Pascal Grange

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PROFESSIONAL EXPERIENCE

01/2014–: **Xi'an Jiaotong-Liverpool University**, Suzhou.
Lecturer 5, Department of Mathematical Sciences.
Honorary lecturer, University of Liverpool.
Courses taught: Quantum Mechanics (MTH311), Cartesian Tensors (MTH308).

2009–2013 : **Cold Spring Harbor Laboratory**. Computational postdoc.
PIs: Partha P. Mitra and Michael Hawrylycz (Allen Institute).
- Developed software to analyze gene-expression data (Allen Brain Atlas).
- Performed statistical analysis of 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.
Thesis: *D-branes, effective actions and mirror symmetry.*

2001–2002: **CERN Theory Division**, Geneva. One-year 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 undergraduate excellence at École polytechnique).
- Refereed papers for the **Journal of High Energy Physics**, **Frontiers in Neuroscience**, **PLoS Computational Biology**, **Bioinformatics**.

PUBLICATIONS AND PREPRINTS

Computational neuroscience

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

Theoretical high-energy physics

- 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]]`.
- P. Grange and S. Schäfer-Nameki, *Noncommutativity, T-folds and $G \times G$ structure*, Nucl. Phys. **B770**, 123 (2007), `[arXiv:hep-th/0609084]`.
- P. Grange and R. Minasian, *Tachyon condensation and D-branes in generalized geometries*, Nucl. Phys. **B741**, 199 (2006), `[arXiv:hep-th/0512185]`.
- P. Grange and R. Minasian, *Modified pure spinors and mirror symmetry*, Nucl. Phys. **B732**, 366 (2006), `[arXiv:hep-th/0412086]`.
- P. Grange, *Tachyon potential in a magnetic field with anomalous dimensions*, JHEP **0506**, 018 (2005), `[arXiv:hep-th/0410180]`.
- P. Grange, *Deformation of p-adic amplitudes in a magnetic field*, Phys. Lett. **B616**, 135 (2005), `[arXiv:hep-th/0409305]`.
- P. Grange, *Branes as stable holomorphic line bundles on the noncommutative torus*, JHEP **0410**, 002 (2004), `[arXiv:hep-th/0403126]`.
- P. Grange, *Modified star-products beyond the large-B limit*, Phys. Lett. **B586**, 125 (2004), `[arXiv:hep-th/0304059]`.
- 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), available from Github.

MAIN CONFERENCES AND PRESENTATIONS

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

2012: – **Neuroscience 2012**, New Orleans.
Poster (first author), with J.W. Bohland, M. Hawrylycz and P.P. Mitra, *A software suite for multivariate analysis of brain-wide gene-expression.*
– **Neuroinformatics 2011, 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 (first author), with B. Okaty, K. Sugino, S. Nelson, M. Hawrylycz and P.P. Mitra: *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.*
– **Neuroinformatics 2011, Marine Biological Laboratory**, Woods Hole.

2010: **Neuroscience 2010**, San Diego. Two posters (first author):
– with P.P. Mitra, *Marker genes and the anatomy of the mouse brain*,
– with M. Henkelman and P.P. Mitra, *Computer-guided stereotactic injections.*

2007: – **Workshop on Poisson geometry, Erwin Schrödinger Institut**, Vienna.
Talk: *Magnetic fluxes and generalized geometry.*
– **DESY**, Hamburg. *Workshop on flux compactifications.*
Talk: *Nongeometric backgrounds.*

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

2004: – **Caltech, Duke** and **Upenn**: talks on mirror symmetry with magnetic fluxes.
– **Prospects in theoretical physics, IAS**, Princeton. Summer school.
– **Random matrices in physics, Les Houches**. Summer school.
– **Institut Henri Poincaré**, Paris. Talk: *Noncommutativity and stable bundles.*

2003: – **XIIth Meeting on geometry, topology and physics, University of Oporto**. Talk: *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.
- **Extra-scientific interests**: middle and long-distance running (2009 Paris Marathon finisher), collecting Chinese scholar's objects of the Ming and Qing dynasties.