

Joint Workshop on Image Processing in Medicine

9:15 am – 5:30 pm Monday 17th November
Cancer Research Institute Lecture Theatre, Addenbrooke's site.

This workshop covers major themes in image processing as it applies to medicine across a range of image acquisition techniques and physical scales from molecules through cells, tissues and organs. The aim is to give a broad overview of research activity from those involved in this area in Cambridge, and some indication of the current needs.

Each session will start with two slightly longer talks. The intention is for these to provide an overview to introduce the relevance of the session in Medical applications, concentrating on actual and potential clinical “bedside” applications in patients; and the relevance of these techniques in “bench” medicine involving in vitro and animal “in vivo” work. These are followed by short, high level, talks from members of the local research community introducing some of their own work relating to each theme. Each session will be closed with a discussion, aiming to pull together common research strands across discipline boundaries and potential future research directions.

9:15 Introduction

Graham Treece (Engineering)

9:20 Morphology and Heterogeneity

co-chairs: **Pietro Cicuta**
Rebecca Fitzgerald

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| 9:20 <i>Tumour morphology and heterogeneity: clinical imaging perspective</i> | Evis Sala (Radiology) |
| 9:35 <i>Optical methods for endoscopic diagnosis of heterogeneous pre-cancerous lesions</i> | Rebecca Fitzgerald (Oncology) |
| 9:50 <i>Using clonal imaging to uncover the cellular basis of epithelial homeostasis</i> | Phil Jones (Hutchison/MRC) |
| 10:00 <i>Dynamics at rest: information content in resting fMRI</i> | John Suckling (Psychiatry) |
| 10:10 <i>Characterization of image heterogeneity using Minkowski functional</i> | Holly Canuto (Biochemistry/CRUK) |
| 10:20 <i>The Melanoma Exemplar</i> | Michelle Tuveson (CRUK) |
| 10:30 <i>Real-time tracking with application to medicine</i> | Tom Drummond (Engineering) |
| 10:40 <i>Discussion</i> | |

10:50 Coffee

11:20 Imaging Mechanical Properties

co-chairs: **David J Lomas**
Michael Sutcliffe

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| 11:20 <i>Soft or hard: does it make a difference?</i> | David J Lomas (Radiology) |
| 11:35 <i>Imaging to measure arterial stiffness</i> | Michael Sutcliffe (Engineering) |

11:50	<i>Single cell mechanics measured by optical and scanning probe techniques</i>	Jochen Guck (Physics)
12:00	<i>Morphogenetic strains and cellular intercalation</i>	Alex Kabla (Engineering)
12:10	<i>Regional aortic stiffness measurements using MRI</i>	Mark Butlin (Clinical Pharmacology)
12:20	<i>MRI-based mechanical simulation of the interaction between blood flow and carotid atheroma</i>	Zhi-Yong Li (Radiology)
12:30	<i>Mechano-transduction and cell adhesion</i>	Vikram Deshpande (Engineering)
12:40	<i>Discussion</i>	

12:50 Lunch

13:50 Analysing Motion / Change

co-chairs: **Martin Graves**
Randy Read

13:50	<i>Investigating motion using MRI</i>	Martin Graves (Medical Physics)
14:05	<i>Automating molecular imaging through crystallography</i>	Randy Read (CIMR)
14:20	<i>Machine vision analysis of nematode behaviour</i>	Bill Schafer (LMB)
14:30	<i>Myosin motor proteins drive cargo transport in cells</i>	Folma Buss (CIMR)
14:40	<i>Visualizing the (fluid) dynamics of eukaryotic flagella</i>	Ray Goldstein (DAMTP)
14:50	<i>Automatic tracking and analysis of motile objects</i>	Simon Bullock (LMB)
15:00	<i>Discussion</i>	

15:10 Coffee

15:40 Novel / Enhanced Imaging

co-chairs: **Kevin Brindle**
Clemens Kaminski

15:40	<i>Imaging metabolism with hyperpolarised magnetic resonance imaging</i>	Kevin Brindle (Biochemistry/CRUK)
15:55	<i>Advanced microscopic imaging in living cells</i>	Clemens Kaminski (Chem Engineering)
16:10	<i>Simultaneous PET/MR: opportunities for co-analysis of datasets</i>	Guy Williams (WBIC)
16:20	<i>Nanoscale functional imaging of living cells</i>	David Klenerman (Chemistry)
16:30	<i>Enhancement of 3D ultrasound and 3D widefield microscopy images</i>	Nick Kingsbury (Engineering)
16:40	<i>Imaging collagen conformation in tumours</i>	Stefanie Reichelt (CRUK)
16:50	<i>Huge digital (e.g. 50 Mb) images from a novel low-power lens</i>	Brad Amos (LMB)
17:00	<i>PathGrid – automating tissue micro array analysis utilising astronomy image processing techniques</i>	Nicholas Walton (Astrophysics)
17:10	<i>Discussion</i>	

17:20 Closing Comments

David J Lomas (Radiology)