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# Report of ICCM 2016 at Beijing

by Lo Yang\*

The Seventh International Congress of Chinese Mathematicians was held in Beijing from August 6 to August 11, 2016 (ICCM 2016). It was jointly hosted by the Academy of Mathematics and Systems Science (AMSS), the Morningside Center of Mathematics (MCM) of the Chinese Academy of Sciences (CAS). Tsinghua University, especially Prof. S. Y. Cheng and Prof. J. Xiao, provided strong supports for the preparation.

The opening ceremony of ICCM 2016 was held in the People's Great Hall on Aug. 6. President Chunli Bai of CAS, President Yong Qiu of Tsinghua University, Professor Shing-Tung Yau of Harvard University and Mr. Ronnie Chan of Morningside Group gave welcoming speeches. More than 1500 people attended.

The most important agenda of the opening ceremony was the announcement and presentation of the Morningside Medal of Mathematics, Chern Prize and ICCM International Cooperation Award, which attracted the attention of all participants.

The Morningside Medal of Mathematics, established in 1998, recognizes the outstanding mathematicians of Chinese descent under the age of 45 for their achievements in the research of pure and applied mathematics. The candidates were nominated worldwide, then refereed by experts in the relevant field, discussed and voted finally by the members of a selecting committee chaired by S.-T. Yau. The winners were kept as a secret until the announcement at the ICCM opening ceremony.

For 2016, it was announced that:

1. Professor Wei Zhang was awarded the 2016 Morningside Gold Medal of Mathematics for his original contributions to number theory and automorphic forms.

2. Another 2016 Morningside Gold Medal of Mathematics was given to Professor Si Li for his original contributions to the mathematics of string theory, in particular for his work on Landau-Ginzburg models and on BCOV theory.
3. Professor Wotao Yin was awarded the 2016 Morningside Gold Medal of Applied Mathematics for his ground breaking work on sparse optimization, ill-posed inverse problems and compressed sensing.
4. Six young mathematicians were awarded the 2016 Morningside Silver Medal of Mathematics. Namely, Prof. Binglong Chen for his contributions to Ricci flow and its applications; Prof. Kai-Wen Lau for his contributions to the theory of arithmetic compactification of Shimura varieties and its applications to the arithmetic of automorphic forms; Prof. Ronald Lok Ming Lui for his contributions to an emerging interdisciplinary field: Computational Quasiconformal Geometry, and its applications to medical imaging, computer graphics and visions; Prof. Jun Yin for his contributions to the solution to the Wigner-Dyson-Mehta conjecture and for developing the self-consistent resolvent method in random matrix theory; Prof. Lexing Ying for his contributions to the development and analysis of fast methods in scientific computing; Prof. Zhiwei Yun for his contributions to the construction of motives with exceptional Galois groups, and his path-breaking work with Prof. Wei Zhang on the L-Series of rank 2 local systems on curves over finite fields.

Chern Prize, established in 2001 in honor of Prof. Shiing-Shen Chern, recognizes mathematicians and individuals of Chinese descent who have made outstanding contributions to mathematical research or to public service activities in support of mathematics. Mr. Ronnie Chan was awarded the 2016 Chern

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Prize for his tremendous contributions to the Chinese mathematics community, including the establishment of the Morningside Center of Mathematics at the Chinese Academy of Sciences, supporting the Morningside Medal of Mathematics, and the Hang Lung Mathematics Awards for high school students in Hong Kong. Prof. Xiping Zhu was another winner of 2016 Chern Prize for his contributions to evolution equation in geometry and his training of geometers at Sun Yat-Sen University.

ICCM International Cooperation Award, established in 2004, recognizes individuals who have made significant contributions to the development of mathematics in mainland China, Hong Kong, Macau and Taiwan through collaboration, teaching, and supporting Chinese mathematicians. Prof. Björn Engquist was awarded the 2016 ICCM International Cooperation Award for his significant contributions in nurturing and mentoring a large number of excellent Chinese mathematicians, and his strong support of the Chinese mathematical community throughout his career.

In the afternoon of 6 August, three symposiums were held in the People's Great Hall.

The first one, entitled "The Golden Age of Fundamental Physics," was chaired by Prof. Robbert Dijkgraaf (Director and Leon Levy Professor at the Institute for Advanced Study in Princeton). Followed by the discovery of the Higgs particle and gravitational waves, fundamental physics entered a golden age. This symposium discussed some challenges and important problems of the new age. The panel members also shared thoughts and viewpoints on how China can become more integrated into the international physics community. Panelists of this symposium included Prof. David Gross (Nobel laureate, Chancellor's Chair Professor of Theoretical Physics at the University of California, Santa Barbara), Prof. Andrew Strominger (Gwill E. York Professor of Physics at Harvard University), and Prof. Qi-Kun Xue (Professor and Vice President of Tsinghua University).

The second one, entitled "Quantitative Biology and Biomedicine," was chaired by Prof. Michael Waterman (Professor of Biological Sciences, Mathematics and Computer Science at the University of Southern California). It focused on the mathematical aspects of modern biology and medicine and pointed out some of the enormous opportunities for the mathematical sciences to make fundamental contributions to these important subjects. Panelists included Prof. Luonan Chen (Executive Director and Professor of Key Laboratory of Systems Biology at the Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences), Prof. Jianfeng Feng (Professor of Mathematics and Director of the Centre for Computational Systems Biology at Fudan University), Prof. Wen-Hsiung Li (Director of the Biodiversity Research Center at Academia

Sinica), and Prof. Xuegong Zhang (Professor of Pattern Recognition and Bioinformatics at Tsinghua University).

The last one, entitled "Unreasonable Effectiveness of Big Data," was chaired by Dr. Harry Shum, Executive Vice President of Technology and Research at Microsoft Corporation. It discussed the theoretical and research challenges of big data, and shared experiences of successful consumer and enterprise applications of big data to search engines, e-commerce, and artificial intelligence. Panelists included Mr. Feng Deng (Founding Managing Director of Northern Light Venture Capital), Prof. Jianqing Fan (Frederick L. Moore '18 Professor of Finance at Princeton University), Mr. Dowson Tong (Senior Executive Vice President and President of Social Network Group at Tencent) and Dr. Jian Wang (Chairman of the Technology Steering Committee at Alibaba Group).

In the evening of 6 August, New World Mathematics Awards was presented. The goal of this award is to encourage outstanding Chinese mathematics students worldwide in their pursuit of mathematical truth.

In order to celebrate the 20th anniversary of MCM, a short and grand ceremony was held in the great hall of Tsinghua University in the morning of Aug. 7. A video recording the development path of MCM was showed before the ceremony. Prof. Shing-Tung Yau, Prof. Jinghai Li (Vice President of CAS), Prof. Xu Chen (Party Committee Secretary of Tsinghua University), Prof. Lo Yang, Mr. Ronnie Chan, and Professor Ye Tian spoke at the ceremony. President Li professed that the establishment of MCM was of great significance and MCM had played an important role and achieved breakthroughs in mathematics research, training young mathematicians, and improving international scientific exchanges.

After the 20th anniversary ceremony of MCM, 7 Morningside Lectures were delivered. The first speaker was Professor Edward Witten, Fields medalist and the Professor of Institute for Advanced Study at Princeton. He described a new perspective on integrable spin systems in two dimensions. After the introduction to Professor Kevin Costello's theory on this system, he commented that it appears that one has to go to string theory and use a certain "brane" system, the D4-NS5 system to give an *a priori* "non-perturbative definition" of the theory.

The subsequent Morningside Speakers and their topics are:

1. Prof. Camillo De Lellis (University of Zurich), The Nash-Kuiper theorem and a conjecture of Onsager;
2. Prof. Stanley Osher (UCLA), Overcoming the curse of dimensionality for certain Hamilton-

Jacobi (HJ) equations arising in control theory and elsewhere;

3. Prof. Yuri Tschinkel (New York University), Rationality properties of higher-dimensional algebraic varieties (He also gave an introduction to Simon Foundation);
4. Prof. Björn Engquist (University of Texas at Austin), Seismic imaging and the Monge-Ampère equation;
5. Prof. Horng-Tzer Yau (Harvard University), Spectral statistics of random graphs;
6. Prof. Zhiwei Yun (Stanford University), Intersection numbers and higher derivatives of L-functions for function fields.

An important event during ICCM 2016 was the establishment of the International Consortium of Chinese Mathematicians which is also called ICCM for short. The ICCM have been prepared for several years by many Chinese mathematicians all around the world. In the evening of Aug. 7, Prof. Yau announced its official establishment. More than one hundred mathematicians and several entrepreneurs attended

the ceremony. The ICCM is a nonprofit academic organization aiming to promote the exchange and cooperation between Chinese mathematicians, and push forward the research and applications of mathematics.

From Aug. 8 to Aug. 11, 36 plenary talks, 106 invited talks and 22 contributed talks, which covered many areas including pure mathematics, applied mathematics, statistics, and computational mathematics, were given on the campus of the University of Chinese Academy of Sciences. They were attended by about one thousand persons, most of them are young mathematicians and graduate students. Many participants expressed that it was a wonderful opportunity for them to learn the latest development of so many subjects on mathematics.

There was a performance of Beijing Opera for ICCM 2016 in Tsinghua University. After the closing of ICCM 2016, the oral exam of 2016 S. T. Yau College student Mathematics Contests started immediately. Most committee members of this contest were the speakers of ICCM 2016. The contest awarding ceremony was held in the evening of Aug. 12.