



MATH-IMS Joint Applied Mathematics Colloquium Series The Chinese University of Hong Kong

This MATH-IMS Joint Colloquium Series is organized by Center for Mathematical Artificial Intelligence (CMAI), under Department of Mathematics and Institute of Mathematical Sciences (IMS) at The Chinese University of Hong Kong. The colloquium series focuses on mathematics and applications of artificial intelligence, big data and related topics.

Date: July 8, 2022 (Friday)

Time: 16:00-17:00 (Hong Kong Time)

Zoom Link: <https://cuhk.zoom.us/j/92775210812>

Mathematical imaging:

From geometric PDEs and variational modelling to deep learning for images

*Speaker: Professor Carola-Bibiane Schönlieb
University of Cambridge*

Abstract: Images are a rich source of beautiful mathematical formalism and analysis. Associated mathematical problems arise in functional and non-smooth analysis, the theory and numerical analysis of nonlinear partial differential equations, inverse problems, harmonic, stochastic and statistical analysis, and optimization. In this talk we will learn about some of these mathematical problems, about variational models and PDEs for image analysis and inverse imaging problems as well as recent advances where such mathematical models are complemented and replaced by deep neural networks. The talk is furnished with applications to art restoration, forest conservation and cancer research.

Bio: Prof. Schönlieb is Professor of Applied Mathematics and head of the Cambridge Image Analysis group at the Department of Applied Mathematics and Theoretical Physics, University of Cambridge. She is also the Director of the Cantab Capital Institute for the Mathematics of Information, Director of the EPSRC Centre for Mathematical and Statistical Analysis of Multimodal Clinical Imaging, Cambridge and co-leader of the IMAGES network. Prof. Schönlieb obtained the Doctor of Philosophy degree in 2009 at University of Cambridge, worked as a postdoc at Georg-August University Goettingen in Germany from 2009 to 2010, she then became a lecturer and reader from 2010 to 2018 at University of Cambridge. Since 2018, she has become the Professor of Applied Mathematics at University of Cambridge. Prof. Schönlieb has a broad research interests including nonlinear PDEs, inverse problems in imaging, sparse regularization, optimization, machine learning for inverse problems, large-scale and high-dimensional imaging analysis and processing, remote sensing, restoration of artwork, etc. Among her many prestigious awards, Prof. Schönlieb has achieved Philip Leverhulme Prize in 2017, Whitehead prize in 2016, EPSRC Science Photo Award in 2013, INiTS Award from INiTS (Innovation into Business), Vienna: 3rd Prize in the Category General Technologies in 2010. For her service, Prof. Schönlieb leads a large Cambridge Image Analysis group and has been associate editor for SIAM Journal on Imaging Sciences, Proceedings of the Royal Society Association, European Journal of Applied Mathematics, SIAM Review, IMA Journal of Numerical Analysis, Journal of Mathematical Imaging and Vision, ESAIM Proceedings and Surveys; member of international advisory panel for Inverse Problems, etc.