

Jonathan Vacher
Albert Einstein College of Medicine
Department of Systems & Computational Biology
1301 Morris Park Avenue
10461 Bronx, NY, USA

E-mail : jonathan.vacher@einstein.yu.edu
Website : jonathanvacher.github.io

Research Experience

- Sept. 2017 **Postdoctorate Research Fellow** *Under the supervision of Ruben Coen-Cagli.*
Department of Comp. Biology, Albert Einstein College of Medicine (AECOM), New-York.
- 2016–2017 **Postdoctorate Research Fellow** *Under the supervision of Gabriel Peyré.*
Département de Mathématiques et Applications (DMA), École Normale Supérieure, Paris.
- 2013–2017 **PhD under the supervision of G. Peyré and C. Monier** *Applied Mathematics and Neurosciences. Dynamic Textures Synthesis for Probing Vision in Psychophysics and Electrophysiology.* [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** *Texture synthesis : the Portilla-Simoncelli algorithm (statistical tools, optimization, C implementation).* Universitat de les Illes Balears, Mallorca. Centre de Mathématiques et de Leurs Applications (CMLA), Cachan.

List of Contributions

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

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

| | |
|-----------|--|
| Aug. 2019 | Talk : An ideal observer model for grouping and contour integration in natural images <i>European Conference on Visual Perception</i> Link |
| June 2016 | Poster : Supervised Learning Estimation of Functional Maps from VSD Imaging <i>International Conference on Mathematical NeuroScience (ICMNS)</i> Link |
| Dec. 2015 | Poster and spotlight presentation : Biologically Inspired Dynamic Textures for Probing Motion Perception <i>Neural Information Processing Systems (NIPS)</i> Link |
| June 2015 | Talk : Dynamic Texture Synthesis for Probing Visual Perception <i>7e Biennale Française des Mathématiques Appliquées et Industrielles (SMAI 2015)</i> Link |
| June 2015 | Poster : A Mathematical Account of Dynamic Texture Synthesis for Probing Visual Perception <i>International Conference on Mathematical NeuroScience (ICMNS)</i> Link |
| Oct. 2014 | Poster : Dynamic Textures for Probing Visual Perception <i>Workshop on Geometrical Models in Vision</i> 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).