

# Raphaël Liégeois

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## Education

- 2011–2015 **PhD in Engineering Sciences**, *University of Liège (ULg)*, Belgium.  
“Dynamical modelling from resting-state brain imaging”, co-supervision by Prof. R. Sepulchre (ULg/UCambridge) and Prof. S. Laureys (ULg).
- 2011–2015 **Year 1 & 2 of B.Sc. in Medicine**, *University of Liège*, Belgium.
- 2005–2011 **M.Sc. and B.Sc. in Biomedical Engineering**, *University of Liège*, Belgium.  
Master’s Thesis: “Structured sparse principal component analysis for fMRI imaging”.
- 2007–2010 **M.Sc. and B.Sc. in Fundamental Physics**, *University Paris-Sud Orsay*, France.
- 2007–2009 **Ingénieur Centralien**, *Ecole Centrale Paris*, France.  
TIME exchange program - Class of 2010.

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## Employment History

- 2018–Present **Post-Doctoral Research Fellow**, *École Polytechnique Fédérale de Lausanne and University of Geneva Faculty of Medicine*, Switzerland.  
In the Medical Image Processing Lab headed by Prof. Dimitri Van De Ville  
○ Chist-Era Project: Interactive and Visual Analysis of Networks.
- 2015–2017 **Post-Doctoral Research Fellow**, *National University of Singapore*, Singapore.  
In the Computational Brain Imaging Group headed by Prof. Thomas Yeo.
- 2011–2015 **PhD Student**, *University of Liège*, Belgium.

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## Teaching Experience

- 2018 - Present **Educational Course Organizer**, *Time-varying connectivity in resting-state fMRI: from methods to interpretations*, in collaboration with Dr. Vince D. Calhoun in 2018 and 2019 at the Organization for Human Brain Mapping annual conference.
- 2018 - 2019 **Project Instigator**, Brainhack Geneva and Brainhack Global, ‘Can fMRI predict IQ?’ and ‘The sound of fMRI’.
- 2011–2015 **Teaching Assistant**, *University of Liège*, Belgium.  
○ Systems Modeling, 2011–2015 (Principal Assistant 2013–2015)  
○ Biomedical Engineering Labs, 2013–2015  
○ Bioinformatics, 2012–2013  
○ Linear Control Systems, 2011–2013  
○ Introduction to Numerical Optimization, 2011–2012

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## Short-Term Visits

- June–Sept. **Visiting Scholar**, *Stanford University*, USA.  
2019 In the Brain Dynamics Lab headed by Prof. Manish Saggar  
○ Topological data analysis of neuroimaging data

- 2015 **Research Visitor**, *University of Cambridge*, United Kingdom.  
Series of short stays to work on methodological aspects of my thesis, invited by Prof. R. Sepulchre
- Feb. 2014 **Research Visitor**, *University of Western Ontario*, Canada.  
In the Brain and Mind Institute, invited by Prof. A. Soddu

## Awards and Grants

- 2019 **Firmenich EPFL-Stanford Exchange Programme** laureate - CHF 11,000.
- 2015–2017 **Wallonie-Bruxelles International Excellence Grant** for postdoctoral project - €24,000.
- 2015–2017 **Rotary-International Foundation Grant** for postdoctoral project - \$25,000.
- 2015 **Lear Foundation Grant** for a research stay at the University of Cambridge - €3,000.
- 2014 **Contest: “Ma thèse en 180 secondes”**: laureate for the University of Liège.
- 2011 **Salier Prize of the best Master’s thesis**.
- 2005 **University of Liège Engineering Admission Exam**: ranked first.

## Community Service

- Reviewing **Publons Profile**  
activities Journals: Neuroimage, Brain Structure and Function, Human Brain Mapping, Medical & Biological Engineering & Computing, IEEE Transactions on Automatic Control.  
Conferences: Organization for Human Brain Mapping, IEEE Conference on Decision and Control.
- Delegation Scientific staff representative for the department, 2013-2015.

## Publications

- [P<sub>11</sub>] M. Petrovic\*, **R. Liégeois\***, and D. Van De Ville. *Community-Aware Graph Signal Processing*. Under review.
- [P<sub>10</sub>] **R. Liégeois**, J. Li, R. Kong, D. Van De Ville, T. Ge, M. Sabuncu and T. Yeo. *Resting brain dynamics at different timescales capture distinct aspects of human behavior*. *Nature Communications* 10 (1), 2317, 2019.
- [P<sub>9</sub>] **R. Liégeois**, I. Merad, and D. Van De Ville. *Time-resolved analysis of dynamic graphs: an extended Slepian design*. *Wavelets and Sparsity XVIII* 1113810, 2019.
- [P<sub>8</sub>] M. Petrovic, T. Bolton, M. Preti, **R. Liégeois**, and D. Van De Ville. *Guided graph spectral embedding: Application to the C. elegans connectome*. *Network Neuroscience* 3 (3), pp. 807-826, 2019.
- [P<sub>7</sub>] J. Casorso, X. Kong, W. Chi, D. Van De Ville, T. Yeo, and **R. Liégeois**. *Dynamic mode decomposition of resting-state and task fMRI*. *Neuroimage* 194, pp. 42-54, 2019
- [P<sub>6</sub>] P. Wang, R. Kong, X. Kong, **R. Liégeois**, G. Deco, M. van den Heuvel and T. Yeo. *Inversion of a Dynamic Mean Field Model Reveals a Cortical Hierarchy in the Resting Human Brain*. *Science Advances* 5 (1), eaat7854, 2019.
- [P<sub>5</sub>] J. Li, R. Kong, **R. Liégeois**, C. Orban, N. Sun, A. Holmes, M. Sabuncu, T. Ge, and T. Yeo. *Global Signal Regression Strengthens Association between Resting-State Functional Connectivity and Behavior*. *Neuroimage* 196, pp. 126-141, 2019.
- [P<sub>4</sub>] **R. Liégeois**, T. O. Laumann, A. Z. Snyder, H. J. Zhou, and T. Yeo. *Interpreting Temporal Fluctuations in Resting-State Functional Connectivity MRI*. *NeuroImage* Vol. 163, pp. 437–455, 2017.

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\*equal contributions

- [P<sub>3</sub>] **R. Liégeois**, E. Ziegler, C. Phillips, P. Geurts, F. Gomez, M. Bahri, T. Yeo, A. Soddu, A. Vanhaudenhuyse, S. Laureys, and R. Sepulchre. *Cerebral functional connectivity periodically (de)synchronizes with anatomical constraints*. *Brain Structure and Function*, Vol. 221(6), pp. 2985-97, 2016.
- [P<sub>2</sub>] **R. Liégeois**, B. Mishra, M. Zorzi, and R. Sepulchre. *Sparse plus low-rank autoregressive identification in neuroimaging time series*. *Proceedings of the 54th IEEE Conference on Decision and Control (CDC)*, pp. 3965-3970, 2016.
- [P<sub>1</sub>] H. Chen, **R. Liégeois**, J. de Bruyn, and A. Soddu. *Principal-component analysis of particle motion*. *Physical Review E*, Vol.91(4), 2015.

## Conference communications

- [C<sub>13</sub>] **R. Liégeois** *Dynamic Mode Decomposition for fMRI data*. Oral presentation, SIAM Conference on Applications of Dynamical Systems, Snowbird, USA, May 2019.
- [C<sub>12</sub>] **R. Liégeois** *Time-Varying Connectivity: Introduction and Terminology*. Oral presentation, Educational Course "Time-varying connectivity in resting-state fMRI: from methods to interpretations", OHBM, Singapore, June 2018.
- [C<sub>11</sub>] **R. Liégeois** *Dynamic Mode Decomposition for fMRI data and task data*. Oral presentation, Alpine Brain Imaging Meeting, Switzerland, January 2018.
- [C<sub>10</sub>] **R. Liégeois**, J. Li, N. Kuek, R. Kong, C. Orban, J. Zhou, M. Sabuncu, T. Ge, and T. Yeo. *Dynamic and static resting-state functional connectivity encode complementary behavioral information*. Oral presentation, Symposium "Dynamics of resting-state functional connectivity: Methods and models", OHBM, Singapore, June 2018.
- [C<sub>9</sub>] **R. Liégeois**, T. O. Laumann, A. Z. Snyder, H. J. Zhou, and T. Yeo. *Stationarity does not imply absence of brain states: interpreting fluctuations in fMRI connectivity*, OHBM, Vancouver, June 2017.
- [C<sub>8</sub>] **R. Liégeois**, M. Zorzi and R. Sepulchre. *Dynamical component analysis of fMRI time series*, OHBM, Geneva, June 2016.
- [C<sub>7</sub>] **R. Liégeois**, C. Phillips, M. Bahri, S. Laureys, and R. Sepulchre. *Total connectivity: a marker of dynamical functional connectivity applied to consciousness*, OHBM, Honolulu, 2015.
- [C<sub>6</sub>] **R. Liégeois**, M. Bahri, M. Zorzi, S. Laureys, and R. Sepulchre. *Dynamical properties of fMRI connectivity in neuronal networks mediating consciousness*, Selected for an oral presentation at the 2nd Scientific Workshop on Brain Function, Whistler, 2014.
- [C<sub>5</sub>] **R. Liégeois**, E. Ziegler, C. Phillips, F. Gomez, A. Soddu, S. Laureys, and R. Sepulchre. *Assessing dynamical correlations between functional and structural brain connectivity*, OHBM, Hamburg, 2014.
- [C<sub>4</sub>] **R. Liégeois**, E. Ziegler, M. Zorzi, A. Soddu, P. Geurts, S. Laureys, and R. Sepulchre. *Dynamics in neuroimaging data analyses*, GIGA research days, Liège, June 2013.
- [C<sub>3</sub>] **R. Liégeois**, A. Soddu and R. Sepulchre. *Note on how cerebral functional connectivity encodes structural constraints of the human brain*, 32nd Benelux Meeting on Systems and Control, Han-sur-Lesse, Belgium, March 2013.
- [C<sub>2</sub>] **R. Liégeois**, A. Vanhaudenhuyse, S. Laureys, R. Sepulchre and A. Soddu. *Centering fMRI data or Removing their First PC amounts to Regressing out the Global Signal*, Abstract accepted at OHBM, Seattle, 2013.
- [C<sub>1</sub>] **R. Liégeois**, A. Soddu and R. Sepulchre. *Large-scale optimization for component analysis of fMRI resting brain data*, 31st Benelux Meeting on Systems and Control, Heijderbos, The Netherlands, March 2012.

## Invited talks

- [T<sub>13</sub>] **R. Liégeois**, *Behavioral counterparts of static and dynamic models of fMRI time series*, Invited by Prof. M. d'Esposito, University of California, Berkeley, USA, August 2019.
- [T<sub>12</sub>] **R. Liégeois**, *Towards dynamical modeling of fMRI time series*, Invited by Prof. R. Poldrack, Stanford University, Stanford, USA, August 2019.
- [T<sub>11</sub>] **R. Liégeois**, *Behavioral counterparts of fMRI dynamics*, Invited by Prof. J. Goni, Purdue University, Lafayette, USA, May 2019.
- [T<sub>10</sub>] **R. Liégeois**, *From static to dynamic representations of resting-state Functional Connectivity MRI*, Invited by Prof. O. Sporns, Indiana University, Indiana, USA, May 2019.
- [T<sub>9</sub>] **R. Liégeois**, *Behavioral counterparts of fMRI dynamics*, Invited by Prof. M. Lindquist, Johns Hopkins University, Baltimore, USA, May 2019.
- [T<sub>8</sub>] **R. Liégeois**, *From static to dynamic representations of resting-state Functional Connectivity MRI*, Invited by Prof. M. Breakspear, Queensland Institute of Medical Research, Brisbane, Australia, Octobre 2017.
- [T<sub>7</sub>] **R. Liégeois**, *From static to dynamic representations of resting-state Functional Connectivity MRI*, Invited by Prof. A. Zalesky, University of Melbourne, Australia, Septembre 2017.
- [T<sub>6</sub>] **R. Liégeois**, *Sparse plus low-rank graphical models identification in neuroimaging time series*, Invited by Prof. J. Songsiri, Chulalongkorn University, Bangkok, Thailand, October 2016.
- [T<sub>5</sub>] **R. Liégeois**, *Exploring brain dynamics to characterize Alzheimer's disease*, Rotary Seminars, Invited by the Rotary Club of Tanjong Pagar, Singapore, October 2016.
- [T<sub>4</sub>] **R. Liégeois**, *Defining dynamical markers of functional connectivity*, Seminar series of the Clinical Imaging Research Center, Singapore, July 2016.
- [T<sub>3</sub>] **R. Liégeois**, B. Mishra, and R. Sepulchre. *Optimizing the low-rank plus sparse decomposition of graphical models*, FNRS FRANSO Meeting, Liège, May 2015.
- [T<sub>2</sub>] **R. Liégeois**, *Time and time series*, The ULg-PhD meeting, Liège, January 2015.
- [T<sub>1</sub>] **R. Liégeois**, *Spectral properties of fMRI time series fluctuations on cerebral anatomy*, Resting fMRI workshop, Pitié-Salpêtrière Hospital, Paris, June 2013.

## Languages

French, English, Dutch, German.

## Additional information

- Outreach events Organization of the first Pecha-Kucha Night in Liège starring ULiège researchers presenting their work to a wide audience, November 2014.  
"Ma thèse en 180 secondes": participation (2014) and organization (2015).
- Sports Hot Air and Gas Balloon: pilot, fellow member of the Belgian Balloon Club  
Swimming, Circus Arts, Running
- Music Piano, Guitar, Organ