

## 医用画像と画像処理（工藤 博幸）

## Medical Imaging and Image Processing (KUDO Hiroyuki)



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## 医用画像と画像処理の研究

私の研究分野は、医用画像と画像処理です。CT（コンピュータトモグラフィ）やPET（ポジトロンCT）と呼ばれる装置において画像を生成する画像処理の研究、医用画像を解析して病変を検出して医師の診断を支援する計算機支援診断、医用画像を解析して人体の3Dモデルを構築して手術のシミュレーションやナビゲーション他に応用する計算解剖学、医用応用を意識した先端の画像処理やコンピュータビジョン、などに関する研究を行っています。特に、CTやPETの画像を生成する画像処理を扱う画像再構成の分野では、世界のトップを走っている研究者だと自負しています。

## Research on Medical Imaging and Image Processing

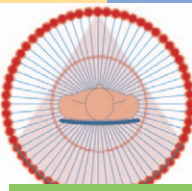
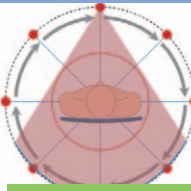
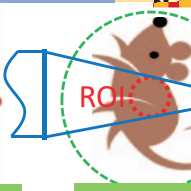
My research fields are medical imaging and image processing. I am mainly working on the following four research subjects. The first subject is the research on image processing, which aims at generating cross-sectional images in CT and PET imaging modalities. The second subject is the research on Computer-Aided-Diagnosis, which aims at supporting the diagnosis by MD using medical image processing techniques. The third subject is the research on Computational Anatomy, which aims at generating 3-D digital model of human atlas together with applying it to, for example, simulation and navigation of surgeries. The last one is the research on newest image processing and computer vision, aiming at applying them to medicine. In particular, I am believing that I am one of top runners in the field of image reconstruction in CT and PET.



## Medical Imaging and Image Processing



### Computed Tomography

New paradigm of CT imaging

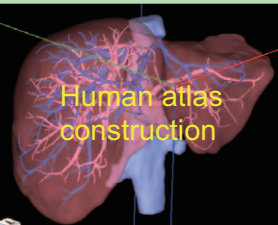
Low-Dose CT
Sparse-View CT
Interior CT

Image reconstruction, 3-D and 4-D CT imaging, Low-dose CT, PET (Positron emission tomography), Electron tomography, X-ray phase tomography

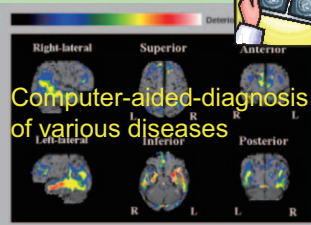



We are joining two very large first-priority national projects

### Medical Image Processing



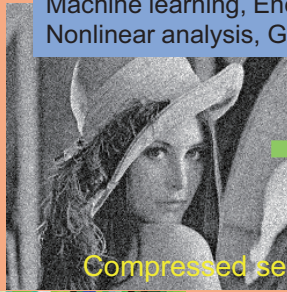

Human atlas construction



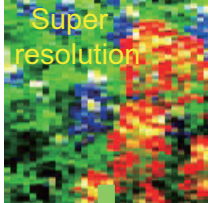
Computer-aided-diagnosis of various diseases

### Mathematical Image Processing

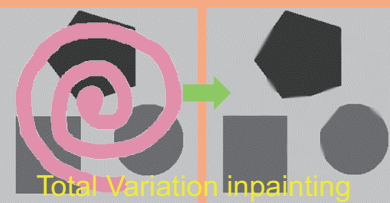
Compressed sensing, Convex optimization, Machine learning, Energy minimization, Nonlinear analysis, Graph algorithms

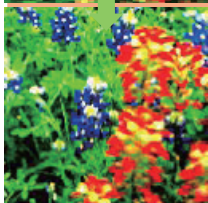
Compressed sensing denoising



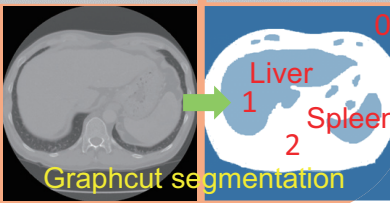
Super resolution



Total Variation inpainting



Graphcut segmentation



Liver 1  
Spleen 2