NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

SEMINAR ANNOUNCEMENT

Geometric Understanding and analysis of unstructured data

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Date: 01 June 2017 (Thursday)
Time: 4.50pm to 5.50pm
Venue: MAS Executive Classroom 2, MAS-03-07
School of Physical and Mathematical Sciences

Abstract

One of the simplest and most natural ways of representing geometry and information in three and higher dimensions is using point clouds, such as scanned 3D points for shape modeling and feature vectors viewed as points embedded in high dimensions for general data analysis. Geometric understanding and analysis of point cloud data poses many challenges since they are unstructured, for which a global mesh or parametrization is difficult if not impossible to obtain in practice. Moreover, the embedding is highly non-unique due to rigid and non-rigid transformations. In this talk, I will present some of our recent work on geometric understanding and analysis of point cloud data. I will first discuss a multi-scale method for non-rigid point cloud registration based on the Laplace-Beltrami eigenmap and optimal transport. The registration is defined in distribution sense which provides both generality and flexibility. If time permits I will also discuss solving geometric partial differential equations directly on point clouds and show how it can be used to "connect the dots" to extract intrinsic geometric information for the underlying manifold.

Speaker Biography

Hongkai Zhao is Chancellor's Professor and Chair of the Mathematics Department at UCI. He got his B.S. in Mathematics from Peking University in 1990 and his Ph.D in Mathematics from UCLA in 1996. He received A. P. Sloan Research Fellowship (2002-2004), Feng Kang Prize for Scientific Computing in 2007 and Chang-Jiang Guest Professorship at Peking University in 2009. His research interest is in computational and applied mathematics that includes modeling, analysis and developing numerical methods for problems arising from science and engineering such as moving interface problem, level set method, fast sweeping method, image processing/computer vision, imaging and inverse problems.

Host: Division of Mathematical Sciences, School of Physical and Mathematical Sciences

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