



## KEY TECHNOLOGIES

# Image Processing and Analysis

**Key words:** acquisition, image processing and interpretation, quantitative imaging

### HUMAN POTENTIAL

Image Processing and Analysis issues brings together research scientists with different skills in different fields (biologists, ceramic engineers, geologists, computer scientists, metallurgists, and signal processing specialists), i.e., a total full-time staff of roughly 30 people and 60 doctoral candidates.

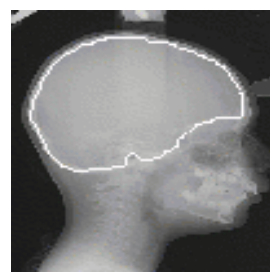
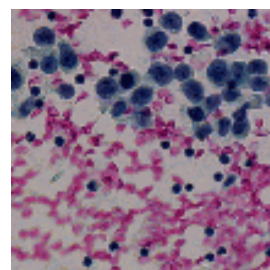
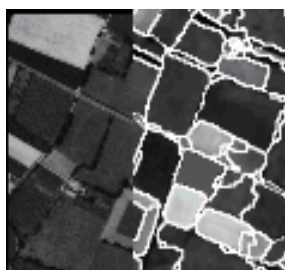


Research priorities focus on following fields:

- ▶ **Pre-processing and fusion:** registration, correction, calibration, restoration and image enhancement
- ▶ **Segmentation:** retrieval of meaningful features in images
- ▶ **Measurements and validation:** morphological and functional brain parameters, measurements in biology and cancerology, measurements in non-planar surfaces from multimodal images for geology and materials
- ▶ **Modelling:** digital and probabilistic methods, inverse problems for MRI and 3D approaches
- ▶ **Pattern recognition:** identification of brain or material structures, design of a numerical individualized atlas of cortical anatomical structures
- ▶ **Knowledge acquisition:** software workbench to model and build on the knowledge and skills in image processing

### EQUIPMENT

The images are produced by image acquisition systems belonging to public laboratories (optical microscopy, confocal atomic force microscopy, and electronic microscopy) or to medical partner-centres (GIP Cycéron, CHU, Cancer research centre François Baclesse): optical microscopy, MRI (Magnetic Resonance Image scanner) or PET (Positron Emission Tomography).



## METHODS

The original working methods combine two approaches, i.e. : Image processing relying on algorithms and numerical models that can retrieve meaningful features from the image to interpret and understand them

Artificial intelligence for a workshop integrating different skills and modelling expertise, built on the accumulated experience in image processing, to assist software development and image management

**Achievements:** Cancer cell identification and counting in cytology, Improvement of anatomical, functional and metabolic medical images, Quantification of the diameter of brain blood vessels and display of the vascular bed, People counting scanners, Image indexing, Interpretation of the damage to equipment subject to mechanical stress, Automatic particle-size analysis of granule materials, Study of the relations between morphometrics and the mechanical properties of polyphase materials

## SUPPORT TO BUSINESS SET-UP PROJECTS IN BASSE NORMANDIE

The Basse Normandie Region has rolled out all its resources to support business projects in the following areas:

- ▶ General funding
- ▶ Business project support
- ▶ Training programs
- ▶ Corporate user services at operations site
- ▶ Technology transfer to companies: [www.gravir.org](http://www.gravir.org) and [www.rdt-bn.org](http://www.rdt-bn.org)

## CONTACTS

*For general technological or scientific information*

■ **Mme Marinette REVENU**  
**ISMRA GREYC** - Bd du Maréchal Juin  
 14050 CAEN CEDEX FRANCE  
 Phone: **33 (0)2 31 45 27 02**  
 Fax: 33 (0)2 31 45 26 98  
 email: [marinette.revenu@greyc.ismra.fr](mailto:marinette.revenu@greyc.ismra.fr)

■ **MM. JL CHERMANT, Michel COSTER LERMAT ISMRA** - Bd du Maréchal Juin  
 14050 CAEN CEDEX FRANCE  
 Phone: **33 (0)2 31 45 26 64**  
 Fax: 33 (0)2 31 45 26 60  
 email: [chermant@labolermat.ismra.fr](mailto:chermant@labolermat.ismra.fr)

*For economic or industrial information*

■ **Normandie Développement**  
 57 Avenue de Bretagne - BP 1083  
 76173 ROUEN CEDEX 1  
 Phone: **33 (0)2 35 03 06 04**  
 Fax: 33 (0)2 35 03 07 86  
 email: [ndrouen@normandydev.com](mailto:ndrouen@normandydev.com)

## COMMITTED COMPANIES...

- ▶ **Hospital facilities** (medical reports)
- ▶ **Sciences & Tec** (Lisieux) (counting systems)
- ▶ **ADCIS** (image processing software) - <http://www.adcis.net/>
- ▶ Orthodontist training centre (practitioner training)
- ▶ **ACTIGRAPH** (medical imaging) - <http://www.actigraph.com/>
- ▶ **ELDIM** (equipment and devices using optics, computerised electronics and image processing) - <http://www.eldim.fr/>
- ▶ **MC2I** (computer-processing software for images) - <http://www.mc2i.fr/>
- ▶ **SNECMA engines (ceramic composites)**
- ▶ **Saint Gobain** (advanced ceramics) - <http://www.saint-gobain.com/fr/html/index.asp>
- ▶ **Philips France** (autofocus for digital camera)

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### For further information:

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