BioImagingUK Meeting – LRI

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Image Analysis

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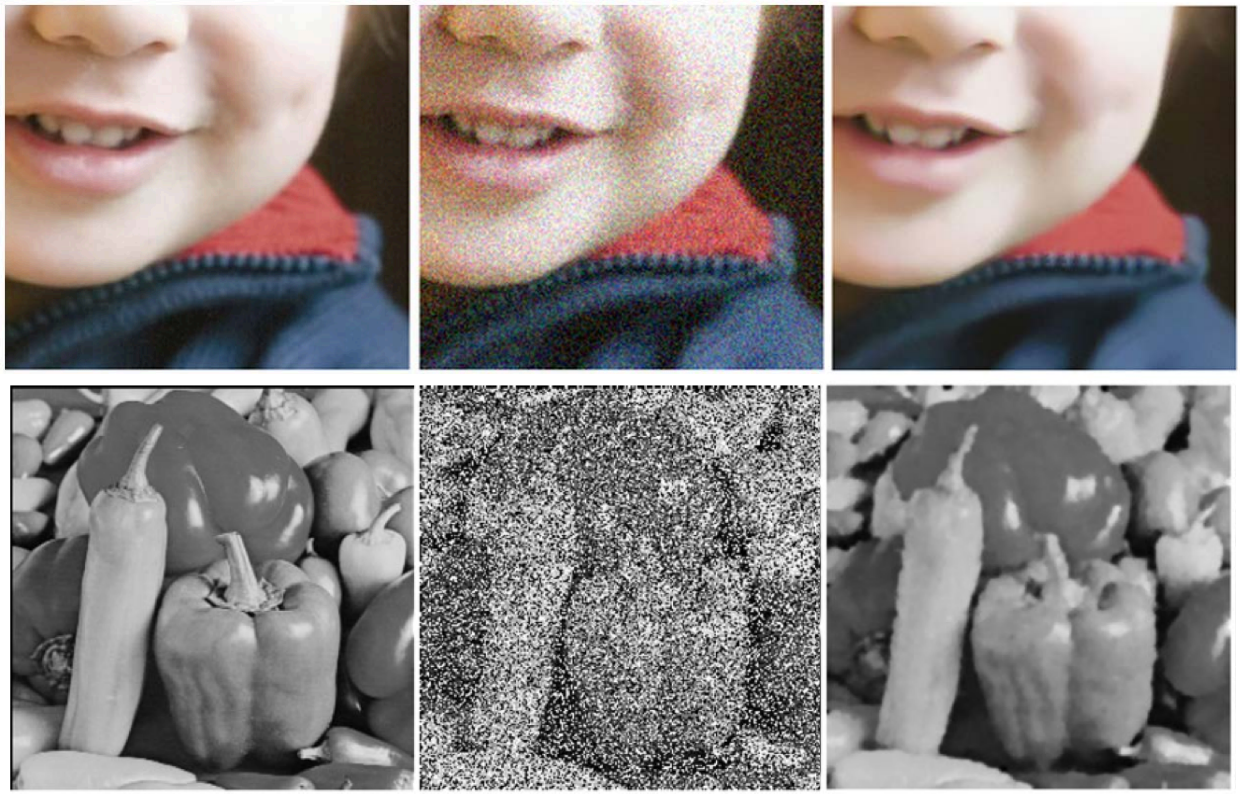
Image Analysis in Context

- **Synergistic relationship:**
  - Image Analysis / Processing
  - Signal Processing
  - Computer Vision
  - Machine / Statistical Learning

Main Topics

- **Filtering / Denoising / Restoration:**

$$E(u) = \int \Big((u - f)^2 + \|\nabla u\| \Big) dx$$

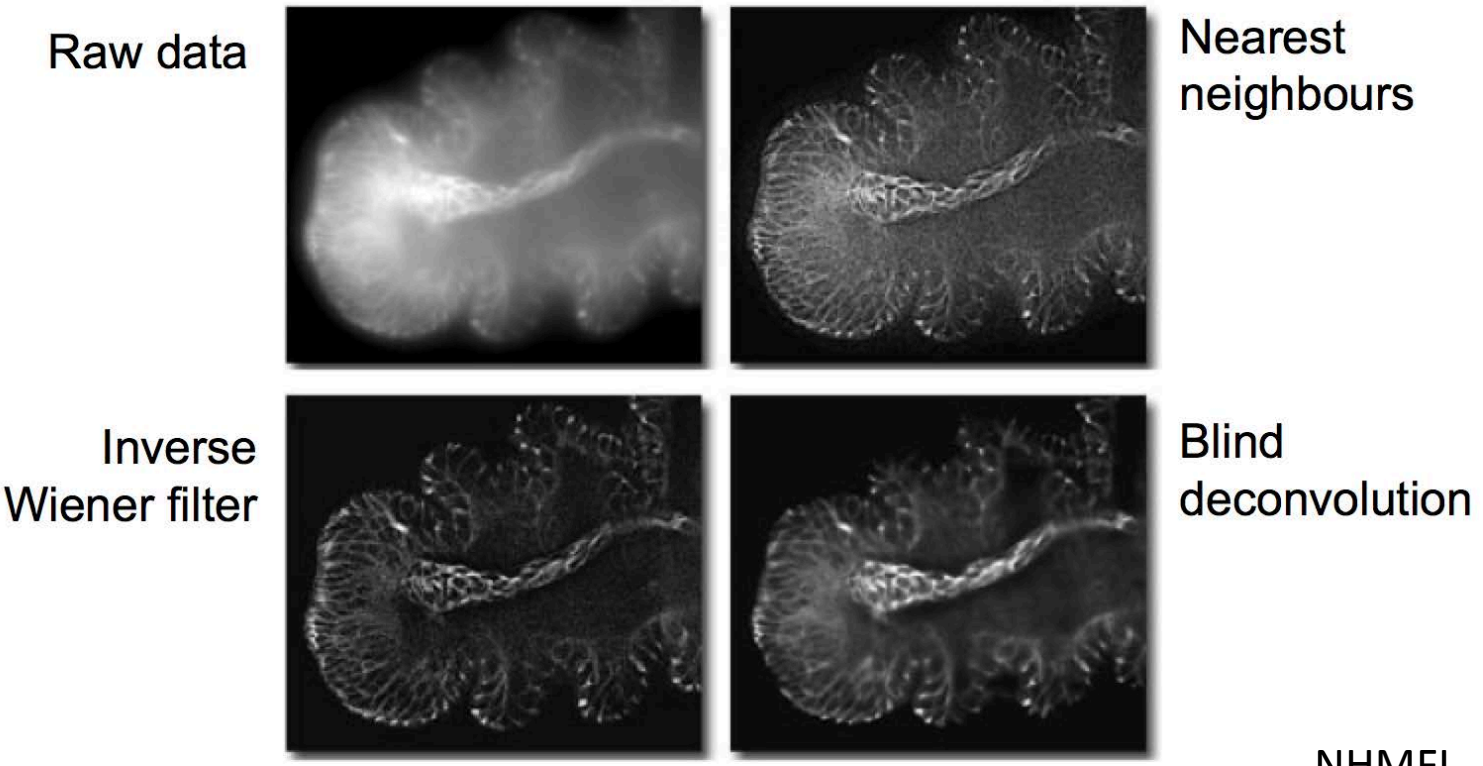


Pizarro *et al.*, 2010

Main Topics

- **Deconvolution / Deblurring:**

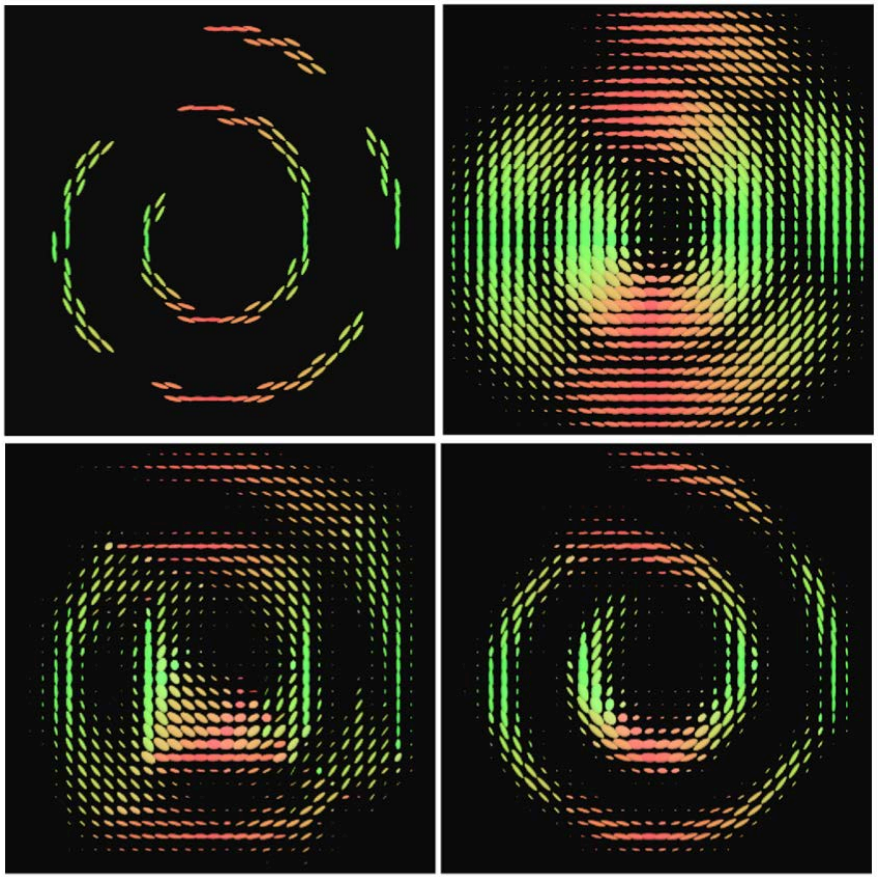
$$E(u) = \int \left(h * u - f - f \ln \left(\frac{h * u}{f} \right) + \|\nabla u\| \right) dx$$



Main Topics

- **Mathematical Morphology:**

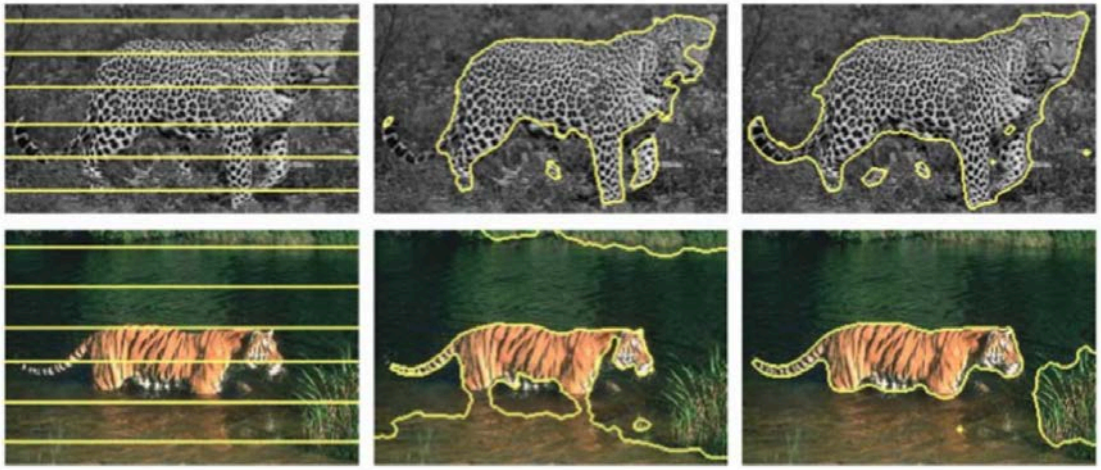
$$\partial_t u = \pm \|D(u) \cdot \nabla u\|$$



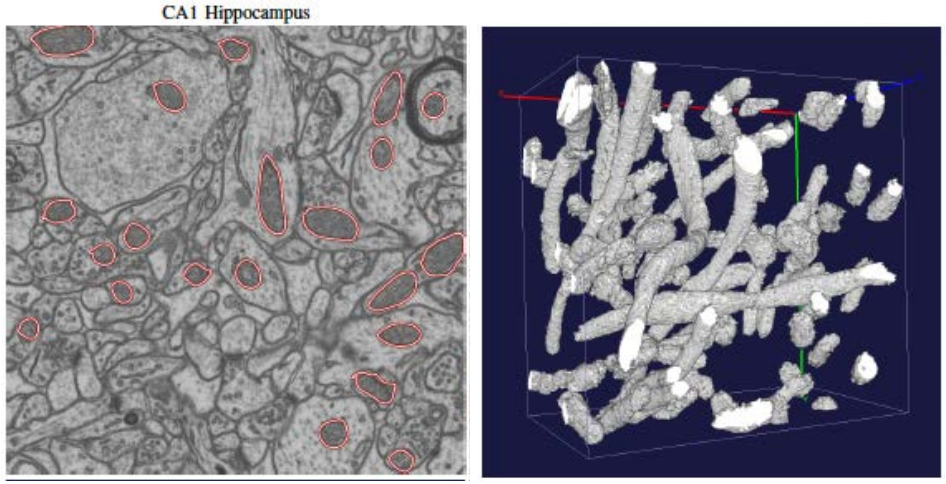
Pizarro *et al*., 2009

Main Topics

- **Segmentation:** $$E(\Omega_i, p_{ij}) = -\sum_{j=1}^{N} \left(\int_{\Omega_1} \log p_{1j}(u_j(x))dx + \int_{\Omega_2} \log p_{2j}(u_j(x))dx \right)$$



Brox *et al.*, 2010

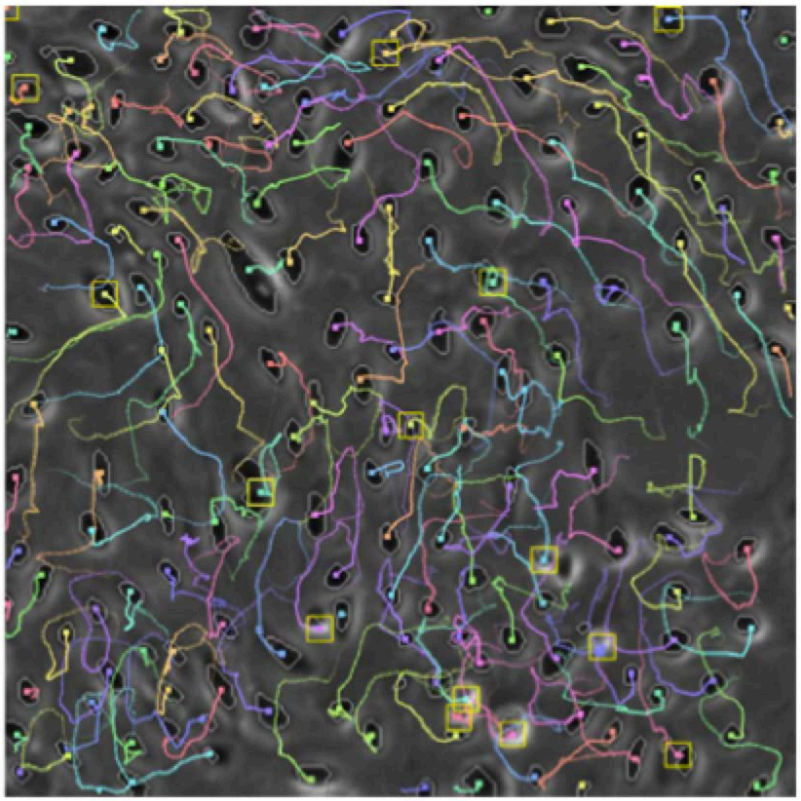


Lucchi *et al.*, 2010

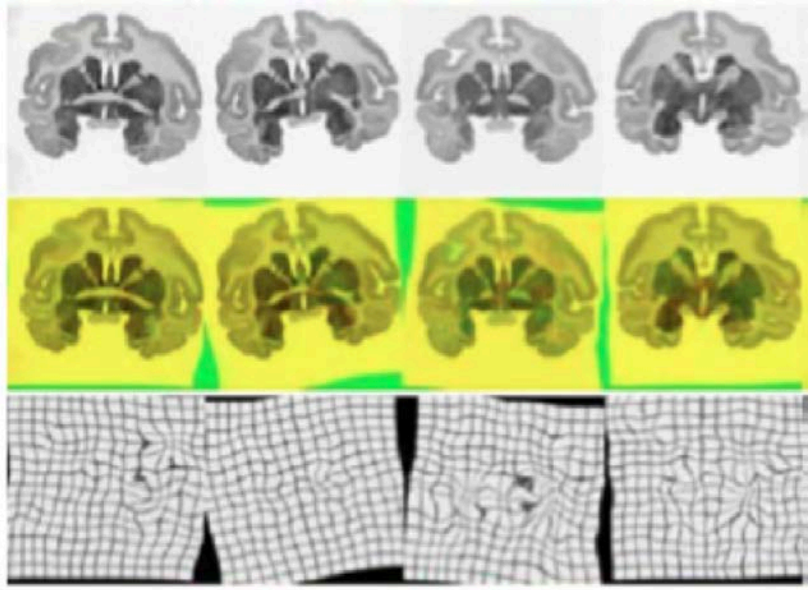
Main Topics

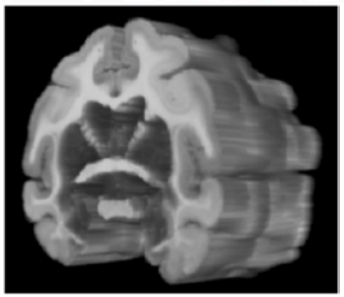
- **Tracking / Registration:**

$$E(T) = \int \left(\left(I_{t_0} - T(I_t) \right)^2 + \sum_i \left(\frac{\partial^2 T}{\partial x_i^2} \right)^2 \right) dx$$



Li *et al*., 2011

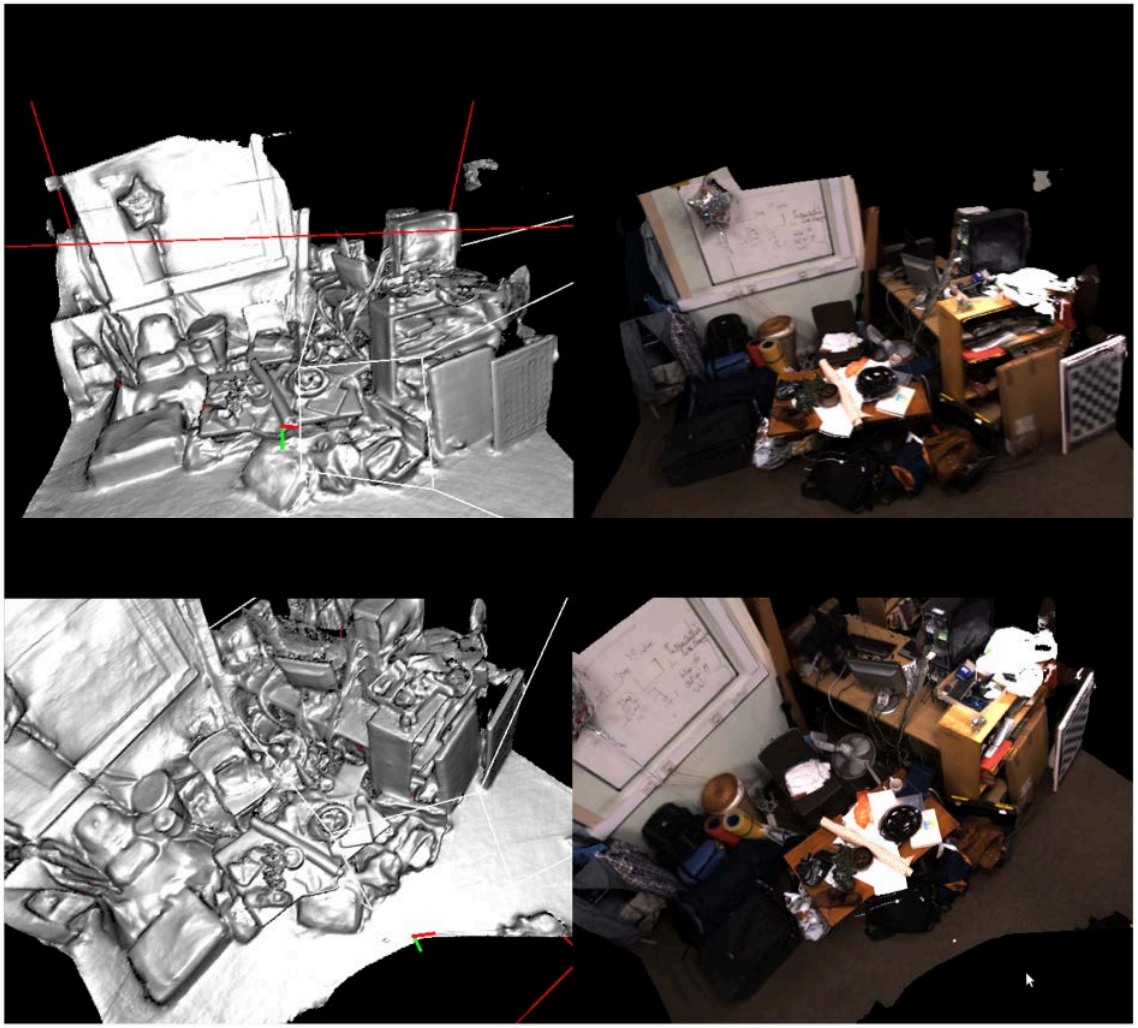




Arganda-Carreras *et al*., 2010

Main Topics

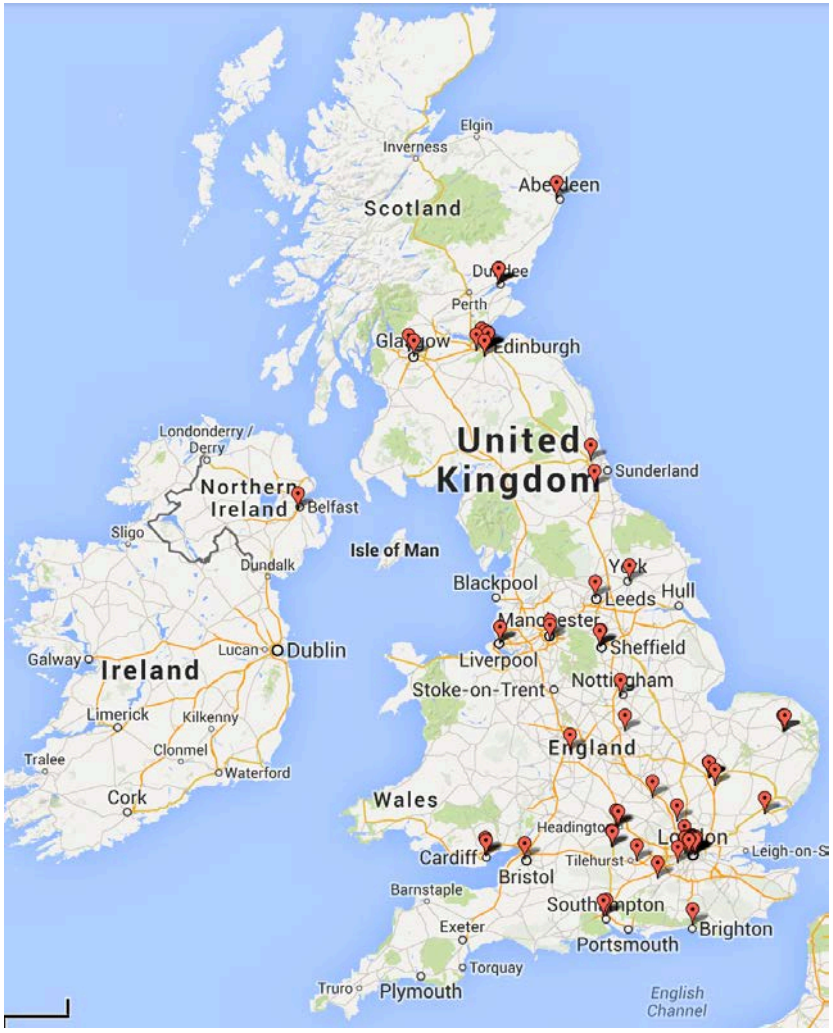
- **Scene Reconstruction:**



Newcombe *et al*., 2011

UK-based Community

- **UK Biological Imaging Facilities:**



Source:
Imaging and Cytometry Laboratory
Bioscience Technology Facility
University of York

UK-based Community

- **UK Biological Image Analysis Labs:**

Dr. Nasir Rajpoot
Bioimage Analysis Lab
University of Warwick

Prof. Stephen J. Mckenna
Computer Vision and Image Processing Group
University of Dundee

Prof. Tony Pridmore
Computer Vision Laboratory
University of Nottingham

Dr. Jens Rittscher
Biomedical Image Analysis Group
University of Oxford

Dr. Luis Pizarro
Computational BioImaging Lab
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Main Journals and Conferences

- **Journals**:
  - IEEE Transaction on Image Processing
  - International Journal of Computer Vision
  - Journal of Mathematical Imaging and Vision
  - SIAM Journal on Imaging Sciences
  - Computer Vision and Image Understanding
  - Image and Vision Computing
  - IEEE Pattern Analysis and Machine Intelligence
  - IEEE Transactions on Medical Imaging
  - Medical Image Analysis

Main Journals and Conferences

- **Conferences**:
  - CVPR (Computer Vision and Pattern Recognition)
  - ICCV (Computer Vision)
  - ECCV (European Computer Vision)
  - ICIP (Image Processing)
  - ICPR (Pattern Recognition)
  - ISBI (Biomedical Imaging: From Nano to Macro)
  - MICCAI (Medical Image Computing)
  - SPIE (Medical Imaging)
  - BII (Bioimage Informatics)