

## 1. Personal details

**NAME :** **MAQUET**  
**SURNAME :** PIERRE ALBERT ANTOINE  
**PLACE AND DATE OF BIRTH :** Torino (Italy), December 12 1961  
**NATIONALITY :** Belgian

**PROFESSIONAL ADDRESSES :**

Service de Neurologie  
CHU de Liège  
Sart Tilman – B35  
4000 LIEGE

GIGA Cyclotron Research Centre – in vivo imaging  
Allée du 6 août  
University of Liège – Sart Tilman  
4000 Liège

**MARITAL STATUS:** Married  
Two children

## 2. EDUCATION AND QUALIFICATIONS

|   |  |
|---|--|
| Doctor in Medicine                      | University of Liège, July 1986, magna cum laude  |
| PhD in Experimental biomedical sciences | University of Liège, June 1990, magna cum laude  |
| Qualification in Neuropsychiatry        | University of Liège, June 1991                   |
| Agrégation de l'Enseignement supérieur  | University of Liège, February 1999, "unanimité". |

## 3. PROFESSIONAL HISTORY

|                                      |              |
|--------------------------------------|--------------|
| FNRS Research Fellow                 | 1986-1990    |
| FNRS Postdoctoral Researcher         | 1990-1992    |
| FNRS Research Associate              | 1992-1999    |
| FNRS Senior Research Associate       | 1999-2003    |
| FNRS Research Director               | 2003-2012    |
| Professor- University of Liège       | 2012-2019    |
| Full Professor – University of Liège | 2019-present |

## 4. STAYS ABROAD

|   |           |
|---|-----------|
| Visiting Research Fellow at the PET unit of the Hammersmith Hospital, London, United Kingdom  | 1991      |
| Research Fellow at the Functional Imaging Laboratory Wellcome Department of Imaging Neuroscience, University College London, United Kingdom | 2000-2002 |

## 5. RESEARCH

Our work first characterized the mechanisms of human sleep and sleep/wake regulation, using functional imaging techniques. We first used positron emission tomography (PET) and quantified the changes in brain glucose metabolism between wakefulness, non rapid eye movement (NREM) and REM sleep (1, 2). We subsequently characterized the functional neuroanatomy of human NREM and REM sleep using cerebral blood flow measurements (3, 4). Finally, using simultaneous EEG and fMRI recordings, we characterized the neural correlates of human sleep spindles (5) and slow waves (6).

Assuming that sleep is involved in memory consolidation (7), we demonstrated using both PET and functional magnetic resonance imaging (fMRI) that patterns of regional brain activity exhibited during learning are re-expressed during subsequent sleep, suggesting an active –although not exclusive- role of sleep in memory consolidation (8, 9). We also showed that sleep deprivation during the first post-training sleep significantly modifies the neural correlates of subsequent memory retrieval (10–12).

We progressively integrated functional neuroimaging in the general framework of the regulation of sleep and wakefulness (sleep homeostasis, circadian regulation, influence of light). We conducted a series of experiments aiming at characterizing the neural correlates of the non-classical (melanopsinergic) system of photoreception in the human brain, which is known to influence the circadian organization of sleep/wake cycle. We showed that in addition to conveying visual information, light can also profoundly and swiftly modulate regional brain function, depending on its wavelength, intensity of duration of exposure (13–16).

We also conducted fMRI studies, capitalizing on the individual trait-like differences in the response to increased sleep pressure or misalignment between sleep homeostasis and circadian signals (17–19). In one of these studies, volunteers were recruited based on the polymorphism of PERIOD3 gene. Indeed, vulnerability to sleep loss is in part genetically determined and is associated with a variable-number (4 or 5) tandem repeat (VNTR) polymorphism (20).

Pursuing our objective to improve the understanding of the regulation of human sleep/wake cycles, we characterized the time course of brain activity during a 42-hour waking period under constant routine conditions. This protocol allowed us to derive the influence of seasons (21), sleep debt and circadian phase (22) onto brain activity.

In 2012, I was appointed professor of neurology at the university of Liège. My objective was to reorganize clinical research in the department. Since then, three medical doctors passed their PhD viva. Our last research efforts are focused on characterizing the microstructure of grey and white matters in multiple sclerosis (23) and Parkinson's disease (in press).

### References

1. P. Maquet *et al.*, **Brain Res.** 571, 149–53. (1992).
2. P. Maquet *et al.*, **Brain Res.** 513, 136–43. (1990).
3. P. Maquet *et al.*, **J Neurosci.** 17, 2807–12. (1997).
4. P. Maquet *et al.*, **Nature.** 383, 163–6. (1996).
5. M. Schabus *et al.*, **Proc Natl Acad Sci U S A.** 104, 13164–13169 (2007).
6. T. T. T. Dang-Vu *et al.*, **Proc Natl Acad Sci U S A.** 105, 15160–15165 (2008).
7. P. Maquet, **Science.** 294, 1048–1052 (2001).
8. P. Maquet *et al.*, **Nat Neurosci.** 3, 831–6. (2000).
9. P. Peigneux *et al.*, **Neuron.** 44, 535–545 (2004).
10. V. Sterpenich *et al.*, **PLoS Biol.** 5, e282 (2007).
11. P. Maquet, S. Schwartz, R. Passingham, C. Frith, **J Neurosci.** 23, 1432–40. (2003).
12. G. Albouy *et al.*, **Neuron.** 58, 261–272 (2008).
13. G. Vandewalle *et al.*, **Proc. Natl. Acad. Sci. U. S. A.** 107, 19549–19554 (2010).
14. G. Vandewalle *et al.*, **Proc Natl Acad Sci U S A.** 107, 19549–19554 (2010).
15. G. Vandewalle *et al.*, **Curr Biol.** 16, 1616–1621 (2006).
16. G. Vandewalle, P. Maquet, D.-J. Dijk, **Trends Cogn. Sci.** 13, 429–438 (2009).
17. C. Schmidt, P. Peigneux, P. Maquet, C. Phillips, **Science.** 316, 309c- (2010).
18. C. Schmidt *et al.*, **Science.** 324, 516–519 (2009).
19. L. Mascetti *et al.*, **J Neurosci.** 33, 10182–10190 (2013).
20. G. Vandewalle *et al.*, **J Neurosci.** 29, 7948–7956 (2009).
21. C. Meyer *et al.*, **Proc. Natl. Acad. Sci. U. S. A.** 113, 3066–3071 (2016).
22. V. Muto *et al.*, **Science.** 353, 687–690 (2016).
23. E. Lommers *et al.*, **NeuroImage Clin.** 23, 101879 (2019).

## 6. ACADEMIC SUPERVISION – PhD STUDENTSHIPS

1. 2001 **Christophe Phillips**  
Source estimation in EEG. Combining anatomical and functional constraints.  
PhD en Applied Sciences, University of Liège
2. 2004 **Balteau Evelyne**  
Optimization of in vivo spectroscopic acquisitions on a high field MR scanner.  
PhD in Sciences, University of Liège
3. 2007 **Christophe Hotermans**  
Caractérisation des différentes étapes de consolidation après apprentissage moteur séquentiel. Etude par la technique de stimulation magnétique transcrânienne répétitive, de l'implication du cortex moteur primaire (M1) au cours de ces différentes étapes.  
PhD in Medical Sciences, University of Liège
4. 2007 **Vandewalle Gilles**  
Nonvisual brain responses to light exposure in human as assessed by functional magnetic resonance imaging  
PhD in Sciences, University of Liège
5. 2008 **Albouy Geneviève**  
Rôle du sommeil dans la consolidation de la mémoire procédurale chez l'homme. Etude comportementale, en imagerie par résonance magnétique fonctionnelle et en magnétoencéphalographie  
Co-tutelle entre les Universités Claude Bernard de Lyon I et de Liège  
PhD in Neurosciences
6. 2008 **Dang Vu Thanh**  
Correlates of Human Non REM sleep Oscillations. A Multi-Modal Functional Neuroimaging Approach  
PhD in Biomedical and Pharmaceutical Sciences, University of Liège
7. 2008 **Sterpenich Virginie**  
Corrélatés cérébraux de la consolidation de la mémoire émotionnelle. Etude en imagerie par résonance magnétique fonctionnelle.  
PhD in Sciences, University of Liège
8. 2009 **Desseilles Martin**  
Attentional deficits in major depression  
PhD in Medical Sciences, University of Liège
9. 2010 **Poirrier Jean-Etienne**  
'Effets du sommeil et de la privation de sommeil sur le protéome hippocampique de rat après apprentissage topographique'

- PhD in Biomedical and Pharmaceutical Sciences, University of Liège
10. 2010 **Matarazzo Luca**  
Offline processing of recent memory induced by a perceptual visual learning during subsequent wakefulness and sleep  
PhD in Biomedical and Pharmaceutical Sciences, University of Liège
  11. 2011 **Bonjean Maxime**  
Experimental and realistic modeling investigations of thalamocortical activity during wakefulness and sleep  
PhD en Applied Sciences, University of Liège
  12. 2013 **Mascetti Laura**  
Influence du polymorphisme du BDNF val66met sur les phénomènes de consolidation mnésique favorisés par le sommeil chez l'homme en imagerie par résonance magnétique fonctionnelle  
PhD in Biomedical and Pharmaceutical Sciences, University of Liège
  13. 2013 **Phan Ba Rémy**  
Multipodal evaluation of gait alterations in persons with multiple sclerosis  
PhD in Medical Sciences, University of Liège
  14. 2014 **Caroline Kussé**  
Functional interactions between memory processes and spontaneous brain activity  
PhD in Biomedical and Pharmaceutical Sciences, University of Liège
  15. 2014 **Anahita Shaffii-Le Bourdieu**  
Sleep and Vulnerability to Sleep Loss  
PhD in Biomedical and Pharmaceutical Sciences, University of Liège
  16. 2015 **Julien LY**  
Circadian Modulation of Human Cortical Excitability  
PhD in Biomedical Sciences, University of Liège
  17. 2016 **Vincenzo Muto**  
Modulation of brain function by sleep debt and circadian rhythmicity  
PhD in Biomedical Sciences, University of Liège
  18. 2016 **Christelle MEYER**  
Seasonality in human cognitive brain responses  
PhD in Biomedical Sciences, University of Liège
  19. 2018 **Estelle RIKIR**  
Apport de l'imagerie de source électrique inter-critique et critique dans l'évaluation pré-chirurgicale des épilepsies focales pharmaco-résistantes en vue d'améliorer la localisation de la zone épileptogène  
PhD in Medical Sciences, University of Liège
  20. 2019 **Emilie LOMMERS**  
Multiparameter MRI quantification of microstructural brain alterations in multiple sclerosis  
PhD in Medical Sciences, University of Liège

21. 2021 **Steve BORNHEIM**

Could transcranial direct current stimulation contribute to acute stroke rehabilitation?  
PhD in Sport Sciences, University of Liege

## **7. ACADEMIC SUPERVISION – POST-DOCTORAL STUDENTSHIPS**

1. Fabien PERRIN (Lyon, France, 2001-2003)
2. Perrine RUBY (Lyon, France, 2002-2004)
3. Manuel SCHABUS (Salzburg, Austria, 2005-2007)
4. Steffen GAIS (Lübeck, Germany, 2005-2007)
5. Géraldine RAUCHS (Caen, France, 2006-2008)
6. Sarah CHELLAPAH (Natal, Brazil, 2012)

## **8. PRIZES AND AWARDS**

|           |   |
|-----------|---|
| 1986      | Prix <i>Specia</i>  |
| 1994      | European Sleep Research Society - Synthelabo Research Grant                     |
| 1995-1996 | Prix de l'Académie Royale de Médecine de Belgique                               |
| 1997      | Prix Léon Frédéricq del'Académie Royale des Sciences de Belgique                |
| 1997      | Prix Linsman  |
| 1999      | Prix Jaumain  |
| 2000      | NATO Advanced Fellowship  |
| 2001      | Prix Lundbeck du Belgian College of Neuropharmacology and Biological Psychiatry |
| 2007      | Prix Monique Brauns de la Fondation Médicale Reine Elisabeth                    |
| 2009      | Prix CDC de la Fondation Médicale Reine Elisabeth                               |
| 2010      | Prix Signoret de la Fondation IPSEN   |
| 2011      | Prix Baron van Gysel de Meise de la Fondation Médicale Reine Elisabeth          |
| 2011      | Prix de la Fondation Baron Clerdent   |
| 2014      | Prix Jeanine et Jacques Delruelle   |

## **9. EDITORIAL BOARDS**

Associate Editor the SLEEP (2003 - 2008)

Associate Editor of the Journal of Sleep and Biological Rhythms (2003 - 2008)

Deputy Editor of the Journal of Sleep Research (2003-2016)

## **10. MEMBERSHIPS**

Fellow of the European Academy of Neurology (2018)

Member of the Société Belge de Neurologie

Member of the European Sleep Research Society

Member of the Organization of Human Brain Mapping