

# Regularisation Methods for Joint Image Reconstruction

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Several imaging problems consider multiple images simultaneously. Examples include colour and multispectral imaging, hybrid imaging in medical imaging (such as PET-MRI, and SPECT-CT), as well as geophysical imaging (electrical and acoustic properties reconstruction). The use of variational regularisation techniques for inverse problems in these applications can treat each image channel separately or jointly. In this talk we consider methods based on the joint information of multiple images in terms of both their *geometry*, and their *statistics*. For the former we propose methods based on parallel level sets, and for the latter methods based on both joint entropy, and on multispectral probabilistic diffusion. Examples are shown on model problems and for medical imaging applications.