

# Piotr Śniady

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Polish Academy of Sciences  
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## Personal information

academic title: Professor

date of birth: February 21, 1976

scientific interests: asymptotic representation theory, representation theory of symmetric groups, random matrices, algebraic combinatorics, Voiculescu's free probability theory

## Current academic affiliation

**Full Professor,**  
*Institute of Mathematics, Polish Academy of Sciences.*

## Education

2013 **Scientific title of Professor.**

2008 **Habilitation (mathematics),** *University of Wrocław,*  
honorable mention.

dissertation: *Asymptotics of representations of symmetric groups*

concentrations: representation theory of symmetric groups, free probability, combinatorics

2001 **Ph.D. (mathematics),** *University of Wrocław,*  
honorable mention.

thesis: *Random matrices and related topics*

concentrations: free probability, invariant subspaces, random matrices

advisor: Prof. Marek Bożejko

1999 **M.Sc. (mathematics),** *University of Wrocław.*

thesis: *On  $q$ -deformed quantum stochastic calculus*

concentrations: quantum probability, stochastic calculus

advisor: Prof. Marek Bożejko

1999 **M.Sc. (theoretical physics),** *University of Wrocław.*

thesis: *On  $q$ -deformed analogue of Clifford–Weyl superalgebra and oscillator representations of quantum Lie algebras*

concentrations: Lie superalgebras, quantum deformations

advisor: Prof. Jerzy Lukierski

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## Professional experience

- Oct. 2016– **Full Professor**,  
now *Institute of Mathematics, Polish Academy of Sciences.*
- Oct. 2009– **Associate Professor**,  
Sept. 2016 *Institute of Mathematics, Polish Academy of Sciences.*
- Oct. 2014– **Full Professor**,  
Sept. 2016 *Uniwersytet im. Adama Mickiewicza w Poznaniu.*
- Oct. 2012– **Grant of Deutsche Forschungsgemeinschaft**,  
Aug. 2014 *Technische Universität München.*
- Feb. 2011– **Humboldt Fellowship for Experienced Researchers**,  
Aug. 2012 *Technische Universität München and Universität Stuttgart.*
- Sept. 2004– **Assistant Professor**,  
Sept. 2014 *University of Wrocław.*
- Aug. 2002– **Postdoc**,  
Aug. 2004 *European Post-Doctoral Institute for Mathematical Sciences*,  
Scholarship held at *Institute des Hautes Etudes Scientifiques* (Bures-sur-Yvette, France), *Ecole Normale Supérieure* (Paris, France), *Syddansk Universitet* (Odense, Denmark), *University of Warsaw* (Warsaw, Poland), *Ecole Normale Supérieure* (Lyon, France), *Université de Franche-Comté* (Besançon, France).
- Feb. 2002– **Assistant Professor**,  
Aug. 2002 *University of Wrocław.*
- Aug. 2001– **Fulbright Scholarship**,  
Jan. 2002 *Texas A&M University.*
- Sept. 1999– **DAAD Scholarship (extended studies)**,  
July 2000 *Heidelberg Universität.*
- Aug. 2000– **Teaching Assistant**,  
Aug. 2001 *University of Wrocław.*

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## Grants

- 2018–2023 **Director of a grant MAESTRO:**  
*Dynamic asymptotic combinatorics*,  
Narodowe Centrum Nauki,  
value: 2,608,620 PLN (approximately 600,000 EUR).
- 2015–2018 **Director of a grant OPUS:**  
*Dual combinatorics of Jack characters*,  
Narodowe Centrum Nauki,  
value: 543,515 PLN (approximately 130,000 EUR).
- 2012–2014 **Grant Trajectories of jeu de taquin and second class particles**,  
Deutsche Forschungsgemeinschaft,  
value: 151,800 EUR.
- 2009–2012 **Director of a grant Non-commutative probability, non-commutative harmonic analysis and their applications**,  
Polish Ministry of Science and Higher Education,  
value: 850,000 PLN (approximately 200,000 EUR),  
16 participants.
- 2006–2009 **Director of a grant Free probability, non-commutative harmonic analysis and applications**,  
Polish Ministry of Science and Higher Education,  
value: 630,000 PLN (approximately 170,000 EUR),  
12 participants.

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## Awards and Honors

- 2022 Invited speaker at *33rd international conference on Formal Power Series and Algebraic Combinatorics (FPSAC)*, July 18–22, 2022
- 2017 **Award of Institute of Mathematics of Polish Academy of Sciences** for outstanding mathematical research
- 2015 **Award of Narodowe Centrum Nauki**
- 2012 **Invited speaker at 6th European Congress of Mathematics**
- 2011 **Wacław Sierpiński Memorial Award**  
(*Division III of Polish Academy of Sciences*)
- 2009 *Polish Prime Minister Award* for the habilitation dissertation
- 2008 Award of *Polityka Foundation*
- 2008–2011 Scholarship for Excellent Young Scientists  
(*Polish Ministry of Science and Higher Education*)
- 2007 *University of Wrocław Rectors's award*

- 2004 *Grzegorz Białkowski Memorial Award* for the doctoral thesis  
(*Fundacja na rzecz Nauki Polskiej* and *Towarzystwo Popierania i Krzewienia Nauk*)
- 2003 ***Kazimierz Kuratowski Memorial Award***  
(**Polish Mathematical Society**)
- 2002 *Polish Prime Minister Award* for the doctoral thesis
- 2002 *Young Mathematician Award*  
(*Polish Mathematical Society*)
- 2002 Scholarship of *Fundacja na rzecz Nauki Polskiej*
- 1999 second award in the *Marcinkiewicz Memorial Contest*  
(contest for a student mathematical article; *Polish Mathematical Society*)

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## Citations

cited 550 times by 372 authors  
(according to MathSciNet database)

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## Selected publications

Valentin Féray and Piotr Śniady. Asymptotics of characters of symmetric groups related to Stanley character formula. *Ann. of Math. (2)*, 173(2):887–906, 2011.

Cristopher Moore, Alexander Russell, and Piotr Śniady. On the impossibility of a quantum sieve algorithm for graph isomorphism. In *STOC'07—Proceedings of the 39th Annual ACM Symposium on Theory of Computing*, pages 536–545. ACM, New York, 2007.

Piotr Śniady and Roland Speicher. Continuous family of invariant subspaces for  $R$ -diagonal operators. *Invent. Math.*, 146(2):329–363, 2001.

Benoît Collins and Piotr Śniady. Integration with respect to the Haar measure on unitary, orthogonal and symplectic group. *Comm. Math. Phys.*, 264(3):773–795, 2006.

Dan Romik and Piotr Śniady. Jeu de taquin dynamics on infinite Young tableaux and second class particles. *Ann. Probab.* 43 (2015), no. 2, 682–737.

James A. Mingo, Piotr Śniady, and Roland Speicher. Second order freeness and fluctuations of random matrices. II. Unitary random matrices. *Adv. Math.*, 209(1):212–240, 2007.

Maciej Dołęga, Valentin Féray, and Piotr Śniady. Explicit combinatorial interpretation of Kerov character polynomials as numbers of permutation factorizations. *Adv. Math.*, 225(1):81–120, 2010.

Piotr Śniady. Gaussian fluctuations of characters of symmetric groups and of Young diagrams. *Probab. Theory Related Fields*, 136(2):263–297, 2006.

Piotr Śniady. Random regularization of Brown spectral measure. *J. Funct. Anal.*, 193(2):291–313, 2002.

Piotr Śniady. Multinomial identities arising from free probability theory. *J. Combin. Theory Ser. A*, 101(1):1–19, 2003.

Piotr Śniady. Factoriality of Bożejko-Speicher von Neumann algebras. *Comm. Math. Phys.*, 246(3):561–567, 2004.

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### Selected conference talks

- July 2022 Invited speaker at *33rd international conference on Formal Power Series and Algebraic Combinatorics (FPSAC)*, Indian Institute of Science, Bangalore, India (60 minutes)
- July 2019 Stanley character formula for the spin characters of the symmetric groups, *31st international conference on Formal Power Series and Algebraic Combinatorics (FPSAC)*, University of Ljubljana, Slovenia (30 minutes)
- July 2018 Dynamics behind random partitions and random permutations, *Institute of Mathematical Statistics Annual Meeting on Probability and Statistics*, Vilniaus universitetas, Vilnius, Lithuania (30 minutes)
- February 2017 Jack characters: dual combinatorics of Jack polynomials, *Workshop on Asymptotic Representation Theory*, Institut Henri Poincaré, Paris, France (50 minutes)
- January 2017 Series of lectures “Characters, maps, free cumulants”, *Winter school “Combinatorics and interactions”*, Centre International de Rencontres Mathématiques, Luminy, France (lectures:  $3 \times 90$  minutes and 60 minutes exercise session)
- September 2016 Jeu de taquin and asymptotic representation theory, *Algebraic Combinatorics in Representation Theory*, Centre International de Rencontres Mathématiques, Luminy, France ( $2 \times 90$  minutes)
- June 2016 Dual combinatorics of Jack polynomials, *Final conference of the MADACA project*, Domaine de Chalès, France (60 minutes)

- December 2014 Hydrodynamic limit of Robinson-Schensted algorithm, *Séminaire Philippe Flajolet*, Institut Henri Poincaré, Paris, France (60 minutes)
- April 2014 Combinatorics of asymptotic representation theory, *Meeting of Edinburgh Mathematical Society*, Aberdeen, United Kingdom (60 minutes)
- March 2013 Combinatorics of asymptotic representation theory, *Séminaire Lotharingien de Combinatoire*, Ellwangen, Germany (3×60 minutes)
- July 2012 **Invited speaker at 6th European Congress of Mathematics**, Kraków, Poland (45 minutes)
- February 2011 Free cumulants in representation theory, *Bialgebras in Free Probability*, Erwin Schrödinger Institute, Vienna, Austria (50 minutes)
- June 2009 Combinatorial interpretation of Kerov character polynomials, *21st International Conference on Formal Power Series & Algebraic Combinatorics*, Hagenberg, Austria (30 minutes)
- September 2008 Combinatorial interpretation of Kerov character polynomials, *Combinatorics and Representation Theory*, Nagoya University, Nagoya, Japan (60 minutes)
- September 2007 Free probability and asymptotic representation theory of symmetric groups, *Workshop on Free Probability, Random Matrices, and Planar Algebras*, Fields Institute, Toronto, Canada (50 minutes)
- September 2007 Computer security, quantum computers and asymptotic representation theory of symmetric groups, *28th Conference on Quantum Probability and Related Topics*, Guanajuato, Mexico (45 minutes)
- June 2007 Asymptotics of groups representations and free probability, *Non-commutative  $L^p$ -spaces, Operator spaces and Applications*, CIRM, Marseille, France (45 minutes)
- November 2006 Representations of Lie groups, random matrices and free probability, *Luminy conference on random matrices*, CIRM, Marseille, France (30 minutes)
- June 2006 Bijections of trees arising from Voiculescu's free probability theory, *18th Annual Conference on Formal Power Series and Algebraic Combinatorics*, San Diego, USA (poster)
- January 2005 Representations of symmetric groups and free probability, *Braid groups, clusters and free probability*, Palo Alto, USA (45 minutes)
- June 2005 Asymptotics of characters of symmetric groups and free probability, *17th Annual Conference on Formal Power Series and Algebraic Combinatorics*, Taormina, Italy (30 minutes)

- March 2005 Gaussian fluctuations of Young diagrams: Connection to random matrices, *Free probability theory*, Oberwolfach, Germany (45 minutes)
- October 2004 Free probability and representations of symmetric groups, *Free probability theory*, Banff, Canada (50 minutes)
- September 2004 Higher order free probability and fluctuations of random matrices, *Operator Algebras*, Kyoto, Japan (45 minutes)
- January 2003 Random regularization of Brown spectral measure, *Random Matrices and Related Topics*, Sandbjerg, Denmark (45 minutes)
- September 2002 Random regularization of Brown spectral measure, *Conference to honour the 70-th anniversary of the birthday of Aleksander Pełczyński*, Bedlewo, Poland (45 minutes)
- July 2002 Inequality for Voiculescu's free entropy in terms of Brown measure, *Entropy in Operator Algebras*, Institute for Pure and Applied Mathematics, Los Angeles, USA (1 hour)
- May 2002 Random regularization of Brown spectral measure, *Polish Probability Conference*, Będlewo, Poland (45 minutes)
- December 2001 Random regularization of Brown spectral measure, *Workshop on Free Probability and Random Matrices*, Canadian Mathematical Society, Toronto, Canada (45 minutes)
- July 2001 Random regularization of Brown spectral measure, *Asymptotic combinatorics with applications to mathematical physics*, Saint-Petersburg, Russia (30 minutes)
- January 2001 Continuous family of invariant subspaces of  $R$ -diagonal elements, *Free Probability and Noncommutative Banach Spaces*, MSRI, Berkeley, USA (45 minutes)
- June 2000 Gaussian random matrix model for  $q$ -deformed Gaussian random variables, *Free Probability Theory and Random Matrices*, Sandbjerg, Denmark (45 minutes)
- February 1999 On  $q$ -deformed quantum stochastic calculus, *International Colloquium on Operator Algebras*, Gmunden, Austria (45 minutes)

## Other responsibilities

- June 2020 **Member of the program committee**, *33th International Conference on Formal Power Series and Algebraic Combinatorics*, Ramat Gan, Israel.
- June 2013 **Member of the program committee**, *25th International Conference on Formal Power Series and Algebraic Combinatorics*, Paris, France.

- August 2012 **Member of the program committee**, *24th International Conference on Formal Power Series and Algebraic Combinatorics*, Nagoya, Japan.
- 1998–2008 **Member of the organizing committee**, Annual workshop *Non-Commutative Harmonic Analysis* in Będlewo, Poland, approximately 80 participants each year.