Curriculum Vitae

Marlène Wiart
French citizenship, 42 years old
Two children (born 2010 and 2013, 18 months parental leave in total)
marlene.wiart@univ-lyon1.fr

Education

1997-2000 **Ph.D. in Bioengineering** (University Claude Bernard Lyon 1: UCBL, Lyon, France)

"Quantification of cerebral perfusion using dynamic MRI", under the supervision of Pr Atilla Baskurt. Obtained with highest honors.

1995-1997 **Master of Science in Physics**

I obtained the Master of Research diploma (DEA) of UCBL with a major in Bioengineering.

1992-1995 **Bachelor of Science in Physics**

I was admitted upon application at the **Ecole Normale Supérieure de Lyon** (ENS Lyon, France) in 1994 after obtaining my college degree in Physics at UCBL. The admission rate is around 1% in this higher education establishment.

Appointments

2015-today Full-time **research director** (directeur de recherche) at the Center for National Scientific Research (CNRS) in the CarMeN lab (U1060 Inserm)

2002-2015 Full-time **research associate** (chargé de recherche) at the CNRS in the Creatis lab (UMR CNRS 5220 U630 Inserm).

2000-2002 Post-doc at the Center for pharmaceutical and molecular imaging, University of California San Francisco (UCSF, San Francisco, USA)

Funding IDs

2015-2019 **Project leader:** French National Research Agency (ANR) "Collaborative project with public-private partnership": Imaging inflammation in vivo in ischemic stroke - development of a multimodal NANOprobe & BRAIN imaging methods (budget to manage: 749 k€)

2007-2011 **Partner:** European Union H2020: SPCCT (PI: Pr Philippe Douek). In Vivo Spectral Photon Counting CT Molecular Imaging in Cardio- and Neuro-Vascular Diseases (budget to manage: 287k€).

2011-2013 **Project leader:** Contract with SANOFI. Evaluation of a new thrombolytic with MRI, in a murine thromboembolic model of stroke (budget to manage: 100 k€)

2007-2011 **Partner:** European Union FP6: I-KNOW (PI: Pr Leif Oestergaard). Integrating Information from Molecule to Man: Knowledge Discovery Accelerates Drug Development and Personalized Treatment in Acute Stroke (budget to manage: 365 k€)

2007-2010 **Project leader:** ANR "Technologie pour la Santé" (Health Technology): INFLAMmation in brain and vessels with iron nanoparticles and cell trafficking: a multi-scale approach of tissue microenvironment, iron nanostructure and iron biotransformations (budget to manage: 849 k€)

Research record

Research topics: My research thematics focus on the development of in-vivo molecular imaging methods using innovative contrast agents and multimodal approaches for translational research in neurology and stroke in particular.

- **MRI of inflammation using iron oxide nanoparticles.** My main achievement is the development of an innovative MRI devoted to the analysis of neuroinflammation following ischemic stroke. This imaging method is based on the in-vivo magnetic labelling of phagocytic cells with ultrasmall superparamagnetic particles of iron oxide (USPIOs). In parallel, I teamed with the head of Lyon's stroke unit, Pr Nighoghossian, to translate the method into the clinics. My current motivations are to improve the specificity of the approach by targeting a macrophage receptor, Mac-1, and to further validate the MRI endpoints by taking advantage of multimodality opportunities, such as two-photon microscopy, phase-contrast microtomography, k-edge imaging with spectral scanner, PET and hybrid PET/MR technology.

- **MRI monitoring of neuroprotection treatments of ischemic stroke.** I have developed a translational platform for investigating rodent models of ischemic stroke. The originality of my approach is to use MRI for animal inclusion and follow-up. I have implemented the same sequences as in clinical trials and I am currently working towards the identification of translational imaging endpoints. The recent contract obtained with SANOFI shows the attractiveness of such an approach for the pharmaceutical industry.

- **Quantification of tissue perfusion and permeability with MRI.** My main contribution to the field is the development of methodological tools, based on black-box analysis or compartmental modelling, to extract quantitative hemodynamic parameters from the kinetics of an MR contrast agent. These works had broad applications both in the pre-clinical and in the clinical arenas: stroke, carotid stenosis, myocardial infarction, pulmonary embolism, breast cancer, prostate cancer and liver cancer.

<u>*Supervision*</u>:

- 3 post-docs (F. Chauveau, 2008-2012, hired by the CNRS; J Bouvier, 2014-2015, hired by GE; E Cuccione 2016-today)
- 7 PhD thesis (J.C. Brisset, 2006-2009; T.H. Cho, 2007-2011; A. Riou, 2008-2012; M. Marinescu, 2008-2012; A. Durand, 2010-2013; H. Rositi 2012-2015; V. Hubert 2015-today)

Other academic services

I am a member of the European Society for Molecular Imaging (ESMI) and reviewer for *Investigative Radiology*, *Journal of Magnetic Resonance Imaging*, *BMC Neuroscience*, *Journal of Neuroinflammation*, *Life Science*, *NMR in Biomedicine* and *Plos One*.

2014-today **Academic editor** of **Plos One**

2007-2011 Member of the Creatis Lab Committee, UCBL, Lyon, France

Prizes and Awards

2007 **Young Investigator Award** of Lyon city. MRI in cardiovascular diseases.

2005 **Young Investigator Award** at the international Symposium on Contrast Media Research (CMR 2005). Imaging of inflammation with iron oxide nanoparticles.

1998 **European prize** of the Association for radiological study and research. Rapid MRI technique for the detection of a pulmonary perfusion defect in patients.

Major publications in the last 5 years

1. Tamion A, Hillenkamp M, Hillion A, Maraloiu VA, Vlaicu ID, Stefan M, Ghica D, Rositi H, Chauveau F, Blanchin MG, **WIART M**, Dupuis V: Ferritin surplus in mouse spleen 14 months after intravenous injection of iron oxide nanoparticles at clinical dose, *Nano Research* 2016, 9:2398-2410.

2. Cuccione E, Versace A, Cho TH, Carone D, Berner LP, Ong E, Rousseau D, Cai R, Monza L, Ferrarese C, Sganzerla EP, Berthezene Y, Nighoghossian N, **WIART M**, Beretta S, Chauveau F: Multi-site laser Doppler flowmetry for assessing collateral flow in experimental ischemic stroke: Validation of outcome prediction with acute MRI. *J Cereb Blood Flow Metab* 2016

3. Frindel C, Rouanet A, Giacalone M, Cho TH, Ostergaard L, Fiehler J, Pedraza S, Baron JC, **WIART M**, Berthezene Y, Nighoghossian N, Rousseau D: Validity of shape as a predictive biomarker of final infarct volume in acute ischemic stroke. *Stroke* 2015, 46**:**976-981.

4. Rositi H, Frindel C, **WIART M,** Langer M, Olivier C, Peyrin F, Rousseau D: Computer vision tools to optimize reconstruction parameters in x-ray in-line phase tomography. *Phys Med Biol* 2014, 59:7767-7775

5. Durand A, Chauveau F, Cho TH, Kallus C, Wagner M, Boutitie F, Maucort-Boulch D, Berthezene Y, **WIART M**, Nighoghossian N: Effects of a TAFI-Inhibitor Combined with a Suboptimal Dose of rtPA in a Murine Thromboembolic Model of Stroke. *Cerebrovasc Dis* 2014, 38:268-275.

6. Marinescu M, Langer M, Durand A, Olivier C, Chabrol A, Rositi H, Chauveau F, Cho TH, Nighoghossian N, Berthezene Y, Peyrin F, **WIART M**: Synchrotron Radiation X-Ray Phase Micro-computed Tomography as a New Method to Detect Iron Oxide Nanoparticles in the Brain. *Mol Imaging Biol* 2013, 15:552-559.

7. Marinescu M, Chauveau F, Durand A, Riou A, Cho TH, Dencausse A, Ballet S, Nighoghossian N, Berthezene Y, **WIART M**: Monitoring therapeutic effects in experimental stroke by serial USPIO-enhanced MRI. *Eur Radiol* 2013, 23:37-47.

8. Desestret V, Riou A, Chauveau F, Cho TH, Devillard E, Marinescu M, Ferrera R, Rey C, Chanal M, Angoulvant D, Honnorat J, Nighoghossian N, Berthezene Y, Nataf S, **WIART M**: In vitro and in vivo models of cerebral ischemia show discrepancy in therapeutic effects of M2 macrophages. *PLoS One* 2013, 8:e67063.

9. Riou A, Chauveau F, Cho TH, Marinescu M, Nataf S, Nighoghossian N, Berthezene Y, **WIART M**: MRI assessment of the intra-carotid route for macrophage delivery after transient cerebral ischemia. *NMR Biomed* 2013, 26:115-123.

10. Chauveau F, Cho TH, Riou A, Langlois JB, Berthezène Y, Nighoghossian N, **WIART M**. Does acute behavioral testing reflect successful ischemia in rats with transient middle cerebral artery occlusion?, *International Journal of Stroke*, 2012;7(6):465-72.