Curriculum Vitae
Alexandru Nica (July 2020)

Contact address:
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Education:
– University of California, Berkeley, 1990-94. Degree: Ph.D. in Mathematics, with specialization in Operator Algebras (May 1994); thesis advisor: Dan-Virgil Voiculescu.

– University of Bucharest, Romania, 1981-86. Degrees: Bachelor (June 1985), and Master of Science (June 1986).

Research interests:
My background is in non-commutative probability and operator algebras. My main line of research is in free probability, particularly its connections to classical probability and to combinatorics. My current research interests include the study of some extensions of the fundamental notion of free independence for non-commutative random variables, such as bi-free independence or infinitesimal free independence. Another current direction of my research concerns asymptotic phenomena for some combinatorial structures (e.g. the diagrammatic objects called "meanders") that are related to free probability.

Scientific positions:
Permanent position in Pure Mathematics Department of the University of Waterloo:
Assistant Professor from July 1997 to June 2001;
Associate Professor from July 2001 to June 2005;
Professor from July 2005 to present.

Visiting and postdoctoral positions:
– Simons CRM Professor at Centre de Recherches Mathématiques in Montreal, March 2019.

– Visiting scholar in the Applied Mathematics Department of the University Paris 5 (Paris Descartes), October 2014 – June 2015.

– Visiting scholar at the Erwin Schrödinger Institute in Vienna, Austria, during special program on "Bialgebras in Free Probability", February-April 2011.

– Member of MSRI in Berkeley, January – June 2001.

– Visiting scholar at the Henri Poincaré Institute in Paris, France, during special program on "Free Probability and Operator Spaces", September – December 1999.

– T.H. Hildebrandt Research Assistant Professor in Department of Mathematics of the University of Michigan, Ann Arbor, September – December 1994 and January 1996 – June 1997.

– Visiting scholar at Queen's University, Kingston (September-December 1995, May-July 1996), and at the Fields Institute, Waterloo (January-August 1995), while holding a Canada International Fellowship.

Supervision of graduate students and of postdoctoral fellows:

Master's students.

– Mario Grgic (MMath thesis, 2000). Thesis title: "Brown spectral measures for elements of finite von Neumann algebras".

– Michael Neagu (MMath thesis, 2000). Thesis title: "The combinatorics of free probability theory with an application to operator norms".

– Matthew Tucker (MMath thesis, 2005). Thesis title: "Subfactors, knots, and the Temperley-Lieb algebra".

– Matthew Fiset (MMath essay, 2010).

– Boyu Li (MMath thesis, 2013). Thesis title: "Asymptotic distributions for block statistics on non-crossing partitions".

– Keegan Flood (MMath essay, 2014).

– Kun-Hung Hsueh (MMath thesis, 2017). Thesis title: "A parallel study of the Fock space approach to classical and free Brownian motion".

– Drew Johnstone (MMath essay, 2017).

– Patrick McIntyre (MMath essay, 2017).

– Daniel Pepper (MMath essay, 2018; co-supervised with Brian Forrest).

– Jacob Campbell (MMath essay, 2019).

Doctoral students.

– Michael Neagu, PhD degree awarded in 2006. PhD thesis on "The asymptotic freeness phenomenon for random permutation matrices with restricted cycle lengths".

– Ion Oancea, PhD degree awarded in 2008. PhD thesis on "Posets of non-crossing partitions of type B and applications".

– Jacob Campbell, current PhD student (started in the PhD program of Pure Math Waterloo in May 2019).

– Daniel Perales Anaya, current PhD student (started in the PhD program of Pure Math Waterloo in September 2018).

Postdoctoral fellows.

– Peter Friis, 1999-2001 (co-supervised with Ken Davidson).

– Jiankui Li, 2001-2003 (co-supervised with Ken Davidson).

– Herbert Lee, 2002-2004.

– Serban Belinschi, 2005-2008.

– Mitja Mastnak, 2007-2008 (co-supervised with Heydar Radjavi).

– Michael Noyes, 2011-2012.

– Kamil Szpojankowski, 2015-2016.

– Ping Zhong, 2017-2018.

Grant support:

My research has been continuously supported, from 1998 to present, by individual research grants (known in recent years as "Discovery Grants") from NSERC. My current Discovery Grant, for the proposal titled "Free probability: combinatorial and analytic aspects, and interaction with other notions of independence" is in the amount of $20,000 per year for the period April 2017 - March 2022.

Organizing of meetings:

– Focus Program on "Applications of Noncommutative Functions" at the Fields Institute, June 2019. [List of organizers was: S. Belinschi (Toulouse), K. Davidson (Waterloo), J. Mingo (Queen's), A. Nica (Waterloo), V. Vinnikov (Ben-Gurion).]

– 5-day workshop on "Analytic versus Combinatorial in Free Probability" at the Banff International Research Station, December 2016. [List of organizers was: J. Mingo (Queen's), A. Nica (Waterloo), R. Speicher (Saarbrücken), D. Voiculescu (Berkeley).]

– Focus Program on "Noncommutative Distributions in Free Probability Theory" at the Fields Institute, July 2013. [List of organizers was: S. Belinschi (Queen's), B. Collins (Ottawa), J. Mingo (Queen's), A. Nica (Waterloo), R. Speicher (Saarbrücken), D. Voiculescu (Berkeley).]

– 5-day workshop on "Free Probability, Extensions and Applications" at the Banff International Research Station, January 2008. [List of organizers was: A. Nica (Waterloo), R. Speicher (Queen's), A. Tulino (Sannio, Italy), D. Voiculescu (Berkeley).]

– Meeting Director for the Summer 2005 Meeting of the Canadian Mathematical Society (Waterloo, June 2005).

– 5-day workshop on "Braid Groups, Clusters and Free Probability" at the American Institute of Mathematics in Palo Alto, California, January 2005. [List of organizers was: J. McCammond (Santa Barbara), A. Nica (Waterloo), V. Reiner (Minnesota).]

– 5-day workshop on "Free Probability" at the Banff International Research Station, October, 2004. [List of organizers was: A. Nica (Waterloo), R. Speicher (Queen's), D. Voiculescu (Berkeley).]

– 32nd annual Canadian Operator Symposium, held in Waterloo in May 2004. [List of organizers was: K. Davidson (Waterloo), L. Marcoux (Waterloo), A. Nica (Waterloo), N. Spronk (Waterloo).]

– Fields Institute workshop on "Free Probability and Random Matrices", December 2001. [List of organizers was: A. Nica (Waterloo), R. Speicher (Queen's).]

– Special session on "Free Probability" at the Winter Meeting of the Canadian Mathematical Society in Toronto, December, 2001. [List of organizers was: A. Nica (Waterloo), R. Speicher (Queen's).]

Invited talks in meetings and seminars, during the last few years:

– 25 minute talk in special session on "Special functions and their applications" of the Winter CMS meeting in Toronto, December 2019.

– 40 minute talk in workshop on "Free probability – the theory, its extensions" at CRM in Montreal, March 2019.

– 50 minute talk in Mathematics Seminar of the School of Mathematical Sciences of University College, Cork, Ireland, February 2019.

– 25 minute talk in workshop "Free probability theory" at Oberwolfach, Germany, December 2018.

– 90 minute talk in "Non-commutative Harmonic Analysis" Seminar of the Mathematics Department of University of Wroclaw, Poland, March 2018.

– 90 minute talk in Probability Seminar of the Mathematics Department of the Warsaw University of Technology, Poland, February 2018.

– 90 minute talk in "Probabilistic Operator Algebra" Seminar in the Mathematics Department of the University of California, Berkeley, February 2018.

– 60 minute talk in workshop on "Random Matrices and Free Probability" at CIMAT, Guanajuato, Mexico, November 2017.

– 30 minute talk in Satellite Conference on Operator Algebas to the Mathematics Congress of the Americas, Toronto, August 2017.

– 20 minute talk in special session on "Free probability and its applications" at the Mathematical Congress of the Americas, Montreal, July 2017.

– 40 minute talk in special session on "von Neumann algebras and their applications" at the Mathematical Congress of the Americas, Montreal, July 2017.

– 50 minute talk in the workshop "Notions of freeness", Saarbrücken, Germany, April 2016.

– 40 minute talk in the workshop "Free probability and the large N limit, 5", Berkeley, March 2016.

– 40 minute talk in the workshop "C^*-algebras, random matrices, free probability and beyond" in honour of 60th birthday of James Mingo, Queen's University, Kingston, October 2015.

– 50 minute talk in Probability Seminar of the Mathematics Department of the Paul Sabatier University, Toulouse, France, April 2015.

– 50 minute talk in Analysis Seminar of the Mathematics Department of University of Lorraine, Metz, France, April 2015.

– Colloquium (50 minute talk) of the Mathematics Department of Saarland University, Saarbrücken, Germany, February 2015.

– 50 minute talk in "Non-commutative Probability Seminar" of the Mathematics Department of Saarland University, Saarbrücken, Germany, February 2015.

– Colloquium (50 minute talk) of the Theoretical Physics Department of the Jagiellonian University, Krakow, Poland, February 2015.

– 50 minute talk in "Random Matrix Seminar" of the Theoretical Physics Department of the Jagiellonian University, Krakow, Poland, February 2015.

Selected Publications:

Monographs.

• D.V. Voiculescu, K.J. Dykema, A. Nica. *Free random variables*, CRM Monograph Series volume 1, American Mathematical Society, 1992.

• A. Nica, R. Speicher. *Lectures on the combinatorics of free probability*, London Mathematical Society Lecture Note Series volume 335, Cambridge University Press, 2006.

Research papers written during the last few years.

• C. Köstler, A. Nica. A central limit theorem for the star-generators of S_∞, which relates to the law of a GUE matrix. 25 pages, accepted for publication in *Journal of Theoretical Probability*. Available as arXiv:1807.05633.

• M. Février, M. Mastnak, A. Nica, K. Szpojankowski. Using Boolean cumulants to study multiplication and anticommutators of free random variables. 36 pages, accepted for publication in *Transactions of the American Mathematical Society*. Available as arXiv:1907.10842.

• A. Nica, P. Zhong. An operator that relates to semi-meanders via a two-sided q-Wick formula. 28 pages, accepted for publication in *Indiana University Mathematics Journal*. Available as arXiv:1801.05501.

• I.P. Goulden, A. Nica, D. Puder. Asymptotics for a class of meandric systems, via the Hasse diagram of NC(n), *International Mathematics Research Notices*, volume 2020, issue 4, 983-1034.

• M. Février, M. Mastnak, A. Nica, K. Szpojankowski. A construction which relates c-freeness to infinitesimal freeness, *Advances in Applied Mathematics* 110 (2019), 299-341.

• H. Bercovici, A. Nica, M. Noyes, K. Szpojankowski. Eta-diagonal distributions and infinite divisibility for R-diagonals, *Annales de l'Institut Henri Poincaré, Probabilités et Statistiques* 54 (2018), 907-937.

• A. Nica. Free probability aspects of irreducible meandric systems, and some related observations about meanders, *Infinite Dimensional Analysis, Quantum Probability and Related Topics* 19 (2016), issue 02, article number 16500119 (22 pages).

• N. Demni, M. Guay-Paquet, A. Nica. Star-cumulants of free unitary Brownian motion, *Advances in Applied Mathematics* 69 (2015), 1-45.

• M. Mastnak, A. Nica. Double-ended queues and joint moments of left-right canonical operators on full Fock space, *International Journal of Mathematics* 26 (2015), issue 02, article number 1550016 (34 pages).

• M. Anshelevich, S.T. Belinschi, M. Fevrier, A. Nica. Convolution powers in the operator-valued framework, *Transactions of the American Mathematical Society* 365 (2013), 2063-2097.