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

Tumour morphology and heterogeneity: clinical imaging perspective
Evis Sala (Radiology)

Optical methods for endoscopic diagnosis of heterogeneous pre-cancerous lesions
Rebecca Fitzgerald (Oncology)

Using clonal imaging to uncover the cellular basis of epithelial homeostasis
Phil Jones (Hutchison/MRC)

Dynamics at rest: information content in resting fMRI
John Suckling (Psychiatry)

Characterization of image heterogeneity using Minkowski functional
Holly Canuto (Biochemistry/CRUK)

The Melanoma Exemplar
Michelle Tuveson (CRUK)

Real-time tracking with application to medicine
Tom Drummond (Engineering)

10:40 Discussion

10:50 Coffee

11:20 Imaging Mechanical Properties

Soft or hard: does it make a difference?
David J Lomas (Radiology)

Imaging to measure arterial stiffness
Michael Sutcliffe (Engineering)
11:50  Single cell mechanics measured by optical and scanning probe techniques  
Jochen Guck (Physics)

12:00  Morphogenetic strains and cellular intercalation  
Alex Kabla (Engineering)

12:10  Regional aortic stiffness measurements using MRI  
Mark Butlin (Clinical Pharmacology)

12:20  MRI-based mechanical simulation of the interaction between blood flow and carotid atheroma  
Zhi-Yong Li (Radiology)

12:30  Mechano-transduction and cell adhesion  
Vikram Deshpande (Engineering)

12:40  Discussion

12:50  Lunch

13:50  Analysing Motion / Change  
co-chairs: Martin Graves, Randy Read

13:50  Investigating motion using MRI  
Martin Graves (Medical Physics)

14:05  Automating molecular imaging through crystallography  
Randy Read (CIMR)

14:20  Machine vision analysis of nematode behaviour  
Bill Schafer (LMB)

14:30  Myosin motor proteins drive cargo transport in cells  
Folma Buss (CIMR)

14:40  Visualizing the (fluid) dynamics of eukaryotic flagella  
Ray Goldstein (DAMTP)

14:50  Automatic tracking and analysis of motile objects  
Simon Bullock (LMB)

15:00  Discussion

15:10  Coffee

15:40  Novel / Enhanced Imaging  
co-chairs: Kevin Brindle, Clemens Kaminski

15:40  Imaging metabolism with hyperpolarised magnetic resonance imaging  
Kevin Brindle (Biochemistry/CRUK)

15:55  Advanced microscopic imaging in living cells  
Clemens Kaminski (Chem Engineering)

16:10  Simultaneous PET/MR: opportunities for co-analysis of datasets  
Guy Williams (WBIC)

16:20  Nanoscale functional imaging of living cells  
David Klenerman (Chemistry)

16:30  Enhancement of 3D ultrasound and 3D widefield microscopy images  
Nick Kingsbury (Engineering)

16:40  Imaging collagen conformation in tumours  
Stefanie Reichelt (CRUK)

16:50  Huge digital (e.g. 50 Mb) images from a novel low-power lens  
Brad Amos (LMB)

17:00  PathGrid – automating tissue micro array analysis utilising astronomy image processing techniques  
Nicholas Walton (Astrophysics)

17:10  Discussion

17:20  Closing Comments  
David J Lomas (Radiology)

Organising committee: Graham Treece, David J Lomas, Pietro Cicuta, Richard Prager and Kevin Brindle