

# Multiparametric Imaging with PET Scans Using High Temporal-Resolution Dynamic Data Acquisition and Modeling

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## ABSTRACT

Researchers at the University of California, Davis, have developed a method to acquire and model high temporal resolution (1-2 seconds per frame) dynamic data with PET scans.

## FULL DESCRIPTION

Current clinical PET scanning methods and data modeling allow for a temporal resolution of 5-10 seconds per frame with compromised image quality. A high temporal resolution dynamic PET scan can attain a higher temporal resolution, around 2 seconds per frame, but currently cannot be adequately resolved. New methodologies and models are needed to obtain and optimize high-resolution dynamic PET scanning data.

Researchers at the University of California, Davis, have developed a method to acquire and model high temporal resolution PET scans that are a function of temporal and spatial locations. This model is able to directly estimate blood flow and blood volume from the dynamic PET data using a single tracer injection. Using this method, for example, one can obtain simultaneous imaging of blood flow and glucose metabolism using a single dynamic  $^{18}\text{F}$ -FDG PET scan. This has applications in characterization of flow-metabolism mismatch or coupling in aggressive tumors, myocardial viability, and brain function in neurodegenerative diseases.

## APPLICATIONS

- ▶ Data analysis of high temporal resolution PET scans
- ▶ Single tracer multiparametric imaging (e.g., perfusion-metabolism imaging by  $^{18}\text{F}$ -FDG)
- ▶ Blood flow imaging and analysis
- ▶ Characterization of tumor aggressiveness in cancer therapy
- ▶ Myocardial viability in coronary artery disease
- ▶ Brain function in neurodegenerative diseases

## FEATURES/BENEFITS

- ▶ Derives blood flow without a flow-specific tracer
- ▶ Allows for a reduced imaging time, cost, and radiation dose
- ▶ Requires only one tracer injection
  - ▶ Applicable to any radiotracers
- ▶ Is effective in all regions, including regions where extraction fraction is low
- ▶ Applicable to all existing clinical PET scanners

## RELATED MATERIALS

## CONTACT

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## INVENTORS

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## OTHER INFORMATION

### KEYWORDS

PET scan, high temporal resolution, time-varying model, multiparametric imaging, dynamic data, single tracer

### CATEGORIZED AS

- ▶ **Imaging**
  - ▶ Medical
- ▶ **Medical**
  - ▶ Diagnostics
  - ▶ Imaging
  - ▶ Other

### RELATED CASES

2018-473-0

▶ • Wang GB. "High temporal-resolution dynamic PET image reconstruction using a new spatiotemporal kernel method". IEEE Trans Med Imaging. 2018 Sep 12. doi: 10.1109/TMI.2018.2869868. [Epub ahead of print]. - 09/12/2018

## PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,896,417	02/13/2024	2018-473

## ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Techniques for Improving Positron Emission Tomography Image Quality and Tracking Real-Time Biological Processes](#)
- ▶ [Quantitative Multiparametric PET/CT Imaging for Nonalcoholic Fatty Liver Diseases](#)

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