Pascal Grange

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PROFESSIONAL EXPERIENCE

1/2014– : Xi'an Jiaotong-Liverpool University, Suzhou.
Lecturer 5, Department of Mathematical Sciences.
Module leader for Quantum Mechanics (MTH311) and Cartesian Tensors (MTH308).
Fellow of the Higher Education Academy (Certificate of Professional Studies in Learning and Teaching in Higher Education obtained in October 2016, with merit).

2009–2013 : Cold Spring Harbor Laboratory. Computational postdoc.
PIs: Partha P. Mitra and Michael Hawrylycz (Allen Institute).
- Developed software to analyse gene-expression data (Allen Brain Atlas).
- Analysed brain-wide expression profiles of genes related to autism and addiction.

2008–2009: Goldman Sachs, London. Associate strategist.
Priced options and monitored risks.

2006–2008: University of Hamburg, Zentrum für mathematische Physik.
Postdoctoral fellow.
Published work on mirror symmetry with magnetic fluxes.

2005–2006: Institute for Advanced Study, Princeton.
Member, School of Natural Sciences.
Published work on phase transitions in string theory.

EDUCATION AND TRAINING

2002–2005: École polytechnique, Paris.
PhD in theoretical physics, with highest honors. Advisor: Ruben Minasian (Saclay).
Thesis: *D-branes, effective actions and mirror symmetry.*

2001–2002: CERN Theory Division, Geneva. Research internship.

2000–2001: Université Paris 7. M.S. in mathematics, with honors.

2000–2003: École des ponts, Paris. Degree in mathematical engineering.

1997–2000: École polytechnique, Paris. Degree in engineering.
Majoring in physics, minoring in mathematics.

HONORS AND RESPONSIBILITIES

- **L.E. Rivot Prize** awarded in 2000 by the **Académie des sciences**, Paris (four prizes awarded annualy for scientific excellence at École polytechnique).

- Refereed papers for the **Journal of High Energy Physics**, **PLoS Computational Biology**, **Frontiers in Computational Neuroscience**, **Bioinformatics**.

PUBLICATIONS

1. P. Grange, *Log-gamma directed polymer with one free end via coordinate Bethe Ansatz*, accepted in Journal of Statistical Mechanics, [arXiv:1701.08606 [cond-mat.dis-nn]].

2. P. Grange, *Quantum centipedes with strong global constraint*, Journal of Physics A: Mathematical and Theoretical **50** 22, 5302 (2017), [arXiv:1608.04711 [cond-mat.dis-nn]].

3. M. Hawrylycz *et al.*, *Canonical genetic signatures of the adult human brain*, Nature Neuroscience (2015) **18 (12)**, 1832–1844.

4. P. Grange, I. Menashe and M. Hawrylycz, *Cell-type-specific neuroanatomy of cliques of autism-related genes in the mouse brain*, Frontiers in Computational Neuroscience **9**, 55.

5. P. Grange, J.W. Bohland, B.W. Okaty, K. Sugino, H. Bokil, S.B. Nelson, L. Ng, M. Hawrylycz and P.P. Mitra, *Cell-type–based model explaining coexpression patterns of genes in the brain*, PNAS 2014 111 (14) 5397–5402.

6. I. Menashe, P. Grange, E.C. Larsen, S. Banerjee-Basu and P.P. Mitra, *Co-expression profiling of autism genes in the mouse brain*. PLoS computational biology, 9(7), e1003128.

7. P. Grange, M. Hawrylycz and P.P. Mitra, *Computational neuroanatomy and co-expression of genes in the adult mouse brain, analysis tools for the Allen Brain Atlas*, Quantitative Biology 2013, **1(1)**: 91–100, [arXiv:1301.1730 [q-bio.QM]].

8. P. Grange and P.P. Mitra, *Computational neuroanatomy and gene expression: optimal sets of marker genes for brain regions*, in IEEE, 46th Annual Conference on Information Sciences and Systems, Princeton 2012, [arXiv:1205.2721 [q-bio.QM]].

9. P. Grange and S. Schäfer-Nameki, *Towards mirror symmetry à la SYZ for generalized Calabi–Yau manifolds*, JHEP **0710**, 052 (2007), [arXiv:0708.2392 [hep-th]].

10. P. Grange and S. Schäfer-Nameki, *Noncommutativity, T-folds and $G \times G$ structure*, Nucl. Phys. **B770**, 123 (2007), [arXiv:hep-th/0609084].

11. P. Grange and R. Minasian, *Tachyon condensation and D-branes in generalized geometries*, Nucl. Phys. **B741**, 199 (2006), [arXiv:hep-th/0512185].

12. P. Grange and R. Minasian, *Modified pure spinors and mirror symmetry*, Nucl. Phys. **B732**, 366 (2006), [arXiv:hep-th/0412086].

13. P. Grange, *Tachyon potential in a magnetic field with anomalous dimensions*, JHEP **0506**, 018 (2005), [arXiv:hep-th/0410180].

14. P. Grange, *Deformation of p-adic amplitudes in a magnetic field*, Phys. Lett. **B616**, 135 (2005), [arXiv:hep-th/0409305].

15. P. Grange, *Branes as stable holomorphic line bundles on the noncommutative torus*, JHEP **0410**, 002 (2004), [arXiv:hep-th/0403126].

16. P. Grange, *Modified star-products beyond the large-B limit*, Phys. Lett. **B586**, 125 (2004), [arXiv:hep-th/0304059].

17. P. Grange, *Derivative corrections from boundary state computations*, Nucl. Phys. **B649**, 297 (2003), [arXiv:hep-th/0207211].

SOFTWARE

`Brain Gene Expression Analysis`, MATLAB toolbox (analysis of brain-wide gene-expression data), see `http://pjgrange.github.io` for download instructions and manual.

MAIN CONFERENCES AND PRESENTATIONS

2017: – **Multiscale modeling and experimental approaches to genome organization**, Les Houches. Poster: *From genome-wide data to cell-type-specificity maps of the brain*.

2016: – **Genomics of Brain Discorders, Wellcome Genome Campus**, Cambridge.
Poster: *Cell-type-specificity of brain-wide expression profiles of cliques of autism-related genes*.
– **1st XJTLU Research Festival**, Suzhou.
Oral presentation: *Computational maps of complex systems: putting coordinates on the brain*.

2014: **Analyzing Brainomics (workshop of NIPS, Neural Information Processing Systems)**, Montreal.
Invited presentation: *Region-specificity of cell types in the mouse brain*.

2012: – **Neuroscience 2012**, New Orleans.
Poster: *A software suite for multivariate analysis of brain-wide gene-expression*.
– **Neuroinformatics 2012, Marine Biological Laboratory**, Woods Hole.
Lecture: *Analysis of brain-wide gene-expression data*.
– **46th Conference on Information Sciences and Systems**, Princeton.
Invited talk: *Computational neuroanatomy and gene expression*.

2011: – **Neuroscience 2011**, Washington, D.C.
Poster: *Distribution of cell types in the mouse brain from the Anatomic Gene Expression Atlas*.
– **Circuits and connectivity in the vertebrate brain**, Cold Spring Harbor.
Lecture: *Computational methods for neuroanatomy*.
– **Network architecture of brain structures, KITP**, Santa Barbara.
Talk: *The Allen Gene Expression Atlas and neuronal cell types*.

2010: **Neuroscience 2010**, San Diego. Two posters:
– *Marker genes and the anatomy of the mouse brain*,
– *Computer-guided stereotactic injections*.

2007: – **Workshop on Poisson geometry, Erwin Schrödinger Institut**, Vienna.
Talk: *Magnetic fluxes and generalized geometry*.

2006: – **Institute for Advanced Study**, Princeton.
Seminar talk: *Tachyon condensation and generalized spaces*.

2004: – **Caltech, Duke** and **Upenn**: seminar talks on mirror symmetry with magnetic fluxes.
– **Prospects in theoretical physics, IAS**, Princeton. Summer school.
– **Random matrices in physics, Les Houches**. Summer school.

2003: – **XIIth Meeting on geometry, topology and physics, University of Oporto**.
Oral presentation: *Noncommutativity in D-brane effective actions*.
– **Frontiers in number theory, geometry and physics, Les Houches**. Winter school.

ADDITIONAL INFORMATION

- **Computing**: MATLAB, C++.

- **Languages**: French (mother tongue), English, German, elementary Mandarin Chinese (HSK3, obtained in January 2017 with a score of 398/400).

- **Extra-scientific interests**: middle and long-distance running (2009 Paris Marathon finisher), collecting Chinese scholar's objects of the Ming and Qing dynasties.