

Pierre Youssef

Maître de conférences

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Research interests

Random matrices and spectrum of random graphs, Geometric Functional Analysis, concentration inequalities, high dimensional convex geometry, matrix column selection problems and data reduction.

Employment

- 2015- **Maître de conférences (tenured)**, *Laboratoire de Probabilités, Statistiques et Modélisation*, Université Paris Diderot, France.
- Fall 2019 **Délégation CNRS (6 months)**, *Laboratoire de Probabilités, Statistiques et Modélisation*, Université Paris Diderot, France.
- Aug-Dec 2017 **MSRI Postdoctoral fellow**, *Mathematical Sciences Research Institute*, Berkeley, USA.
- 2013-2015 **CNRS/PIMS Postdoctoral fellow**, *under the supervision of Nicole Tomczak-Jaegermann and Alexander Litvak*, University of Alberta, Canada.
- 2010-2013 **Teaching assistant**, *Université Paris-Est Marne-la-Vallée*, France.

Education

- 2010-2013 **PhD in mathematics**, *Université Paris-Est Marne-la-Vallée*, under the supervision of Olivier Guédon.
Title: Restricted invertibility, distance to the cube and covariance of random matrices. Defended on May 21, 2013.
- 2009-2010 **Master in pure mathematics: Second year**, *Université Pierre et Marie Curie- Paris VI*, Highest honors.
Master thesis codirected by Dario Cordero-Erausquin and Olivier Guédon.
Title: Restricted invertibility and the Banach-Mazur distance to the Cube.
- 2008-2009 **Master in pure mathematics: First year**, *Université Pierre et Marie Curie- Paris VI*, Highest honors.
Research project under the supervision of Gilles Godefroy.
Title: Existence and uniqueness of preduals of Banach spaces.
- 2005-2008 **BS in mathematics**, *Lebanese University- Faculty of Science II*, Highest honors.

Teaching experience

- 2015- **Teaching duties at Paris VII and ENS Cachan**, 4-5 courses per year.
First year Masters probability course, Regular second and third year probability courses, first year projects supervision, topic course around concentration inequalities at ENS Cachan.
- 2013-2015 **Instructor for BS degree**, *University of Alberta*.
Courses: Calculus I, Calculus III.
- 2010-2013 **Instructor for BS degree**, *Université Paris-Est Marne-la-Vallée*.
Courses: Algebra 2, Analysis 1, Calculus, methodology of mathematics.
- 2005-2014 **Private courses for undergraduate students**.

Awards and grants

- 2019 **“Phénomènes en grande dimension”**, *joint grant (with 12 colleagues) of ~ 75000 Euros delivered by Fondation Del Duca, Institut de France.*

- 2019 **Projet Exploratoire Premier Soutien (PEPS)**, a small personal grant of 3500 Euros delivered by CNRS, France.
- 2017-2021 **PEDR**, Prime d'encadrement et de recherche.
- 2017 **JMAA Ames Award**, for the paper "Adjacency matrices of random digraphs: singularity and anti-concentration."
- 2016-2020 **ANR SAMARA**, joint grant (~ 175000 Euros) with Charles Bordenave, Marc Lelarge and Justin Salez to work on Spectrum, Algorithms and random walks in random networks.
- 2016 **Projet Exploratoire Premier Soutien (PEPS)**, a small personal grant of 3000 Euros delivered by CNRS, France.
- 2014 **Prix de Thèse UPE**, prize awarded by Paris-Est University for the best PhD of the doctoral school of Mathematics, Computer Science, Information and Communication sciences.
- 2014 **NANUM 2014 Travel Grant**, to participate in SEOUL ICM 2014.
- 2013-2015 **PIMS/CNRS Post-Doctoral Fellowship**, for a Post-Doctoral position at the University of Alberta.
- 2011-2012 **International mobility grant obtained from the doctoral school of Paris-Est**, to visit Professor Apostolos Giannopoulos at the University of Athens from May 5 till June 17.
- 2008-2010 **Bourse Master Ile-De-France** delivered by conseil régional d'Ile-De-France.
- 2005-2008 **Awards of excellence delivered by the Lebanese University**, for being ranked first in all Bachelor courses.

Papers

- [1] **Restricted invertibility and the banach-mazur distance to the cube.**
Mathematika 60 (2014), no. 1, 201-218.
- [2] **A note on column subset selection.**
International Mathematics Research Notices, 2014(23):6431-6447, 2014.
- [3] **Estimating the covariance of random matrices.**
Electronic journal of Probability, Vol 18, no.107, 1-26.
- [4] **Extracting a basis with fixed block inside a matrix.**
Linear Algebra and Its Applications, 469(Complete):28-38, 2015.
- [5] **When does a discrete-time random walk in $\mathbb{R}^n$ absorb the origin into its convex hull?**
Ann. Probab. 45 (2017), no. 2, 965-1002.
(Joint with K. Tikhomirov)
- [6] **Bernstein type inequality for a class of dependent random matrices.**
Random Matrices Theory Appl. 5 (2016), no. 2, 1650006, 28 pp.
(Joint with M. Banna and F. Merlevède)
- [7] **Anti-concentration property for random digraphs and invertibility of their adjacency matrices.**
C.R. Math. Acad. Sci. Paris, 354 (2016), 121-124.
(Joint with A. Lytova, A. Litvak, K. Tikhomirov and N. Tomczak-Jaegermann)
- [8] **Adjacency matrices of random digraphs: singularity and anti-concentration.**
J. of Math. Analysis and Appl., 445 (2017), 1447-1491.
(Joint with A. Lytova, A. Litvak, K. Tikhomirov and N. Tomczak-Jaegermann)

- [9] **Restricted invertibility revisited.**
A Journey Through Discrete Mathematics. A Tribute to Jiri Matousek., Springer International Publishing, 657–691, 2017.
 (Joint with A. Naor)
- [10] **Approximating matrices and convex bodies.**
International Mathematics Research Notices, Vol. 2017, No. 00, pp. 1–19.
 (Joint with O. Friedland)
- [11] **On the norm of a random jointly exchangeable matrix.**
J. Theor. Probab (2018). <https://doi.org/10.1007/s10959-018-0844-y>
 (Joint with K. Tikhomirov)
- [12] **The spectral gap for dense random regular graphs.**
Ann. Probab. 47 (2019), no. 1, 362–419.
 (Joint with K. Tikhomirov)
- [13] **The smallest singular value of a shifted d -regular random square matrix.**
Prob. Th. Rel. Fields, 173 (2019), 1301–1347.
 (Joint with A. Lytova, A. Litvak, K. Tikhomirov and N. Tomczak-Jaegermann)
- [14] **The rank of random regular digraphs of constant degree.**
J. of Complexity, 48 (2018), 103–110.
 (Joint with A. Lytova, A. Litvak, K. Tikhomirov and N. Tomczak-Jaegermann)
- [15] **The dimension-free structure of nonhomogeneous random matrices.**
Inventiones mathematicae (2018), Volume 214, No. 3, pp. 1031–1080.
 (Joint with R. Latała et R. van Handel)
- [16] **Structure of eigenvectors of random d -regular digraphs.**
Trans. Amer. Math. Soc., 371 (2019), 8097–8172.
 (Joint with A. Lytova, A. Litvak, K. Tikhomirov et N. Tomczak-Jaegermann)
- [17] **Circular law for sparse random regular digraphs.**
Submitted, available at arXiv:1801.05576.
 (Joint with A. Lytova, A. Litvak, K. Tikhomirov and N. Tomczak-Jaegermann)
- [18] **Outliers in spetrum of sparse Wigner matrices.**
available at arXiv:1904.07985
 (Joint with K. Tikhomirov)
- [19] **Courant-Fisher bound for coordinate subspaces.**
preprint.
 (Joint with A. Naor)
- [20] **Existence of a stably proximal parallelepiped.**
In preparation, final stage.
 (Joint with A. Naor)

Conference talks

- Oct 2012 **Journées du GdR "Analyse Fonctionnelle, Harmonique et Probabilités" 2012**, Université Paris-Est Marne-la-Vallée , France.
- Apr 2013 **LAAS International Science Conference**, Lebanese American University, Lebanon.
- Oct 2013 **AMS fall central sectional meeting**, Washington University, Saint-Louis, USA.

- Mar 2014 **Geometric Tomography and Harmonic Analysis**, *BIRS*, Canada.
- June 2014 **LSMS annual meeting**, Lebanon.
- Aug 2014 **Communication courte au congrès international de mathématiques**, Seoul-Korea.
- Oct 2014 **Informal analysis seminar**, *University of Michigan*, Etats Unis.
- Oct 2014 **AMS western central sectional meeting**, *San Francisco state university*, USA.
- Oct 2015 **Convexity, probability and discrete structures, a geometric view point**, *Université Paris-Est Marne-La-Vallée*, France.
- Dec 2015 **Journées du GdR "Analyse Fonctionnelle, Harmonique et Probabilités" 2015**, *CIRM*, France.
- Jan 2016 **Spectrum of Random Graphs**, *CIRM*, France.
- May 2016 **Journées d'analyse de Beyrouth**, *Lebanese University*, Lebanon.
- May 2016 **Conference on Geometric Functional Analysis in Honour of Nicole Tomczak-Jaegermann**, *University of Alberta*, Canada.
- June 2016 **Asymptotic Geometric Analysis III**, *Euler institute*, Saint-Petersburg, Russie.
- July 2016 **Concentration Week on Geometric Functional Analysis**, *Texas A&M university*, USA.
- Oct 2016 **Journées du GdR "Analyse Fonctionnelle, Harmonique et Probabilités" 2016**, *Institut de Mathématique de Toulouse*, France.
- Apr 2017 **ProbabLY ON random matrices**, *ENS Lyon*, France.
- Apr 2018 **Expected Characteristic Polynomial Techniques and Applications**, *Institute for Pure and Applied Mathematics*, UCLA, USA.
- May 2018 **Random Matrices and Free Probability Theory**, *Institute for Pure and Applied Mathematics*, UCLA, USA.
- June 2018 **Congrès SMF 2018**, *Lille*, France.
- July 2018 **IMS annual meeting**, *Vilnius*, Lithuania.
- May 2019 **Geometric and Functional Inequalities in convexity and probability**, *Florence*, Italy.

Seminar talks

- July 2009 **Université Libanaise- Faculté des sciences II**, *Lebanon*.
- Oct 2011 **Séminaire des Thésards**, *Université Paris-Est Marne-la-Vallée*, France.
- May 2012 **University of Athens**, *Greece*.
- Oct 2012 **Séminaire des Thésards**, *Université Paris-Est Marne-la-Vallée*, France.
- Jan 2013 **Séminaire d'analyse fonctionnelle**, *Université Pierre et Marie Curie*, France.
- Mar 2013 **Measure theory seminar**, *Kent State University*, USA.
- Mar 2013 **Analysis/Probability Learning Seminar**, *University of Michigan*, USA.
- May 2013 **Séminaire d'analyse fonctionnelle**, *Université Lille 1*, France.
- June 2013 **Groupe de travail ASPRO**, *Université Paris-Est Marne-la-Vallée*, France.
- June 2013 **Séminaire d'analyse**, *Institut de Mathématiques de Bordeaux*, France.
- Sept 2013 **Analysis working seminar**, *University of Alberta*, Canada.
- Oct 2013 **Analysis seminar**, *University of Columbia- Missouri*, USA.
- Nov 2013 **Analysis working seminar**, *University of Alberta*, Canada.
- Nov 2013 **Analysis seminar**, *University of British Columbia*, Canada.
- May 2014 **Analysis seminar**, *University of Kiel*, Germany.
- May 2014 **Colloquium**, *University of Kiel*, Germany.
- June 2014 **Université Saint-Joseph**, *Liban*.
- Oct 2014 **University of California San Diego**, *USA*.
- Apr 2015 **American university of Beirut**, *Lebanon*.
- May 2015 **Séminaire d'analyse fonctionnelle**, *Université de Franche-Comté*, France.

- Oct 2015 **Groupe de travail modélisation**, Université Paris Diderot, France.
- Nov 2015 **Séminaire d'analyse fonctionnelle**, Université Pierre et Marie Curie, France.
- Nov 2015 **Séminaire d'analyse Harmonique**, Université Paris Sud, Orsay, France.
- Nov 2015 **Séminaire d'analyse fonctionnelle**, Université Lille 1, France.
- Jan 2016 **Groupe de travail Matrices et Graphes aléatoires**, Institut Henri Poincaré, France.
- Feb 2016 **Séminaire d'analyse-Probabilité**, Université Paris Dauphine, France.
- Mar 2016 **Séminaire du LPMA**, Université Pierre et Marie Curie, France.
- Nov 2016 **Groupe de travail Probabilités, Théorie Ergodique et Systèmes Dynamiques**, Université de Rouen, France.
- Dec 2016 **American university of Beirut**, Lebanon.
- Dec 2016 **Lebanese University- Faculty of science II**, Lebanon, 9 hours Mini-course.
- Jan 2017 **Séminaire d'analyse fonctionnelle**, Université Pierre et Marie Curie-Paris VI, France.
- May 2017 **Séminaire de Probabilité et Statistiques**, Université Nice Sophia-Antipolis, France.
- Nov 2017 **Postdoc seminar**, MSRI, USA.
- Apr 2018 **Groupe de travail Modélisation Stochastique**, Université Paris Diderot, France.
- Apr 2018 **Mathematical Physics Seminar**, Université de Genève, Switzerland.
- May 2018 **Groupe de travail Matrices et Graphes aléatoires**, Institut Henri Poincaré, France.
- Nov 2018 **Séminaire d'analyse fonctionnelle**, Université Lille 1, France.
- Feb 2019 **Séminaire d'analyse fonctionnelle**, Université Pierre et Marie Curie-Paris VI, France.
- April 2019 **Probability seminar**, Princeton University, USA.
- April 2019 **Probability seminar**, Courant institute, NYU, USA.

Conferences and seminars organization

- Jan 2020 **Co-organizer of an international conference “Spectra, Algorithms and Random Walks on Random Networks”**, CIRM, France.
- 2017- **Co-organizer of the weekly working seminar “Modélisation Stochastique”** at Université Paris Diderot.
- Aug-Dec 2017 **Co-organizer of the weekly Young Researchers Seminar in the GFA program** at MSRI.
- August 2016 **Organizer of a session on concentration inequalities**, Journées MAS, Grenoble, France.

Services to community

- 2011-2013 **Representative of the PhD students at the doctoral school of Paris-Est.**
Reviewer for: *Journal of Functional Analysis, Advances in Mathematics, International Mathematics research notices, Annals of Applied Probability, Annales Institut Henri Poincaré, SIAM journal of Matrix Analysis and Applications, Linear Algebra and its Applications, Stochastic Processes and their Applications, Electronic Journal of Probability, Electronic Communications in Probability, ESAIM: Probability and Statistics.*
- 2019 **Member of recruitment committee for a maître de conférences position at Paris Nanterre**, candidate recruited: Niccolo Torri.

International stays

- Sept 2010 **Thematic program on Asymptotic Geometric Analysis**, Fields institute- Toronto, Canada.
 Stay duration: 1 month.
- May 2012 **Invited by Prof. Apostolos Giannopoulos**, University of Athens, Greece.
 Stay duration: 1.5 month.

- March 2013 **Invited by Prof. Artem Zvavitch**, *Kent State University*, USA.
Stay duration: 1 week.
- March 2013 **Invited by Prof. Mark Rudelson**, *University of Michigan*, USA.
Stay duration: 1 week.
- October 2013 **Invited by Prof. Peter Pivovarov**, *University of Columbia Missouri*, USA.
Stay duration: 1 week.
- May 2014 **Invited by Prof. Hermann Köenig**, *University of Kiel*, Germany.
Stay duration: 1 week.
- October 2014 **Invited by Prof. Rayan Saab**, *University of California San Diego*, USA.
Stay duration: 1 week.
- May 2016 **Invited by Prof. Alexander Litvak**, *University of Alberta*, Canada.
Stay duration: 1 month.
- July 2016 **Invited by Prof. William Johnson**, *Texas A&M university*, USA.
Stay duration: 2 weeks.
- August 2017 **Thematic program Geometric Functional Analysis**, *MSRI*, USA.
Stay duration: 5 months.
- July 2018 **Invited by Prof. Konstantin Tikhomirov**, *Georgia institute of Technology*, USA.
Stay duration: 2 weeks.
- April 2019 **Invited by Prof. Ramon van Handel**, *Princeton University*, USA.
Stay duration: 1 week.

Other

Citizenship, *Lebanese/French*, Born on 26 september 1987 in Lebanon.

Language, *Arabic (native language)*, French (fluent), English (fluent).

Various, *With Karam Fayad*, I am the author of "*A vos marques, Prets, Pensez*", a book on logic puzzles.