

# Prix Jeffery-Williams

## Jeffery-Williams Prize



**Roland Speicher**  
(Universität des Saarlandes)

intitulé *Lectures on the Combinatorics of Free Probability*, est généralement considéré comme une référence dans le domaine.

Le professeur Speicher a reçu la bourse Heisenberg de la Fondation scientifique allemande de 1995 à 2000 et la bourse de recherche Killam du Conseil des Arts du Canada en 2007 et 2008. Il a également reçu la Bourse du premier ministre pour l'excellence en recherche du premier ministre de l'Ontario en 2000 et une subvention du programme d'Initiative d'appui au leadership du CRSNG. En 2010, il a aussi reçu un prix d'excellence en recherche de l'Université Queen's. Ses résultats ont été publiés dans les revues mathématiques les plus réputées : *Inventiones Mathematicae*, *Duke Mathematical Journal*, *Advances in Mathematics*, *Documenta Mathematica*, *American Journal of Mathematics*.

Le domaine de recherche du professeur Speicher, les probabilités libres, (introduit par Voiculescu), repose sur l'interface entre les algèbres d'opérateurs et la théorie des probabilités. Cette théorie tire ses origines de la théorie quantique, l'une des théories scientifiques les plus marquantes du XX<sup>e</sup> siècle. Au début de l'ère quantique, Werner Heisenberg a dit que la théorie quantique devait être basée sur l'algèbre non commutative des matrices. L'apport du domaine des probabilités libres relève de sa capacité de traiter des variables aléatoires non commutatives.

Roland Speicher contribue de manière fondamentale au domaine des probabilités libres. Bon nombre de ses découvertes ont changé le cours des choses dans le domaine. En particulier, il a trouvé une interprétation combinatoire simple et élégante de the analytic R-transform. Ses travaux initiaux ont été enrichis de nombreuses façons, et il a placé l'étude des cumulants libres au cœur de la théorie. Son ouvrage corédigé avec Nica,

Roland Speicher est aussi reconnu pour de nombreuses autres contributions importantes. Mentionnons la représentation dans l'espace de Fock of the deformed Heisenberg commutation relations, the discovery of R-diagonal operators, a stochastic calculus for free Brownian motion, the discovery and classification of easy quantum groups, and the discovery of higher order freeness.

En particulier, dans un article rédigé en 1991 avec Bozejko, il a résolu un problème datant de 20 ans sur l'existence d'une représentation dans l'espace de Fock of the deformed Heisenberg commutation relations, qui est l'un des articles les plus souvent cités dans le domaine. Dans un autre article récent publié cette fois avec Koestler, sur un théorème libre de De Finetti, il montre que special quantum groups are the adequate symmetries for free probability et constituent une percée importante.

Après avoir étudié la physique et les mathématiques à Sarrebruck, à Fribourg et à Heidelberg, Roland Speicher a obtenu son doctorat en 1989 et son habilitation en 1994 de l'Université d'Heidelberg. Il s'est joint au corps professoral de l'Université Queen's en 2000 et il occupe en ce moment un poste combiné à l'Université de La Sarre, en Allemagne.

Roland Speicher has made fundamental contributions to free probability. Many of his discoveries have changed the course of the subject. In particular he found a simple and elegant combinatorial interpretation of the analytic R-transform. This initial work has been extended in many ways and has made the study of free cumulants a central part of the theory. His joint book with Nica «Lectures on the Combinatorics of Free Probability» is widely considered as a standard reference for the field.

Dr. Speicher was a Heisenberg Fellow of the German Science Foundation from 1995 to 2000 and a Killam Research Fellow of the Canada Council for the Arts in 2007 and 2008. He was a recipient of a Premier's Research Excellence Award from the Prime Minister of Ontario in 2000 and of

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*The Jeffery Williams Prize was inaugurated to recognize mathematicians who have made outstanding contributions to mathematical research. The first award was presented in 1968.*

*Le prix Jeffery-Williams rend hommage aux mathématiciens qui se sont distingués par l'excellence de leur contribution à la recherche mathématique. Il a été décerné pour la première fois en 1968.*

## Jeffery-Williams Prize *(continued)*

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a Leadership Support Initiative Award from NSERC. In 2010 he was awarded the Excellence in Research Prize from Queen's University. His results have been published in the most distinguished mathematical journals including *Inventiones Mathematicae*, the *Duke Mathematical Journal*, *Advances in Mathematics*, *Documenta Mathematica*, and the *American Journal of Mathematics*.

Dr. Speicher's area of research, free probability (which was introduced by Voiculescu), lies on the interface between operator algebras and probability theory. This theory had its origins in quantum theory, one of the most successful scientific theories of the twentieth century. At the birth of the quantum age, Werner Heisenberg pronounced that quantum theory must be based on the non-commutative algebra of matrices. The achievement of free probability is its ability to deal with non commuting random variables.

Dr. Speicher is also known for many other important contributions. Among them are the Fock space representation of the deformed Heisenberg commutation relations, the discovery of R-diagonal operators, a stochastic calculus for free Brownian motion, the discovery and classification of easy quantum groups, and the discovery of higher order freeness.

In particular, his 1991 CMP paper (with Bozejko) solved a 20 year old problem on the existence of a Fock space representation of the deformed Heisenberg commutation relations and is among the most heavily cited papers in the subject. His recent CMP paper (with Koestler) on a free de Finetti theorem shows that special quantum groups are the adequate symmetries for free probability and presents a major breakthrough.

After studying physics and mathematics in Saarbrücken, Freiburg, and Heidelberg, Dr. Speicher received his PhD in 1989 and his Habilitation in 1994 at the University of Heidelberg. He joined the faculty at Queen's University in 2000 and he currently holds a joint appointment at the Saarland University, Germany.

## Doctoral Prize *(continued)*

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Bozejko and Speicher, obtained as q-deformations of the two classical quantum mechanical operator systems. They showed that these algebras are always exact, and made progress on a conjecture of Dykema and Nica. In the year since completing his degree, he has written several more papers on multivariable operator theory in the commutative and non-commutative settings. He has proven to be an accomplished researcher with great prospects for the future.

Matthew Kennedy obtained his PhD in mathematics from the University of Waterloo in 2011. He declined an NSERC PDF in order to take a tenure track job at Carleton University.

## Adrien Pouliot Award *(continued)*

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camps, mentorship programs, and classroom visits by mathematicians and educators. Over the past few years a number of students who have benefited from these programs have graduated with grade 12 math, a course that is required for entry into university programs in subjects such as science and engineering. Melania and the community she works with see this as a significant initial step and hope many more will follow.

Melania Alvarez obtained her BS degree in actuarial science from the National University of Mexico, she holds an MS in Operations Research from Stanford University and an MS in Economics from the University of Wisconsin-Madison. She has worked in the private sector as a risk analyst and as a research associate in the Quantitative Assessment Program at the University of Wisconsin-Madison. Currently she is preparing a dissertation for a PhD in mathematics education at Simon Fraser University.