, and functional resting-state data in 450 healthy subjects balanced for left and right handedness.

I'm currently working more particularly on the white matter connectivity by studying the structural connectome, *i.e.* the architecture of the brain's connectome, assessed with diffusion imaging-based tractography to provide information on the intra- and inter-hemispheric patterns of connectivity and their association with grey matter, and task-induced functional markers of hemispheric specialization.

Selected Publications:
- Sarubbo S, Petit L, De Benedictis A, Chioffi F, Ptito M, Dyrby TB (2019) Uncovering the inferior fronto-occipital fascicle and its topological organization in non-human primates: The missing connection for language evolution. Brain Structure and Function, in press.
- Chenot Q, Tzourio-Mazoyer N, Rheault F, Descoteaux M, Crivello F, Zago L, Mellet E, Jobard G, Joliot M, Mazoyer B, Petit L (2018) A population-based atlas of the human pyramidal tract in 410 healthy participants. Brain Structure and Function, in press.
- Mandonnet E, Sarubbo S, Petit L (2018) The nomenclature of human white matter association pathways: Proposal for a systematic taxonomic anatomical classification. Frontiers in Neuroanatomy 12:94.
- Maier-Hein KH et al. (2017) The challenge of mapping the human connectome based on diffusion tractography. Nature Communication 8:1349.

Marc Joliot, PhD (University of Bordeaux, France)

Marc Joliot, Ph.D., HDR, is a research director in multimodal biomedical imaging at the French Atomic Energy Commission (CEA) and co-head of the human brain connectome thematic in the "Groupe d'Imagerie Neurofonctionnelle" (GIN) a team of "Institut des Maladies Neurodégénératives" (IMN).

imary focus of research on the intrinsic connectivity observed in functional MRI in the resting state. The developed approach is based on multiscale modeling of the organization of this activity. This search has for object the study of the variability of this organization through the population. His second focus is on the development of new methodology in bioimaging data analysis and management: AAL atlas (Citation index of 9453), AICHA functional homotopic atlas, a Multi-scale Independent Component Clustering Algorithm (MICCA), the BIOMIST database. His third focus is on electromagnetic / hemodynamic and metabolic multimodal imaging.

Selected Publications:
- Chou YH, Sundman M, Whitson HE, Gaur P, Chu ML, Weingarten CP, Madden DJ, Wang L, Kirste I, Joliot M, Diaz MT, Li YJ, Song AW, Chen NK (2017) Maintenance and Representation of Mind Wandering during Resting-State fMRI. Scientific reports 7:40722.

- Allanic M, Herve PY, Pham QC, Lekkal M, Durupt A, Brial T, Grioche A, Matta N, Boutinaud P, Eynard B, Joliot M (2017) BIOMIST: A Platform for Biomedical Data Lifecycle Management of Neuroimaging Cohorts. Frontiers in ICT.
- Joliot M, Tzourio-Mazoyer N, Mazoyer B (2016) Intra-hemispheric intrinsic connectivity asymmetry and its relationships with handedness and language Lateralization. Neuropsychologia. doi : 10.1016/j.neuropsychologia.2016.03.013.
- Doucet G, Naveau M, Petit L, Zago L, Crivello F, Jobard G, Delcroix N, Mellet E, Tzourio-Mazoyer N, Mazoyer B, Joliot M (2012) Patterns of hemodynamic low-frequency oscillations in the brain are modulated by the nature of free thought during rest. Neuroimage 59:3194-3200.

Daniel Margulies, PhD (Institut de Cerveau et de la Moelle épinière, France)

Daniel Margulies is a tenured researcher with the Centre national de la recherche scientifique (CNRS) in Paris. He previously led the Neuroanatomy & Connectivity Research Group at the Max Planck Institute for Human Cognitive and Brain Sciences in Leipzig. He has worked at NYU and Humboldt University, and was awarded the Otto Hahn Medal for his doctoral dissertation (2010) and the Young Investigator Award from the Organization for Human Brain Mapping (2018). His research investigates the organization of large-scale brain networks, primarily through the analysis of intrinsic activity as measured with fMRI. He has developed approaches to define subregions within complex cortical areas, conducted cross-species comparative neuroanatomical studies, and related variation in these networks to phenotypic differences across individuals. His current research addresses the emergence of network topography and its relationship to cortical structure.

Selected Publications:
- Huntenburg JM, Bazin P-L, Margulies DS (2018). Large-Scale Gradients in Human Cortical Organization. *Trends Cogn Sci* 22(1): 21–31.
- Oligschlager S, Huntenburg JM, Golchert J, Lauckner ME, Bonnen T, Margulies DS (2017) Gradients of connectivity distance are anchored in primary cortex. *Brain Struct Funct* 222(5): 2173–2182
- Margulies DS, Ghosh SS, Goulas A, Falkiewicz M, Huntenburg JM, Langs G, Bezgin G, Eickhoff SB, Castellanos FX, Petrides M, Jefferies E, Smallwood J (2016). Situating the default-mode network along a principal gradient of macroscale cortical organization. *Proc Natl Acad Sci U S A* 113(44): 12574–12579
- Jakobsen E, Bottger J, Bellec P, Geyer S, Rubsamen R, Petrides M, Margulies DS (2016). Subdivision of Broca's region based on individual-level functional connectivity. *Eur J Neurosci* 43(4): 561–571

Emmanuel Mellet, MD, PhD (University of Bordeaux, France)

Emmanuel Mellet is research director at the CNRS, specialist in cognitive neuroimaging.After a MD (specialist in psychiatry), a PhD in neurosciences and a post-doctoral training at the Cycéron center in Caen, he was recruited at the CNRS in the GIN Group, now part of the IMN UMR 5293 in Bordeaux (Dir., E. Bezard).From 2003 to 2011, he was Professor of Neurosciences at the University of Caen Basse-Normandie and created and managed the Master's Degree in Neurosciences and Imaging of Health until 2010. He is research director at the CNRS since 2011 and a member of the National Committee of the CNRS (Brain, Cognition and Behavior) from 2012 to 2016.

As a specialist in cognitive neuroimaging, his early work focused on the neural bases of visual mental imagery, topographic memory and the relationships between verbal and visual representations at the brain and behavioural level. In particular, he shows how visual and language brain areas cooperate to build internal representations. He then worked on the relationships between manual laterality, hemispheric specialization and cognitive performances. He is now working on mental content during the resting state and is developing a theme on the evolution of cognitive functions in collaboration with archaeologists.

Selected Publications :
- Mellet, E., Salagnon, M., Majkic, A., Cremona, S., Joliot, M., Jobard, G. et al. (2018). Neuroimaging supports the representational nature of the earliest human engravings.
- Constant, M., & Mellet, E. (2018). The Impact of Handedness, Sex, and Cognitive Abilities on Left-Right Discrimination: A Behavioral Study. *Front Psychol*, *9*, 405.
- Mellet, E., Mazoyer, B., Leroux, G., Joliot, M., & Tzourio-Mazoyer, N. (2016). Cortical Asymmetries during Hand Laterality Task Vary with Hand Laterality: A fMRI Study in 295 Participants. *Front Hum Neurosci*, *10*, 628.
- Zago, L., Petit, L., Jobard, G., Hay, J., Mazoyer, B., Tzourio-Mazoyer, N. et al. (2017). Pseudoneglect in line bisection judgement is associated with a modulation of right hemispheric spatial attention dominance in right-handers. *Neuropsychologia*, *94*, 75-83.

Laure Zago, PhD (University of Bordeaux, France)

Laure Zago is a cognitive neuroscientist (CNRS) at the Neurofunctional Imaging Group within the Neurodegenerative Diseases Institute (UMR 5293, Team 5, CEA - CNRS - Université de Bordeaux, France). Her research interests concern the cerebral lateralization of visuospatial attention and number cognition. She develops three main projects in the field of hemispheric specialization. The first one concerns the study of the cerebral bases of spatial attention associated to attentional behavioral biases, called "pseudoneglect" in healthy subjects. The second project is aimed at investigating the cerebral bases of calculation in relationship with the cerebral lateralization of visuo-spatial processes and language. The third one is to evidence the different patterns of complementary hemispheric specialization of language and spatial attention, and to explore their effects on cognition in healthy subjects. She uses a multimodal approach by combining structural and functional neuroimaging data, cognitive and behavioral laterality data.

Selected publications :
- Ochando, A., & Zago, L. (2018). What Are the Contributions of Handedness, Sighting Dominance, Hand Used to Bisect, and Visuospatial Line Processing to the Behavioral Line Bisection Bias. *Frontiers in Psychology*, *9*. doi:10.3389/fpsyg.2018.01688
- Zago, L., Hervé, P.-Y., Genuer, R., Laurent, A., Mazoyer, B., Tzourio-Mazoyer, N., & Joliot, M. (2017a). Predicting hemispheric dominance for language production in healthy individuals using support vector machine. *Hum Brain Mapp*. doi:10.1002/hbm.23770
- Zago, L., Petit, L., Jobard, G., Hay, J., Mazoyer, B., Tzourio-Mazoyer, N., . . . Mellet, E. (2017b). Pseudoneglect in line bisection judgement is associated with a modulation of right hemispheric spatial attention dominance in right-handers. *Neuropsychologia*, *94*, 75-83. doi:10.1016/j.neuropsychologia.2016.11.024
- Zago, L., Petit, L., Mellet, E., Jobard, G., Crivello, F., Joliot, M., . . . Tzourio-Mazoyer, N. (2016). The association between hemispheric specialization for language production and for spatial attention depends on left-hand preference strength. *Neuropsychologia*, *93*, 394-406. doi:10.1016/j.neuropsychologia.2015.11.018

Ami Tsuchida, PhD (University of Bordeaux, France)

My long-term research interests are about understanding functional organization of the human brain, and learning the impacts of different kinds of lesions on local and global functional architectures of the brain, and how in turn they affect cognition. For my PhD at McGill University, I investigated the functional specialization of human frontal lobes through neuropsychological studies of a large number of patients with chronic, focal prefrontal lesion. I became interested in how the focal lesions may alter the network organizations of the brain. I went on do my postdoc training with Dr. Brenda Milner at the same university, to get trained in neuroimaging and methods to study intrinsic functional connectivity networks and their relation to individual variability in memory performance in healthy subjects. I joined the Neurofunctional Imaging Group (GIN) team at Bordeaux University in 2017 to work on a project to investigate the effects of small white matter lesions on the local white matter microstructure as well as on global intrinsic connectivity architecture. I am involved in the processing and management of the multi-modal neuroimaging data from the MRi-Share study, a database of 1,870 students enrolled in Bordeaux University. In particular, I have been responsible for the processing and analyses of anatomical data for morphometry and diffusion imaging data for investigation of structural connectivity and white matter microstructure.

Selected Publications:
- A Tsuchida and LK Fellows. Are core component processes of executive function dissociable within the frontal lobes? Evidence from humans with focal prefrontal damage. Cortex, 2012 49(7): 1790-1800
- A Tsuchida and LK Fellows. Are you upset? Distinct roles for orbitofrontal and lateral prefrontal cortex in detecting and distinguishing facial expressions of emotion. Cerebral Cortex, 2012 22(12): 2904-2912
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Neuroenergetics, or understanding how the brain produces energy to maintain its functions, has attracted much attention recently. From the improvement of cognitive performances through lifestyle changes (e.g. exercise and nutrition) to novel neuroprotective strategies against neurodegenerative diseases, it appears that neuroenergetics is central for several and diverse aspects of neurobiology. More particularly, studying the cellular links between neuronal activity and energy homeostasis is of utmost importance to elucidate the mechanisms of energy supply dictated by costly neuronal activity. It has also direct impact for neuroprotection

Selected Publications:
- The metabolism of [3-(13)C]lactate in the rat brain is specific of a pyruvate carboxylase-deprived compartment. Bouzier AK, Thiaudiere E, Biran M, Rouland R, Canioni P, Merle M. J Neurochem. 2000 Aug;75(2):480-6.
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- Glucose and lactate metabolism in C6 glioma cells: evidence for the preferential utilization of lactate for cell oxidative metabolism. Bouzier AK, Voisin P, Goodwin R, Canioni P, Merle M. Dev Neurosci. 1998;20(4-5):331-8.
- Compartmentation of lactate and glucose metabolism in C6 glioma cells. A 13c and 1H NMR study. Bouzier AK, Goodwin R, de Gannes FM, Valeins H, Voisin P, Canioni P, Merle M. J Biol Chem. 1998 Oct 16;273(42):27162-9.

Cameron Craddock, PhD (Austin, USA)

R. Cameron Craddock, PhD, is a computer engineer who combines an extensive R. Cameron Craddock, PhD, is a computer engineer who combines an extensive knowledge of MRI acquisition and analysis methods with computational sciences to research the impact of development and mental health disorders on brain function. He obtained his undergraduate and graduate degrees in the department of Electrical and Computer Engineering at Georgia Tech and completed post-doctoral fellowships at Baylor College of Medicine and the Virginia Tech Carilion Research Institute. Dr. Craddock spent 5 years in New York City working at the Child Mind Institute and Nathan S. Kline Institute for Psychiatric Research before joining the Department of Diagnostic Medicine in the Dell Medical School at The University of Texas at Austin in 2017

Selected Publications:
- Assessment of the impact of shared brain imaging data on the scientific literature. Milham MP, Craddock RC, Son JJ, Fleischmann M, Clucas J, Xu H, Koo B, Krishnakumar A, Biswal BB, Castellanos FX, Colcombe S, Di Martino A, Zuo XN, Klein A. Nat Commun. 2018 Jul 19;9(1):2818
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- The Healthy Brain Network Serial Scanning Initiative: a resource for evaluating inter-individual differences and their reliabilities across scan conditions and sessions.
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