EUROPEAN INSTITUTE FOR BIOMEDICAL IMAGING RESEARCH

ANNUAL REPORT 2011

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IMPRINT

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Editorial

Dear Network Members, Colleagues and Friends,

We are pleased to present the Annual Scientific Report 2011 of the European Institute for Biomedical Imaging Research (EIBIR). It is our hope that you enjoy this review of the past year's activities and research projects, and that it gives a useful idea of the many fascinating activities, events and projects currently in the pipeline.

We would like first of all to thank our more than 110 Network Members who, by subscribing to one of the three service-package categories introduced in 2010, demonstrated their faith in the mission and importance of EIBIR. We are working to further increase the benefits of membership and hope to attract many more institutions in the coming year: EIBIR is a service organisation for scientists run by scientists, and the greater the number of its active members the greater its efficacy. As a platform open to all disciplines with an interest in biomedical imaging, EIBIR relies on bottom-up initiatives and active involvement on the part of all members.

The Scientific Advisory Board (SAB) held two face-to-face meetings in 2011: the inaugural meeting at the European Congress of Radiology, and a meeting in December to brainstorm responses to the next FP7 health call. The latter was intended to aid in developing a general scientific strategy, new initiatives for the coming year, and ideas as to how EIBIR can best align itself in response to the call; expected in mid-2012, a number of its preliminary topics are relevant to biomedical imaging.

In addition, the SAB has followed with great interest developments in the European Union surrounding the preparation of the 8th Framework Programme for Research, to be titled Horizon 2020. EIBIR has participated in a number of stakeholder consultations and has emphasised the importance of bottom-up initiatives from researchers as opposed to research programmes determined by top-down proposals from policy-makers. The simplification measures envisaged for institutions participating in EC-funded research programmes under Horizon 2020 would be very welcome and hopefully will be implemented. The European Commission has proposed earmarking 10% of the suggested € 80bn research funding for Horizon 2020 for health-related research, and we need your support in insisting that an increased share for health research is crucial and that research funding in general be increased to € 100bn, as demanded by the European Parliament.

European healthcare will be challenged over the next decade by an ageing population, an increasing proportion of which will be beyond retirement age, leading to increasingly complex disease patterns which will necessitate a move in therapeutic approaches away from treatment by isolated specialties and subspecialties towards a more comprehensive and holistic model. Clearly, biomedical imaging will play a key role in meeting these challenges and EIBIR, as a multi-disciplinary platform, is well equipped to develop approaches which can rise to them.

As European funding schemes become increasingly competitive, EIBIR is striving also to develop a strategy that will allow the network to thrive, and the activities of its multi-disciplinary thematic working groups to continue, independent of EU funding. This is certainly a major challenge, as lack of funding limits the potential for activity and innovation, and at this point we would like gratefully to acknowledge the support provided by our Industry Panel and its members, which during the past year has allowed us to provide start-up aid to many new initiatives and to dedicate resources to supporting numerous project applications. We are also thankful, of course, to the European Society of Radiology, which once again contributed significant funds to EIBIR over the past year, as there has not yet been an agreement on distributing this support among all shareholder organisations.

And, as ever, we would like to strongly encourage our eight shareholder organisations and our industry partners to become more actively involved in the activities of EIBIR, and to foster bottom-up activities within the network.

In the following pages you will find detailed reports from the directors of our joint initiatives, as well as from the project leaders, and we hope you will find them enlightening and inspirational.

We look forward to working with you over the course of a productive 2012!



Jürgen Hennig EIBIR Scientific Director



Gabriel Krestin Chair of EIBIR General Meeting ESR 1st Vice President

Highlights

New projects starting in 2011 and 2012

COST Action for researchers working on theranostic agents

EIBIR actively contributed to the proposal-writing process for the COST Action on the development of innovative nanosized systems for imaging-guided drug delivery, which began in October 2011. Properly designed agents will allow for the in vivo quantitative assessment of the amount of drug reaching a pathological region, and for the visualisation of molecular changes due to the therapeutic effects of the delivered drug. (Details: see p. 29)

COST Action on arterial spin labelling in dementia

This COST Action, initiated in December 2011, aims to tackle a very specific problem in the ageing population worldwide: dementia. EIBIR will play a crucial role in coordinating the administration of this four-year Action, including the organisation of strategy meetings, the dissemination of information and the development of training activities. The grant will allow for harmonisation of resources and for the optimal use of facilities already in existence throughout Europe. (Details: see p. 30)

MEDRAPET – A study on radiation protection education and training in Europe

A European study on the identification of needs in radiation protection education and training of medical professionals was successfully conducted in autumn 2011, coordinated by the European Society of Radiology (ESR) and supported by EIBIR staff-members. The results of the 27-month project, funded by the European Commission through a tender, will be the basis for the revision of the EC Radiation Protection 116 Guidelines on Education and Training in Radiation Protection for Medical Exposures. (Details: see p. 28)

EIBIR supports investigatorinitiated study on preoperative breast MRI in clinical practice

The study "Preoperative breast MRI multicenter international prospective analysis (MIPA)" will be conducted under the guidance of EIBIR in collaboration with the European Society of Breast Imaging (EUSOBI) and with the financial support of Bayer Pharma AG. From 2012, approximately twenty centres throughout Europe will be involved, enrolling around 2,600 women from the ages of eighteen to eighty with newly-diagnosed breast cancer. (Details: see p. 31)







News from running projects

Euro-Biolmaging survey and proof of concept studies: key pillars for defining eligibility criteria for future nodes

In summer 2011, Euro-Biolmaging ran a pan-European survey on existing imaging infrastructure and user requirements. More than 600 European participants from academia, industry and funding bodies had their say about future demands for imaging research infrastructure. Aiming to test and refine standardised execution and access protocols, Euro-Biolmaging will conduct proof of concept studies from January to June 2012. 63 imaging facilities across Europe will provide open access in kind, and 228 researchers submitted their research proposals for the project. (Details: see p. 24)

ENCITE goes online with a training cluster for chemical and biological imaging reporters

Six centres in Germany, Italy, Belgium, the Netherlands and Israel will establish a repository of newly developed chemical and biological imaging reporters for cell labelling and provide flexible access to specific intense training activities for individuals and small groups. The cluster was formed officially in February 2012. (Details: see p. 18)

EIBIR welcomes new disciplines

EIBIR would like officially to welcome the European Society of Paediatric Radiology (ESPR) and the European Society of Picture Archiving and Communication Systems in Medicine (EuroPACS) as shareholder organisations, and eagerly anticipates their active contribution to its activities and to their further increasing EIBIR's multi-disciplinary character.

- » ESPR organises and brings together physicians involved in the field of paediatric imaging, to contribute to the progress of paediatric imaging (particularly within but also outside Europe) and to coordinate training and education with other branches of medical imaging and paediatrics in clinical, scientific, education and research fields. www.espr.org
- » EuroPACS promotes informationexchange in the fields of research, user experience, implementation, assessment and benefit-auditing within the broader context of the development and use of digital systems for the acquisition, storage, transport, processing, display and reproduction of medical pictures (PACS) and related technologies as well as their integration in the context of healthcare. www.myeuropacs.org









EIBIR's Joint Initiatives – ambitious goals successfully realised

During 2011, EIBIR's thematic working groups, entitled Joint Initiatives, continued their activities and through collaborative efforts succeeded in paving the way for a number of new funding sources and projects, further facilitating European exchange and refining their programmes. Within the Joint Initiatives dedicated to biomedical image analysis, probe chemistry, evidence-based radiology and cancer imaging, participants deepened their collaboration and expanded their teaching activities.







Biomedical Image Analysis – key to shaping the future of biomedical imaging

Through training, collaborative projects and a roadmap towards improved interoperability of and access to biomedical image analysis tools, EIBIR's Biomedical Image Analysis Platform (BioMedIA) is taking an active role in shaping the future of biomedical imaging research.

This initiative, whose aim is to represent biomedical image analysis research on a European level and furthermore to promote educational activities in that field, resulted in two highlights:

The IMAGINE Workshop, presented for the first time in March at the ECR 2011,

is a high-tech specialty exhibition showcasing the latest technological developments in medical image analysis and image-guided interventions. The workshop focused on the development of quantitative imaging biomarkers, computer-aided detection and diagnosis, integrated and interactive visualisation, therapy planning, image-guided interventions and robotics as well as computerassisted training. The workshop featured innovative technological developments in, among other fields, diagnosis and therapy-planning guidance. In total, eighteen out of 58 abstracts were selected by the platform members as excellent papers.

Following the tremendous success of the first EIBIR Summer School,

which took place in Viladrau/ES in 2010 and focussed upon cardiovascular and oncologic diseases, the platform organised a **second PhD summer school in Dubrovnik/HR** in August 2011. The focus was on imaging in neurology with lectures from leading researchers in the field of neurology, neuroradiology, MR imaging, nuclear imaging and image analysis.

During the second half of 2011, the working group further developed its collaboration with the following decisions and planning processes:

» Exhibition EIBIR presents IMAGINE ECR 2012, March 1-4, 2012, Vienna/AT

Research institutes, university groups and industrial companies will have the chance to present their innovative and exciting technological developments. The exhibition in 2012 has been fully incorporated into the scientific programme of the ECR. Numerous abstracts in the fields of neurological disease, cardiovascular disease, oncology and musculoskeletal disease have been submitted.

- Two-day workshop on medical image analysis software International Symposium on Biomedical Imaging (ISBI), May 2-5, 2012, Barcelona/ES The initiative is actively contributing to the European research infrastructure for biomedical image analysis, through a variety of projects including the Data Storage and Analysis work package of the ESFRI project Euro-BioImaging. The objective of this workshop is to discuss issues related to interoperability and access to advanced medical image analysis software.
- » EIBIR Summer School

During the annual meeting at ECR 2011, the members of the platform convened to discuss educational, research and strategic activities and decided to hold the EIBIR Summer School on a two-yearly basis. The next EIBIR Summer School will again focus upon neurology, and will be held in summer 2013.

The platform members are investigating the possibility of European funding for training programmes for researchers in biomedical image analysis.



Prof. Wiro Niessen Director of the Biomedical Image Analysis Platform office@eibir.org

EIBIR provides a platform to discuss issues relevant to my field, biomedical image analysis, at a European level. For example, we are now actively working to define the roadmap for "Biomedical Data Storage & Analysis" as part of the ESFRI project Euro-Biolmaging, and discussions we have within our Biomedical Image Analysis Platform and with other EIBIR members are of crucial importance in this process.



Integrated visualization of coronary anatomy derived from CTA and myocardial perfusion derived from perfusion MRI; courtesy: H. Kirsili et al. Erasmus MC, Rotterdam, Netherlands

The Chemistry Platform – pan-European cooperation strengthens the development of novel theranostic agents

The Chemistry Platform, whose focus is the development of imaging probes, was formed by a core group of five top-class European research teams in Belgium, Italy, the Netherlands, Switzerland and the United Kingdom. The platform devotes special attention to developing initiatives alongside European companies engaged in the production of diagnostic probes for medical imaging. Pre-clinical collaborations will sharpen the focus of this initiative in order to explore new applications in the field of physico-chemical probes. The key goals of the platform are

- » to contribute to the design and fabrication of innovative imaging probes and
- » to implement contacts between chemistry groups active in the synthesis of new tracers/contrast agents and biomedical research teams interested in their pre-clinical assessment.

www.eibir.org





Prof. Silvio Aime Director of the Chemistry Platform office@eibir.org

C EIBIR is paving the way to a full integration of research groups in the field of chemistry within the European imaging community. Within EIBIR's Chemistry Platform, scientists have an excellent frame for exchange and discussions with each other throughout Europe related to the development of probes and novel therapeutic agents.

To these ends, EIBIR supported the proposal-writing process of the COST Action "Theranostics imaging and therapy: An Action to Develop Novel Nanosized Systems for Imaging-Guided Drug Delivery", involving several EIBIR Network Members.

The Action, proposed by Silvio Aime, University of Torino/IT and Director of the Chemistry Platform, began with its first Management Committee Meeting in Brussels/BE in October 2011.

The Action's aim is to demonstrate the potential of image-guided therapies in the treatment of diseases with high social impact bringing together the major European research groups focussed on the development of new and innovative combined diagnostic/ therapeutic/theranostic agents. The group envisages to develop its understanding of crucial aspects of the drug delivery process in vivo, in particular regarding the efficiency of drug targeting and release and the relationship with the therapeutic effect. Properly designed agents will allow the in vivo quantitative assessment of the amount of drug reaching a pathological region and the visualisation of molecular changes resulting from the therapeutic effects of the delivered drug. The implementation of therapies with imaging technologies will provide physicians with an extraordinary tool for accelerating the development of molecular and personalised medicines, and thus extend substantially the armoury available in the fight against a range of diseases.

The work programme focuses on imaging reporters and nanocarriers for theranostic agents, preparation and selection of targeting vectors, theranostic agents responsive to endogenous and external stimuli and set-up of preclinical theranostic protocols.

For details on the COST Action please see page 29.

EuroAIM/Evidence-based radiology: diagnostic and interventional radiology in the spotlight

EIBIR's European Network for the Assessment of Imaging in Medicine (EuroAIM) is focussed primarily on involving radiologists in the (delayed) application of the principles of evidence-based medicine in diagnostic and interventional radiology.

Evidence-based radiology (EBR) has become a topic of considerable interest among experts in radiology, as seen at the first EuroAIM Session at the ECR 2011, during which the subject of EBR's key importance was discussed and during which more than 120 persons were present for the presentation of the results of the preliminary analysis. This analysis focussed on the radiologist's role in the production of secondary evidence, generally agreed to be the best way to effect change in the medical world as a whole.

The group members currently focus on three main activities:

Evidence-based radiology

Established in March 2011 and involving more than forty members in cooperation with ESR's affiliated subspecialty societies, the core members of the working group are Zbigniew Serafin (Department of Radiology and Diagnostic Imaging, Nicolaus Copernicus University, Collegium Medicum, Bydgoszcz/ PL) and Jaap Stoker (Department of Radiology, Academic Medical Center, University of Amsterdam/NL).

During 2011, the group undertook a systematic literature search for secondary studies concerning diagnostic imaging or interventional radiology published from 2001 to 2010. Of 3,502 papers initially screened, 1,931 studies were selected for evaluation, and 1,058 entered authorship analysis (86%). Only 231 (22%) of the studies were found to be published with a radiologist or a nuclear medicine physician as first, second or last author.

The study concludes that imaging specialists seem to play a minor role in undertaking evidence-based studies concerning their own medical field. In other words, research into diagnostic imaging and interventional procedures is defined by teams composed mainly of other medical specialists and radiologists are clearly lagging behind. Catching up will involve imaging experts assuming a huge workload.

EVIDENCE BASED RADIOLOGY

Dynamic overview of evidence concerning sensitivities and specificities of a variety of imaging technologies in radiology

Coordinated by Myriam Hunink (Clinical Epidemiology and Radiology at the Erasmus University Medical Center in Rotterdam/NL and Harvard School of Public Health, Boston/US), a working group has been formed and aims to supply a dynamic overview of evidence concerning sensitivities and specificities of MRI, CT, ultrasound, conventional radiography, PET, SPECT, and scintigraphy for a range of clinical applications.

Up to now, 343 publications have been retrieved. After the exclusion of noneligible candidates, studies referring to MRI (39), CT (43), ultrasound (53), conventional radiography (9), PET (21), SPECT (10) and scintigraphy (16) were reviewed.

An exponential increase in the number of meta-analyses was found over time. The overview will be available on Wikipedia.

Multicenter study on preoperative breast MRI in clinical practice

The study "Preoperative breast MRI multicenter international prospective analysis (MIPA)" will be conducted, with EIBIR assuming responsibility in cooperation with the European Society of Breast Imaging (EUSOBI) and financially supported by Bayer Pharma AG. Two concurrent consecutive cohorts of newly diagnosed breast cancer patients defined by receiving/ not receiving preoperative breast MRI will be compared for age/breast density. Analytical adjustment will be performed for relevant covariates. All centres involved will be high-volume and highquality breast imaging/care facilities.

Starting in 2012, it is planned to enrol in the study approximately 2,600 women from eighteen to eighty years of age with newly diagnosed breast cancer: 1,300 for the MRI group and 1,300 for the no-MRI group. Rate and type of changed surgical planning in the MRI group will be assessed.

- » Primary outcomes will be rate of primary up-front mastectomy and reexcision rate for positive margins.
- » Secondary outcome will be ipsilateral recurrence rate, contralateral cancer rate, and distant metastasis occurrence during 5-year follow-up.



Prof. Francesco Sardanelli Director EuroAIM, f.sardanelli@grupposandonato.it

Cooperation with EIBIR is a great opportunity to enter a network of persons highly dedicated to research in radiology and medical imaging. My personal experience was mainly characterized by the interaction with a number of major experts in Europe and also overseas, opening new possibilities for scientific activity in radiology. The major fact is that one can exchange new ideas, one or two years before they appeared as congress abstracts. This happened in the EuroAIM as well as in the EIBIR as a whole. 📕 📕



Cancer Imaging challenges and partnership in oncology

By 2010, cancer had become the leading cause of death worldwide. Medical imaging influences every step of cancer care and will play a crucial role in clinical oncology in the coming years.

The use of imaging allows oncologists to identify the exact location and extent of a tumour and metastases for initial diagnosis, staging and treatment planning; and thanks to advances in molecular imaging, it will soon be possible to gather information about the expression and activity of specific molecules and biological processes having an influence on a tumour's behaviour. This information will make cancer screening more effective, allowing earlier detection and more accurate treatment planning, as well as improving the general understanding of how cancer arises and develops.

The EIBIR Cancer Imaging Working Group has been established to meet the interdisciplinary challenges of cancer imaging, and involves experts from the fields of radiology, nuclear medicine and image processing. Imaging techniques provide important information on

- » screening for cancer
- » diagnosis/staging/prognosis
- » guiding cancer treatment
- » determining if a treatment is working
- » monitoring for cancer recurrence

In order to explore the various opportunities for collaboration with other associations, EIBIR has established contact with two international organisations:

- » In March 2011, a meeting was held between the American College of Radiology Imaging Network (ACRIN) and the EIBIR Cancer Imaging Working Group in order to obtain detailed information (ECR 2011 in Vienna/AT). ACRIN's goal is through clinical trials of diagnostic imaging and image-guided therapeutic technologies to generate information that will, in application, lengthen and improve the quality of the lives of cancer patients.
- » In September 2011, EIBIR and the European Organisation for Research and Treatment of Cancer (EORTC) have started a joint collaboration to support clinical trials related to imaging in Europe. The first face-toface meeting was arranged in order to discuss possibilities to foster collaboration in cancer imaging on a European level as well as to focus on specific actions within fundamental and translational research.

The working group will focus on the following activities in 2012-2013:

- » Collaboration with the European Organisation for Research and Treatment of Cancer (EORTC)
- » Organisation of a joint training workshop on imaging in clinical research for clinical trialists including oncologists, research nurses and others.
- » EORTC/EIBIR session on clinical trials (ECR 2013)



Prof. Peter Brader Director of the Cancer Imaging Working Group office@eibir.org

Cancer is now the world's leading cause of death and the imaging community has the chance to become the pivotal specialty in modern medicine working toward optimised diagnosis and therapies for individual patients. To meet this challenge the Cancer Imaging Working Group focuses on innovation, collaboration and the evolution of basic, translational and clinical imaging research.

Funded research projects initiated and/or managed by EIBIR

As a service organisation for its Network Members, EIBIR plays a proactive role in the development and definition of future research policies as well as in the implementation and coordination of research projects infrastructure and training on a European level.



European research grants for innovative studies







ENCITE -

Applying two cuttingedge imaging methods to cell-based therapies and progressing them from research-stage towards clinical practice

By coordinating a huge variety of cell therapies at generic and diseaseoriented levels, the overall objective of the European Network for Cell Imaging and Tracking Expertise (ENCITE) is to develop and implement new imaging tools in cellular therapy and progress them towards clinical application. ENCITE is co-funded by the European Commission within the 7th Framework Programme and co-ordinated by EIBIR.

In attempting to answer the questions "What are the clinical needs?" and "What are the best tools for translation to clinics?", ENCITE has achieved promising advances on FLT-PET and ¹⁹F MR imaging. Furthermore, particular attention has been paid to the creation of a multi-disciplinary training centre offering access to specific training and to a virtual database serving as a repository for probes and procedures based upon ENCITE's cutting-edge technologies and methods.



In vivo detection of immune responses to vaccines with ¹⁸F-labeled 3'-fluoro-3'deoxythymidine (FLT)-PET imaging

Detection of immune system responses with FLT-PET imaging could be useful for vaccine development. In metastatic melanoma patients vaccinated with radio-tagged, antigen-loaded dendritic cells (DC), CT and FLT-PET imaging showed accumulation of DC and FLT in lymph nodes. PET imaging also showed that lymph node uptake of FLT correlats with greater levels of circulating antigen-specific antibodies and T cells.

Though current biomarkers are unable to adequately predict vaccine-induced immune protection in humans with infectious disease or cancer, timely and adequate assessment of antigenspecific immune responses is critical for successful vaccine development. Therefore, a method for the direct assessment of immune responses in vivo in a clinical setting has been developed. Melanoma patients with lymph node (LN) metastases received DC vaccine therapy injected intranodally followed by [18F]-labelled 3'-fluoro-3'-deoxy-thymidine ([18F]FLT) PET at various points after vaccination.

Control LNs received saline or DC without antigen. De novo immune responses were readily visualised in treated LNs early after the prime vaccination, and these persisted for up to three weeks. This selective [18F] FLT uptake was absent in control LNs, although tracer uptake in treated LNs increased markedly with as little as 4.5×105 DC. Immunohistochemical staining confirmed injected DC dispersion to T cell areas and resultant activation of CD4+ and CD8+ T cells. The level of LN tracer uptake correlates to a significant degree with the level of circulating antigenspecific IgG antibodies and antigenspecific proliferation of T cells in peripheral blood. Furthermore, this correlation was not observed with [¹⁸F]FDG. Therefore, [¹⁸F]FLT PET offers a sensitive tool to study the kinetics. localization and involvement of lymphocyte subsets in response to vaccination. This allows for early discrimination of responding from non-responding patients in anti-cancer vaccination and will aid physicians in individualised decision-making.

Planned studies include identifying and testing additional PET imaging agents as tracers for specific immune cell subpopulations.



Source: Aarntzen EH, Srinivas M, De Wilt JH, Jacobs JF, Lesterhuis WJ, Windhorst AD, Troost EG, Bonenkamp JJ, van Rossum MM, Blokx WA, Mus RD, Boerman OC, Punt CJ, Figdor CG, Oyen WJ, de Vries IJ, Early identification of antigenspecific immune responses in vivo by [18F]-labeled 3'-fluoro-3'-deoxythymidine ([18F]FLT) PET imaging. Proceedings of the National Academy of Sciences of the United States of America, 2011. 108(45): 18396-9. ¹⁹F MR images (false color) of perfluorocarbon-labelled human DC transplanted into the mouse footpad (left) and human neural stem cells implanted into the mouse brain (right). The ¹⁹F image intensity can be used to quantify the number of cells. A background anatomical 1H MR image (grey scale) of the animal in the same position is used to unambiguously locate the cells in vivo.





Highlights of ¹⁹F MRI: latest developments and outlook

Gene and cell therapies have the potential to be pivotal in curing such intractable diseases as cancer, AIDS, heart disease and genetic disorders. In recent years huge progress was made, particularly in preclinical work, but translation to clinical applications has proved difficult. A key obstacle is the current inability to answer fundamental questions about the therapies: Where do the cells, or genetic material, localise after transplantation? Is the transplant functional? What is the correct dosage? What is the best route of transfer?

In vivo imaging may answer these questions. Although more established in experimental settings, non-invasive cellular and molecular imaging is clinically feasible. Magnetic resonance imaging (MRI), with its superior resolution and ability to acquire wholebody images non-invasively, becomes here a crucial technology. Though MRI approaches employing conventional (¹H) contrast agents are well-known, the use of ¹⁹F MRI tracers is currently the subject of some debate and seems promising. ¹⁹F MRI eliminates complications arising from confounding background signal, which is encountered when using other nuclei (particularly ¹H), and therefore allows unambiguous identification and direct quantification from the image data.

The potential of ¹⁹F MRI for cell tracking has been demonstrated, for instance in the tracking of human DC and neural stem cells (Figure). Moreover, molecular interactions with a cellular target such as a protein or a marker enzyme can be measured through chemical shifts or by a detectable "switching on" of the ¹⁹F signal - if, for example, the signal is detectable only in the presence of a marker enzyme expressed by a reporter gene. This allows for quantifiable detection of gene expression, and sensitivity can further be enhanced through the use of paramagnetic complexes.

Thus, progress in the design of new ¹⁹F MRI probes, and the rate of technological advance in general, is rapid.

The scientific team is convinced that the ¹⁹F technology is an emerging platform that will accelerate developments in gene and cell therapies and their translation into routine clinical practice.



ENCITE Multi Centre Cluster for Training

Besides the further development of the above-described cutting-edge cellular imaging technologies and their application in clinical practice, there is a pressing need for the development of dedicated training programmes. To this end, five consortium partners have launched the ENCITE Multi Centre Cluster to provide training in ENCITE's new technologies.

The Cluster has established a constantly-updated repository of newly developed chemical and biological imaging reporters for cell labelling, which includes procedures for the reporters' preparation and their full characterisation, detailed protocols for their use, and methods for the accurate interpretation of the results obtained. In addition, it will develop training materials, intensive training structures and hands-on workshops in laboratories for individuals and small groups, as well as an e-learning system.

Chemistry

Centre 1: University of Torino/IT

Topics: Design/testing of paramagnetic relaxation, CEST MRI agents in cellular labelling applications, computer programmes improving the use of paramagnetic relaxation and CEST MRI agents in cell labelling, and of paramagnetic relaxation and CEST MRI agents for cellular labelling studies

Centre 2: University of Mons/BE

Topics: Superparamagnetic nanoparticles: profiles, protocols for comprehensive characterisation, synthesis of reproducible batches and relaxometry

Biology

Centre 3: Max-Planck-Gesellschaft, Cologne/DE **Topics:** In vivo aspects of molecular imaging

Centre 4: Weizmann Institute of Science, Rehovot/IL **Topics:** Reporter gene-bank, userinterface for multimodal data management and data processing software, tools for multimodal small animal correlative imaging, histological validation

Centres 5+6: Radboud University Nijmegen Medical Centre/NL Focus 1: Tumor immunology

Topics: Imaging tools in clinical research, tools for monitoring cellular therapies (MRI, SPECT, PET), small animal imaging, translation to clinical application, ethical/regulatory issues

Focus 2: Cell Dynamics

Topics: Preclinical intravital microscopy; deep intravital tissue microscopy in window and other models; procedures for post-processing and quantification of intravital microscopy data to monitor the efficacy of anti-tumor therapy

In the long-term, the materials and courses within the e-learning system developed by ENCITE will be made available online to the cellular and molecular imaging community in Europe.

The ENCITE research partners remain positive that, in a joint, collaborative, multi-disciplinary effort, the challenges of ¹⁹F MR and FLT-PET imaging can be solved, putting new and exciting tools at the disposal of researchers in biomedical sciences and in the long term of clinicians, to the ultimate benefit of European patients and healthcare systems.

Details: www.encite.org



Philipp Böhm-Sturm Max-Planck-Institute for Neurological Research, In-Vivo-NMR Laboratory, Cologne/DE

Within ENCITE I am working on the further development of ¹⁹F magnetic resonance imaging to non-invasively track and quantify neural stem cells. An ENCITE workshop last year on "9F in vivo MRI" brought together researchers covering a wide range of disciplines, from the synthesis of new compounds to imaging in preclinical models of cell therapy. Being one of the organisers, I am convinced that these ioint efforts will significantly improve progress in this exciting new field. EIBIR's coordination of multinational networks such as ENCITE provides an excellent platform for young scientists like myself to share ideas and to extend their research activities across borders and institutions - already in an early stage of their scientific career.



The HAMAM project makes progress in developing a multimodal clinical workstation to aid in breast cancer diagnosis

@Health





Despite tremendous advances in modern imaging technology, early detection and accurate diagnosis of breast cancer are both areas in which there is significant room for improvement. It is the most widespread cancer among women, with approximately 350,000 new diagnoses and 130,000 fatalities in Europe every year and accounting for 26% of all new cancer cases and more than 17% of cancer deaths, but prevention in any real sense remains some way off as its causes remain obscure. It is essential in the fight against this cancer to improve our capacities for early detection and accurate diagnosis, allowing physicians sufficient time to develop patientspecific treatment plans. Both challenges demand that all available information be compiled and presented within a unified, comprehensive user interface, supported by automated analysis.

The modern digital age presents an array of emerging technologies with potential applications in the screening and diagnosis of breast malignancy. An accurate early diagnosis requires data from different imaging modalities to be combined, including mammography (MG), 2-D ultrasound, MRI, digital breast tomosynthesis (DBT), positron emission mammography (PEM), and automated 3-D breast ultrasound (ABUS). A combination of all these will provide a comprehensive yet clinically robust multimodal breast imaging tool that is both sufficiently sensitive and sufficiently specific.

The HAMAM project ('Highly Accurate Breast Cancer Diagnosis through Integration of Biological Knowledge, Novel Imaging Modalities, and Modelling') was launched in September 2008 under the 7th Framework Programme for Research. It comprises nine project partners from seven countries, all of whom are at the vanguard of breast imaging and diagnosis. EIBIR is the project coordinator.

The HAMAM workstation showing a multimodal computer aided detection breast case. Breast ultrasound and mammography are presented simultaneously with a single reading session. All images are spatially correlated, enabling the cursor to be synchronized across modalities. An automatically detected lesion is indicated in both modalities by the red outline.



The HAMAM project partners have realised their vision of a single clinical workstation integrating all imaging modalities and clinical information, and have successfully developed a prototype model (cf. Fig.). By providing all the relevant information in a single location. the workstation enables the accurate assessment of multimodal information and thereby the characterisation and classification of suspicious breast tissue; by incorporating advanced image presentation and analysis methods, it will aid in reliable decision-making as to treatment and ultimately reduce the number of mortalities resulting from breast cancer. These methods include spatial correlation to efficiently link findings and to navigate between images from multiple modalities, as well as dedicated computer-aided detection and classification (CAD) methodology. The workstation also benefits from access to a large multidisciplinary database, whose population was also part of this project.

Diagnostic breast cancer information originating from various sources and disciplines, including unimodal and multimodal imaging, genetic mutation data and risk scores, was the subject of joint analysis using the HAMAM database. The breast cancer pathology status of more than 650 patients has been mined, using association analysis to identify correlations between tumour type, grade, receptor status and genetic loci alterations (single nucleotide polymorphisms).

As the HAMAM Project is nearing its conclusion, there will be a final session for the presentation of its achievements to the public at the European Congress of Radiology 2012:

HAMAM Public Session ECR 2012, Vienna/AT EIBIR IMAGINE Theatre March 1, 2012, 9:00-11:00

Details: www.hamam-project.org



Prof. Horst Karl Hahn Fraunhofer MEVIS – Institute for Medical Image Computing, Bremen/DE and HAMAM Scientific Coordinator

Founded only five years ago, the EIBIR network already plays an essential role in coordinating research efforts in medical imaging across Europe, and its leadership and project management bodies made significant contributions to the HAMAM project throughout planning, operations and dissemination. EIBIR has the potential to be instrumental in bridging the gap between clinical and preclinical imaging and the latest research in physics, biology and mathematics (as well as other disciplines). Most importantly, if properly implemented by the Member State organisations Euro-Biolmaging will create Europe's first coherent, synergistic and sustainable continent-wide biomedical imaging research infrastructure. This will have a range of benefits: for example, a European medical image computing cloud infrastructure could eradicate the need for future research projects to set-up yet another imaging database or image analysis server.

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European grant for the development of imaging research infrastructure

2011: Euro-Biolmaging prepares eligibility criteria for future infrastructure nodes

In 2002 the European Strategy Forum on Research Infrastructures (ESFRI) was established in order to review the European research infrastructure landscape and to identify research infrastructures for inclusion in the pan-European "ESFRI Roadmap". The roadmap departed from the traditional concept of large-scale research infrastructures by supporting the idea of distributed infrastructures, with



facilities beginning to take shape in various locations, and since 2008 includes the project Euro-Biolmaging: European Research Infrastructure for Imaging Technologies in Biological and Biomedical Sciences.

Euro-Biolmaging is scientifically coordinated by EIBIR (Medical Imaging) and the European Molecular Biology Laboratory, EMBL (Biological Imaging), and aims to establish a pan-European Biomedical Imaging Research Infrastructure in a harmonised manner. The 39 partners of the Euro-Biolmaging consortium adopted the ESFRI research infrastructure model, but there are still many open questions whose answers will determine the character of the Euro-Biolmaging research infrastructure of the future. The consortium truly believes a bottom-up approach to be the most productive way forward, and with that in mind the project's focus in 2011 was on consultation with the scientific community and the users, as well as the technical staff responsible for running facilities. The results will provide the Euro-Biolmaging stakeholders, the relevant governments and the funders with clear indications about existing demands and needs and possible routes of supply for research infrastructure in biomedical imaging. National initiatives, the Survey and proof-of-concept studies are the measures which, applied, will lead to development of the eligibility criteria for future Euro-BioImaging nodes.

National initiatives: broad European support

Euro-Biolmaging has become a driving force in organising European biological and biomedical imaging. The first step in this process is for the national imaging infrastructure providers in the Member States to define their needs and capabilities, which requires a significant degree of self-organisation on their part. At this point, the imaging communities of fourteen countries have formed national networks that support Euro-BioImaging principles. The networks have already appointed national coordinating persons, who will guarantee the consistent exchange of information between these networks and Euro-Biolmaging.

Euro-Biolmaging Survey: a success beyond expectations

During summer 2011, Euro-Biolmaging conducted a detailed online pan-European survey of the imaging infrastructure landscape. The survey aimed to identify the needs and expectations of potential users and to produce an inventory of the existing imaging facilities, and of their research and training activities. Imaging research infrastructure providers and users as well as funding agencies, were asked about their expectations related to research infrastructures, thereby helping to define the requirements and properties of the potential nodes under the Euro-Biolmaging umbrella. More than 660 participants, from 26 countries, participated in the survey, a remarkable number considering the effort required to answer the high number of questions (more than 50). This clearly indicates that the growing European imaging community has a true interest in the European imaging research infrastructure concept proposed by Euro-Biolmaging. First major results

- » A number of imaging technologies will be required by European scientists in the future
- » Users and providers identify a need for the same technologies
- » Most imaging facilities do not provide external access above 10% of their capacity
- » Cost models for access: there is a gap between what users can afford and what facilities need to charge. This gap has to be filled by new funding models for infrastructure usage
- » There is a significant demand for advanced-level training activities

More detailed results will be published on the project website in early 2012.

Euro-Biolmaging Proof-of-Concept Studies (PCS): 63 imaging facilities open their doors to European scientists

From January to July 2012 Euro-Biolmaging will conduct a series of proof-of-concept studies to provide a scientifically, technologically and geographically rich sampling of running sites and projects. The studies will be crucial in testing and refining standardised execution and access protocols for Euro-Biolmaging imaging facilities, assessing potential pitfalls in the exploitation of these resources, and will be useful in identifying the community's current interest-level in access to various biomedical imaging technologies. The call for users was open from October 1st to November 30th, 2011, and more than 200 proposals from all over Europe were submitted for evaluation by a panel of experts. The researchers selected will have the opportunity to undertake their projects at one of 63 imaging facilities across seventeen countries, which in itself will contribute in kind to Euro-BioImaging's Preparatory Phase.

Learn more about this and the participating facilities at: www.eurobioimaging.eu

The Institute for Clinical Radiology at the Klinikum Grosshadern, LMU, Munich, is a partner in the EU project Euro-BioImaging. EIBIR is coordinating this project for the Medical Imaging community, together with EMBL (in charge of the biological community). They are coordinating forty beneficiaries in 25 countries throughout Europe, and on top of this are establishing exchange channels with organisations with similar agendas throughout the world. They are open-minded, demonstrate great leadership and are encouraging and highly professional in communication and organisation. Despite the fact that they travel to many of the individual work-package meetings throughout Europe, still they are on their office phones almost every time one tries to reach them, and miraculously emails are generally responded to on the same day. Euro-BioImaging started in Dec 2010 and since then the already-close bonds between the LMU Radiology and EIBIR are getting yet closer. The LMU Radiology unit (PD Dr. Konstantin Nikolaou, PD Dr. Fabian Bamberg and Dr. Thomas Hendel) is chairing the work-package User Access and is a partner in the work-package Innovative Technologies - Medical Imaging. The project partners benefit daily from the extremely professional, cheerful and enthusiastic work ethic at EIBIR (Dr. Pamela Zolda). In the ongoing preparatory phase of Euro-Biolmaging, the development of each work-package has been very carefully planned. These tasks are carefully organised on both a management and an operational level, facilitated by Project Management on a scientific level from Euro-Biolmaging. Both levels are equally represented in the central (EIBIR) and peripheral (LMU, Radiology) units. Even if it were not for the intriguing vision and mission of Euro-Biolmaging, one would still love to be part of the consortium for the highly professional, goal-directed and joyful collaboration with EIBIR.

Euro-Biolmaging receives preparatory phase funding under the 7th Framework Programme of the European Union.

PD Dr. Konstantin Nikolaou, PD Dr. Fabian Bamberg and Dr. Thomas Hendel Institute for Clinical Radiology at the Klinikum Grosshadern, Ludwig-Maximilians-Universität Munich/DE

PEDDOSE.





European grants for improvement of radiation protection

Dose and health impacts of radiopharmeceuticals - PEDDOSE.NET tries to evaluate the degree of potential risks

PEDDOSE.NET - "Dosimetry and Health Effects of Diagnostic Applications of Radiopharmaceuticals with Particular Emphasis on the Use in Children and Adolescents" is a two-year project funded by the European Commission under the 7th Framework Programme. The main goals of the project are to evaluate the potential health impacts of nuclear medicine diagnostics, and further to provide recommendations for future research and on the use and standardisation of hybrid imaging.

Data evaluation and the challenge of new hybrid imaging devices

A rigorous evaluation of the effects of diagnostic radiopharmaceuticals requires analysis of the underlying scientific data. This can be a challenge as, for many substances, some of this data was published many years ago and applied the methodologies available at that time. Furthermore, there is a lack of data on biokinetics in paediatric nuclear medicine. Moreover recently, new hybrid imaging devices became available, which require new and adapted protocols for patient scanning.

It was to meet these challenges that, for the first time in Europe, PEDDOSE. NET, a consortium of five European partners under the management of EIBIR, carried out a systematic scientific evaluation of the available dosimetry data for diagnostic nuclear medicine with particular emphasis on paediatric nuclear medicine. Recommendations were developed for directing future research, on the use and standardisation of hybrid imaging, on the implementation of patient-specific dosage applied to nuclear medicine diagnostics and on education and training. The results of the project were presented at a pre-congress symposium to the ECR in Vienna in March 2011, and at a well-attended pre-congress meeting prior to the annual congress of the European Association of Nuclear Medicine in Birmingham/UK in October 2011.

For the young scientists involved in the project, PEDDOSE.NET offered an excellent opportunity to begin their career in this field.

Details: www.peddose.net



PEDDOSE.NET is a profoundly important project, as its results provide an in-depth survey of the available

dosimetry-related data for both adults and children, and of the available information on the usage and dosimetry of hybrid systems. Additionally, it seeks to identify areas for future research. As a young scientist, participating in this European project gave me the possibility of a comprehensive insight into diagnostic nuclear medicine. Collaborating in an international team of both young scientists and experienced researchers in this field was very inspiring. Furthermore, I had the opportunity to present our results at international conferences and within the PEDDOSE.NET workshops that were organised by EIBIR. Overall, this experience will be beneficial to my future career.

Uta Eberlein Universitaetsklinikum Wuerzburg Wuerzburg/DE



My participation in PEDDOSE.NET was related to the investigation of dose reduction, directly related to imaging systems. Re-

cent technological innovations in nuclear medicine imaging and the increasing use of CT in new hybrid devices have had a significant influence on patient radiation exposure. Under the co-ordination of EIBIR, it was possible for me, as a young scientist, to participate in the PEDDOSE.NET consortium together with four European partners. The project has put diagnostic nuclear medicine in the frame and showed that further research in this area should be encouraged. With the professional help of EIBIR and EANM, a public workshop has been organised to present the project results to the wider scientific community. Furthermore, EIBIR makes it possible to disseminate and integrate the project findings throughout the European Community. 🕊

Charlot Vandevoorde Universiteit Gent/BE



Consortium meeting at EANM 2011, Birmingham/UK, October 2011

MEDRAPET tackles Europe's needs in radiation protection education and training

In order to ensure excellence in radiation protection, and to implement programmes for the optimisation of radiation protection in medicine, it is essential to approach education and training consistently, with high-standard training programmes on a homogenous EU level. The MEDRAPET project (MEDical RAdiation Protection Education and Training) is trying to meet exactly this challenge. The EC-funded project's focus is on three major tasks: the carrying-out of an **EU-wide study** on radiation protection training, in order to identify the current needs and deficiencies; the organisation of a European Workshop, to be held in Athens/ GR, in April 2012; and finally the development of a European Guidance document.

The development of a methodical approach to a study on radiation protection training of medical professionals in the EU Member States is a main part of the MEDRAPET project. During the development and implementation of the continuing study, all consortiummembers identified the relevant categories of

medical professional and the fields



EDUCATION AND TRAINING

of application. Furthermore, it was important to define the aspects of training needing to be covered, the methodological approach required and to develop a logical structure for the questionnaire.

The results of the MEDRAPET Project will form the basis for revisions to the Radiation Protection 116 Guidelines on Education and Training in radiation protection

for medical exposures. The project's consortium comprises the main European stakeholders and professional groups in this field, including the European Society of Radiology (ESR), the European Federation of Organisations for Medical Physics (EFOMP), the European Federation of Radiographer Societies (EFRS), the European Association of Nuclear Medicine (EANM), the European Society for Therapeutic Radiology and Oncology (ESTRO), as well as the Cardiovascular and Interventional Radiological Society of Europe (CIRSE). The European Society of Radiology (ESR) leads the consortium, supported by EIBIR's experienced project staff.

As a result of the European Guidance, a permanent multidisciplinary working party will be created to draft and maintain European standard competencysets at various levels, deciding the minimum radiation protection training and Continuous Professional Development (CPD) required for all medical staff working with ionising radiation.

EIBIR supports the ESR in encouraging the formation of consortia to evaluate the implementation of referral guidelines for medical imaging

The European Society of Radiology (ESR) has been awarded an EC Tender to evaluate the current state of national referral guidelines in medical imaging and to provide advice to the European Commission on the need for further community action in this area.

To comply with the requirement laid down in the EU Directive on Medical Exposures that Member States ensure that recommendations concerning referral criteria for medical exposures, including radiation doses, are available to prescribers, a number of Member States have developed national referral guidelines for clinical imaging as guidance for the referring physicians in justifying radiological imaging procedures and to ensure the highest possible standards of safety for patients being exposed to radiation. In order to support the Member States in implementing the relevant article of the Medical Exposures Directive, the European Commission published in 2000 'Radiation Protection 118. Referral Guidelines for Imaging' (RP 118). These guidelines are based on the Royal College of Radiologists 1998 publication 'Making the best use of a department of clinical radiology: guidelines for doctors'. Recent advances in medical imaging have led to rapid developments in imaging technology that necessitate the continuous updating of the guidelines. The European Commission updated its RP118 document in 2003 and published these amendments as an intermediate version in 2008 before the publication of a new complete document. The ESR-led consortium, comprising the Royal College of Radiologists, the Société Francaise de Radiologie, the Cardiovascular and Interventional Radiological Society of Europe and the European Society of Paediatric Radiology, will develop and conduct a study on the development and implementation of referral guidelines for radiological imaging in the EU Member States and discuss the findings at a European workshop at the end of September 2012.

The study's findings and the discussions that take place at the workshop will form the basis of the final project-goal, a European guidance document giving recommendations for further action to the European Commission. The project will also contribute to the dissemination of information about existing good practice in the European Union, and facilitate stakeholder involvement.

The project has been supported in application and implementation by project management staff from EIBIR.

European grants dedicated to fostering scientific excellence (COST Actions)

COST, a funding programme for European cooperation in Science and Technology, is playing an important role in the construction of a European research area. As a promoter of multidisciplinary research, it aids in the coordination of nationallyfunded research on a European level and aims to foster the development of scientific excellence in a wide range of disciplines.

COST Action for European Cooperation in the development of novel theranostic agents

Within the framework of its work with chemical and molecular science and technologies, EIBIR supported the proposal writing process of a 4-year long COST Action entitled "Theranostics imaging and therapy: An Action to Develop Novel Nanosized Systems for Imaging-Guided Drug Delivery". The Action, proposed by Silvio Aime, University of Torino/IT and Director of EIBIR's Chemistry Platform, represents the collaboration of experts from fifteen countries in chemistry and molecular sciences and technologies. During the First Management Committee Meeting, held in Brussels/ BE in October 2011, the research and dissemination plan was defined.

The Action's focus is to demonstrate the potential of image-guided therapies in the treatment of diseases with high social impact and brings together the major European research groups working on the development of novel combined diagnostic/therapeutic/theranostic agents. Crucial aspects of the drug delivery process in particular regarding the efficiency of drug targeting and release and the relationship of these with the therapeutic effect will be best understood when applying these technologies in vivo. Properly-designed agents will allow the in vivo quantitative assessment of the amount of drug reaching a pathological region and the visualisation of molecular changes resulting from the therapeutic effects of the delivered drug.

The implementation of therapies with imaging technologies will provide physicians with extraordinary tools for accelerating the development of molecular and personalised medicines, and thus extend substantially the armoury available in the fight against a range of diseases. The work plan comprises five working groups:

1. Imaging reporters for theranostic agents

Gather teams with proper expertise in the design and preparation of imaging reporters for technologies with potential for image-guided therapies (MRI, US, optical, nuclear)

Optimisation of reporters to display the highestpossible sensitivity (especially for MRI detection), optimal efficiency in loading nanocarriers, and the ability to modulate the contrast as a function of endogenous/external stimuli

2. Nanocarriers for theranostic agents

Gather research teams with expertise in designing and preparing consolidated or innovative nanocarriers, which can efficiently load drugs and imaging reporters

3. Preparation and selection of targeting vectors

Preparation, selection and testing of the targeting moieties necessary to optimise the performance of the theranostics

4. Theranostic agents responsive to endogenous and external stimuli

Design of theranostic agents whose drug release, and consequently the image contrast variation, can be triggered by endogenous chemical variables that characterise the disease to be cured (e.g. pH or enzymatic activity) or physical means (US, temperature, light) externally applied to the diseased tissue/organ

5. Set-up of preclinical theranostic protocols

Pre-clinical validation of the theranostic agents developed in the other work plans. Of particular importance is the presence of research groups involved in the development of specific animal models for the diseases of interest, as well as imaging technologists, who will optimise the detection and the post-acquisition image-processing of theranostic image-guided therapies

The next meeting of the COST Action is planned for February 17-18, 2012 at the University of Torino/IT.

Details: www.cost.esf.org

COST Action for the European Arterial Spin Labelling Initiative in Dementia

University College London is pleased to announce the official launch of the COST Action "Arterial Spin Labelling (ASL) Initiative in Dementia (AID)", submitted within COST's biomedicine and molecular biosciences domain, which currently represents the expertise in this field of twelve European countries. The Action, to run for the next four years, was developed with the help of EIBIR and began with the official Kick-Off Meeting in Brussels/BE in December 2011.

Typical Arterial Spin Labelling (ASL) images from the brain of a young volunteer, an healthy ageing person and a patient with Alzheimer's Disease (AD). Note the drastic reduction of perfusion in the AD patient, in particular in the frontal and parietal areas of the brain, that mirror the changes seen using FDG-PET. These images were acquired in the highly specialised "Fundación CIEN - Fundación Reina Sofía (Alzheimer Project)" in Madrid/ES, and are provided courtesy of Dr. Juan Antonio Hernandez Tama-The aim of the COST-funded mes. BM1103 Action "Arterial Spin Labelling Initiative in Dementia (AID)" is to allow such techniques to be validated and deployed generally throughout Europe, and not to be restricted to advanced research centres.



This grant was obtained to tackle a very specific health-care problem: dementia. With care-costs approaching 1% of global Gross Domestic Product (GDP; World Alzheimer Report 2010; www.alz.co.uk/research/files/ WorldAlzheimerReport2010.pdf), and with an ageing global population, dementia represents a major clinical challenge. For Alzheimer's disease, the most common cause of dementia, revised diagnostic criteria have recently been proposed and now incorporate biomarkers, mostly based on imaging. In addition, disease-modifying therapies currently in development will be specific to molecular pathologies unique to each dementia and are likely to have significant side-effects. Accurate diagnosis will therefore become very important to avoid exposing patients to unnecessary, costly and potentially dangerous treatments. During this AID Action, measurement of cerebral blood flow was proposed as an alternative to PET imaging in the assessment of metabolic changes, and was considered sufficiently important to be part of these new diagnostic criteria. However, ASL is still underutilised at present due to the heterogeneity and multiplicity of its implementations. Technological improvement and the standardisation of acquisition and post-processing methods are therefore considered essential to enable ASL to evolve into a general clinical tool. This grant will allow for the harmonisation of resources, the coordination of efforts and the optimal use of facilities already existing in Europe. To date, no other consortium has been tasked with coordinating the development of any MRI technology, and EIBIR will play a crucial role in the administration of this four-year project.

The principle of such grants is that anyone can join the Action at any point in time. In the spirit of that principle, the Action's working group would be very pleased to welcome any member of the MRI community interested in joining this endeavour.

To find out more, please contact the EIBIR Management: office@eibir.org

Details: www.cost.esf.org

EIBIR's first industrysponsored study

During the second half of 2011 an action plan for a mutually beneficial collaboration between EIBIR and one of its industrial partners has been developed. This action plan will now form the basis of an investigator initiated study entitled "Preoperative Breast MRI in Clinical Practice: Multicenter International Prospective Meta-Analysis of Individual Data (MIPA)".

The study is expected to start in 2012 under the direction of EIBIR and Francesco Sardanelli, University of Milan School of Medicine/IT and Director of EIBIR's Joint Initiative "EuroAIM/Evidencebased radiology", in collaboration with the European Society of Breast Imaging (EUSOBI) and supported financially by Bayer Pharma AG.

A number of centres throughout Europe will be involved, enrolling about 2,600 women from the ages of eighteen to eighty with newly diagnosed breast cancer, with the central unit in Milan. Subject enrolment started in 2012; presentations as well as the publication of survey results are expected in 2013.

EIBIR is delighted that Bayer Pharma AG has agreed to provide essential support for a study that will be crucial in increasing knowledge about the clinical use of contrast-enhanced breast MRI, and hopes that other Industry-Panel members will do the same with similar projects. Within this study, EIBIR's main duties and responsibilities will be in financial management and the administration of calls for participating centres, and it will also provide support in the publication and dissemination of the study results.

EIBIR and its Network Members gear up for upcoming calls for grant proposals

There is a massive diversity of grants for different topics: FP7 Health, Information and Communication Technologies and Research Infrastructure, Grants by the European Science Foundation for training and Conferencing and Marie Curie Actions, public-private initiatives like the Innovative medicines Initiative (IMI) and many more.

EIBIR is following closely the development of the new framework programme Horizon 2020, which combines innovation, research and economy. Running from 2014 until 2020 with a budget of € 80bn, the European Union's new programme for research and innovation is part of the drive to create new growth and jobs in Europe.

In autumn/winter 2011, EIBIR participated in a number of stakeholder consultations held by the European Commission in order to emphasise the importance of health-related research and in particular the role of biomedical imaging in regard to personalised medicine and the EU's efforts to ensure active and healthy ageing.

By the end of 2013, legislative acts on Horizon 2020 will be adopted by the European Parliament and Council. The first call within the programme will be launched in January 2014.

Details: http://ec.europa.eu > research > Horizon2020



Prof. Xavier Golay University College London, United Kingdom EIBIR active Network Member

G It has been wonderful to collaborate with the staff from EIBIR in the planning and writing of the European COST Action. The staff there is very responsive, and they definitively know what they are talking about in terms of European administrative convolutions! I have also had the pleasure of participating in a Summer School organised by EIBIR, and the attention to detail that went into its preparation made it a really remarkable experience.

> | EUROPEAN INSTITUTE | FOR BIOMEDICAL | IMAGING RESEARCH





EIBIR's multidisciplinary Network grows

As an organisation, EIBIR relies on a high number of actively contributing Network Members. It is a platform open to all disciplines with an interest in biomedical imaging and welcomes bottom-up initiatives and active involvement.

Network Members' development

EIBIR's more than 110 Network Members allow the Network to be where it is today. It would like to thank the active, regular and associate Network Members who subscribed to one of the three service packages introduced in 2010, and in doing so demonstrated their trust in and support for the Network and its mission.

Member Institutions 2011



Overview by main focus of interest of the research groups (1 member institution can consist of several groups)

General Radiology	51
MR Research	8
Image Processing/Analysis	3
Biomedical Chemistry	4
Medical Physics	8
Neuroscience	10
Interventional Radiology	1
Nuclear Medicine & PET	8
Computer Science	6
Basic Biomedical Research	12
TOTAL	111

Active Members



Austria		2
Belgium		5
Czech Republ	ic	2
Estonia		1
France		9
Germany		7
Israel		1
Italy		6
Netherlands		8
Norway		1
Portugal		1
Spain		3
Sweden		2
Switzerland		1
		50

Regular Members



1

4

1

2

3

1 12

1

5

3 **53**

Israel

Italy

Poland

Spain Sweden

Slovenia

Luxembourg

Netherlands

Switzerland

United Kingdom

Czech Republic	1
Germany Romania	1
Sweden	1
Switzerland	3
Turkey	1
	8

Associate Members

EIBIR's Scientific Advisory Board defines new strategies for 2012-2014

Acting as a Steering Committee and representing a variety of disciplines in imaging research, the Scientific Advisory Board is the scientific operational body of EIBIR. The Board is responsible for defining EIBIR's longterm scientific strategies, deciding on the implementation of specific activities and offering advice to members related to their research ideas.

In 2011, two face-to-face meetings were held to discuss the scientific strategies for 2012-2014 and the research topics for working groups. Moreover, both the next FP7 call for HEALTH 2012 and Horizon 2020 were analysed to identify potential topics of interest to the biomedical imaging community and to develop responses to stakeholder consultations. The Scientific Advisory Board has defined the key activities for the coming year:

Research work

- » Establishment of a working group on image-guided therapy and interventions
- » Development of a virtual platform for imaging-related PhD training programmes
- » Establishment of a working group on biomarker imaging in non-cancer diseases
- » FP7 Health call 2012 discussion with Network Members and set-up of potential consortia

Cooperation

- » Collaboration activities with EORTC on imaging-related aspects of clinical trials in oncology (Joint Workshop at ECR 2013)
- » Meeting and discussion with the representatives of the European Commission's department DG Research, Unit Personalised medicine
- » Discussions with Industry Partners regarding their involvement in and active contribution to research projects



EIBIR Scientific Advisory Board Meeting, Vienna/AT, December 2011

Co-shaping the European research agenda

» Horizon 2020 – statements and position papers to emphasise the importance of health-related research and the role of imaging

During 2012, the Scientific Advisory Board will work towards achieving the above goals and to ensuring that further progress is made in its mission in general.

The Scientific Advisory Board is a team of twenty-three scientists under the leadership of Scientific Director Prof. Jürgen Hennig, University Clinical Centre of Freiburg/DE.

Shareholder representatives

Bosmans, Hilde (EFOMP) Hausegger, Klaus (CIRSE) Stroobants, Sigrid (EORTC) Krestin, Gabriel (ESR) Owens, Catherine (ESPR) Ratib, Osman (EuroPACS) Speck, Oliver (ESMRMB) Tatsch, Klaus (EANM) von Wulfen, Heinrich (COCIR)

EIBIR's Initiative Directors

Bernsen, Monique (Cell Imaging Network) Brader, Peter (Cancer Imaging Group) Niessen, Wiro (Biomedical Image Analysis Platform) Sardanelli, Francesco (EuroAIM) Schönberg, Stefan (Euro-Biolmaging)

Regular members

Aime, Silvio representing also EIBIR's Joint Initiative Chemistry Platform (Torino/IT) Grenier, Nicolas (Bordeaux/FR) Hajek, Milan (Prague/CZ) Lassmann, Michael (Würzburg/DE) Martí-Bonmatí, Luis (Valencia/ES) Padhani, Anwar (Northwood/UK) Soricelli, Andrea (Naples/IT) Trattnig, Siegfried (Vienna/AT) van Beers, Bernhard (Clichy/FR)









CUUIH











EIBIR's decision making and advisory bodies

EIBIR is divided into a number of decision-making, operational and supporting bodies tasked with developing strategies, facilitating multidisciplinary collaboration and crossborder exchange, and increasing the benefits of membership. The collaboration of the EIBIR Office with multidisciplinary shareholder organisations, research workers and funding partners has formed an active network whose purpose is to provide advice and support in networking, administration, project management and research training and communication. EIBIR's shareholder organisations emphasise the importance of multidisciplinarity in biomedical imaging research. EIBIR is pleased to have nine shareholder organisations represented at its General Meeting, where strategic decisions are made and recommendations for scientific activities within EIBIR are developed. Multidisciplinarity in biomedical imaging research is one of the network's principal objectives, with the following disciplines currently represented: general radiology, cardiovascular and interventional radiology, nuclear medicine, medical physics, cancer research, paediatric radiology, magnetic resonance in medicine and biology, as well as IT solutions for image data management. In addition to the research branch, there is an industry contingent (consisting of radiological, electromedical and IT technologies for healthcare) actively supporting in EIBIR's decision-making processes.

ESR European Society of Radiology www.myesr.org

CIRSE

Cardiovascular and Interventional Radiological Society of Europe www.cirse.org

COCIR

European Coordination Committee of the Radiological, Electromedical and Healthcare IT industry www.cocir.org

EANM

European Association of Nuclear Medicine www.eanm.org

EFOMP

European Federation of Organisations in Medical Physics www.efomp.org

EORTC

European Organisation for Research and Treatment of Cancer www.eortc.be

ESMRMB

European Society for Magnetic Resonance in Medicine and Biology www.esmrmb.org

ESPR

European Society of Paediatric Radiology www.espr.org

EuroPACS

European Society for the Promotion of Picture Archiving and Communication Systems in Medicine www.myeuropacs.org

The Industry Panel – a unique opportunity for public-private collaboration

In its role as mediator for network partners and working groups, EIBIR will help the industry partners to participate in research projects. Its focus in coming years will be on fostering and initiating public-private partnerships and multidisciplinary collaboration.

There is currently a huge potential for new action plans emphasizing the mutual interests of industry and academia for bringing innovations to the market. The coming year will allow EIBIR and its industry partners to identify joint projects for cooperation in order to establish a sound, durable partnership that will be of mutual benefit and improve the European biomedical imaging research landscape. EIBIR gratefully acknowledges the support of its Industry Partners:

GOLD partners



PHILIPS SIEMENS

SILVER partners



HITACHI Inspire the Next

GE Healthcare



Prof. Colin Caro, Imperial College, London/UK Leonard Fass European Academic Relation Manager, GE Healthcare & Prof. at Imperial College, London/UK and Bengt Nielsen Research Manager, GE Healthcare



Alessandro Maiocchi Bracco Imaging Spa

SIEMENS

Dr. Bernd Montag, CEO Imaging + Therapy Systems Division Siemens Healthcare G Cardiovascular Flow Studies - Research by Prof. Colin Caro's group in the Bioengineering department at Imperial College has been directed at understanding the influence of blood flow on arterial wall disease. The project investigated two major diseases, atherosclerosis (ATH) and intimal hyperplasia (IH), whose distributions appear to be determined by local fluid mechanics. The aim was to detect and clarify local predisposing factors with the objectives of suppressing progression and providing rational treatment. The research used imaging technologies such as GE Healthcare Ultrasound and MRI systems in physiological flow models and human volunteers. Data were analysed using Computational Fluid Dynamics (CFD) to understand the role of fluid mechanics and mass transport in disease distribution. Prior work by this group had shown that ATH occurs in low wall shear (WS) locations as does IH. It was also understood that large vessel geometry is generally three dimensional (non-planar), generating swirling and cross-mixing of blood flow and influencing the distribution of WS and blood-wall mass transport. Flow pulsatility may also be a factor. The investigations in the present study included: numerical study of flow and blood-wall mass transport in helical conduits that included grafts and stents, an MRI study of aortic bifurcation geometry from a clinical data base, ultrasound studies of carotid bifurcation geometry and flow in volunteers and phantoms, and CT, ultrasound, and histopathological studies of arterial stent IH in porcine models. The major results obtained include: increased understanding of flow-vessel geometry interaction with implications for wall shear and blood-wall mass transport, MR image reconstruction and features of aortic bifurcation geometry, Ultrasound flow imaging at the carotid bifurcation, including detection and quantification of secondary flow oscillation using a novel Phase Fourier Doppler technique and proposal of a local vessel wall hypoxia hypothesis for IH - for which there is currently no satisfactory treatment.

What about the future of molecular imaging beyond PET/SPECT? In the last decade a strong emphasis has been placed on the search for new contrast-enhanced imaging procedures enabling the visualisation of pathological tissues using molecular or cellular targeting strategies. This approach, also known as molecular imaging, opened-up new horizons in the conceptualisation of a next generation of imaging probes, that became molecular entities interacting with the biological matter. Radiolabeled tracers for PET or SPECT are, of course, the most straightforward candidates for this approach. However, the translation of the molecular imaging concept to other imaging modalities, from the most sensitive Optical to the less sensitive Magnetic Resonance imaging, was not straightforward, while X-ray probes were not considered due to their low sensitivity. The optical imaging modality, applied over the NIR range of frequencies, offers an interesting translational perspective particularly in the field of image-guided surgery, where real-time delineation of lesion margins and/or sentinel lymph node mapping could have a huge impact on the current clinical protocols. Another intriguing molecular imaging strategy is based on the visualisation of intracellular metabolic pathways using suitable substances that, after a metabolic transformation, can generate a detectable signal; this approach has been already explored in the framework of Optical imaging procedure, and can be used in a clinical environment. Moreover, the metabolic imaging concept is offering a possible way of reducing the gap between Magnetic Resonance and PET/SPECT modalities in molecular imaging procedures. Indeed, the combination of Magnetic Resonance Spectroscopy and hyperpolarized agents entering as substrates in the metabolic transformations has the potential to change profoundly the nature of contrast-enhanced MRI procedures. The ongoing clinical trials with the hyperpolarized pyruvate will provide a first reliable assessment of the effectiveness of this approach. The molecular imaging paradigm is offering new ideas and research opportunities, but their effective translation into clinic is currently drastically limited by economical and regulatory factors. Moreover, competition is also growing with less expensive methods for conducting in vitro analyses of biological fluids, with recent advances in analytical technologies having made possible the detection of relevant biomarkers at the picomolar concentrations. Hence the future of new molecular imaging procedures will depend on their being complementary to in vitro diagnostic procedures and on the increased collaboration between the imaging and pharma industries in the implementation of companion diagnostic development schemes involving new imaging probes and procedures.

Siemens is one of the world's largest suppliers to the healthcare industry. The Siemens Imaging + Therapy Division is deeply committed to collaborative research and development with more than 1,000 clinical collaborations globally. These have resulted in some of the most exciting imaging innovations of the past decade, including the first fully integrated MR/PET system, Biograph mMR. Imaging innovation for the advancement of human health is our passion: making procedures safer, decisions sounder and the delivery of care more sustainable.

Financial Report

EIBIR's activities are financed by a number of sources, including Network Member service fees, Industry Panel service package fees, support from the European Society of Radiology (ESR) and EC funding for European research projects coordinated by EIBIR.

A detailed annual financial report is presented to and approved by the shareholder organisations at the annual General Meeting, usually held on the occasion of the European Congress of Radiology in Vienna.

The ESR continues to provide significant financial support to EIBIR, ensuring the maintenance of office infrastructure, allowing for the set-up of new initiatives and supporting the application and grant-writing processes for new projects. The amount of support provided by the ESR is determined every year according to need and has been between € 150,000 and € 250,000 in recent years.

EIBIR is working on ways to increase the involvement of its shareholder organisations and has opened dialogues to discuss how such interaction and commitment could be increased in the future, as until now the only shareholder contributing to the annual budget of EIBIR is the ESR. One proposal was to encourage shareholders to bring on-board a certain number of Network Members, partly in order to diversify a network whose Members are currently predominantly radiology departments. This proposal was considered difficult by some organisations, and therefore an alternative proposal has been made to introduce annual contributions per shareholder organisation, which will be debated further at the 2012 General Meeting.

A service organisation for scientists run by scientists

EIBIR's Network Members now enjoy a variety of benefits facilitating networking and collaboration, project management, research communication and training as well as in the organisation of meetings.

Networking

EIBIR allows scientists to become actively involved in European working groups in order to successfully put their research ideas into practice and to enjoy the benefits of knowledgeexchange. Services provided are:

Get informed

- » Information on debates in biomedical imaging
- » First-hand information on EU calls and other funding schemes
- » Access to EIBIR's restricted online members' directory

Exchange and shape

- » Collaborate and interact with EIBIR's multidisciplinary network
- » Create task-forces for implementing strategic research goals
- » Influence and define a scientific topic within your own area of expertise on a European level

Participate

- » Take an active role in EIBIR's Joint Initiatives and meet experts who share your research interests, including cell imaging, biomedical image analysis, chemistry, cancer and evidence-based radiology
- » Initiate or contribute to common research/infrastructure projects

Project management

EIBIR is committed to support scientists at every stage of research, from the proposal-writing process to follow-up activities subsequent to project completion. This servicechain enables scientists to focus on their scientific work as opposed to administration. Help is provided in:

- » Proposal-writing
- » Establishing a working group or consortium
- » Negotiation with funding organisations
- » Implementation (coordination, administration and finance management, dissemination and training, monitoring, media, etc.)
- » Follow-up activities subsequent to project completion

Research Communication

EIBIR's mandate is to facilitate the dissemination of knowledge, improving healthcare and increasing the general awareness of the importance of biomedical imaging research. To this end, it has been optimising its ability to offer tailored communication strategies, particularly in the following areas:

- » Establishment and maintenance of media contacts
- » Survey management
- » Initiation of dialogue with the scientific community and the general public
- » Support in conducting and publishing studies
- » Editorial support for scientific publications
- » Design and maintenance of project-related CI and websites
- » Development and dissemination of printed materials

Research Training

EIBIR can use its vast experience to provide support in the establishment, organisation and promotion of training, particularly in the following areas:

- » Technical support in developing training modules (including online)
 » Contacts within
- accreditation authorities
- » Promotion of training events
- » Support of scientific exchange programs and organisation of visiting fellowships

Meeting organisation

To allow scientists to benefit from meetings that fulfil their expectations in terms of scientific content and of structure, EIBIR's service now extends to the organisation of meetings, including: technical organisation prior to the event, on-site management and follow-up activities.

EIBIR is constantly seeking to increase the benefits of Network Membership, and to that end encourages its members to provide feedback. Moreover, in order to raise its visibility EIBIR has plans to further intensify its communication activities. $\frac{1}{2}$

Events in 2012

HAMAM Public Session

 Date:
 March 1, 2012, 09:00-11:00

 Venue:
 ECR 2012

EIBIR IMAGINE Theatre, Austria Center Vienna/AT Level 02 (next to Room U)

The EU-funded HAMAM project pursued the ambitious goal to improve methods for the early detection and accurate diagnosis of breast cancer by integrating the available multimodal images and patient information on a single clinical workstation. In particular, computer assistance for spatial correlation, for multimodal detection and for workflow support and visualization have been developed in the project. During the HAMAM Session, you can learn about the challenges related to multimodal breast imaging as well as how the workstation developed during the project and facilitates the radiologist's clinical work. Also, you will have the opportunity to explore the HAMAM workstation hands-on in the EIBIR IMAGINE exhibition after the session.

www.hamam-project.org



EUROPEAN INSTITUTE FOR BIOMEDICAL IMAGING RESEARCH

EIBIR Network Member Session at ECR 2012

Collaborative Initiatives in Imaging Research

Date: March 2, 2012, 14:00-15:30 Venue: ECR 2012, Austria Center Vienna/AT, Lounge 6/ Level O1

No matter what the field, networking is always vital.

The European Institute for Biomedical Imaging Research (EIBIR) is dedicated to promoting collaborative research. At the Network Member Session it will present a range of collaborative initiatives that help research teams put into practice their research ideas and that facilitate information-exchange.

Come to discover some inspirational examples of collaboration in imaging research!

www.eibir.org



EIBIR/EuroAIM Session at ECR 2012

Evidence-based radiology: ongoing projects and perspectives

Date: March 3, 2012, 16:00-17:30 Venue: ECR 2012, Austria Center Vienna/AT, Room Z

Persuasive evidence for the efficacy of imaging technology is frequently still lacking. The European Network for the Assessment of Imaging in Medicine (EuroAIM) is undertaking multiple projects in order to clarify and promote the role of radiologists in secondary literature, to facilitate the retrieval of secondary literature and to promote research projects. A range of current projects and perspectives will be presented.

Target audience: radiologists and experts in radiology-related fields

www.eibir.org

EIBIR is pleased to announce a range of public events for 2012, including training workshops and educational sessions organised by EIBIR or one of the many projects it coordinates. The events listed are open to all interested scientists, and details regarding programmes and registration can be found at the relevant websites.





Hit Topics in Molecular Unwong - TOPTH 2012 PROCESSING BIOMEDICAL THROES

ENCITE Session at ECR 2012

Imaging highlights - Monitoring disease and therapy

Date: March 4, 2012, 14:00-15:30 Venue: ECR 2012, Austria Center Vienna/AT, Room Z

The European Network for Cell Imaging and Tracking Expertise (ENCITE) will demonstrate a range of new MR imaging technologies and biomarkers, as well as some promising and innovative approaches to the monitoring of diseases, across the spectrum of cell therapies operating on a disease-oriented level.

Target audience: anyone interested in the latest developments in MR and multimodal imaging technologies and in how these can be applied in the monitoring of diseases and therapies in vivo in preclinical models and clinical studies

www.encite.org

Euro-Biolmaging Session at ECR 2012

Support of translational imaging research by pan-European research infrastructures

Date: March 4, 2012, 16:00-17:30 Venue: ECR 2012, Austria Center Vienna/AT, Room Z

This session will give details of the progress of Euro-Biolmaging, the ESFRI pan-European research infrastructure for imaging technologies in biological and biomedical sciences. Synergies that have developed between Euro-Biolmaging and other ESFRI research infrastructures in the lifescience field, and their potential impact on translational research in imaging, will also be explored.

Target audience: anyone interested in imaging research infrastructure

www.eurobioimaging.eu

TOPIM 2012

Date: April 15–20, 2012 Venue: Ecole de Physique des Houches, Les Houches/FR

Processing biomedical images: Visualisation, Modelling, Segmentation, Quantification, Registration.

Incredibly realistic image-rendering techniques from the entertainment industry are entering the biomedical field, and will without any doubt change practice in the research and clinical environments. At the same time, innovations in image computing science as applied to image calculation, analysis and modelling are making unprecedented leaps forward in the imaging of biomedical parameters. Meet ENCITE experts and discuss the latest multidisciplinary advances!

TOPIM 2012 is the 6th Winter Conference of the European Society for Molecular Imaging and is co-funded by ENCITE.

www.topim.eu www.encite.org

Events in 2012







WWU Münster/Peter Grewer; Veröffentlichung genehmigt durch die WWU und Pressestelle der Stadt Münster

MEDRAPET – European Workshop on Education and Training in Medical Radiation Protection

Date: April 21-23, 2012 Venue: Divani Caravel Hotel; Athens/GR

One of MEDRAPET's primary goals is the organisation of a European Workshop on the training of medical professionals in the EU Member States in radiation protection. This Workshop aims to facilitate the discussion of that training. MEDRAPET is currently conducting an EU-wide study to establish the status of medical radiation protection education and training in the Member States.

www.medrapet.eu

ENCITE Workshop on new tools and applications in optical imaging and its transition into the clinic

Date: May 21-23, 2012 Venue: Leiden University Medical Centre/NL

The University of Leiden, in close cooperation with the Max-Planck Society, has organised this workshop to give attendees the opportunity to learn more about the latest developments in the following: cellular, whole-body optical and optoacoustic technologies, targeted nanoparticles and smart activatable probes (and more), and their potential to aid in following cell migration, cell death and other important molecular processes. One of the workshop's highlights will be a tour of the new imaging facility of the Leiden University Medical Center for both cells and animals.

www.encite.org

ENCITE course within ESMRMB Lectures on MR programme

Small Animal MR Imaging

Date: September 20-22, 2012 Venue: Translational Research Imaging Center, Department of Clinical Radiology, University Hospital Münster/DE

The course will address basic technical and practical aspects of MRI with emphasis on demands for small animal application. Lectures will provide a basic background in MR physics and describe intrinsic and extrinsic MR contrast mechanisms. The major aspects of appropriate animal handling and anaesthesia, and of monitoring and maintaining a stable physiological state during imaging, will be explained. The course is organised in partnership with the European Society for Magnetic Resonance in Medicine and Biology, within the framework of ESMRMB's Lectures on MR. The scientific programme was developed by Prof. Cornelius Faber, Westfälische Wilhelms-Universität Münster/DE. project partner of ENCITE.

www.encite.org www.esmrmb.org





Presseamt Münster/Tilman Roßmöller; Veröffentlichung genehmigt durch die WWU und Pressestelle der Stadt Münster

ENCITE Mini-Categorical Course at ESMRMB Congress 2012

"Contrast Enhanced Cellular Labelling, from the Bench to the Patient: ENCITE Contributions"

Date: October 4-6, 2012 Venue: Centro de Congressos de Lisboa, Lisbon/PT

ENCITE has organised the 2nd ENCITE Mini-Categorical Course to take place over three consecutive days. Dr. Milan Hajek, representing the Institute for Clinical and Experimental Medicine in Prague/CZ, and Prof. Robert Muller from the RMN Laboratory in Mons/BE, both ENCITE partners, are responsible for determining the course's scientific programme.

www.encite.org www.esmrmb.org

ENCITE Hands-On Workshop

"MIA Mouse Imaging Academy"

Date: November 2012 Venue: CeNTec, Center for Nanotechnology, Münster/DE

Following the great success of the first two specialised trainingsessions in the field of small animal handling and imaging for young researchers in 2010 and 2011, the Westfälische Wilhelms-Universität Münster/DE is delighted to announce the third session. The workshop will comprise a series of lectures as well as hands-on sessions to allow the close observation of important imaging methods.

www.encite.org



ENCITE Final Workshop

Date: November 4–6, 2012 **Venue:** to be confirmed

The final ENCITE event will present project results and make the main technologies and methods developed accessible to the broader public. Scientists and representatives of industry and the European institutions involved are most welcome to attend the event.

www.encite.org

www.eibir.org