

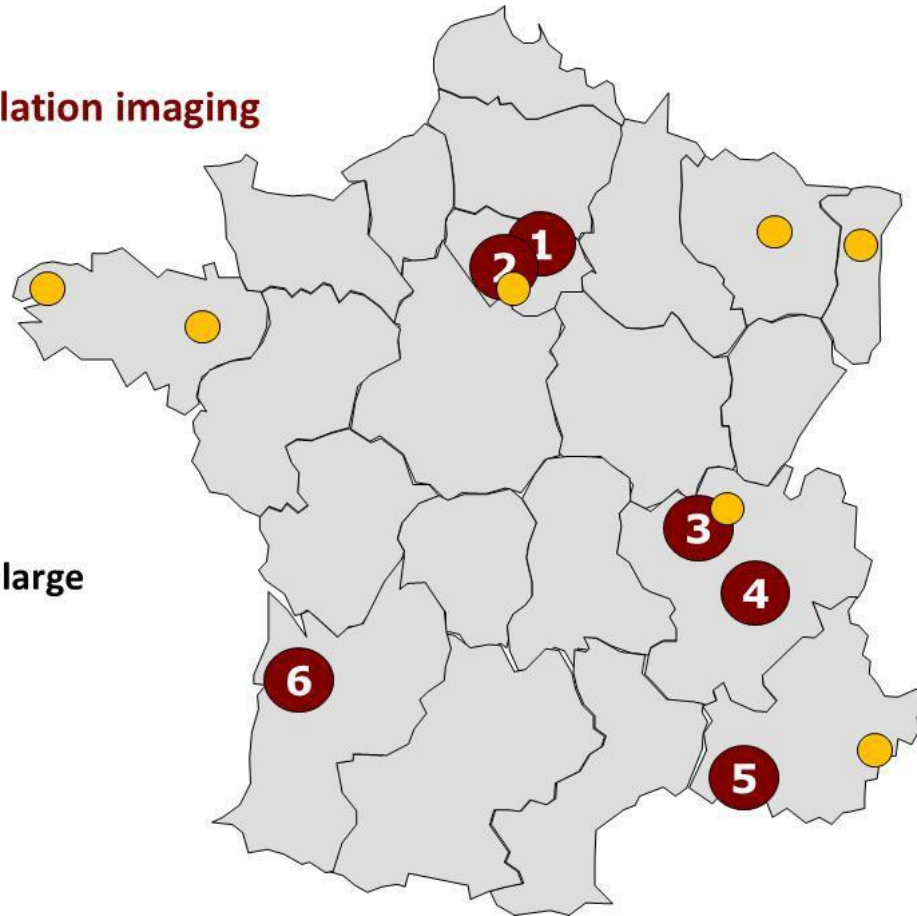
# WP4 Multimodality Quantitative Imaging and signal processing

D Visvikis

INSERM UMR1101,  
LaTIM, Brest

- 6 physical nodes
- + 1 transversal node for population imaging

1. Paris Centre
2. Paris Sud
3. Lyon
4. Grenoble
5. Marseille
6. Bordeaux
7. Management and data analysis for large databases / population imaging

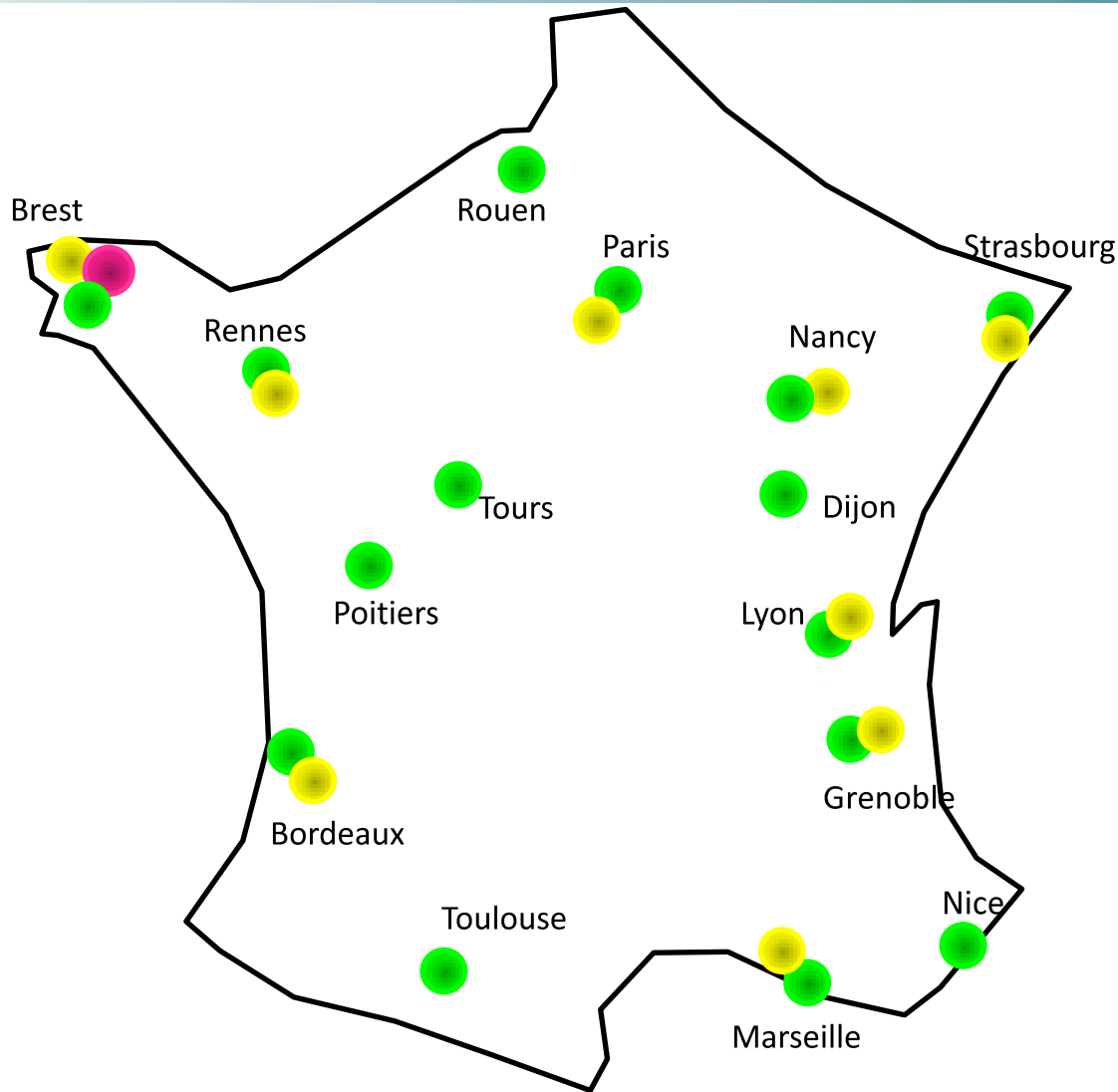


Four scientific workpackages:

- WP1: Hardware developments (L Darrasse, Paris)
- WP2: Multimodality tracers (P Dumy, Montpellier)
- WP3: Interventional Imaging (M de Mathelin, Strasbourg)
- WP4: Multimodality quantitative imaging and signal processing (D Visvikis, INSERM Brest)

1 WP specific for training (V Fardeau, E Heinrich INSTN)

# WP4 Participants



- coordination
- Steering committee (COPIL)
- WP4 : Multimodality quantitative imaging and signal processing

## COPIL

- S Jan (Paris Sud)
- F Peyrin (Grenoble)
- D Brasse (Strasbourg)
- I Bloch (Paris Centre)
- C Lartzien (Lyon)
- N Costes (Lyon)
- F Heitz (Strasbourg)
- C Barillot (Rennes)
- M Dojat (Grenoble)
- F Baldacci (Bordeaux)
- M Garreau (Rennes)
- S Takerkart (Marseille)
- Y Cointepas (Paris Sud)
- O Bertrand (Lyon)
- M Tanter (Paris)

- Foster interactions in the community of image and signal processing (ISP) related to specific needs associated with the different FLI nodes
- Determine the future perspectives in ISP and advice on preparing the evolution in this field within the next 4-5 years

- Multi-dimensional image reconstruction
- Multimodality image analysis
- Population imaging
- Numerical Simulations
- Signal Processing in medical imaging/MEG/EEG
- Ultrasound imaging and analysis

# Identify priorities

- ✓ Identify priority research projects in each of the FLI nodes
- ✓ Establish expertise outside the FLI nodes relevant to these priority projects

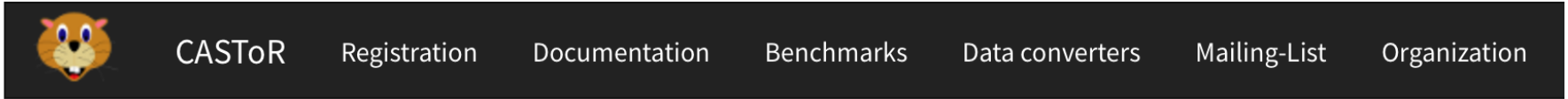
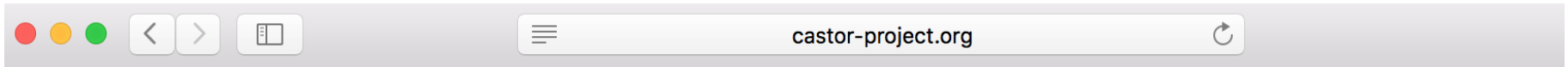
## Achieving these goals:

- (i). Call for proposals facilitating the emergence of collaborative R&D projects between FLI nodes and/or other groups
- (ii). Organise thematic workshops relevant to such priority projects

- Multi-dimensional image reconstruction  
6 collaborations (2-5 partners)
- Multimodality image analysis / population imaging  
13 collaborations (2-6 partners)
- Numerical Simulations and modeling  
2 collaborations (2-5 partners)
- Signal Processing in medical imaging/MEG/EEG  
3 collaborations (4 partners)
- Ultrasound imaging and analysis  
2 collaborations (2-4 partners)



- Session spéciale WP4 FLI, RITS 2017, Lyon
- Journées scientifiques WPs FLI, Paris 12-13 Décembre 2018



## CASToR - Customizable and Advanced Software for Tomographic Reconstruction

CASToR is an open-source multi-platform project for 4D emission (PET and SPECT) and transmission (CT) tomographic reconstruction. This platform is a scalable software providing both basic image reconstruction features for "standard" users and advanced tools for specialists in the reconstruction field, to develop, incorporate and assess their own methodologies in image reconstruction (such as specific projectors, optimization algorithms, dynamic data modeling, etc) through the implementation of new classes.

- ✓ 1st public release: May 2017
- ✓ Already >150 registered users

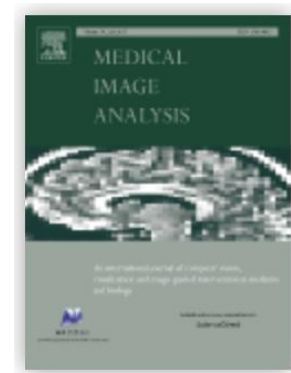


- ✓ Identify possible mature research projects for enriching and benchmarking the node IAM platform
- ✓ MICCAI challenge 2016 (publication 2017): benchmarking of image segmentation approaches for PET oncology applications led by the WP4 leading partners in multimodality image analysis

## The first MICCAI challenge on PET tumor segmentation

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- Co-organisation of a pre-conference workshop on PET/MR (EANM conference 2013, Lyon)
- Organisation of a national PET/MR workshop, opening of the CERMEP PET/MR platform (Lyon, 2014)
- Organisation of a national workshop on spectral CT imaging (Marseille, 2014), 2<sup>nd</sup> one planned for 2018
- Recent advances in multimodality medical image analysis (Paris, 2018)

- Prolongation jusqu'au 2024
- Nouvelles propositions des WPs scientifiques pour FLI-2:
  - ✓ Co-conception : plus d'intégration entre développements instrumentation et traitements des données
  - ✓ Intégration d'informations hétérogènes : modélisation multi-paramétrique: approches à base de techniques d'apprentissage / intelligence artificielle : classification, exploitation données multi-sources

