OPENING WORDS
Lorenzo E. Derchi; Genoa, Italy
ESR President

PRESENTATION OF ESR HONORARY MEMBERSHIP
Michael G. Kawooya; Kampala, Uganda
Federico G. Lubinus; Bucaramanga, Colombia
Vijay M. Rao; Philadelphia, USA

PRESENTATION OF ESR GOLD MEDALS
Anna-Maria Belli; London, UK
Luis Donoso Bach; Barcelona, Spain
Valentin E. Sinitsyn; Moscow, Russia

KEY LECTURE: BUILDING PUBLICS
Sir David Adjaye; London, UK

LIVE CONCERT
Dorretta Carter
Vienna Arts Orchestra, conductor Alex Johansson
Neue Wiener Stimmen, choir
Wiener Sängerknaben, choir

Conceptual Artist, Director, Stage & Video Designer
Amra Bergman

Musical Director
Erich Hofmann
ECR 2019 marks an important anniversary. This will be the 25th ECR congress held in Vienna since 1991: a great achievement! Those who have been coming here since the beginning will find a meeting that has become bigger over the years, now including not only the Austria Center, but also many of the buildings surrounding it.

It is a true ‘congress city’, which has grown to accommodate the increasing numbers of delegates from all over the world. Those who are here for the first time will discover a congress with a wide range of opportunities to learn about the different aspects of our specialty, with sessions suited to all, from beginners to advanced professionals.

Over the years, the ECR has provided radiologists with a European platform for the presentation of research and debate and has been the key to the creation of a community of people working together and advancing in science and education together. This has been the result of the efforts of the Congress President and Programme Planning Committees who, with the help of the well-structured and dedicated efforts of the ESR Scientific Programme Department, have worked as if they were in a relay team, passing the baton from one to the next and ensuring continuity of aims and good results over the years.

The ECR has always been a creative meeting. It started with a classical structure, made up of refresher courses, scientific presentations and posters, and, over the years, has incorporated various new ways for contributors to present scientific work. The first big innovation was in 2007, with the introduction of the electronic posters of EPOD. This, in turn, gave rise to the new session format ‘The Voice of EPOD’, in which the scientific message of selected posters could be explained in person by their authors. Last year, the ‘MyTalk’ presentations, the lounge meetings of ‘Coffee & Talk’ and the hands-on approach to interventional radiology of ‘The Cube’ were introduced. All these session formats have proved successful and will be continued, and even expanded, this year.

Furthermore, an additional new session type will be launched, not only for ECR delegates, but also open to anyone who is interested in joining in. The ‘Women in Focus’ initiative will explore the challenges encountered by women in our field and in other medical and medical-related professions. It will open a debate about gender parity in our profession and will try to present role models to whom the ever-increasing number of women entering into radiology can relate.

The 25th ECR in Vienna can be considered as a chance to reflect on the journey of European radiology through the past years and as a starting point for the future. This is why it has been called ‘the bigger picture’. The concept is reflected in the educational programme, in which basic sessions for students and a state-of-the-art programme for residents and young radiologists sit side-by-side with discussions on the future of our discipline. The impact of artificial intelligence on our work, the new diagnostic horizons provided by liquid biopsy, the need to increase the visibility of radiology and to develop respectful and fruitful relationships with patients in everyday clinical practice, and the challenges that medical doctors have to meet in dealing with humanitarian emergencies, are only a few of the important topics we will discuss.

The willingness of the radiological community to play an active part in ‘the bigger picture’ has been demonstrated by the record number of high-quality abstracts we received. I have to deeply thank the many colleagues who have submitted the results of their studies for consideration at the meeting. We have tried to increase the number of scientific sessions in order to accommodate the majority of them and give the chance of active participation to as many as possible.

A high number of abstracts has been received from the ESR meets countries. These will be Italy, my home country, Pakistan, and the whole African continent.

The ‘ESR meets’ initiative provides the chance to get to know our colleagues from these places better and when meeting radiologic societies from other continents, to learn how these colleagues work and live, to strengthen relationships and to create friendships with them.

This year, for the first time, we will meet many radiologists from Africa. We will try to understand what the European Society of Radiology can do for them and, at the same time, what we can learn from their experience.

Three well-known leaders in different fields of radiology will hold Honorary Lectures. Prof. Paul S. Siffert’s lecture is entitled ‘Contrast-enhanced US in paediatrics: ready for clinical practice?’ and will address a technique that is not widely used and whose benefits are not yet fully explored. Prof. Regina Beets-Tan will discuss the new frontiers of oncologic imaging in her lecture ‘Oncologic imaging: a new beginning has just begun’. Finally, Prof. S. Nahum Goldberg will explore the extent of the potentially beneficial and harmful systemic effects of focal interventional oncologic radiology by asking the question ‘Systemic effects of image-guided tumour therapy have we opened Pandora’s Box or found the Holy Grail?’

The European Congress of Radiology will see not only radiologists taking part, but also delegates working in all allied sciences. There will be a number of educational and scientific sessions specifically dedicated to radiographers. The European Federation of Radiographer Societies (EFRS) has made the ECR its flagship meeting and this year there has been a larger number of abstracts submitted by radiographers than ever before. Once again, the ESR/EFERS Joint Radiographer Abstract Awards will be presented to the submitters of the best radiographer abstracts.

If you cannot come to Vienna (someone has to remain home and do the tough work), you can watch ECR Online! Almost all sessions will be broadcast live for you to watch from home. Furthermore, they will be recorded and made available on demand later (often as soon as the same evening). You can even use ECR Online here in Vienna, to watch presentations you were not able to attend. There will be ample lounges where you can get

Welcome to ECR 2019! Welcome to the 25th ECR in Vienna!

Thanks for coming to be a part of ‘the bigger picture’!

Welcome to ECR 2019!

BY LORENZO E. DERCHI, ESR PRESIDENT

ECR 2019 HIGHLIGHTS

Welcoming all radiographers to ECR 2019

CLINICAL CORNER

Imaging biomarkers start to come of age in early detection of cancer

TECHNOLOGY & RESEARCH

ECR 2019 sees digital x-ray manufacturers focus on workflow and efficiency

COMMUNITY NEWS

Leading interventional radiologist receives ESR Gold Medal

ECR TODAY 2019

EUROPEAN CONGRESS OF RADIOLOGY

DAILY NEWS FROM EUROPE’S LEADING IMAGING MEETING | WEDNESDAY, FEBRUARY 27, 2019

myESR.org #ECR2019

The willingness of the radiological community to play an active part in ‘the bigger picture’ has been demonstrated by the record number of high-quality abstracts we received. I have to deeply thank the many colleagues who have submitted the results of their studies for consideration at the meeting. We have tried to increase the number of scientific sessions in order to accommodate the majority of them and give the chance of active participation to as many as possible.

A high number of abstracts has been received from the ESR meets countries. These will be Italy, my home country, Pakistan, and the whole African continent.

The ‘ESR meets’ initiative provides the chance to get to know our colleagues from these places better and when meeting radiologic societies from other continents, to learn how these colleagues work and live, to strengthen relationships and to create friendships with them.

This year, for the first time, we will meet many radiologists from Africa. We will try to understand what the European Society of Radiology can do for them and, at the same time, what we can learn from their experience.

Three well-known leaders in different fields of radiology will hold Honorary Lectures. Prof. Paul S. Siffert’s lecture is entitled ‘Contrast-enhanced US in paediatrics: ready for clinical practice?’ and will address a technique that is not widely used and whose benefits are not yet fully explored. Prof. Regina Beets-Tan will discuss the new frontiers of oncologic imaging in her lecture ‘Oncologic imaging: a new beginning has just begun’. Finally, Prof. S. Nahum Goldberg will explore the extent of the potentially beneficial and harmful systemic effects of focal interventional oncologic radiology by asking the question ‘Systemic effects of image-guided tumour therapy have we opened Pandora’s Box or found the Holy Grail?’

The European Congress of Radiology will see not only radiologists taking part, but also delegates working in all allied sciences. There will be a number of educational and scientific sessions specifically dedicated to radiographers. The European Federation of Radiographer Societies (EFRS) has made the ECR its flagship meeting and this year there has been a larger number of abstracts submitted by radiographers than ever before. Once again, the ESR/EFERS Joint Radiographer Abstract Awards will be presented to the submitters of the best radiographer abstracts.

If you cannot come to Vienna (someone has to remain home and do the tough work), you can watch ECR Online! Almost all sessions will be broadcast live for you to watch from home. Furthermore, they will be recorded and made available on demand later (often as soon as the same evening). You can even use ECR Online here in Vienna, to watch presentations you were not able to attend. There will be ample lounges where you can get

continued on page 2
BY JONATHAN MCNULTY, EFRS PRESIDENT

Welcoming all radiographers to ECR 2019

Radiographers have long been involved in the European Congress of Radiology (ECR), and the European Federation of Radiographer Societies (EFRS) has had responsibility for developing the radiographers’ sessions since ECR 2012. However, it is only in recent years that the ECR has become the official scientific congress of the EFRS, and the European Society of Radiology (ESR), for medical imaging radiographers.

Over the past eight congresses, the radiographers’ programme has grown considerably, as has the participation of radiographers. A total of 4,377 radiographers and radiography students, from 75 countries, attended ECR 2018 and we look forward to welcoming even more to ECR 2019, which has now become one of the largest international gatherings of radiographers.

In 2018, a total of 22 refresher courses, professional challenge sessions, special focus sessions, joint sessions, Rising Stars sessions, MyT3 sessions, and scientific sessions made up the radiographers’ programme. For ECR 2019, this will rise to 24 sessions, which will truly offer something for everyone. A special word of thanks must go to Dr. Andrew England from the University of Stafford, UK, and a member of the EFRS Educational Wing Management Team, and Dr. Marianna Garhardt from Landspitali University Hospital, Iceland, who are the co-chairs of the 2019 radiographers’ scientific subcommittee, and to their team for an excellent educational and scientific programme. Aside from the above sessions, we also look forward to the radiographers’ Voice of EPOS sessions, the involvement of radiographers in a series of sessions at the Cube 2.0 (a special programme dedicated to Interventional radiology), and the EFRS Educational Wing annual meeting and our student session.

At ECR 2019, Room C on the 2nd level will become the new venue for most of the sessions in the radiographers’ programme. The Radiographers’ Lounge has also been relocated to Foyer C (outside Room C). In this area, the EFRS and ESR will welcome 20 national radiographers’ societies, along with some educational institutions, who are members of the EFRS Educational Wing, who will all have booths in this area. The radiographers’ Voice of EPOS stage will also be located in the lounge area, as will a number of research studies, requiring your participation, which will take place in the EFRS Radiographers’ Research Hub (Room 209). The Radiographers’ Lounge will thus be a great meeting place and, together with the rest of the EFRS Executive Board, I look forward to meeting you in this area and seeing you at the radiographers’ sessions.

Following the launch of the ESR/EFRS Radiographer Awards and the Radiographers’ Evening last year, both initiatives will continue for ECR 2019. I look forward to jointly presenting, with the congress president Professor Lorenzo E. Derchi, the Best Radiographer Paper Abstract awards, the Magna Cum Laude Radiographer Poster awards, and the Best Radiography Student Abstract award during the ECR. Do not miss out on what promises to be another fantastic social event for radiographers on Thursday, February 28, where Professor Derchi and I look forward to hosting over 500 radiographers on the night.

The EFRS represents over 100,000 radiographers and over 8,000 radiography students, across 35 countries, through 40 national societies, along with 60 universities within our Educational Wing. The EFRS is proud to collaborate with the ESR on what has become the biggest and best programme for radiographers. We look forward to continuing our work with the ESR to grow the radiographers’ programme along with the participation of radiographers and radiography students from around the world.

On behalf of the EFRS and the ESR, we hope that you have a great congress and look forward to meeting with you over the coming days.

Dr. Jonathan McNulty is Associate Professor and Associate Dean of Graduate Studies at University College Dublin School of Medicine in Dublin, Ireland, and President of the European Federation of Radiographer Societies.
Spotlight on radiology in Uganda

Michael Grace Kawooya is a Professor of Radiology at the Ernest Cook Ultrasound Research and Education Institute and Professor Emeritus at the Makerere University College of Health Sciences in Kampala, Uganda. He has done much for the develop- ment of radiology in his coun- try and the rest of Africa, but says efforts must continue to increase the number of radiologists and range of equipment, and to raise awareness of radiation safety. "Kawooya believes Africa can learn a lot from European advances. His contributions to improving bilateral cooperation will be rewarded today as he receives ESR Honorary Membership.

ECR Today: How much has radiology advanced in Uganda? Michael Grace Kawooya: In the late 1980s, radiology was very new to medical practice in Uganda, and ultrasound has been termed 'brain-drained' to Europe and other regions. Ultrasound has been maximally exploited in investiga- tion of all parts of the body includ- ing brain, chest, cardiovascular system, musculoskeletal and others, whereas in developed countries one may use CT or MRI.

ECR: Are there any regional trends in radiology in Africa? MGK: The same challenges facing radiology in Uganda bedevil most of Africa, but North Africa, which is largely Arabic, and South Africa, which is wealthiest, face fewer chal- lenges. In these parts of Africa, radiology has flourished more com- pared to Central, East, and West Africa. The radiologist-to-popula- tion ratio is approximately 1:10,000 in Egypt, 1:30,000 in Uganda and 1:8,000,000 in Malawi. The more afflu- ent regions have higher numbers and range as well as sophistication of imaging equipment. They have more radiology training institu- tions and undertake more research.

ECR: Your research interest is ultrasound. Which new develop- ments do you use in daily practice? MGK: In Uganda, we have embarked on some of these develop- ments, especially in the appli- cation of ultrasound in additional condi- tions like anaesthesia, point of care, emergency medicine, mus- culoskeletal, and interventional radiology.

New interesting develop- ments include the application of contrast agents elastography, machine learning and artificial intelligence to ultrasound.

ECR: What has been your expe- rience with ultrasound in a low es- source setting? MGK: Diffusion of ultrasound in this setting has been explosive. This may be due to the fact that we are starved of high-tech cross-sect- tional imaging like CT and MRI, and ultrasound has been termed by others as the poor man’s CT and MRI. In Uganda, one finds an ultra- sound machine in almost every cor- ner of the small and major towns and villages. There is a lot of mistrust of these machines are manned by untrained practitioners, but in fact many are manned by sonog- raphers. In sub-Saharan Africa, ultrasound can boast of having the highest throughput of sono- graphers from our training institu- tions. Sadly, some of these Ugandan ultrasound graduates have been ‘brain-tained’ to Europe and other regions. Ultrasound has been maximally exploited in investiga- tion of all parts of the body includ- ing brain, chest, cardiovascular system, musculoskeletal and others, whereas in developed countries one may use CT or MRI.

ECR: What about the use of ultrasound in imaging tropical diseases? MGK: In diseases like bilharzia, ultrasound plays a key role in epi- demiological studies and is applic- able in the diagnosis and ultra- sound-guided therapy of hydatid disease (Echinococcosis), which con- sists of aspiration of the liver cyst and alcohol injection to kill the parasite.

In HIV/AIDS, ultrasound is valu- able in demonstrating abdominal disease, especially in patients with espe- cially tuberculous, and is used to guide diagnostic procedures for obtaining tissue specimens, cells and exudates.

The disease burden for some of these conditions is high and out- weights available resource equip- ment and trained manpower. Resources for purchasing diagnos- tic and treatment kits are scarce. Machines may be old with poor re- solution. Patients living in remote areas can’t access or afford the much-needed service.

ECR: You helped founded AFRO- SAFE.rad, a campaign for radiation safety in Africa, a few years ago. What are the first results? MGK: One major outcome is increased awareness by re- sidents and ultrasound has been termed ‘brain-drained’ to Europe and other regions.

ECR: How is artificial intelli- gence being implemented in radi- ological practice in Africa? MGK: There is a budding inter- est in artificial intelligence (AI). In Uganda, we are fortunate to have an artificial intelligence laboratory in the Main University of Makerere and one student attempted a study on AI and breast cancer. Our ultra- sound training institute ECUREI has written up and submitted a pro- posal on AI in prostate cancer to an international funder. One major problem with this engine has been shown keen interest in supporting the institute in undertaking proj- ects in Africa. And now, we are writing up concepts in this regard.

ECR: What is your relationship with European radiology and the ECR? MGK: European radiology is very advanced in all areas. Much of what is done in Europe is applicable to Africa and we are glad to learn how to adopt and adapt European advances.

My first experience with the ECR was in 1993 when I first attended the meeting. Several of my col- leagues during my fellowship at the Eberhard Karls University in Tübingen, Germany, encouraged me to attend. At the end of the con- gress, as I boarded a plane to Brus- sels in which the then ESR Presi- dent, Prof Albert L Baert, also sat, I said to myself we should also form a similar society and con- gress in my country and in Africa. The idea of USOAFARI and FACOR, the Ugandan and African societies and congresses of radiology began to form in my mind. As soon as I arrived in Uganda, I got together with colleagues and we decided to create these societies.

Thereafter, I attended the ECR for a few years and then ceased until 2013. Ever since then, I have attended the meeting every year. I like the congress because I acquire new knowledge and improve my skills. I present at least one EPOS paper a year and that motivates me. The EuroSafe Campaign, which I have been very inspiring and moti- vating, and was key in founding the UROSAFE Campaign. I enjoy catching up with old friends and making new friends. This coming year will be a very exciting year. I have always wanted myself when the ECR would meet Africa, and it is happening this year! Africa can share its radiology challenges, experiences, joys, culture and dreams with the rest of the world. Further cementing our friendship and collaboration. And of course I eagerly anticipate receiving the highly esteemed ESR Honorary Membership.

To the rest of the world and a num- ber of regions of the world, the ECR has explained ‘big workloads, turf bat- tles with other medical specialties, and challenges imposed by teleradi- ology and artificial intelligence are some of the many difficulties we have to deal with, not only in radiol- ogy societies but also as radio- logicians working about the role of the radiologist in all aspects of care. But radiology practice in the con- tinent is uneven and a major differ- ence is that the training, according to Lubinus, who cur- rently heads the Latin American Educational Forum, a group that brings together radiological soci- eties of South America to develop and improve diseases of the region. ‘Training is dependent on the regulations of each country. The minimum requirements demanded to be a specialist and in the mini- mum requirements demanded to be a specialist and in the mini- mum requirements demanded to be a specialist and in the mini-
Radiology continues to evolve from anatomic to more physiologic and functional assessment of disease processes, with more precise quantification and minimally invasive therapeutic options. Rapid technological advances have led to tremendous growth in radiology along with associated costs. But the digital age has introduced a number of previously non-existent opportunities to transform radiology from a service, using tools powered by informatics and machine learning (ML). "Radiologists should learn how to utilise these technological advances to add value and reduce waste in healthcare," she said.

Artificial intelligence (AI) and ML applications are valuable tools that make radiologists more effective and increase their contributions to personalised and precision medicine. "AI can assist radiologists at a time when we are challenged to provide imaging services that are faster, safer and affordable, as well as information that is quantitative and precise. These new technologies will improve workflow and quality from diagnosis, freeing up time for us to better position ourselves as integral members of the patient’s health-care team," she said.

"The move toward value-based imaging continued to be the biggest trend in the US, where emphasis was placed on volume when structuring radiology practice. Policymakers lack understanding of imaging’s contribution to patient care and the extent of services that radiologists provide. That is why we have begun the necessary transition to a value-based care model," she explained.

In research, she singled out papers on genetic therapy for cancer, resting state fMRI studies of brain networks, PET radiotracers, biomarkers in lung cancer imaging, and the exploitation of deep learning applications. But radiologists have only begun to scratch the surface of what artificial intelligence and machine learning can do," she said.

Prof. Rao is the first female president of the RSNA, a society he served twice as president. Under his aegis, the ACR worked to have a standardised training programme, a goal that is now recognised by the Colombian ministry of education as the basis for evaluation and certification of radiology graduates, and radiologists who have received their certification abroad.

For the past four years, the Latin American Education Forum has also engaged in developing a standardised academic residency programme as a reference instrument for the validation of qualifications of Latin American radiologists, to improve the much needed certification and recertification in radiology. Colombia is the only country in Latin America, and one of the few countries in the world, that has a proper radiology legislation to regulate practice and protect both radiologists and patients. "In general, our radiologists do a good job, and the major trend is to increase the evidence of our expertise," she said.

"We are involved in the management of the professional component of radiology services. Most radiologists, however, still perform image interpretation without major interaction with the patient or the referring doctor. It is these experiences that help us to groove and gain the insights and knowledge we need to become strong leaders," she said.

"We would like to see more women pursue such positions, but my advice to both women and men would be to seek out mentors, network with your colleagues, join a society like the RSNA or ESR and find ways to volunteer. Seek out opportunities to interact with your colleagues in other parts of the world. It is these experiences that help us to groove and gain the insights and knowledge we need to become strong leaders," she said.

Global collaborations fostered by the RSNA under her presidency, notably through RSNA Spotlight courses, have been particularly gratifying for her. "These collaborations with our international colleagues have been extremely rewarding. Through an international exchange of ideas, we are able to join forces with our colleagues throughout the world so that our expertise can be utilized to the utmost," she said.

She attended the ECR for the first time in 2018 and was very impressed by the expansive congress and international scale. "I really enjoyed the opportunity to learn more about the ESR Meets countries, especially the cultural presentations. I was struck by the common issues that unite radiologists across the globe, and found it beneficial to share challenges and possible solutions with internation colleagues," she said.

She hopes the ESR will continue its international programmes with other societies, to provide its members with learning opportunities and global perspectives on the issues that affect their practices.
Radiographers’ sessions continue to expand at ECR 2019

The ECR is the official annual scientific meeting for radiographers in Europe, recognised by both the European Federation of Radiographer Societies (EFRS) and the European Society of Radiology (ESR). Continuing the tradition established by previous ECRs, there will, once again, be a strong, up-to-date and comprehensive radiographers’ programme.

Andrew England, PhD, is a Senior Lecturer at the University of Salford, United Kingdom, and Co-Chair of the Radiographers’ Scientific Subcommittee for ECR 2019.

In recent years, we have seen record-breaking growth in the attendance of radiographers at the ECR. ECR 2019 will continue to grow and follow this trend with further increases in the presence and visibility of radiographers. To accommodate the growing demand, a number of additional sessions specifically targeted at radiographers have been introduced into the scientific programme. As a result, the new ECR 2019 radiographers programme again promises to be world-leading and spectacular.

New to ECR 2019 is the hosting of radiographer sessions in Room C (Level 2), which will serve as a hub for radiographers to meet and network during the congress. Similar to previous years, the Radiographers’ Lounge will be available outside of Room C as a break-out area and also as an important focal spot for radiographers to meet, relax and network. Alongside the Radiographers’ Lounge will be the Radiographers’ Voice of EPOS Stage and booths from a range of radiographers’ societies. This will provide further opportunities for radiographers to engage with networks and share their colleagues from around the world. The EFRS will be located in this area together with the new EFRS Radiographers’ Research Hub. For the first time, this will facilitate the collection of data for a number of radiographer-led research projects.

A number of traditions will continue from ECR 2018, including the Radiographer Awards which will be presented by the EFRS and ESR Presidents on Thursday at 9 AM. These awards will again recognise the winners of the best scientific papers and abstracts. There will also be the second bigger ECR Radiographers’ Social Evening, co-hosted by the presidents of the EFRS and ESR. This will take place on Friday with a visit to a local Venetian vineyard, and provide a further opportunity for networking and socialising.

Demand is likely to be high and I would encourage all radiographers to try and secure tickets early. The EFRS will again host a number of interesting sessions. The first will be the dedicated EFRS Workshop on growing radiography research (Saturday 10–11.30). Secondly, the EFRS will once again host its own EFRS Meet session for radiographers, in conjunction with representatives of the Danish Society of Radiographers, Radiograf Rådet, during the EFRS meets Denmark session (Friday 12–1.30). We look forward to hearing about the radiography profession in Denmark and sharing experiences. The EFRS will also co-host a joint session with the European Organisation for Research and Treatment of Cancer on radiographers being at the heart of cancer treatment and research (Thursday 16–17.30). Following on from this there will be a further joint session between the EFRS/EFRS Radiographers’ Research Hub and the ESR on patient safety in medical imaging (Saturday, 16–17.30). This session on patient safety is a suitable adjacent to the recent publication of a joint ESR/EFRS statement on the same topic. There will be an ISNRT meets Africa session with a focus on radiographers offering imaging services in Africa (Friday, 16–17.30).

The radiographers’ Refresher Course programme will commence with a session on forensic imaging (today, 08–10.30). This session will provide insights into the role of radiographers in forensic imaging and help to highlight the associated challenges. A further four Refresher Courses are planned, including sessions on the topics of hybrid imaging, radiography audit and quality management, breast imaging and ultrasound. A number of Coffee & Talk sessions will take place throughout the congress, again with a specialist focus for radiographers. These cover areas including #ECR2019 social media in radiology (today, 16–17.30), clinical audit across Europe and paediatric radiation protection. A professional challenges session has been developed, which focuses on the very important issue of radiographer ‘burnout or bore-out’ (Saturday, 09–10.00). There will be two further special focus sessions, the 3D printing lab from bench to bedside (Thursday, 15–17.30) and clinical simulation and its role in radiography education (Friday, 09–10.00).

Following the success of the sessions for radiographers within the Rising Stars programme in 2017 and 2018, these sessions have been continued. Five sessions aimed at radiography students and new graduates have been planned and include topics such as radiation research, radiation protection, career planning, the future of radiology and clinical dilemmas.

Don’t forget you can also catch up with any sessions you missed via ECR Online – as sessions are all recorded for both live and on-demand viewing!

With the record number of abstract submissions this year, the scientific sessions are once again packed with a very interesting and diverse range of research topics. The quality of submissions remains high and at ECR 2019 there will be 140 paper and poster scientific sessions. Abstracts have been arranged predominantly according to modality, with sessions on CT, MRI, dose optimisation, professional issues and mammography, to name but a few. A dedicated session on radiography education will appeal to attending academics as well as those with an interest in training and education. The Voice of EPOS sessions will also continue at ECR 2019 and will provide selected radiographers with an opportunity to summarise their electronic posts verbally in four to five minutes. This initiative provides a massive opportunity for radiographers to develop presenting skills and disseminate their research. There will be a Eurosafel Imaging session on improving radiation protection in medical imaging for low and middle-income countries (Friday, 15–17.30). For radiographers with an interest in Interventional radiology (IR), the Cube 2.0 at ECR 2019 is an ideal opportunity. The Cube is a dynamic educational space dedicated to the field of IR. Four days of IR-specific activities have been planned with radiologists, radiographers and nurses in mind. Sessions are designed to be interactive and hands-on, covering peripheral, central, oncological and neurological IR.

Finally there are plenty of other sessions throughout the entire congress with either radiographer involvement or interest.

On behalf of the ECR 2019 Radiographers’ Scientific Subcommittee and the EFRS, we hope that you have a very enjoyable and rewarding congress.
The latest addition to the CIRSE conference family focusing exclusively on a key area of interventional radiology: embolisation in all its applications.

June 26-29 | Valencia | Spain
MASTERING EMBOLISATION

Some highlights from the ET 2019 programme

Special Topic Sessions
Examining the current evidence on new or controversial developments in embolotherapy.

Technical Focus Sessions
Highlighting the latest trends in specific embolic materials, delivery systems and advanced guiding modalities.

Case Remedy Sessions
Featuring case discussions including therapy options, technical aspects, outcome and follow-up.

Morbidity and Mortality Conferences
Looking at the “bad days” as well as the “good days” in the angiosuite.

www.ETconference.org
Italians make effective use of multidisciplinary team approach to combat lung cancer

Multidisciplinary care and personalised medicine have developed hand-in-hand over the last few years. At today's session, five Italian specialists in lung cancer will be looking to the future and discussing how developing the right strategy can make a substantial difference in diagnosing and managing lung cancer.

Dr Anna Rita Larici, an assistant professor of radiology at the Agostino Gemelli University Hospital in Rome, is an enthusiastic advocate of multidisciplinary care for lung cancer patients. She recalls a case from earlier this year in which a patient was referred to her hospital after multiple investigations elsewhere.

"He underwent several diagnostic tests, including CT and PET CT scans, as well as invasive procedures, notably transbronchic biopsy and endobronchial ultrasound biopsy before it was demonstrated that his lung lesion was not cancer, but pneumonia," she explained.

Larici, who is president of the College of Thoracic Radiology of Italy and head of the Italian Society of Medical and Interventional Radiology (SIRM), believes the patient didn't receive correct management. "He underwent several non-useful investigations because he wasn't dealt with, from the beginning, in a multidisciplinary context," she said.

Lung cancer is a leading cause of mortality worldwide and is responsible for more than two million cases and more than 1.7 million deaths each year, according to recent data from the World Health Organisation.

"Diagnosis and therapeutic management of patients with lung cancer is a challenging topic and the overall death rate hasn't significantly improved for several decades," said Larici. "But nowadays we have new possibilities to customise care for each patient."

This inspired her to agree to moderate today's session, which will focus on the different roles in a multidisciplinary team, with talks from experts in imaging, pathology, oncology, and surgery. Among them are Prof. Silvia Novello, professor of medical oncology at the University of Turin, Italy. She too is convinced that current and future improvements in lung cancer treatment are due to the work of multidisciplinary teams.

"Nothing can be done in a proper way in the diagnostic and therapeutic fields without the co-operation of different specialists, such as the oncologist, pulmonologist, pathologist, radiologist, radiotherapist and surgeon," she noted.

Multidisciplinary teams are common in Italian university hospitals, according to Larici, although they are less widespread in small peripheral hospitals. They improve clinical decision-making by bringing specialists together in the same room to discuss cases. In her hospital, the team analyses patient information and comes to a joint clinical decision.

"We start from images," she said. "Imaging is the core of the meeting. The expert chest radiologist puts forward the diagnostic hypothesis in the case of an indeterminate lung lesion, taking into consideration imaging characteristics and available clinical data, or defines the clinical stage or re-stage after treatment of a known lung cancer, and the further management of the patient mainly depends on these evaluations.

Personalised medicine has come hand-in-hand with multidisciplinary teamwork, Novello explained. Physicians have access to a wider range of treatment options, including drugs that may only benefit a certain percentage of patients.

"With personalised medicine, the overall survival rate is increased in a substantial proportion of patients with lung cancer," said Dr Mario Silva, assistant professor in radiology at the Department of Diagnostic Imaging University of Parma, and researcher in Lung Cancer Screening at the National Cancer Institute of Milan.

Silva will be talking about cancer staging using the 8th edition of the TNM Classification of Malignant Tumours. He explained that personalised medicine and technological development have led to an increased complexity of staging algorithms, with more sub-stages being added. Although this makes the radiologist's job harder, the benefits to clinicians include knowing when not to intervene.

He gave the example of a 77-year-old female smoker with chronic obstructive pulmonary disease (COPD) and a non-solid 1.5cm lesion of the upper lung. Improved imaging criteria and a multidisciplinary view of the patient allow the weighing up of surgery risk in patients with multiple co-morbidities. This could lead to the patient's tumour being managed conservatively unless a solid component appears, avoiding an unnecessary lobectomy, he said.

The treatment guidelines have changed in response to personalised medicine, with suggestions on alternative treatments after the tumour becomes resistant to initial therapy. According to Silva, the faster new drugs are developed, the more options clinicians have to combat drug-resistant tumours, and the longer patients may survive.

With patients moving through a succession of treatments, cancer no longer progresses in a systematic predictable way explained Novello. Instead, there may be progression at one or two disease sites, despite an overall improvement in the patient's condition. Radiological imaging may need to be interpreted differently and treatment tailored to individual metastases.

In his talk, Silva will also briefly discuss new technologies to improve staging Spectral CT, which relies on advanced scanner technology can detect abnormalities in the distribution of contrast agent in the neoplastic tissue to better pinpoint the tumour’s evolution. He believes it may develop into an alternative to PET, the current reference standard for non-invasive lung cancer staging.

Regular meetings of the multidisciplinary lung cancer team play an essential role in determining an appropriate care plan at the Agostino Gemelli University Hospital in Rome. (Provided by Dr. Anna Rita Larici)
ECR 2019: medical physics & the bigger picture

For those of us involved in developing the physics programme over recent years, it is heartening to see the enormous progress in innovation, concepts and patient experience reported at the European Congress of Radiology.

This has come about through a team effort by researchers, educators, scientists, radiographers and radiologists, which is becoming stronger year-on-year through collaboration between the European Federation of Organisations for Medical Physics (EFOMP), the European Federation of Radiographer Societies (EFRS) and the ESR.

This year’s theme of ‘The Bigger Picture’ strikes a great resonance with the next stage in optimising radiology for patient experience and safety improvement. This is reflected in the exciting physics programme for this year’s congress, which looks at the process of maximising benefit for patients, tailored to clinical need and image quality rather than focusing on one parameter alone, such as radiation dose.

The 2019 programme includes a number of hot topics, with one Special Focus session covering the emerging (and rapidly expanding) field of 3D printing in medical imaging, and another devoted to the up-and-coming use of 7T MRI scanning in clinical practice, which heralds a new frontier for diagnostic imaging. The physics programme also reflects recent advances in the use of big data and artificial intelligence, with this year’s EFOMP Workshop featuring two sessions on extracting clinical information from large data sets, where the quest for challenges and potential benefits are huge. In addition, the role of imaging in the six of liquid biopsy is covered by a New Horizon session devoted to that topic.

Methods to quantify totochrome and calcium using CT feature strongly in the sessions that have been prepared for ECR 2019. These techniques are particularly useful in cardiac imaging, the theme of the 2019 International Day of Radiology publication in which many members of the Physics in Medical Imaging subcommittee were involved. As always, radiation dose optimisation features strongly in the Eurosafe Imaging sessions and the new Coffee & Talk programme will also have a strong physics presence.

In 2019, there are seven exciting physics in medical imaging scientific sessions presenting research on Image quality and optimisation in CT (SS 63), ‘CT scanning cardiovascular, calcium, and iodine’ (SS 22), ‘Radiation dose optimisation in CT’ (SS 63), ‘MRI: safety, phantoms and quantification’ (SS 33), ‘Innovations in imaging machine learning, quality and new techniques’ (SS 43), ‘Radiation protection technology and management’ (SS 151) and ‘Breast imaging physics’ (SS 71).

Our annual popular education programme for 2019 combines accessible and high-impact refresher courses on the fundamentals of MRI, image quality assessment in radiological optimisation, through to dose management in paediatric CT scanning. While it may be a challenge to get up early on Sunday morning, following the annual ECR Party thereafter, those who do so will certainly be rewarded by attending the refresher course on iterative reconstruction in CT, which proved very popular and was rated highly by ECR 2018.

During 2018 many joint initiatives have further strengthened the already excellent collaboration between EFOMP and the ESR. These include the continuing involvement of EFOMP at the ECR through the planning and delivery of workshops, joint sessions and physics sessions, as well as the very welcome participation of the ESR in EFTOMP events throughout the year. These included the European School for Medical Physics Experts (ESMPE) on Computed Tomography held in Prague in January 2018 and the 2nd European Congress of Medical Physics (EFCMP) which took place in August 2018 in Copenhagen, via a joint EFTOMP-ESR scientific session.

In addition, many other initiatives have already been planned for the coming year, which will reinforce not only the collaboration between EFOMP and the ESR but also the relationships between the two communities of radiologists and medical physicists, and radiographers through EFORS, for the ultimate benefit of patients.

Vienna being such a beautiful, hospitable city, the members of the physics subcommittee are also striking the balance between work and play for 2019. As part of ‘The Bigger Picture’ we are hosting a social event for physicists attending the congress on Thursday, February 28, from 7–9 pm at a city centre venue. For the first time, the EFOMP booth in the international village will have an EFOMP representative present. There will be a chance to meet up with some of the subcommittee members at the congress to exchange ideas. Details for these events are listed on the EFOMP website and social media feeds.
Imaging biomarkers start to come of age in early detection of cancer

Biomarkers, in combination with liquid biopsy and pathology, can help to optimise cancer detection and characterisation in the years ahead, and they now form an integral part of a diagnostic approach that aims to integrate diverse data from imaging, pathology, and liquid biopsy/laboratory medicine. ECR 2019 delegates will learn at today’s New Horizons session.

There’s a movement now that says diagnosis is optimised by the integration of all three,” Prof. Heinz-Peter Schlemmer, director of the department of radiology and co-ordinator of the imaging and radio-oncology research at the German Cancer Research Centre (DKFZ), Heidelberg, Germany, told ECR Today. “For a long time, we’ve been seeking quantitative data from imaging that lets us detect a cancer early and determine tumour aggressiveness, local infiltration, and metastatic potential and to plan and monitor therapies.”

Combining liquid biopsy and imaging looks set to improve future surveillance by detecting subclinical disease earlier, and ultimately will deliver better outcomes, according to Prof. Vicky Goh, chair of the international liquid biopsy laboratory at Guy’s and St Thomas’ Hospital in London.

“But accurately quantifying disease burden in small sites, it is possible currently to improve patient selection for further therapy,” she said. “Targeted molecular imaging will have an increasing role, particularly as disease is detected earlier and its burden has reduced.”

In the era of liquid biopsy, there will still be an important role for imaging and a need for greater sensitivity. In this respect, Goh stressed the need for more sensitive imaging. This morning, she plans to explain how cancer surveillance aims to detect disease progression at an early enough stage for further definitive treatment to be a success.

Turning to his main interest, Schlemmer noted that as far as clinical studies morphology acts as a biomarker quantifying tumour size. Distant therapy, it can show whether the tumour is regressing, progressing or stable and thus indicate whether or not a treatment is effective.

There are numerous other biomarkers associated with tumours, many of which are functional, and these can be quantified with MRI.

“This is the most important radiological biomarkers in clinical use. Although these biomarkers have been available for a few years, radiologists still struggle to use them effectively in clinical trials because there has been no standardisation between different machines and operators, according to Schlemmer, whose team is working towards improving this.

“Turning to some of the newer imaging methods, he mentioned that chemical exchange saturation transfer (CEST) imaging is showing promise because it allows for the measurement of protein content in the tumour.

“Change in protein content is important. We don’t fully understand the biological significance of this, but we have seen meaningful changes, particularly in brain tumours,” he noted. “We’ve also seen a genetic mutation that results in a measurable difference in protein content. We hope that in time we will use CEST for other applications.”

There are various further new imaging techniques, such as diffusion-weighted imaging (DWI) with MRI, which looks at cellular density and composition of the extracellular matrix. DWI is an established technique in the diagnosis of prostate cancer, and is starting to be used in melanoma too.

Schlemmer explained that cancer drugs and radiotherapy have an impact on imaging at various stages of the disease. With chemotherapy, these diffusion changes dissipate within a couple of hours of starting therapy, and they are a powerful indicator measuring the depth of tumour cells.

Referring to the overarching aims of using imaging biomarkers, he said that it was important to both detect tumours in the first instance but also to determine if a tumour is responding to therapy.

“Different mass lesions seen on morphological images do not indicate the malignant potential of the lesion. But with diffusion imaging, we can see increased cellular density in the mass lesion, and in addition, with dynamic contrast perfusion imaging we can see neovascularisation, providing a strong indication that this mass lesion belongs to a malignant tumour,” he explained, adding that diffusion and perfusion are known biological cancer hallmarks in reflected by imaging biomarkers.

These are the most important radiological biomarkers in clinical use. Although these biomarkers have been available for a few years, radiologists still struggle to use them effectively in clinical trials because there has been no standardisation between different radiologists, adding that his team has also used deep learning with prostate cancer.

“The more we can evaluate the area as well as an experienced, well-trained radiologist can, so even though there is no gain in knowledge, a less experienced radiologist could use the process and the quality of reading and reporting can be increased,” said Schlemmer, adding that his team has also used deep learning with prostate cancer.

There are various further new imaging techniques, such as diffusion-weighted imaging (DWI) with MRI, which looks at cellular density and composition of the extracellular matrix. DWI is an established technique in the diagnosis of prostate cancer, and is starting to be used in melanoma too.

Schlemmer explained that cancer drugs and radiotherapy have an impact on imaging at various stages of the disease. With chemotherapy, these diffusion changes dissipate within a couple of hours of starting therapy, and they are a powerful indicator measuring the depth of tumour cells.

Referring to the overarching aims of using imaging biomarkers, he said that it was important to both detect tumours in the first instance but also to determine if a tumour is responding to therapy.

“Different mass lesions seen on morphological images do not indicate the malignant potential of the lesion. But with diffusion imaging, we can see increased cellular density in the mass lesion, and in addition, with dynamic contrast perfusion imaging we can see neovascularisation, providing a strong indication that this mass lesion belongs to a malignant tumour,” he explained, adding that diffusion and perfusion are known biological cancer hallmarks reflected by imaging biomarkers.

These are the most important radiological biomarkers in clinical use. Although these biomarkers have been available for a few years, radiologists still struggle to use them effectively in clinical trials because there has been no standardisation between different
Integration, impact and end user friendliness are key for AI use in medical imaging

BY MÉLISANDE ROUGER

Medical imaging and deep learning are increasingly coming together into the field of deep imaging, which covers the whole workflow from image formation to clinical diagnosis or prognosis.

This approach is going to have a major impact in the long run, but it is crucial to also think of the short term and develop a vision and criteria of how AI should be introduced to benefit clinical practice. It is the radiological community’s responsibility to make sure that new AI tools improve their services to both patients and referring physicians, and the good news is that they have become aware of the fact, according to Prof. Wiro Niessen from Rotterdam, the Netherlands.

“Radiologists are becoming more proactive in AI. They are not interested in being swamped by a lot of solutions. From that end users need,” said Niessen.

Over the last year, major organizations, including the ESR, the American College of Radiology (ACR) and the Radiological Society of North America (RSNA), have invested a lot of effort in that sense. Niessen is president of the Medical Image Computing and Computer Assisted Intervention Society (MICCAI), which represents a community that is developing AI tools for medical imaging and is currently working with the European Society of Medical Imaging Informatics and the ACR to organise competitions between AI algorithm providers for specific clinical tasks. The idea is to take very early end user opinions into account to help develop tools that address a relevant clinical problem.

“We need such incentives to make sure that AI developers build tools that end users need. And we also need to have objective criteria to evaluate the performance of such tools in a realistic clinical setting,” Niessen said.

Tools are only going to be used if they are practical and can be integrated directly into workflow. Many solutions are available on the market, but it’s unlikely that a hospital will buy ten of different tools, which would require all kinds of different interfaces. Instead, one should think of how to integrate different functionalities under the hood, for users to easily switch between them. “AI is delivered by different vendors, but that should be almost invisible for the end user. We are going to see more cooperation between SMEs and large companies in order to improve user experience,” he said.

“Here any real impact, a solution should meet two main criteria: it should solve a problem well, and that problem should come in high volumes, according to Dr. Hugh Harvey from London, UK, who is clinical director of Khoros Medical Technologies.

“Breast cancer screening is a good area in which to develop AI tools. There are hundreds of millions of mammograms taken every year. It is a very repetitive task, for the radiologist reporting them, and quite a hard one too as cancer is found in only 1% of screening mammograms or fewer reveals cancer. Machines can do that task really well at high volume,” he said.

It makes more sense to use deep learning (DL) rather than machine learning (ML) for screening, Harvey believes. Full size mammography images are too big for traditional ML techniques to handle on a case-wise basis, and there are features and patterns within the images that cannot be programmed using ML. On the other hand, DL systems have the ability to discover all relevant features themselves, even some that humans cannot appreciate.

“We have had ML screening algorithms for over a decade but they have never been good enough to impact clinical practice. It is only now that DL is here that it can actually change something,” he said.

DL systems are so refined that they are finding features that humans cannot see, and sometimes only features that are solely related to one hospital or population. Differences may spring from the underlying patient distribution, the acquisition hardware that is used, or something else.

“Keeping a human involved in the process gets around the ‘black box’ problem, according to Harvey. “As long as there is someone working with the machine, there is accountability.”

New Horizons Sessions

Wednesday, February 27, 14:00–15:30, Room K

NH 3 Artificial intelligence (AI): driven by radiologists

Chairperson’s introduction

E. Komer; Freeburg/DE

The impact of AI technologies in patient care: advantages and limitations

E.L. Siegel; Baltimore, MD/US

How to integrate AI technology in radiology today

W.J. Niessen; Rotterdam/NL

How will the introduction of AI change the role of the radiologist?

H. Harvey; London/UK

Panel discussion: The radiologist’s work after integrating AI

Commercial PAPERS

READ ALL CONGRESS POSTERS AT epos.myESR.org OR AT THE EPOS LOUNGE ON LEVEL 1
FDG uptake in the left vocal cord due to right recurrent laryngeal nerve palsy because of rising tumour marker. FDG PET/CT showed asymmetric strong uptake with thyroid cancer, and multiple past surgeries, underwent restaging. This clinical case shows a potential false positive interpretation. A 70-year-old man with thyroid cancer and multiple past surgeries, restaged with FDG PET/CT. The uptake can be highly variable in the lymphatic tissue, salivary glands, thymus, muscles, ovaries, testes, atrial hearts, and the gastrointestinal tract. One of the most important challenges is to correctly differentiate physiological uptake from these normal variants, and this differentiation can prove a great source of potential false positive interpretation.

In addition to normal variants, other challenges stem from FDG not being a tumour-specific substance; increased FDG uptake may be seen in a variety of other benign conditions like inflammation, treatment-related effects such as thymic hyperplasia after chemotherapy, sarcoidosis like reaction after immunotherapy, and inflammatory response after radiotherapy. Benign tumours such as thyroid/colorectal adenoma also can lead to false positive interpretation. Conversely, false negative interpretations are possible in cases of low tracer uptake or high non-tumoural activity, Pfannenberg continued.

"To avoid misinterpretation, FDG uptake should always be precisely correlated with the high tracer uptake in target tumour tissue," she said. "Preparation includes correct timing of PET/CT (more than 14 days after chemotherapy, and three months after radiotherapy), fasting status in PET/CT, and interventions to reduce brown fat activity and hyperglycaemia in diabetic patients. Oral CT contrast agents should be of low density with no barium, and patients should be instructed to stay relaxed and avoid talking and chewing after the injection of FDG.

The session will also cover other aspects of hybrid imaging, namely the technical and methodological-related pitfalls and artifacts, to be addressed by ESHI MT President Prof. Thomas Bayer, deputy head of the Centre for Medical Physics and Biomedical Engineering at the Medical University of Vienna. CT attenuation correction performed in PET/CT to improve diagnosis, is prone to several errors due to methodological shortcomings associated with segmentation scaling methods, and CT transmission measurements, he explained. The most common errors include truncation artifacts, and those arising from high-density implants and positive contrast agents. Specifically, high-density CT contrast agents, such as barium, can lead to an overestimation of FDG uptake. To prevent this, protocols must be optimised.

More frequently, errors from patient motion during the examination propagate through CT attenuation correction into the final images and lead to distortion bias of the reconstructed data – and potentially, mislocation. Again, protocols are the key to success here. In addition, artefacts and biases may occur from involuntary mistakes made during the set-up and implementation of the imaging procedure, he added.

In a bid to provide useful pointers to attendees, Bayer will outline the principles of CT attenuation correction in PET/CT and discuss sources of artefacts arising from CT attenuation correction methodology and from specific imaging workflow scenarios that are not optimised for routine PET/CT. He hopes that delegates will not only understand the methodological pitfalls of hybrid techniques and frequent potential image distortions but also grasp solutions to limit clinical misinterpretation arising from these artefacts.
MRI: illuminates typical and special features of neurological conditions

By Frances Rylands-Monk

DELEGATES AT TODAY’S neuroimaging session will learn about how MRI is key to differentiating paediatric white matter lesions.

For instance, MRI’s diagnostic capacity is vital for determining acute disseminated encephalomyelitis (ADEM) and ruling out possible causes with similar findings, which have a completely different prognosis and treatment. Furthermore, better MRI characterisation can help guide doctors to best treatment options.

ADEM is a severe immune-mediated, inflammatory demyelinating disorder of the central nervous system. It is typically triggered by an infection, and it usually affects the white matter of the brain and spinal cord in children. The condition is in part characterised by neuroimaging evidence of multi-focal white matter inflammatory demyelinating lesions, which in the absence of specific biological markers is extremely important in establishing its diagnosis, according to Dr. Alex Rovira Cañellas, head of the Neuroradiology Section, at Vall d’Hebron University Hospital in Barcelona, Spain.

A combination of clinical, lab and MRI data has led to the new classification of inflammatory demyelinating diseases, he noted. Based on this classification, novel entities, such as myelin oligodendrocyte glycoprotein (MOG)-antibody disease, have recently been described.

MOG-antibodies (MOG-Ab) can be detected in up to 50% of ADEM patients, and up to 100% in multiphasic ADEM cases. Importantly, recent data indicate that in ADEM, MRI findings may vary depending on the disease phase and location.

“ADEM in some cases can be classified as an MOG antibody disease,” he stated. “Knowledge of this new classification is essential for the management of the patients.” Rovira Cañellas said.

Today, ECR 2019 delegates will hear how in terms of differential diagnosis for ADEM, multiple sclerosis (MS) is the main contender. Although MS in children is infrequent, in rare cases the first attack of MS may be indistinguishable from ADEM, he continued. In fact, approximately 15–20% of children with a definite diagnosis of MS initially present with an ADEM-like picture. Topography of the lesions and signal intensity can help doctors distinguish paediatric MS from ADEM at onset, because lesions in hypointense T2 lesions (black holes) are rare in ADEM.

MRI remains the imaging modality of choice for ADEM, but which sequences should the neuroradiologist use to establish a diagnosis? Rovira Cañellas reckons MRI studies should include the brain and spinal cord, because spinal cord involvement occurs in around 30% of patients, and an optimal protocol should comprise T1, T2, T2 fluid-attenuated inversion recovery (FLAIR) and diffusion-weighted imaging (DWI) sequences. In ADEM, gadolinium enhancement is only used in 10% to 30% of cases, but contrast-enhanced T1-weighted sequences are recommended for the first diagnostic MRI examination because ADEM typically involves the vast majority of lesions simultaneously, a pattern uncommon in MS.

Moreover, follow-up MRI is especially important for establishing the diagnosis of ADEM. Contrary to what commonly occurs in MS, ADEM is not associated with the development of new lesions on sequential scans performed more than three months after the onset of the disease, while with a subsequent diagnosis of MS, MRI reveals incomplete resolution or persistence of lesions, he noted. Furthermore, research is needed to improve characterisation of inflammatory demyelinating diseases.

“Informed characterisation will help in better establishing the prognosis such as, for example, the risk of clinical relapses and of disability progression, and therefore in establishing the best treatment options.” This is obviously highly relevant when dealing with paediatric patients, Rovira Cañellas stated.

Aiming to provide tips for general radiologists to better identify transient ischaemic attack (TIA), Prof. Jérôme Hodel, head of the Department of Neuroradiology at the Henri Mondor University Hospital in Créteil, France, stressed the importance of detecting parenchymal or vasculature abnormalities via MRI to explain the symptoms. Such abnormalities can be subtle and the imaging protocol can be optimised to further improve diagnostic performance, he noted, adding that TIA represents a major public health issue and general radiologists play an important role in patient management.

“Arterial slow-flowing blood, as encountered in TIA, can be studied in detail by arterial spin labelling (ASL) and post-contrast 3D turbo spin echo sequences. Minor stroke can be better detected using an optimised diffusion sequence, while brain hyperfusion can be detected with susceptibility-weighted imaging (SWI) by assessing brain venous signal,” he told ECR Today ahead of the congress.

Few studies are available on the use of SWI or ASL in TIA, but results suggest that ASL may potentially overtake the conventional dynamic susceptibility contrast (DSC) MR perfusion technique to detect brain hyperfusion, according to Hodel. Meanwhile, although the use of optimised diffusion in TIA patients is better established, certain parameters, such as number of directions or b value, are still controversial.

At today’s session, he plans to outline how to optimise protocols for TIA. “Diffusion can be significantly improved by using higher b values, while the T2* sequence can be advantageously replaced by SWI,” he noted.

The main challenge for general radiologists is getting to know these new techniques. Understanding ASL hyperintensity, for example, can be difficult, because it may mean an increased – or conversely decreased – blood flow. In the presentation, he will provide advice on how to better evaluate ASL images.

Identifying common stroke mimics is an ongoing challenge, and attendees will hear how specific MRI protocols can be best deployed in these cases. For now, a sustained effort is being made to further reduce MRI scan time by using techniques such as echo-planar imaging (EPI) or compressed sensing (CS). Hodel continued: “Including cardiac imaging in the initial diagnostic work-up may also improve the management of patients with TIA,” he concluded.

Brain MRI (T2 FLAIR image) shows differences between acute disseminated encephalomyelitis (ADEM) and multiple sclerosis (MS). The former (left image) was completely resolved on a follow-up study obtained four months later (right image). (Provided by Dr. Alex Rovira Cañellas)

**Special Focus Session**

Wednesday, February 27, 16:00–17:30, Room E2

**SF 4 My three top tips in neuroimaging** (not only for neuroradiologists)

- Chairperson’s introduction
  - M. Staggs, Poznan/PL
- MRI T2 brain white lesions
  - A. Kramic, Grenoble/FR
- Multiple sclerosis
  - K. Katulska, Poznan/PL
- Acute disseminated encephalomyelitis (ADEM)
  - A. Rovira-Cañellas, Barcelona/ES
- Encephalitis
  - M. Stajgis, Poznan/PL
- Microbleeds
  - L. van den Hauwe, Antwerp/BE
- Panel discussion: “You can ask for more advice – questions from the audience, answers from experts

**ADEM in a 6-year-old boy with large subcortical bilateral lesions at presentation (left image) that was completely resolved on a follow-up study obtained four months later (right image). (Provided by Dr. Alex Rovira Cañellas)**
CT colonography is accurate, safe and cost-effective – now radiologists must make its case

Colorectal cancer (CRC) is a public health issue. It is the second highest cancer killer in the world and the second most common cancer in women in Europe.

Screening is key to reducing CRC mortality, as it enables cancer to be detected and treated earlier. Even before it develops, by detecting colorectal polyps smaller than 1 cm, which could become cancer five to ten years later.

Stool tests, and in particular the faecal immunochemical test (FIT), remain the most commonly used screening method for CRC across Europe. In European healthcare-driven organised population screening programmes, the FIT is sent as a kit to people over 50, so that they can collect a sample and send it back for analysis. Although screening programmes using stool tests reduce the risk of dying from CRC by up to 33%, they do not target polyps, which means that they cannot reduce CRC incidence.

There is considerable room for improvement in this regard and CTC could help to fill the gap, according to Prof. Andrea Laghi from Rome, Italy. “Our recommendation is that CTC be implemented by governments as part of their population screening programmes. It performs better than other tools in many instances, and it is safe, patient friendly and minimally invasive,” said Laghi, who is president-elect of the European Society of Gastrointestinal and Abdominal Radiology (ESGAR), a society that is leading the provision of CTC education, training and guidelines in Europe.

CTC is a strong test and, despite potential disadvantages – bowel preparation, lavage-free protocols impacting sensitivity, detection of flat and serrated lesions, etc. – it is particularly safe. Thanks to iterative reconstruction techniques, radiation exposure from CT is now much lower than natural background exposure.

Decisive robust evidence regarding the sensitivity and specificity of CTC, a number of clinicians still do not accept the technique. Four randomised clinical trials have shown that CTC is as good as colonoscopy for cancer and large polyp detection (>10mm). For 6–9mm polyps, which are not so relevant in a screening scenario, CTC is slightly inferior to colonoscopy, but better than a stool test.

A combination of factors has led to this poor reputation: competition with colonoscopy and poor marketing of the technique among primary care physicians are to blame, Laghi believes. “If the prescribers are not aware of the new developments in accuracy and low radiation exposure, they will stop patients from participating in CTC screening programmes.”

In currently organised population screening programmes based on FIT, CTC is recommended for patients who have a positive FIT, who are then referred to colonoscopy, and when results are incomplete.

CTC is also recommended in patients with positive FIT who refuse to undergo colonoscopy. Unexpectedly this is not an uncommon situation. In Italy about 27% of patients whose stool test comes out positive refuse to undergo a colonoscopy examination. A recent Italian study shown that a larger number of patients would accept undergoing complete evaluation of the colon with CTC, according to Laghi.

More scientific evidence is expected to confirm a third scenario, in which patients who have been invited for a screening programme refuse to take part from the start. “We can offer CTC instead of a stool test, and see if more people attend screening. We are convinced that we will motivate more people to attend the programme, but there is no evidence to support this hypothesis yet,” said Laghi, who is about to start an investigation on the topic.

For the moment, CTC is used as a first-line screening test in healthcare-driven organised population screening programmes, cost-effectiveness in comparison with other screening tests remains to be demonstrated. Current models used in cost analysis are biased by input, but data is emerging that shows that CTC offers a return on investment. Two randomised clinical trials in the Netherlands and Italy have shown that the costs of CTC screening were substantially lower than the cost assumptions that are used in published cost-effectiveness analyses. According to these studies, the average costs per participant of CTC in the Netherlands are €989.40 and €986.80 in Italy. “Mathematical models need to be re-calculated,” Laghi concluded.
Ultrasound training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Simulation has gained much popularity in healthcare education over the past decade, largely due to technological developments that have led to dramatic improvements in the realism and sophistication of simulators. As it enables trainers to acquire essential skills within a safe environment that closely resembles reality, simulation is gaining increasing momentum at different levels of healthcare education. The use of simulators allows trainers to develop skills while applying theoretical knowledge in a controlled setting and thus prepare them for real situations. The training agenda can be determined by the needs of the trainees, and whole procedures or specific components can be simulated.

Against this background, medical simulation has been proposed repeatedly as a technique that can considerably improve patient care. Despite solid evidence, simulation is still severely under-utilised as a teaching modality and is often on the periphery of any training programme. For a number of reasons, this is quite understandable. Among them are the increase in the patient load, financial constraints, the need for a higher patient load on the ward, and lack of time for training. However, simulation should not be seen as an additional task, but rather as an indispensable tool to improve patient safety and quality of care.

Another challenge is the lack of standardized training and certification. According to Prof. Dirk André Clevert, from the department of Medicine and Technology in Trondheim, Norway, “there are still some obstacles to overcome regarding the establishment and integration of ultrasound and other forms of simulation into medical training curricula. According to him, simulation should be used as an essential component of the training and certification to bridge various educational gaps.”

Patient simulation appears to be particularly well suited for ultrasound training. Ultrasound simulators have evolved constantly over recent years, to a point where they now provide an opportunity for realistic hands-on training for a broad spectrum of ultrasound examinations and interventions, with structured step-by-step procedural guidance alongside virtual cases. However, despite the benefits of clinical simulation methods, their place within the training curriculum is far from clearly determined. There are still some obstacles to overcome following the establishment and integration of ultrasound and other forms of simulation into medical training curricula. According to him, simulation should be used as an essential component of the training and certification to bridge various educational gaps.

A radiologist interpreting screening mammograms.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?

The digital processing revolution is having an impact on many areas of life, including medicine and education. When it comes to the latter, one particular area where such technology is making a difference is the use of simulators.

Ultrasound training simulates models in training and education: Quo vadis?
Clinical audit: An important tool for improving quality and outcome of patient care

With the aim of further promoting knowledge and understanding of clinical audit and its application in the departmental radiology setting, a panel of experts will discuss the topic in a session today, taking various different perspectives, including the implementation of clinical audit programmes and updates on current guidelines and recommendations.

A clinical audit consists of measuring a clinical outcome or a process against well-defined standards established using the principles of evidence-based medicine. It is based on a structured review of radiological practices, procedures, and results, carried out in order to improve standards of good medical radiological practice, improve the quality and outcomes of patient care, and identify the changes needed to reach these goals. It is conducted correctly and professionally, clinical audits are a powerful tool for improving patient care on various levels.

Today’s session aims to raise awareness about the necessity of clinical audits and further promote knowledge and understanding of clinical audit and its application in the departmental radiology setting. There is a pressing need for all clinical radiology departments across Europe to engage themselves in the process of clinical audit. On the one hand, of course, because clinical audit has tremendous potential benefits to patient care and can highlight system deficiencies that need to be addressed. But also because the Basic Safety Standards Directive (BSSD) came into European law last year, including a wide range of important radiation protection guidelines and targets,” said Dr. David Howlett, Consultant Radiologist at Eastbourne Hospital, UK, and Chair of the ESR Audit and Standards Subcommittee.

The BSSD specifically alludes to the need for clinical audit processes to support BSSD transcription, which is legally required and mandatory. “Compliance with BSSD standards will be the focus of inspection by the relevant national radiation protection competent authorities, meaning this topic is of immediate importance for all European clinical radiology departments,” he added.

In 2017, the ESR produced a Guide for Clinical Audit to support radiology departments in developing clinical audit programmes. Espanarto, as the guide is called, covers the fundamentals of clinical audit function and practice and clarifies the requirements around the BSSD, among other useful information. During his presentation, Howlett plans to provide an update on the latest version of the guide. “An updated version of Espanarto is planned for launch at ECR 2019 or even sooner. It contains updated advice and details on inspection as well as an expanded selection of clinical audit templates, including regulatory ones that relate to radiation protection and non-regulatory templates relating to service provision and clinical practice,” he noted.

Also in this session, Mr. Steve Ebdon-Jackson from the UK’s Public Health England Centre for Radiation, Chemical and Environmental Hazards (CERC), Oxfordshire, will outline the activities of the Heads of the European Radiation Protection Competent Authorities Working Group on Medical Applications (HERCA WGMMA) relating to clinical audit. “The aim of the presentation is to provide a clear understanding of the importance of the differences between inspections and audits in regard to various aspects, such as their specific purpose, outcome, scope and persons carrying out the task,” said Ebdon-Jackson. “There are many differences between an audit and an inspection, and even if audits include regulatory matters as a subset, they do not replace the inspection of regulatory compliance by the regulatory body or competent authority.”

Following Ebdon-Jackson, Dr. Taina Autti, from the department of radiology at the Helsinki University Central Hospital, Finland, will discuss Finnish clinical audit rounds performed between 2012 and 2015 as well as the resulting recommendations issued by the Finnish advisory committee for clinical audit and its effectiveness. Furthermore, Mrs. Marie-Louise Ryan, from the School of Medicine and Medical Sciences at the University College Dublin, Ireland, plans to outline the radiographic perspective regarding the implementation of a clinical audit programmes. Last but not least, Steven Lee, from the Department of Healthcare Transformation Services at Siemens, Guildford, UK, will provide an insight into audit in industry. His talk will cover the evolution of different industrial management paradigms concerned with quality improvement from the middle of the last century, the growing emphasis on the ‘people dimension of quality improvement, and the significance of using an agreed and systematic process such as the ‘Plan, Do, Study Act (PDSA) system for effecting quality improvement.”

Table 1: Important differences between audit and inspection (Provided by Mr. Steve Ebdon-Jackson)

<table>
<thead>
<tr>
<th>Basis</th>
<th>Inspection</th>
<th>Audit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirement</td>
<td>Standards and Good Practice</td>
<td></td>
</tr>
<tr>
<td>Legal Mandate</td>
<td>Recommendations and Suggestions</td>
<td></td>
</tr>
<tr>
<td>Peer Review System</td>
<td>Inspectors and Advisors</td>
<td></td>
</tr>
<tr>
<td>Professionals</td>
<td>Scope</td>
<td></td>
</tr>
<tr>
<td>Comprehensive</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This session is part of the EuroSafe Imaging campaign.
Small pulmonary nodules detected incidentally on cross-sectional imaging that includes the chest, continue to pose a dilemma, despite the publication of initial seminal recommendations on their management by the Fleischner Society more than two decades ago. The dilemma stems from the fine balance that must be struck between conservatively managing (or even discharging from further surveillance) benign nodules (which form the vast majority) on the one hand, and timely detection of early lung cancers on the other. There are a number of differences between the two most widely used sets of recommendations in Europe for nodule management: the British Thoracic Society 2015 (BTS) guidelines and the updated Fleischner Society 2017 (FS) guidelines. Chiefly, the BTS guidelines expouse volumetric analysis of nodules where possible (i.e. solid and reliably segmented) and risk-based management; the FS guidelines suggest average diameter-based management, and subjective assignment of low or high risk status for solid nodules based on nodule and patient characteristics, especially smoking status. In our study, we measured agreement, as well as rates of discharge and referral for PET/CT between the BTS and FS recommendations for pulmonary nodule management. We included 138 patients, 89 of whom were current or former smokers, with fully investigated CT-detected incidental lung nodules initially imaged between 2014 and 2015 and followed up to 2017. These included solid, sub-solid and ground glass nodules, with a median average diameter of 7mm and with eight (5.8%) of these ultimately found to be malignant. We retrospectively modelled and compared four suggested strategies for their management: combined volume and diameter-based BTS (BTSvol), diameter-only-based BTS (BTSdiam), diameter-only-based FS where current or former smokers were considered high risk (FSsmoking), and diameter-based FS where a Brock model score of ≥5% was considered high risk (FSBrock).

We found that agreement between the BTS and FS management strategies was good, with a weighted kappa statistic (k) of 0.66–0.72. However, significantly more patients were discharged using volume-based compared to only diameter-based BTS recommendations (25.4% vs 10.1%, respectively, p=0.001), and compared to diameter-based FS guidelines stratified by smoking status (25.4% vs 10.1%, p=0.0002). Nineteen percent (4/21) of nodules referred for immediate PET-CT using BTSvol criteria were found to be malignant; none of these would have been referred for immediate PET-CT using BTSdiam or FSsmoking guidelines. Applying BTSvol criteria found to be malignant none of these would have been referred for immediate PET-CT applying both BTSvol and FSsmoking guidelines. We found no difference in discharge rates between BTSdiam and FS guidelines stratified by Brock score (25.4% vs 20.8%, p=0.12). Conversely, significantly more patients were referred for immediate PET-CT using BTSvol compared to BTSdiam (52.6% vs 31.3%, p=0.002) and FSbrock (5.8%, p=0.0002). Nineteen percent (4/21) of nodules referred for immediate PET-CT using BTSvol criteria were found to be malignant; none of these would have been referred for immediate PET-CT applying BTSdiam or FSsmoking guidelines. Our results imply that BTS volume-based guidelines can lead to earlier definitive management of incidental lung nodules by discharging nodule follow-up rates compared to diameter-based BTS and diameter-based smoking-stratified FS management, and (2) resulting in higher referral for immediate PET/CT, allowing timelier detection of malignant nodules. However, FS guidelines stratified by the Brock model, rather than smoking status alone, can yield similar discharge rates to BTS volume-based management, suggesting that the use of a multifactorial risk prediction model over smoking status alone can harmonise guidelines.

Comparing recommendations by British Thoracic Society and Fleischner Society

### Scientific Session: Chest

**Wednesday, February 27, 10:30–12:00, Room K**

**SS 204 Lung cancer: guidelines, screening and nodule management**

**Moderators:**
- F.B. Demirkazik, Ankara/TR
- P. Franch, Tirano/IT

**Applying British Thoracic Society 2015 compared to Fleischner Society 2017 recommendations for lung nodule management leads to different discharge and PET-CT referral rates**


**Comparing recommendations by British Thoracic Society and Fleischner Society**
From mobile units to radiography rooms and interventional suites, exhibitors are showing systems that are more compact, more flexible, and more capable of advanced applications. Mobile x-ray units in particular are getting slimmer down while security features are being beefed up to prevent cyber-security lapses. In advanced clinical applications, several companies are showing image-stitching algorithms for performing examinations of the spine and long bones. Also, look out for vendors focusing on artificial intelligence (AI) analysis of radiography examinations.

Philips Healthcare is unveiling Philips Zenit, a new high-end mobile surgery platform. It designed the system in cooperation with customers to ensure ease of use and operating efficiency and includes features that aim to increase clinical performance in the operating room.

For the Azurion angiography platform, Philips has released Azurion 7 Torsion, a scaled-down version of its Azurion 7 interventional system. The unit includes a premium ceiling-mounted DR system that’s designed to support seamless long-bone and full-leg imaging in less than 10 milliseconds. Support for artificial and augmented intelligence are built into the DR 800, which also supports advanced clinical applications like full leg/full spine studies and large field-of-view tomosynthesis. The company is also highlighting the DR 600 and DRK 100+ mobile x-ray units, the DR 600 ceiling-suspended room, the DR Retrofit kit, and Musica image processing software. Meanwhile, Carestream Health is promoting its Carestream Health DigitalDiagnost C90 system. The DigitalDiagnost C90 features a live camera on the tube head that can help with patient positioning.

For long-view exposures, Fujiﬁlm is offering FDR D-Evo GL, which enables the acquisition of single-shot exposures of the whole spine and inferior limbs. The IIS and Virtual Grid technology are designed to reduce scatter radiation. The vendor is also showcasing the FDRG Plus and FRD Nano mobile x-ray units.

GE Healthcare developed its Discovery XRev HD radiography system to reduce repeat imaging examinations. The unit includes FlashPad HD digital detectors, which have four times more pixels per area than previous technology, producing highly detailed x-ray images, according to the company. The firm’s Halo image processing software enables workflow to continue smoothly while the AutoRAD Suite supports the stitching of x-ray images. GE’s Auto Image Paste tool supports seamless long-bone and spine x-ray studies.

Konica Minolta is promoting its AeroDR X30 mobile radiography system, a manually driven unit that’s designed to deliver high performance, even in tight spaces. Equipped with the AeroDR Flat-panel digital detector, the device features a 15-inch touchscreen display and AeroNAV software.

**ECR 2019 sees digital x-ray manufacturers focus on workflow and efficiency**

As medical imaging's bread-and-butter modality, digital radiography (DR) is all about efficiency. At this week’s ECR 2019 technical exhibition, DR vendors are highlighting how their new technologies can help radiology departments work more efficiently and deliver better patient care at a lower cost.
Digital breast tomosynthesis is well positioned as next successor in European breast screening

Whichever side of the breast screening debate you sit on, one cannot dispute that digital mammography is the most established technology across Europe.

Radiation dose, the impact of false-positives, overdiagnosis and suitability for differing breast densities are issues that continue to challenge use of digital mammography in screening. Therefore, healthcare technology vendors have developed technology that could offer an alternative to mammography. Below, we review these emerging products and assess their potential impact and market viability in the context of breast screening in Europe.

There are several commercially available products already certified and upgrades to existing digital mammography systems are often possible. DBT pricing is also not a substantial premium on standard digital mammography. Assuming health providers are convinced of the clinical benefits of DBT, economics should not be the limiting factor for adoption.

Automated Breast Ultrasound (ABUS) has like DBT, also been approved for some time, but has had limited impact so far. While awareness that conventional digital mammography may not be as effective in screening for women with dense breast tissues has increased, adoption has been slow. The European Breast Guidelines’ from the European Commission also do not support ABUS in screening, suggesting a conditional recommendation against the intervention for use of ABUS instead of digital mammography with women with dense breast tissues, due to a lack of evidence.

From a market perspective, barriers to entry are also higher versus DBT. ABUS systems will need to be purchased in addition to digital mammography at the recommendation standard, with prices of almost rivaling digital mammography systems, providing bay to significant capital and economic feasibility study to justify the additional cost. It is also notable that few ABUS systems have developed ABUS solutions, with only a handful available in Europe today.

Conventional digital mammography, combining digital mammography and ABUS in a single system, may offer a solution to the economic challenges: However, one system is commercially available in Europe (Cape Ray) with other systems expected to launch soon.

Digital mammography is currently a significant challenger to digital mammography anytime soon. Replacing digital mammography will be a slow process due to high capital and operational costs, as well as the need for cross-training.

Perhaps the most promising are those that utilise phototoracic imaging, combining laser pulses and sound waves to identify regions of high vascular density and corresponding high haemoglobin concentration thought to occur around tumours and lesions between malignant and benign masses. While the lack of radiation with this approach is a clear plus, most systems are still in development or undergoing certification. Moreover, the price of these systems so far is mooted to be the same or higher than conventional digital mammography.

BY STEVE HOLLOWAY

Digital breast tomosynthesis is well-positioned as next successor in European breast screening

Whichever side of the breast screening debate you sit on, one cannot dispute that digital mammography is the most established technology across Europe.

Radiation dose, the impact of false-positives, overdiagnosis and suitability for differing breast densities are issues that continue to challenge use of digital mammography in screening. Therefore, healthcare technology vendors have developed technology that could offer an alternative to mammography. Below, we review these emerging products and assess their potential impact and market viability in the context of breast screening in Europe.

There are several commercially available products already certified and upgrades to existing digital mammography systems are often possible. DBT pricing is also not a substantial premium on standard digital mammography. Assuming health providers are convinced of the clinical benefits of DBT, economics should not be the limiting factor for adoption.

Automated Breast Ultrasound (ABUS) has like DBT, also been approved for some time, but has had limited impact so far. While awareness that conventional digital mammography may not be as effective in screening for women with dense breast tissues has increased, adoption has been slow. The European Breast Guidelines’ from the European Commission also do not support ABUS in screening, suggesting a conditional recommendation against the intervention for use of ABUS instead of digital mammography with women with dense breast tissues, due to a lack of evidence.

From a market perspective, barriers to entry are also higher versus DBT. ABUS systems will need to be purchased in addition to digital mammography at the recommendation standard, with prices of almost rivaling digital mammography systems, providing bay to significant capital and economic feasibility study to justify the additional cost. It is also notable that few ABUS systems have developed ABUS solutions, with only a handful available in Europe today.

Conventional digital mammography, combining digital mammography and ABUS in a single system, may offer a solution to the economic challenges. However, one system is commercially available in Europe (Cape Ray) with other systems expected to launch soon.

Digital mammography is currently a significant challenger to digital mammography anytime soon. Replacing digital mammography will be a slow process due to high capital and operational costs, as well as the need for cross-training.

Perhaps the most promising are those that utilise phototoracic imaging, combining laser pulses and sound waves to identify regions of high vascular density and corresponding high haemoglobin concentration thought to occur around tumours and lesions between malignant and benign masses. While the lack of radiation with this approach is a clear plus, most systems are still in development or undergoing certification. Moreover, the price of these systems so far is mooted to be the same or higher than conventional digital mammography.

Perhaps the most promising are those that utilise phototoracic imaging, combining laser pulses and sound waves to identify regions of high vascular density and corresponding high haemoglobin concentration thought to occur around tumours and lesions between malignant and benign masses. While the lack of radiation with this approach is a clear plus, most systems are still in development or undergoing certification. Moreover, the price of these systems so far is mooted to be the same or higher than conventional digital mammography.

Perhaps the most promising are those that utilise phototoracic imaging, combining laser pulses and sound waves to identify regions of high vascular density and corresponding high haemoglobin concentration thought to occur around tumours and lesions between malignant and benign masses. While the lack of radiation with this approach is a clear plus, most systems are still in development or undergoing certification. Moreover, the price of these systems so far is mooted to be the same or higher than conventional digital mammography.

Perhaps the most promising are those that utilise phototoracic imaging, combining laser pulses and sound waves to identify regions of high vascular density and corresponding high haemoglobin concentration thought to occur around tumours and lesions between malignant and benign masses. While the lack of radiation with this approach is a clear plus, most systems are still in development or undergoing certification. Moreover, the price of these systems so far is mooted to be the same or higher than conventional digital mammography.

Perhaps the most promising are those that utilise phototoracic imaging, combining laser pulses and sound waves to identify regions of high vascular density and corresponding high haemoglobin concentration thought to occur around tumours and lesions between malignant and benign masses. While the lack of radiation with this approach is a clear plus, most systems are still in development or undergoing certification. Moreover, the price of these systems so far is mooted to be the same or higher than conventional digital mammography.

Perhaps the most promising are those that utilise phototoracic imaging, combining laser pulses and sound waves to identify regions of high vascular density and corresponding high haemoglobin concentration thought to occur around tumours and lesions between malignant and benign masses. While the lack of radiation with this approach is a clear plus, most systems are still in development or undergoing certification. Moreover, the price of these systems so far is mooted to be the same or higher than conventional digital mammography.
EIBIR welcomes you to its lounge for information on research funding

BY EMMA GRIFFIN

The European Institute for Biomedical Imaging Research (EIBIR) is a non-profit organisation founded by the European Society of Radiology (ESR) in 2006. EIBIR coordinates and supports research in biomedical imaging as well as the dissemination of knowledge.

EIBIR offers professional guidance and support through a variety of different research-related services. These range from informing researchers about open and upcoming funding opportunities, supporting the preparation of research funding proposals and disseminating results to finding the right partners for your project, providing an electronic Data-Capture Platform for your data collection, and providing professional project management and dissemination.

EIBIR published its first Strategic Research Agenda (SRA) for Biomedical Imaging in September 2018. The SRA is a non-profit organisation founded by the EIBIR office in future funding programmes. It was developed by the EIBIR office and the EIBIR Scientific Advisory Board, in collaboration with its eleven shareholder organisations, representing scientific societies related to biomedical imaging.

Come and meet us in the EIBIR Lounge to talk about our services or to find out about some of our current projects. You will find the EIBIR Lounge in the AEC Business Centre, next to Café Motto at the main entrance.

We also invite you to our Coffee & Talk Session tomorrow, 10:00–11:00, in Room CAT A, which will be chaired by our Scientific Director Prof. Gabriel Kreisnt from Rotterdam, the Netherlands. Attendees can visit the EIBIR Session and enjoy a free coffee while learning more about the European research funding landscape and what it takes to write a successful application. The Coffee & Talk Session is the perfect opportunity to ask the EIBIR team about research funding in Europe and how you get the funding you need.

Dr. Ing. Peter Gercskebeke, Carina Kern and Pamela Zolda

Drip, ship, retrieve and leave: an approach to the regional management of acute stroke patients requiring thrombectomy

There has been much debate regarding the optimum model of care for patients presenting with symptoms of stroke who may require thrombectomy. Both the drip and ship and mothership models have been described in the literature.

We describe our approach for the drip and ship model, whereby patients are returned immediately or within 24 hours of thrombectomy to their referring institution, and the optimum the two groups.

We are the only institution in the Republic of Ireland with a 24/7 thrombectomy service. Due to our inability to admit all patients to our own stroke unit after thrombectomy, we have developed a model whereby patients are immediately returned to their referring institution or admitted for 24 hours depending on travel time from the referring institution. The local regional group incorporates patients within 90 minutes of the endovascular stroke centre (ESC) while the remote regional group includes all those over 90 minutes away. A total of 367 patients were transferred to our institution from January 2016 to June 2018, with 377 patients in the local group and 89 patients in the remote regional group. Both groups had similar median NIHSS on admission (16 vs 15) with ASPECTS of 9. Successful recanalisation (TICI 2b-3) was seen in 86.9% and 89.5% in the local and remote groups respectively. Both groups had excellent clinical outcome (mRS 0–2) with 50-day mRS of 49% in the local group and 58% in the remote group. Six per cent (n=19) of the remote group required admission to our stroke unit after thrombectomy most commonly due to ICU admission, while 43.9% (n=37) of the remote group were admitted beyond the usual time frame of 24 hours. The patients who were returned immediately or 24 hours after thrombectomy showed excellent clinical outcomes, demonstrating no significant adverse events due to this management protocol. Patients referred from more remote stroke centres had better outcomes than those from more local centres (50-day mRS 75.8% vs 44.5%). However, the local group had a higher treatment rate per stroke diagnosis compared to the remote group (9.5% vs 3.5%). This is perhaps due to a combination of the prolonged time between imaging in the referring institution and arrival at the ESC, excluding those who were rapid progressors, and a less well-established process for evaluating those presenting with acute ischaemic stroke symptoms.

This study also highlights the additional bed requirements needed when planning for a regional ESC service. Based on the numbers of patients who were not returned as per the ‘intention to treat’ protocol, an additional 375 bed days would be required over this two-and-a-half year period.

Our method of returning patients to their referring institutions after thrombectomy enables the treat- ment of larger numbers of patients in a system of care, which would not otherwise facilitate this treatment, while optimising the use of stroke-related resources in both the referring centre and the thrombectomy centre.

We encourage you to attend our presentation to learn more about our approach to the regional management of acute stroke patients requiring thrombectomy.
EIBALL promotes use of imaging biomarkers in clinical trials

The European Imaging Biomarkers Alliance (EIBALL) subcommittee appointed a new Chair in 2018, Prof. Nandita deSouza of the Institute of Cancer Research, London. Under Prof. deSouza, EIBALL has adopted a new mission statement. “This statement embodies the goals of EIBALL and helps direct our future plans,” notes Prof. deSouza. The mission statement sets out EIBALL’s goal: ‘to facilitate imaging biomarker development, standardisation and use in clinical trials and in clinical practice by collaboration with specialist societies, international standards agencies and trials organisations to develop a network of excellence’. The EIBALL subcommittee has adopted a two-year roadmap to facilitate the achievement of these goals.

One of EIBALL’s primary objectives is getting more biomarkers into clinical trials. To encourage this, the EIBALL Subcommittee has adopted a two-year roadmap to facilitate the achievement of these goals.

In relation to pillar one, the EIBALL committee in conjunction with the European Society for Hybrid, Molecular and Translational Imaging (ESHTM) and the European Institute for Biomedical Imaging Research (EIBIR) has produced an article on imaging biomarkers, titled ‘Utilising validated imaging biomarkers as decision-making tools in clinical trials and practice: current status and recommendations’ for European Radiology. This article reviews current evidence for the use of quantitative biomarkers in clinical settings at various stages of the disease pathway including diagnosis, prognosis and treatment response. It suggests that the observer-driven pattern recognition that is standard in the interpretation of medical images ought, increasingly, to be supplemented by quantitative biomarkers that inform on disease detection, characterisation and assessment of response to treatment (that) will achieve quantitative and objective decision-support tools in the patient management pathway.

However, quantification remains a challenge as semi-quantitative scoring systems have been developed to overcome this, but the quantitative potential of imaging remains under-exploited because of variability of the measurement, lack of harmonised systems for data acquisition and analysis and, crucially, a paucity of evidence on how such quantification potentially affects clinical decision-making and patient outcome. On this basis, the article makes recommendations for employing imaging objectively to drive patient management decisions.

In relation to pillar two, Dr. Angel Alberti-Bayarri, of La Fe Health Research Institute, Valencia, has showcased using renal biomarkers as an example. Additionally, the workshop showcased using renal biomarkers as an example. Additionally, the selection of combinations of biomarkers from hybrid imaging technologies using AI will be addressed

Joint Session: ESR and EIBALL (European Imaging Biomarkers Alliance)

Wednesday, February 27, 08:30–10:00, Room M1

Imaging biomarkers and their combinations in the era of artificial intelligence

- Chairpersons’ introduction
  O. Clément; Paris/FR
  N.M. deSouza; Sutton/UK
- Building and discovering biomarkers with AI
  N. M. de Souza; Sutton/UK
- COST action initiatives as a platform for image biomarker selection
  A. Caroli; Rancic/IT
- Role of AI in the introduction of imaging biomarkers: acceleration or obstacle?
  J.C. Waterton; Manchester/UK
- Panel discussion: What infrastructure do we need to exploit AI for selecting, validating and managing imaging biomarkers?

WORKSHOPS

Room 0.16 (Entrance Level)

13:30 – 14:30 CT Added Value of Ultra-Low Dose CT, Dose Reduction to Chest XR, for Diagnosing Chest Pathology
Dr. I. Hernandez, Leiden, The Netherlands
14:45 – 15:45 HI AI for Clinical Decision Support: Towards Prediction and Prescription
A. O’Neil, Edinburgh, UK

WORKSHOPS

Room K (Lower Level)

12:30 – 13:30 MULTI-MODALITY AI, Deep Learning and Multi-Parametric Assessment for Advanced Imaging and Diagnostics
Chair: Prof. Catherine Oppenheim, MD, Centre Hospitalier Sainte-Anne, Paris, France
Speakers:
Roadmap for Artificial Intelligence in Radiology: Recognition, Reconstruction, Reasoning
Prof. Bram van Ginneken, PhD, Radboud University, Nijmegen, The Netherlands
Deep Learning Reconstruction: The Next Step in CT Image Quality
Prof. Matthias Prokop, MD, Radboud University, Nijmegen, The Netherlands
MRI and Advanced Algorithms like Computed MRI from Research to Clinical Practice
Prof. Luca Saba, MD, University of Cagliari, Cagliari, Italy
Multi-Parametric Approach for Diffuse Liver Disease with Ultrasound
Prof. Valérie Vilgrain, MD, Hôpital Beaujon, Clichy, France

Made possible. Made For life.
ESR’s EuroSafe Imaging campaign celebrates five years of medical radiation protection

The EuroSafe Imaging Stars initiative was launched in 2014 with the goal of establishing a worldwide network of imaging departments committed to best practice in radiation protection. To participate in this initiative, imaging facilities have to perform a self-assessment according to a list of 21 criteria on the topics optimization, justification, quality and safety, education, research, and regulatory compliance. After successful evaluation, applicant facilities are awarded a number of stars from one to five, depending on the criteria fulfilled. Over 100 facilities have joined the network of EuroSafe Imaging Stars so far. Efforts are underway to expand the network of Stars across other continents. In particular, a collaboration with the AFRoSaf campaign has been started to help develop the concept and facilitate dissemination in Africa.

The past five years also saw the establishment of different multidisciplinary EuroSafe Imaging Working Groups focusing on appropriate image quality, CT dose repositories, clinical diagnostic reference levels, paediatric imaging, and the dissemination and promotion of the ESR iGuide. A new working group on dosimetry for imaging in clinical decision support will be officially launched at ECR 2019.

EuroSafe Imaging has developed different education and training initiatives. In 2015, the ‘Ask EuroSafe Imaging’ initiative was launched; three working groups, focusing on CT, paediatric imaging and interventional radiology, each composed of one expert in radiology, medical physics and radiography, regularly publish short educational material called ‘Tips and Tricks’ on the EuroSafe Imaging website. These are aimed at providing professionals, patients, and carers with concise educational material on a specific issue related to CT, paediatric imaging and interventional radiology. So far, almost 50 ‘Tips & Tricks’ editions have been produced. All material is freely accessible at www.eurosafiming.org and is also published on the ESR’s e-learning platform, Education on Demand.

EuroSafe Imaging also prepared the checklist ‘Managing a Safe CT Service’, which is available in English, Portuguese and Spanish. The initiative supports the development and dissemination of the ESR eGuide, which is a new ESR e-learning project utilizing the ESR Guide decisions support portal for training purposes.

EuroSafe Imaging is very pleased to collaborate closely on education and for imaging in clinical decision support with the IAEA Radiation Protection of Patients Unit. In this regard, webinars have been organised jointly since 2017, e.g. on the topics Clinical Decision Support, Tips & Tricks in CT DR, Hybrid Imaging and Justification and Guidance. Recordings of the webinars are freely available at both the EuroSafe Imaging and IAEA websites.

Currently, EuroSafe Imaging is developing an on-line course focusing on radiation protection in medical imaging.

EuroSafe Imaging ensures a multidisciplinary approach to medical radiation protection and, in accordance with the EuroSafe Imaging Call for Action’s latest key objective, Action 2.1, EuroSafe Imaging engages with stakeholders and collaborates with related initiatives and regulatory authorities in Europe and beyond to contribute to a global safety culture in medical imaging. Therefore, all EuroSafe Imaging activities are directed by a Steering Committee composed of representatives of the ESR’s Chair of the Working Groups, and members of the ESR Federation of Radiographer Societies (EFRS), the European Federation of Organisations for Medical Physics (EFPOM), and the European Federation of Radiographer Societies (EFSR), the European Society of Paediatric Radiology (ESPR). Additionally, the ESR’s Patient Advisory Group and the European Coordination Committee of the Radiological Electromedical and Healthcare IT Industry (COCIR) are invited as observers.

EuroSafe Imaging promotes medical radiation protection at over 50 meetings and conferences around the world annually to raise awareness about patient safety topics and support the development of new regional campaigns. EuroSafe Imaging is proud to be a role model for other safe imaging campaigns worldwide. They are coordinated by the International Society of Radiology Quality & Safety Alliance (ISROQA) under the co-chairmanship of the EuroSafe Imaging chair. Current members of ISROQA are AFRoSaf (E-AfroSafe and F-Afrsaf), Arabsafe, Canada Safe Imaging, EuroSafe Imaging, Imaging Centsy, Image Vitaly, Japan Safe Imaging, and LatinSafe.

To celebrate its fifth anniversary, EuroSafe Imaging has many activities in store for ECR 2019. EuroSafe Imaging will again have a dedicated EuroSafe Imaging Lounge on the 1st floor in Foyer N, which will feature a café, a photo booth and a stand providing information on patient safety topics. Moreover, seven Scientific Sessions, eight Coffee & Talk Sessions and three Voice of EPOS poster presentation sessions are organised. Furthermore, an electronic poster exhibition with over 120 submissions from experts around the world will be displayed.

For further information on the EuroSafe Imaging campaign visit the EuroSafe Imaging Lounge and take your souvenir photo, or go to www.eurosafiming.org.

Prof. Guy Frija with ISROQA member organisations and others at the 2019 European Conference on Radiation Protection in Medicine.
Cardiovascular effects after radiotherapy for breast cancer: the European MEDIRAD Project

Identification of imaging-derived cardiovascular effects after breast cancer radiotherapy: towards preventive strategies for radiation-induced major cardiac events

MEDIRAD

Radiation-induced major cardiac events (MCEs) are a growing problem for breast cancer patients, affecting quality of life and survival. It is crucial to unravel the relationship between radiation dose to cardiac substructures and MCEs and their early subclinical precursor cardiovascular effects to develop preventive strategies. Today’s EuroSafe Imaging session will focus on cardiovascular effects after radiotherapy for breast cancer, with three presentations from the European MEDIRAD Project (www.medirad-project.eu).

The MEDIRAD project, launched in June 2017, is the first EURATOM project dedicated to researching the implications of medical low dose radiation. Thirty-three partner organisations from 14 countries across Europe are participating in this ambitious four-year project, which was awarded €10 million under the EURATOM research and training programme of Horizon 2020.

Prof. Elizabeth Cardis (EIBISB, Spain) is the scientific coordinator of MEDIRAD and Prof. Guy Frija (UPDescartes, France) is responsible for the clinical management. The European Institute for Biomedical Imaging Research (EIBISB, Austria) is in charge of overall project management, as well as communication and dissemination activities.

The consortium brings together a wide range of expertise, including research groups that focus on radiology, nuclear medicine, radiotherapy, dosimetry, epidemiology, biology, informatics, modelling, radiation protection, and public health.

MEDIRAD has three major operational objectives:
1. Improving organ dose estimations and registrations;
2. Evaluating and understanding the mechanisms of the effects of medical radiation exposure, focusing on two outcomes of public health relevance (cardiovascular effects and cancer risk).
3. Developing science-based recommendations for the effective protection of patients, workers, and the general public.

Development of prediction models of early and late cardiovascular effects after radiotherapy for breast cancer to predict 1) imaging-based cardiovascular effects and 2) evaluating and understanding the mechanisms of the effects of medical radiation exposure, focusing on two outcomes of public health relevance (cardiovascular effects and cancer risk).

MEDIRAD work plan

By Anne Crijns

Wednesday, February 27, 08:30–10:00, Room N
EU I Cardiovascular effects after radiotherapy for breast cancer: the European MEDIRAD Project

» Chairpersons’ introduction
A. Crijns; Groningen/NL
G. Frija; Paris/FR

» Overview of dose-effect relationships and their use in strategies for prevention of cardiovascular effects after radiotherapy for breast cancer
A. Crijns; Groningen/NL

» Discussion
Optimisation of multivariable prediction models for major cardiac events after radiotherapy for breast cancer
D.S. Spoor; Groningen/NL

» Discussion
The MEDIRAD Early-Heart study
S. Jacobs; Fontenay aux Roses/FR

» Discussion
Imaging biomarkers of cardiovascular effects of incidental cardiac radiation
E. Moissaux; Paris/FR

» Discussion
This session is part of the EuroSafe Imaging campaign.

EuroSafe Imaging Session

Wednesday, February 27, 08:30–10:00, Room N
EU I Cardiovascular effects after radiotherapy for breast cancer: the European MEDIRAD Project

» Chairpersons’ introduction
A. Crijns; Groningen/NL
G. Frija; Paris/FR

» Overview of dose-effect relationships and their use in strategies for prevention of cardiovascular effects after radiotherapy for breast cancer
A. Crijns; Groningen/NL

» Discussion
Optimisation of multivariable prediction models for major cardiac events after radiotherapy for breast cancer
D.S. Spoor; Groningen/NL

» Discussion
The MEDIRAD Early-Heart study
S. Jacobs; Fontenay aux Roses/FR

» Discussion
Imaging biomarkers of cardiovascular effects of incidental cardiac radiation
E. Moissaux; Paris/FR

» Discussion
This session is part of the EuroSafe Imaging campaign.
AI needs to say: “may I?”

As artificial intelligence (AI) gets rooted deeper in radiology, the need for a framework for its ethical conduct becomes more urgent. Analogies from other fields in science may provide insights into the establishment of a code of ethics for the use of AI in radiology.

According to the world-renowned Dutch-American primatologist and ethologist Frans de Waal, at Emory University in Atlanta, morality originated within animal relations first, prior to Homo sapiens culture. His observations to determine any similarities between primates and humans in terms of morality led Professor de Waal to conclude that two factors consistently come out: reciprocity and empathy. In his TED talk titled ‘Moral behaviour in animals’, while very viral with more than four million views, de Waal shows what happens when two monkeys are paid unequally. What seems like a very human trait (caring about the well-being of others) is actually something we share with primates and other mammals.

With the advent of artificial intelligence (AI), we are facing a paradigm shift in our conceptualisation of handling enormous amounts of data with the ever-finer tools of reception and detection that are at our disposal in radiology. Gone are the days when we, as radiologists, in the daily practice of interpreting cross-sectional images from patients, were pretty much limited to our general perception of the shades of grey or other colour-coded pixels. Thanks to deep learning, we are now armed with the ability to acquire meaningful data that are otherwise beyond the range of our bodies’ capacity to process. This brings up the inevitable question: how should we govern AI from an ethical standpoint?

The ways intelligence is exercised in humans and in species taxonomically closer to us may offer hints to our handling of the ethical issues related to the latest manifestation of intelligence, AI. First, we have to recognise that “there is nothing artificial about AI”, as Fei-Fei Li, the co-director of the Stanford Human-Centered AI Institute, puts it. “It is inspired by people, it is created by people, and – most importantly – it impacts people.” Second, the two factors that Professor de Waal calls ‘the pillars of morality’, found in the behaviour of other mammals, can provide insights here. Reciprocity is associated with a sense of justice and fairness. Empathy is the ability to understand and share the feelings of another. The code of ethics for the use of AI in radiology needs to address these two essentials of mammalian ethics.

The ‘field of neuroscience’, in which I am more than four of us, is associated with a sense of justice and fairness. Empathy is the ability to understand and share the feelings of another. The code of ethics for the use of AI in radiology needs to address these two essentials of mammalian ethics.

We want to connect young radiologists in Europe with each other, but also with the clinical routine. In order to escape our emergency room, it is your task to diagnose all the pathologies our patient suffers from. You might use several modalities in trauma imaging. If you are able to detect all pathologies, you can save the patient’s life and escape the emergency room. But, as in real life, you need to keep an eye on the time and solve our prepared radiological riddles quickly (within 30 minutes), otherwise the patient will succumb to his injuries. The ER will be loaded with puzzles and tricky questions related to radiology and sciences tailored to all training levels, from resident to board-certified radiologist. We hope that we will be able to challenge your communication skills and your logical reasoning as a team, and that you will leave our room with a positive experience.

The non-profit organisation Young Radiologists in Europe aims to establish an international platform for job-related networking, as well as scientific exchange and cooperation for radiologists. We want to connect young radiologists and enable exchange between residents and renewed senior clinicians to support projects and ideas. To meet in person, it is our goal to provide a number of scholarships for different congresses and events (as we did for ECR 2018). Anyone who shares our vision is welcome to actively participate in the achievement of our goals! We are looking forward to meeting you at this year’s ECR.

The Escape Room will run from Tuesday, February 26, to Saturday, March 2, from 10:00 to 17:00, and will be located at the Hotel Melia Vienna, within the DC Tower. Sessions are for half an hour and the room will allow a maximum of six participants.

Key points: Registration? Just come around and try to escape! Where? 3rd floor of the Hotel Melia Vienna, DC Tower.

From 15-20 minutes

Dr. Tugba Akinci D’Antonoli is a radiologist and a researcher at the University Hospital of Basel in Switzerland. She is the lead author of the EPOS scientific exhibit titled ‘Ethical considerations for artificial intelligence implementation in radiology’.

BY TUGBA AKINCI D’ANTONOLI

Can you escape?

Working in a team that interacts well is daily business for medical professionals in clinical routine.

As we perform in hospitals every day, we would like to offer your team the unique experience of taking part in an escape game – of course with a radiological twist – at ECR 2019. It is brought to you and organised by the Young Radiologists in Europe.

The goal of all, what is an escape room (ER)?

Escape rooms have become commonplace around the world over the last decade. Participants enter as a team and then must solve a series of challenges in a set period of time in order to get a key to escape the room. Of course, we have adapted the game for the medical world, so you are able to participate with your colleagues. In order to escape our emergency room, it is your task to diagnose all the pathologies our patient suffers from. You might use several modalities in trauma imaging. If you are able to detect all pathologies, you can save the patient’s life and escape the emergency room. But, as in real life, you need to keep an eye on the time and solve our prepared radiological riddles quickly (within 30 minutes), otherwise the patient will succumb to his injuries. The ER will be loaded with puzzles and tricky questions related to radiology and sciences tailored to all training levels, from resident to board-certified radiologist. We hope that we will be able to challenge your communication skills and your logical reasoning as a team, and that you will leave our room with a positive experience.

The non-profit organisation Young Radiologists in Europe aims to establish an international platform for job-related networking, as well as scientific exchange and cooperation for radiologists. We want to connect young radiologists and enable exchange between residents and renewed senior clinicians to support projects and ideas. To meet in person, it is our goal to provide a number of scholarships for different congresses and events (as we did for ECR 2018). Anyone who shares our vision is welcome to actively participate in the achievement of our goals! We are looking forward to meeting you at this year’s ECR.

The Escape Room will run from Tuesday, February 26, to Saturday, March 2, from 10:00 to 17:00, and will be located at the Hotel Melia Vienna, within the DC Tower. Sessions are for half an hour and the room will allow a maximum of six participants.

Key points: Registration? Just come around and try to escape! Where? 3rd floor of the Hotel Melia Vienna, DC Tower.
Explore Guerbet Patient Pathway and Educational Program at Tech Gate
February 28 – March 3

Route from Austria Center Vienna
Route from underground
Church (‘Women in Focus’)
DC Box (‘ESR Connect‘Studio’)
Leading interventional radiologist receives ESR Gold Medal

Anna-Maria Belli, Professor of Interventional Radiology at St. George’s Hospital in London, UK, will be presented with the Gold Medal of the European Society of Radiology today. Ahead of the ceremony, she shared her views on which directions interventional radiology should take.

Interventional radiology (IR) procedures initially broke into the field of peripheral arterial disease by opening up blocked arteries and establishing angioplasty as a valid, alternative, minimally invasive therapy for those either unfit or unsuitable for standard bypass surgery. It has now become an accepted therapy, replacing open surgery in many situations and responsible for saving limbs from amputation.

As experience and skill with arterial catheterisation advanced, so did arterial embolisation, which is used with the opposite intention from angioplasty by selectively occluding arteries. Initially this was an emergency procedure used to treat life-threatening haemorrhage, making it difficult to train in. However, with its expanded indication in the treatment of vascular tumours, it has become a common elective procedure and it has been one of Belli’s special areas of research during the four decades in which she has practised as an interventional radiologist. "Embolisation is now an alternative treatment which may replace standard surgical options, e.g. in the treatment of thyroid and benign prostatic hyperplasia," she said.

Non-vascular interventional radiology has also grown in leaps and bounds, particularly in the management of cancer with interventional oncology. "The new technologies being introduced into interventional oncology are amongst the most exciting developments and indicate a very strong future for IR," she believes.

Although advances in the technology and application of IR have been spectacular, the subspecialty faces serious threats. It is of paramount importance for interventional radiologists to take clinical responsibility for managing patients and not act as technicians at other clinicians’ request. “That is simply no longer acceptable, if it ever was,” she said.

Interventional radiologists understand the imaging as well as the clinical and technical role of the therapies they offer. They are counselled for their expertise and have the best understanding of the risks and benefits of their treatments. Therefore they need to see their patients in a clinical setting before and after intervention. “This can be a challenge, as, historically, radiology departments have not been set up with this in mind,” she admitted.

Another issue is the lack of candidates to take up the torch, as insufficient trainees come into the specialty. Their absence is felt particularly strongly in the UK, where a lack of trainees and manpower has become a challenge for diagnostic and interventional radiology services, but this is also true for the rest of Europe.

Belli believes the unclear training pathways and onerous emergency duties, as a consequence of inadequate numbers, may be putting off aspiring candidates. “A clear training path for those who wish to become IRs would attract the more surgically minded junior doctors and prevent them from selecting other surgical specialties,” she explained.

One thing is certain: unless IR has adequate numbers to support major centres and the ability to offer a 24/7 IR service, it will lose ground to other specialties.

Another very serious challenge is attracting more women into the field. Currently only about 12% of IRs are female, and this percentage is only slowly increasing. With less than 35% of medical school graduates being female, the community needs to address this problem urgently.

Belli was the first, and so far only, female president of the British Society of Interventional Radiology (BSIR), as well as the first female president of the Cardiovascular and Interventional Radiological Society of Europe (CIRSE). In her time as president, she created the Women in IR session at CIRSE 2019, and she says the society continues to prioritise this issue.

Empowering women to take on leadership roles is helpful, but, as in many other industries, practical solutions are required to get more women interested in the field. “I think the key is developing flexible training and working schedules. At the moment 80–90% of all IRs work full time, yet we know that women in particular favour flexible working arrangements. Belli also blames a disproportionate fear of exposure to radiation for the lack of interest amongst women medical graduates. Radiologists understand how to minimise exposure both for workers and patients, and it is part of their role, but they also need to educate medical students and young doctors who are considering their career options.

“No-one should suggest to a woman that she should not become an interventional radiologist because she will be exposed to radiation. This is a form of discrimination, as it is the prevention of women performing IR procedures whilst pregnant. The evidence shows that radiation doses are negligible with modern equipment and good technique,” she insisted.

A dedicated interventional radiology (IR) programme will again be held at the ECR in the Cube, a new addition that attracted lots of delegates last year. Spreading over 700m² of floor space in the Mélia Hotel, the Cube 2.0 will once more provide an engaging, hands-on introduction to the fascinating world of IR, with four main themes, one per congress day: peripheral IR, central IR, oncological IR and neuromodulatory IR. Friday, March 1 will notably feature five interactive sessions on oncological IR, with opportunities for participants to simulate oncological interventions.

The Cube is also cooperating with the European Federation of Radiographer Societies (EFRS) and radiographers are very welcome to take part. This ‘Silicon Valley’ of IR education is sure to make a big splash at ECR 2019!
Expand your role and show value, Donoso urges radiologists

Prof. Luis Donoso Bach from Barcelona, a former ESR President, will receive the ESR Gold Medal, the highest honour bestowed by the society today at the ECR.

"The ESR is also becoming a more and more global society and one of its challenges for the years to come will be to integrate all these new members from all over the world in the best possible way," he concluded.

Highly respected Russian radiologist continues to reach for the top, after two decades with the ESR

Professor Valentin Sinitsyn is chair of radiology and head of the radiology department at the medical faculty of Moscow Lomonosov State University, Moscow. A pioneer in cardiac imaging in Russia, he has helped advance the field in his country, but believes there is still much to be done to increase MR and CT use.

After 20 years of working to advance the ECR and European radiology, he will receive the ESR Gold Medal today.

Sinitsyn has championed the introduction of spiral and multidetector CT, high-field MRI and hybrid imaging, and the development of evidence-based radiology and medicine.

As he graduated from Sechenov Medical University in Moscow in 1979, cardiac CT and MRI did not yet exist. "With the help of these new modalities, radiology penetrated fields where it had never been used before, and the best example is cardiac imaging," he said.

Sinitsyn started implementing cardiac imaging back in the 1980s and has very fond memories from that time. Although there were also harsh days for the field, he said: "Most cardiologists and radiologists believed that cardiac MRI and CT were tools that were good for nothing in real clinical practice. I still remember my first case of apical hypertrophic cardiomyopathy diagnosed with cardiac MRI in 1987, when nobody could make a correct diagnosis," he said.

Today, Sinitsyn is working to overcome a little disappointment with the slow penetration of cardiac MRI and CT in Russian clinical practice. The benefits of modern cardiac imaging are well known, but the percentage of cardiac CT and MR examinations in cardiac imaging is just around 1%. "Low reimbursement for such examinations and insufficient knowledge and motivation from both radiologists and cardiologists are mostly to blame for this situation," he said.

Cardiac radiology is much more complex than searching for pulmonary nodules with chest CT, and new artificial intelligence (AI) is also entering the field. Sinitsyn and his team are working on automatic analysis of coronary arteries and CT fractional flow analysis, and there are many other possible applications of AI in cardiac radiology. Quantitative analysis of cardiac imaging datasets, such as myocardial perfusion and strain analysis, and 3D and 3D-mapping, should become more accurate, and less operator-dependent and time-consuming, he suggested.

"Radiologists must be involved in AI, as it will increase their productivity and give them more opportunities for creative work and new breakthroughs in diagnostic imaging," he said.

As the president of the Russian Society of Radiology Sinitsyn acknowledges the part played by European Society of Radiology in preparing him for the role. "Both the ESR and its meeting the ECR shaped me as one of the leaders of Russian radiology. I have spent..."
The UK’s need for more radiologists continues to be an overarching challenge for the Royal College of Radiologists (RCR). Demand for the diagnostic reporting and interventional skills of radiologists continues to spiral, but the workforce is not keeping up. The RCR’s most recent workforce census revealed the National Health Service (NHS) is now short of at least 1,000 diagnostic radiologists needed properly to meet the demand for patient imaging, an estimate we know is incomplete because the UK also needs hundreds more interventional radiologists.

The number of vacant radiologist posts is growing, as is the amount of money that hospitals spent £116m on out-of-hours reporting and outsourcing (double the amount spent in 2014).

As well as pushing for more financial support for the NHS to upgrade scanning equipment and invest in the camaraderie and clinical opportunities these European colleagues.

The RCR continues to lobby the Government throughout 2018 to improve upon them the vital importance of medical radiostatope, at the time of writing the College was still awaiting clear contingency plans in the event of a ‘no deal’ Brexit. Therefore, we will continue to hold trainees and consultants will not face any new barriers in coming to the UK as highly skilled workers.

One area that did receive definitive government funding last year was artificial intelligence (AI) in imaging. Various public-private partnerships were unveiled during 2018, including the award in November of £50 million to five research consortia in England and Scotland tasked with developing AI to improve imaging and pathology analysis.

The College is hugely supportive of the UK’s concerted push to develop imaging AI, which we know will be fundamental to improving patient care and supporting radiologists in future. College officers and the RCR’s AI research policy group meet regularly with the NHS, industry and regulatory bodies to discuss standardisation and validation of AI algorithms ahead of clinical application, and we look forward to continuing to influence AI development in UK radiology.

Dr. Nicola Strickland is a consultant radiologist at Imperial College Healthcare NHS Trust in London and President of the Royal College of Radiologists.

BY NICOLA STRICKLAND

Radiologist staffing uncertainties of Brexit and opportunities of AI remain vital issues for ECR

The need for more radiologists continues to be an overarching challenge for the Royal College of Radiologists (RCR).

The need for more radiologists continues to be an overarching challenge for the Royal College of Radiologists (RCR).

sinitsyn served as teaching activities.” During these two decades, Sinitsyn served as president of both the European Society of Nuclear Radiology and ECR 2014, as well as serving on countless related committees. He tries to reach for the top, to match the ESR’s standards, and works to motivate colleagues, resi-
dents and students to do the same.

Knowing the needs of radiology in his home country, he was able to suggest topics important to radiologists from Russia and its neighbour-
boring countries. He has notably contributed to the implementa-
tion of international standards of teaching and training in radiology in Russia, and organised the trans-
lation and promotion of BI-RADS and textbooks on MR, emergency radiology and cardiac imaging in his country.

Sinitsyn believes that the ESR should now be more active in issuing different standards and guidelines, which are necessary for radiological practice. “A lot of work has already been done in this field, with documents available on the ESR website and the launch of initiatives like EuroStale Imaging and the ESR iGuide, and the trend must continue and evolve further,” he said.

In 2019, the ECR celebrates its 25th congress in Vienna. In this iconic year, participants should not miss out on the recently intro-
duced ‘Coffee & Talk’ open forum, where challenging problems and developments in modern radi-
ology are discussed in an inform-
al and friendly atmosphere. Another important part of the programme are the ‘European Excellence in Education (EE)’ ses-
sions, which give the most essen-
tial and up-to-date knowledge to both young and experienced radi-
ologists, and are essential courses for preparing for the European Diploma in Radiology (EDIR) examination,” he noted.

And of course, he very much welcomes being awarded the ESR Gold Medal at his favourite con-
gress. “I sincerely believe that the ECR is the most attractive and interesting radiological congress,” he said.

In 2014, the RCR’s most recent workforce census revealed that, regardless of a deal or ‘no deal’ Brexit, EU trainees and con-
sultants will not face any new barriers in coming to the UK as highly skilled workers.

The ECR is also urging officials to add specialty and associate spe-
ciality radiologists to the UK’s Short-
age Occupation List, to help us channel more EU radiology exper-
TEN into UK hospitals.

At the time of writing, the future of the UK’s EU Withdrawal Agree-
ment was in flux, which meant uncertainty around the future procurement logistics of medical supplies and medical radiostatopes in the event of a ‘no deal’ Brexit. Officials have been working with the healthcare industry on stock-
pile planning for medicines and equipment while encouraging man-
ufacturers to focus on air freight fast-transport for the imported radiostatopes that are crucial for
diagnostic scanning and cancer treatment.

Despite meeting members of Government throughout 2018 to improve upon them the vital impor-
tance of medical radiostatope, at the time of writing the College was still awaiting clear contingency pro-
tocols for radiostatopes supply post-
Brexit. Therefore, we will continue to hold officials to account until future supply is assured.

Improving the equipment base and guiding the growth of artifi-
cial intelligence. Throughout 2018 the RCR worked hard to raise awareness of the UK’s urgent need for better scanners, and we will continue to lobby hard on the issue. Key topical campaigns last year included the provision of the CT angiography scans that are vital in detecting heart disease, as well as shortfalls in providing mul-
ti-parametric MR imaging to detect prostate cancer and appropriately target prostate biopsies.

We supplied health policy mak-
ers with the contingencies needed to upgrade scanning equipment across NHS hospitals, as well as quoting for the workstations and IT connectivity that would allow our radiologists to work as effec-
tively as possible. The UK Government has given general statements about supplying new scanners and capital investment, and we will still await any firm news of committed investment.

One area that did receive definitive government funding last year was artificial intelligence (AI) in imaging. Various public-private partnerships were unveiled during 2018, including the award in November of £50 million to five research consortia in England and Scotland tasked with developing AI to improve imaging and pathology analysis.

The College is hugely supportive of the UK’s concerted push to develop imaging AI, which we know will be fundamental to improving patient care and supporting radiologists in future. College officers and the RCR’s AI research policy group meet regularly with the NHS, industry and regulatory bodies to discuss standardisation and validation of AI algorithms ahead of clinical application, and we look forward to continuing to influence AI development in UK radiology.

Dr. Nicola Strickland is a consultant radiologist at Imperial College Healthcare NHS Trust in London and President of the Royal College of Radiologists.
ESNR tackles challenges in paediatric neuroimaging

Paediatric neuroimaging specialists are facing many demands as well as opportunities to improve. In this context, I will briefly present a few of these challenges here.

Technical Focus Sessions will scrutinise sample attention: six dedicated sessions dedicated to the topic will also be touched on in a Case Report Session on women’s and men’s health, with Tiago Bilhim discussing radial access and cell protection embolisation for PAE. The session also offers those attending insights into other important quality-of-life issues, such as priapism, postpartum haemorrhage following abdominal placental abruption and endometriosis.

Invasive issues themselves can represent a driving force in the continuing expansion of IR services. While IR’s role in cancer care and trauma management is supported primarily by colleagues and national guidelines, patients themselves are seeking out minimally invasive treatments for chronic quality-of-life issues, and interventionists should be ready to meet this demand.

Novel therapies will also be given plenty of space at ET 2019, including embolisation for osteoarthritis, haemorrhoids, lymphatic and obesity. Coming hot on the heels of controversial data at RENA 2018, this session will seek to educate the audience on current surgical options for obesity animal and human data on bariatric embolisation and the possible use of y-90 microspheres to enhance its effect. Alongside many clinical applications and techniques, embolisation technologies will also be given ample attention: six dedicated Technical Focus Sessions will scrutinise currently available embolisation and support technologies (such as liquid embolics, microcatheters or cone-beam CT), and delegates will also have access to an extensive, embolisation-focused technical exhibition.

CIRSE is very much looking forward to further strengthening embolisation education and supporting its development as an integral part of IR practice. We therefore warmly invite all radiologists with an interest in embolotherapy, colleagues, friends and corporate partners to embrace this new CIRSE conference and join us for ET 2019 in Valencia!

www.cirseconference.org

The inaugural meeting of the new European Conference on Embolotherapy (ET), organized by CIRSE, will be held in Valencia, Spain, on June 26–29.

“Great things are done by a series of small things brought together” Vincent van Gogh

Embolotherapy in the spotlight – ET 2019 in Valencia

Carotid-directed embolotherapy has become an indispensable treatment for a variety of conditions and is an integral part of interventional radiology (IR) practice. The recent technical advancements and ensuring that IRs receive first- rate education on the growing port- folio of embolisation procedures is a key mission of the Cardiovascular and Interventional Radiological Society of Europe (CIRSE).

Until now, the subject was tackled within the framework of the Annual Meeting and at smaller hands-on training courses, with a hitherto sparse effort of being expended on the CREST Europe meeting, organised in collaboration with the CIRSE founders. In 2019, CIRSE’s embolisation activities will become an annual event, in the form of the new European Conference on Embolotherapy (ET).

ET shifts CIRSE’s embolotherapy education into a higher gear, pro- viding us with a dedicated annual embolisation conference, which will enable the IR community to learn about new innovations in the field of embolisation and con- tribute to its continuing evolution. The inaugural meeting will be held in Valencia, Spain, on June 26–29.

The strong versatility of embolisation is clearly seen in the scientifi- c programme, which spans a range of established and novel applications.

An area of great clinical and pub- lic interest in recent years has been prostatic artery embolisation (PAE) for benign prostatic hypertrophy (BPH). This condition is highly prev- alent, affecting half of males aged 50 and over, and approximately 9% of men who reach their 80s. It can result in a serious reduction in the quality of life, affecting urination and bladder control, and increasing the risk of urinary tract infections and kidney problems.

PAE offers an attractive ther- apeutic approach to BPH, using microspheres to embolise the prostatic artery, blocking the blood supply to the prostate in order to improve lower urinary tract symp- toms. This procedure has been gaining recognition and popular- ity in recent years, with patient benefits already shown in short- and mid-term results, with long- term results now beginning to be published.

ET offers considerable oppor- tunities for a thorough discussion of the available materials, proper technique, and naturally the lat- est data. An Established Therapy Session dedicated to the topic will see renowned experts, including Francisco Carnicero (the innov- ator behind the sophisticated PEFoTED technique) and Nigel Hacking, addressing patient selec- tion, anatomy technique, post-procedural care and most crucially, the evidence to support its use.

The topic will also be touched on in a Case Report Session on women’s and men’s health, with Tiago Bilhim discussing radial access and cell protection embolisation for PAE. The session also offers those attending insights into other important quality-of-life issues, such as priapism, postpartum haemorrhage following abdominal placental abruption and endometriosis.

Invasive issues themselves can represent a driving force in the continuing expansion of IR services. While IR’s role in cancer care and trauma management is supported primarily by colleagues and national guidelines, patients themselves are seeking out minimally invasive treatments for chronic quality-of-life issues, and interventionists should be ready to meet this demand.

Novel therapies will also be given plenty of space at ET 2019, including embolisation for osteoarthritis, haemorrhoids, lymphatic and obesity. Coming hot on the heels of controversial data at RENA 2018, this session will seek to educate the audience on current surgical options for obesity animal and human data on bariatric embolisation and the possible use of y-90 microspheres to enhance its effect. Alongside many clinical applications and techniques, embolisation technologies will also be given ample attention: six dedicated Technical Focus Sessions will scrutinise currently available embolisation and support technologies (such as liquid embolics, microcatheters or cone-beam CT), and delegates will also have access to an extensive, embolisation-focused technical exhibition.

CIRSE is very much looking forward to further strengthening embolisation education and supporting its development as an integral part of IR practice. We therefore warmly invite all radiologists with an interest in embolotherapy, colleagues, friends and corpo- rate partners to embrace this new CIRSE conference and join us for ET 2019 in Valencia!

www.cirseconference.org

The inaugural meeting of the new European Conference on Embolotherapy (ET), organized by CIRSE, will be held in Valencia, Spain, on June 26–29.
ESCR continues to expand and promote cardiovascular radiology in Europe

Promotion of cardiovascular imaging through education and research remains in the spotlight for the European Society of Cardiovascular Radiology (ESCR). The ESCR is the platform for standardisation, networking, advocacy and expert certification of cardiovascular radiology in Europe.

Cardiovascular radiology has in the last decade been at the forefront of new developments in non-invasive imaging of the heart and vessels. The increasing diagnostic and prognostic importance of imaging studies performed by radiologists is reflected by expanding indications (e.g. transcatheter valve replacement), the development of new techniques for evaluation of cardiac disease (e.g. myocardial T1-mapping) and the practical implementation of recent insights into the prognostic value of CT of the coronary arteries in various populations, among other examples.

Promotion of scientific activities and education has always been one of the pillars of the ESCR’s support of radiologists in the field of cardiovascular imaging. Our educational webinars, introduced in 2016, are one successful example of how the ESCR is using new forms of communication and media to reach out to our members and other interested colleagues. The programme for 2019 includes basic and advanced cardiovascular imaging topics (Table 1). Traditionally, these webinars have been delivered and moderated by experts in their fields in an interactive, informal fashion. In 2019 we are introducing a new format for webinars, in which the recently established ESCR MR/CT Registry will play an active role. The creation of this Young Club represents an important part of the ESCR’s focus on its young set members. The Young Club, currently led by Dr. Giuseppe Muscogiuri, promotes our young talents, giving them a voice within our community by among other things, publishing a newsletter every three months. All webinars remain available on the new ESCR website, accessible to all members to view on demand. In order to make the education offerings of the ESCR as accessible as possible, the membership cost for 2019 amounts to only €40 for all membership types. Besides these webinars, the ESCR continues to provide workshops on a variety of topics, often emphasising in close relation with the annual ESCR event or with local organisations. Finally, the ESCR supports the European School of Radiology (ESOR) Exchange Programme for Fellowships, offering young qualified trainees the opportunity for further sub-specialisation in cardiovascular imaging in prestigious training centres in Europe. Each year, two fellowship grants provided by the ESR/ESCR and ESCR are provided to successful applicants. Our annual meeting remains a popular highlight among the cardiovascular radiology community in Europe for state-of-the-art education and networking. After a successful joint ESTI-ESCR meeting in Geneva (Switzerland) in May 2018, the ESCR is currently preparing for its next meeting, an event that will take place between October 21 and 23, 2019, in the vibrant city of Antwerp, Belgium. The ESCR also continues to develop relationships with other societies, including the Asian Society of Cardiovascular Imaging (ASCI) and the North American Society for Cardiovascular Imaging (NASCI). One of our current major tasks is the daily support and professional defence of our members. In recent years, significant efforts have been made to further document the contributions that radiologists are making to the development and execution of cardiovascular radiology in Europe. This is an important task, as many developments occur at the crossroads of medical specialties with potentially conflicting interests. For this reason, an MR/CT registry was introduced in 2012, allowing anonymous registration of cardiac MR and CT cases. It now includes more than 230,000 submissions from more than 1,380 contributors, spread over 31 participating centres from 33 countries (Table 2). The registry not only provides an extensive database for education and preparation of cardiac examinations, but also serves as a data source for multicentre studies in cardiac imaging and as factual documentation of the increasingly active role that radiologists play in the field of cardiovascular radiology. A different practical support initiative offers templates for structured reporting in cardiac radiology. It constitutes a joint venture between the ESCR and Smart Cardiovascular Imaging (SCI) and is integrated into the aforementioned MR/CT registry. It not only provides a practical way to generate standardised reports with minimal additional typing but also enables collection of data in a highly structured fashion suitable for further analysis. To further guide the implementation of important imaging topics, consensus documents are being developed by the ESCR board on a variety of topics. The consensus document on transcatheter aortic valve replacement has been finalised and will be available soon.

Finally, the European Board of Cardiovascular Radiology (ESCR) diploma represents a recognised European qualification in cardiovascular radiology for radiologists, confirming their expertise in this field and allowing for objective promotion of their skills and experience during their professional lives. It is endorsed by the European Society of Radiology, with examinations taking place at the annual ESCR and ECR meetings. More information can be found at the ESCR website (www.escr.org).

Your passport to a better career in Radiology

Meet the ESR team at their Airstream during ECR for full information about the upcoming examinations. Special examination fees for those who apply for the ESR examination during ECR 2019.

General Topic Title Subtopics
Optimise your cardiac MR How to avoid common problems/mistakes Setting up a CMR examination: standard workflow & sequences revisited How to avoid artefacts and pitfalls
Optimise your cardiac MR Cardiac MR optimisation in daily clinical routine “My late enhancement does not work”—clinical examples, explanations and solutions
Modern techniques for Cardiac CT Anatomy or function or both? Assessment of coronary stenosis and FFR CT perfusion
Modern techniques for Cardiac CT Case-based assessment of coronary artery disease Assessment of stable coronary artery disease CT in acute chest pain
Modern techniques in Cardiac MR The fourth and fifth dimension in cardiac MR 4D flow imaging in cardiac imaging: Ti mapping; how, when and why?
Modern techniques in Cardiac MR Case-based functional cardiac MR Myocardial characterisation, how do I do it Assessment of grown-ups with congenital heart diseases (ESCR)
Valvar Imaging CT and MR in valvular heart disease: advanced imaging techniques (beyond echo-...) CT before minimal invasive valvular repair Maybe MR in valvular heart disease: when echocardiography is not enough
Valvar Imaging Case-based valvular radiology CT before and after minimal invasive valvular MR valve repair
Structural Heart Disease Cardiac imaging before intervention in structural heart disease What do we need prior to treatment of intracardiac defects? What cardiac imaging can provide in / for Electrophysiology
Structural Heart Disease Case-based cardiac assessment on unguided cath How to approach the unguided heart? Great vessel diseases of the chest

Table 1: Educational webinars, organised by the ESCR in 2019

<table>
<thead>
<tr>
<th>Participating nations</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participating centres</td>
<td>22</td>
</tr>
<tr>
<td>Contributing users</td>
<td>1,382</td>
</tr>
<tr>
<td>CT submissions</td>
<td>105,263</td>
</tr>
</tbody>
</table>

Table 2: ESCR MR/CT registry data (see also www.mrct-registry.org)
BARBARA GEEROMS AND CEDRIC BOHYN

Previously busy October for Lithuanian Radiologists’ Association

On October 5–6, 2018, the city of Kaunas, Lithuania, hosted the 7th Baltic Congress of Radiology (ECR TODAY | WEDNESDAY, FEBRUARY 27, 2019)

The Young Radiologist Section of the Belgian Society of Radiology: who are they, what do they do and what drives them?

The board of the Belgian Society of Radiology (BSR), including members of the YRS, during the BSR’s 2018 Annual Meeting.

Barbara Geeroms is co-editor of the Journal of the BSR (JBSR) and Barbara Geeroms and Cedric Bohyn are radiology residents at the University Hospital of Louvain and board members of the Young Radiologist Section (YRS) of the Belgian Society of Radiology (BSR). The board of the BSR is rounded off on October 5 and 6 at the congress of the association, which takes place every three years, with elections of the board and the president of the association.

The main points of the report were the re-election of Prof. Saulius Lukosevicius as President of the Association as well as the two largest Univer-

The Young Radiologist Section of the Belgian Society of Radiology: who are they, what do they do and what drives them?

The board of the Belgian Society of Radiology (BSR), including members of the YRS, during the BSR’s 2018 Annual Meeting.

Barbara Geeroms and Cedric Bohyn are radiology residents at the University Hospital of Louvain and board members of the Young Radiologist Section (YRS) of the Belgian Society of Radiology (BSR)....
Special Exhibition: Ernst Caramelle A Résumé

MUMOK
1070 Vienna, Museumsplatz 1
www.mumok.at
WHAT’S ON TODAY IN VIENNA?

WEDNESDAY, FEBRUARY 27, 2019

Theatre & Dance

Kommt ein Pferd in die Bar
Based on a novel by David Grossman
AKADEMIETHEATER | 20:00
1010 Vienna, Lisztstraße 1
Phone: +43 1 51444 4145 | www.burgtheater.at

Mephisto
based on the novel by Klaus Mann
BURGTHEATER | 20:00
1010 Vienna, Universitätsring 2
Phone: +43 1 51444 4145 | www.burgtheater.at

Acht Frauen
by Robert Thomas
KAMMERSPIELE DER JOSEFSTADT | 19:30
1010 Vienna, Rotenturmstraße 20
Phone: +43 1 42 700 300 | www.josefstadt.org

europa flieht nach europa
by Miroslava Svolikova
KASINO AM SCHWARZENBERGPLATZ | 20:00
1010 Vienna, Schwarzenbergplatz 1
Phone: +43 1 51444 4140 | www.burgtheater.at

Alles für'n Hugo
Contribution by Casper Kraner and Hugo Wiener by Katharina Straller
RABENHOF | 20:00
1030 Vienna, Rabengasse 3
Phone: +43 1 712 82 82 | www.rabenhoftheater.com

Macbeth
By Gertot Plass
TAG | 20:00
1060 Vienna, Gumpendorfer Straße 67
Phone: +43 1 5865222 | www.dastag.at

Der einsame Weg
by Arthur Schindler
THEATER IN DER JOSEFSTADT | 19:30
1080 Vienna, Josefstadtier Straße 26
Phone: +43 1 4 700 300 | www.josefstadt.at

Tuesdays with Morrie
by Jeffrey Hatcher and Mitch Albom
VIENNA’S ENGLISH THEATRE | 19:30
1080 Vienna, Josefstadtier Straße 12
Phone: +43 1 402 12 60 0 | www.englishtheatre.at

Komödie im Dunkeln
by Peter Shaffer
VOLKSTHEATER | 19:30
1070 Vienna, Neustiftgasse 1
Phone: +43 1 5211 400 | www.volkstheater.at

Concerts & Sounds

Isabelle Faust, violin
Alexander Melnikov, piano
L. van Beethoven: Sonata a minor op. 23 for violin and piano, Sonata f major op. 24 for violin and piano, (“Spring’s sonata”), Sonata g major op. 96 for violin and piano
KONZERTHAUS | 19:30 | MOZART-SAAL
1030 Vienna, Lothringerstraße 20
www.konzerthaus.at

Wiener Symphoniker
Conductor Alain Altinoglu
Nora Guthsch, mezzo-soprano
Denis Matsuev, piano
F. Liszt: concerto for piano and orchestra no. 2 a major; S. Prokofjew: Cantata for mezzo-soprano, choir and orchestra, op. 78
MUSIKVEREIN | 19:30 | GROSSER SAAL
1010 Vienna, Bösendorferstraße 12
www.musikverein.at

George Cables (USA) & Victor Lewis Quartet (Italy)
PORGY & BESS (JAZZ) | 20:30
1050 Vienna, Riemergasse 11
www.porgy.at

Joachim Schneebberger Quartett
Swing, Modern Jazz
JAZZLAND (JAZZ) | 21:00
1010 Vienna, Franz-Josef-Kai 29
www.jazzland.at

The Blackberries (Germany) • guests
ARENA (POP, ROCK & ALTERNATIVE) | 20:00
1050 Vienna, Baumgasse 80
www.arena.wien

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

Opera & Musical Theatre

Elias
by Felix Mendelssohn Bartholdy, text following the Old Testament
Conductor: Calixto Bieito
Director: Christian Gerhaher, Maria Bengtsson, Michael J Scott, Ano-Beth Savang, Kai Rüütel, Carolina Lippe, Anna Marshania, Florian Köfler, ORF Radio-Symphonie-orchester Wien, Arnold Schenken Chor
THEATER AN DER WIEN | 19:00
1060 Vienna, Linke Wienzeile 6
www.theater-wien.at

Pinocchio
Opera by Pierangelo Valtinoni
Conductor: Guido Mancusi
VOLKSOPER | 19:30
1090 Vienna, Währingerstraße 78
www.volksoper.at

I Am From Austria
Musical with songs by Rainhard Fendrich
RAJMUNDTHEATER | 18:30
1010 Vienna, Seilerstätte 9
www.musicalvienna.at

Bodyguard
by Lawrence Kasdan & Alexander Dixelters
RONACHER | 18:30
1060 Vienna, Wallgasse 18–20
www.musicalvienna.at

Cinema & Film

Il Villaggio di cartone (The Village of Carton, Italy 2011)
by Ermanno Olmi
FILMMUSEUM | 18:30
1010 Vienna, Augustinerstraße 1
Phone: +43 1 533 70 54
www.filmmuseum.at

Every Thing Will Be Fine (Germany/Canada/Norway/ Sweden/France, 2015)
by Wim Wenders
METRO KINOKULTURHAUS | 18:30
1010 Vienna, Augustinerstraße 1
Phone: +43 1 512 18 03
www.filmarchiv.at

Don’t Come Knocking (Germany/USA/France, 2005)
by Wim Wenders
METRO KINOKULTURHAUS | 21:00
1010 Vienna, Johannngasse 4
Phone: +43 1 512 18 03
www.filmarchiv.at
TODAY

Room A

Grand Opening

FIVE SENSES

17:45

THE 25TH ECR IN VIENNA
ECR 2019 — LET'S CELEBRATE TOGETHER