



Highlight Cerimed Newsletter N°1 March 2007

CERIMED ON THE WAY

The University of the Mediterranean has been mandated in December 2004 by the French Ministry of Health to set up the Cerimed project. (European Centre for Research in Medical Imaging). Then, Cerimed has been included in the French national "Pole de compétitivité entitled "Photonics: complex system of optics and imaging" Cerimed is now supported by the French National Institute for Cancer (INCa). Cerimed is a European centre with an ambitious goal to federate academic and industrial partners as well as medical institutions across Europe and even abroad in the field of medical imaging. Different actions are on the way through the organization of regular international workshops and conferences or the setting-up of international collaborations to work on innovative projects to improve existing systems or develop new concepts for the future of medical and molecular imaging.

The European deployment of CERIMED

These actions are complemented by a strong effort of promotion of Cerimed in different high reputation European Institutions and laboratories and several direct contacts with high level authorities in different countries. A European deployment group has been setup by the Cerimed executive committee. It is chaired by Prof. David Townsend, with one high level representative of several European countries, with the mission to promote the Cerimed deployment in Europe, to prepare partnerships with existing national structures working or interested in medical imaging, to prepare collaboration protocols at the highest scientific, administrative and political level, and to involve at the earliest stage European collaborators in the Cerimed managerial structure.

In the recent months important meetings have been organized with the Ministry of Science and Education in Portugal, with the Director General of the Italian National Institute of Health, as well as with the Director General of the Atomic Institute of the Austrian Universities in Vienna and the Director General of the Spanish National Research Centre for Energy, Environment and Technology in Madrid. Moreover a collaboration agreement has been formally signed in Marseille on September 14, 2006, between the President of the University of the Mediterranean, Professor Yvon Berland, for Cerimed and Professor Boris Gryniou, former Ministry of Science and Education in Ukraine, representing the Ukrainian Academy of Sciences.

This first issue of the quarterly Cerimed newsletter will present an overview of recent Cerimed actions on the organisation of international events and on the setting up of the first three pilot projects of Cerimed.

Organization of international events:

The Cerimed community has been very active in 2006 in federating academic and industrial partners across Europe involved in the different aspects of medical imaging (instrumentation development, pre-clinical and clinical applications) through a series of international events.:

EuroMedIm2006: Marseille, Palais du Pharo, 9-12 May, 2006

The first International Conference on Molecular Imaging Technology was held on 9-12 May 2006 in the Pharo Palace in Marseilles, France, and was attended by 250 participants worldwide. It focused on the requirements and recent advances in detectors and techniques for in-vivo molecular imaging. This domain is in rapid expansion and will encounter a spectacular development in the coming years as it will allow bridging between post-genomic research activities and new diagnostic and therapeutic strategies for major disease. In particular the molecular profiling of tumors and gene expression can lead to tailored therapies and therapeutic monitoring of cancer, degenerative and genetic diseases. Moreover, the repeatability of non-invasive approaches allows a more precise evaluation of drug targeting and pharmacokinetics studies on small animals, as well as an early screening and treatment follow-up of patients.

As an illustration of the pluridisciplinarity spirit of this conference, it was co-chaired by a particle physicist, Paul Lecoq from CERN, Geneva, and by a medical doctor, Olivier Mundler, from the Timone university hospital in Marseilles. The conference also hosted an industrial exhibition with 12 booths facing the old harbour of Marseilles, where major companies involved in medical imaging were represented.

First Cerimed thematic workshop on Data Acquisition in Medical Imaging: CPPM, Luminy, 14 September, 2006

Co-organized by the french GDR MI2B ("Groupement de Recherche") and Cerimed this one day workshop was setup by Patrick Le Du (CEA, Saclay), Gérard Montarou (IN2P3-LPC Clermont-Ferrand) and Christian Morel (CPPM, Marseille). It took place on the Luminy campus in the CPPM ("Centre de Physique des Particules de Marseille"). The main objective of this workshop was to review the various aspects of the read out and data acquisition (DAQ) architectures for future medical imaging devices 'beyond the state of the art'. The purpose was to look forward to determine what are the fields where R&D and demonstration has to be made (the fast treatment of Time of Flight aspects for example). Medical doctors presented their needs, electronics engineers answered in describing the technical front end state of the art and challenges in view of the modern evolution of read out and computing architecture from the fundamental physics field.

Second Cerimed thematic workshop on High Performance Nuclear Medicine Imagers for Vascular Disease Imaging (Brain and Heart), Rome, 13-14 November, 2006

This workshop, jointly organized by the "Istituto Sperimentale di Sanita" and Cerimed took place in Rome under the chairmanship of Franco Garibaldi from ISS. It was really international, with a large participation from several European countries but also from the United States. The main focus of this meeting was: (1) definition of the imaging goals to detect vulnerable plaque and stem cells in heart and brain, (2) definition of the required imaging performance specifications for the clinically relevant imaging tasks, (3) evaluation of the existing and potentially soon available imaging technologies applicable to these imaging tasks, and (4) definition of the necessary directed R&D effort towards the goal of better detection of low abundance targets such as plaques and stem cells. Other thematic workshops have been programmed for 2007, including one on Breast imaging in January.

The Cerimed pilot projects:

Although in a preconfiguration stage Cerimed is already a place where different actors, academic research institutes, medical institutions and industry can meet, generate innovative ideas and launch interesting collaborative projects. So far 3 pilots projects have been setup in 2006.

Tomo-X-Gamma:

This project is led by Christian Morel, from CPPM (Centre de Physique des Particules de Marseille) and involves 4 laboratories and 2 SME's (Small and Medium Enterprise) in France. The goal is to develop an hybrid X/Gamma tomographic camera for small animals. It capitalizes on previous development of the ClearPET, a high resolution/high sensitivity small animal PET camera developed by the international Crystal Clear Collaboration and on the PIXSCAN, a single photon X-Ray detection system developed by Pierre Delpierre at the CPPM. The combination of the high resolution anatomical information provided by the X-Ray CT and the high sensitivity functional information given by the PET is of considerable interest is the registration of both modalities can be as simultaneous as possible. .

ClearPEM-Sonic:

This international project is led by Olivier Mundler, from the university hospital La Timone in Marseilles. There are 10 participants, including major laboratories in Belgium, Portugal, CERN and 3 SME's including one startup.

Standart X-Ray mammography is not determinant in 30% of the cases, particularly for dense breast, which concern women either young or under oestrogen treatment. There is therefore a need for a significant improvement of breast imagery..A dedicated mammography PET scanner combined with innovative ultrasonic technology may be a very promising approach to overcome the limitations of the spatial resolution of a stand-alone PET...Moreover, this approach opens up perspectives for a low dose breast screening by replacing conventional X-Ray mammography further down in the future.

The ClearPEM-Sonic will integrate the efforts of a portuguese consortium working in the frame of the Crystal Clear Collaboration for the development of a dedicated machine for functional mammography, the ClearPEM, and the recent developments of innovative ultrasonic features, which are recognized to bring in a significant added value for clinical use.

Ultrasonic evaluation of thyroid nodules:

This project is conducted by Frédéric Sebag (endocrine surgery in university hospital Timone) with the SupersonicImagine team. The frequency of thyroid nodules is around 5% in women and 1% in men, these numbers increasing to 20-30% if ultrasonography is used. Ten percent of these nodules are malignant. Actually, the diagnosis of cancer relies on cytological examination of fine-needle biopsy. The aim of this study is to investigate the improvement of differential diagnosis between benign and malignant nodules with the innovative technique developed by SupersonicImagine which makes possible the measurement of tissue elasticity. Indeed, rational states that tumoral tissues have a lower elasticity than normal tissues. The study will be conducted first in the university hospital Timone in Marseilles. In patients undergoing surgery, the elasticity index of the nodules will be quantified with this method on the day before surgery and checked after surgery and pathological examination of the nodules. The project is supported by Assistance Publique Hopitaux de Marseille.

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