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Research Experience

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| Sept. 2017 | Postdoctorate Research Fellow <i>Under the supervision of Ruben Coen-Cagli.</i> Department of Comp. Biology, Albert Einstein College of Medicine (AECOM), New-York. |
| Jan. – Sept. 2017 | Postdoctorate Research Fellow <i>Under the supervision of Gabriel Peyré.</i> Département de Mathématiques et Applications (DMA), École Normale Supérieure, Paris. |
| 2013–2017 | PhD under the supervision of G. Peyré and C. Monier <i>Applied Mathematics and Neurosciences. Dynamic Textures Synthesis for Probing Vision in Psychophysics and Electrophysiology.</i> Link Dauphine University (Paris Sciences Lettres), Paris. Unité Neuroscience, Information et Complexité (UNIC-CNRS), Gif-sur-Yvette. |
| 2011–2012 | Research internship under the supervision of J-M. Morel and B. Coll <i>Texture synthesis: the Portilla-Simoncelli algorithm (statistical tools, optimization, C implementation).</i> Universitat de les Illes Balears, Mallorca. Centre de Mathématiques et de Leurs Applications (CMLA), Cachan. |

List of Contributions

In preparation

Vacher J., Briand T., The Portilla-Simoncelli Texture Model: Towards the Understanding of the Early Visual Cortex, *To be submitted to Image Processing On Line* [Link](#)

Pre-prints

Vacher J., Coen-Cagli R., Combining mixture models with linear mixing updates: multilayer image segmentation and synthesis, *arXiv 1905.10629, 2019* [Link](#)

Vacher J., Mamassian P., Coen-Cagli R., Probabilistic Model of Visual Segmentation, *arXiv 1806.00111, 2019* [Link](#)

Journals

Le Coënt A., Fribourg L., Vacher J., Wisniewski, R., Probabilistic reachability and control synthesis for stochastic switched systems using the tamed Euler method, *Nonlinear Analysis: Hybrid Systems, 2020* [Link](#)

Roggerone V., Vacher J., Tarlao C., Guastavino C., Auditory motion perception emerges from successive sound localizations integrated over time, *Scientific Reports, 2019* [Link](#)

Vacher J., Meso A. I., Perrinet L. U., Peyré G., Bayesian Modeling of Motion Perception using Dynamical Stochastic Textures, *Neural Computation, 2018* [Link](#)

Briand T., Vacher J., How to Apply a Filter Defined in the Frequency Domain by a Continuous Function ?, *Image Processing On Line* 6, 183-211, 2016 [Link](#)

Briand T., Vacher J., Galerne B., Rabin J., The Heeger-Bergen Pyramid Based Texture Synthesis Algorithm, *Image Processing On Line* 4, 276–299, 2014 [Link](#)

Conferences

Le Coënt A., Fribourg L., Vacher J, Control synthesis for stochastic switched systems using the tamed euler method, *IFAC Conference on Analysis and Design of Hybrid Systems*, 2018 [Link](#)

Vacher J., Meso A. I., Perrinet L. U., Peyré G., Biologically Inspired Dynamic Textures For Probing Motion Perception, *Advances in Neural Information Processing Systems*, 1918-1926, 2015 [Link](#)

Participation in Conferences

Upcoming

Feb. 2020 Poster: Measuring Human Probabilistic Segmentation Maps *Computational and Systems Neuroscience (Cosyne) 2020* [Link](#)

Past

Aug. 2019 Talk: An ideal observer model for grouping and contour integration in natural images *European Conference on Visual Perception* [Link](#)

June 2016 Poster: Supervised Learning Estimation of Functional Maps from VSD Imaging *International Conference on Mathematical NeuroScience (ICMNS)* [Link](#)

Dec. 2015 Poster and spotlight presentation: Biologically Inspired Dynamic Textures for Probing Motion Perception *Neural Information Processing Systems (NIPS)* [Link](#)

June 2015 Talk: Dynamic Texture Synthesis for Probing Visual Perception *7e Biennale Française des Mathématiques Appliquées et Industrielles (SMAI 2015)* [Link](#)

June 2015 Poster: A Mathematical Account of Dynamic Texture Synthesis for Probing Visual Perception *International Conference on Mathematical NeuroScience (ICMNS)* [Link](#)

Oct. 2014 Poster: Dynamic Textures for Probing Visual Perception *Workshop on Geometrical Models in Vision* [Link](#)

Participation in Review Committees

Conferences

Neural Information Processing Systems 2019 (NeurIPS): [Website](#)

Limited Labeled Data workshop @ICLR 2018–2019: [Website](#)

Computational and Systems Neuroscience 2020 (Cosyne): [Website](#)

International Conference on Machine Learning 2020 (ICML): [Website](#)

Journals

Image Processing On Line Journal (IPOL): [Website](#)

IEEE Transactions on Visualization and Computer Graphics: [Website](#)

Vision Research: [Website](#)

Professional Society Membership

since 2015 **Société de Mathématiques Appliquées et Industrielles** [Link](#)
since 2019 **Vision Science Society** [Link](#)

Awards and Scholarships

March 2019	Seal of Excellence for the project “Decompose the hierarchical process of human visual segmentation” <i>Certificate delivered by the European Commission, as the institution managing Horizon 2020, the EU Framework Programme for Research and Innovation 2014-2020</i> Link
2012–2013	Excellence Master’s Scholarship <i>Funding (10 000 euros) from the Fondation de Mathématiques Jacques Hadamard (FMJH)</i> Link

Computer Science

Operating systems	Linux, Windows
Languages	Python (parallel/GPU computing, scikit-learn, deep learning with PyTorch), Matlab (including PsychToolbox for psychophysics), basic knowledge in C/C++
Data knowledge	natural images, psychometric results, extracellular recordings, brain optical imaging

Teaching Activities

Oct. 2016	French tenured civil servant as teacher in mathematics <i>Availability for postdoctoral research.</i>
2013–2015	Lecturer in Analysis, Linear Algebra, Differential Calculus <i>Three hours a week. Mid to high level students.</i> Dauphine University, Paris.
July 2013	Highest mathematics competitive exam for academic teaching <i>Agrégation de mathématiques. French trainee civil servant as teacher in mathematics.</i>
2011–2013	Examiner in mathematics <i>Oral exam training. Two hours a week. High level students.</i> Classes Préparatoires aux Grandes Écoles, Janson de Sailly high school, Paris.

Higher Education

2013–2017	PhD in Applied Mathematics Dauphine University (Paris Sciences Lettres), Paris.
2011–2013	Master’s degree in mathematics <i>Mathematics, Vision and Learning. Graduated with honours.</i> École Normale Supérieure de Cachan.
2010–2011	Bachelor’s degree in mathematics <i>Applied Mathematics. Graduated with honours.</i> École Normale Supérieure de Cachan.

Languages

French: native / English: fluent / Spanish: basic

Interests and other activities

Sports: handball, hiking, tennis, ...

Video/Board Games: hearthstone, megawatt, smallworld, 7 wonders, ...

Music, cinema, sciences, social sciences, economy, politics, ...

President of the association "Les sENS de l’Art" in 2012: in charge of the organization of the annual art and music festival of ENS Cachan (budget: 40 000 euros).