

TRAIL

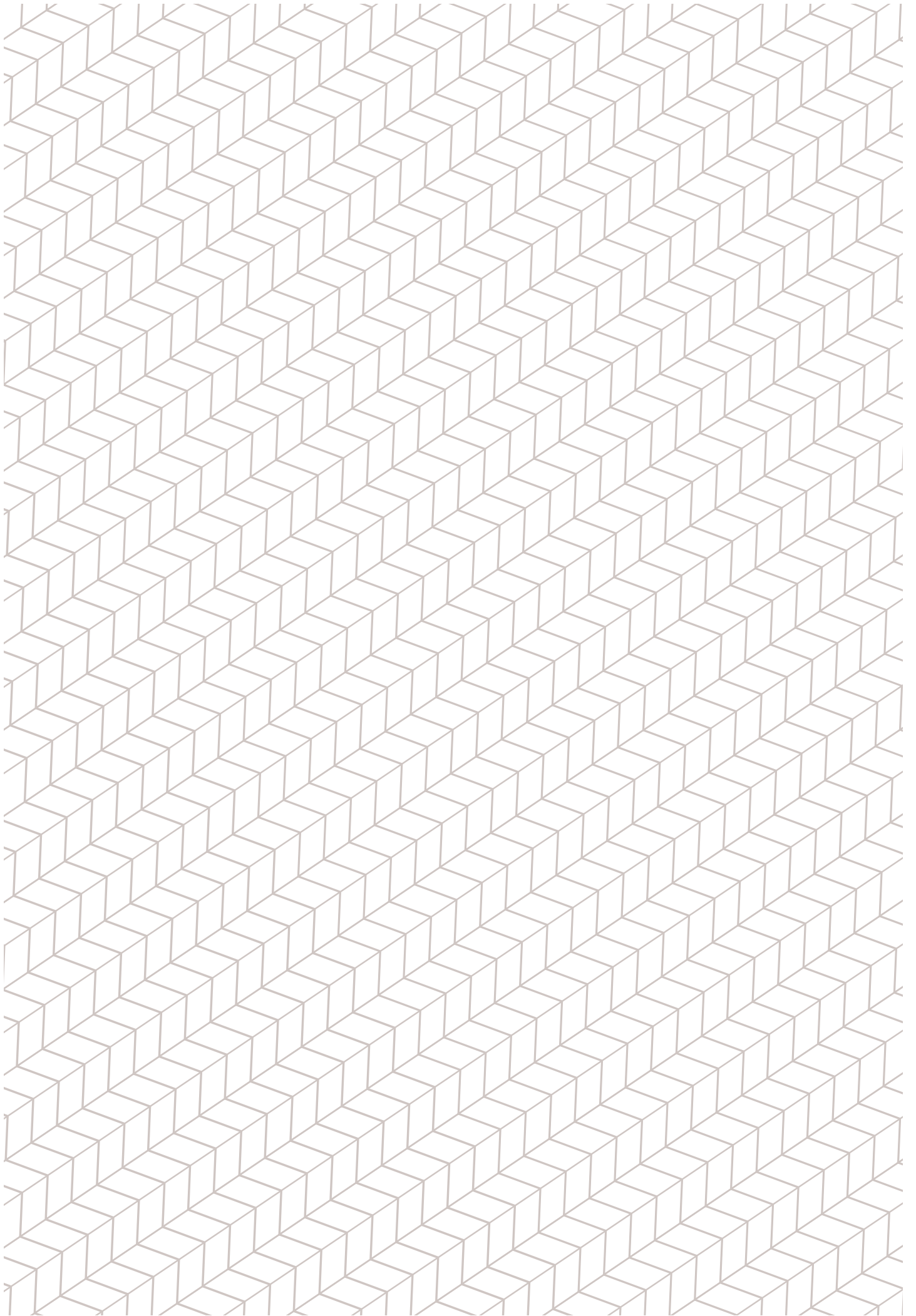
Translational Research and Advanced Imaging Laboratory
2011 - 2016 Achievements



université
de BORDEAUX



Instituts
thématiques
Inserm
Institut national
de la santé et de la recherche médicale



Research



260
scientists



34
funded research projects
(5.4 M€)



10
top level research
teams



89
publications quoting
TRAIL



10
patents

Research projects

MOD

Mathematical modeling of the response to antiangiogenic drugs via medical imaging, 2013, 380 000 € (onco)

ARM

Automatic assessment of Radiofrequency ablation Margins, 2016, 150 000 € (onco)

NEKOMRI

MRI sequence for bronchial wall segmentation and analysis, 2014, 35 000 € (pneumo)

HETEROMRMAP

MR mapping of renal function heterogeneity to characterize parenchymal nephropathies, 2016, 50 000 € (nepbro)

BIOPSYPROSTAPROBE

Antibody-based fluorescence probe for biopsy guidance of prostate cancer, 2014, 35 000 € (onco)

GMCOG

Grey matters! Toward a better understanding of grey matter alteration and cognitive deficit associated with multiple sclerosis, 2016, 200 000 € (neuro)

IPALICA

Inflammatory pathways leading to intracranial aneurysm growth, 2015, 35 000 € (neuro)

STEAMRI

Whole lung oxygen-enhanced imaging in humans using MRI, 2016, 40 000 € (pneumo)

ABACI

Automated Brain anatomy softwares for cohort imaging, 2012, 314 830 € (neuro)

ACTE

Cognitive training and brain functional connectivity, 2012, 130 000 € (neuro)

TRAIL&TRACKS

Atlasing white matter tracts, 2011, 97 500 € (neuro)

ADPP

Brain Topology of AD presymptomatic phase, 2015, 30 000 € (neuro)

COBRASCAN

Quantitative computed tomography for phenotyping COPD within COBRA cohort, 2013, 234 448 € (pneumo)

HIFU

Alteration of the blood brain barrier induced by HIFU, 2012, 30 000 € (onco)

MRGHIFU

Methodological developments for applications of HIFU in cardiology and oncology, 2013, 400 000 € (cardio-onco)

HR-DTI

Developping High-Resolution DTI method, 2012, 130 000 € (neuro)

MDMRI

Methodological Developments in High Spatial/Angular-resolution DTI for ex-vivo validation of tractography, 2016, 49 600 € (neuro)

NEWFISP

Improving MRI resolution to correctly MRI-diagnose cardiac pathologies and metastases, 2012, 250 000 € (cardio-onco)

TRAILDNP

To improve in vivo DNP in mice at 0.2T, 2011, 242 500 € (neuro)

ONCOFLUX

Metabolic flux MR imaging in tumors, 2013, 240 000 € (onco)

FITTING

¹⁸F-Bioorthogonal probe for imaging traumatic brain injury glycol-biomarkers, 2016, 48 800 € (neuro)

TARGLIN

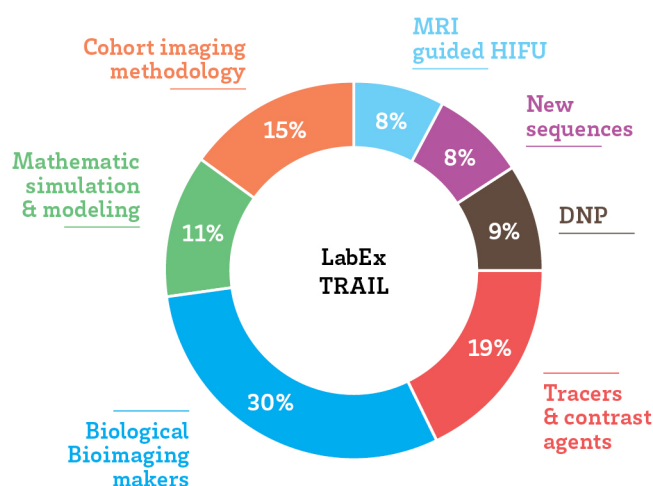
Imaging siRNA targeting of glioblastoma using peptide-based nanoparticles, 2015, 150 000 € (onco)

NEPMIP

NanoEmulsion Platform for Magnetic Particle Imaging, 2015, 35 000 € (cardio)

NANOMULTIMAG

Smart multimodal nanoprobe for MRI/MPI/NIRF imaging with magneto/optical contrast agents for atheroma plaque targeting, 2016, 150 000 € (cardio)



TBI

Longterm neurovascular unit changes after mild traumatic brain injury: potential biomarker & Vasc-TBI, 2015, 150 000 € (neuro)

IBIO-NI

New Imaging Biomarkers of neuroinflammation such as MS, 2012, 310 654 € (neuro)

INNES

Lactate and neuronal metabolism, 2011, 300 579 € (neuro)

TRANSFEAR

Cerebral structure changes involved in pathological fear recovery, 2012, 130 000 € (neuro)

MIMATHUMAB

Molecular Imaging of Atheroma with Human Antibody, 2012, 295 000 € (cardio)

SCICOG&REACTIV

Imaging biomarker in MS, 2011, 130 000 € (neuro)

IMMELAPT

Detecting tumors using SPECT molecular imaging and optimized aptamers, 2012, 250 000 € (onco)

PRITOR

NeuroPeptide Receptors Imaging for TumOR Targeting, 2013, 90 000 € (onco)

SUPSIFLU

Supported Silyl Fluorination, 2013, 130 000 € (onco)

PIAF

¹⁸F for PET-imaging angiogenesis, 2011, 164 000 € (onco)

Publications

WP1 - MR Guided HIFU

° MRGHIFU : Methodological developments for preclinical & clinical applications of MR guided HIFU

Non-invasive cardiac pacing with image-guided focused ultrasound.

F. Marquet, P. Bour, F. Vaillant, S. Amraoui, R. Dubois, P. Ritter, M. Haïssaguerre, M. Hocini, O. Bernus & B. Guesson .
Nature Scientific Report, Oct 16.

Improved cardiac magnetic resonance thermometry and dosimetry for monitoring lesion formation during catheter ablation.

V. Ozenne, S. Toupin, P. Bour, B. Denis de Senneville, M. Lepetit-Coiffe, M. Boissenin, J. Benois-Pineau, M. S. Hansen, S. J. Inati, A. Govari, P. Jais and B. Guesson. Magnetic Resonance in Medicine, 2016 Feb 21.

WP2 - New Sequences

° HR-DTI: Developing High-Resolution DTI method

VolBrain : An Online MRI Brain Volumetry System.

José V. Manjón and Pierrick Coupé, Frontiers in Neuroinformatics, July 2016.

Automatic thalamus and hippocampus segmentation from MP2RAGE: comparison of publicly available methods and implications for DTI quantification.

Erhard Næss-Schmidt, Anna Tietze, Jakob Udby Blicher, Mikkel Petersen, Irene K. Mikkelsen, Pierrick Coupé, José V. Manjón, Simon Fristed Eskildsen, International Journal of Computer Assisted Radiology and Surgery, June 2016.

Fasudil treatment in adult reverses behavioural changes and brain ventricular enlargement in Oligophrenin-1 mouse model of intellectual disability.

H. Meziane, M. Khelfaoui, N. Morello, B. Hiba, E. Calcagno, S. Reibel-Foisset, M. Selloum, J. Chelly, Y. Humeau, F. Riet, G. Zanni, Y. Herault, T. Bienvenu, M. Giustetto and P. Billuart, Human Molecular Genetics, May 2016.

Non Local Spatial and Angular Matching: Enabling higher spatial resolution diffusion MRI datasets through adaptive denoising.

S. St-Jean, P. Coupé, M. Descoteaux, Medical Image Analysis, March 2016.

Detection of brain tumors and systemic metastases using nanoLuc and Fluc for dual reporter imaging.

C. Germain-Genevois, O. Garandeau, F. Couillaud. Mol Imaging Biol., 2016 Feb;18(1):62-9.

MRI Noise Estimation and Denoising Using Non-local PCA.

J. V. Manjon, P. Coupé, A. Buades. Medical image analysis, 22(1): 35-47, 2015.

NABS: Non-local Automatic Brain Hemisphere Segmentation.

J. E. Romero, J. V. Manjon, J. Tohka, P. Coupé, M. Robles. Magnetic Resonance Imaging, 33(4): 474-484, 2015

Rotation-invariant multi-contrast non-local means for MS lesion segmentation.

N. Guizard, P. Coupé, V. Fonov, J. V. Manjon, A. Douglas, D. L. Collins. Neuroimage: Clinical, 8: 376-389, 2015.

An Optimized PatchMatch for Multi-scale and Multi-feature Label Fusion.

R. Giraud, V-T. Ta, N. Papadakis, J. V. Manjón, D. L. Collins, P. Coupé and ADNI. NeuroImage 2015.

Detection of Alzheimer's Disease Signature in MR Images Seven Years Before Conversion to Dementia: Toward an Early Individual Prognosis.

P. Coupé, V. S. Fonov, C. Bernard, A. Zandifar, S. F. Eskildsen, C. Helmer, J. V. Manjón, H. Amieva, J-F. Dartigues, M. Allard, G. Catheline, D. L. Collins, and ADNI. Human Brain Mapping, 2015.

Publications

Non-local means inpainting of MS lesions in longitudinal image processing.

N. Guizard, K. Nakamura, P. Coupé, V. S. Fonov, D. L. Arnold, D. L. Collins, *Frontiers In Neuroscience*, nov 2015.

Anatomically Constrained Weak Classifier Fusion for Early Detection of Alzheimer's Disease.

M. Komlagan, VT Ta, X. Pan, JP Domenger, D. Louis Collins, P. Coupé, and the Alzheimer's Disease Neuroimaging Initiative. *Machine Learning in Medical Imaging*, 141-148, 2014.

Optimized PatchMatch for Near Real Time and Accurate Label Fusion.

Vinh-Thong Ta, Rémi Giraud, D. Louis Collins, and Pierrick Coupé. *MICCAI*, 105-112, 2014.

° NEWFISP: Improving MRI resolution to correctly MRI-diagnose cardiac pathologies and metastases

Fast 3D Ultrashort Echo-Time Spiral Projection Imaging Using Golden-Angle: A Flexible Protocol for In Vivo Mouse Imaging at High Magnetic Field.

C. R. Castets, W. Lefrançois, D. Wecker, E. J. Ribot, A. J. Trotier, E. Thiaudiere, JM Franconi, and S. Miraux. *Magnetic Resonance in Medicine*, May 2016.

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.

A. J. Trotier, C. R. Castets, W. Lefrançois, E. J. Ribot, JM Franconi, E. Thiaudiere, and S. Miraux. *Journal of Magnetic Resonance Imaging*, jan 2016.

Free-breathing 3D diffusion MRI for high-resolution hepatic, metastasis characterization in small animals.

E. J. Ribot, A. J. Trotier, C. R. Castets, B. Dallaudiere, E. Thiaudiere, JM Franconi, S. Miraux, *Clin Exp Metastasis*, nov 2015.

Fast and robust 3D T1 mapping using spiral encoding and steady RF excitation at 7T: application to cardiac manganese enhanced MRI (MEMRI) in mice.

C. R. Castets, E. J. Ribot, W. Lefrançois, A. J. Trotier, E. Thiaudière, JM Franconi and S. Miraux. *NMR in Biomedicine*, mars 2015.

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P. Coupé, J. V. Manjón, M. Chamberland, M. Descoteaux, B. Hiba. *NeuroImage* 83, 245-261, 2013.

Diffusion weighted image denoising using overcomplete local PCA.

J. V. Manjon, P. Coupé, L. Concha, A. Buades, D. Louis Collins, M. Robles. *PLoS One*, Volume 8, Issue 9, Sept 2013.

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.

A. J. Trotier, W. Lefrançois, K. Van Renterghem, JM Franconi, E. Thiaudière and S. Miraux, *Journal of Cardiovascular Magnetic Resonance*, 2015.

Water Selective Imaging and bSSFP Banding Artifact Correction in Humans and Small Animals at 3T and 7T, Respectively.

E. J. Ribot, D. Wecker, A. J. Trotier, B. Dallaudière, W. Lefrançois, E. Thiaudière, JM Franconi, S. Miraux, *PLOS ONE*, 2015.

Self-gated bSSFP sequences to detect iron-labeled cancer cells and/or metastases in vivo in mouse liver at 7 Tesla.

E. J. Ribot, T. J. Duriez, A. J. Trotier, E. Thiaudiere, JM Franconi, and S. Miraux. *J Magn Reson Imaging*. June 2014.

Time-resolved TOF MR angiography in mice using a prospective 3D radial double golden angle approach.

A. J. Trotier, W. Lefrançois, E. J. Ribot, E. Thiaudiere, JM Franconi, and S. Miraux. *Magn Reson Med*. Mar 2014.

WP3 - Dynamic Nuclear Polarization

° TRAILDNP: To improve in vivo DNP in mice at 0.2 T

Enzymatically Shifting Nitroxides for EPR spectroscopy and Overhauser-Enhanced Magnetic Resonance Imaging.

G. Audran, L. Bosco, P. Bremond, JM Franconi, N. Koonjoo, S. Marque, P. Massot, P. Mellet, E. Parzy, and E. Thiaudiere. *Angew. Chem.* 2015.

In vivo Overhauser-enhanced MRI of proteolytic activity.

Koonjoo N, Parzy E, Massot P, Lepetit-Coiffé M, Marque SR, Franconi JM, Thiaudiere E, Mellet P. *Contrast Media Mol Imaging*, sep 2014

Alkoxyamines: toward a new family of theranostic agents against cancer.

Moncelet D, Voisin P, Koonjoo N, Bouchaud V, Massot P, Parzy E, Audran G, Franconi JM, Thiaudiere E, Marque SR, Brémond P, Mellet P. *Mol Pharm*, july 2014.

Overhauser-enhanced MRI of elastase activity from in vitro human neutrophil degranulation.

E. Parzy, V. Bouchaud, P. Massot, P. Voisin, N. Koonjoo, D. Moncelet, J.M. Franconi, E. Thiaudiere, and P. Mellet. *PLoS One.* 2013.

WP4 - Tracers and contrast agents

° PIAF: 18F for PET-imaging angiogenesis

General Last-Step Labeling of Biomolecule-Based Substrates by [12C], [13C], and [11C] Carbon Monoxide.

T. Cornilleau, H. Audrain, A. Guillemet, P. Hermange and E. Fouquet. *Org. Lett.* 2015.

Pd⁰-catalyzed methyl transfer on nucleosides and oligonucleotides envisaged as a PET tracer.

E. Fouquet et al. *Molecules*, 2013.

[18F]Si-RiboRGD : the winning combination. From the design and the synthesis to the imaging of avb3 integrins in melanoma tumors.

E Amigues, J Schulz, M Szlosek-Pinaud, P Fernandez, S Silvente-Poirot, S Brillouet, F Courbon and E Fouquet. *ChemPlusChem*, 2012.

° ONCOFLUX : Metabolic flux MR imaging in tumors

MR imaging, targeting and characterization of pulmonary fibrosis using intra-tracheal administration of gadolinium-based nanoparticles.

N. Tassali, A. Bianchi, F. Lux, G. Raffard, S. Sanchez, O. Tillement and Y. Crémillieux. *Contrast Media and Molecular Imaging*, May 2016.

In vivo online magnetic resonance quantification of absolute metabolite concentrations in microdialysate.

S. Glögger, S. Rizzitelli, N. Pinaud, G. Raffard, V. Zhendre, V. Bouchaud, S. Sanchez, G. Radecki, L. Ciobanu, A. Wong, Y. Crémillieux. *Nature Scientific Reports*, Nov 2016.

° TARGLIN : Imaging siRNA targeting of glioblastoma using peptide-based nanoparticles

In Vivo Follow-up of Brain Tumor Growth via Bioluminescence Imaging and Fluorescence Tomography.

Genevois C, Loiseau H and Couillaud F. *International Journal of Molecular Sciences*, Oct 2016.

Publications

° NANOMULTIMAG : Smart multimodal nanoprobe for MRI/MPI/NIRF imaging with magneto/optical contrast agents for atheroma plaque targeting.

Z-Shaped Pyrrolo[3,2-b]pyrroles and Their Transformation into p-Expanded Indolo[3,2-b]indoles.

R. Stezycki, M. Grzybowski, G. Clermont, M. Blanchard-Desce and D. T. Gryko. *Chemistry a European Journal*, Feb 2016.

In vitro imaging of b-cells using fluorescent cubic bicontinuous liquid crystalline nanoparticles.

V. Miceli, V. Meli, M. Blanchard-Desce, T. Bsaibess, M. Pampalone, P. G. Conaldi, C. Caltagirone, M. Obiols-Rabasa, J. Schmidt, Y. Talmon, A. Casu and S. Murgia. *RCS Advances*, June 2016.

Bright Electrogenated Chemiluminescence of a Bis-Donor Quadrupolar Spirofluorene Dye and Its Nanoparticles.

H. Li, J. Daniel, JB Verlhac, M. Blanchard-Desce and N. Sojic. *Chemistry a European Journal*, July 2016.

° IMMELAPT : Detecting tumors using SPECT molecular imaging and optimized aptamers

Ex Vivo and In Vivo Imaging and Biodistribution of Aptamers Targeting the Human Matrix MetalloProtease-9 in Melanomas,

D. Kryza, F. Debordeaux, L. Azéma, A. Hassan, O. Paurelle, J. Schulz, C. Savona-Baron, E. Charignon, P. Bonazza, J. Taleb, P. Fernandez, M. Janier, JJ Toulmé. *PlosOne*, Feb 2016.

° SUPSIFLU: Supported Silyl Fluorination

Gold-catalysed cross-coupling between aryldiazonium salts and arylboronic acids: probing the usefulness of photoredox conditions.

T. Cornilleau, P. Hermange and E. Fouquet. *Chem Communication*, July 2016.

° PRITOR: NeuroPeptide Receptors Imaging for TumOR Targeting

Comparison between Three Promising β -emitting Radionuclides, (67)Cu, (47)Sc and (161)Tb, with Emphasis on Doses Delivered to Minimal Residual Disease.

Champion C, Quinto MA, Morgat C, Zanotti-Fregonara P, Hindié E. *Theranostics*. 2016 Jun.

Dose Deposits from 90Y, 177Lu, 111In, and 161Tb in Micrometastases of Various Sizes: Implications for Radiopharmaceutical Therapy.

Hindié E, Zanotti-Fregonara P, Quinto MA, Morgat C, Champion C., *J Nucl Med*. 2016 May.

A new class of radiopeptides for PET imaging of neuromedin-B receptor: 68Ga-ranatensin analogs.

C. Morgat, R. Varshney, D. Vimont, C. Savona-Baron, C. Riès, C. Chanseau, S. Bertrand, A. K. Mishra, E. Hindié, P. Fernandez and J. Schulz. *Med Chem Commun.*, April 2016.

Evaluation of 68Ga-DOTA-TOC PET/CT for the detection of duodenopancreatic neuroendocrine tumors in patients with MEN1.

C. Morgat, F.L. Vélayoudom-Céphise, P. Schwartz, M. Guyot, D. Gay, D. Vimont, J. Schulz, J. Mazère, ML Nunes, D. Smith, E.Hindié P. Fernandez, A. Tabarin, *EJNMMI*, jan 2016.

Targeting neuropeptides receptors for cancer imaging and therapy: Perspectives with bombesin, neurotensin and neuropeptide-Y receptors.

Morgat C, Mishra A.K, Varshney R, Allard M, Fernandez P, Hindié E. *J Nucl Med*. 2014.

A phantom-based method to standardize dose-calibrators for new emitters: 68Ga as demonstrative working example.

Morgat C, Mazère J, Fernandez P, Buj S, Vimont D, Schulz J, Lamare F. *Nucl Med Commun*. 2014.

WP5 - Bioimaging markers

° GMCOG : Towards a better understanding of grey matter alteration and cognitive deficit associated with multiple sclerosis.

In Vivo 7T MR Quantitative Susceptibility Mapping Reveals Opposite Susceptibility Contrast between Cortical and White Matter Lesions in Multiple Sclerosis.

X W. Bian, X E. Tranvinh, X T. Tourdias, X M. Han, X T. Liu, X Y. Wang, X B. Rutt, and X M.M. Zeineh. *AJNR*, oct 2016.

Selective dentate gyrus disruption causes memory impairment at the early stage of experimental multiple sclerosis.

V. Planche, A. Panatier, B. Hiba, E. Ducourneau, G. Raffard, N. Dubourdieu, M. Maitre, T. Lesté-Lasserre, B. Brochet, V. Dousset, A. Desmedt, S.H. Oliet, T. Tourdias. *Brain Behavior and Immunity*, dec 2016.

Publications

° **BIOPSYPROSTAPROBE : Antibody-based fluorescence probe for biopsy guidance of prostate cancer**

In vivo imaging of prostate cancer using an anti-PSMA scFv fragment as a probe.

Mazzocco C, Fracasso G, Germain-Genevois C, Dugot-Senant N, Figini M, Colombatti M, Grenier N & Couillaud F, Scientific Reports 6, 23314, Mar 2016.

° **IBIO-NI: New Imaging Biomarkers of neuroinflammation such as MS**

Cervical spinal cord DTI is improved by reduced-FOV with specific balance between numbers of diffusion gradient directions and numbers of averages.

A Crombé, N Alberti, B Hiba, V Dousset, T Tourdias, AJNR, May 2016.

Early Fiber Number Ratio Is a Surrogate of Corticospinal Tract Integrity and Predicts Motor Recovery After Stroke,

Antoine Bigourdan, F. Munsch, P. Coupé, C. R.G. Guttmann, S. Sagnier, P. Renou, S. Debruxelles, M. Poli, V. Dousset, I.Sibon, T. Tourdias, Stroke, March 2016.

Stroke location is an independent predictor of cognitive outcome.

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Ruet A, Hamel D, Deloire MS, Charré-Morin J, Saubusse A, Brochet B. J Neurol Sci. oct. 2014.

Hippocampal microstructural damage and memory impairment in clinically isolated syndrome.

Planche V at al. MS journal., oct 2016.

° **DIMI : Imaging myelin volum in MS patients**

Neuroinflammatory imaging biomarkers : Relevance to Multiple Sclerosis and its therapy.

Thomas Tourdias and Vincent Dousset. Neurotherapeutics. 2013.

° **INNES: Lactate and neuronal metabolism**

Evaluation of a high-resolution micro-sized magic angle spinning (HRMAS) probe for NMR-based metabolomic studies of nanoliter samples.

N. Tuan Duong, Y. Endo, T. Nemoto, H. Kato, AK Bouzier-Sore, Y. Nishiyama and A. Wong. Analytical Method, Aug 2016.

High-resolution NMR-based metabolic detection of microgram biopsies using a 1-mm HRMAS prototype probe.

Y. Nishiyama, Y. Endo, T. Nemoto, AK Bouzier-Sore and A. Wong. Analyst, oct 2015.

Rapid adaptation of rat brain and liver metabolism to a ketogenic diet: an integrated study using ¹H- and ¹³C-NMR spectroscopy.

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Uncertainties in pentose-phosphate pathway flux assessment underestimate its contribution to neuronal glucose consumption: relevance for neurodegeneration and aging.

AK Bouzier-Sore and J. P. Bolaños, Front Aging Neurosci. 2015.

¹³C-NMR spectroscopy applications to brain energy metabolism.

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Glucose and lactate metabolism in the awake and stimulated rat: a (¹³C)-NMR study.

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° **MIMATHUMAB: Molecular Imaging of Atheroma with Human Antibody**

A Recombinant Human Anti-platelet scFv Antibody Produced in Pichia pastoris for Atheroma Targeting.

A. Vallet-Courbin, M. Larivière, A. Hocquellet, A. Hemadou, SN. Parimala, J. Laroche-Traineau, X. Santarelli, G. Clofent-Sanchez, MJ Jacobin-Valat and A. Noubhani. PLoS ONE, dec 2016.

Solid Lipid Nanoparticles for Image-Guided Therapy of Atherosclerosis,

K. Oumzil, Michael A. Ramin, C. Lorenzato, A. Hémadou, J. Laroche, MJ. Jacobin-Valat, S. Mornet, CE. Roy, T. Kauss, K. Gaudin, G. Clofent-Sanchez, and P. Barthélémy, Bioconjugate Chemistry, jan 2016.

Publications

Nanoparticles functionalised with an anti-platelet human antibody for in vivo detection of atherosclerotic plaque by Magnetic Resonance Imaging.

M.J Jacobin-Valat, J. Laroche-Traineau, M. Larivière, S. Mornet, S. Sanchez, M. Biran, C. Lebaron, J. Boudon, S. Lacomme, M. Cérutti, G. Clofent-Sanchez. *Nanomedicine: Nanotechnology, Biology, and Medicine*, 2014.

° **SCICOG & REACTIV: Imaging biomarker in MS**

Cognitive evaluation by tasks in a virtual reality environment in multiple sclerosis.

D Lamargue-Hamel D, Deloire M, Saubusse A, Ruet A, Taillard J, Philip P, Brochet B. *J Neurol Sci*, dec.2015.

Deciphering depressive mood in relapsing-remitting and progressive multiple sclerosis and its consequences on quality of life.

D. Lamargue Hamel, M. Deloire, A. Ruet, J. Charré-Morin, A. Saubusse, JC Ouallet, B. Brochet. *PLOS ONE*, dec. 2015

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Posterior lobules of the cerebellum and information processing speed at various stages of multiple sclerosis.

Moroso A et al. *JNNP journal*, oct 2016.

° **TBI : Longterm neurovascular unit changes after mild traumatic brain injury : potential biomarker.**

Chronic cerebrovascular dysfunction after traumatic brain injury.

Jullienne A, Obenaus A, Ichkova A, Savona-Baron C, Pearce WJ, Badaut J. *J Neurosci Res*. Jul 2016.

Improved long-term outcome after transient cerebral ischemia in aquaporin-4 knockout mice.

L. Hirt, A. M Fukuda, K. Ambadipudi, F. Rashid, D. Binder, A. Verkman, S. Ashwal, A. Obenaus and J. Badaut. *JCBFM*, janvier 2016.

° **TRANSFEAR: Cerebral structure changes involved in pathological fear recovery**

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F. Wurtz, El-Khoury-Malhame, Wilhelm Michael, Beetz Roques, Reynaud, Courtin, Khalfa, C. Herry, *Neuroscience*, May 2016.

4-Hz oscillations synchronize prefrontal-amygdala circuits during fear behavior.

N. Karalis, C. Dejean, F. Chaudun, S. Khoder, R. Rozeske, H. Wurtz, S. Bagur, K. Benchenane, A. Sirota, J. Courtin & C. Herry. *Nature Neurosciences*, Feb 2016.

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C. Dejean, J. Courtin, R. Rozeske, M. C. Bonnet, V. Dousset, T. Michelet, and C. Herry. *Biological Psychiatry* Sep, 2015.

° **BIOIMAGING MARKERS ARTICLES**

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N. Grenier, P. Merville and C. Combe, *Nature Reviews Nephrology*, April 2016.

Multiple sclerosis lesions are better detected with 3D T1 gradient echo than with 2D T1 spin echo gadolinium enhanced imaging at 3 Tesla.

Crombe A, Saranathan M, Ruet A, Durieux M, Roquefeuil E, Ouallet JC, Brochet B, Dousset V, Tourdias T. *AJNR Am J Neuroradiol* 2015 Mar.

Optimization of white matter nulled magnetization prepared rapid gradient echo (MP-RAGE) imaging.

Saranathan M, Tourdias T, Bayram E, Ghanouni P, Rutt BK. *Magn Reson Med* 2014 May.

Optimization of Magnetization-Prepared 3-Dimensional Fluid Attenuated Inversion Recovery Imaging for Lesion Detection at 7T.

Saranathan M, Tourdias T, Kerr AB, Berstein JD, Kerchner GA, Han MH, Rutt BK. *Investigative Radiology* 2014 May.

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Tourdias T, Saranathan M, Levesque IR, Su J, Rutt BK. *Neuroimage*, 2014 Jan.

Publications

WP6 – Mathematical simulation and modeling

◦ MOD: Mathematical modeling of the response to antiangiogenic drugs via medical imaging

Modeling of Tumor Drug Resistance : the case of GIST Liver Metastase.

Lefebvre G., Cornelis F., Cumsille P., Colin T., Poignard C., Saut O. Spatial. Mathematical Medicine & Biology, March 2016.

Computational Trials: Unraveling Motility Phenotypes, Progression Patterns, and Treatment Options for Glioblastoma Multiforme. F. Raman, E. Scribner, O. Saut, C. Wenger, T. Colin, H. M. Fathallah-Shaykh, PlosOne, jan 2016.

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E. Baratchart, S. Benzekry, A. Bikfalvi, T. Colin, L. S. Cooley, R. Pineau, E. Ribot, O. Saut, W. Souleyreau. PlosOne Nov 2015.

Patient-specific simulation of tumor growth, response to the treatment, and relapse of a lung metastasis: a clinical case.

T. Colin, F. Cornelis, J. Jouganous, J. Palussière and O. Saut . Journal of Computational Surgery, 2015.

WP7 – Cohort imaging methodology

◦ ADPP: Supported Silyl Fluorination

Age-Related Modifications of Diffusion Tensor Imaging Parameters and White Matter Hyperintensities as Inter-Dependent Processes. A. Pelletier, O. Periot, B. Dilharreguy, B. Hiba, M. Bordessoules, S. Chanraud, K. Pérès, H. Amieva, JF. Dartigues, M. Allard and G. Catheline. Frontiers in Aging Neurosciences, jan 2016.

Activity/rest cycle and disturbances of structural backbone of cerebral networks in aging.

M. Baillet, B. Dilharreguy, K. Pérès, JF. Dartigues, W. Mayo, G. Catheline. Neuroimage, Sept 2016.

◦ COBRASCAN : Quantitative computed tomography for phenotyping COPD within COBRA cohort

Lung morphology assessment of cystic fibrosis using MRI with ultra-short echo time at submillimeter spatial resolution.

G. Dournes, F. Menut, J. Macey, M. Fayon, JF Chateil, M Salel, O. Corneloup, M Montaudon, P. Berger, F. Laurent. Eur Radiol, feb 2016.

Quiet Submillimeter MR Imaging of the Lung Is Feasible with a PETRA Sequence at 1.5 T1.

G. Dournes, D. Grodzki, J. Macey, PO Girodet, M. Fayon, JF. Chateil, M. Montaudon, P. Berger, F. Laurent. Radiology, july 2015.

CT evaluation of small pulmonary vessels area in patients with COPD with severe pulmonary hypertension.

F. Coste, G. Dournes, C. Dromer, E. Blanchard, V. Freund-Michel, PO Girodet, M. Montaudon, F. Baldacci, F. Picard, R. Marthan, P. Berger, F. Laurent. Thorax, april 2016.

◦ ACTE : Ambulatory Cognitive Training in Elderly

Neuroimaging and Alcoholism.

Chanraud S, Bernard C. Annales Médico-Psychologiques 2015.

Compensatory recruitment of neural resources in chronic alcoholism.

Chanraud S. and Sullivan EV. Handbook of Clinical Neurology, Vol. 125, 2014.

CARDIOLOGY

"Antibodies for molecular imaging of vulnerable plaques in atherosclerosis."

Number and publication date : WO2013072438 - 23/05/2013.

Inventors : Gisèle Clofent-Sanchez, Kamel Deramchia, Marie-Josée Jacobin, Stéphane Bonetto, Jeanny Traineau.

"Method for fat quantification in a region of the heart."

Number and publication date : WO2015165978 - 05/11/2015.

Inventors : Hubert Cochet, Pierre Jaïs.

"Method to control a target area of the heart, ablation method of target area of the heart, associated system"

Number and publication date : WO2016034594 - 10/03/2016.

Inventors : Fabrice Marquet, Pierre Bour, Bruno Quesson, Fanny Vaillant.

"Method to control focused ultrasound calibration for cardiac stimulation, cardiac stimulation method, associated systems and devices."

Number and publication date : WO2016034590 - 10/03/2016.

Inventors : Fabrice Marquet, Pierre Bour, Bruno Quesson, Fanny Vaillant, Rémi Dubois.

"Lipid based nanocarrier compositions loaded with metal nanoparticles and therapeutic agent."

Number and publication date : WO2016170010 - 27/10/2016.

Inventors : Jean-Philippe Barthélémy, Khalid Oumzil, Gisèle Clofent-Sanchez, Marie-Josée Jacobin, Jeanny Laroche-Traineau, Stéphane Mornet, Karen Gaudin, Abdelmajid Noubhani, Xavier-François Santarelli.

NEUROLOGY

"Stroke prediction : methods and tools."

Number of deposit : PCT/FR2015/053480

Date of deposit : 14/12/2015

Inventors : Thomas Tourdias, Vincent Dousset, Igor Sibon, Fanny Munsch, Paul Perez, Julien Asselineau.

ONCOLOGY

"Matrix metalloproteinase 9 (MMP-9) aptamer and uses thereof."

Number and publication date : WO2013153138 - 17/10/2013.

Inventors : Jean-Jacques Toulmé, Sonia Da Rocha, Eric Dausse, Michèle Allard, Laurent Azéma.

"Kits-of-parts comprising Nucleic Acids able to form a kissing complex and their uses thereof."

Number and publication date : WO2015071385 - 21/05/2015.

Inventors : Jean-Jacques Toulmé, Eric Dausse, Guillaume Durand, Eric Peyrin, Corinne Ravelet.

"Method for tumor growth prediction"

Number and publication date : WO2016097050 - 23/06/2016.

Inventors : Thierry Colin, Olivier Saut, Marie Martin, Julie Jouganous, Julie Joie.

PNEUMOLOGY

"Method for MRI characterisation of airways lung"

Number of deposit : PJ2015-054/BV2016-007

Date of deposit : 05/2016

Inventors : Gaël Dournes, Fabien Baldacci, François Laurent, Patrick Berger.

Training



37

lectures by
international speakers



4

intra-community
scientific days



15

supported
international
symposiums



62

students in Master
Program since 2012

Lectures by international speakers

2012

"Anticipating medical imaging research evolutions."

Professor Marco ESSIG, Heidelberg University, Canada, invited by Vincent Dousset, NCM (U1215).

2013

"Multidimensional biomarkers for early detection of neurodegeneration."

Dr Ernesto SANZ-ARIGITA, CITA Alzheimer, San Sebastian, Spain, invited by Laurent Petit, GIN.

"Seeing Cells with MRI."

Professor Jeff W.M. BULTE, The Johns Hopkins University School of Medicine Baltimore, US. Invited by Sylvain Miraux, CRMSB

"Time, speech, and the right hemisphere."

Professor Martin MEYER, Department of Psychology, Plasticity and Learning in the healthy aging brain, University of Zurich, Switzerland. Invited by Laurent Petit, GIN.

"Cooperation between Kyoto University and Toshiba Medical."

Professor Yasutaka FUSHIMI, Department of Diagnostic Imaging and Nuclear Medicine, Kyoto University, Japan, invited by Vincent Dousset, NCM (U1215)

"Brain sodium MRI: implications for multiple sclerosis."

Dr Wafaa ZARAOUI, University of Marseille, France, invited by Sylvain Miraux, CRMSB.

"Most recent development of High performance gradients and Ultra High Field."

Dr Franz SCHMITT, Siemens, R&D department, Deutschland, invited by Sylvain Miraux, CRMSB.

"Evaluating tumor vascular structure and its response to therapy with pre-clinical contrast-enhanced ultrasound."

Dr Lori BRIDAL, University Pierre et Marie Curie, London, UK, invited by Sylvain Miraux, CRMSB.

"Image-guided injection and non-invasive monitoring of tissue engineering in stroke"

Professor Mike MODO, University of Pittsburgh, US, invited by Sylvain Miraux, CRMSB.

"Real-time passive acoustic mapping of tissue ablation and drug delivery by ultrasound"

Professor Constantin COUSSIOS, BUBBL, Oxford University, UK, invited by Bruno Quesson, CRCTB.

"Biomimetic polymersomes, a promising platform towards personalized nanomedicine"

Professor Sébastien LECOMMANDOUX, University of Bordeaux, France, invited by Sylvain Miraux, CRMSB.

2014

"MRI Guided Focused Ultrasound of the Breast."

Professor Dennis PARKER, Utah Center for Advanced Imaging Research, Salt Lake City, US, invited by Bruno Quesson, CRCTB.

"Neuroimaging at ultra high field."

Professor Brian RUTT, Stanford School of Medicine, US, invited by Thomas Tourdias, NCM (U1215).

"Diffusion MRI: From Diffusion to Brain connectomics."

Dr Aurobrata GHOSH, INRIA Sophia-Antipolis Center, France, invited by Bassem Hiba, INCIA.

"Enzyme-mediated Site-specific Bioconjugation for Molecular Imaging and Drug Delivery."

Dr Christopher HAGEMEYER, Baker IDI, Melbourne, Australia, invited by Gisèle Clofent-Sanchez, CRMSB.

"One-step Kit-like Radiofluorination of Peptides and other large molecule."

Pr David PERRIN, Department of Chemistry, University of British Columbia, Vancouver, CANADA, invited by Eric Fouquet, ISM.

2015

"Magnetic Particle Imaging: A Novel Fast 3D In Vivo Imaging Modality based on Magnetic Nanoparticle Contrast Agents."

Dr. Nicoleta BAXAN, Bruker BioSpin MRI GmbH, Ettlingen, Germany, invited by Gisèle Clofent-Sanchez, CRMSB.

"Molecular bases of the metabolic programs of neurons and astrocytes."

Professor Juan P. BOLANOS, Salamanca University, Spain, invited by Anne-Karine Bouzier-Sore, CRMSB.

"Astrocytes boost neuronal protection during glutamatergic neurotransmission."

Professor Juan P. BOLANOS, Salamanca University, Spain, invited by Anne-Karine Bouzier-Sore, CRMSB.

"Imaging of the pituitary."

Professor Yukio MIKI, Osaka City University, Kyoto, Japan, invited by Vincent Dousset, NCM (U1215).

"Mitochondrial respiratory chain assembly dictates differential ROS production in neurons and astrocytes."

Professor Juan P. BOLANOS, Salamanca University, Spain, invited by Anne-Karine Bouzier-Sore, CRMSB.

"Acceleration of MRI angiography by compressed Sensing."

Dr Stanislas RAPACCHI, University of California, Los Angeles, US, invited by Sylvain Miraux, CRMSB.

"Platelets : good or bad guys."

Dr Karen ALT, Baker Heart and Diabetes Institute, Melbourne, Australia, invited by Gisèle Clofent-Sanchez, CRMSB.

"Aneurysm and inflammation."

Professor Shuh NARUMIYA, Kyoto University, Japan, invited by Vincent Dousset, NCM (U1215).

"Positron emission tomography of human brain can monitor neuroinflammation and camp signaling: applications to alzheimer's disease and depression."

Dr Robert INNIS, NIH, USA, invited by Philippe Fernandez, INCIA.

"MR-guided HIFU of the Brain : potentials and challenges."

Professor Dennis PARKER, Utah Center for Advanced Imaging Research, Salt Lake City, US, invited by Bruno Quesson, CRCTB.

"Respective value of PET and MRI in the presurgical evaluation of patients with partial epilepsy."

Professor Franck SEMAH, CHRU Lille, France, invited by Michèle Allard, INCIA.

"White matter bundle analytics: building atlases and tractometry in the space of streamlines."

Pr Maxime DESCOTEAUX, Sherbrooke connectivity Imaging Lab (SCIL), Canada, invited by Laurent Petit, GIN.

2016

"Le scanner spectral à comptage photonique."

Professor Philippe DOUEK, Cermep, centre d'imagerie du vivant, Lyon, invited by Vincent Dousset, NCM (U1215).

"Nanoparticules pour le théranostic de l'athérosclérose."

Dr Anatol KONTUSH, INSERM Research Unit 1166, University Pierre and Marie Curie, Paris, France, invited by Gisèle Clofent-Sanchez, CRMSB.

"Long-term Neuroimaging of Human Neural Stem Cells following Neonatal Hypoxic-Ischemic Injury."

Professor Andrew OBENAUS, Loma Linda University, California, US, invited by Jérôme Badaut, INCIA.

"Capillary dysfunction in Alzheimer's disease."

Associate Pr Simon ESKILDSEN, Aarhus University, invited by Pierrick Coupé, LABRI.

"Spatio temporal dynamics of functional connectivity extracted using dictionary learning approaches."

Associate Professor Nicolas Farrugia, University of Brest, France, invited by Sandra Chanraud, INCIA.

"PET/MRI multimodal imaging : unparalleled accuracy."

Dr. Florence DELMAS, Bruker, France, invited by Sylvain Miraux, CRMSB.

"Non invasive biomarkers in the ischemic mouse brain."

Professor Lorenz Hirt, Unil-CHUV, Lausanne, Switzerland, invited by Jérôme Badaut, INCIA.

"Alterations of brain metabolism in type 2 diabetes: a magnetic resonance study in vivo."

Dr Joao Duarte, Laboratoire d'imagerie du métabolisme, Lausanne, Switzerland, invited by Anne-Karine Bouzier-Sore, CRMSB.

"Bolstering neuroenergetics as a neuroprotective strategy."

Professor Luc Pellerin, Unil-CHUV, Lausanne, invited by Anne-Karine Bouzier-Sore, CRMSB.

Supported symposiums

Modulamag : contrast modulation in MRI.

TRAIL Thematic school, 2012.

Contact : Jean-Michel Franconi, RMSB.

NeuroGlia Interactions Symposium.

TRAIL International Symposium, 2012.

Contact : Anne-Karine Bouzier-Sore, RMSB.

Connectomics : The wiring diagram of the human brain.

TRAIL International Summerschool, 2014.

Contact : Laurent Petit, GIN.

KidMRI : Functional MRI for renal parenchymal disease: Ready for clinical practice.

TRAIL International symposium, 2015.

Contact : Nicolas Grenier, University Hospital center of Bordeaux/EA-IMOTION.

Neuroepiomics : Epidemiology of vascular and brain aging in cohorts with large scale imaging and omics data.

International summerschool, 2015.

Contact : Stéphanie Debette, Neurocampus.

Euroanalysis in chemistry.

International symposium, 2015.

Contact : Philippe Hermange, ISM.

Cosine 6 : mathematical simulation in medicine.

International symposium, 2016.

Contact : Olivier Saut, IMB.

Aptamers in Bordeaux 2016 : aptamers biology, chemistry & technology.

International symposium, 2016.

Contact : Jean-Jacques Toulmé, IECB.

GECO-57 2016 : organic chemistry.

International symposium, 2016.

Contact : Philippe Garrigues, ISM.

National Congress of Section 28 - CNRS.

National symposium, 2016.

Contact : Sylvain Miraux, RMSB.

SFRMBM 2017 : Innovating applications in MRI and MRS.

International symposium, 2017.

Contact : Anne-Karine Bouzier-Sore, RMSB.

Aptamers in Bordeaux 2017 : aptamers biology, chemistry & technology

International symposium, 2017.

Contact : Jean-Jacques Toulmé, IECB.

Neuroimaging changes after acute brain injuries to evaluate the remote plasticity, 2017.

International symposium, 2017.

Contact : Jérôme Badaut, Grégory Barriere, INCI.

5ème Ecole d'imagerie du Petit animal appliquée au Cancer 2017 : small animals imaging.

International school, 2017.

Contact : Franck Couillaud, RMSB.

NeuroFrance 2017.

International symposium, 2017.

Contact : Erwan Bézard, Neurocampus.

Intra-community days

Since 2013, four intra-community days were organized to federate and train the TRAIL community.



TRAIL - Translational Imaging Meeting


Image guided therapy and diagnosis


Friday 27th September 2013
Pôle Juridique et Judiciaire
35 place Pey Berland à Bordeaux


PROGRAM

9:00 - 9:30	••••• Welcome participants
9:30 - 9:45	••••• Opening session
9:45 - 10:30	••••• Brain sodium MRI: implications for multiple sclerosis Dr Wafaa Zaaraoui, Centre de Résonance Magnétique Biologique et Médicale, Marseille
10:30 - 11:15	••••• Most recent development of High performance gradients and Ultra High Field Dr Franz Schmitt, SIEMENS Healthcare, Director, MR R&D Europe
11:15 - 11:45	••••• <i>Coffee Break</i>
11:45 - 12:30	••••• Evaluating tumor vascular structure and its response to therapy with pre-clinical contrast-enhanced ultrasound Dr Lori Bridal, Laboratoire d'imagerie Paramétrique – Paris
12:30 - 14:00	••••• <i>Lunch Break</i>
14:00 - 14:45	••••• Image-guided injection and non-invasive monitoring of tissue engineering in stroke Pr Mike Modo, Departments of Radiology & Bioengineering - University of Pittsburgh
14:45 - 15:30	••••• Real-time passive acoustic mapping of tissue ablation and drug delivery by ultrasound Pr Constantin Coussios, Biomedical Ultrasonics, Biotherapy & Biopharmaceuticals Laboratory (BUBBL), Oxford
15:30 - 16:15	••••• Biomimetic polymersomes, a promising platform towards personalized nanomedicine Pr Sebastien Lecommandoux, Laboratoire de Chimie des Polymères Organiques, Bordeaux
16:15 - 17:00	••••• Closing session

trail.labex-univ-bordeaux.fr






TRAIL

Translational Research and Advanced Imaging Laboratory

Animation scientifique TRAIL 2014
Présentation de l'avancement des projets 2011-2012



Mercredi 25 juin 2014 de 8h30 à 14h00
Amphithéâtre du CGFB – Site Carreire – Bordeaux

8h30 - 9h00	Café d'accueil
9h00 - 11h00	Présentation de l'avancement des projets 2011-2012 9h00 : NewFisp (S. Miraux) 9h25 : TRAILDNP (E. Thiaudière) 9h50 : PIAF (E. Fouquet, M. Szlosek-Pinaud) 10h15 : MIMATHUMAB (G. Clofent-Sanchez) 10h40 : ABACI (B. Mazoyer, F. Crivello)
11h00 - 11h20	Pause Café - Session posters tous projets Concours du meilleur poster – 2 prix réservés aux post-doctorants et doctorants concourants
11h20 - 13h00	Présentation de l'avancement des projets 2011-2012 11h20 : INNES (A-K. Bouzier-Sore) 11h45 : IBIO-NI (B. Brochet) 12h10 : SCICOG&REACTIV (M. Deloire) 12h35 : TRAIL&TRACKS (L. Petit)
13h00 - 14h00	Pause déjeuner
14h00	Remise des 2 prix posters


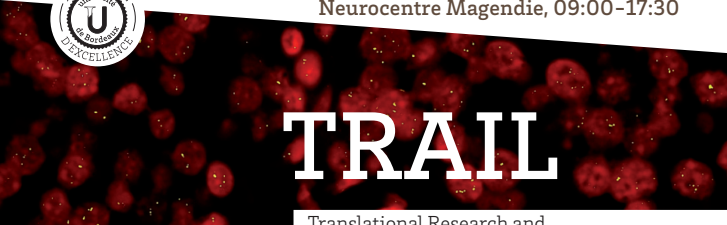






Intra-community days


Friday the 25th of September, 2015
Neurocentre Magendie, 09:00-17:30

TRAIL

Translational Research and
Advanced Imaging Laboratory

Workpackages 4&5 Scientific Meeting



Tracers and contrast agents, biological bio-imaging markers






Mireille Blanchard-Desce (ISM) / Gisèle Clofent-Sanchez (RMSB) /
Philippe Fernandez (INCLIA)

<p>9h: Welcoming coffee</p> <p>9h15: Hyper-bright nanoparticles made from molecules: new tools for medical imaging. <i>Mireille Blanchard-Desce</i></p> <p>10h15: WP5: > Biopsyprostateprobe > Mimatubumab</p> <p>11h: Break</p> <p>11h15: WP4: > Immelapt > Pritor</p> <p>12h: Discussions</p>	<p>12h30: Lunch</p> <p>14h: Inflammation imaging and neurovascular applications. <i>Paolo Zanetti-Fregonara</i></p> <p>15h: WP4-5: > Supsiifu > Ibioni</p> <p>15h45: Break</p> <p>16h: WP5: > Innes > Transfeer</p> <p>16h45: Discussions</p>
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Contact
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gisele.clofent-sanchez@rmsb.u-bordeaux2.fr

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université de Bordeaux - direction de la communication - septembre 2015

7 Juillet 2016
Palais de la Bourse
Bordeaux



TRAIL

Translational Research and
Advanced Imaging Laboratory



Journée scientifique de TRAIL #4



Les doctorants et post-doctorants de TRAIL vous présentent leurs projets autour d'un déjeuner !

Programme

- 12h00** Lunch - Concours de posters
- 14h00** Conférence internationale, Pr. Gabriel Krestin, EIBIR
- 14h30** Remise des 5 prix du concours et présentation des projets par les lauréats
Fin de la journée vers **16h**

Événement gratuit et ouvert à toute la communauté universitaire, sur inscription (en ligne à partir de mi-mai).







Attractivity



33

international academic
collaborations



33

industrial
collaborations



8

European projects



11.1 M€

of cofunding
(1.28M€ private)



8

visiting scholars



94

international
communications



46

recruitments
(PhD, doctoral, engineers,
technicians)

Academic Collaborations

University of Washington, USA.
SRI International Network, USA.
MAGNIMS Network, USA.
Buffalo University, New York, USA.
Harvard Medical School, Boston, USA.
University of Stanford, San Francisco, USA.
University of Utah, Salt Lake City, USA.
National Institute of Health, USA.
University of Wisconsin, USA.
Loma Linda University, USA.
University of Georgia, USA.
University of Verona, Italy.
University of Sherbrooke, Quebec.
University of Valencia, Spain.
BICAMS group, Hungary.
MS CENTER, Amsterdam, Netherlands.
Santa Chiara Hospital, Trento, Italy.
Sherbrooke University, Canada.
Royal Holloway London, UK.
UNIL-IP, Lausanne, Switzerland.
Baker IDI, Melbourne, Australia.
VIT University, India.
Monash University, Australia.
University of Sherbrooke, Canada.
University of Alabama, Birmingham, UK.
University of Mons, Belgium.
INMAS, NewDehli, India.
Royal Holloway London, UK.
University of Ferrara, Italy.

Industrial Collaborations

AFFICHEM: drug design for oncology
BALT: endovascular treatment of intracranial aneurysms
BRUKER: imaging sequence development and magnetic particle imaging
CADESIS: database management for cohort imaging
GLAXOSMITHKLINE: preclinical oncology imaging and drug efficiency testing
IBA MOLECULAR: radiotracers development
IGT SA: HIFU development for oncology and cardiology
INTRASENSE: post processing for pulmonary imaging
LFB BIOTECHNOLOGIES: antibodies engineering
MERK SERONO: neuroinflammation clinical studies
MICROVENTION: endovascular treatment of aneurysms
NOVAPTECH: aptamer-based tools
PACIFIC BIOSCIENCES: human immunoglobulin sequencing
PENUMBRA: endovascular treatment of intracranial aneurysms
PHILIPS: sequence development
ROCHE: immunotherapy modeling
SANOFI: MRI/PET bioimaging markers for Alzheimer disease
SUPERSONIC IMAGING: imaging equipment prototyping
SIEMENS: oncology imaging, HIFU development
TEVA: support for neuroinflammation clinical studies
UNITHER: drug efficiency study

European Projects

2012

ITN Marie Curie-Pi-Networks

Countries partners : Spain, France, UK, Germany, Sweden.

French Investigator : Yannick Crémillieux, ISM.

2013

ITN Marie Curie EDU-GLIA

Countries partners : Germany, UK, France, Sweden, Slovenia, Czech Republic, Israel.

French investigator : Bruno Brochet, NCM (U1215).

2014

ERA-net NEURON - CnsAflame : Neuroinflammatory mechanisms of chronic neurodegeneration and cognitive decline following traumatic brain injury.

Countries partners : Germany, France, Sweden, Israel.

French Investigator : Jerome Badaut, INCIA.

2015

FLAG-ERA JTC - Multi-Lateral : Multilevel Integrative Analysis of Brain Lateralization for Language.

Countries partners : Netherlands, France, Spain.

French Investigator : F. Crivello, GIN.

2016

ERC Starting Grant - ECSTATIC : Electrostructural Tomography - Towards Multiparametric Imaging of Cardiac Electrical Disorders.

Host country : France.

Principal investigator : H. Cochet, CRCTB.

ERA-net NEURON - TRAINS : Time dependent Remote Alterations after Injury to the Nervous System.

Countries partners : Germany, Israel, France, Poland, Latvia.

Principal Coordinator : J. Badaut, G. Barrière, INCIA.

COST Action - Parenchyma

French coordinator : N. Grenier, University Center Hospital of Bordeaux /EA IMOTION.

Innovative Medicines Initiative - BEAt-DKD : Diabetic Kidney Disease.

French coordinator : N. Grenier, University Center Hospital of Bordeaux /EA IMOTION.

Visiting Scholars*

2014

Pr. Troels Skrydstrup, University of Aarhus, Denmark.

Duration : 3 months.

Thematic : Carbon 11 labeling methodology for PET imaging.

Pr. Charles Guttman, University of Harvard, Boston, USA.

Duration : 3 months.

Thematic : Neuroinflammation and MS imaging

Pr. Juan P. Bolanos, Instituto de Biología Funcional y Genómica, Spain.

Duration : 6 months.

Thematic : Carbon 13 spectro and metabolism

2015

Pr. Denis Parker, UTAH University, Salt Lake City, USA.

Duration : 3 months.

Thematic : Breast cancer MR guided HIFU applications.

Pr. Anil Kumar Mishra, Institute of Nuclear Medicine and Allied Sciences, New Dehli, India.

Duration : 3 months.

Thematic : Neuroimaging.

2016

Pr. Jing-Huei Lee, University of Cincinnati, USA.

Duration : 1 month.

Thematic : Biomedical imaging and regenerative medicine.

Pr. Andre Obenaus, Department of Pediatrics, Loma Linda University, Canada.

Duration : 4 months.

Thematic : Long-term Neuroimaging of Human Neural Stem Cells.

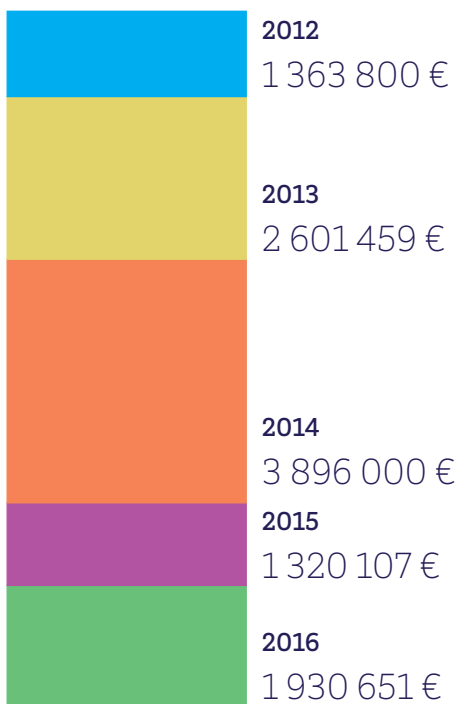
Dr. Nicolas Farrugia, University of Brest, France.

Duration : 1 week.

Thematic : Analysis of cerebral plasticity with aging brain : functional dynamic approach.

* IdEx program

Cofunding



Total
11 112 017 €

Recruitments



International Communications

2013

"Alteration of the blood brain barrier induced by HIFU".

Klaus Petry, Neuroinflammation, Imaging and Therapy of Multiple Sclerosis, U1049.

Conference done at Oxford University (UK), Leloir Institute (Argentina) and 23rd Congress Shanghai (China).

"Functional neuro-energetic and brain imaging: how do astrocytes contribute to the signal? "

Anne-Karine Bouzier-Sore, RMSB. Conference done at EUROGLIA (Germany) and at GORDON conference (USA).

"Stem-based tractography of long association fibers of the human brain."

Laurent Petit and Janice Hau, GIN. Conference done at ISMRM (Croatia).

"Diffusion as a Probe of Neural Tissue Microstructure".

Laurent Petit and Janice Hau, GIN. Conference done at ISMRM (Croatia).

"Aptamers, clever oligonucleotides for bio-sensing".

Jean-Jacques Toulmé, IECEB. Conference done at Tohoku University (Japan).

2014

"Impact of DWI denoising on Track-Density Imaging"

Bassem Hiba, INCIA. Conference done at HUMAN BRAIN MAPPING (Germany).

"Ecological assessment in cognitive screening in MS".

Bruno Brochet, NCM (U1215). Conference done at IMSCOGS (Spain).

"Including ecological assessment in cognitive screening in MS".

Delphine Lamargue-Hamel, NCM. Conference done at ECTRIMS (USA).

"NMR spectroscopy «for dummies» and its application to decipher metabolism".

Anne-Karine Bouzier-Sore, RMSB. Conference done at the University of Lausanne (Switzerland).

"Towards MRS using High-Resolution Magic-Angle Coil Spinning: application to brain metabolism".

Anne-Karine Bouzier-Sore, RMSB. Conference done at ISMRM (Italy).

"Versatile and Multimodal Imaging Tool for Biological Applications".

Gisèle Clofent-Sanchez, RMSB. Conference done at 10th International Conference on the Scientific and Clinical Applications of Magnetic Carriers (Germany).

"Non-invasive cardiac stimulation by MRI-guided focused ultrasound: a feasibility study on isolated beating pig heart",

Fabrice Marquet, CRCTB. Conference done at the International Ultrasonics Symposium (USA).

"Identification of GRPR in ER-positive breast cancer cells as molecular basis to develop a new 68Ga-GRPR-antagonist (68Ga-DOTA-RV_15) for PET molecular imaging".

Clement Morgat, INCIA. Conference done at the Congress of the European Association of Nuclear Medicine (Sweden).

"Methodological proposal to standardize dose-calibrators for new emitters: 68Ga as demonstrative working example".

Clement Morgat, INCIA. Conference done at the Congress of the European Association of Nuclear Medicine (Sweden).

"Comparative efficacy of 90Y, 177Lu and 111In for the irradiation of tumor cells and micrometastases: a Monte Carlo study using CELLDOSE".

Elif Hindi, INCIA. Conference done at the Congress of the European Association of Nuclear Medicine (Sweden).

"Anatomical connectivity of the inferior fronto-occipital fasciculus using stem-based tractography".

Janice Hau, GIN. Conference done at the HUMAN BRAIN MAPPING (Germany).

"Stem-based tractography to study the anatomical connectivity of human brain white matter pathways".

Janice Hau, GIN. Conference done at the HUMAN BRAIN MAPPING (Germany).

"Stem-based tractography to study the anatomical connectivity of human brain white matter pathways".

Janice Hau, GIN. Conference done at the HUMAN BRAIN MAPPING (Germany).

"Mapping whole brain white matter tracts in 410 healthy humans".

Janice Hau, GIN. Conference done at the SCIL (Canada).

"In vivo OMRI of proteolysis."

Eric Thiaudière, RMSB. Conference done at ISMRM (Italy) and ENIM (Belgium).

"CT measurement of small vessels as a tool to phenotype COPD subjects with severe pulmonary hypertension".

Gaël Dournes, CRCTB. Conference done at European Society of Thoracic Imaging (Netherlands).

2015

"MR Spectroscopy of very small volumes (< 0.4 µl) of ¹³C-labelled metabolites using microcoil detection: application to online measurements of cerebral microdialysate".

Yannick Cremillieux, ISM. Conference done at ISMRM (Canada).

"Brain functional connectivity and morphology changes in medication-overuse headache: evidence for addiction-related processes".

Sandra Chanraud, INCIA. Conference done at EFIC 8th International Pain in Europe Congress (Italy).

"Motor control in aging: Sensori-motor network connectivity at rest and motor performance".

Maud Dupuy, INCIA. Conference done at Donders Conference (Netherlands).

"Hippocampal microstructural damage and memory impairment in clinically isolated syndrome".

Vincent Planche, NCM. Conference done at ECTRIMS (Spain).

"Vulnerability of dentate gyrus to microglial activation leads to early memory impairment in a model of multiple sclerosis".

Vincent Planche, NCM. Conference done at ECTRIMS (Spain).

"Cerebellar sub-structures in cognitive impairment: volumetric and microstructural analyses at different stages of Multiple Sclerosis".

Amandine Moroso, NCM. Conference done at ECTRIMS (Spain).

"Imaging biomarker and pathophysiology of early memory impairment in multiple Sclerosis: a pre-clinical study with diffusion-tensor imaging of hippocampal layers".

Thomas Tourdias, NCM. Conference done at ISMRM (Canada).

"Early neuroprotective effect of lactate in neonatal hypoxic ischemic brain damages".

Anne-Karine Bouzier-Sore, RMSB. Conference done at Gordon Conference (USA) and ESMRMB (Scotland).

"Neonatal hypoxic ischemic brain damages: early neuroprotective effect of lactate".

Anne-Karine Bouzier-Sore, RMSB. Conference done at Euroglia (Spain).

"MR Spectroscopy of very small volumes of ¹³C-labelled metabolites using microcoil detection: application to online measurements of cerebral microdialysate".

Anne-Karine Bouzier-Sore, RMSB. Conference done at ISMRM (Canada).

"Theranostic of atherosclerosis using human antibody-targeted multi-modal nanoparticles for in situ delivery of drugs".

Gisele Clofent-Sanchez, RMSB. Conference in the Baker Heart and Diabetes Institute (Australia).

"A high-throughput method based on flow cytometry for the screening of phage-scFvs for the theranostic of atherosclerosis"; *Gisele Clofent-Sanchez, RMSB.* Conference done at PEGS Europe Protein & Antibody Engineering (Portugal).

"Fast Simultaneous Temperature and Displacement Imaging During HIFU Ablation in Swine Liver".

Pierre Bour, CRCTB. Conference done at ISMRM (Canada).

"Contactless cardiac stimulation with MRI guided High Intensity Focused Ultrasound".

Fabrice Marquet, CRCTB. Conference done at ISHR (USA).

"A robust PCA-based motion estimation approach for MR Thermometry radiofrequency ablation monitoring".

Solange Toupin, CRCTB. Conference done at ESMRMB (UK).

"Precise cross-section estimation on tubular organs".

Fabien Baldacci, LaBRI. Conference done at CAIP (Malte).

"Lung morphology assessment of cystic fibrosis using non-contrast enhanced proton MRI with submillimeter details at 1.5 Tesla".

Fabien Baldacci, LaBRI. Conference done at RSNA (USA) and ESTI (Spain).

"Online monitoring of brain metabolites: A microdialysis and microcoil approach.

Yannick Cremillieux, ISM. Conference done at EUROMAR meeting (Czech Republic).

"MR Spectroscopy of very small volumes (< 0.4 µl) of ¹³C-labelled metabolites using microcoil detection: application to online measurements of cerebral microdialysate".

Yannick Cremillieux, ISM. Conference done at ISMRM (Canada).

"Development of a ⁶⁸Ga-ranatensin analog for bombesin receptor PET molecular imaging".

Clement Morgat, INCIA. Conference done at Theranostics world congress ⁶⁸Ga and PRRT (USA)

"Terbium¹⁶¹ a promising radionuclide for the irradiation of tumor cells and micrometastases: Monte Carlo assessment using CellDose". *Clement Morgat, INCIA*. Conference done at the Congress of the European Association of Nuclear Medicine (Germany).

"Recognition of bundles in healthy and severely diseased brains".

Janice Hau, GIN. Conference done at ISMRM (Canada).

"Resonance frequency-shifting nitroxide for probing proteolytic activity in vivo using the Overhauser-enhanced MRI technique". *Neha Koonjoo, RMSB*. Conference done at ISMRM (Canada).

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"Monte-Carlo comparison of four beta-emitting radionuclides of interest for targeted radionuclide therapy of small tumors: ¹⁷⁷Lu, ⁶⁷Cu, ⁴⁷Sc and ¹⁶¹Tb".

Clement Morgat, INCIA. Conference at the Annual Meeting of the European Association of Nuclear Medicine (Spain).

"Detection of duodenal and pancreatic neuroendocrine tumors in MEN1 patients: comparison of the performances of ⁶⁸Ga-DOTA-TOC PET/CT and ¹¹¹In-pentetreotide".

Clement Morgat, INCIA. Conference at the Annual Meeting of the Endocrine Society (USA).

"In vivo Mapping of Protease Activity using Overhauser-enhanced MRI: Challenges and Promises".

Elodie Parzy, RMSB. Conference at the Asia-Pacific EPR Symposium (Russia).

"In vivo imaging of prostate cancer using an anti-PSMA fragment as a probe".

Claire Mazzocco, EA Imotion. Conference at the European Congress of Radiology (Austria).

"3D Longitudinal MRI Studies on Novel Tissue-Engineered Bone Constructs in Living Rats : Volume & Perfusion Assessments", *Sylvain miraux, RMSB*. Conference at ISMRM (Singapore).

"4D Flow MRI of the Cardiovascular System in Small Animals at 7T with an Ultrashort TE Sequence Com-bined with an Injection of Iron Nanoparticle".

Sylvain Miraux, RMSB. Conference at ISMRM (Singapore).

"T1 Longitudinal quantification of iron-oxyde particles using a 3D UTE Spiral Look-Locker sequence at 7T".

Sylvain Miraux, RMSB. Conference at ESMI (Netherlands).

"Simultaneous MRI and MRS spectroscopy of small volume (1 microlitre) intracerebral metabolites: a combined microdialysis and microcoil application".

Yannick Cremillieux, ISM. Conference done at European Molecular Imaging Meeting (Netherlands) and ISMRM (Singapore).

"A combined microcoil and microdialysis approach to measure metabolic response in real-time".

Yannick Cremillieux, ISM. Conference done at ISMRM (Singapore).

"Membrane dynamics of AQP4: a new key pathway for physiopathological brain cell communication?"

Aurélie Ruet, NCM. Conference done at the Annual meeting of the FENS (Denemark).

"Thalamus Optimized Multi-Atlas Segmentation at 3T".

Aurélie Ruet, NCM. Conference done at ISMRM (Singapore).

"Early cerebellar cognitive profile in multiple sclerosis: From saccadic impairment to grey matter altera-tions".

Thomas Tourdias, NCM. Conference done at ECTRIMS (UK).

"Efficacy and safety of alemtuzumab in 104 patients with active relapsing-remitting MS: one-year fol-low-up in France", *Aurélie Ruet, NCM*. Conference done at ECTRIMS (UK).

"Cognitive impairment in primary progressive multiple sclerosis".

Thomas Tourdias, NCM. Conference done at IMSCOGS (USA).

"Hippocampal microstructural damage and memory impairment in multiple sclerosis: A translational study from animal models to CIS and MS patients".

Thomas Tourdias, NCM. Conference done at IMSCOGS (USA).

"Social cognition and cognitive impairment in multiple sclerosis".

Aurelie Ruet, NCM. Conference done at IMSCOGS (USA).

"Age-related differences in time course of brain activation and connectivity during feedback-based associative learning".

Sandra Chanraud, INCIA. Conference done at the Cognitive Neuroscience Society Congress (USA) and Human Brain Mapping (Switzerland).

"Short term effect of lactate neuroprotection in neonate hypoxia-ischemia: a metabolic or signal effect?".

Leslie Mazuel, RMSB. Conference done at ESMRMB (Austria).

"Trans-resveratrol supplementation during gestation and lactation attenuates hypoxia-ischemia brain lesions in rat neonates". *Leslie Mazuel, RMSB.* Conference done at ESMRMB (Austria).

"Lactate: more than a neuronal energetic substrate".

Anne-Karine Bouzier-Sore, RMSB. Conference done at EWCBR (Switzerland).

"Theranostic of atherosclerosis using human antibody-targeted multi-modal nanoparticles for in situ drug delivery".

Gisele Clofent-Sanchez, RMSB. Conference done at the International Conference and Exhibition on Nanomedicine and Nanotechnology in Health Care (Thailand).

"Targeted nanoparticles for multimodal molecular imaging in a mouse model of atherosclerosis".

author: Melusine Larivière, RMSB Conference done at the International Conference and Exhibition on Nanomedicine and Nanotechnology in Health Care (Thailand).

"Theranostic of atherosclerosis: a high throughput method based on flow cytometry for the screening of phage-scFv".

A Hémadou, RMSB. Conference done at the PEGS Europe Protein & Antibody Engineering Summit (Portugal).

"CNS Barrier Function in Juvenile Traumatic Brain Injury".

Jerome Badaut, INCIA. Conference done at the Gordon Research Conference (USA).

"Online visualization of lesion extent during RF ablation by thermal dose mapping: correlation with post-ablation T1-w imaging and gross-pathology".

Solange Toupin, CRCTB. Conference done at the Interventional MRI Symposium (USA).

"In Vivo monitoring of cardiac radiofrequency ablation by real-time MR Thermometry".

Solenn Toupin, CRCTB. Conference done at the Interventional MRI Symposium (USA).

"First Clinical Evaluation of Real-Time Cardiac MR Thermometry".

Valery Ozenne, CRCTB. Conference done at the Interventional MRI Symposium (USA).

"Ex vivo and in vivo non-invasive ultrasound-based cardiac pacing".

Fabrice Marquet, CRCTB. Conference done at ISHR (USA).

"Real-time visualization of temperature distribution in the myocardium during radiofrequency ablation by Magnetic Resonance thermometry".

Solenn Toupin, CRCTB. Conference done at ISHR (USA).

"In vivo non-invasive ultrasound-based cardiac pacing in pigs".

Fabrice Marquet, CRCTB. Conference done at ISHR (USA).

"Automatic Temperature Control During MR Guided Catheter Based Radiofrequency Ablation of the Heart".

Valery Ozenne, CRCTB. Conference done at ISMRM (Singapore).

"First Clinical Evaluation of Real-Time Cardiac MR Thermometry".

Valery Ozenne, CRCTB. Conference done at ISMRM (Singapore).

"In-Vivo Echo-Navigated MR Thermometry for Real-Time Monitoring of Cardiac Radiofrequency Ablation. Summa cum laude award".

Solenn Toupin, CRCTB. Conference done at ISMRM (Singapore).

"Non-Invasive Cardiac Stimulation with MR Guided HIFU: A Rapid, Cardiac Triggered, MR-ARFI Method for Direct Visualization of Stimulation Site and Assessment of Tissue Stiffness".

Pierre Bour, CRCTB. Conference done at ISMRM (Singapore).

"Non-invasive cardiac pacing using images-guided focused ultrasound ex vivo and in vivo in pigs".

Fabrice Marquet, CRCTB. Conference done at ISTU (Israel).

"Simultaneous monitoring of MR-ARFI and MR-thermometry during HIFU ablation".

Pierre Bour, CRCTB. Conference done at ISTU (Israel).

"Hyperthermia of tumor microenvironment for therapeutic purposes".

Franck Couillaud, EA-Imotion. Conference done at COST radiomag meeting (Greece).

"Odyssey of nanoparticles from the tube to the tumor cells. How to bring bricks together?".

Franck Couillaud, EA-Imotion. Conference done at COST radiomag meeting (UK).

Governance



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steering



6

general



2

board of trustees meeting



1

scientific advisory board meeting



1

mid-period audit from the french research agency

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