Pierre J. Clavier

Curriculum Vitae

Education

2015–Present **Post-doc**, *Institute für Mathematik*, Potsdam.

2012–2015 **PhD**, *Pierre et Marie Curie University (UPMC)*, Paris.

2010–2012 **MSc**, *Paris-Sud University*, ENS Ulm and Imperial College London.

2007–2010 **BSc**, *Paris-Sud University*, Orsay.

Experiences in Research

2015–Present **Post-Doc**, Institut für Mathematik; Potsdam Universität.

Formalisation of the physical concept of locality and application to renormalisation and geometry. I am also interested by the theory of rough paths. Adressed topics:

- Locality structures and applications to renormalisation and distributions over manifolds.
- Hopf algebra of renormalisation.
- Universal property of rooted forests and generalisation.
- Analytic renormalisation, multivariate complex analysis (through the geometry of cones).
- Higher zeta numbers.

2012–2015 **PhD**, *Analytic and geometric approaches of non-perturbative aspects of quantum field theories*, Advisor: Pr Marc P. Bellon, LPTHE; Paris VI.

I mainly studied Schwinger–Dyson equations, in particular through the prism of Ecalle's resurgence theory. With other collaborators (C. Brouder, V. Dang Nguyen and F. Hélein) I have also studied geometric aspects of the BRST and Batalin–Vilkovisky formalisms. Adressed topics:

- Alien calculus and resurgence applied to Schwinger–Dyson equations.
- Integration of polyvector fields (Batalin–Vilkovisky formalism).
- BRST cohomology.

Spring 2012 **Msc internship**, *Representation of a generalisation of the Virasoro algebra*, Supervisors: Dr. Robin Zegers & Pr Vincent Rivasseau, LPT; Paris XI.

My goal was to extend a generalisation of the Virasoro algebra stepping from the random tensors theory to obtain a semi-simple algebra.

Spring 2011 **Msc internship**, *Orbiting Branes in Supergravity*, Supervisor: Pr. Kellogg Stelle, Theoretical Physics Group; Imperial College.

I have studied the stability of BPS solutions to eleven dimensional supergravity under various kind of perturbations.

2010-2011 **MSc Project**, *BPS Branes and Supergravity*, Supervisor: Pr. Kellogg Stelle, Theoretical Physics Group; Imperial College.

This six month project was the foreword of the internship above. I have learnt there the basics of differential geometry which were not part of the curriculum. I have also seen how the BPS solutions to eleven dimensional supergravity were built.

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Summer 2010 **Bsc internship**, *Introduction to the Bethe ansatz and to spin chains*, Supervisor: Dr. Robin Zegers, LPT; Paris XI.
This was an introduction to the notion of integrability through the notion of spin chains.

Selected list of presentations

Nov. 2017 **Alien calculus and non-perturbative mass generation**, *Analysis and Geometry in Cargèse*, Cargèse, France.

May 2017 **Branching processes and renormalization**, *7th Annual ERC Berlin-Oxford on Applied Stochastic Analysis*, Berlin, Germany.

March 2017 **Renormalization of Feynman integrals**, *Mathematics and Physics meet in la Habana*, La Habana, Cuba.

Dec. 2016 **A generalization of the universal property of rooted trees**, *Seminar of the group: Probability theory and Mathematical Finance*, TU Berlin, Allemagne.

Aout 2016 **Branching procedure and tree-like iterated sums**, *Workshop on Renormalization and Mathematical Physics*, Sichuan University, Chengdu, Chine.

Aout 2015 **Alien calculus and transeries for a Schwinger-Dyson equation**, *Renormalization in statistical physics and lattice field theories*, Université de Montpellier, France.

Sept. 2014 **Solving a Dyson–Schwinger equation around its first singularities in the Borel plane**, *Dyson-Schwinger Equations in Modern Mathematics and Physics*, ECT*, Trento, Italie.

Professional Skills

Languages

French **Mothertongue**

English **Advanced** *Professional and colloquial*

German **Intermediate** *B1 level*

Russian **Basic** *Basic words and phrases only*

organisational duties

Organisator of conference at ESI Vienna

Co-author of a DFG project

Organiser of the Analysis group seminar since 2017

Co-editor of the proceeding of the Ouagadougou summer school

Organiser of a PhD students seminar for two years

Teaching

In post-doc **Management of two master internships** *In french and english*

In post-doc **Teaching assistant** (undergraduate and master courses) *In german and english*

During PhD **Teaching assistant** (undergraduate courses) *In french*

References

Pr. Dr. Sylvie Paycha, Supervisor.
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Pr. Dominique Manchon, Colleague.
Dominique.Manchon@math.univ-bpclermont.fr

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