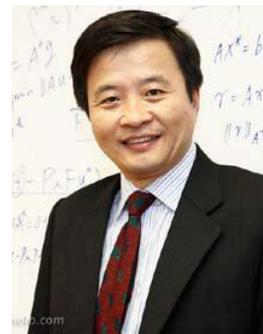**Professor SHEN Zuowei**
Tan Chin Tuan Centennial Professorship
[Science]
1 January 2013 to 31 December 2015

Professor, Department of Mathematics
National University of Singapore

Professor Shen received his B.S. degree in Mathematics from Hohai University, Nanjing, China, in 1982 and his Ph.D. degree in Mathematics from the Department of Mathematics of the University of Alberta, Edmonton, Canada, in 1991. He then spent two years at the University of Wisconsin-Madison, USA as a Research Associate. Since 1993, he has been with the Department of Mathematics, National University of Singapore. He won the Outstanding University Research Award in 1997 and 2008 at the National University of Singapore and the National Science Award of Singapore in 1998. He was awarded the Society of Photographic Instrumentation Engineers Wavelet Pioneer Award in 2012 and was one of the inaugural fellows of the Singapore National Academy of Sciences in 2011. He has been invited to speak at many international conferences and workshops, including the International Congress of Mathematicians in 2010 and International Congress on Industrial and Applied Mathematics 2015. He is on the editorial boards of several international journals in applied mathematics.

RESEARCH / STUDIES

Professor Shen's research interests are in applied mathematics, especially the field of applied and computational harmonic analysis. Together with his collaborators, he has made several significant contributions in wavelet theory and its applications that include:

i.   The development of a theoretical framework and construction of multivariate wavelets, which can be used for geometric compression and reconstruction;

ii. The introduction of two mathematical principles: the duality principle for Gabor frames, and the unitary extension principle for wavelet frames, which provide a foundation for Gabor frames and wavelet frames;

iii. Pioneering the use of wavelet frames in digital image restorations. He has built up models based on wavelet frame theory, derived powerful algorithms and provided their mathematical analysis. With his work, the wavelet-frame-based image recovery has become one of the main approaches in the field. In addition, his algorithms have also been used in other applications such as restoration of video images, reconstruction of biomedical images, compress sensing and low-rank matrix complication.

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