Lucile Mégret

Curriculum vitae

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PhD in mathematics

Current position

Since November 2020, I am lecturer (Maîtresse de conférences) in Sorbonne Université, UMR 8256 - Biological Adaptation and Ageing in the team Compensation Systems in Neurodegenerative Disease and Aging (BrainC).

Education

2016 **PhD in mathematics**, *Jacques-Louis lion laboratory (Pierre et Marie Curie University, Paris) & MYCENAE project team (INRIA, Paris)*, Thesis entitled: *Limits cycles explosions, qualitative analysis, numerical simulations and models*
Supervisors: J.-P. Françoise (JLL lab) & F. Clement (MYCENAE)

2013 **BS in mathematics for modeling**, *UPMC (Paris), école polytechnique, ENS ULM*

2012 **BS in basic mathematics**, *Joseph Fourier University (Grenoble)*

Postgraduate training

01/2020-31/2020 **Post-doctoral position in machine learning**, team “BrainOmics" of the lab “NeuroSpine ", CEA

03/2017-12/2019 **Post-doctoral position in biostatistics, bioinformatics and modeling**, team “Compensation Systems in Neurodegenerative Disease and Aging - BrainC" of the lab “Biological Adaptation and Ageing ", UMR 8256 Pierre et Marie Curie University

Teachings

Teaching on a regular basis (192 hours/year), at every level from first year of university to M2 level at Sorbonne University (Paris), mostly in the math-stat-info division of the department of biology, but also in the departments of mathematics and informatics.

Training/Supervision

2022 **M1 Biologie Intégrative et Physiologie**, *Lyon 1*, Marwan Belhachmi

2021 **M1 Biologie Intégrative et Physiologie**, *Sorbonne Université*, Maxime Guedre

Selected/Invited talks at international conferences

12/2022 **NSERM-JSPS Workshop, AI and big data approaches in precision medicine and health science**, *Use of shape analysis concepts in machine learning to precisely analyze complex omics data*, Yamaguchi, Japan

10/2022 **The 21st International Conference on Systems Biology (ICSB 2022)**, *Precision machine-learning identifies a new paradigm for therapeutic discovery in Huntington's disease: remodeling stress response to re-instate neuronal health and resilience*, Berlin, Germany

03/2022 **2nd Euro-Geroscience Conference**, *Precise machine learning suggest that brain cells facing a neurodegenerative insult are the subject of molecular decompensation and aging*, Toulouse, France

10/2021 **Groningen-Jena Aging Meeting (G-JAM)**, *Precise machine learning suggest that brain cells facing a neurodegenerative insult are the subject of molecular decompensation and aging*, remote

09/2019 **EMBO Workshop, Network inference in biology and disease**, *miRAMINT: modelling RNA-seq time-series data through variable selection and surface matching narrows the implication of miRNAs in the brain of Huntington's disease knock-in mice*, Naples, Italy

Publications and pre-print(s)

Pre-print(s)

1 **T. T. Yen. Nguyen, W. Harchaoui, L. Mégret, C. Mendoza, O. Bouaziz, C. Neri, A. Chambaz***, *Optimal transport-based machine learning to match specific patterns: application to the detection of molecular regulation patterns in omics data*, arXiv:2107.11192, under review , (2023)

Original publications

2 **L. Mégret, B. Gris, S. S. Nair, J. Cevost, M. Wertz, J. Aaronson, J. Rosinski, T. F Vogt, H. Wilkinson, M. Heiman, C. Neri**, *Shape deformation analysis reveals the temporal dynamics of cell-type-specific homeostatic and pathogenic responses to mutant huntingtin*, Elife, (2021)

3 **L. Mégret, S. S. Nair, J. Dancourt, J. Aaronson, J. Rosinski, C. Neri**, *Combining feature selection and shape analysis uncovers precise rules for miRNA regulation in Huntington's disease mice* , BMC Bioinformatics, 21, 75, (2020)

4 **L. Mégret, J. Demongeot**, *Gevrey solutions of singularly perturbed differential equations, an extension to the non-autonomous case*, Discrete & Continuous Dynamical Systems - S (AIMS), (2019)

5 *__J. Demongeot, D. Istrate, H. Khlaifi, L. Mégret, C. Taramasco, R. Thomas__*, *From conservative to dissipative non-linear differential systems. An application to the cardio-respiratory regulation*, Discrete & Continuous Dynamical Systems - S (AIMS), (2019)
* Author names by alphabetic order

6 **A. Vergallo, L. Mégret, S. Lista, E. Cavedo, H. Zetterberg, K. Blennow, E. Vanmechelen, A. De Vos, M.-O. Habert, M.-C. Potier, B. Dubois, C. Neri, H. Hampel**, *Plasma amyloid beta 40/42 ratio predicts cerebral amyloidosis in cognitively normal individuals at risk for Alzheimer's disease*, Alzheimer & Dementia, 15(6), pp.764-775 (2019)

7 **E. Bigan, N. S. Sasidharan, F.X. Lejeune, H. Fragnaud, F. Parmentier, L. Mégret, M. Verny, J. Aaronson, J. Rosinski, C. Neri**, *Genetic cooperativity in multi-layer networks implicates cell survival and senescence in the striatum of Huntington's disease mice synchronous to symptoms*, Bioinformatics, (2019)

8 **L. Mégret**, *Studies of the Petrov Module for a Family of Generalized Liénard Integrable Systems*, Qualitative Theory of Dynamical Systems, 20(2), pp.1-21 (2017)

9 *__M. Desroches, J.-P. Françoise, L. Mégret__, *Canard-Induced Loss of Stability Across a Homoclinic Bifurcation*, Arima, 20, pp. 47-62 (2015)

* Author names by alphabetic order

Review

1 **L. Mégret, C. Mendoza, M. Arrieta Lobo, E. Brouillet, T.-T.-Y. Nguyen, O. Bouaziz, A. Chambaz, C. Neri**, *Precision machine learning to understand micro-RNA regulation in neurodegenerative diseases*, Front Mol Neurosci., (2022)

Services

2023- **Scientific Council**, *Association Huntington France (AHF)*, AHF funds Ph.D. fellowships for research on HD

Scientific dissemination

09/2021-01/2022 **Press review editor**, *for the CNRS review "Image des maths" (in french)*