Innovation within tradition – welcome to the 24th European Congress of Radiology

By Lorenzo Bonomo, ECR 2012 Congress President

It is a great pleasure to welcome you to Vienna and the European Congress of Radiology, the annual meeting of the world’s largest radiological society. Over the years, the participation of professional delegates at this congress has constantly increased and the ECR has indeed become a major event for radiologists throughout our continent and increasingly throughout the rest of the world.

Over the last few decades, our discipline has experienced a happy phase, rich in important technological innovations and clinical applications that guarantee our patients high standards of diagnosis and treatment. But there is still a significant need to increase the number of radiologists acquainted with novel imaging techniques.

Let me highlight some of the innovations introduced this year.

Two new Scientific Subcommittees on oncologic imaging and emergency radiology have been formed. These are two ever expanding fields within radiology and this is the reason why we have organised this year, for the first time, Refresher Courses and one State of the Art Symposium on these topics, along with specific scientific sessions. Learning from the past, we have increased the number of interactive sessions. Interactivity enhances understanding and bridges the gap between theoretical lectures and practical application in daily routine. Moreover, it allows attendees to make a direct contribution to the sessions and to communicate with the speakers.

The Foundation Course will focus on ultrasound in order to underline the necessity for radiologists to know and carry out ultrasound scanning better than other specialised physicians, and the importance of including ultrasound in diagnosis, along with other imaging techniques.

One of the Professional Challenges Sessions will be held jointly by the ESR and the International Commission on Radiological Protection (ICRP). Radiation protection is an extremely important area of focus for the whole discipline. The collaboration with the ICRP, the first of its kind at any ECR, will involve not only the organisations own experts, but also representatives from the International Atomic Energy Agency.

The ESR meets’ sessions – among the fundamentals of the congress for years – will be dedicated to Italy, Romania and Egypt respectively, all countries that have responded with great enthusiasm to our invitation. The invited partner discipline is our sister discipline radiation oncology, in which imaging plays a growing role in defining and assessing patients’ response to treatment.

As always, we will give particular attention and space to young radiologists. They will benefit from the new subspecialty Refresher Courses entitled ‘How I report’, which focus on how to report in a way that is more understandable and useful to referring physicians. Several other initiatives will be dedicated to the younger generation, such as ESR Rising Stars, the Junior Image Interpretation Quiz, the Radiology Trainers Forum and the ESOR Session, and Invest in the Youth. I welcome the future of the discipline to Vienna!

For those who will not be able to join us and benefit from the ECR’s high quality programme, selected sessions – such as the opening ceremony, honorary lectures and the ESR meets’ sessions – will be broadcast online via the ESR website, thanks to an initiative introduced this year called ‘ECR goes to…’. As usual, presentations will also be available after the congress via the ESR website.

Besides our scientific and educational programme, I hope you will enjoy the friendly atmosphere of the Austria Center, as well as Vienna itself, such a beautiful city that everyone will enjoy visiting during the breaks in the congress.

I am very grateful to all those that have contributed to organising this meeting and I am very happy to welcome each and every attendee. Enjoy the Congress, enjoy Vienna!

Lorenzo Bonomo is the ECR 2012 Congress President.

Thursday 1 March 2012
Thursday is Breast Care Day

We cordially invite you to this program. The Breast Care Day on March 1, 2012 is part of the European Congress of Radiology in Vienna.

10:30 – 11:30
Satellite Symposium
3D Tomosynthesis – Opportunities for Breast Cancer Imaging
Studio 2012, Level O1

12:00 – 13:30
Lunch Symposium
Imaging for Breast Cancer Therapy Planning, Execution and Control
Studio 2012, Level O1

14:00 – 15:30
Hands-on Workshop
3D Breast Tomosynthesis
Siemens Experience Lounge in the Austria Center Vienna, Entrance Level

14:30 – 16:00
Panel Discussion
Impact of Breast MRI on Therapy Decisions and Therapy Outcome
Chaired by Professor Francesco Sardanelli, Milano, Italy
Studio 2012, Level O1

16:00 – 17:30
Hands-on Workshop
MRI Breast Reading and Reporting
Siemens Experience Lounge in the Austria Center Vienna, Entrance Level
Eminent art historian delivers opening lecture at the ECR

By Mélisande Rouger

Dr. Sylvia Ferino-Pagden, who is Director of the Picture Gallery at the Kunsthistorisches Museum (KHM, Museum of Art History) in Vienna and a specialist in Italian Renaissance art, will present the Opening Lecture "Arcimboldo in the service of natural science", highlighting the links between art and natural science.

Dr. Ferino-Pagden studied art history at Vienna University and Bryn Mawr College in Pennsylvania, where she obtained her MA and did her PhD. She obtained several research fellowships from Scuola Normale Superiore in Pisa, St. Hugh's College in Oxford, Kunsthistorisches Institut in Florence and the Bibliotheca Hertziana (Max-Planck-Institute) in Rome.

The focus of her career has been the Italian Renaissance and she has been Curator of Italian Renaissance Painting at the KHM since 1988. She is also Director of KHM’s research projects that are supported by external institutions, such as scientific exhibitions (x-ray, infrared and chemical analysis) of the paintings by Titian.

She has been a member of the Editorial Board of scholarly quarterly Veneta Cinquecento and a member of various international committees. She has received many awards for her work, including the Crux de Oro Borghese for the best foreign language translation of KHM’s art history publications.

Her most important exhibitions and exhibition catalogues include "Late Titian and the Sensuousness of Painting" (Vienna, KHM/Venice, 2007/08), "La prima donna del mondo – Isabella d’Este – Fürstin und Mäzenatin der Renaissance" (Vienna, KHM, 1994) and "Immagini del Sentire, i Cinque Sensi nell’Arte / Los Cinco Sentidos y el Arte" (Cremone/Madrid, Museo del Prado, 1996/1997), and most recently "Arcimboldo, artista milanese tra Leonardesca e Caravaggesca" (Milan, 2011). At ECR 2012, Dr. Ferino-Pagden will again focus on Giuseppe Arcimboldo, a late Renaissance Lombard artist (1526–1593), whose artistic drawings were used for scientific illustrations in his time.

In today’s Opening Lecture titled ‘Arcimboldo in the service of natural science’ she will talk about the artist’s role as court painter and portraitist to Maximilian II and Raphael II in Vienna.

Sylvia Ferino-Pagden
Do you want to know more about Thyroid Elastography?

Samsung Medison is one of the world’s leading researchers, developers and manufacturers of ultrasound. Founded in 1985, Samsung Medison was acquired by Samsung Electronics in February 2011. Throughout its history, the company has achieved a series of technological breakthroughs, such as introducing the world’s first commercially available 3D and 4D diagnostic ultrasound scanners. Driven by an investment of 12 percent of revenues into R&D, its range of machines now covers everything from the lightest and most portable of scanners, to the very latest and most sophisticated in ultrasound technology. Samsung Medison also produces digital X-rays and other medical imaging products.

PROGRAM

Mini Satellite Symposium for March 1, 2012
Mini Lunchtime Symposium on March 1, 12:00-13:00, room U2D 442-443

Thyroid Elastography - Elastoscan Contrast Index, a Novel Technology

Thyroid Elastography - the story so far
Prof. Paolo Ricci

Technical Aspects of Elastoscan Contrast Index for Thyroid
Wim van de Vooren

Elastoscan Contrast Index for Thyroid: First Clinical Results
Dr. Vito Cantisani

Live scan with a model with Accuvix A30
Dr. Vito Cantisani
**Renowned ultrasound specialist awarded Honorary Membership at ECR 2012**

By Mélisande Rouger

In recognition of his significant contribution to advancing radiology and healthcare, Professor Giovanni Guido Cerri from São Paulo, Brazil, has been awarded the Honorary Membership of the European Society of Radiology at ECR 2012.

Professor Giovanni Guido Cerri is Secretary of São Paulo State for Health and Director of the Institute of Radiology at the Hospital das Clínicas, School of Medicine, University of São Paulo (FMUSP). Born in 1953 in Milan, Italy, he emigrated to Brazil in 1955, where he started a successful career in radiology, taking over leading roles in prominent national and global organisations. Professor Cerri graduated in medicine, in 1976, from the School of Medicine of São Paulo University, where he subsequently did his residency and PhD. He specialised in ultrasound and computed tomography at Birmingham University in Alabama, U.S. He received his first appointment as Associate Professor at the FMUSP in 1986.

“The possibility of working as a health professional has always motivated me due to the challenges of an ever-progressing science that plays a decisive role in improving the quality of life of the general population. Radiology has undergone a true revolution in the last few decades and has become one of the key factors for longer and better living. I have had the opportunity to implement and follow these changes at the University Hospital and, more recently, I have been committed to public health actions that represent large-scale answers to the population's needs”, he said.

A professor of radiology since 1996, he was elected five times as President of the Post-graduation Committee of FMUSP and was Clinical Director of the Hospital das Clínicas from 1998 to 2002. He then became Dean of the FMUSP and President of the Council of the Hospital das Clínicas. In January 2011, he was appointed Secretary of São Paulo State for Health by Governor Geraldo Alckmin. In this capacity, he is working on strengthening the role of regional healthcare, tackling issues such as organ transplantation and oncology treatment, decreasing child mortality and increasing the number of hospital beds. Professor Cerri is involved with various Brazilian organisations. He currently serves as Scientific Director of the Brazilian Medical Association, and Director and President of the Council of the Cancer Institute State of São Paulo, as well as Professor at the FMUSP in 1986.

He was also President of the World Federation for Ultrasound in Medicine and Biology from 2006 to 2009 and has presided over the FLAUS (Federación Latinoamericana de Sociedades de Ultrasonido en Medicina y Biología – Latin American Federation of Ultrasonography Societies). Over the years he has worked with and provided expertise to various international organisations, such as the International Society of Radiology and the World Health Organization.

He has published 300 scientific articles in international and Brazilian journals, 22 books (more than 40,000 issues sold), and about 50 newspaper and magazine articles. He has supervised 48 theses and held conferences in 25 countries.

He has received more than 30 awards, including the LAFU Medical Sciences Award, and several honour distinctions granted by Brazilian and international societies for his work in the medical field.

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**ESR Honorary Membership awarded to celebrated neuroradiologist**

By Michael Crean

In recognition of his exceptional contribution to radiology, and his outstanding research into brain imaging and neurodegenerative disorders, Dr. Burton P. Drayer from New York, United States, will be awarded Honorary Membership of the European Society of Radiology at ECR 2012.

Dr. Burton Paul Drayer is currently the Dr. Charles M. and Marilyn Newman Professor and Chairman of the Department of Radiology (1995 to present) at Mount Sinai School of Medicine and the Executive Vice President for Risk at the Mount Sinai Medical Center. He is also the immediate past president of the Radiological Society of North America (RSNA). He is a world renowned researcher in the fields of CT and MR imaging of the aging brain, neurodegenerative disorders, brain infarctions and neurological and psychological disorders.

Dr. Drayer first received an undergraduate degree in political science from the University of Pennsylvania before moving on to receive his medical degree from the Finch University of Health Sciences/The Chicago Medical School in 1971. He then went on to take an internship at the University of Vermont, where he also served as a neurology resident. He completed his radiology residency as well as a fellowship in neuroradiology at the University of Pittsburgh. He also worked at the Duke University Medical Center, North Carolina, from 1979–1986, where he became Professor of Radiology and Assistant Professor of Medicine (Neurology). He assumed his present position at the Mount Sinai Medical Center in 1995. He was chair of the Division of Neuroradiology-Research Education at the Barrow Neurological Institute in Phoenix, Arizona from 1986 to 1995.

“My main motivation for choosing neuroradiology was the fascinating architectural nature of the central nervous system, my interest in an academic career doing patho-anatomical and physiologic research, and the emergence of exciting cross-sectional, non-invasive imaging technologies. The exceptional dynamism of neuroradiology and the unique opportunity in radiology to combine research, education, clinical care, and administration continue to keep me highly motivated,” Dr. Drayer stated.

Dr. Drayer has been a prolific researcher and writer within the field of neuroradiology. He has authored around 200 journal articles, has 41 book chapters to his name and has published two books. He was also editor of Neuroradiology Clinics of North America from 1989–2003. Not surprisingly, he is in great demand as a lecturer and guest speaker, which is evidenced by the fact that he has given over 200 invited lectures and speeches. He was a fellow of both the American College of Radiology (ACR) and the American Academy of Neurology. He is Past President of the New York Roentgen Society and he was also a founding member of the American Society of Neuroradiology (ASNR) Research Foundation and President of the ASNR from 1996 to 1997.

In recognition of this, Dr. Drayer has received many awards and held many prestigious positions. Beginning as early as in his career as 1977 he was awarded first prize in the Presidents Award of the Pittsburgh Roentgen Society as well as the Cornelius G. Dyke award from the ASNR in the same year. More recently he received a Distinguished Service Award from the American Board of Radiology in 2008, made the list of best doctors in New York Magazine from 1996 to present and was awarded the Gold medal from the American Society of Neuroradiology in 2011.

Dr. Drayer’s achievements and research interests are too numerous to list here but some of his many research interests include; neurodegenerative disease and normal aging, Alzheimer’s disease, Parkinson’s disease, multiple sclerosis, cerebral infarction, vascular malformation of the brain and brain neoplasm, to name but a few. He has served on many national advisory boards, reflecting his expertise on matters such as those concerned with Alzheimer’s disease, stroke and Parkinson’s disease.

After being elected to the Board of Directors of the RSNA in 2003, Dr. Drayer became Chairman of the board in 2009, president elect in 2010 and finally President of the RSNA in 2011.
The medical image continues to grow in importance for the diagnosis and treatment of diseases. As a direct result of the imaging innovations of the past decades, today diseases can be detected earlier and better. Treatment decisions can be made with higher confidence based on more specific clinical information. Medical procedures get less and less invasive, with reduced dose and less open surgery. And, higher affordability of imaging and higher productivity with imaging enable more and more nations around the globe to give their populations access to modern care. With that, imaging today contributes significantly to advancing human health. We at Siemens are passionate about innovation that advances human health. Together with you we want to celebrate the medical image and its potential to do just that.

Come and visit us at ECR 2012 to see our latest imaging innovations, leading the way.

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Images, leading the way.
Together, let’s celebrate the clinical image and its potential to improve care for more patients around the globe.
Outstanding radiologist and technology pioneer awarded ESR Honorary Membership

By Mélisande Rouger

In recognition of his major contribution to the development of radiology, particularly in the areas of imaging technologies and musculoskeletal imaging, and his devotion to the restructuring of radiological standards of practice, Professor Moshe Graif from Tel Aviv, Israel, will be awarded Honorary Membership of the European Society of Radiology at ECR 2012.

Moshe Graif, MD, is a renowned radiologist in the fields of ultrasound and MRI, whose work has considerably advanced both research and clinical radiology. His early interest in imaging technologies also helped to improve and spread their use in clinics today. He has been Chairman of the Department of Medical Imaging at the Tel Aviv Sourasky Medical Center since 1989 and Professor of Medical Imaging at the Faculty of Medicine of Tel Aviv University since 1992.

Born in 1948 in Bucharest, Romania, and living in Israel since 1950, he obtained his medical degree from the Faculty of Medicine of the University of Tel Aviv in 1973. From 1975 to 1980, he trained in radiology at the Rambam Medical Center in Haifa, in affiliation with the Faculty of Medicine of the Technion Institute of Technology. In 1980, he moved to Tel Aviv where he became Associate Professor in Medical Imaging in 1992 and full Professor in 2006. In 1984, he joined London Hammer smith Hospital for a year as a research fellow at the MRI unit, with a view to bringing the new technology and clinical practice to Israel.

He has taken on several professorships across the Atlantic; in 1995–96 as Visiting Professor of Radiology, again at Thomas Jefferson University Hospital; in 2000 as Adjunct Associate Professor of Radiology at the Israel Academy of Science. He is also a research grant reviewer for the National Institute of Health and Chief Scientist at the Ministry of Health and the Israel Academy of Science.

He has also served as co-President of the French-Israeli Association of Medical Imaging since 2002 and was co-President of the 6th Mediterranean Congress on Magnetic Resonance (2002–2006).

Graif is one of the most influential radiologists in Israel. He has been Chairman of the Israel Radiological Association (ISRA) for the past twelve years. Under his chairmanship, ISRA took part in the ‘ESR meets’ programme at ECR 2008. He is also a member of the Executive Committee of the Scientific Council of the Israel Medical Association (IMA), a member of the National Council of Medical Imaging for the Israeli Ministry of Health and Chief Radiology Counsellor for the Maccabi Health Services Organization. He is also a research grant reviewer for the Chief Scientist at the Ministry of Health and the Israel Academy of Science.

He is an honorary member of the French Radiological Society (SFR), from which he received the ‘Excellence award at ARAB Health 2012’ in 2007.

He has been awarded the ESR Honorary Membership, a reviewer for many publications, including the European Journal of Radiology and the Journal of Medical Sciences.

At the ARAB Health Congress, which took place on January 23–26, 2012 in Dubai, the Clinical Imaging Institute of Al Ain Hospital in Abu Dhabi received the ‘Excellence in Imaging and Diagnostics Award’ due to the outstanding accomplishments of its angiography and interventional radiology programme.

The judges evaluated the quality assurance programme, accuracy of radiological diagnosis, turnaround time for radiology examinations, patient safety, workflow and safety of patient and staff, as well as waste management and radiation safety policies of the department.

Al Ain Hospital, which is a tertiary hospital focused on acute care, is managed by Vamed Health Services Company (SEHA). As privately enriching. Working in the UAE is the multicultural and multi-ethnic aspect, which is professionally, as well as privately enriching. Working in the UAE offers the opportunity to take creative advantage of diversity. Besides all the work-related success and experience, living in the UAE is a very positive experience by itself, getting in touch with the local culture and hospitality. Life in the UAE, being easy and safe, is perfect for family and children. Coming to Al Ain was the right move for my family and me, at the right time.”
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SEE YOU IN LISBON ...
Pancreatic cancer management demands teamwork and multidisciplinary approach

By Frances Rylands-Monk

Pancreatic cancer patients is a complex and challenging task requiring a multilateral effort across medical specialties. Speakers at today's multidisciplinary session intend to illustrate to ECR delegates a unified approach to pancreatic cancer that enables the goals of each specialty to be achieved for timely diagnosis and effective treatment.

With pancreatic cancer, surgeons need to know if there are any liver metastases because they usually prevent surgical treatment. Percutaneous biopsies of pancreatic cancer have an inaccuracy rate of up to 25%, so diagnostic imaging plays a central role. The detection of metastases depends on size, histology and the reaction of contrast agents, and to a lesser extent on the technique, when detecting metastases above 2 cm. Accuracy is lower when metastases under 2 cm in size are concerned. Therefore depicting small liver metastases by means of diagnostic imaging, before and after contrast administration may avoid unnecessary laparotomies which are always associated with a different level of morbidity and mortality.

At this afternoon's session, attendees will learn about which pathological criteria are necessary to diagnose liver metastases and the importance of histological subtyping such as adenocarcinoma versus endocrine neoplasm. They will also find out about the sensitivity of different imaging modalities in detecting liver metastases and the improvement in sensitivity after the administration of liver-specific contrast agents, as well as the imaging criteria for the differential diagnosis of focal liver lesions. The issue of positive lymph node presence will be addressed too.

Each patient is discussed with different aims: sometimes the diagnosis is not known and the challenge is in narrowing down the differential diagnosis; for others, the treatment options are debated, or the case is reviewed after the pathological diagnosis is obtained. In some cases, particular complications are discussed,” Manfredi remarked. “This approach will be demonstrated during the panel discussion at today’s session, in which the experts will guide the general radiologists present in the auditorium in the interpretation of example cases and show the strategies they employ to arrive at the correct diagnosis. Manfredi aims to outline the imaging findings in different pancreatic neoplasms, radiology’s role in surgical planning and the strengths and weaknesses of imaging in patient management.

A case in point that determines management is whether pancreatic lesions are shut or cystic. A solid lesion must be resected, if possible, according to Bassi, while some cystic lesions can be followed up, as will be covered more fully by Zamboni, who will illustrate the different pathological patterns of pancreatic neoplasms, cytology, embolic solid, their immunohistochemistry and the possible progression from benign to malignant pathology.

Depending on the indication, different surgical procedures for determining whether the lesion is a neoplasm or not mean different questions exist for the pathologist and the radiologist. The pathologist should know the criteria helpful for the differential diagnosis with tumour-like conditions that do not require surgery but medical therapy instead, while radiologists should know the diagnostic imaging signs for differential diagnoses in patients with a mass in the pancreas, Manfredi commented.

Multidisciplinary Sessions: Managing Patients with Cancer

Multidisciplinary Sessions

Managing Patients with Cancer

Thursday, March 1, 16:00–17:30, Room E2

MS 3 Pancreatic tumours

Case presentation and discussion

R. Manfredi; Verona/IT

What the surgeon needs to know

C. Bassi; Verona/IT

Complete or incomplete resection: the added value of the pathologist

G. Zamboni; Verona/IT

Imaging of pancreatic tumours

R. Moref; Verona/IT

Case presentation and discussion

R. Manfredi; Verona/IT

Axial contrast-enhanced CT scan during the pancreatic phase of the dynamic study shows a hypodense lesion in the head of the pancreas (arrow), representing a small adenocarcinoma at surveillance-pathological examination. (Provided by Dr. Riccardo Manfredi)

Serosus cystadenoma. Axial half-Fourier T2-weighted image (TR/TE = 1/20 ms) shows a multicystic, microcystic neoplasm of the head of the pancreas with a central scar. (Provided by Dr. Riccardo Manfredi)
High-field MRI creates many exciting new possibilities in cardiac cases

By Philip Ward

Successful cardiac examinations with 3 Tesla MRI do not require wizardry or exceptional power, but they do call for solid knowledge of the potential problems and the technical aspects of the equipment, according to Dr. Bernd Wintersperger, associate professor of radiology and section chief for cardiac imaging at the University Health Network, Mount Sinai Hospital and Women’s College Hospital, University of Toronto, Canada.

Proper patient safety screening is essential to avoid potential difficulties with devices or implants that are incompatible with 3T. The increased signal to noise ratio (SNR) and contrast to noise ratio (CNR) at 3T benefits most cardiac MR applications, but changes in general physics need to be addressed, he noted. The improvement in CNR boosts tissue contrast, and may facilitate either more detailed or faster imaging with higher acceleration factors. Users might be discouraged by off-resonance artefacts in cine cardiac imaging when they first move toward 3T. These artefacts are more common and prominent at 3T, but the technology has advanced and allows for adequate measures to reduce or eliminate artefacts,” noted Wintersperger, adding that his presentation at today’s refresher course will discuss the basics for better understanding and how to eliminate artefacts by scanner and sequence adjustments. He plans to focus mainly on frequency adjustment and magnetic field homogeneity.

The quality of myocardial first pass perfusion imaging is enhanced by using 3T, and assessment of myocardial ischaemia can improve as a result of the change. Also, contrast-enhanced MR angiography (MRA) benefits from increased field strength, and this brings gains for patients with aortic or pulmonary vasculature diseases. For both applications, tissue contrast is higher and high-resolution imaging can be pushed beyond 1.5 T capabilities.

“The generally high SNR/CNR at high field strength is the perfect basis for accelerated imaging. With even more sparse sampling approaches and sophisticated reconstruction techniques, cardiac imaging at higher field strength will eventually go entirely 3D, with possible multiple contrast imaging,” Wintersperger predicted. “Smart physiologic monitoring and fast imaging also will allow real-time functional assessment. Overall, scanning comfort will improve for patients as a result of these techniques, while we will be able to gather even more functional and structural information.”

At today’s session, he plans to provide general radiologists with basic information about the benefits, pitfalls and drawbacks of 3T cardiac imaging. He will cover practical considerations on patient safety, image technique adjustments and how to exploit the benefits of 3T. He wants to ensure that radiologists are prepared for conducting 3T cardiac examinations.

CT has become an important diagnostic tool in the workup of cardiac patients, especially coronary artery disease, and radiologists should know and learn as much as possible about this technique so they can supply suitable and helpful diagnostic information to their colleagues in cardiology, stated Dr. Konstantin Nikolao, associate professor of radiology and associate chair, department of clinical radiology, Großhadern Campus, University Hospitals Munich, Germany.

Cardiac CT has undergone dramatic improvements over recent years, and is entering clinical routine, particularly in patients with both stable angina and acute chest pain. Therefore, many patients are eligible for cardiac CT, and every radiologist should know the basics of this topic and should be aware that this technique is evolving quickly, he commented.

Cardiac CT was primarily designed for non-invasive assessment of the coronary morphology – i.e., detection or exclusion of coronary artery stenoses – but the assessment of the ischaemic myocardium is now being evaluated with dual-energy CT techniques to display the iodine content of the myocardium. Both techniques seem to be useful in detecting the haemodynamic relevance of a given stenosis, and they add functional information on the morphological information derived from conventional CT angiography.

Patient selection is an important, if not the most important, issue, both in terms of patient characteristics (age, weight, body shape, and heart rhythm) and clinical indications, including the symptoms and the pre-test likelihood of having coronary artery disease, according to Nikolao. In addition, choosing the correct acquisition technique is vital because it affects image quality, the amount of information derived from the scan, and the radiation dose.

Methods for reducing radiation dose should be very well known to any radiologist performing cardiac CT, and many of them can be combined; he continued. They include prospective ECG triggering, high-pitch acquisition modes, automatic ECG-dependent tube-current regulations, and the optimal setting of tube voltage. If possible, all these techniques should be employed, depending on the patient habitus, ECG rhythm, and clinical indication.

Nikolaou anticipates a continuation of the emphasis on functional myocardial information, and thinks this will complement the morphological information from CT angiography. Also, larger, prospective, multicentre outcome trials will be designed and performed, and the scientific evidence for a number of clinical indications for cardiac CT should be tested and broadened.

“From a technical standpoint, the optimisation of dose-reduction techniques will be ongoing, as well as acquisition and post-processing of myocardial perfusion data derived from CT,” he pointed out. “Especially on the detector side, new technical developments will increase signal-to-noise and spatial resolution, and potentially provide spectral information.”
Act now to ensure CT is not ‘the doughnut of death’ in trauma

By Philip Ward

For high-quality trauma care, radiologists must recognise the importance of making the CT scanner available in a timely fashion to severely injured patients by working with the emergency department and anaesthetic staff, making sure that protocols for scanning and reporting trauma patients are adhered to, and developing services that can be delivered within a few minutes, 24 hours a day.

That’s the central message of Dr. David Kessel, immediate past president of the British Society of Interventional Radiology and consultant radiologist at Leeds Teaching Hospitals, U.K.

Trauma patients can present anywhere. Even severe cases may need to be brought to smaller centres as a life-saving staging post, so radiologists need to ensure that services are in place to perform and interpret imaging in these critically ill patients. Trainee radiologists must learn about trauma imaging by exposure both in the workplace and in teaching sessions.

“In trauma circles, the CT scanner used to be considered the ‘doughnut of death’. The reason for this was a combination of logistics and technology,” he noted. “The logistical impediment relates to needing to have a scanner appropriately located in relation to the emergency department and ready to receive severely injured patients within a very short time from their arrival in the hospital. This means that there must be radiographers available, trauma must be rehearsed and the teams responsible for ongoing resuscitation are familiar with the CT environment and ready to accompany the patient during the scan.”

The technological factor that has turned the CT unit into ‘the doughnut of life’ is the speed of scanning. A whole-body trauma CT can be performed in under two minutes, and it gives information about all major injuries to the head, spine, thorax, abdomen and pelvis, explained Kessel, a speaker at this afternoon’s refresher course.

In the head to mid-thigh, CT should be the primary investigation of choice for severely injured patients and should not be delayed. Experienced radiologists are a crucial element of an early and accurate diagnosis. Trauma scans should be reported according to simple algorithms, and the goal is to provide a primary survey report that identifies immediately life-threatening injuries within minutes of a scan. Next must come a more in-depth secondary survey assessment of potential diagnostic problems that will have an impact on patient management.

Unfortunately, there is a lingering sentiment in many emergency departments that CT is a dangerous place for the critically ill patient. In fact the CT department is as safe as anywhere else if it is properly equipped and the patient is adequately supported by the resuscitation team. There is no reason that ventilation, resuscitation and monitoring should not continue during scanning,” Kessel pointed out.

Diagnostic radiologists who are likely to see trauma patients need to consider how they will be able to provide this crucial service in an efficient fashion. Logistically, this means considering how scanning and reporting will be performed within an hour of the patient arriving in the hospital.

However, he admits some issues still await resolution. “When scanning, the most important thing to remember is that there must be sufficient body coverage for the scan and it is important to consider the patient’s position in the scanner to allow you to take stock and review the images in a logical fashion. Mistakes are most likely to be made if the radiologist is rushed or distracted by clinicians each with their own specific concern,” he added.

The simplest way to prevent pitfalls is to scan and report trauma patients according to protocol and using standard proformas, Kessel maintains. At Leeds, there is a single protocol for trauma scans detailing the scan settings, contrast dose, and image reformats so that all scans are performed to a fixed recipe. In addition, there are two standard report sheets: one for the initial assessment, and another for the radiological secondary survey. Each sheet provides details about the body areas that need to be commented on.

Many trauma patients are young, and because trauma CT scans impart a significant radiation dose, there is a possibility of cancer-related deaths. This must be balanced against the risks to the patient from the trauma he noted. There are two key ways to minimise radiation dose: ensure that patients are only scanned if they have a genuine indication with appropriate mechanism of trauma or constellation of injuries, and use the correct protocol and avoid repeat scanning.

“There is increasing evidence that early CT scanning improves outcome in trauma patients,” stated Kessel. “The military experience in Camp Bastion in Afghanistan has led to a model in which incoming wounded military and civilians can be taken directly into the CT scanners on arrival at the military hospital.”

He is also watching closely for the results of an important ongoing trial in the Netherlands that is randomising trauma patients either to conventional therapy or to CT before resuscitation. If this turns out to confer advantages by directing treatment to the most life-threatening aspects of a patient’s injuries, there will be pressure to change the early trauma pathway. This will have a major impact for planning CT services, including their location and ensuring that they are staffed 24 hours a day, he predicts.

The recognition and treatment of injuries have evolved dramatically over the past two decades, according to Prof. Lars Lonn, professor of endovascular surgery and consultant in the department of radiology at the National University Hospital of Denmark in Copenhagen. Image quality and acquisition times have improved, and imaging’s use as a diagnostic tool is essential. It also serves as the bridge to endovascular minimally invasive procedures.

“Vascular and trauma surgery, as well as interventional radiology, are now truly in a transitional phase. Standard open repair is being replaced by endovascular and minimally invasive techniques to an extent far beyond our imagination,” he commented. “The techniques developed for elective cases are now applicable for injured patients. The endovascular treatment for emergencies has consequences for both institutional and regional organisation.”

He thinks success can only be achieved by having a team with wide elective experience, and most importantly, there must be good team spirit, where everybody remembers why they are working in hospitals: to improve a patient’s healthcare.

To avoid problems, a safe chain of logistics, in which all team members collaborate and share knowledge, is essential. A change of mindset and a more systematic approach is necessary to prevent errors, and he advocates the implementation of training in a simulated environment as an integrated part of daily practice. A combination of expertise in simulation technology and knowledge of trauma medicine/surgery will help to create a positive environment and safe medical care for emergency medicine. Thus, integrating appropriate training methods into daily practice will be crucial in the future.

“More collaboration between specialties will be a must,” Lonn stressed. “It is a challenge to keep up with this future, and prognostication is a difficult moving target. In my 25-year career, the development of imaging modalities, more recently functional techniques, was not a consideration when I entered radiology.”

“The trauma surgeon and the radiologist need to embrace their collaboration in order to improve patient safety and satisfaction.”

Management of trauma patients should involve interventional radiology, neurosurgery, orthopaedic surgery, plastic surgery, vascular surgery, anaesthesiology, among others. Use of e-learning and validated curricula can strengthen team training, leading to better care in real-life scenarios, he concluded.

An injured 14-year-old boy is transferred by the resuscitation team in the x-ray department.

Simulators can play an important role in facilitating training of embolisation procedures, as shown by this photo from the Orzone Educational Sessions at the CIRSE 2011 meeting, held last September in Munich, Germany. The training set-up consisted of the Orzone hybrid training cathlab, Oriamp, the Mentice endovascular simulator; VIST C and the Laerdal full body patient, and SimMan 3G. (Photo provided by Orzone AB, Göteborg, Sweden, and Prof. Lars Lonn.)

Lars Lonn is professor of endovascular surgery and consultant in the department of radiology at the National University Hospital of Denmark in Copenhagen.

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“The trauma surgeon and the radiologist need to embrace their collaboration in order to improve patient safety and satisfaction. Management of trauma patients should involve interventional radiology, neurosurgery, orthopaedic surgery, plastic surgery, vascular surgery, anaesthesiology, among others. Use of e-learning and validated curricula can strengthen team training, leading to better care in real-life scenarios, he concluded.

Refresher Course:
Interventional Radiology
Thursday, March 1, 16:00–17:30,
Room N/O
RC 309 The trauma patient
- Chairman’s introduction
  A. Watkinson; Exeter/UK
  B. Management of arterial trauma
    J. Urbaniak; Madrid/ES
  C. Solid organ trauma
    L. Lonn, Copenhagen/DK

Panel discussion:
Do we need IR in the ER?
Knowing your options is the key to limiting neural tissue loss

By Simon Lee

Perhaps more than in any other emergency scenario, the contribution of imaging and the decisions made by radiologists in emergency neurological cases can dramatically affect patient management. In order to limit the loss of neural tissue and give the patient the best possible chance of making a complete recovery, it is imperative that emergency neurological imaging is performed as swiftly and as accurately as possible. In other words, in an emergency setting, ‘time is brain’. When the knowledge and swift decision-making of a radiologist working under pressure can have such a huge bearing on the patient’s quality of recovery, it is fitting that ECR 2012 includes a Categorical Course dedicated to ‘Emergencies in Neuroradiology’, the first session of which gets underway today.

In recent decades the frequency of different neurological emergencies has changed slightly. Improvements in vehicle safety standards have led to small declines in the number of traumatic brain injuries, while ageing populations and a rise in the level of obesity have contributed to a higher prevalence of ischaemic stroke. But the big issues have remained the same, and these will be covered in six separate sessions dealing with traumatic emergencies, oncologic emergencies, ischaemic stroke, subarachnoid haemorrhage, acute CNS infections, and acute cranial nerve dysfunctions, each of which will be chaired by an expert in the field. Course coordinator Prof. Paul M. Parizel, who is President of the European Society of Neuroradiology (ESNR) and Chairman of the Department of Radiology at Antwerp University Hospital, expects the whole course to appeal to a broad range of ECR delegates.

“The experience of professionals who encounter neuroradiology varies greatly, and this is one reason why it is so important to have this course. It should serve as an update for neuroradiologists who are in the business, as I think it gives an excellent current overview, but perhaps even more importantly it should serve as a primer for those radiologists who have not specifically trained as neuroradiologists but who, by circumstance, are required to care for these patients once in a while. There are definitely some important knowledge gaps to be filled here, because there is so much new information and so many more things we can offer in terms of imaging procedures and image-guided treatments,” said Parizel.

Not so long ago, when a patient was admitted to an emergency department with, for instance, acute stroke, CT imaging was only used to rule out haemorrhage, and that was the main element in the decision tree. New developments then pushed MR imaging to the forefront and diffusion-weighted imaging began to be used to show ischaemic brain tissue in the early stages. The pendulum has now swung back towards CT, which, thanks to technological improvements, has now become a multi-parametric technique. Non-contrast CT is still used to rule-out haemorrhage, but it is followed by perfusion CT (to look for ischaemic brain tissue and to identify thresholds for salvageable penumbra with thrombolytic therapy) and by CT angiography (to show occlusion of a major blood vessel). The good news for patients and for patient management is that much more can be done in an acute setting, but the drawback is that it has become much more complicated. In day-to-day practice, especially in smaller hospitals or less specialised centres, it is not that easy for radiologists handling numerous responsibilities to be aware of precisely which course of action is necessary or the implications of the decisions they reach.

“Thanks to advances in technology, we have quick and comprehensive neuroradiological imaging that can provide information that will guide patient treatment in many serious emergency settings. But the technology is wasted without the background knowledge. For example, posterior reversible encephalopathy syndrome (PRES) is a rare acute condition that can occur in the setting of neurotoxicity, often in association with edema, cyclosporine after transplantation, or severe hypertension. The clinical presentation of PRES can be puzzling to the neuroradiologist or oncologist taking care of the patient and it is a diagnosis that relies very heavily on imaging, because of its unique CT or MRI appearance. Within minutes, imaging can change the whole course of treatment for the patient, but obviously you also need a person who is able to recognize what there is to see, so that they can actually alter the management of the patient. The radiologist needs to be confident in his/her decision making and should know which imaging modalities should be performed first and why, and what the second line should be, and so on. That’s exactly what we’ve tried to emphasize in creating and planning this course,” said Parizel.

“Anybody with an interest in the brain, spine, or emergencies should attend this course for two reasons. First, the topics are highly relevant and they affect the way we manage patients. Second, the speakers were very carefully selected and are among the best and brightest that our profession has to offer. We have had complete freedom to choose the speakers and topics that we felt would be most appropriate, and I’m very grateful to Prof. Romano for that,” he added.

Categorical Courses: Emergencies in Neuroradiology

Thursday, March 1, 16:00–17:30, Room D1
CC 319 Ischaemic stroke (‘acute neurologic deficit’)
Moderator: R.D. Brüning, Hamburg/DE

Saturday, March 3, 16:00–17:30, Room D1
CC 1119 Subarachnoid haemorrhage (‘the worst headache ever’)
Moderator: P.H. Nakstad, Oslo/NO

Sunday, March 4, 08:30–10:00, Room D1
CC 1219 Radiological management of traumatic emergencies
Moderator: D. Goldsher, Haifa/IL

Sunday, March 4, 16:00–15:30, Room D1
CC 1419 Oncologic emergencies in neuroradiology
Moderator: J. Walecki, Warsaw/PL

Monday, March 5, 08:30–10:00, Room D1
CC 1619 Acute onset of cranial nerve dysfunctions
Moderator: M.A. Papathanasiou, Athens/GR
Imaging modalities prove crucial for an accurate differential diagnosis of inflammatory conditions

By David Ziska

Radiological imaging together with the contribution of nuclear medicine is crucial in the diagnosis of inflammatory conditions. Inflammatory infectious conditions are extremely common and basically classified by the presence of micro-organisms in the body. The hallmark of inflammation is the body’s reaction characterised by increased local blood flow, oedema, pain and recruitment of white blood cells in order to disinfect and remove the pathogen.

Inflammatory bowel disease (IBD) and vascular graft infection (VGI), which will be covered in this session in detail, are two conditions where both specialties, radiological imaging (RI) and nuclear medicine (NM), can contribute equally to finding the right diagnosis.

Inflammation, however, can also be seen in other degenerative diseases without the presence of pathogens. In these diseases, the inflammatory process is very similar to that of infections, but the recruitment of white blood cells is of a much lesser extent and mainly due to lymphocytes. Dr. Alberto Signore, from the Department of Nuclear Medicine and Molecular Imaging at the University Medical Center Groningen, points out the importance of an accurate differential diagnosis when dealing with inflammatory conditions. “In most cases, we have to make a differential diagnosis between these two types of inflammation: a sterile inflammation versus a septic infection (infection) because prognosis is different and treatment is different. In the case of a sterile inflammation, it can be treated with anti-inflammatory drugs only and the prognosis is generally good. In the case of septic infection (infection), treatment should be initiated with antibiotics and/or surgery and the prognosis can be bad,” said Signore.

Imaging modalities are crucial to making an accurate differential diagnosis between the two types of inflammation and also in evaluating the extent of the disease, as well as the progress and control of the treatment in practice. Radiological modalities, including conventional radiology, ultrasonography, computed tomography and magnetic resonance imaging, are the primary choice for assessing the site and extent of inflammation, for example the lungs, bowel, bones, joints and brain. Oedema and increased vascularity in inflammation can also be easily detected, but when it comes to differential diagnosis between sterile and septic infection, the specificity of radiological methods is not precise enough. Radiological imaging is very useful in evaluating the extent of inflammation and associated complications, but cannot be used to monitor the efficiency and progress of treatment in short intervals.

The signs of inflammation that can be detected by RI are certainly less specific than in NM, whilst the radiological evaluation of the site and extent of the inflammatory process is more accurate, as it is always above 90% the clarification rate. Dr. Francesca Maccioni from the Department of Radiological Sciences at La Sapienza University of Rome, Italy, explains Dr. Signore: “Unfortunately nuclear medicine imaging methods are complex to perform and require radiopharmaceuticals and very high costs, and the prognosis can be bad.”

Overall, the session will focus on the integration of different imaging modalities and the gains that can be achieved by combining NM and radiological imaging methods. Talks about vascular graft infections from the radiological perspective as well as from the nuclear medicine perspective will be given by Dr. Alejandro Romero Jaramillo, from Vall d’Hebron University Hospital, Barcelona, Spain and Prof. Ora Israel from Rambam Health Care Campus, Haifa, Israel, respectively.

The Chairmen's introduction

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PC 3 Diagnosis of inflammatory conditions

Chairmen’s introduction

Prof. Francesca Maccioni, Rome/IT

Prof. A. Palkó, Szeged/HU

Prof. P. Bourguet, Rennes/FR

Prof. A. Fraga, Barcelona/ES

Prof. O. Israel, Haifa/IL

Panel discussion - What is seen in the crystal ball: the future role of nuclear medicine and radiology in the evaluation of inflammatory conditions
Dynamic contrast-enhanced MR mammography is a sensitive method for detection of breast cancer because it highlights tumour vasculature, but diagnostic results may vary widely depending on reader experience. Diffusion-weighted imaging (DWI) and MR spectroscopy (MRS) aim to address this issue, and are continuing to show promise.

The neoplastic vasculature is induced in a mostly preclinical stage of breast cancer (2–3 mm in size). Consequently, MRI can detect these early breast cancers, which might be detected only by chance using conventional mammography because no mass or microcalcifications are present, said Dr. Pascal Baltzer, director of mammography at the centre for radiology at Friedrich-Schiller University in Jena, Germany. He will speak at today’s breast refresher course on MRI diffusion, perfusion and spectroscopy.

In investigations involving MRI techniques, pharmacokinetic modelling of high temporal resolution dynamic contrast-enhanced imaging (perfusion imaging) has promised quantitative insights into the pathological characteristics of neoplastic vasculature, while DWI and MRS are based on entirely different concepts.

“While MRS is a molecular imaging technique able to quantify biochemical tissue properties, DWI is influenced by microstructural tissue changes,” he explained.

Baltzer plans to elaborate on implementing these techniques in clinical practice and the possible diagnostic benefits. A key benefit of using DWI or MRS is that no contrast agent is needed, unlike the regular MR mammography technique. DWI provides insight into subcellular tissue microstructure that is altered by neoplastic growth. Using MRS, chemical tissue components can be analysed.

Both techniques are promising, because they provide quantitative and thus objective, information about target regions,” he remarked. “However, DWI is far easier to implement into clinical practice as MRS is technically challenging and less easy to interpret.”

DWI and MRS are additional techniques for tissue characterization, but their superiority over conventional mammography has not been demonstrated empirically, he stated. Moreover, perfusion, DWI, and MRS are, to different degrees, still investigational methods that cannot be recommended without caution for clinical practice, especially MRS.

Today’s course is likely to interest both breast radiologists and oncologic radiologists because the techniques are not restricted to breast imaging.

“There is an ongoing trend toward non-contrast MRI techniques not only for breast cancer detection and lesion differentiation, but also for monitoring response to neoadjuvant treatment,” Baltzer said. “Just recently, researchers at the DKFZ (Deutsches Krebsforschungszentrum) in Heidelberg have published a rapid communication on chemical exchange saturation transfer (CEST) imaging of the breast, which is another interesting MRI technique. The first MR-CEST scanners may change our view on nuclear medicine in the role of breast cancer diagnosis. Furthermore, 3-Tesla MRI is more broadly used for breast MRI, promising higher signal-to-noise, probably at the cost of challenging artefacts.”

Another presenter at the session, Dr. Alexandra Athanasiou from the department of radiology at the Institut Curie in Paris, will discuss ultrasound elastography, which maps breast lesion stiffness. There are two elastography techniques available: strain imaging and shear-wave imaging. Strain imaging uses external compression gradually applied to the lesion by means of the ultrasound probe, deforming the lesion. In shear-wave imaging, no external compression is applied and the ultrasound system induces mechanical vibration by using near-wave imaging.

“The choice depends on the equipment and experience of each radiologist,” stated Athanasiou. “Pitfalls often arise from suboptimal experience of each radiologist,” stated Athanasiou. “Pitfalls often arise from suboptimal

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Advantages of ultrasound include the modality’s low cost, short examination time, lack of sedation, and performance of the procedure at the bedside of intubated, ventilated neonates.

“Ultrasound is safe to be repeated as many times as we need, and thus it is a very useful means for early detection of brain disease and follow-up and evolution and response to treatment,” she explained. “State-of-the-art ultrasound is an excellent means of depicting very small lesions like septic infarcts, cortical ischaemia and cortical changes due to sepsis. Suboptimal ultrasound equipment, technique and operator skills may result in an inaccurate examination that gives insufficient information compared to a standard brain MRI. Monitoring of brain maturation and myelination abnormalities are better evaluated with state-of-the-art MRI comprising diffusion tensor imaging and tractography.”

At Angiopoylos hospital, all neonates in the intensive care unit are evaluated for brain disease and monitored by using ultrasound. In babies with hypoxic-ischaemic and haemorrhagic disease, a baseline brain MRI is performed once the baby is stable enough to be transported to the MRI suite. For prognostic reasons, brain maturation and myelination are evaluated by MRI between the age of six to eight, as well as at 24 months.

At today’s special focus session, the role of advanced post processing of MRI is the theme of the morning session of the department of diagnostic radiology at Lund University, Sweden. She aims to ensure that attendees are well-grounded in the principles and pros and cons of tractography, and she wants them to appreciate the applications of susceptibility-weighted contrast-enhanced MRI. ECR delegates can also learn about the indications of voxel-based methods and the advantages over region-of-interest analysis.

Region-of-interest-based morphometric diffusion tensor imaging analysis has been used for assessing age-related changes in the human brain and to visualise eloquent white-matter bundles and their relationship to brain tumours, cerebral infarctions and other lesions. However, the technique is limited to two dimensions, while diffusion tensor tractography allows the possibility of an overall view of individual fibre bundles in 3D-spaces for studying brain maturation and revealing abnormalities in so-called normal appearing white matter, according to Malys Sundgren. Dynamic susceptibility-weighted contrast-enhanced perfusion MRI can provide haemodynamic information that complements conventional MRI and is being used increasingly in clinical practice to diagnose, manage and understand brain tumours in children.

Today’s clinical studies involve multidimensional high-resolution images containing a substantial amount of structural and functional information. The role of quantitative imaging and the parameters measured have become more and more important to evaluate the severity of a disease, disease progression and response to therapy. An increasing number of different quantitative image analysis techniques that can be used both in adults and children have been developed over recent years, she concluded.

Clinical Corner

By Finn Snyder

The functional and quantitative data provided by MRI, ultrafast CT, and hybrid imaging modalities go beyond the anatomical and morphological parameters traditionally used for diagnostic analysis. Radiologists now have the tools to extract quantitative measurements of functional parameters such as flow, oxygenation, motion and function, as well as tissue characterisation, texture, and local alterations in physical characteristics that allow the depiction of focal abnormalities.

This is the opinion of Osman Ratib, chair of radiology at the department of medical imaging and information sciences, University Hospital of Geneva, Switzerland. He thinks the use of quantitative analysis tools is now required to help establish and optimise objective criteria to distinguish between normal and abnormal tissue.

The emergence of hybrid techniques that extend images into a molecular dimension, where metabolic parameters are measurable, allow for a more accurate and objective diagnostic analysis of image data. Such a plethora of information requires advanced software tools to enable extraction of quantitative data and to assist radiologists in their diagnostic tasks and provide adequate tools for visualisation and quantification of complex data, he remarked.

Clinical decisions in patient management, as well as treatment monitoring, rely on precise quantitative criteria.

“The availability of adequate software tools and suitable reference databases to establish objective limits and thresholds that can be used to monitor progress towards evidence-based medicine, where objective and measurable criteria can be used to select the most appropriate treatment,” he explained.

Support is also needed to help predict patient response to treatment, and to separate responders from non-responders. Technics such as PET-CT and PET-MRI provide quantitative measurements of tracer uptake and metabolic pathways that allow doctors to better monitor response to treatments, he added. Referring physicians and radiologists rely on these measurements in daily practice, and they expect radiologists to provide more than just diagnostic findings. Therefore, radiologists face a significant challenge in image analysis workflow, and computer-aided diagnostic analysis software is vital for their work.

One common example of image analysis is the quantification of oncological studies, including the quantitative longitudinal follow-up of tumour size and response to treatment over a series of exams acquired at different points in time. Ratib thinks such analysis requires adequate measurement tools but also appropriate informatics infrastructure to maintain a database of previous measurements and cohorts of reference values. Additionally, with the emergence of new metabolic imaging techniques, these measurements do not rely only on changes in size and shape of tumours but also on their metabolic activity.

Similar quantitative analysis techniques are nowadays applied to functional imaging of the brain, with advanced MRI providing diffusion-weighted approaches and fibre tracking yielding additional functional parameters that can be critical for evaluating strokes, tumours, and brain trauma.

Besides the growing importance of image analysis techniques and informatics infrastructure in daily radiology practice, the need for easy management and communication is a must in today’s network-oriented clinical care. Moreover, new computer-aided diagnosis (CAD) techniques are becoming more widely prevalent in assisting radiologists in providing more accurate diagnostic decisions.

This change in work environment will undoubtedly influence the way radiologists perform, and they will have to adapt their workflow accordingly. This afternoon’s refresher course, chaired by Ratib, will explain how to make best use of this additional information, and how radiologists will need to adapt their diagnostic workflow to achieve desired results.

The course is intended for radiology practitioners wishing to learn more about changes in informatics and computer-based image analysis tools which are now available to them and which will be part of their routine. It will highlight some key concepts linking new techniques of image reconstruction and image analysis as well as image rendering techniques available. It will also present some of the efforts in standardisation, and efforts aiming at establishing common syntax and semantics to ensure consistency and comparability. Finally, the course will review the latest CAD techniques and how they can be integrated effectively in daily practice.

DICOM has already enabled great progress towards sharing results of CAD procedures. Dr. Bernard Gobaud, senior researcher at the Unité VÉSIAGES Inserm 746, Rennes, France, noted that semantic open source software tools can be used directly to query from a data-
ECR Today: What are the applications for CT and x-ray in chest imaging?

Denis Tack: Chest radiographs are useful for the diagnosis and follow-up of numerous disorders, and are used as a first-line imaging diagnostic tool worldwide.

CT is the imaging method of reference for the diagnosis and follow-up of almost all disorders in the lungs and the mediastinum. CT is mandatory.

ECRT: The dose delivered by a state-of-the-art CT and x-ray in chest imaging? How do image processing and CAD impact radiological daily practice?

Denis Tack: Chest CT is at the upper limit of the dose for chest examinations. I am convinced that the actual dose will be further reduced. My hope is that CT radiation dose will no longer be a subject of debate when I retire in 15 years. The clinical benefits of CT are so great that we should not be restricted by dose considerations. However, because of its low cost and availability it is not likely for CXR to disappear completely.

ECRT: Do you have any recommendation on how to reduce dose even further? What do you think will be the future development in this regard?

Denis Tack: Justification is key. Every CT has to be justified. Every delivered milligray has to be justified. Again, it is more philosophical than practical, but given the potential of the technique to be optimised, this concept is essential for solutions in collective dose from diagnostic procedures.

ECRT: Do you think radiologists, globally speaking, are well aware of dose reduction techniques? Is this part of their daily routine?

Denis Tack: Awareness was very low ten years ago. It seems that awareness of dose from CT is now much better, at least in countries where annual surveys on CT dose are carried out.

ECRT: Do you think patients are well enough informed on radiation exposure?

Denis Tack: I am not convinced that patients should be informed of their individual risk when undergoing a CT examination. The reason is that there is no valid method for calculating the risk each individual takes. The patient may be informed about the benefit-to-risk ratio of the CT examination.
Ultrasound’s lower costs give it significant advantages over other modalities

By John Bonner

These difficult economic times mean that medical staff throughout Europe are being asked to make savings and provide an even better service at lower cost. Inevitably, that will cause physical and emotional strains, but such pressures are also an incentive to develop new technologies and novel applications for existing equipment and different, more efficient ways of working.

Examples of these responses will be on display on the booths of the ultrasound equipment vendors in the commercial exhibition at this year’s ECR. Because the modality is relatively low cost, particularly compared with CT and MRI, manufacturers remain optimistic about the future.

Producing ergonomic technology was one of the main aims of Philips Healthcare when it began development work on the latest version of its iU22 xMatrix premium ultrasound system. Its X6-1 PureWave xMatrix array transducer produces ultra-thin slice imaging, resulting in crisp, high-resolution images simultaneously. This results in the capture of twice as much clinical information in the same amount of time without moving, allowing clinicians to create two full-resolution images sequentially one after another. What is more, colour Doppler, you acquire blocks of the same image. Together these separate functions create a powerful new diagnostic tool, he said.

Since ultrasound was developed as a clinical tool, two separate methods have been used to characterise blood flow: colour flow imaging shows the direction that the blood is moving, while pulsed wave Doppler helps to quantify the flow rate. But is there any reason why both parameters should not be measured at the same time, saving time and effort for the technician and improving productivity? The French-based vendor SuperSonic Imagine certainly thinks this is feasible, and has set up a research project to prove the point. This project has culminated with the introduction of Ultra Fast Doppler technology that will be displayed for the first time at the ECR 2012 conference.

“Behind this technology is the ability that we have developed to capture ultrasound images at between 10 and 200 times faster than conventional systems,” explained Dr. Jeremy Bercoff, director of ultrasound R&D at SuperSonic Imagine and co-founder of the company. “This is possible because we are leveraging the massive parallel computing technology that is available from the videogame industry, so we can process much more data than you would find with a classical ultrasound machine. In conventional colour Doppler, you acquire blocks of the image sequentially one after another. What we can do is to acquire all the blocks at the same time; it’s a very simple concept, you just need the processing power to be able to perform it.”

It is the same basic technology, borrowed from the entertainment industry, as that used in the company’s elastography imaging system, which identifies differences in tissue stiffness that may indicate the presence of a tumour. Both applications are available on its Aixplorer units on show in the exhibition hall. These technologies both identify processes that occur too quickly to be captured by standard ultrasound technology: the shear waves that are the basis of elastography and the split second changes in the direction of blood flow that may be a result of some underlying pathology. Moreover, the same technology can also acquire fully quantifiable Doppler data that enables the technician to generate post-processed Pulse Wave Doppler spectra from multiple locations within the same image. Together these separate functions promote more cost-effective health care through improving the integration of data from ultrasound examinations with those of other imaging modalities. This capability will be available in the soon-to-be-launched Acuson S3000 ultrasound system, the flagship in the company’s range of premium scanners. The new product includes the one-click elite Fusion solution, which is intended to make fusion imaging part of the clinical routine. The application will make it possible to automatically combine 3-D CT volumes with real-time ultrasound.

Previous fusion techniques required the patient to lie motionless throughout the entire examination to avoid elaborate manual realignments. “The automatic, one-click advanced registration capabilities of the Acuson S3000 system eliminate these limitations, reducing CT image registration to mere seconds, and profoundly simplifying manual registration techniques to enhance workflow during MR volume registration. Fusion imaging can play an important role not only in diagnosis and follow-up but also in image-guided interventions,” said Glenn Davis, vice-president for worldwide sales and marketing for Siemens’ ultrasound business.

Other features of this work-in-progress include a novel elastography application, the Virtual Touch tissue iQ, which permits simultaneous display of a colour-coded tissue stiffness map and shear-wave velocity scanning in a single image. This application allows immediate visual assessment of lesions and their stiffness characteristics while pro-

Enhancement of a hepatocellular carcinoma is displayed in contrast harmonic echo (CHE) mode. (Provided by Hitachi Aloka)
Another striking difference that ECR attendees will notice is some new names above the exhibition booths, after a period of significant consolidation. Over the past year or so, Samsung has acquired Medison, Fujiﬁlm has bought SonoSite and Hitachi merged with Aloka. It is hoped that these partnerships will lead to major synergies among vendors with complementary technologies.

At the Hitachi Aloka Medical stand, representatives will be displaying the latest updates to the ProSound product range, from the flagship F75 unit to the compact Alpha 6 machine. A key feature of this product range is the phase detection analysis concept, which provides two features, contrast harmonic echo (CHE) and eFlow. CHE is an original mode for the detection of ultrasonic contrast microbubbles that receives the harmonic components reﬂected by the bubbles when insonated with a low pressure pulse wave, and it offers a very high sensitivity in detection without movement artefacts, the company says.

On the other hand, eFlow is a new high-definition blood flow imaging mode. It is based on the same core technology of phase shift detection and can improve spatial and temporal resolution. With eFlow, it is possible to display blood ﬂow information with higher sensitivity and resolution than with conventional Doppler methods. This enables detailed observation of fine blood vessels, such as those inside a tumour, which were previously difﬁcult to display as individual vessels using conventional methods.

The Hitachi real-time virtual sonography (HI-RVS) feature is available on the company’s Vision range. The company also offers a 4D ultrasound elastography feature on its HI Vision Ascendus system, using conventional volume ultrasound probes to create live 3D images depicting the relative stiffness of tissue.

At the GE Healthcare booth, the company is demonstrating the latest enhancements for its Logiq E9 ultrasound system. These include continued image quality improvements for colour and 4D scanning, which can be of particular beneﬁt for shared service applications. Expanded elastography applications for prostate, thyroid, musculoskeletal and gynaecology investigations are also possible.

Additionally, the company has promised to expand volume navigation enhancements to more transducers. This should provide a boost for applications such as transcranial examinations, as well as the ability to load in multiple data sets, including positron emission tomography (PET) images. Finally, enhanced needle-tracking capabilities are promised with an additional device, the Virtual Needle tracker, which GE Healthcare insists will virtually eliminate the difﬁculties associated with needle placement.

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Monday, March 5: 10:00–17:30
Next generation ultrasound fusion: optimise and automate

By Theo Ahadome,
Stephen Holloway,
Carly Reed

Fusion imaging is not a new concept; the most well-known example is PET-CT, which has been in use for over a decade. The fusion of real-time ultrasound with MRI or CT is far less established in the radiology sector. Ultrasound may not always be the modality of choice for many radiologists, due to a long standing preference for advanced imaging modalities, such as MRI and CT. However, recent advances in image quality, improved workflow, and rising concerns over radiation exposure, are re-igniting radiologist’s interest in ultrasound.

Fusion imaging is used to integrate two images from different diagnostic imaging modalities. In the use of ultrasound fusion, radiologists are able to superimpose (or fuse) real-time ultrasound images with pre-taken MR or CT images. This allows radiologists to utilise the clarity of detail produced by MRI and CT, yet manipulate and explore anatomical bodies using real-time ultrasound.

Initially, image guided navigation software was used in conjunction with ultrasound systems to provide multi-modal fusion capabilities. This was preceded by the first generation of ultrasound systems that performed this procedure independently. This concept attracted the attention of radiologists; however, the limitations of these first generation systems prevented widespread use. The main issue was workflow. The technology was complicated and difficult to use, which made the use a long and challenging process. In many cases, ultrasound fusion was less cost effective for the radiologist and more inconvenient for the patient. This was further hindered by image resolution below today’s improved standards.

For many manufacturers, advancing ultrasound use in radiology has been a challenge. While the introduction of new technologies has driven ultrasound use in other applications, such as heart wall motion diagnostics in cardiology and 3D/4D volume imaging in OB/GYN, many radiologists continue to only use ultrasound for basic examinations.

The market for ultrasound in radiology was estimated to account for 31% of total revenues in the European, Middle East and Africa (EMEA) market in 2011. The current market outlook for high-end radiology ultrasound systems in developed regions is poor, with economic pressures limiting investment. The growth of this market is also still dependent on changing the general opinion held by many professionals in this field. A new generation of fusion technology could be the first step in changing this trend, and driving new market growth.

There have been a number of significant improvements recently. ‘Smart Fusion’, a new function in the Aplio 500 by Toshiba Medical Systems, and ‘eSie Fusion’ imaging, in the Acuson S3000 system by Siemens Healthcare, both highlight this development. One of the key improvements is in transducer technology, with the incorporation of new advanced GPS positioning. This enables real-time feedback of needle position during interventional procedures, allowing highly accurate guidance. This improves both the efficiency and quality of the procedure. New software and visualisation packages allow automatic alignment between the ultrasound and CT or MRI image. This decreases the time taken to produce the fusion image, significantly improving workflow and convenience for the radiologist.

Real-time clinical procedures will benefit from this new ultrasound fusion technology; for example, biopsies detecting bone and soft tissue cancers can be performed to a high level of diagnostic confidence. This should also limit call-backs, increase efficiency, reduce expenditure and improve the treatment process.

Radiology is forecast to remain the largest application market for ultrasound throughout the forecast period in EMEA. The advancements of ultrasound fusion imaging may help to drive further growth of this modality, as radiologists see the potential of new ultrasound technology. It is essential to provide further education to demonstrate the clinical benefits and efficiency of using ultrasound in this segment, and to create technology that can provide cost-effective and time-saving solutions for radiologists. The key factor in driving this growth will not be brand new technology, but optimising current technology. Automation and simplification of complex ultrasound examinations can significantly improve workflow for the clinician, driving increased ultrasound use in radiology. The newest generation of ultrasound fusion looks to be the first step in this process.

The authors are market analysts in the medical imaging and healthcare IT research groups at InMedica. InMedica is a leading provider of market research and consultancy in the medical electronics industry (www.in-medica.com).

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The increasing role of ultrasound in the evaluation of testicular lesions

By Lorenzo Derchi

The diagnostic approach to testicular lesions is based primarily on physical examination. The identification of lesions is carried out by observing changes in tissue consistency, revealed through palpation of the testis. Patients are then referred for ultrasound imaging for further characterisation.

Ultrasound elastography has the ability to produce non-invasive assessments of the mechanical properties of tissue and to image its elasticity. Its role in clinical practice has been increasing rapidly [1, 2]. Most papers dealing with this technique in superficial tissues have focused on breast and thyroid diseases; [3, 4] little attention has been paid to the possible role of elastography in the evaluation of testicular lesions.

A paper by A. Goddi et al. entitled, ‘Real-time tissue elasticity imaging for the evaluation of testicular lesions’ (Eur Radiol DOI 10.1007/s00330-012-2525-x) was published on October 26, 2011, in the ‘First online’ section of European Radiology [5]. The paper reports on a series of patients, with a combined total of 144 solid testicular lesions, who were examined, both with conventional B-mode Duppler ultrasound and RTE. The authors categorised the results obtained by RTE into five grades:

1: even strain for the entire lesion
2: strain in most of the lesion
3: strain at the periphery of the solid lesion, with no strain in the centre
4: no strain in the entire lesion
5: no strain in the entire lesion or surrounding tissues.

Categories one to three are considered benign; categories four to five are regarded as malignant. Furthermore, the results of RTE correlated with lesion sizes. Of RTE-grade 5 lesions, RTE produced 87.5% sensitivity, 98.2% specificity, 93.3% positive predictive value, 96.4% negative predictive value and 99.8% accuracy in differentiating benign from malignant lesions. When considering lesion sizes, in 71 patients with nodules >5 mm, RTE classified 66 lesions (grades one to two) as benign, all confirmed by follow-up. The remaining five lesions were classified as malignant (grade 4), the final diagnosis for four of them was seminoma. The remaining nodule had not changed after a 30 month period; it was classified as ‘probably benign’ and considered a false positive. In 14 of the testicular lesions, RTE correctly characterised 19 out of 21 nodules: 15 (all RTE grade 4) were malignant. The remaining two lesions (one Leydig cell tumour and one teratocarcinoma with multilocular appearance) were classified as grade two and considered as false negatives.

Only one of 166 lesions with RTE grade one was a testicular neoplasm (Leydig cell tumour causing gynaecomastia). The authors concluded that lesions with RTE grade one, less than 10 millimetres, can be considered benign unless clinical or laboratory data suggest otherwise.

These results seem especially useful in patients with small, indeterminate, testicular masses. These small solid nodules are a problem that has become relatively frequent with the widespread use of ultrasound imaging for any scrotal complaint. We see at the level of the testis the what has already been seen in liver (haemangiomas, simple cysts), gallbladder (asymptomatic stones), kidneys (simple cysts) and thyroid (nodular goitre): ultrasound shows the real prevalence of ‘lesions’, but we do not know what they are, what their clinical significance is or how to deal with them.

The presence of these small, non-palpable lesions has been described in 0.21% to 1% of examined patients [6-10]. Prevalence of malignancy varies widely in reported cases: from 0/10 cases [6] to 8/9 of operated subjects [8], even then orchidectomy is not always justified. A variety of solutions have been suggested: from targeted biopsy under intraoperative US guidance and simple excision of the lesion, if histology confirms its benign nature, to a policy of ‘active surveillance’, with short-term follow-up ultrasound studies (every three months), and surgery only for lesions that show interval growth [10, 11].

Recently, it has been suggested that identification, with new imaging techniques, of features indicating the benign nature of the disease process (such as lack of internal vascularity at contrast-enhanced ultrasound (CEUS)) studies or a ‘soft’ consistency at elastography imaging) can be used, together with a lack of increased tumour marker, as a criterion to avoid surgery completely [12].

In assessing small testicular nodules and can be helpful in deciding the most appropriate clinical approach, allowing in particular expectant management in selected cases. Technical advances in ultrasound of the testes do not allow precise histological diagnosis but provide strong clues about benign versus malignant nature, thus affecting therapeutic decisions. Treatment decisions based on a combination of these new data with ‘conventional’ findings as well as clinical and laboratory results could possibly, be the new future standard of care in patients with small, indeterminate, testicular lesions.

Professor Lorenzo Derchi from Genoa/IT is Ultrasound Section Editor for European Radiology.

References:

The increasing role of ultrasound in the evaluation of testicular lesions - lines of the European Federation of Societies of Ultrasound in Medicine and Biology for the use of CEUS in the tests [13].

The paper by Goddi et al. [5] confirms that ultrasound elastography can play a useful role in assessing small testicular nodules and can be helpful in deciding the most appropriate clinical approach, allowing in particular expectant management in selected cases. Technical advances in ultrasound of the testes do not allow precise histological diagnosis but provide strong clues about benign versus malignant nature, thus affecting therapeutic decisions. Treatment decisions based on a combination of these new data with ‘conventional’ findings as well as clinical and laboratory results could possibly, be the new future standard of care in patients with small, indeterminate, testicular lesions.

References:
During 2011, the European Institute for Bio-
medicinal Imaging Research (EIBIR) increased the number of its network members. EIBIR is a service organisation for scientists run by scientists: EIBIR keeps on thriving.

A service organisation for scientists run by scientists: EIBIR keeps on thriving.

The EIBIR Cancer Imaging Working Group has embarked on a collaborative effort with the European Organisation for Research and Treatment of Cancer (EORTC), as they have both recognised the lack of imaging-related clinical trials as well as the need to involve imaging experts early on in clinical trials, when protocols are being developed. There is an ongoing effort to identify relevant EORTC trials in the pipeline that would be suitable for add-on studies related to imaging. Joint courses are envisaged on the topic of standardising the training of imaging experts in the good practice of clinical activities as well as teaching oncologists how to incorporate imaging into clinical trials.

The EuroAIM initiative has continued its work on evidence-based radiology and has attracted a large number of members to its working group. Two of the FFP projects coordinated by EIBIR will soon draw to a close. HAMAM has established a digital clinical workstation for improved breast cancer diagnosis that facilitates the daily work of clinicians and will present its final workshop one day prior to the beginning of ECR 2012. The project PEDPOSE.NET will conclude with a comprehensive report on the safety of diagnostic procedures in nuclear medicine, including the new recommendations of the International Commission on Radiological Protection, epidemiological data and technical aspects of image production. The consortium will also issue recommendations and guideline proposals for the application of radioactive pharmaceuticals to children.

ENCITE has progressed well, establishing its Multi-Centre Cluster for training on cell labelling techniques. The consortium has applied for a six-month cost-neutral extension to provide access to imaging technologies in order to be able to take into account recent advances in cell imaging as well as to ensure fulfilment of its work plan. Two COST Actions have started with the support of the EIBIR management office, one on imaging and theranostics initiated by the EIBIR chemistry platform and one on arterial spin labelling. The EIBIR staff supported the ESIR in successfully applying for an EC Tender on referral guidelines for imaging which aims to assess the current status of national referral guidelines in the EU member states and to provide guidance to the European Commission to further community action on this issue.

Last but not least Euro-BioImaging, the ESFRI research infrastructure project aiming to provide access to imaging technologies across the full range of biological and medical applications, from molecule to patient, has progressed well, exceeding its goals and EIBIR, as a multi-disciplinary platform, is well suited to developing approaches with which to rise to these challenges.

As European funding schemes become more and more competitive, EIBIR is striving to develop a strategy that will allow the network to thrive and continue the activities of its multi-disciplinary thematic working groups, independent of EU funding. This is certainly a major challenge, as lack of funding limits the potential for activity and innovation. The support provided by our Industry Panel members is gratefully acknowledged and allows us to give start-up aid to new initiatives and dedicate resources to supporting project applications.

And of course EIBIR is most thankful to the European Society of Radiology which once again dedicated significant funds to EIBIR over the past year, as there has not yet been an agreement on spreading this support among the number of its network members. EIBIR is a service organisation for scientists run by scientists: EIBIR keeps on thriving.

By Jürgen Hennig and Gabriel P. Krestin

Towards an automatic alignment of multi-modal images of the breast

By Thomy Mertzianidou, John Hipwell, Christine Tanner, Rita Mann, Ulrich Bick, Thorsten Twellmann, Henkjan Huisman, Nico Karssenmeijer, Horst Hahn, David Hawkes

HAMAM* is an EU funded project on multi-modal breast cancer image analysis carried out by a consortium with partners from EIBIR (AT), UCL (UK), Fraunhofer MeVis (DE), MeVis Medical Solutions (DE), ETH Zürich (CH), Radboud University Nijmegen Medical Centre (NL), The University of Dundee (UK), Charité-Universitätsmedizin Berlin (DE), and Boca Raton Community Medical Centre (US).

A key component of the HAMAM project is relating breast images from a range of modalities including digital breast tomosynthesis (DBT), x-ray mammography, and 3D ultrasound with one another. This is a challenging task due to the highly deformable nature of the breast coupled with differences in image appearance. To tackle this problem we have investigated a range of techniques from linear, geometric transformation models, incorporating anatomical landmarks, to more complex, patient-specific, biomechanical models (Figure 1). We have applied these techniques to the alignment of MRI with 3D breast ultrasound and x-ray mammograms.

Mammography is routinely used as a screening and diagnostic tool for the early detection and management of breast cancer. Due to the projective nature of x-ray imaging, the superimposition of normal fibro-glandular structures reduces the sensitivity of mammography and may hamper the assessment of lesion expansion. Consequently, MRI is commonly used as a complementary modality, providing a 3D image and functional information to detect mammographically occult lesions and further evaluate mammographically detected lesions. We have developed a generic framework for automatic alignment between these two modalities for clinical use. In this configuration, we use a geometrical, affine transformation model to approximate the breast deformation resulting from mammographic compression between two plates. The correspondence between the MRI and x-ray mammogram is then determined by aligning breast structures in the x-ray mammogram with the corresponding features visible in an x-ray image simulated from the MRI volume. For validation we used 57 visible lesions identified on routine clinical CC and MLO mammograms from 49 subjects. The median accuracy obtained was 13mm (Figure 2).

We also tested the algorithm’s performance and the registration of an MR image to the CC and MLO mammograms of a patient with a localisation clip, inserted after biopsy. The median accuracy for both views in this test was 9mm. The results indicate that an intensity-based registration algorithm, using a regularised single-transformation model, can provide radiologists with a clinically useful tool for combined MR and x-ray breast cancer diagnosis.

Automatic 3D breast ultrasound (ABUS) is a new modality, which provides 3D images of the breast. Benefits, with respect to x-ray mammography, include avoidance of ionising radiation, a 3D view of the breast and an anticipated increase in sensitivity for lesions in dense breasts. Reduced costs also make ABUS attractive in comparison to MRI. ABUS images are acquired under modest frontal compression of the breast using a wide transducer. Generally one to four views are required to cover the whole breast. Interpretation of all views is time consuming and subtle abnormalities might be missed. Uni- and multi-modality computer-aided detection (CAD) methods aim to improve the efficiency and accuracy of this task. Multi-modality CAD requires the linkage of extracted regions across modalities, and which is usually based on image features of the regions and their spatial position within the breast. Incorporating prior knowledge of the expected breast transformation and keeping the number of free parameters low is vital. For ABUS-MRI matching, we combined a cylindrical shear transformation and an analytic ellipsoid compression. This requires a minimum number of features to be identified. These are the location of the nipple and the breast thickness, the posterior of the nipple in both modalities, the medial-lateral direction of the nipple to the breast edge on ultrasound, and an approximation of the rib cage using a cylinder on the MRI. A mean accuracy of 14mm was achieved for linked lesions in four cases (Figure 3). Simulation of the breast compression enables more direct image comparison and greatly reduces the size of the breast region which needs to be investigated by a radiologist or searched during automatic feature linkage.

These methods aim to approximate the highly non-linear deformations of a real breast deformation, whilst being quick to compute and straightforward to translate into a clinical context. We are currently investigating the potential clinical impact of this work, using a large database of cases collected by the project partners. In addition we are evaluating how these techniques could be used to enhance multi-modal-diagnosis, both by a radiologist and using the project’s multi-modal CAD developments.

The project will be showcased on Thursday, March 1, 14:00–15:30 in the EIBIR IMAGINE Theatre next to room U on the second level.

Figure 1: A biomechanical breast model created from a segmented MRI (left) and used to simulate a mammographic cranio-caudal compression (right). Tissue classified as fibroglandular is represented by blue tetrahedral elements, the pectoral muscle by green elements and a lesion is shown in red.

Figure 2: An example of a CC (left) and an MLO view (right) mammogram of a patient diagnosed with ductal carcinoma in situ. The finding in the x-ray mammograms is indicated in red, the projection of the finding in the MRI is indicated in green and their overlap in yellow.

Figure 3: Orthogonal slices at the location of the ultrasound lesion (marked by lines) for (top, bottom) two cases showing (left) ABUS and (middle) MRI (right) transformed MRI. The MR lesion is marked by a black contour.

1 European 7th Framework Programme ICT-2007.5.3 www.hamam-project.org

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The HAMAM project showcases novel software tools for advanced multimodal breast imaging

by Thorsten Twellmann, HAMAM consortium

At ECR 2012, the consortium of the EU funded research project HAMAM (Highly Accurate Breast Cancer Diagnosis through Integration of Biological Knowledge, Novel Imaging Modalities, and Modelling) is presenting its final results to the international radiology community. If your interest is in the efficient recording and interpretation of multimodal breast images, or computer-aided detection and diagnosis of breast cancer, then do not miss the software demonstrations and related presentations by researchers from the HAMAM consortium as part of the IMAGINE exhibition.

Breast imaging is one of the most important clinical applications when it comes to utilizing the wide and still increasing variety of imaging modalities that are at the radiologist's disposal for early detection, diagnosis, and treatment of breast cancer. In addition to conventional modalities of mammography (MG) and dynamic contrast-enhanced (DCE-) MRI, novel imaging techniques, such as positron emission mammography (PEM), automated 3D breast ultrasound (ABUS) and digital breast tomosynthesis (DBT), provide more detailed or even new morphological, functional, and metabolic information. Yet, the integration of this information into the clinical routine remains challenging and time-consuming due to the complexity, heterogeneity, and the amount of multimodal and multi-timepoint image data that is collected these days in screening and diagnostic work-ups. In 2008, IT researchers from academia and industry, together with leading clinical experts, formed the multidisciplinary HAMAM consortium. They set out to jointly develop a prototypical next generation of multimodal reading workstations, featuring novel software tools aimed at improving the efficiency and quality of clinical decision-making in the daily clinical practice of multimodal breast imaging.

A special emphasis was placed on the spatial correlation of anatomical structures across imaging studies that are either acquired in a serial manner or with different modalities, or both. With conventional workstations, the identification of corresponding structures in 2D or 3D images, or in dynamic sequences, and 3D modalities, such as DCE-MRI and ABUS, for multimodal finding assessment or the linking of enhancing structures in serial DCE-MRI studies over time, require extensive effort. For this purpose, the HAMAM researchers have developed novel techniques to automatically detect and segment anatomic structures which serve to orientate human reader and is expected to improve the quality of diagnostic decisions.

The new tools were integrated into a prototype of a patient-centric reading workstation. The workstation enables the reader to quickly access all patient-related imaging studies available on the local workspace or in clinical PACS archives. A variety of predefined uni- and multimodal hanging protocols are at the reader's disposal, providing an efficient and standardised display of the image data. The HAMAM team at this year's IMAGINE provide a first-hand and hands-on presentation of a set of exciting new options that might become standard tools in future workstations for multimodal breast imaging.

The accompanying poster to this presentation is published in EPOSS and can be accessed online at myESR.org/EPOSS. The poster (C-2611) is titled ‘HAMAM – Novel Software Tools for Efficient Assessment of Multi-Modal Breast Imaging’.

The project will be showcased on Thursday, March 1, 14:00–15:30 in the EIBIR IMAGINE Theatre next to room U on the second level.

The HAMAM Consortium consists of:

• EIBIR, AT
• Fraunhofer MEVIS, DE
• MeVis Medical Solutions AG, DE
• Radboud Universiteit Nijmegen, NL
• University College London, UK
• The University of Dundee, UK
• Eidgenoessische Technische Hochschule Zuerich, CH
• Charité-Universitätsmedizin Berlin, DE
• Rosa Raton Community Hospital, US

Further information to be found at www.hamam-project.org

The accompanying poster to this presentation is published in EPOSS and can be accessed online at myESR.org/EPOSS. The poster (C-2611) is titled ‘HAMAM – Novel Software Tools for Efficient Assessment of Multi-Modal Breast Imaging’.

The HAMAM consortium, coordinated by EIBIR, aimed to achieve the ambitious target of improving the early detection and accurate diagnosis of breast cancer by integrating the available multi-modality information to improve cancer diagnosis and treatment. The HAMAM consortium will present its final results to the international radiology community at the ECR 2012, which will be held in Vienna, Austria from March 29 to April 1, 2012.

Thorsten Twellmann works at MeVis Medical Solutions AG.

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Image fusion across dimensions in real-time
A tool for tumour motion tracking in image-guided radiotherapy

By Wolfgang Birkfellner and Hugo Furtado

Compared to multislice CT, MR tomography, and molecular imaging systems, x-ray imaging appears almost as a humble, old-fashioned modality despite the fact that it is still the most widespread and certainly one of the most important radiological imaging techniques.

Digital x-ray imaging deserves special appreciation for its role in interventional imaging – not only for its well-known applications in interventional radiology, but also as a tool for tracking tumour motion in hypofractionated radiation therapy. In a research project funded by the Austrian Science Funds FWF; the EC 7th Framework Programme and the Austrian Christian-Doppler Society, methods and algorithms have been developed which aim at reaching this goal.

Image-guided radiotherapy is considered to be a state-of-the-art method for the management of lung tumours. Given the good x-ray contrast of the tumour in lung tissue, it is possible to measure the three-dimensional motion of the clinical target volume caused by breathing during irradiation. In order to achieve this goal, a modern linear accelerator equipped with digital x-ray equipment is necessary. By means of extremely effective, yet affordable computer hardware – a so-called general purpose graphics processing unit – and by numerous refinements on an algorithmic level, our group was successful in increasing the performance of 2D/3D image registration algorithms to an extent where real-time 3D tumour motion tracking by means of projective x-ray imaging became feasible.

Currently, offline analysis of streamed x-ray image data during hypofractionated lung radiotherapy indicates that three degrees of freedom in rotation can be retrieved with a latency of approximately 100 ms. Figure 1 shows two screenshots with the location of the planned target volume (PTV, in green) and the clinical target volume (CTV, in red) during treatment. The accuracy of the setup was also measured using an ANZAI respiration phantom. Comparison of the translational motion in cranio-caudal direction compared to the measurements as given by an optical tracking system revealed an accuracy of approximately 2 mm (Figure 2), which should be sufficient to reduce the safety margins of the PTV and thus may enable a reduction of dose to the surrounding organs at risk.

The accompanying poster to this presentation is published in EPOS™ and can be accessed online at myESR.org/EPOS. The poster (C-2505) is titled ‘2D/3D registration for real-time intra-fractional tumor motion tracking during radiotherapy’.

The project will be showcased on Thursday, March 1, 14:00–15:30 in the EIBIR IMAGINE Theatre next to room U on the second level.

Wolfgang Birkfellner and Hugo Furtado work at the Centre for Medical Physics and Biomedical Engineering, Medical University Vienna, Christian-Doppler Laboratory for Medical Radiation Research for Radiation Oncology, Vienna.


Figure 1: Relative change of the clinical target volume (in green) versus the static planned target volume (in red) during hypofractionated radiotherapy of the lung. The obvious displacement caused by breathing motion was determined from the intrafractionally acquired x-ray data using real-time 2D/3D registration.

Figure 2: Simulation results of real-time 2D/3D registration on an ANZAI phantom. The correlation of motion patterns measured with an optical tracking system and the results of the registration algorithm as determined from a series of x-ray images acquired at a frame rate of 5 Hz is shown on the left. The checkerboard image on the right gives an impression on the match of the digitally rendered radiographs used for registration and the real x-ray data.
Investing in radiology's future: the European School of Radiology, a success story

By Nicholas Gourtsoyiannis

The European School of Radiology has completed five years in action. Five challenging and rewarding years of uninterrupted commitment and continuous investment in radiological education in Europe and worldwide. ESOR was seen as one of the main missions of the newly created European Society of Radiology in 2005 and was established thereafter as a growing initiative in the field of education with two main goals: to raise the scientific profile of radiological education and to assist in harmonising radiological education throughout Europe by supporting the implementation of the European Training Charter.

These past five years have been marked by an outstanding growth in a wide range of modular activities, including visiting schools, seminars, tutorials, scholarships, the Teach-the-Teachers programme and exchange programmes for fellows, all of which have so far delivered complementary and continuing education to 8,100 residents and young radiologists. The school has also offered 1,450 course grants and 209 training grants worldwide. In addition to these impressive numbers, ESOR is proud of being instrumental in mobilising the resources available for radiological education in Europe and the world, and for creating a long-term educational commitment and a structured network – the ESOR community – through partnership. All of this hugely appreciated utilisation of teaching resources has been implemented with the unlimited support of highly esteemed and renowned lecturers, tutors, mentors, volunteer reference training centres, local organisers, subspecialty and national societies, academic institutions, and valued industrial partners.

However, the most celebrated partner of ESOR is undoubtedly you. You are the heart of the ESOR community and I would like to encourage you all to actively participate and benefit from its programmes, use the opportunities offered for exchange and interaction, and to give or obtain the knowledge and skills needed to meet tomorrow’s requirements.

As radiology has become fundamental to most clinical diagnoses and central to modern patient care, the vision for radiological education has to be widened. ESOR already has the strategy, the organisation, the synergies, and the dedication to embrace and respond to any new challenges. I am confident that in the years to come ESOR will maintain its leading role in bringing visionary leadership to our practicing community. It will continue to deliver successfully as the main ESR enterprise for the multi-parametric harmonising of radiological training in Europe. Anchoring itself within our society and through a long-term partnership, ESOR will evolve and establish itself as the greatest provider of radiological education in Europe and the world.
Since 2009 the ESR’s EU Taskforce has dedicated itself to monitoring and analysing political and legislative developments within the European Union affecting the radiological profession. The aim of the Taskforce is to foster a political environment at EU level, where legislation is drafted and implemented to serve the healthcare needs of the general public through the promotion of research, education, science, and quality service in the field of radiology. Given the importance of the ESR’s agenda, the Board of Representatives decided to establish a subcommittee in order to ensure continuity and sufficient attention to these key topics.

The ESR’s EU Taskforce maintains close relations with politicians on a national level and policymakers of the European Union’s institutions, while engaging them in dialogue. The ESR website keeps ERS members up-to-date on European affairs and offers a range of opportunities to get involved in the ESR’s work. Below you will find an overview of the most important policy areas the ESR is currently involved in, or planning to engage in, in order to ensure a favourable development of medical imaging in the best interests of Europe’s patients.

One of the most current and effective projects of the ESR’s EU Taskforce is the Alliance for MRI. It was founded in March 2007 and involves patient organisations, patient groups, leading European scientists, and the medical community, who together are seeking to avert the serious threat posed by EU health and safety legislation to the clinical and research use of Magnetic Resonance Imaging (MRI).

The Hungarian Society of Radiologists in 2012

The Hungarian Society of Radiologists was founded in 1922 in order to provide a collective forum for radiologists to develop scientific and educational courses, Hungarian and international scientific meetings and congresses. Both the Journal and the website also provide important guidelines and educational material as well.

We continue to cooperate, successfully, with the Central and East European associations of radiology. The Central-Hungarian-Slovakian Radiological Congress take place in one of the member countries, every second year. In order to overcome the language barrier, the official language of the congress is English.

The Hungarian Radiological Symposia organizing committee has strengthened the scientific connection between French and Hungarian radiologists. In 2012 (April 23–27) it will be held in Felsőtárkány, a beautiful little mountain village near Eger. We would like to add, that we are proud of being represented in the world by local experts, with whom we also cooperate in the framework of the European Union. The Hungarian Society of Radiologists (HSR) is an institutional member of the ESR. HSR is held every two years. The 26th Congress of the Hungarian Society of Radiologists will take place in Debrecen on June 21–23, 2012. The 26th Congress of the Hungarian Society of Radiologists will take place in Debrecen on June 21–23, 2012.

By Javeni Hemetsberger

By István Batthyány

The National Scientific Congress of the HSR is held every two years. The 26th Congress of the Hungarian Society of Radiologists will take place in Debrecen on June 21–23, 2012. The organiser of the congress expects somewhere between 600 and 800 people, from all over Hungary and abroad, to attend. The congress will consist of refreshers courses, scientific sessions, workshops, and state of the art lectures in Hungarian, English and international languages. Well-known international experts and Hungarian specialists have been invited. The scientific programme will cover all fields of radiology and related sciences. The industrial exhibition will present the latest developments in medical technology.

The HSR actively and successully took part in the celebration of the first European Day of Radiology on February 16, 2011, the anniversary of Wilhelm Conrad Röntgen’s death. The activities that took place in Hungary included lectures, press releases and social media campaigns. The main topics were stroke imaging, radiation, cancer management, and trauma radiology.

On September 24–26, 2010, Pécs hosted the Central European Congress on Non-invasive Cardiovascular Imaging. The lecture programme was presented by highly acknowledged specialists from all over the world. In 2012 this world-class training event will be broadened to include the world’s most noted lecturers in cardiovascular imaging, for example national directors of Non-invasive Cardiovascular Imaging will take place on September 20–22, 2012, and will be held in Pécs.

We are convinced that the events of 2012 will meet scientific and social expectations, and all interested radiologists and radiographers participating in our meetings can expect a warm welcome. More information about the upcoming and past events is available on our websites.

The Hungarian Society of Radiologists on web:

- socrad.hu, and on our social websites, www.radiologia.hu.
- Representatives of the Hungarian Society of Radiologists regularly present lectures at major international scientific meetings and congresses. For example the National Congress of Radiology. Many of them are invited speakers; others are actively participating in the scientific debate and comprise a rich and colourful audience.
- We are proud of being represented in the leadership of the ESR, by Professor András Pal. We are working in the subcommittee on 'Societal challenges' in the ESR. Apart from him, both Zita Morvay and Endre Szabó are members of the ESR Working Group on Undergraduate and postgraduate teaching. Gábor Forrai is EUSOBI’s representative to the ESR Subspecialities Committee, Attila Doros is the representative to the National Societies Committee, and István Batthyány is the representative to the Professional Organisation Committee.

More information on the society can be found at www.socrad.hu or www.radiologia.hu.
In order to highlight for you, our readers and ECR participants, some of the most exciting articles published in European Radiology during 2011, we asked our section editors for their expert opinion by selecting what they believe to be the most groundbreaking developments in their field.

Dr. Anne Tardivon from the Institut Curie in Paris, France, is European Radiology section editor for breast imaging.

She chose the first abstract you can find below because it concerns a new emerging technology which is easy to implement (availability for digital mammographic units) and it is a potential alternative to breast MRI (accessibility, lower costs, reproducibility). Another reason is that the clinical trials (comparison between MRI and angio-mammography) are still ongoing.

Angio-mammography is easy to implement in a routine workflow, associating standard mammograms at low energy (morphology) and acquisition of a high energy image after contrast medium injection which depicts abnormal angiogenesis (functional imaging). As surveillance protocols using breast MRI increase, especially for women with an intermediate risk of breast cancer (lifetime risk 20–25%), angio-mammography could be an alternative test for this very large population. Currently, its performance compared to MRI is under evaluation. If false negatives from angio-mammography are only related to well-differentiated cancers, this technique could also be one way to avoid overdiagnosis.

Dual-energy contrast-enhanced digital mammography: initial clinical results


Abstract: To assess the diagnostic accuracy of Dual-Energy Contrast-Enhanced Digital Mammography (CEDM) as an adjunct to mammography (MX) versus MX alone and versus mammography plus ultrasound (US).

Materials and methods: 120 women with 142 suspect findings on MX and/or US underwent CEDM. A pair of low- and high-energy images was acquired using a modified full-field digital mammography system. Exposures were taken in MLO at 2 min and in CC at 4 min after the injection of 1.5 ml/kg of an iodinated contrast agent. One reader evaluated MX, US and CEDM images during 2 sessions 1 month apart. Sensitivity, specificity, and area under the ROC curve were estimated.

Results: The results from pathology and follow-up identified 62 benign and 80 malignant lesions. Areas under the ROC curves were significantly superior for MX+CEDM than it was for MX alone and for MX+US using BI-RADS. Sensitivity was higher for MX+CEDM than it was for MX (93% vs. 78%; p<0.001) with no loss in specificity. The lesion size was closer to the histological size for CEDM. All 23 multifocal lesions were correctly detected by MX+CEDM vs. 16 and 15 lesions by MX and US respectively.

Conclusion: Initial clinical results show that CEDM has better diagnostic accuracy than mammography alone and mammography-ultrasound.

Dr. Tardivon chose the second abstract because this meta-analysis of MRI performance in the staging of breast cancers emphasises the low methodological quality of multiple studies published over the last 15 years. These findings could also be applied to many studies evaluating MRI techniques such as kinetic protocols, diffusion, spectroscopy, etc. As we continue to evaluate new imaging technologies like this, little progress is possible within the medical community or patient care. Multicentre prospective trials, if possible randomised, should be mandatory as is the case for methodological approaches to new drugs. It is urgent to evolve as fast as technology advances.

Magnetic Resonance Imaging in the preoperative assessment of patients with primary breast cancer: systematic review of diagnostic accuracy and meta-analysis


Abstract: To estimate the diagnostic accuracy of magnetic resonance imaging (MRI) in detecting additional lesions and metastases, respectively. True positive MRI findings should be pathologically verified because the high FP rate. Future research on this emerging technology should focus on patient outcome as the primary end-point.

Key Points:
- Breast Magnetic Resonance Imaging is becoming increasingly popular for cancer staging before surgery.
- This diagnostic accuracy systematic review and meta-analysis updates previous ones demonstrating MRI has high diagnostic accuracy and causes more extensive surgery.
- Magnetic Resonance protocols at 1.5 T or greater shows greater positive predictive value than lower-field equipments.
- The actual impact on clinical relevant outcomes should be addressed with properly designed randomized controlled trials.
ESUR introduces PI-RADS MR guidelines for prostate imaging

By Gerttraud Heinz-Peer

Prostate cancer imaging is a major challenge for radiologists and so the European Society of Urogenital Radiology (ESUR) has established a working group on prostate cancer imaging under the leadership of Prof. Jelle Barentsz. A guideline for MR imaging of the prostate was completed at the end of 2011 and was made available online in European Radiology on February 9 [1]. This is the first step towards the standardisation of prostate imaging. Jelle Barentsz and his team in the ESUR Prostate Working Group introduced the prostate imaging, reporting and data system (PI-RADS) which has since been adopted by the American College of Radiology.

The role of MRI in prostate cancer evaluation is disputed and often underestimated. Technological advances over the past five years have demonstrated that multi-parametric MRI, including diffusion-weighted imaging (DWI) and contrast-enhanced MRI, can better detect prostate cancer, can evaluate the actual tumour burden, and is more accurate at tumour grading than standardised transrectal ultrasound biopsy protocols. This means that multi-parametric MRI can be used to evaluate tumour risk and, as a result, can lead to a more tailored therapy. There is increasing evidence that MRI before the second, or even initial, biopsy can accurately distinguish those patients who require immediate biopsies and those for whom biopsy can be deferred. Recently, a computer program which uses apparent diffusion coefficient (ADC), calculated from DWI, and Gleason score was found. Thus, MRI before biopsy may help detect high-grade tumours, which helps target biopsies within areas of low ADC values.

With the support of ESUR, the first international workshop on prostate imaging was held, successfully, in Ghent, Belgium, and was organised by Geert Vleugels.

The second international ESUR prostate workshop will take place in Rome under the guidance of Valeria Panebianco. If you are interested, please visit the ESUR website (www.esur.org) or prostateMRcourse.com.

Additional News

On October 13–16, 2011, the 18th ESUR Symposium was held in Dubrovnik, Croatia, under the chairmanship of Prof. Boris Brkić. This joint meeting with the Society of Abdominal Radiology (SAR) was attended by over 400 participants from around the world.

The 19th ESUR Symposium will be held in Edinburgh, Scotland, on September 13–16, 2012, and is being organised by Sami Moussa. The main topic will be ‘Renal and female imaging.’ Besides an outstanding scientific and educational programme, we are looking forward to some ‘chilled-out’ social and cultural activities during the symposium, while also enjoying some Scottish food and drink. For further information, programme details and registration, please visit www.esur2012.org.

New ESUR guidelines have been published in European Radiology: ‘ESUR guidelines—ovarian cancer staging and follow-up. Staging of uterine cervical cancer with MRI.’ Guidelines can be downloaded via the ESUR website.

Ongoing success of the ESUR Global Education Programme on the Safe Use of Contrast Media

ESUR guidelines on the safe use of contrast media, which are summarised in the guideline booklet (latest version 7.0), are greatly appreciated by radiologists and other specialists who deal with contrast media. The ESUR Global Education Programme aims to ‘teach the teachers’ about the safe use of contrast media. The most recent courses were held in November, in Brazil and Indonesia, with G. Heinz-Peer and S. Morcos, and in Taiwan with M.F. Bellin and H. Thomsen lecturing.

The European Society of Urogenital Radiology wishes all readers a successful and stimulating ECR 2012. Panta rhei!

More information on the society can be found at www.esur.org

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Reference

Activities of the Radiology Trainees Forum (RTF) in 2011

By Deniz Bulja, Chairman

Last year was quite a busy year for us, at the Radiology Trainees Forum. The RTF General Assembly was held during ECR 2011 and was attended by 29 national delegates as well as representatives of the ESR and the ESR Education Committee. Our RTF Board, which was elected during the RTF General Assembly, now consists of the following members: Deniz Bulja, Bosnia and Herzegovina; Sandra Hutchings, United Kingdom; Ana Sverko Peternar, Croatia; Viola H. Koen, the Netherlands; and Myriam Edjlali-Goujon, France.

Apart from the General Assembly, the RTF Board held several online meetings in January, April and September as well as the RTF Starter Kit. Several online meetings were arranged to help the ESR European Diploma Subcommittee. These meetings proved to be very fruitful and resulted in the creation of two new task-driven groups with a focus on specific issues, like the role of the RTF in undergraduate education and the possible proactive involvement of RTF delegates in the submission of case material for the ESR Self Assessment Tool and the European Diploma Subcommittee.

The RTF has begun cooperating with the European Training Assessment Programme (ETAP), as the RTF is represented there by its board member, Ana Sverko Peternar, who was involved in the evaluation of the radiology training programme at the Hospital Clinic Barcelona in October 2011. In 2011 the RTF also applied to become a recognised stakeholder of Euro-BioImaging. This involves many different collaborative projects concentrating on work package 13, which aims to establish a coordinated, modular, and standardised package 13, which aims to establish a coordinated, modular, and standardised education and learning, it is also a good place for radiology trainees and national delegates, proved to be a major success and it has returned again, for ECR 2012. As in previous years RTF delegates meet with trainees and provide them with lots of up-to-date information about RTF activities, ECR sessions suitable for trainees and the RTF Starter Kit. The RTF Meeting Point is located in the Rising Stars Lounge in Foyer B on the 2nd Level. Be sure to visit during your stay!

The ECR is an important event not only for RTF members, but also for junior radiologists from all over Europe as it presents them with a lot of interesting options. Among the many exciting features of the ECR are the RTF Highlighted Lectures, which have been organised, specifically, with the interests of junior radiologists in mind. The RTF Booth during last year’s ECR, as a central meeting point for interested trainees and national delegates, proved to be a major success and it has returned again, for ECR 2012. As in previous years RTF delegates meet with trainees and provide them with lots of up-to-date information about RTF activities, ECR sessions suitable for trainees and the RTF Starter Kit. The RTF Meeting Point is located in the Rising Stars Lounge in Foyer B on the 2nd Level. Be sure to visit during your stay!

The RTF General Assembly will be held on Saturday, March 3, 10:00–11:30, Meet & Greet your RTF Representative with the ESOR Educational Director in the Rising Stars Lounge.

Meet & Greet sessions at the Rising Stars Lounge

Meet & Greet your RTF Representative

This year again you have the unique opportunity to get in touch with your national RTF representative during the ECR! Visit the RTF Meeting Point in the Rising Stars Lounge (Foyer B, 2nd Level) where resident representatives will be available to provide you with first-hand information.

Meet & Greet sessions with the ESOR Scientific/Educational Director and the ESR President in the Rising Stars Lounge:

Friday, March 2, 13:30–13:50
Prof. Nicholas Gourtsoyiannis; Athens/GR
ESOR Scientific/Educational Director

Saturday, March 3, 15:15–15:30
Prof. Andris Palkšis; Liepāja/LV
ESR President

Sunday, March 4, 15:30–15:50
Prof. Lorenzo Bonomo; Rome/IT
ESR President

We are looking forward to seeing you there!
Gustav Klimt and the birth of modernism in Vienna (Part 1)

Gustav Klimt (1862–1918), fin de siècle genius and pioneer of Viennese Modernism, would have celebrated his 150th birthday in 2012. His paintings – notably The Kiss, one of the world's best-known pictures – are seen as epitomising the spirit of change that heralded the dawn of the modernist era. In 2012 numerous museums in the Austrian capital will be staging special exhibitions to mark the anniversary year in addition to the works that are on permanent display in the city.

All forms of high culture gravitated towards Vienna around 1900. Pioneering developments in the worlds of literature, the visual arts, architecture and music were taking place at a speed not seen since. In 1910 Vienna had a population of two million, making it the world's fifth-largest city and the undisputed cultural capital of Central Europe. Gustav Klimt's pictures reflect the artistic and scientific discoveries and developments that shaped the period.

Klimt's oeuvre mirrors the evolution of artistic movements from the Gründerzeit to the early days of abstraction. Influenced by Hackelöer, the defining Viennese painter of the late 19th century; Klimt, his brother Ernst, and Franz Matsch accepted a number of commissions to decorate buildings on Vienna's showpiece Ringstrasse boulevard. The staircase of the Kunsthistorisches Museum and the Burgtheater are two outstanding examples of their work. Klimt's creative output and the style he developed in later years paved the way for younger contemporaries, Egon Schiele and Oskar Kokoschka.

The Secession and the Wiener Werkstätte

The legacy of Klimt and his fellow artists' 1897 protest against an outdated view of art, which led to the foundation of the Secession movement, can be seen to this day. Created by Joseph Maria Olbrich, an employee of Otto Wagner, the new Secession Building exhibition hall bears the prescient motto of 'To every age its art, to art its freedom.' Klimt, his brother Ernst, and Franz Matsch. The images depict the history of the fine and applied arts from their ancient Egyptian beginnings to the modern age. The museum will also be offering guided tours that include specially constructed walkways to take in these unique paintings.

Priceless sketches by Gustav Klimt for the ceiling paintings above the grand staircase of the Burgtheater were discovered in the theatre's attic in the late 1990s, rescuing them from decay. Today the drawings, which include the artist's only self-portrait, are exhibited in a separate Klimt room. They can be viewed as part of a guided tour that also takes in the ceiling paintings above the grand staircase.

Josef Hoffmann and Gustav Klimt joined forces to work on the Palais Stoclet in Brussels, for which Klimt created the Stoclet Frieze. His nine working sketches for the project are on display in Vienna at the Austrian Museum of Applied Arts/Contemporary Art (MAK). The latter also owns the estate of the world-famous Wiener Werkstätte, which includes studies, model books, photographic volumes, original fabric patterns, embroideries and the entire company archive. In 2012 the MAK will again be showing a large number of objects created by the Wiener Werkstätte, including furniture, vases, ceramic tableware and postcards by Josef Hoffmann, Kolo Moser, Dagobert Peche and other collaborators of the Wiener Werkstätte.

Gustav Klimt's last studios, which he used from 1911 until his death in 1918, is scheduled to reopen in fall 2012 after comprehensive renovation. The ground floor of the building, in Feldmühlgasse in the 13th district, will house a special area designed to give visitors an authentic taste of the artist's working and home environment.

Gustav Klimt in Vienna

A large number of works by Gustav Klimt, particularly from his early period, are on permanent display in Vienna. His world-famous Beethoven Frieze (1902) is on display at the Secession – one of Vienna's most eye-catching architectural attractions, and the former headquarters of the artists' association which Klimt co-founded. The cycle, inspired by the composer, adorns three walls and measures approximately 34 by two meters.

In the stairwell of the Kunsthistorisches Museum there are some 40 spandrel paintings and other decorative works in the narrow sections of wall between the archways and columns. Eleven of these are by Gustav Klimt, and the remainder by his brother Ernst and Franz Matsch. The images depict the history of the fine and applied arts from their ancient Egyptian beginnings to the modern age. The museum will also be offering guided tours that include specially constructed walkways to take in these unique paintings.

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For all the latest information on the 2012 Klimt Year visit www.klimt2012.info/en
What’s on today in Vienna?

Theatre & Dance
Please note that all performances, except at Vienna’s English Theatre, are in German!

Akademietheater
1030 Vienna, Lutzstraße 1
phone: +43 1 51444 4145
www.burgtheater.at
20:00 Die Kommune by Mogens Rukov and Thomas Vinterberg

Burgtheater
1010 Vienna, Dr. Karl-Lueger-Ring 2
phone: +43 1 51444 4145
www.burgtheater.at
18:30 Das weite Land by Arthur Schnitzler

Rabenhof
1030 Vienna, Rabengasse 3
phone: +43 1 712 82 82
www.rabenhof.at
20:00 Lisa by Thomas Glavinic, the story of a female heavy criminal as told in a monologue by her next (male) victim

Schauspielhaus
1090 Vienna, Porzellangasse 19
phone: +43 1 317 01 01
www.schauspielhaus.at
20:00 Der Geizige – Ein Familiengemälde nach Molière by Peter Licht

Tanzquartier Wien
1070 Vienna, Museumsplatz 1
www.tqw.at
20:30 I Love Vienna by Philippe Reina (France/Austria)

Theater in der Josefstadt
1080 Vienna, Josefsbader Straße 26
phone: +43 1 402 12 60 0
www.josefstadtt.at
19:30 John Gabriel Borkman by Henrik Ibsen

Vienna’s English Theatre
1080 Vienna, Josefsgasse 12
phone: +43 1 402 12 60 0
www.englishtheatre.at
19:30 Time stands still by Donald Margulies

Concerts & Sounds

Konzerthaus (Classical Music)
1030 Vienna, Lothringerstraße 20
www.konzerthaus.at
19:30 Wiener Symphoniker, conductor Sakari Oramo
Thomas Zehetmair, violin
J. Haydn, J. Strauss, R. Strauss

Musikverein (Classical Music)
1010 Vienna, Bösendorferstraße 12
www.musikverein.at
19:30 Katia & Marielle Labèque, piano
Gonzalo Grau, percussion,
Raphaël Seigner, drums
C. Debussy, I. Stravinsky, L. Bernstein

Porgy & Bess (Jazz)
1010 Vienna, Brienzerstraße 11
www.porgy.at
20:30 Fatoumata Diawara ‘Fatou’

Arena (Alternative Music)
1010 Vienna, Brienzerstraße 80
www.arena.at
20:30 Los Banditos

Opera & Musical Theatre

Theater an der Wien
1060 Vienna, Linke Wienzeile 6
www.theater-an.de
19:00 The Fairy Queen Semi-opera by Henry Purcell
(opera concertante) conducted by Robert King, with Lucy Crowe,
James Gilchrist, David Wilson-Johnson

Volksoper
1090 Vienna, Währingerstraße 78
www.volksoper.at
19:30 Die Manta / Gianni Schicchi by Gaetano Donizetti

Wiener Staatsoper
Vienna State Opera
1010 Vienna, Rennweg 2
www.wiener-staatsoper.at
19:00 Carmen by Georges Bizet, conducted by Yves Abel, with Elena Maximova,
Maksim Gendrowski, Carlos Alberu, Maja Kovalewska

Raimundtheater
1060 Vienna, Währingstraße 18–20
www.raimundtheater.at
19:30 Ich war noch niemals in New York by Udo Jürgens & Gabriel Barylli

Ronacher
1010 Vienna, Seilerstraße 9
www.ronacher.at
19:30 Sister Act by Alan Menken,
Glenn Slater & Cheri & Bill Steinkellner

Wiener Stadthalle
1150 Vienna, Vogelweidplatz 1
www.stadthalle.com
20:00 all you need is love! The Beatles Musical feat. ‘Twist & Shout’