CITATIONS OF WINNERS

PRESIDENT'S SCIENCE AWARD 2017

Professor Gan Wee Teck

Distinguished Professor, National University of Singapore

"For his illustrious contributions to the field of mathematics, and his outstanding work on the Langlands programme and the Gan-Gross-Prasad conjecture"

Professor Gan Wee Teck is an internationally recognised and respected member of the mathematics fraternity and is considered to be a world leader in the fields of number theory and representation theory. He attained his PhD in mathematics from Harvard University and is currently a distinguished professor at the National University of Singapore (NUS). Prior to that he was a professor at the University of California, San Diego. In the course of his stellar career in mathematics, Professor Gan has garnered an impressive list of accolades including the prestigious American Math Society Centennial fellowship and the Sloan Research Fellowship. He has also been invited to speak at the International Congress of Mathematicians as recognition of being among the top in his field.

Over the past 10 years, Professor Gan's work on the Langlands programme, one of the most actively pursued areas of contemporary mathematics, and the Gan-Gross-Prasad conjecture has helped to link the two mathematical fields of number theory and representation theory. Number theory is a field of mathematics that deals with the properties of numbers, their patterns and their relationship with each other. Representation theory deals with the study of symmetries in algebraic structures.

Professor Gan's contributions towards linking the two fields mean that mathematicians could potentially use elements from number theory to solve problems related to representation theory, and vice versa. His achievement has been lauded as ground-breaking and a step forward in the field of mathematics.

His work has captured the attention of the research community and was pursued with great vigour by leading researchers from elite universities worldwide. One example of how highly rated his work is internationally can be seen from a 10-day summer school and conference that was conducted in Paris in 2014. It was devoted to the Gan-Gross-Prasad Conjecture and was attended by a crowd which was considered high for a pure mathematics field.

The work done by Professor Gan deeply impacts two foundational fields of mathematics. As part of his work in the Langlands Programme and the Gan-Gross-Prasad Conjecture, Professor Gan has also helped to resolve a number of mathematical enigmas. His work has already helped a number of mathematicians solve their problems by applying his

work to their own models. For example, Professor Gan's work helped the work of Furusawa-Morimoto to establish an old conjecture of Bocherer on Fourier coefficients of Siegel modular forms.

A noteworthy example is the proof of a 40-year old theory hypothesised by renowned mathematician Roger Howe, known as Howe's Duality Conjecture. He has also collaborated with many other renowned mathematicians, such as Benedict Gross and Dipendra Prasad on the Gan-Gross-Prasad Conjecture, which bears his name. His work has established a framework on which others had formulated theories, and subsequently resulted in burgeoning research by others from top institutions.

Professor Gan's work has potential real-world implications. Mathematics forms the foundation for numerous branches of science, and many technologies today would not have taken form if not for advances in mathematics. For example, technological advances like computing, automation, artificial intelligence and precision engineering would not be possible without mathematics guiding the understanding, design and logic of these technologies.

Another favourable outcome of his work is how it has put Singapore on the world map in the mathematics community. NUS has seen an increase in the number and diversity of their graduate students, especially in number theory and representation theory. Such a large number of graduate students in a particular pure mathematics discipline is rare, and is no doubt due in part to Professor Gan's high profile research. Such a gathering of bright minds working together will surely be beneficial to the field of mathematics and the country as a whole.

Professor Gan's love for mathematics was sparked many years ago by his secondary school mathematics teacher, Mr Song Hoe Chye. Mr Song believed in teaching mathematics to his students in a way that helped them to understand the subject at a deeper level, not just to do well in their exams. This emphasis of understanding mathematics at a deeper level has stayed with Professor Gan throughout his career, and was a factor in helping him achieve what he has today.

For his illustrious contributions to the field of mathematics, and his outstanding work on the Langlands programme and the Gan-Gross-Prasad conjecture, Professor Gan Wee Teck is awarded the 2017 President's Science Award.