SOLESNE BOURGUIN

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EMPLOYMENT

Boston University – Associate Professor	2022–Present
Boston University – Assistant Professor	2015–2022
Carnegie Mellon University – Zeev Nehari Visiting Assistant Professor	2013–2015
University of Luxembourg – Marie Curie Postdoctoral Fellow	2012–2013
New York Branch of Dexia Credit Local – Quantitative Analyst	2007–2008

EDUCATION

Ph.D. in Mathematics – University of Paris Panthéon-Sorbonne (Advisor: Ciprian A. Tudor)	2008–2011
M.S. in Mathematics – University of Paris Panthéon-Sorbonne	2006–2007
M.S. in Mathematical Engineering – Ecole des Mines de Nantes	2003–2006

RESEARCH INTERESTS

Malliavin calculus, Markov diffusion operators and Dirichlet forms, regularity of laws, Stein's method and limit theorems, free probability and random matrices, fractional Brownian motion and related processes

PUBLICATIONS

[1] **S. Bourguin**, T. Dang and K. Spiliopoulos, *Moderate deviation principle for multiscale systems driven by fractional Brownian motion*, preprint (2022)

[2] **S. Bourguin**, S. Campese and T. Dang, *Functional Gaussian approximations in Hilbert spaces: the non-diffusive case*, preprint (2022)

[3] **S. Bourguin** and T. Dang, *High dimensional regimes of non-stationary Gaussian correlated Wishart matrices*, Random Matrices: Theory and Applications, no. 1, Paper No. 2250006, 43 pp. (2022)

[4] **S. Bourguin**, S. Gailus and K. Spiliopoulos, *Discrete-time inference for slow-fast systems driven by fractional Brownian motion*, Multiscale Modeling and Simulation: A SIAM Interdisciplinary Journal (MMS), vol. 19, no. 3, 1333–1366 (2021)

[5] **S. Bourguin**, S. Gailus and K. Spiliopoulos, *Typical dynamics and fluctuation analysis of slow-fast systems driven by fractional Brownian motion*, Stochastics and Dynamics, vol. 21, no. 7, 2150030, 30pp. (2021)

[6] **S. Bourguin**, C.P. Diez and C.A. Tudor, *Limiting behavior of large correlated Wishart matrices with chaotic entries*, Bernoulli, vol. 27, no. 2, 1077–1102 (2021)

[7] **S. Bourguin** and S. Campese, *Approximation of Hilbert-valued Gaussians on Dirichlet structures*, Electronic Journal of Probability, vol. 25, paper no. 150, 30pp. (2020)

[8] **S. Bourguin** and I. Nourdin, *Freeness characterizations on free chaos spaces*, Pacific Journal of Mathematics, vol. 305, no. 2, 447–472 (2020)

[9] **S. Bourguin**, S. Campese, N. Leonenko and M.S. Taqqu, *Four moments theorems on Markov chaos*, The Annals of Probability, vol. 47, no. 3, 1417–1446 (2019)

[10] **S. Bourguin** and C. Durastanti, *On high-frequency limits of U-statistics in Besov spaces over compact manifolds*, Illinois Journal of Mathematics, vol. 61, no. 1-2, 97–125 (2018)

[11] **S. Bourguin** and C. Durastanti, *On normal approximations for the two-sample problem on multidimensional tori*, Journal of Statistical Planning and Inference, vol. 196, 56–69 (2018)

[12] **S. Bourguin** and S. Campese, *Free quantitative fourth moment theorems on Wigner space*, International Mathematics Research Notices IMRN, vol. 2018, no. 16, 4969–4990 (2017)

[13] **S. Bourguin**, *Vector-valued semicircular limits on the free Poisson chaos*, Electronic Communications in Probability, vol. 21, no. 55, 1–11 (2016)

[14] **S. Bourguin**, C. Durastanti, D. Marinucci and G. Peccati, *Gaussian approximations of nonlinear statistics on the sphere*, Journal of Mathematical Analysis and Applications, vol. 436, no. 2, 1121–1148 (2016)

[15] **S. Bourguin** and C.A. Tudor, *On the law of the solution to a stochastic heat equation with fractional noise in time*, Random Operators and Stochastic Equations, vol. 23, no. 3, 179–186 (2015)

[16] **S. Bourguin**, *Poisson convergence on the free Poisson algebra*, Bernoulli, vol. 21, no. 4, 2139–2156 (2015)

[17] **S. Bourguin** and G. Peccati, *Semicircular limits on the free Poisson chaos: counterexamples to a transfer principle*, Journal of Functional Analysis, vol. 267, no. 4, 963–997 (2014)

[18] **S. Bourguin** and G. Peccati, *Portmanteau inequalities on the Poisson space: mixed regimes and multidimensional clustering*, Electronic Journal of Probability, vol. 19, no. 66, 1–42 (2014)

[19] O. Aboura and **S. Bourguin**, *Density estimates for solutions to one dimensional backward SDE's*, Potential Analysis, vol. 38, no. 2, 573–587 (2013)

[20] **S. Bourguin** and J.C. Breton, *Asymptotic Cramér type decomposition for Wiener and Wigner integrals*, Infinite Dimensional Analysis, Quantum Probability and Related Topics, vol. 16, no. 1, 1–13 (2013)

[21] **S. Bourguin** and C.A. Tudor, *Malliavin calculus and self normalized sums*, Séminaire de Probabilités XLV, Lecture Notes in Mathematics, Springer (2013)

[22] **S. Bourguin** and C.A. Tudor, *Asymptotic theory for fractional regression models via Malliavin calculus*, Journal of Theoretical Probability, vol. 25, no. 2, 536–564 (2012)

[23] **S. Bourguin** and C.A. Tudor, *Berry-Esséen bounds for long memory moving averages via Stein's method and Malliavin calculus*, Stochastic Analysis and Applications, vol. 29, no. 5, 881–905 (2011)

[24] **S. Bourguin** and C.A. Tudor, *Cramér's theorem for gamma random variables*, Electronic Communications in Probability, vol. 16, 365–378 (2011)

BOOK CHAPTERS

[25] **S. Bourguin**, C. Durastanti, D. Marinucci and G. Peccati, *U-statistics on the spherical Poisson space*, in Stochastic analysis for Poisson point processes: Malliavin calculus, Wiener-Itô chaos expansions and stochastic geometry, Bocconi & Springer Series, Springer (2016)

[26] **S. Bourguin** and G. Peccati, *The Malliavin-Stein method on the Poisson space*, in Stochastic analysis for Poisson point processes: Malliavin calculus, Wiener-Itô chaos expansions and stochastic geometry, Bocconi & Springer Series, Springer (2016)

AWARDS AND GRANTS

Simons Foundation collaboration grant for Mathematicians	2019–2024
NSF Travel Grant	2014
Marie Curie Postdoctoral Fellowship, Fond National de la Recherche, Luxembourg	2012–2013
Ecos-Sud Grant, Ministère de l'Education Nationale et de la Recherche, France	2011

MENTORING EXPERIENCE

Thanh Le Nhat Dang: Ph.D. graduate student, Boston University 2017–2022
Title of thesis: On non-stationary Wishart matrices and functional Gaussian approximations in Hilbert spaces
First position: Postdoctoral fellow at Florida State University

Siragan Gailus: Postdoctoral fellow, Boston University 2018–2020
First position: Postdoctoral fellow at Technische Universität Berlin, Germany

Simon Campese: Postdoctoral fellow, Boston University 2018–2019
First position: Postdoctoral fellow at Technische Universität Hamburg, Germany

Chen Xing: Master's student, Boston University 2016
Title of project: Stein's method and Malliavin calculus
First position: Ph.D. graduate student at University of North Carolina at Chapel Hill

TEACHING EXPERIENCE

Probability Theory II (GRS MA780 – Boston University) Spring 18, 19, 20, 21, 22
Level: Graduate

Mathematics of financial derivatives (CAS MA577 – Boston University) Fall 16, 17, 18, 19, 20, 21
Level: Undergraduate

Basic probability and statistics (CAS MA213 – Boston University) Fall 17, 18, 19, 20, 21, Summer 18
Level: Undergraduate

Calculus II (CAS MA 124 – Boston University) Summer 16, 17
Level: Undergraduate

Introduction to stochastic processes (CAS MA 583 – Boston University) Spring 17
Level: Undergraduate

Honors linear algebra (CAS MA 442 – Boston University) Spring 16
Level: Undergraduate

Malliavin calculus (GRS MA881 – Boston University) Fall 15
Level: Graduate

Concepts of mathematics (Math 127 – Carnegie Mellon University) Summer 15
Level: Undergraduate

Malliavin calculus (Math 881 – Carnegie Mellon University) Spring 15
Level: Graduate

Real Analysis I (Math 355 – Carnegie Mellon University) Fall 13, 14
Level: Undergraduate

Advanced topics in stochastic analysis (Math 880 – Carnegie Mellon University) Spring 14
Level: Graduate

Interest rate modeling (Université de Lille, France) Fall 11, 12
Level: Graduate

ACADEMIC SERVICE

Service for the College of Arts and Sciences: Member of the Natural Sciences Curiculum committee (2021, 2022).

Service for the department: Graduate committee (2019, 2020, 2021, 2022), Undergraduate committee (2019, 2020), Member of two focus groups in the framework of the statistics program mini-retreat series (2018, 2019), Academic advisor (2018–Present), Computer committee (2018, 2019, 2020, 2021), Probability and statistics graduate admissions committee at Boston University (2016, 2017, 2018, 2019, 2020, 2021), Search committee for a tenure-track position in probability and stochastic processes at Boston University (2017), Department website committee at Boston University (2016, 2017), Organizer of the probability and statistics seminar at Boston University (2015, 2016, 2017, 2018), Coorganizer of the CCF Seminar at Carnegie Mellon University (2014, 2015), Organizer of the probability working group at University of Paris Panthéon-Sorbonne (2009, 2010).

Service outside of the university: Reviewer for Mathematical Reviews, The Annals of Probability, Electronic Journal of Probability, Bernoulli, Stochastic Processes and their Applications, Potential Analysis, Random Matrices: Theory and Applications, Journal of Mathematical Analysis and Applications, Infinite Dimensional Analysis and Quantum Probability, Latin American Journal of Probability and Mathematical Statistics, Journal of Dynamical and Control Systems, Journal of Theoretical Probability, Journal of Multivariate Analysis, Statistics, Acta Mathematica Sinica, Journal of Applied Mathematics, Statistics and Probability Letters, High Dimensional Probability VII, Science China Mathematics, Advances in Applied Probability, Acta Mathematica Vietnamica, Complex Analysis and Operator Theory.

INVITED PRESENTATIONS

Mathematics Seminar Series, University of Massachusetts Boston November 24th, 2021
Title: *Stein's method, stochastic calculus of variations, and random matrices*

MAA and AWM lecture series, Boston University April 12th, 2021
Title: *What is noncommutative probability?*

Probability and statistics seminar, Boston University March 25th, 2021
Title: *Regularity of forward-backward SDEs via PDE techniques*

10th World Congress in Probability and Statistics, Seoul, South Korea August 18th, 2020
Title: *Limiting behavior of large correlated Wishart matrices*

German Probability and Statistics Days, Dresden, Germany March 25th, 2020

Title: *Regularity of forward-backward SDEs via PDE techniques*

Asymptotic expansion and Malliavin calculus II, Institut Henri Poincaré, Paris, France — December 11th, 2019
Title: *Regularity of forward-backward SDEs via PDE techniques*

London analysis and probability seminar, University College London, London, UK — May 28th, 2019
Title: *Regularity of forward-backward SDEs via PDE techniques*

Stochastics seminar, Worcester Polytechnic Institute — April 2nd, 2019
Title: *Four moments theorems on Markov chaos*

New developments in free probability and applications, CRM, Montreal, Canada — March 26th, 2019
Title: *Freeness characterizations on free chaos spaces*

Probability seminar, University of Luxembourg, Luxembourg — August 20th, 2018
Title: *Four moments theorems on Markov chaos*

Analysis and Probability seminar, University of Tennessee in Knoxville — April 10th, 2018
Title: *Four moments theorems on Markov chaos*

Stochastic analysis seminar, Kansas University — February 22nd, 2018
Title: *Four moments theorems on Markov chaos*

Analysis and probability seminar, University of Connecticut — December 1st, 2017
Title: *Finitely many moments theorems on Markov chaos*

Mathematical Congress of the Americas, McGill University, Montreal, Canada — July 25th, 2017
Title: *Some recent results on Wigner integrals*

Mathematical Finance, Probability and PDE Conference, Rutgers University — May 18th, 2017
Title: *Finitely many moments theorems on Markov chaos*

Probability seminar, Brown University — December 6th, 2016
Title: *Recent developments on Wigner integrals*

Free probability seminar, Saarland University, Saarbrücken, Germany — June 16th, 2016
Title: *Abstract Fourth Moment Theorems*

Probability seminar, University of Rome Tor Vergata, Rome, Italy — May 18th, 2016
Title: *Gaussian approximation of nonlinear statistics on the sphere*

Free probability seminar, Texas A&M University — April 7th, 2016
Title: *Limit theorems and characterization of freeness on the free Poisson chaos*

Probability seminar, University of California San Diego — February 18th, 2016
Title: *Portmanteau inequalities on the Poisson space*

Stochastics seminar, Georgia Institute of Technology — April 23rd, 2015
Title: *Semicircular limits and transfer principles on the free Poisson chaos*

Probability and mathematical finance seminar, University of Pittsburgh — March 18th, 2015
Title: *Density analysis of BSDEs*

Probability and statistics seminar, Boston University — January 30th, 2015
Title: *Semicircular limits and transfer principles on the free Poisson chaos*

Mathematics colloquium, Carnegie Mellon University — January 14th, 2015
Title: *Semicircular limits and transfer principles on the free Poisson chaos*

Probability and mathematical finance seminar, Carnegie Mellon University — September 29th, 2014
Title: *Density analysis of BSDEs*

Latin American Congress of Probability, Cartagena de Indias, Colombia — September 23rd, 2014
Title: *Semicircular limits on the free Poisson algebra*

Probability seminar, University of Rome Tor Vergata, Rome, Italy — June 18th, 2014
Title: *Portmanteau inequalities on the Poisson space*

Probability and mathematical finance seminar, Carnegie Mellon University — March 31st, 2014
Title: *Elements of non-commutative probability theory*

Probability and mathematical finance seminar, Carnegie Mellon University — September 9th, 2013
Title: *Stochastic geometry and the Malliavin calculus of variations*

Stochastic Analysis for Poisson Point Processes, MFO, Oberwolfach, Germany — February 13th, 2013
Title: *Mixed limits and asymptotic independence on the Poisson space*

Mathematics colloquium, University of Connecticut — January 28th, 2013
Title: *Recent developments in probabilistic approximations and applications*

Probability seminar, University of Luxembourg, Luxembourg — April 12th, 2013
Title: *Portmanteau inequalities on the Poisson space*

Colloque Franco-Roumain de Mathématiques Appliquées, Bucarest, Romania — August 27th, 2012
Title: *Asymptotic theory for fractional regression models via Malliavin calculus*

Probability seminar, University of Luxembourg, Luxembourg — May 3rd, 2012
Title: *Some recent developments in non-commutative probability theory*

International Conference on Operations Research, Habana, Cuba — March 15th, 2012
Title: *Cramér theorems on the Wiener space*

Probability seminar, Université de Toulouse Paul Sabatier, Toulouse, France — January 31st, 2012
Title: *Cramér theorems on the Wiener space*

CERAMADE seminar, University of Paris Dauphine, Paris, France — January 10th, 2012
Title: *Cramér theorems on the Wiener space*

CMAP seminar, Ecole Polytechnique, Palaiseau, France — January 9th, 2012
Title: *Density existence and estimates for solutions to certain BSDEs*

Journées de Probabilités et Statistique, ENSA de Marrakech, Marrakech, Marocco — December 16th, 2011
Title: *Cramér theorems on the Wiener space*

CIMFAV Seminar, University of Valparaiso, Valparaiso, Chile — November 10th, 2011
Title: *Asymptotic theory for fractional regression models via Malliavin calculus*

IRMAR Seminar, University of Rennes I, Rennes, France — October 24th, 2011
Title: *Cramér theorems on the Wiener space*

MAP5 Seminar, University of Paris Descartes, Paris, France — October 21st, 2011

Title: *Cramér theorems on the Wiener space*

IECN Seminar, University of Nancy I, Nancy, France — October 13th, 2011
Title: *Cramér theorems on the Wiener space*

Self-similarity and related fields conference, Le Touquet, France — June 10th, 2011
Title: *Asymptotic theory for fractional regression models via Malliavin calculus*

Probability and Statistics Seminar, University of Paris Panthéon-Sorbonne, Paris, France — December 7th, 2010
Title: *Cramér theorems on the Wiener space*

International Conference on Stochastic Analysis, Hammamet, Tunisia — October 8th, 2010
Title: *Asymptotic theory for fractional regression models via Malliavin calculus*

MISCELLANEOUS

Languages: French (native), English (fluent), German (proficient).

Technical: LaTeX, Mathematica, MatLab, Maple, C, C++, Java, VBa, Bloomberg, Reuters, Murex.