FRIDAY, MARCH 1

ECR TODAY

3
**Friday, March 1**

**11:00–12:00**  
AI in 8 – industry pitches from Icometrix, Envoy AI, Aidence, AGFA, Osimis

**12:00–12:40**  
Dr. Liz O’Riordan: AI from a Patient’s Perspective

**12:45–13:00**  
Q&A with Dr. Liz O’Riordan & Dr. Hugh Harvey

**13:30–14:30**  
AI in 8 – industry pitches from Smart Reporting, iCAD, Contextflow, Oxipit, 12 Sigma Technologies

**14:30–15:30**  
AIX Panel: Implementing Artificial Intelligence in Clinical Care  
Moderator: Dr. Wim Van Hecke

**Saturday, March 2**

**11:00–12:00**  
AI in 8 – industry pitches from Densitas, Infervision, Nvidia, Incepto Medical, Subtle Medical

**12:00–12:40**  
Dr. Filippo Pesapane & Dr. Marina Codari: AI Ethics and Regulation: an open issue

**12:45–13:00**  
Q&A with Dr. Filippo Pesapane, Dr. Marina Codari & Dr. Wim Van Hecke

**13:30–14:30**  
AI in 8 – industry pitches

**14:30–15:30**  
AIX Panel: Where to next?  
The Regulation of Radiological AI in Europe and Abroad  
Moderator: Dr. Hugh Harvey

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**AIX PARTICIPANTS**

AGFA Health | CareAidence | Aidoc | BioMind | Cercare Medical | contextflow | Combinostics  
CorTechs Labs | Densitas | EnvoyAI | iCAD | icometrix | Incepto Medical | Infervision  
Kheiron Medical | NVIDIA | Median Technologies | M*Modal | OnePacs | Osimis | Oxipit  
Quantib | Quibim | Smart Reporting | 12 Sigma Technologies

**THE AIX IS PROUDLY SUPPORTED BY CANON MEDICAL**
Interventional radiologists respond to growing pressures to minimise radiation risks

Interventional radiologists may be raising their risk of cancer due to a deficit of training and awareness, but there are practical ways to reduce the risks, expert speakers will tell ECR 2019 delegates at today’s joint session of the ESR and the European Federation of Organisations for Medical Physics.

“It is not a statistically proven coincidence, but brain tumours have been seen in interventional cardiologists and radiologists,” said Prof. Peter Vock, professor emeritus at the University of Bern, Switzerland. “These tumours have been mostly on the left side of the brain and, if you know the architecture of an interventional unit, this is the side where you have higher exposure when you do interventions.”

Prof. Werner Jaschke, chairman of the Department of Radiology at the University of Innsbruck, Austria, noted that an increased number of radiation-induced skin injuries have been observed since the year 2000, after a long period when low-dose diagnostic procedures and improved radiation protection made radiation-induced tissue injuries a non-issue for radiologists.

“Radiologists think the risks of radiation are exaggerated, and this was true for a long time, but, with more and more high-dose procedures, especially in interventional radiology, it is important to address this again,” he said.

The effects of radiation exposure remain poorly understood, explained Vock. Until recently, the statistics for radiation exposure came from Japanese atomic bomb survivors and a few other studies of humans, many of whom had received higher doses than radiologists receive at work.

Common models of the biological effects of radiation exposure, such as the linear no-threshold (LNT) model favoured by some international bodies, make questionable assumptions when extrapolating to effective doses below around 50 millisieverts (mSv), he continued. “To add to the complexity, the randomly determined risk of radiation-induced cancer varies by dose rate, age at exposure, gender, individual radiosensitivity, and the location of the exposure. The lung, thyroid, and breast, for example, are more vulnerable than some other parts of the body.”

Despite the uncertainties, Vock said there is some evidence that low doses of radiation can be harmful. For instance, a large study of nuclear plant workers found an increased rate of cancer deaths at a mean cumulative dose of 21 mSv – in the range received by interventional radiologists at work (Risk of cancer from occupational exposure to ionising radiation: retrospective cohort study of workers in France, the United Kingdom, and the United States [INWORKS] BMJ 2015 doi: 10.1136/bmj.h3819).

Fortunately, interventional radiologists can reduce their exposure by following the rules of best practice, he noted. “If you use all these rules, you will have a small fraction of the exposure you would have without, and the risk is minimised.”

The first rule is to question the justification of the fluoroscopic intervention. Other techniques might be more appropriate and, if so, the radiation dose can be reduced – if not removed entirely. Radiation exposure is higher with complex procedures involving long fluoroscopy time and multiple images or angiographic series; according to Jaschke. Radiologists can reduce the dose they receive by, for example, switching from 16 frames per second to a lower-frame rate when you do interventions.”
There is a new opportunity today to take the EDiR examination for free next year at the ECR 2020!

Solve the question posted at the EBR blog before 13:30h.

The question right answer and the winner will be announced at the EBR blog at 14:00h today.

The European Board of Radiology will raffle amongst the winners a free examination fee for the examination that will take place within the ECR 2020 frame. ECR 2020 free registration will be also included!

Go to the EBR blog at blog.myebr.org to find the EDiR Question of the Day, and further interesting resources to prepare for the examination.
In his talk, he will present results from a survey of EuroSafe Imaging Star departments to show how many of them have implemented the new requirements. A further survey of national societies aims to discover how many European Union member states have implemented nationwide structures to support clinical audits. Brady noted that 36 out of 47 national societies and 68 out of 123 EuroSafe Imaging Star departments had given feedback in response to the surveys. “This is a really excellent response rate,” he said. He will also explain how radiology departments can undertake clinical audits. There’s no specificity in the directive about what departments need to be auditing, and it leaves it up to the individual department, he added. One department might run an audit on waiting times, while another could look at radiation protection issues. To assist radiology departments, the ESR has released a Clinical Audit Tool booklet, Espe-ranto, containing 17 templates and other details to guide radiologists through audit in various situations. The first edition was originally published in 2011, but a second edition containing 13 additional templates had been developed. The 17 original templates, along with the six new ones, cover activated carbon, which must be measured under the directive. Most of this information relates to radiation exposure. Another seven templates cover audit topics relating to service provision and clinical practice. These are not required to comply with legislation.

In today’s session, Dr. Jan Schillebeeckx, a consultant and former university seminar professor at Qaelum. He explains that the ESR has released a Clinical Audit Tool booklet, Esperanto, containing 17 templates and other details to guide radiologists through audit in various situations. The first edition was originally published in 2011, but a second edition containing 13 additional templates had been developed. The 17 original templates, along with the six new ones, cover activated carbon, which must be measured under the directive. Most of this information relates to radiation exposure. Another seven templates cover audit topics relating to service provision and clinical practice. These are not required to comply with legislation. In today’s session, Dr. Jan Schillebeeckx, a consultant and former university seminar professor at Qaelum. He explains that the ESR has released a Clinical Audit Tool booklet, Esperanto, containing 17 templates and other details to guide radiologists through audit in various situations. The first edition was originally published in 2011, but a second edition containing 13 additional templates had been developed. The 17 original templates, along with the six new ones, cover activated carbon, which must be measured under the directive. Most of this information relates to radiation exposure. Another seven templates cover audit topics relating to service provision and clinical practice. These are not required to comply with legislation.

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Women at work must follow their passions, Hricak says

ECRT: Are leaders born or is leadership an acquired skill?

HH: Many believe that leaders are born and people exhibit leadership characteristics from an early age. While this is often the case, I also believe that leadership ambition may develop over time and that not all leaders start off with a leadership role in mind. If you are thinking about a leadership role, take opportunities and be prepared to take a risk if you are excited by a challenge that is presented, even if you do not know where it may lead. Be brave and trust in yourself.

ECRT: How do experienced radiologists regard their younger colleagues?

HH: It very much varies from person to person. It is often difficult for women not just to ascend to leadership but also to stay there, and sometimes we have a tendency to generalize. There are many studies about difficult interpersonal relationships between women hampered by corporate men and women, who lack trust. However, while there will always be women who are overly competitive with other women, there will always be very nurturing women, who are excellent mentors to other women. The same is true for men – it is just that men in leadership are not under the same scrutiny. There are many good indicators that the new generation is much more gender blind and does not see gender as a big issue. As the new generation grows older, I believe they will show greater respect for choices and greater approval of flexibility, regardless of gender.

ECRT: What is the traditional image of a woman in a leading role?

HH: Women in leadership roles have traditionally been seen as tough, driven and determined, and the image has not changed much. However, as more women assume leadership positions, they are serving as role models, giving them opportunities to shape new images of how leadership in women can be. Women leaders today can be themselves and lead as they think fit, and do not always be very nurturing women, but rather women who are overly competitive.

ECRT: What are the key factors of a successful academic career in radiology?

HH: Success in academia requires a willingness to work hard and often very long hours, to obtain a position and to solve a problem, move straight on one’s next goal, and a rather autocratic style. Starting with the new millennium, the image of a leader changed, and it was very important that leaders looked fit and healthy. However, the style of leadership tended to remain the same. It was a change in form more than in function. Today’s understanding of what a role model is in leadership continued to evolve. I do believe we are seeing a change in function as well – emerging from idealization of an old, autocratic, executive-style of role model to that of a leadership general appreciation of leadership that is more transparent and inclusive, emphasizing discussion and consensus-building – leadership that appreciates diversity and understands the power of the internet and social media.

Women in the Focus – The Bigger Picture

Friday, March 1, 14:00-15:15, The Church

WF 3 Women in challenging environments

Chair: J.E. Husband; London/UK

» Panel discussion: Diversity in healthcare delivery

S. Bahar Ceviz; Ankara/TR, E. Olasunkanmi Balogun; Lagos/Nigeria, M. Abdel-Wahab; Vienna/AT, C. Beardmore; Guildford/UK, J.E. Husband; London/UK, G. McGinty; New York, NY/US

WF 4 Leadership and mentorship

Friday, March 1, 16:00-17:25, The Church

Chair: J.E. Husband; London/UK

» Chairperson’s introduction

J.E. Husband; London/UK, R.G.H. Beets-Tan; Amsterdam/NL

» It’s the little things that matter

M. Abdel-Wahab; Vienna/AT

» It’s the little things that matter

NG, R.G.H. Beets-Tan; Amsterdam/NL, D. Husseiny Salama; Cairo/EG, S.F. Khan; Islamabad/PK, L. O’Riordan; Ipswich/UK

» Panel discussion: Reminiscence: remembering to pass forward

J.E. Husband; London/UK, G. McGinty; New York, NY/US

» An example of Women Health Counselling Centres for refugee women and girls

S. Bahar Ceviz; Ankara/TR, E. Olasunkanmi Balogun; Lagos/Nigeria

» Panel discussion: Diversity in healthcare delivery

S. Bahar Ceviz; Ankara/TR, E. Olasunkanmi Balogun; Lagos/Nigeria, M. Abdel-Wahab; Vienna/AT, C. Beardmore; Guildford/UK, J.E. Husband; London/UK, G. McGinty; New York, NY/US

» It’s the little things that matter

NG, R.G.H. Beets-Tan; Amsterdam/NL, D. Husseiny Salama; Cairo/EG, S.F. Khan; Islamabad/PK, L. O’Riordan; Ipswich/UK

» Safe spaces for women in challenging environments: the example of Women Health Counselling Centres for refugee women and girls

S. Bahar Ceviz; Ankara/TR

» Panel discussion: Diversity in healthcare delivery

S. Bahar Ceviz; Ankara/TR, E. Olasunkanmi Balogun; Lagos/Nigeria, M. Abdel-Wahab; Vienna/AT

» It’s the little things that matter

NG, R.G.H. Beets-Tan; Amsterdam/NL, D. Husseiny Salama; Cairo/EG, S.F. Khan; Islamabad/PK, L. O’Riordan; Ipswich/UK

ECRT: How would you encourage women to become leaders in their profession?

HH: I encourage women to follow their passions. If what you want to be a leader, then as a mentor, I can help you by talking to you and, most importantly being there for you to pick you up when things do not go well. I can show you where the challenges may occur and help you avoid difficulties when you are down, your mentor needs to show you it is OK – the storm will pass, and you will be even better for it. At the same time, it is important to respect and help someone who wants to go part-time so they can spend more time with their family. We need to respect and celebrate choices.
Potential of AI in hybrid imaging can only be realised if integrated into workflow

The benefits of using artificial intelligence in hybrid imaging are real for decision support, prediction and other applications. But imaging specialists must adopt a practical approach for tools to be implemented in daily routine, and this can only happen if they are integrated into the hospital’s major workflows, as experts will explain today during a session held by the European Society for Hybrid, Molecular and Translational Imaging (ESHIMT).

There is a natural match between artificial intelligence (AI) and hybrid imaging (HI), and a new field of research has emerged to combine both. HI merges parameters from two imaging modalities into a single exam and it generates a lot of information that is intrinsically multiparametric, and therefore interesting to mine with AI. “We will benefit a great deal from AI,” said ESHIMT President, Prof. Thomas Beyer from Vienna, Austria.

“HI brings together anatomical images with molecular imaging on a cellular level. FDICT and PET/MR already provide the reader with much broader information than CT alone, and multiparametric imaging comes to a climax with MRI according to Beyer. “You have the 16 shades of grey of MRI and the molecular imaging capacities of PET. With HI, and PET/MRI in particular, radiologists and nuclear medicine experts will start leveraging dynamic imaging modes, which is like watching a lesion’s spatio-functional characteristics over time,” he said.

But the more parameters are added to the observation of a tumour, the more difficult it becomes for an individual doctor to make a judgement call on the phenotype of a disease. Machine learning, deep learning and other techniques could therefore be used as a decision support mechanism for physicians who diagnose patients using hybrid modalities, Beyer suggested. “We want to use AI to extract more information from individual hybrid images but also from a cohort of hybrid images of a patient with a particular disease, which a single doctor cannot define.”

Furthermore, HI is closely connected with pathology, and researchers increasingly view AI as a tool to mediate between imaging and histopathology. Studies are already being conducted on combining digital histopathology with PET/MRI and generating prediction models based on machine learning, to differentiate between benign and malignant tumours in the prostate, without the need to do biopsy. “This is what we conceive AI and ML can help us do, among other things,” Beyer said.

Oncology probably more than any other field needs to integrate imaging data through radiomics with proteomics, genomics, pathology, therapy and radiology to move towards personalised medicine, according to Antoine Leimgruber, a nuclear medicine physician, radiologist and physicist from Vevey, Switzerland. “Radiomics can help radiotherapists and nuclear doctors by providing them access to much broader information than CT alone. PET/CT and PET/MRI in particular are many different tools but it is quite a technical approach. There is a natural match between hybrid imaging and histopathology. Studies are already being conducted on combining digital histopathology with PET/MRI and generating prediction models based on machine learning. There are many different tools but it is very hard to use them in a clinical setting when data is flowing in very quickly, every day, in every hospital. The question is how the medical team is going to integrate them all. The point of using radiomics is to keep it simple, manageable and truly useful, Leimgruber explained. “If you have too many tools and you have to spend hours delineating lesions, then you are only going to improve your scoring system by a few percent. This strategy is never going to go through the everyday clinical setting. Solutions must be integrated into the major workflows in the hospital.”

A solid start would be to integrate simple and standardised data which has been extracted from reproducible protocols, into the hospital workflow in the most automated way possible, so that people actually use or access the data. “Otherwise the old saying ‘garbage in – garbage out’ will affect radiomics as well, and this would not be in anybody’s interest,’ he concluded.

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Cardiovascular and Interventional Radiological Society of Europe
Systemic effects in interventional oncology: Holy Grail or Pandora’s Box?

S. Nahum Goldberg is full professor of radiology at Hadassah Hebrew University, Jerusalem, Israel and visiting professor of radiology at Harvard Medical School, Boston, MA. He is a worldwide expert in image-guided tumour therapy, a field he has helped pioneer and continues to advance. He will share some of the latest results on the effects of these therapies, both positive and negative, today during the Josef Lissner Honorary Lecture.

Image-guided therapy and trans-vascular intervention work best on small tumours in the liver, kidney and several other organs, evidence over the past two decades shows. That was the birth of interventional oncology and it held exciting promise for the radical improvement of cancer treatment. Based on that knowledge and premise, many researchers have worked towards combining these procedures with more conventional cancer therapies like chemotherapy and radiation to increase the size and range of the population that can be treated.

One of the underlying premises of interventional therapies is that using imaging to guide a procedure is less invasive than using other methods like surgery. Despite this and other advantages that have led to ablation systems and techniques now being used clinically more than 100,000 times annually, things have not always gone as planned, according to Goldberg, who heads the interventional oncology unit at Hadassah Medical Centre. “Specifically, for much of the last two decades, we have argued that other benefits of these interventional oncologic therapies, including percutaneous tumour ablation and chemoembolisation, were focal and local, based upon our conviction that we were only affecting the tumour we were treating and not the entire patient system. It turns out, based on early case reports and more solid evidence produced over the last five years or so, that this premise is not always true,” said Goldberg.

“Most of the damage occurs where intended, but all kinds of pathways in the system are also activated after an intervention. Just like a sunburn that affects a local piece of skin can be accompanied by a headache or fever, a systemic reaction can follow an interventional oncologic procedure in some patients and under certain circumstances. Depending on the type of tumour and its location, a series of both positive and negative systemic effects can be unleashed,” he added.

These effects are rather variable and are currently hard to predict, but one thing is certain: there is a good side and a bad side – the Holy Grail and Pandora’s Box, as Goldberg put it. On the positive side, interventional procedures can incite an immune reaction in which the body will identify the cancer and form much larger responses that can help to treat other tumours besides the one that is being targeted. Such positive reactions, which can be of assistance in the treatment of metastatic cancer occur under the so-called abscopal effect hypothesis, in which tumours shrink both inside and outside and the scope of localised treatment.

On the negative side, interventional therapies can activate or free pathways that can have harmful effects, including tumour growth increase. In his lecture today, Goldberg will provide some of the initial data regarding which molecular mechanisms can have potential effects on treatment, but above all, he wants to increase awareness of the issue among the audience.

“It becomes incumbent on us to better understand on a tumour-by-tumour, organ-by-organ, ablation-method-by-ablation-method, and patient-by-patient approach which pathways we’re activating and how to accentuate the positive and cause immune effect, and reduce or eliminate the negative that you see from tumorigenic effects,” he said.

The medical community must think of clever methodologies to figure out which interventional therapy is going to give the best results, and personalised medicine using biomarkers has a role to play. However, we are still at an early stage in terms of understanding which biomarkers will predict which patients are going to go along a given immune pathway or tumorigenic pathway. Much of this work remains to be done.

Large data bioinformatics and artificial intelligence search strategies will potentially serve that purpose, helping, for example, to collate and analyse data from biobanks. Goldberg and his colleagues are exploring how to develop rational methods of determining how much data are needed to develop sufficient clinical relevance.

“The million-dollar question will be how to elegantly extract relevant data, as opposed to the current investigation methods, which are usually driven by individual investigators and which, at some point, won’t be enough,” he concluded. Goldberg has helped to develop the field of interventional oncology from scratch. Twenty years ago he was involved in a partnership with Prof. Luigi Solbiati from Milan and Dr. Tito Lavraghi from Vimercate, Italy, two pioneering Italian radiologists in the field of image-guided tumour ablation.

Around that time, he founded a minimally invasive tumour therapy laboratory at Beth Israel Deaconess Medical Center in Boston, and about 15 years ago, he established an independent applied radiology laboratory at Hadassah Medical Centre. In addition to helping to elucidate the mechanisms behind tumour ablation, ablation systems and techniques designed in these laboratories are now used clinically more than 100,000 times annually.
Dive into interventional radiology at the Cube 2.0

Open 8:30-17:30 February 27 - March 2 at the DC Tower, ECR City

For more information visit www.myESR.org/cube

The Cube offers a holistic, engaging and hands-on introduction to IR, covering peripheral, central, oncological and neurological interventions, radiation protection, teamwork and innovation.

Interactive expert-led presentations, a massive collection of simulators, thousands of devices, virtual anatomy and more await you at ‘the Silicon Valley of IR education’.

The Cube is located in the cuboid annex of the DC Tower.
Let AI do the boring part and boost structured reporting, experts argue

Templates, CDE and open source frameworks are among the strategies developed on both sides of the Atlantic to unleash the power of artificial intelligence in structured reporting.

BY MÉLISANDE ROUGER

Experts will present the latest tools and solutions to highlight cooperative ways to make radiology reports more understandable to clinicians, more pertinent in healthcare and less boring to radiologists, today at the ECR. Radiologists have been talking about ways to improve the information provided in their reports for quite some time. Although most of their colleagues still dictate their reports in free text, leading radiologists agree that this is not the way to go for the future.

“Free text can be difficult for a referring physician to understand and, if a radiologist is not meticulous enough, key information may not be easy to identify,” said Dr. Adrian Brady from Cork, Ireland, Chair of the ESR Quality, Safety & Standards Committee.

Using structured reporting (SR) templates to help radiologists fill in their reports has emerged as an interesting solution for simplifying the process. The idea is to have boxes in the reports, so that they all follow the same structure. The only thing that changes is the information in each structured section. “If radiologists use the same SR templates, it makes it much easier for physicians to understand results,” Brady said.

In 2017, the ESR and RSNA signed a Memorandum of Understanding to include the creation of a common working group called the TLAP (the Template Library Advisory Panel) to develop common research templates. This is an interesting direction to explore, said Mildenberger explained. “Having information that is relevant for other colleagues from other disciplines is the real path and a challenge for the near future. Having a common editorial board could be interesting in this regard, and it is a solution we are considering,” he said.

One key requirement for templates to be useful is obviously that they be developed to incorporate all relevant elements, including common data elements (CDEs), data that is generated during the process of imaging, which has a shared definition. A CDE encompasses a well-defined question as well as its allowable answers, according to Prof. Charles Kahn from Philadelphia, U.S., who chairs the ESR PIER (Professional Issues and Economics) Subcommittee, and will give some overview on developments for structured reporting.

The solution works like a plug-in that vendors can include in their products and use in specific applications that have been predefined by AI designers. The tool is semi-automating SR, where radiologists are assisted in creating the structured part of the report and the form has been created for them.

The framework was presented for vendor competition at RSNA 2017 and interesting working tracks have been set in motion, such as modules for pulmonary and liver lesions. It can be used for all kinds of clinical settings to standardise report scenarios, for example, evaluating incidental findings like thyroid nodules, renal cysts and ovarian cysts, Alkasab suggested.

The definition format and reference implementation software are freely available, and we hope to empower individual radiologists, expert groups and vendors to develop a robust ecosystem of CAR-D tools that can further improve the quality and efficiency of the patient care that our field provides,” he concluded.

PIER Session (Professional Issues and Economics in Radiology)

Friday, March 1, 08:30-10:00, Room N

PIER @ ECR Session

(Joining with the ESR Health Subcommittee)

PI 1 Reporting and communication today and tomorrow: challenges to implement structured reporting (RS) and deal with artificial intelligence (AI)

» Speakers’ introduction
  A. Brady; Cork/IE
  E. Neti; Phoenix/US

» Update on developments for structured reporting: Radreport 2.0; TLAP MERT
  P. Mildenberger; Mainz/DE

» The concept of common data elements (CDE) for reporting
  C.E. Kahn; Philadelphia/PA/US

» Decision support and artificial intelligence (AI) to improve reporting in radiology
  T.K. Alkasab; Boston, MA/US

» Communication with referring physicians and patients: what is relevant?
  J.M.L. Bosmans; Ghent/BE

» Panel discussion: How to use structured reporting and artificial intelligence in reporting

Prof. Charles Kahn from Philadelphia, U.S., will speak about common data elements (CDE) for reporting.

Prof. Tarik Alkasab from Boston, US, will show how decision support and artificial intelligence can improve reporting in radiology.

Panelists: Prof. Peter Mildenberger from Mainz, Germany, chair of the ESR PIER Subcommittee, will give overview on developments for structured reporting.

Let AI do the boring part and boost structured reporting, experts argue

Templates, CDE and open source frameworks are among the strategies developed on both sides of the Atlantic to unleash the power of artificial intelligence in structured reporting.
Radiology in Italy takes centre stage on day three of ECR 2019

The future status and development of the radiological profession look set to come under the microscope today during the eagerly anticipated ‘ESR meets Italy’ session. The major challenges ahead, including artificial intelligence (AI) and machine learning, are to be addressed by expert speakers.

“Radiology in Italy takes centre stage on day three of ECR 2019”

ECR TODAY | FRIDAY, MARCH 1, 2019

BY BECKY MccALL

ESR meets Italy

Friday, March 1, 10:30-12:00, Room A
EM 2 From morphology to function

Presiding:
L.E. Derdhi; Genna/IT
R. Grassi; Naples/IT

• Introduction: Radiology in Italy
C. Bibbolino; Rome/IT

• Italian emergency network
V. Miele; Florence/IT

• Interlude: The sirens: myth or reality?
R. Grassi; Naples/IT

• Emergency interventional radiology: brain and body
G. Carrafello; Varese/IT

• Interlude: The cyclops: myth or reality?
R. Grassi; Naples/IT

• La Radiologia Medica: the role of the journal in an international setting
A. Giovanni; Ancona/IT

• Panel discussion: How will the radiologists' profession evolve?

There is a need to iron out differences between regions, and to ensure the proper distribution of resources nationally be added.

Dr Corrado Bibbolino is a board member of the Italian branch of Choosing Wisely.

“We feel that we have to be able to drive AI and not be driven by it. The Italian way of thinking may help our community to fight to ensure that AI does not supersede the human elements of care,” Dr Corrado Bibbolino, head of the Forensic and Ethical Section of the Italian Society of Medical Radiology (SIRM), told ECR Today ahead of ECR 2019. He fears AI may take over the role of the radiologist, and the personal aspects and skills may be lost.

“Patients may think that they are satisfied with AI, but it is not the same as dealing with a real person – it’s not like an automatic ticket machine in a railway station,” Bibbolino said. “Human characteristics like empathy and intuition are not there. A computer might resolve a problem, but it cannot ask the patient questions, feel the reaction, look into the patient’s eyes and think what the patient is thinking – these are things AI cannot do. This is the difference between a human and a robot. AI is important but it is not a substitute for a real radiologist.

Bibbolino is a long-standing member of the Italian radiology community having been active in healthcare policy and education for around 40 years. He contributed to the development of national guidelines for radiology practice, including the regulation of teleradiology, and his influence and leadership have led to the establishment of recent Italian laws on healthcare security, professional liability and insurance reimbursement.

In today’s presentation, Radiology in Italy of particular note and relevance will be his work with Choosing Wisely, which aims to promote dialogue around avoiding unnecessary medical tests and treatments. The initiative is involved with the so-called slow medicine movement, and focuses on a thoughtful, deliberate approach to patient care.

“A radiologist should be near the patient, not only exist as an invisible figure,” said Bibbolino. “This is a typical and defining feature of radiology practice in Italy, which differs distinctly from countries where the radiologist and the patient are often located in separate rooms.”

Unlike some other European countries, Italian radiologists carry out ultrasound examinations themselves and report to the patient immediately afterwards, he explained. In other parts of Europe, radiographers or technicians carry out the ultrasound scans and often a patient does not get to meet the radiologist at all. “We feel it is important to be close to our patients, to understand their condition and deal directly with them, not through intermediaries,” he emphasised.

Bibbolino went on to say that, in Italy, particular attention is paid to risk management for both patients and staff. Thanks to legislation that came into effect in late 2017, called the Gelli law, the safety of examinations, treatment and professional liability have become even more important issues.

The large number of radiologists in Italy, compared with other countries, facilitates radiologists taking on roles that are carried out by technicians and radiographers elsewhere. There are 14,700 radiologists in Italy, and given the country’s population of slightly over 60 million, there is around one radiologist per 4,300 people.

According to data from the Organisation for Economic Co-operation and Development, Italian radiology runs more than 2,000 CT and 1,700 MRI scanners, of which only 32% are less than five years old. Bibbolino noted that a recent SIRM survey found that approximately 120,000,000 x-ray, ultrasound, CT, MRI and intervention radiology examinations are performed in Italy annually.

“All with these examinations, there is a problem with appropriateness and overdiagnosis. Some medical problems don’t need imaging, for example, MRI of the lumbar spine isn’t always necessary,” he said. “If you have a problem, some patients can wait for two to three months for imaging, but here in Italy patients can have MRI after a few days.”

Also speaking during the same session will be Dr. Vittorio Miele, head of imaging at the Careggi University Hospital in Florence and President Elect of SIRM 2019. He will discuss the Italian Emergency Network. Request for emergency diagnostic and therapeutic services are constantly growing, due to both clinical and epidemiological factors, and this is due to the increasing amount of traumatic events and non-traumatic clinical emergencies.

“Therfore overcrowding of the emergency system because patients with minor health problems attend due to a lack of immediate response in the non-emergency system,” he said.

Miele pointed out that the major- ity of patients accessing emergency care have at least one diagnostic examination to determine the care path. “Twenty-four-hour radiology staffing greatly influences the diagnostic performance of a depart-
Don’t get caught out: beware the perils of revealing data on social media

BY VIVIENNE RAPER

Sharing patient data on Facebook and WhatsApp involves a breach of European data protection regulations and can have serious consequences, according to Dr. Erik Ranschaert, President of the European Society of Medical Imaging Informatics (EuSoMII). He aims to raise awareness of secure alternatives at today’s Special Focus session.

He recalls a story from 2013, when an assistant surgeon from the Sacred Heart Hospital in Liege, Belgium, hit the news headlines for when an assistant surgeon from a Dutch hospital sent patient names and images via WhatsApp, while a study by Google DeepMind found that doctors use Snapchat to send scans to each other. "One of the main reasons is there is a need for fast communication. It is an easy way to efficiently share medical data," said Ranschaert, adding that a resident might want to get a second opinion on a scan from an interventional radiologist, and if the patient is in a life-threatening situation, every second counts.

However, it is now important to consider the European Union’s General Data Protection Regulation (GDPR). When radiologists share images, they must secure the explicit consent of the patient. Moreover, Snapchat or WhatsApp don’t allow audit or access control to images, and there is no guarantee the data can be permanently deleted or explained. Ensuring patient consent is also the topic of a talk by Prof. Duman Ratib, professor of Medical Imaging at the University of Geneva in Switzerland. He noted that GDPR permits general consent, whereby patients agree their data can be used for research without specific information about the research studies that will use the data. The insurance is that a specific study must be approved by an ethics committee.

Under general consent, images and related data are anonymised, but the patient still has rights, and can withdraw from future projects, Ratib added. To eliminate the anonymous data, there must be a secure code linking the data to the patient's identity. "It is complex to implement and has a cost, and as we move towards today's facial recognition, it is easy for a computer to match a reconstructed image from a CT or MRI image of your head to an image that you published on WhatsApp or the internet."

To avoid such risks, facial data from medical images can be blurred out, but this prevents studies on the eyes, nose or sinus to be performed on such altered data. Some data security experts recommend removing all identifying features, including blurring out tattoos on CT scans of the skin, for example. Ratib wonders how much each patient should be informed about what measures are being taken to protect the confidentiality of data. "We have to tell them, we will do everything we can to keep your data anonymised, but there is always a risk. If someone wants to expend enough time and effort to find you, they will, but our responsibility is to minimise that risk as much as possible," he said.

As for sharing those images, Ranschaert wants to educate radiologists and researchers about secure alternatives to social media, such as WhatsApp. More secure apps include Tag Connect, Forward Health, Siilo and Medic Bleep. These are GDPR-compliant, allowing encryption, data transparency, access control, audit control and anonymity, with formal arrangements for processing and storage, he said. Images taken with a dedicated messaging app, such as Siilo, can be securely stored on remote data servers with strict control over authorised users. Even if the smartphone is stolen, the data can remain safe.

Sensitive features can be automatically detected and hidden by covering the face with a shapeless mask of pseudo-random noise. (Provided by N. Roduit, University Hospital of Geneva)
Optimising the management of cancer-related pain

Cancer is one of the leading causes of death globally, responsible for an estimated 9.6 million deaths in 2018. About one in six deaths is due to cancer, and the trend is upward. According to the World Health Organization (WHO), the number of new cancer cases is on the rise globally and deaths from cancer worldwide are projected to reach over 13 million in 2030.

Besides the threat of dying, cancer-related pain (CRP) is the most common source of distress attributed to the disease. Pain is highly prevalent in the cancer population and a burdensome symptom with the potential to negatively impact patients’ quality of life. Both acute and chronic pain are well documented as being among the most frequent and distressing symptoms in cancer. It has been estimated that the prevalence of pain in newly diagnosed cancer patients is approximately 20 percent, depending on cancer type and other factors, and that 75 percent of patients with advanced disease deal with pain every day.

Statistics like these are well documented in many epidemiological studies. However, what is often not considered in these statistics is that these statistics have not changed significantly in the past 30 years. Acknowledging the magnitude of the problem, in 1986, the WHO published the analgesic ladder in order to establish guidelines for cancer pain management. Despite remarkable advances in understanding, diagnosing, and treating cancer since then, pain relief is still not adequate. This constitutes a call to action for best use of cancer pain control, according to Prof. Afsin Gangi, from the department of interventional radiology at the University Hospital of Strasbourg, France, who will chair today’s special focus session.

The term cancer pain distinguishes pain in patients with cancer from pain in patients without tumours. However, it does not convey details of the characteristics, etiology, and pathophysiology of pain. Oncological patients experience different types of pain in multiple sites. Cancer causes pain as it compresses nerves, invades bone, produces obstructive symptoms in the pulmonary, gastrointestinal, and genitourinary systems, and detached involved visceral organs, among other ways. While chronic pain syndromes are usually directly related to the neoplasm itself or to a cytotoxic therapy, acute pain syndromes usually come along with diagnostic or therapeutic interventions. Although some are disease-related, such as bone pain from a pathologic fracture, visceral pain from acute obstruction or perforation of a hollow structure, or pain resulting from an acute haemorrhage into a tumour.

As for today, a large proportion of patients with advanced systemic cancers cannot be cured. Nevertheless, appropriate diagnostic and therapeutic tools are available to ensure that pain is sufficiently assessed and controlled during the course of the disease. ‘Alleviating pain should be at the heart of every oncologist’s thought: how to get there?’ said Gangi. ‘Interventional procedures may be indicated in patients with chronic, refractory and severe pain. In selected patients, image-guided interventions offer the potential to improve not only quality of life, but also the patient’s function and independence. Also, these interventional procedures broaden the ability of palliative care providers to control pain and limit medication side effects,’ he said.

Novel image-guided interventions have made a significant impact in the management of CRP, which, in many cases cannot be sufficiently treated or can be relieved only to a limited extent by conventional pain therapies. Gangi. As interventional radiologists, we care for an increasing number of oncological patients with the broad spectrum of palliative intent minimally invasive procedures that we provide. These include, for example, neurolysis, cementoplasty, screw fixation, thermal ablation, and embolisation. The availability of minimally invasive, image-guided interventions offers interventional radiologists a major role in the multidisciplinary management of cancer pain. It is important that interventional radiologists understand their meaningful impact when it comes to pain management and thus, improving patient’s quality of life.

One of the most common types of pain in patients with advanced cancer is pain from bone metastases. Gangi mentioned that some patients are aware of a host of factors that influence the formula for palliative care, such as Dr. Georgi Tsoumakidou, from the department of interventional radiology at the University Hospital of Strasbourg, will show in her presentation on bone metastases. She will specifically address the importance of those physicians and the question of how to integrate the interventional radiologist into the palliative care team.

Special Focus Session

Friday, March 1, 08:30–10:00, Studio 2019

» Chairpersons’ introduction
A. Gangi, Strasbourg/FR
» Pain from bone metastases
G. Tsoumakidou, Strasbourg/FR
» Abdominal pain management with minimally invasive techniques
D.C. Madoff, New York, NY/US
» Pelvic pain management with minimally invasive techniques
B. Kantler, Paris/FR
» Panel discussion: How to integrate the interventional radiologist in the ‘palliative care’ team

Don’t miss today’s Joint Session of the ESR and ESTRO to learn about MR-integrated radiotherapy

Friday, March 1, 08:30–10:00, Room X

Joint Session of the ESR and ESTRO (European Society for Radiotherapy and Oncology)
Current status and future challenges in MR-integrated radiotherapy

» Chairpersons’ introduction
L. Derchi, Genoa/IT
U. Ricard, Turin/IT
» Clinical status of MR-integrated photon therapy
L. Baldini, Rome/IT
» Integration of MR and particle therapy: how far are we
A. Hoffmann, Maastricht/NL
» MR-based functional imaging
R.G.H. Beets-Tan, Amsterdam/NL
» Adaptive workflow: current status and challenges
S. Kharuzhuyk, Minsk/BY
» Panel discussion: We need more integration than originally thought: how to get there?

Prof. Regina Beets-Tan will speak about MR-based functional imaging in today’s ESR/ESTRO session.
Danish Radiographers (back row, second from left), together with members of the profession of radiography each year. EFRS the opportunity to highlight the contribution of one of their member societies to the profession of radiography each year.

Introduced for the first time at ECR 2013, the ‘EFRS meets’ sessions follow the tradition of the ‘EFRS meets’ sessions and give the European Federation of Radiographer Societies (EFRS) the opportunity to highlight the contribution of one of their member societies to the profession of radiography each year.

For ECR 2019, the EFRS will meet Denmark for this, the seventh ‘EFRS meets’ session. The Danish Council of Radiographers, Radiograf Rådet, is a founding member of the EFRS and has been an active member of the EFRS throughout our 16-year history. Radiograf Rådet is extremely active in promoting the profession, advancing education and training opportunities, encouraging radiographers to undertake research at the highest level, and in lobbying for their radiographers. Danish radiographers are currently involved in the EFRS leadership and across several EFRS working groups.

Radiography in Denmark is marked by significant growth in terms of both the number of radiographers and in terms of research. That counts both as a profession and among the individual professionals. The number of Danish radiographers has almost doubled over the past ten years and over the past five years the total number of radiographers holding, or working towards, a doctoral qualification/PhD has grown from one to 13. Radiography education in Denmark is in the form of a Bachelor of Science (Bachelors of Radiography) programmes with a duration of three and a half years.

‘EFRS meets Denmark’ will explore a range of topics highlighting the breadth and depth of the radiography profession in Denmark. The current President of the Danish Council of Radiographers, Charlotte Graungaard Falkwald, who is also a member of the EFRS Executive Board, will introduce the session. She will also give a short introduction to the country, the life and culture, and the profession in Denmark. The EFRS meets Denmark session will then explore some diverse topics through four presentations.

Pica Ann Blackburn Andersen, a radiographer and one of Denmark’s most innovative hospital executives, will discuss ‘Improvements in healthcare’, where she will explore modern radiological departments’ need for adjustment towards the general development and the use of ‘out of the house’ radiographers, and strategies to benefit both the citizen/patient and also the hospital.

University College of Copenhagen has developed space for their radiography students to research the newest technologies. Student Lea Marie Petersen will report on her work on artificial intelligence (AI), together with Rigshospitalet (Copenhagen University Hospitals), and will consider how AI can improve diagnostics and treatment for the benefit of both the radiologist and the patient.

For both the Danish Council of Radiographers and for the Danish profession, the human touch is of uttermost importance. Part of the Danish Council of Radiographers’ mantra goes “… radiographers are also humanists”, which indicates that a Danish radiographer takes human factors seriously. Susie Holm, a PhD student and radiographer, will introduce the subject in her presentation on ‘Technological mediated patient and radiographer experience’.

Dr. Anne Dorte Blankholm, who holds a PhD in MRI, will introduce the subject in her work on artificial intelligence (AI) and will be the subject of a political session, arranged by the Danish Parliament on EM 4 EFRS meets Denmark.

Dr. Jonathan McNulty, will chair the session jointly with Dr. Hall Pecht, from University College Lillebaelt, a member of the EFRS Educational Wing. We look forward to seeing you at the session and you will also have an opportunity to chat and network with the listed speakers at the Radiograf Rådet’s booth, in the Radiographers’ Lounge outside Room C on Saturday between 10:00 and 12:00.

Michael Dreyer is Editor of Radiograf Rådet, Charlotte Graungaard Falkwald is President of Radiograf Rådet and an EFRS Executive Board Member, Claus Brux Pedersen is Chief Science Officer of Radiograf Rådet, Jonathan McNulty is President of the European Federation of Radiographer Societies.

**ESOR Professional Development Programmes 2019/2020**

Visiting Scholarship Programmes (Europe)
- residents in training years 3-5
- three months
- Application closes March 11

Visiting Scholarship Programmes (USA)
- residents in training years 3-5
- three months
- MSICC, New York
- Application March 19 - April 15

Visiting Scholarship Programme for Chinese Radiologists in Jo Li
- fully qualified and practising Chinese radiologists
- three months
- Birmingham, United Kingdom
- Application September

Exchange Programmes for Fellowships (Europe)
- board-certified radiologists within their first three years of practice
- three months
- Application closes March 11

One-year Fellowships (Europe)
- board-certified radiologists within their first three years of practice
- twelve months
- Application open in November

Exchange Programmes for Fellowships (USA)
- board-certified radiologists (three to six years professional experience)
- at least a one-year involvement in breast imaging
- six months
- MSICC, New York
- Application open in September

Brocco Fellowships
- residents in their last years of training and board-certified radiologists
- two months (clinical and management fellowships)
- four months (research fellowships)
- Application open in June

Nicholas Gourlayannis
Teaching Fellowship
- board-certified radiologists, holding a post at or an academic position, who have completed three to ten years of clinical/academic practice at the time of application
- approximately, one week per centre
- Application open in March

For further information on the detailed programmes and application, please visit esor.org
Can unsupervised machine learning help us ‘drill the oil’ from our PACS?

Existing imaging data from healthcare systems around the world constitute an enormous source that could be mined by novel technology such as machine learning. However, when we try to leverage the millions of existing images stored in the depths of our institutional PACS servers, we must deal with poor data structure, missing labels, noise, and technical and ethical limitations.

In the future, it is inevitable that we will develop ways of prospectively acquiring data that is homogenised and structured across institutions and borders. Nevertheless, it would be a shame to discard all the existing imaging data like sitting on an enormous oil field and ignoring it because there is no way to access it, as Hugh Harvey argues in an interesting blog post about data readiness levels – a concept that tries to rate data according to its appropriateness for analysis by machine learning.

Therefore, we need to find novel approaches that allow us to tap into this rich source of imaging data. Technical variability introduced by heterogeneous scanning protocols and differing manufacturers poses a serious hindrance in mining existing medical images. Furthermore, the multitude of different technical parameters (each introducing its own complex effects on radiomics features) makes it difficult to anticipate how certain features will react to a combination of changing parameters.

One way to increase our understanding of this problem is to meticulously analyse each technical parameter with different imaging feature sets and in different pathologies. Another way is to let unsupervised machine learning have a go at it, include as much information as possible, and let the computer decide what of it is important.

In our work, we used unsupervised machine learning to cluster thousands of chest CT scans from clinical routine, without any regard for the reason for referral or demographics. An example is shown in Figure 1, where our algorithm clustered 4,800 chest CT scans exclusively based on visual features. The two clusters on the left and right essentially represent the two most common slice thicknesses in the dataset, 1 and 3mm, respectively. This strong influence of slice thickness on radiomics features has been described both in phantom and patient studies, and is expressed by the distinct clusters on the two sides in the figure. Still, there is relevant information that we can extract (such as the poor prognosis imparted by the chest CT scans at the bottom of the clusters – more on this in our session).

Moreover, we will also discuss how technical parameters influence the discovered clusters, up to a point where relevant clinical information gets blurred, not only by the noise in the image, but also by the higher-level noise resulting from changing scanning protocols and scanners. While missing data and noise can be detrimental to machine learning analyses of medical imaging data, there is still relevant information that can be extracted. Now we need to develop a way to do the ‘drilling and refining’ of the data.

Dr. Sebastian Röhrich is a resident at the University Clinic for Radiology and Nuclear Medicine at the Medical University Vienna, Austria.

Figure 1: 4,800 chest CT scans from clinical routine, clustered by unsupervised machine learning solely by visual appearance. The two main clusters on the left and right represent the two most common slice thicknesses (1mm and 3mm, respectively), demonstrating the strong susceptibility of the machine learning algorithms to technical variability.

Scientific Session: Imaging Informatics
Friday, March 1, 10:30–12:00, Studio 2019
SS 1005a Hot topics in machine learning: from radiomics to natural language analysis
Moderators: S.S. Martin; Frankfurt/DE
E. Neri; Pisa/IT
Scanner parameter induced variability of radiomics features in routine chest CT data
S. Röhrich, J. Hofmanninger, J. Pan, F. Prayer, H. Prosch, G. Langs; Vienna/AT.

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Radiography education: heading for new shores

The progressing digital revolution does not stop at the gates of radiology and radiography education; in fact, it continues to advance rapidly.

The growing number of innovative developments within information technology will substantially reshape the practice of radiology and radiography within European countries. A current challenge is to harmonise and standardise radiology training and accreditation across borders,” said Prof. Laura Oloaga Zufiria, from the department of radiology at the Hospital Clinic Barcelona, Spain, who will chair today’s session together with Dr. Francis Zarb, from the department of radiology at the Faculty of Health Sciences, University of Malta.

“Simulation techniques are widely used in medical education as its use has great potential to shape medical education and subsequently the quality of care. Its effectiveness in helping trainees to achieve, measure, and maintain skills in various medical fields, and in the performance of a variety of clinical procedures, has been demonstrated. So when it comes to radiography education, Oloaga sees much potential in simulation technology. “Simulation teaching programmes allow for more interactive learning processes, mimicking the real-world practice of radiology with simulated clinical scenarios. The use of simulation systems allows acceleration of the learning curve, following individual learning needs and thus improvement of patient safety.”

“A major advantage of simulation programmes, as simulation is an expensive teaching modality,” warns Oloaga. “Other limitations and challenges facing radiography education? Can simulation replace hands-on patient experience?”

“High fidelity: clinical simulation for undergraduate radiography” A. Henner; Oulu/FI

“How simulation can help prepare students and have a positive impact on interprofessional working” J. McNulty; Dublin/IE

“Panel discussion: Is simulation enough to meet the current challenges facing radiography education? Can simulation replace hands-on patient experience?” A. Henner; Oulu/FI

“Providing opportunities for practical ultrasound training” B. Kraus; Vienna/AT

“Clinical radiography education across Europe: an overview” L. Oleaga Zufiría; Barcelona/ES

“SF 9b Clinical simulation and its role in radiography education” Oleaga Zufiría, Barcelona/ES

The education of the future must be learner-centred. Trainees must have an active role in the learning process, while teachers are not suppliers of knowledge and information, but organisers of activities and directors of their learning experiences,” Oloaga noted.

One of these new developments and educational methodologies that, according to Oloaga and Zarb, needs to be implemented into the training curriculum, is simulation. By providing a safe and effective environment for trainees at all levels to practice and acquire clinical skills, thus bridging the gap between theory and practice, simulation programmes offer radiologists and radiographers a valuable active learning process.

“Simulation technology is widely used in medical education as its use has great potential to shape medical education and subsequently the quality of care. Its effectiveness in helping trainees to achieve, measure, and maintain skills in various medical fields, and in the performance of a variety of clinical procedures, has been demonstrated. So when it comes to radiography education, Oloaga sees much potential in simulation technology. “Simulation teaching programmes allow for more interactive learning processes, mimicking the real-world practice of radiology with simulated clinical scenarios. The use of simulation systems allows acceleration of the learning curve, following individual learning needs and thus improvement of patient safety.”

“To ultrasound and interventional procedures, in which the acquisition of manual skills and a prolonged learning curve are necessary, the use of simulation systems is essential for the training of the radiologist or radiographer with the patient, since each patient scenario is unique.”

“In addition to the two co-chairs, a wide range of experts on radiography education, from Europe and beyond, will make this session a particularly interesting one, with speakers from Austria, Finland, the UK, South Africa, and Ireland (EFRS President Dr. Jonathan McNulty addressing simulation from various angles. The session will close with a panel discussion, featuring all speakers, addressing the potential of simulation to meet the current challenges facing radiography education and the question of whether it can replace hands-on patient experience.”

3D printing aortic model used to help trainees to practice complex interventional procedures.

Virtual Environment for Radiotherapy Training (VERT)

(All images provided by Prof. Oloaga Zufiria and Dr. Francis Zarb, Copyright: Hospital Clinic Barcelona, Spain, University of Malta)
Is there a need for CT in cases of patellar instability?

How to remove the systematic bias in measuring the TTTG distance in MR

Images show superimposed CT (left) and MR (right) slices with the lines drawn to perform the TTTG measurement in the left knee of a 29-year-old female asymptomatic volunteer.

Patellar instability represents a common and significant health condition that affects young people and can lead to early osteoarthritis. The aetiology of patellar instability is multifactorial, and once treatment options range from conservative therapies to different surgical interventions, a precise diagnosis is required.

One of the most recognised risk factors for patellar instability is the increased tibial tubercle-trochlear groove (TTTG) distance, that is considered pathologic when greater than 20mm and has been proposed as a threshold for considering a realignment procedure CT is the gold-standard imaging method for performing the TTTG measurement, and has proven to be reliably reproducible.

On the other hand, many patellar instability patients undergo MR imaging of the knee, as it is the only method capable of assessing tears of the medial patellofemoral ligament and chondral defects, and ruling out loose bodies. If MR could be used to reliably assess the TTTG distance, an extra CT study could be avoided. Besides, many patients with patellar instability are young and avoiding radiation exposure would be considerably beneficial.

Many studies aiming for that solution have found that the TTTG distance tends to be underestimated on MR in relation to CT. Positioning is the most important reason for this difference while CT is performed with the leg in full extension, the dedicated knee coil in MR surrounds the knee in a greater than 20mm TTTG when imaged with the body coil, in full extension.

Since then, a gap has remained in the literature, for no study has compared the TTTG measurement in MR using a body coil and in CT. Our study aimed to compare those methods and to evaluate inter-observer agreement between MR measurements in asymptomatic volunteers. A low-dose CT and an MR T1-weighted axial sequence of both knees were performed in full extension, the latter using a body coil, in 38 knees of 17 asymptomatic volunteers. Measurements were made independently by two musculoskeletal radiologists with five and two years of experience, after a training session.

Results showed good agreement between CT and MR measurements, with statistical significance (p<0.0001) and the inter-rater reliability was excellent for all measurements and for all slice choices on both imaging methods.

In conclusion, MR acquisition of the knees using the body coil can be used to assess the TTTG distance, without the need for an additional CT study, thus avoiding ionising radiation exposure and financial costs.

Top topics for presentation: Musculoskeletal, Interventional radiology, AI and machine learning, Musculoskeletal.
Artificial intelligence takes centre stage at ECR 2019's technical exhibition

When you take a stroll through the extensive exhibition area at the congress, you can’t fail to notice that artificial intelligence (AI) is everywhere. Unsurprisingly, it is the dominant theme at ECR 2019.

In addition to new applications for enhancing radiology workflow and image processing, notable industry trends include the ongoing development of software platforms designed to make it easier for medical imaging professionals to adopt AI in clinical practice. A new feature this year in the Artificial Intelligence Exhibition (AIX), located in the X1 Hall, the AIX enables attendees to meet small-and medium-sized enterprises, take in sessions at the AIX Theatre, and participate in self-training on AI provided by Nvidia Deep Learning Institute. The AIX Theatre will feature keynote presentations, interactive panel discussions, and eight-minute pitches from more than 20 companies. At its booth, GE Healthcare is demonstrating software applications and smart devices built on Edison, its AI platform that ties together existing AI partnerships and products. For example, Centricity Clinical Archive provides a holistic clinical image patient record to help improve diagnostic confidence while embedded analytics provide operational insights into data study quality creating a “closed data platform for AI development and future functionality,” said Jan Siegel, director of application services for GE’s digital business.

As part of an exclusive AI partnership, the vendor is also holding joint sessions on AI with the European Society of Radiology and will have a dedicated space in its booth for visitors to experience AI with interactive tools.

Elsewhere, Terarecon is showcasing its EnvoyAI subsidiary’s EnvoyAI platform, which includes a free portal for developers to upload and test AI algorithms, as well as an end-user portal to help users achieve their desired clinical workflows. The vendor is also spotlighting its Northstar AI Explorer software for viewing and interacting with AI results directly within a radiologist’s reading workflow, as well as the iNtuition AI Adapter tool for bringing algorithms on the EnvoyAI platform into the clinical workflow of its iNtuition advanced visualization software.

Philips Healthcare is introducing Intellispace Discovery v3.0, a software platform designed to facilitate the development and deployment of radiology AI algorithms for clinical and translational research. The firm is also showcasing the Illumeo technology and has incorporated its adaptive intelligence capabilities into the Intellispace Portal 11 software, which is being launched this week at ECR 2019.

Meanwhile, Sectra is featuring its vendor-neutral AI platform, which provides customers with access to best-of-breed AI tools within existing radiology workflows. Customers can use make use of AI-based algorithms developed by Sectra as well as third parties. The company is also introducing its SMART workflow accelerators that are designed to solve various radiology workflow tasks, such as using priorities or various risk scores to control workflow, or performing series matching to support manual display protocols. Further initiatives to help delegates use AI to enhance workflow, support radiologists, and improve image processing are prevalent throughout the exhibition halls.

Siemens Healthcare is highlighting efforts to create digital twins, AI-powered models that could be used to simulate a patient’s individual organ physiology and potentially to predict changes and treatment outcomes. These digital models could also help optimize workflows by predicting the impact of operational changes, according to the company.

Siemens is also showcasing its first application based on its new Al-Bad Companion radiology “intelligent software-assistant” platform. Designed to help radiologists interpret chest CT images, Al-Bad Companion Chest CT identifies and measures organ lesions on chest CT images and automatically generates a radiology report. Also on display is Al-Pathway Companion, an AI-based clinical decision-support system that helps physicians make diagnostic and therapeutic decisions along a patient’s clinical pathway. At its booth, Fujifilm Medical Systems Europe is highlighting the REiLI medical imaging and information technology and has incorporated its adaptive intelligence capabilities into the Intellispace Portal 11 software, which is being launched this week at ECR 2019.

Designed to serve as an assistant for radiologists, Siemens Al-Bad Companion Chest CT software identifies and measures organ lesions on chest CT images and automatically generates a radiology report. Also on display is Al-Pathway Companion, an AI-based clinical decision-support system that helps physicians make diagnostic and therapeutic decisions along a patient’s clinical pathway. At its booth, Fujifilm Medical Systems Europe is highlighting the REiLI medical imaging and information technology and has incorporated its adaptive intelligence capabilities into the Intellispace Portal 11 software, which is being launched this week at ECR 2019.

The latest version of Philips’ Intellispace Discovery software platform is designed to facilitate the development and deployment of radiology AI algorithms for clinical and translational research. (Provided by Philips)

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Slow adoption of enterprise IT could impact future prospects for European radiology

BY STEVE HOLLOWAY

Few will deny that healthcare is changing. Care delivery models are increasingly moving towards inter-disciplinary care, combining the expertise of different physicians to deliver managed, longitudinal care pathways for patients. Technology is also re-shaping diagnosis, advancing the performance and capabilities of medical imaging hardware while augmenting diagnostic interpretation with software tools and artificial intelligence.

For radiology, which has often been at the forefront of technological and clinical advances, this evolution creates a significant opportunity to take a leading role in a new era of diagnostic excellence. However, significant challenges must be overcome, including a change in attitude to radiology software adoption.

Europe’s preference for best-of-breed radiology IT versus broader multi-department enterprise solutions is a potential limiting factor for cancer care in some of the future. The European market remains staunchly focused on pre-implementation of IT software for radiology-only. While many solutions are marketed as enterprise imaging, few have the capability to support multi-disciplinary clinical information sharing.

Our recent analysis of the market proved this. Only 71% of radiology IT revenues in Europe last year were for enterprise solutions, compared to 73% in North America. Most implementations were also only enterprise in nature being connected and delivered as part of multi-disciplinary care, hesitation to manage and share information from different departments such as oncology, radiology or surgery. Over the next five years, we forecast this proportion to only increase to 33% in Europe, far behind the 66% forecast in North America. In many cases, radiology equipment teams argue that advanced capabilities in radiology or best of breed, offering higher diagnostic quality and thus outweighs the value of clinical interoperability. Looking ahead, this argument could hold less weight than before in context of broader care collaboration.

Interdisciplinary diagnosis and care management is already common in some markets today. For example, multi-disciplinary ‘tumour boards’ for managing the treatment of cancer have for some time utilised the collective specialisation of oncologists, surgeons, pathologists, radiologists and other clinical care staff. Too often though managing and sharing clinical content between these departments has been impossibly slow. Adoption of electronic medical systems (EMR) has been partly to blame in some European countries, though EMR is rarely the right platform for complex data management; medical imaging, genomics information and pathology slides have therefore had to be collated, sometimes even converted, to produce ultrahigh-resolution images at the same dose level as a standard CT scan.

Augment Care is directing attention to augmented and artificial intelligence technology included in its digital radiography systems and Munra image processing software.

Ziosoft is highlighting the AI-powered quantitative imaging capabilities available on its Ziosoft View e-neural advanced visualisation platform. Ziosoft’s pre-processing algorithms can also autonomously create images and cine studies, and then reformatted the results for PACS without any human intervention, according to the company.

Numerous other specialist AI firms are also showcasing their developments for a wider range of image analysis applications.

Comparison of enterprise radiology as percentage of total radiology IT software and services market revenue in 2018 and forecast for 2022, by region: EEMEA = Eastern Europe, Middle East and Africa.

At a time when advanced imaging technologies are increasingly moving towards the implementation of AI in clinical practice, a significant shift in the technology sector. Moreover, implementation of AI in clinical practice will also increasingly find procurement decision making will move up the leadership chain, away from clinical leadership. This will make acquiring best of breed radiology IT harder and slower, especially if interoperability with other departments and systems is compromised. While some radiologists may see this as a threat to their ownership of the software and tools they use every day, it should instead be viewed as an opportunity to build consensus and partnerships within multidisciplinary care models. In the USA for example, many radiologists feared that enforced adoption of EMR, which often led to the replacement of best of breed radiology information systems (RIS) with enterprise hospital information systems (HIS) would impact their work. While there was some short-term pain, two things have occurred. Firstly, many of the best of breed RIS features migrated into a new generation of PACS, or were applied to existing systems through upgrades. Secondly radiologists are today able to incorporate diagnostic information from across the health network, maximizing the availability of new semantic search tools embedded in imaging IT platforms. Europe on the other hand, with less aggressive EMR adoption and a more fragmented market, may find that its lack of enterprise RIS will limit adoption of these new tools.

Furthermore, advances in artificial intelligence in radiology will require access to large pools of medical imaging and associated patient data. While AI in its infancy today for medical imaging, the structure of the European market may hinder market development and the roll out and adoption of AI-based diagnostic tools. Europe is already somewhat disadvantaged at a disadvantage in the AI development race, given that its main competitors in North America and China both have far larger populations to be used in training and testing. While there have been some initial moves in Europe towards initiatives to open up siloed data sets, as in France with the Ga AI imaging ecosystem, too little has so far been done at a national or pan-European level to support the growth of this technology sector. Moreover, implementation of AI in clinical practice will also suffer unless more is done at a national, regional and international level to address interoperability between radiology systems and other health data sets.

Combined, these factors point to some clear risks for European radiology. Without a significant change, it could fall behind as the shift to interdisciplinary care, centralised procurement and AI intensifies. Otherwise, European radiologists could lose a golden opportunity to be at the forefront of the future of digitalisation and care provision.
**Biobanks** are repositories for the storage and retrieval of biological samples of a large number of subjects. A major goal of biobanks is the organised collection of biological material and associated information to spread access among scientists requiring the data and material for scientific research.

**Imaging biobanks**, repositories of resources for medicine and medical research which typically include radiology imaging data, relevant clinical data, and other possible modalities, store image collections just as standard biobanks store biological samples. The ESR noted in their Position Paper on Imaging Biobanks (2005) that approximately 70% of the world’s biobanks were located in Europe.

Major progress has already been made in genetics and metabolomics analyses, finding candidate genes and metabolites causing either disease, or acting as a link between them. Effects of compensatory mechanisms were studied using epidemiological research. Imaging studies revealed and validated the conclusion that amyloid and the volume of particular brain regions can be predictors of disease pathology and may be suitable for risk prediction. Finally an in vitro cell culture model which co-cultures endothelial cells, neurons, astrocytes, and pericytes to form a functional model of the neurovascular unit and the blood-brain barrier is being developed.

COSTREAM is led by Prof Corinna van Duijn from Erasmus MC (Rotterdam/NL). EIBIR leads the management and dissemination activities of the project. More information can be found at www.ostream.eu.

If you are interested in learning more about these projects, stop by the EIBIR Lounge on the entrance level.

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**TECHNOLOGY & RESEARCH**

**EIBIR supports innovations in diagnosis and treatment of cancer and Alzheimer’s disease**

The European Institute for Biomedical Imaging Research (EIBIR) supports tomorrow’s medical imaging technology and is currently managing seven projects funded by the Horizon 2020 framework programme, working together with numerous universities and industry partners.

**ESR to set up image collections to facilitate imaging research and integration with -omics databases**

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and most did not include, or were not linked to nor include, any kind of imaging information. The position paper stated that: A European imaging biobanks network would significantly boost European research in the imaging domain by stimulating the design and validation of new imaging biomarkers, as well as improving our understanding of their biological significance. However, such a network would require standardisation, validation and benchmarking of the data in imaging biobanks.

The harmonisation of data-acquisition protocols as well as standardising image processing methods to extract reliable information is thus of great importance. Recognising the importance of integrating imaging and ‘omics’ data and the need for a structured repository for imaging data in order to facilitate personalised medicine, clinical trials, and the evaluation of new drugs, the ESR and Biobanking and Biomolecular Resources Research Infrastructures – European Research Infrastructure Consortium (BBMRI-ERIC), which hosts the world largest biobanking directory (catalogue), have been working together since November 2017, their agreement being renewed in December 2018. A key part of this collaboration has been the expansion of MIABIS 2.0 (Mini- mum Information About Biobank data sharing) with metadata on imaging collections and DICOM (Digital Imaging and Communications in Medicine) information.

The ESR has worked together with BBMRI-ERIC on extending the BBMRI-ERIC Directory 2.0 so it can be used also to describe image collections. A number of biobank representatives were approached and asked to populate the directory by providing metadata on their image collection data. During the collection process, it became clear that, in some cases, descriptions of image collections already existed in various BBMRI national nodes in different countries and, in other cases, image collections existed that were not included described in any BBMRI national nodes (e.g. where a node did not exist, or where a node did not include image biobanks).

The ESR MIABIS/DICOM Working Group has taken on the task of establishing a platform to enable the descriptions of image collections from countries which are not part of BBMRI-ERIC or whose collections are not included in BBMRI national nodes.

In late 2018, ESR experts began collaboration with the European Institute for Biomedical Imaging Research (EIBIR), who have the infrastructure necessary to support the creation of an online catalogue for existing image collections as well as access to the biomedical imaging research community in Europe. The catalogue will not provide the images or access to them but describe the collections of images, relevant information on data acquisition and image analysis, and provide contact information for access requests.

The implications of the EU’s General Data Protection Regulation (GDPR) on biobanks with a focus on the secondary use of samples and data will be highlighted in today’s ESR and BBMRI-ERIC joint session at 14:00 in Room E1. Secondary use of image data is a common practice in radiological research and raises numerous legal, ethical and organisational challenges. BBMRI-ERIC has in collaboration with more than 90 public and private health research organisations spearheaded the development of guidance on how to use the GDPR to ensure the protection of patients’ privacy and to empower medical research. This collaboration will result in a Code of Conduct for Health Research, a soft law instrument that research organisations and EU countries can use to better implement the GDPR.

Joint Session of the ESR and BBMRI-ERIC (Biobanking and BioMolecular Resources Research Infrastructure – European Research Infrastructure Consortium)

Friday, March 1, 14:00–15:30, Room E1
Will the General Data Protection Regulation (GDPR) hamper the secondary use of clinical imaging data for research?

Moderators: E. Steinfelder; Graz/AT
A. van der Lugt; Rotterdam/NL

» Why is secondary use of existing imaging data important for research progress?
E. Steinfelder; Graz/AT

» Can I reuse, share or give open access to existing imaging data for research?
M.T. Mayrhofer; Graz/AT

» Can I sell or licence imaging data to industry or spin-off companies?
J.A. Bovenberg; Aerdenhout/NL

» How to anonymise imaging data for research?
B. Gibaud; Rennes/FR

» Panel discussion: How to overcome the hurdles of secondary use of imaging data
B. Gibaud; Rennes/FR

EPOS
READ ALL CONGRESS POSTERS AT epos.myESR.org
OR AT THE EPOS LOUNGE ON LEVEL 1

Friday, 1 March

WORKSHOPS

Room 0.14 (Entrance Level)
9:30–10:30 | DR Clinical Value of “Advanced Edge Enhancement” Image Processing Software
C. Deurman, Amstelveen, Netherlands
11:00–12:00 | UL Clinical Value of Ultra-High Frequency in Breast Ultrasound
Dr. L. Steyaert, Bruges, Belgium
13:00–14:00 | UL Multi-Parametric Approach of Liver Diseases: Fibrosis and Steatosis Assessment
Dr. C. Ferreira, Pavia, Italy

Room 0.16 (Entrance Level)
9:30–10:30 | MR Breast Imaging and Post-Processing Using Otea Medical breasctscape®
Dr. M. Fischer, Teltow, Germany
11:00–12:00 | CT Added Value of Deep Learning CT Reconstruction (AICE) in Clinical Practice
Dr. M. Brink, Nijmegen, The Netherlands
14:00–15:00 | HII The New Age of Advanced Visualization - Using Global Illumination for MSK and Forensic Imaging
Prof. A. Blum, Nancy, France
15:30–16:30 | HII Improving Your Confidence: CT-Subtraction in Head and Neck Studies
Dr. S. M. Niehues, Berlin, Germany

Missed our Lunch Symposium? Watch the presentations on our YouTube channel: www.youtube.com/CanonMedicalEU

For a complete overview of our educational program, please visit https://eu.medical.canon/ecr2019

Meet us in Expo X3
EuroSafe Imaging meets Canada Safe Imaging

Canada Safe Imaging (CSI) is a joint initiative between the Canadian Association of Radiologists, the Canadian Association of Medical Radiation Technologists, and the Canadian Organization of Medical Physicists. It also includes a number of other Canadian associations, universities and healthcare institutions and organizations. More recently, CSI joined forces with the Radiation Safety Institute of Canada (RSIC), a national non-profit organization dedicated to the promotion of occupational radiation safety, in order to leverage resources and effect positive change in the national radiation protection agenda in medical imaging. CSI’s mission is to:

- Promote knowledge translation and adoption of and adherence to good radiation safety practices and standards as they relate to the Canadian healthcare environment.
- Develop potential strategies and initiatives to enhance medical imaging radiation safety and care.
- Shape and promote a strategic research agenda for radiation protection of patients in Canada.

Achievements:

- The CSI website, available in both English and French, can be accessed at: http://canadasafeimaging.ca/en/homepage/

CSI has partnered with the RSIC to implement a new service: the Free Information Service in Radiation Safety offers medical imaging professionals answers to patient and workplace safety questions, as well as answers to direct patient enquiries about imaging procedures’ exposures and their associated risks.

- A voluntary stakeholder registration portal has been created and CSI is inviting all interested parties to register in order to receive updates, invitations to roundtable discussions and free awareness sessions.

Activities:

- In order to better understand the Canadian and international landscape, CSI has conducted a number of studies:
  - A review of different organizational involvement in medical radiation safety at the national and provincial levels.
  - A review of patient and physician knowledge and dialogue about low dose radiation exposure.
  - A review of national diagnostic reference levels (DRLs) and how they compare with other countries.
  - A review of different medical radiation safety initiatives worldwide.

In 2017, CSI, in collaboration with the Canadian Agency for Drugs and Technology in Health (CADTH), conducted a pan-Canadian survey to determine awareness and implementation of the Bonn Call for Action recommendations amongst the radiation safety community. A twelve-question survey asked Canadian health professionals working in radiation safety to report on the extent to which the 10 Bonn Call for Action priorities have been implemented in their jurisdictions. As well, for each priority, survey responders were invited to provide feedback on initiatives that promote compliance, policy and practice issues that impact the application of the priorities, actions to help harmonise radiation protection activities across Canada, and ideas to support the priorities in the future.

The survey concluded that, while there are numerous initiatives aimed at radiation protection and safety at the federal, provincial, and local level, it is still a challenge in Canada. Not all initiatives are implemented, and adherence may vary from province to province, facility to facility and, in some instances, from department to department. The full report is available at https://cadth.ca/radiation-protection-and-safety-awareness-and-implementations-bonn-call-action-priorities-canada.

Moving forward, CSI is working with its partners to implement a Canadian version of the EuroSafe Imaging Stars initiative. Stay tuned for further information on this project.

David Koff, MD, FRCP(C) is Professor of Radiology at McMaster University, in Hamilton, Ontario, Canada and has been Chair of the Department of Radiology for the past eleven years. He is the Chair of Canada Safe Imaging and the Director of the Medical Imaging Informatics Research Centre at McMaster.

EuroSafe Imaging is a role model for other safe imaging campaigns worldwide. They are coordinated by the International Society of Radiology Quality & Safety Alliance (ISRQSA). Current members of ISRQSA are: AFROSafe (E-Afrisanisse and F-Afraisafe), AraźSafe, Canada Safe Imaging, EuroSafe Imaging, Image Gently, Image Wisely, Japan Safe Imaging, and LatinSafe.

Become a Friend of EuroSafe Imaging

Show your support for radiation protection and safety in medical imaging by joining our more than 51,500 Friends of EuroSafe Imaging now.
Austrian version of ESR iGuide nears launch

BY WOLFGANG SCHIMA

Taking into account the dramatic pace of radiological evolution since the late 1990s, especially in CT and MR imaging, the Austrian Roentgen Society (Österreichische Röntgen­gellschaft, ÖRG) decided in 1999 to develop referral guidelines for radiological imaging.

The scope was clear: the project should encompass the most important clinical indications for radiological imaging and the guidelines would be published in a booklet that would fit into a doctor’s coat pocket.

In 2000, the first edition was published. It was a great success, because it provided clinical guidance for referring physicians in Austria for the first time. Three further editions followed up to 2013, with the 4th edition also being made available electronically.

When the time came for a major revision of the guidelines for the publication of the 5th edition, a discussion was started about whether we should continue with strictly national imaging referral guidelines or leverage the European ESR iGuide project. The ESR iGuide is a clinical decision support system that uses European imaging referral guidelines developed by the ESR in cooperation with the American College of Radiology (ACR). The board of the ÖRG soon decided to go for an Austrian version of the ESR iGuide. After successful negotiations with the ESR, the ÖRG was granted permission to produce an Austrian version of the ESR’s guidelines and to make them available for all physicians in Austria. A free of charge, in print and web-based format.

In addition, the ESR iGuide will be available as an integrated decision support solution for radiology referral using the Austrian version.

The ESR iGuide is based on the ACRs appropriateness criteria, which have been developed over the past 25 years, with criteria for more than 800 clinical indications covering all fields of medical imaging. All relevant imaging modalities that may be involved in a specific clinical scenario are rated as ‘usually appropriate’, ‘may be appropriate’ or ‘usually not appropriate’, which helps referring physicians to choose the most efficient and appropriate imaging modality.

The Austrian ESR iGuide project involves translation of the content and also critical re­appraisal of indications and recommended imaging procedures (supported by scientific evidence, if available). In particular, ultrasound has an important role in radiological imaging in Austria, which deserves to be defined appropriately in referral guidelines. Moreover, in the evolving field of radiology, new indications appear, which have to be taken into account and incorporated into such guidelines.

It was decided by the involved bodies to build in working groups covering organ-oriented chapters (neuro, head-neck, chest, cardiac, gastrointestinal, etc.), disease-oriented chapters (oncologic or trauma imaging), and pediatric radiology. These working groups deliver proposals. For some indications, like pediatric trauma, joint working groups (of pediatric and trauma imaging) are being established to find a consensus.

In the second step, recommendations will be reviewed with particular attention to the field of radiation protection. In the third step of the process, the steering committee will review recommendations that differ significantly from the ESR iGuide and newly developed guidelines for new clinical scenarios.

This task is an enormous challenge, but the Radiation Protection Regulation issued in 2018, as part of the national implementation of the EU Basic Safety Standards Directive (2013/59/Euratom), stipulated that imaging referral guidelines have to be used in Austria. Thus, it was felt by the ÖRG board that it would be better to be at the steering wheel of this process than in the back seat.

The Austrian iGuide will be made available as a mobile app, but for those who still like to wear their white coats, a pocket booklet with the most important clinical indications and recommendations will be published.

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ESGAR expansion promises even more value for abdominal specialists

The European Society of Abdominal and Gastrointestinal Radiology (ESGAR), is the largest single grouping worldwide of radiologists and allied professionals interested in the subspecialty of abdominopelvic radiology. Our prime focus is the diagnosis and (radiological) treatment of gastrointestinal and hepatobiliary disease. At the end of 2018, our current active membership stands at 2,361 members from 75 different countries, encompassing all continents.

Since our inauguration in 1990, ESGAR activities have expanded to cover two broad areas. The first is our Annual Meeting and the second is our workshop activity, which has expanded greatly over the last decade. Workshops describe smaller educational meetings (averaging around 50 to 100 participants) that focus on a very specific topic. In 2018 we held 11 individual workshops, attracting a total of 629 registrants. Workshops present the opportunity to concentrate in great detail on a specific topic within a smaller, more intimate grouping than is possible at our annual meeting. In 2019 we will hold workshops for pancreatic imaging (Valencia, Paris and Rome), CT colonography (Dublin), liver imaging (Paris, Riga and Milan), imaging the acute abdomen (Vienna), staging rectal cancer (Amsterdam and Paris), abdominal CT (Verona), and diagnosis of upper and lower gastrointestinal tumours (Brussels). Our Summer School will be particularly interesting to residents in training as it is aimed at younger radiologists, but those who already have a specific interest in abdominal imaging. Our workshops are being updated constantly so please visit www.esgar.org for current programmes and further details.

A third area of activity, guidelines, has expanded rapidly. In 2018 we published (in peer-reviewed indexed journals) guidelines related to rectal cancer imaging, hepatocellular carcinoma, and inflammatory bowel disease. Work is currently underway regarding guidelines for imaging fistula-in-ano and the acute abdomen, which we hope will conclude in 2019. Guidelines are important because there is a voracious appetite from radiologists eager to learn and introduce best practice for the benefit of their patients. Furthermore, involvement of ESGAR members in their production ensures that any recommendations are evidence-based and right at the forefront of current best practice in abdominal imaging. ESGAR produces both monographic and multidisciplinary guidelines; the former dealing with predominantly radiological issues whereas the latter investigates radiological issues but normal anatomy and relevant clinical history.

Regarding our annual meeting, this was held in Dublin for 2018 under the expert Presidency of Prof. Helen Fenlon, and attracted 1,436 registrants from 57 countries. It was an unqualified success and drew considerable praise from attendees. I am confident that our 2019 meeting will achieve similar admiration, held this year in Rome, Italy, from June 5 to 8 inclusive and overseen by Prof. Andrea Laghi. The meeting offers a smorgasbord of educational activities at all levels for those interested in abdominal imaging. The programme can be found at the ESGAR website and I am sure that the greatest challenge faced by attendees will be deciding which of the many simultaneous sessions they choose to attend. Luckily, many of these are available subsequently on our website, to view at your leisure.

If you are at all interested in abdominal imaging then please do consider becoming an ESGAR member, if you are not so already. Indeed, I would go so far as to state that no European abdominal subspecialist can really be considered as such unless an ESGAR member, all of the key opinion leaders in our subspecialty are members. Membership also brings much more than just joining the premier grouping for our subspecialty: you will enjoy registration discounts for our annual meeting and workshops, and can access our website’s members’ area where an extremely wide range of educational activities await you via our e-Education portal. You can choose from video lectures, e-posters, individual cases, a journal watch, and registration for webinars. Everything you need can be found at www.esgar.org. We hope to see you there soon.

For more information please visit www.esgar.org.
New challenges and opportunities for magnetic resonance imaging

It’s an exciting time for research in magnetic resonance imaging and spectroscopy and their application to medicine and biology.

The European Society for Magnetic Resonance in Medicine and Biology (ESMRMB) supports educational activities and research in these areas. Our membership is highly interdisciplinary, including physicians, engineers, scientists and radiographers, while the Lectures on MRI are targeted at physicians and basic scientists. The Hands-on MRI courses are a unique educational offering of the ESMRMB, providing hands-on sessions on MRI scanners and workstations of different vendors. These are aimed at radiographers, MR technologists and interested physicians – more details can be found on the ESMRMB website, www.esmrmb.org.

In 2019, our Annual Scientific Meeting is being held in Rotterdam, the Netherlands, on October 3–5. This is the 36th such meeting, but for the first time it will be organised around a small number of major themes, which reflect some of the key radiological issues that are faced by ESMRMB members. As in other areas of radiology, machine learning is poised to have a huge impact on the interpretation of magnetic resonance images and spectra, but in MRI, deep learning is also impacting upon the ways in which data are acquired and reconstructed. Educational and plenary sessions at the meeting will provide opportunities for those who are new to machine learning to improve their understanding and for experts collectively to push forward this exciting field of research.

Efficient MRI is increasingly important as society focuses on healthcare costs, while imaging technology becomes progressively more powerful. Machine learning should clearly have a positive effect on imaging efficiency, but there are many other recent advances, including motion correction, compressed sensing and fingerprinting which are also having an impact. The interdisciplinary remit of the ESMRMB means that we are ideally placed as a learned society to address these issues: the meeting will feature a multidisciplinary group of expert speakers who will consider how recent technical and clinical developments can help to improve the efficiency of MRI.

Interestingly, the ESMRMB’s poster contribution to the ‘Walk of Fame’ (a dedicated subspecialty society poster exhibition along the walkway between the underground station and the congress venue) at this year’s ECR (Accelerated 3D T2-mapping of the prostate in 3.5 min using TV-SENSE reconstruction by Rohini Vidy Shankar and colleagues from KCL, UK) also addresses this important theme, describing a way of speeding up T2-mapping for imaging of prostate cancer. Please do take a look at it if you have the chance.

The third theme is gadolinium-free imaging: the adverse effects of some gadolinium-based contrast agents in patients with compromised kidney function and the recent focus on gadolinium deposition in the brain, has motivated a concerted effort to identify alternative approaches to gadolinium-contrast-enhanced imaging, including ASL, CEST and T1rho-weighting, as well as the use of iron-oxide based agents. I do hope that some of you can join us for a lively discussion of these important themes in Rotterdam in October.

Richard Bowtell is Professor of Physics and Director of the Sir Peter Mansfield Imaging Centre at the University of Nottingham, and the current President of the European Society of Magnetic Resonance in Medicine and Biology.

The 36th Annual Scientific Meeting of the ESMRMB will be held in Rotterdam, the Netherlands, on October 3-5, 2019.
Education needs to include teaching how to think critically, says Editor-in-Chief of Insights into Imaging

After his first full year in office, we asked the Editor-in-Chief, Prof. Luis Martí-Bonmatí from Valencia, Spain, about his experience with Insights into Imaging, the educational member of the ESR journal family, and why, in the future, educational articles will have to meet the demand to be critical.

ECR Today: You started your editorship in January 2018. How was your first year as Editor-in-Chief of Insights into Imaging? Luis Martí-Bonmatí: I would say inspiring! This first year was full of opportunities and discoveries. I have learned how important the editing process is. We had to find an editorial line that best defines the journal, and takes care of authors and reviewers while getting the best from them for the quality recognition of the journal. We were also able to increase our international background and diffusion. I am very happy that more authors from non-European countries find our journal an attractive choice in which to publish their results.

Nowadays, the journal focuses on publishing reviews, either educational or critical, but also features a large number of original articles, guidelines and statements. We want to create a freely available online forum for topics of controversy. In this way, Insights into Imaging is recognized as a highly prestigious journal, ranked within the first quartile (Q1) as assessed by the Scopus database (2018).

I was proud to find out that reviewers are extremely devoted to the journal. They put so much time and effort into continuously increasing the quality and relevance of the submitted manuscripts. The journal has to further improve the way to recompense them for this great support. We are looking forward to finding the best method to recognize the input of our reviewers.

We now have an acceptance rate close to 85%, at least, two peer reviewer evaluations and a final editorial decision. Although a high-quality evaluation takes time, with a mean of 35 days from submission to first decision, we want this process to be as short as possible; all authors should receive the first decision without any delay, even during holiday and congress periods.

ECRT: The journal’s submission numbers have seen an impressive increase in 2018. Do you believe that there were specific topics that contributed to this boom in submissions? LMB: Submission numbers again have a clear positive trend. The main aspects of this improvement are probably related to several factors, such as the growing importance of medical imaging in healthcare pathways, the willingness of radiologists to audit their practice and improve their knowledge and skills, the growing importance of research in medical developments, and the authors’ recognition of Insights into Imaging as a leading Q1 journal.

ECRT: You introduced a new article type called ‘Critical Review’. Can you explain what these articles can offer in terms of content and scientific value? LMB: Critical reviews provide an overview on state-of-the-art topics and emerging techniques with an updated and innovative approach; they allow the radiological community to access the best evidence-based knowledge. Critical reviews focus on the use of imaging criteria and related findings from both clinical evidence and research developments, and the critical aspect helps one to understand the meaning of a statement in order to evaluate how to further translate improvements into clinical practice. We are encouraging these reviews to use the level of evidence and recommendations to define clinical decisions with an evidence-based approach.

ECRT: Your lecture at this year’s Coffee & Talk Session on ethical traps in publication is called ‘What to think about when writing a paper’. What do you think authors are most worried about and how do you deal with it as the Editor-in-Chief? LMB: Authors should focus on the expected impact of their contribution on the radiological community. I will try to share with the attendees the best ways to construct and write a successful paper that will most probably be published, read and cited. Both scientific and educational papers are extremely relevant and have a real impact on the way we perform radiology. I believe that, in order to write a good paper, authors must understand how a critical thinking approach to existing knowledge is the best way to increase the paper’s relevance and visibility.

ECRT: What are your plans and goals for Insights into Imaging in 2019? LMB: My hope for 2019 is to finally receive an impact factor, but this is somewhat out of my hands. An impact factor would help us further attract the best manuscripts and improve the overall reputation of the journal. I am also planning to approach authors from countries that are currently underrepresented within the journal, such as Japan, China, Germany, Denmark, Sweden, and Canada, which clearly should be invited to increase their presence.

Visual abstracts, those that visually summarise key points from the article with a nice graphical design, will improve the article’s visibility and message. We are exploring the possibility of creating this type of abstract to promote our articles’ spread by including them in all journal- and society-linked newsletters.

Finally, the authors’ satisfaction with the editorial process is more than 85%, rating the experience as ‘excellent’ or ‘good’. I am willing to further improve this score by making the overall evaluation process faster, with clear and concise advice after the review and fast and efficient international promotion of their work. We are also planning to send authors their achievements in terms of number of downloads, citations and altmetric scores over the last 12 months. I am sure our Open Access policy fosters networking, broader collaboration, and increased citations.

www.i3-journal.org

Prof. Luis Martí-Bonmatí is director of the Medical Imaging Department at La Fe University and Polytechnic University Hospital, and chief of radiology at Quirónsalud Hospital in Valencia, Spain. He is also the director of the Biomedical Imaging Research Group (GIBI230) at La Fe University Hospital, and chief of radiology at Quirónsalud Hospital in Valencia, Spain. He is also the director of the Biomedical Imaging Research Group (GIBI230) at La Fe University Hospital.
EDiR prep resources can boost radiology trainees’ learning

The European Diploma in Radiology (EDiR) is a standardised European diploma. It is a measure of excellence and a distinctive value for trainees to add to their CVs on completion of their training. The EBR website provides comprehensive online resources, including sample examinations and literature links, to help candidates prepare for the EDiR examination. In addition, dedicated ‘ESOR for EDiR’ courses have been organized by the European School of Radiology. These courses take place in Vienna during nine days (one day per subspecialty) in November. Moreover, numerous recorded ESOR courses are also available via the EBR’s e-Learning platform, Education on Demand.

The number of EDiR candidates is growing, the community of EDiR holders is expanding, and interest in obtaining the radiology diploma is increasing worldwide. There is certainly a need for guidelines and resources to guide candidates during preparation for the diploma. Educational technologies play an important role in radiology education. Internet-based distance learning is now used in radiology training and continuing education. The EDiR Scientific Board and the European Board of Radiology (EBR) embrace these new technologies and have created new online resources that will be of value for EDiR candidates.

The EBR is consolidating efforts to make the EDiR a part of trainees’ learning programmes, and to this end, we are investing in new technologies and have created new online resources that will be of value for EDiR candidates.

EDiR examinations have a limited number of places and the EBR does not offer any waiting lists. Places are offered on a first-come, first-served basis. Only applications through the EBR website are processed.

Hospitals and heads of departments wishing to register their final year residents will benefit from a 20% discount on the examination fee.

<table>
<thead>
<tr>
<th>European Diploma in Radiology: examination calendar</th>
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<tbody>
<tr>
<td>New Delhi, March 31</td>
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<tr>
<td>Istanbul, June 19</td>
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<tr>
<td>Barcelona, July 2 and June 3</td>
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<td>Vienna, September 16</td>
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<td>Vienna, October 24</td>
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<td>Vienna, October 25</td>
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<td>Islamabad, April 5, 2020</td>
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EDiR examinations have a limited number of places and the EBR does not offer any waiting lists. Places are offered on a first-come, first-served basis. Only applications through the EBR website are processed.

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#ECR2019

[myESR.org](http://myESR.org)
Each ESER Congress is energetic and fun but doesn't shy away from addressing the difficult clinical topics that we all face in our everyday hospital practice. ESER 2018 was no exception: two days of beautiful sunshine greeted delegates from 15 countries as they gathered in Krakow, Poland, in October 2018. The warmth of Polish hospitality blew us all away. Parallel sessions ran throughout the two-day conference with a particularly high light being Dr. Ferjo Berger from Toronto and his session on My prognosis for the development of radiology for the next ten years, which was packed. Dr. Marcela de la Hoz Polo and Amandeep Sandhu did a great double act with their popular Tips and tricks for your first night on call workshop. Drs. Ana Blanquez, Gem Cali, Marek Stagg, Mariano Scaglione and Ram Sanai were all specifically mentioned as excellent speakers in the delegate evaluation.

Watch out for a repeat of these great topics at the joint SERAU-ESER meeting in Seville (May 16–17, 2019), which promises to be a very exciting one. Not only is SERAU (Sociedad Española Radiología Accidentes y Urgencias) very active, but we have more than 400 delegates expected for their meeting, meaning that the combination with a wider ESER audience should create a wonderful synergy, especially as our first society that young radiologists address the difficult clinical topics. The topics have been carefully chosen based on the most popular lectures and workshops at previous congresses. You can check the full programme at www.eser-society.org, but highlights that caught my eye during the conference are the introduction of the highly successful four-day Nordter Emergency Course in Oslo (May 13–17, 2019). There will be four workshops, covering neonate, chest, acute abdomen and postoperative abdomen; you can register for these at the Nordter website (www.nordtertrauma.net), but be quick – there are only 50 places and these began filling up almost from the first moment that the places opened.

Radiologists nowadays get their information from the internet and social media so as a society we have to invest in this. If you haven’t recently visited the ESER website, I urge you to look again; it has been revamped and is a pleasure to navigate. There is plenty of information to browse through, covering the webinar programme, workshops, diploma and future courses. Our Digital Media Lead, Dr. Maureen Dumba, deserves special congratulations this year for achieving over 1,000 twitter followers for the ESER Radiology twitter and Instagram feed. Finally, the European Diploma in Emergency Radiology. We are excited to have appointed 12 expert EDER holders in 2018, who are now examiners for the first group of candidates for the EDER in March 2019. Having the EDER will, as for the other European Society of Radiology Diplomas, be a passport to furthering your emergency radiology career through our Europe and the rest of the world, and we strongly encourage you to consider taking the diploma. Looking forward to meeting many of you at Vienna, or in Oslo or Seville, please feel free to come up and introduce yourselves.

Dr. Elizabeth Dick, MBCh BSc, FRCP, MD is a Consultant Radiologist and Honorary Senior Lecturer at Imperial College NHS Trust, London, with expertise in body MRI, emergency, trauma and MSK radiology. She is Head of Trauma Radiology as well as Associate Director of Medical Education at the same institution. Dr. Dick is Past President of the British Society of Emergency Radiology and President of the European Society of Emergency Radiology.

**COMMUNITY NEWS**

**BY ELIZABETH DICK**

**ESER: rolling out the new Diploma in Emergency Radiology in 2019**

Last year was a packed one for the European Society of Radiology’s youngest sub-society, the European society of Emergency Radiology (ESER), and 2019 looks set to be even busier.

Dr. Maureen Dumba, EDER Digital Media Lead, deserves special congratulations for achieving over 1,000 twitter followers for the @ESERadiology twitter and Instagram feed.

ESER delegates enjoy Krakow’s main square during the ESER Congress in Krakow, Poland, in October 2018.

Your passport to a better career in Radiology

Meet the EDiR team at their Airstream during ECR for full information about the upcoming examinations.

Special examination fees for those who apply for the EDiR examination during ECR 2019.

Dr. Elizabeth Dick, MBCh BSc, FRCP, MD is a Consultant Radiologist and Honorary Senior Lecturer at Imperial College NHS Trust, London, with expertise in body MRI, emergency, trauma and MSK radiology. She is Head of Trauma Radiology as well as Associate Director of Medical Education at the same institution. Dr. Dick is Past President of the British Society of Emergency Radiology and President of the European Society of Emergency Radiology.
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Details at www.european-radiology.org
First EDIR examination in Russia: just one highlight of busy year for RSR

BY VALENTIN SINITSYN

In 2019, the Russian Society of Radiology (RSR) celebrates its 103rd anniversary.

In 2019, the Russian Society of Radiology (RSR) celebrated its 103rd anniversary. The first EDIR examination in Russia took place during RSR 2019 in Moscow. In 2019, the Russian Society of Radiology (RSR) celebrates its 103rd anniversary. Being one of the oldest radiological societies in the world, the Russian Society of Radiologists has known different periods of activity, with ups and downs. After the end of the USSR, the society was re-shaped into the Russian Association of Radiologists and joined the European Association of Radiology (the ESRs fourteenth) in 1991. It is interesting to note that this event coincided with the creation of the first European Congress of Radiology (ECR) in Vienna, Permanent contact and support from the side of the ESR – the biggest and most visible radiological society in the world – have had a significant impact on the development and transformation of our national society. In 2011 the society returned to its original "birth name" and was transformed into the Russian Society of Radiology. Since 2017 our radiological community has resumed the tradition of conducting the annual national congress of radiology. Russian healthcare in general and Russian radiology in particular, have been trying to adapt themselves to rapid changes in modern medicine and technology. Education and training of radiologists remain among the top priorities of our society. Everybody knows that due to some drawbacks of our post-graduate education system there is a great need for better training and education of our radiologists. The ESR offers many opportunities for our radiologists, nuclear medicine specialists, radiographers, medical physicists, and professionals from other specialties related to radiology, to improve their knowledge according to the highest international standards. Besides the ECR and subspecialty congresses and workshops, the European School of Radiology (ESOR) has turned out to be one of the most effective educational tools. In 2009, the first ESOR course took place in Russia. Since then, thanks to the enthusiasm and professionalism of former ESOR director, Professor Nicholas Court-soyriaren, and the ESOR Board, ESOR has held two to three teaching courses in different Russian cities each year, and every course has been overbooked long in advance. Each year, Professor Lorenzo Derchi, praising the ESOR experiences with their colleagues. The new director of ESOR, Professor Valerie Vilgrain, together with the current ESOR board, are continuing the school’s traditions. For example, the cardio-thoracic course in Sochi, the Astana Tutorial, and the Thalassemia ESOR Visiting Professorship Course were the remarkable educational events of 2018 for radiologists from Russia, Kazakhstan, and Uzbekistan. In 2019 we plan to have two new courses in Russia together with ESOR tutorials and visiting professorship courses in neighboring countries.

One of the biggest events of 2018 for our country was the first EDIR examination in Russia, which took place on November 10, in Moscow, during our annual national congress. Before this event, just a few Russian radiologists had passed the EDIR examination in Vienna during the ECR. Together with the European Board of Radiology office, our society (special thanks to Dr. Oleg Bronov, MD, who coordinated and promoted the first EDIR in Russia) organised several webinars explaining the essence of the EDIR and how to prepare for it. In spite of some sceptical warnings, 15 Russian radiologists accepted the challenge to take the examination. We are very proud of these brave young doctors. Five of them succeeded and obtained the prestigious diploma – quite a good start for a first local EDIR examination! What is more important is that we already have a small group of radiologists willing to take the next EDIR examination in Moscow, this year, during the annual RSR congress.

Attendance of the RSR annual congress is steadily growing. This year, the congress was attended by 3,790 participants from 27 Russian cities and towns, and 22 foreign countries. The guest country of the RSR congress in 2018 was Kazakhstan and the guest societies were the ESR (as usual!), the European Society for Hybrid, Molecular and Translational Imaging (EHMTI), and the American College of Radiology (ACR). The congress (similar to the ECR) was broadcast online and its records are available on the RSR website (russian-radiologists). The RSR has been constantly expanding its activities. For such a big country, one national congress is not enough, so the society organises regional teaching courses (usually four in a year) together with regional congresses of the largest daughter societies. In 2018, the regional congresses of the Siberian Association of Radiologists and the Moscow Regional Society of the RSR attracted hundreds of attendees and offered interesting educational and scientific programmes. It is worth noting that the invited guest societies of the Siberian congress and of the Moscow Regional Society were the Korean Society of Radiology (KSR) and the European Society of Neuroradiology (ESNR), respectively.

Various ESR and ESR initiative activities and initiatives have resulted in our radiologists (especially the young ones) becoming increasingly involved in the ESR and ECR. This year another landmark event took place. Russia entered the top ten countries by the number of abstracts and posters submitted for ECR 2019. We were very proud to get a letter from the ESR President, Professor Lorenzo Derchi, praising the RSR for its contribution to the ECR 2019 scientific programme. We are sure that our society will continue to grow and improve thanks to our friendship and partnership with the ESR and other affiliated societies. We have no intention of copy-pasting what the ESR has been doing, but we would like to improve our work according to the standards of excellence provided by the big society.

The RSR wishes a wonderful ECR 2019 to all ‘real’ and ‘online’ participants of this astonishing meeting!

Prof. Valentin Sinitsyn is Head of Radiology and Chair at the Medical Faculty of Lomonosov Moscow State University and President of the Russian Society of Radiology (RSR). He was President of ECR 2014 and is Past-President of the ESR.
Breast radiologists and EUSOBI to stay at forefront of multidisciplinary interaction

The European Society of Breast Imaging (EUSOBI) is a flourishing society that recently reached the 1,000 members milestone. Our mission is to support breast radiologists in their everyday practice, providing education and the best evidence-based guidelines, as well as cooperation with other breast care specialists and non-physicians, in order to pitch in towards the goal of precision medicine.

One of the principal aims of EUSOBI is to enhance the visibility of breast radiologists, as well as to strengthen collaboration with other radiological and non-radiological scientific bodies and societies, as well as with patients.

Since 2012, we have been establishing a network together with 31 other National Breast Imaging Societies. The network published a joint position paper on breast cancer screening in 2017 so that patients can learn first-hand what the options and the pros and cons of breast cancer screening are, as well as the role of radiologists as primary actors in the diagnosis of small and curable breast cancers.

Last year, we collaborated with the Romanian Society of Breast Imaging (RSIB) on the Multimodality Breast Imaging Course, which was held for the second time, last November in Sibiu, Romania.

Other EUSOBI publications intended to help patients understand our role in breast care and how we use technology to help them better understand the diagnostic process, discuss mammography (Insights Into Imaging, 2017), ultrasound (Insights Into Imaging, 2018), and MRI (European Radiology, 2015). These publications are also intended to explain to clinicians our mission and our value in the multi-disciplinary endeavours.

During ECR 2018, EUSOBI was present at the European Society for Medical Oncology Congress, as well as at the European Breast Cancer Conference in March, with a whole session on new breast imaging technologies. In January 2019, Arab Health again welcomed our society to a dedicated session, Arab Health meets the European Society of Breast Imaging.

EUSOBI Board members are active speakers all around the world, carrying the message of the European vision of breast radiology: patient-centred and for all women who need it. In 2017, our board members travelled to all five continents and delivered lectures at more than 200 congresses, meetings and courses.

EUSOBI warmly welcomes all physicians and non-physicians interested in breast care to team up and help us elevate breast imaging to the next level.

Dr. Julia Camps-Herrero is the current EUSOBI President. She is a breast radiologist working at the Hospital Universitario de la Ribera in Alzira, Spain.
Special Exhibition: Flying High
Women Artists of Art Brut

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1010 Vienna, Freyung 8
www.kunstforumwien.at

Aloïse Corbaz, Bal Tango – Hôtel Rosière, 1960–1963,
Kunstmuseum Solothurn, Schenkung Etienne und Jacqueline Porret-Forel, 1995 © Fondation Aloise, Chigny
WHAT’S ON TODAY IN VIENNA?

FRIDAY, MARCH 1, 2019

**Theatre & Dance**

**Kampf des Negers und der Hunde**
by Bernard-Marie Koltès
AKADEMIETHEATER | 20:00
1010 Vienna, Lisztstraße 1
Phone: +43 1 51444 4145 | www.burgtheater.at

**Medea**
by Simon Stone
BURGTHEATER | 20:00
1010 Vienna, Universitätsring 2
Phone: +43 1 51444 4145 | www.burgtheater.at

**Vier Sterne Stunden**
by Daniel Glattauer
KAMMERSPIELE DER JOSEFSTADT | 19:30
1010 Vienna, Rotenturmstraße 20
Phone: +43 1 51444 4140 | www.burgtheater.at

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

**Der Untergang des österreichischen Imperiums**
by Ed Hauswirth and the Ensemble of TAG
TAG | 20:00
1060 Vienna, Gumpendorfer Straße 67
Phone: +43 1 5865222 | www.viennatag.at

**Knuckles become clouds**
by Anna Prokopová (Czech Republic), Costas Kekis (Greece), Andrea Gunnlaugsdóttir (Iceland)
TANZQUARTIER WIEN | 18:00 | TQW STUDIOS

**Concerts & Sounds**

**BonbonBall 2019**
Classic Viennese Ball with lots of sweets
KONZERTHAUS | 20:00
1030 Vienna, Luthergasse 20
www.konzerthaus.at

**Wiener Symphoniker**
Conductor: Alain Altinoglu
Nora Gubich, 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 | 20:00 | GROSSER SAAL
1010 Vienna, Bösendorferstraße 12
www.musikverein.at

**Shake Stew (Austria/Germany)**
C Andy Weiss Quintett
Hard-Rock
JAZZLAND | 21:00
1010 Vienna, Franz-Josefs-Kai 29
www.jazzland.at

**Opera & Musical Theatre**

**Wonderful Town**
Musical by Leonard Bernstein
Conductor: James Holmes
VOLKSOPER | 19:30
1090 Vienna, Währingerstraße 78
www.volksoper.at

**Die Zauberflöte (‘The magic flute’) for children**
by W.A. Mozart
Conductor: Michael Güttler
STAATSOPER | 14:30 + 17:00
1010 Vienna, Opernring 2
www.wiener-staatsoper.at

**I Am From Austria**
Musical with songs by Rainhard Fendrich
RAUMKONFIGURATION | 19:30
1060 Vienna, Wallgasse 18-20
www.musicalvienna.at

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

**Kampf der Neger by Koltès © Reinhard Werner / Burgtheater**
Hanna Binder, Lisa-Maria Sommerfeld, Constanze Winkler, Tobias Resch, Luka Vlatković in Die rote Zora und ihre Bande by Heid © www.lupispuma.com / Volkstheater
Sarah Schütz, Wiener Staats Ballett in Wonderful Town by Bernstein © Barbara Pállfy / Volksoper Wien
Patricia Meeden and the ensemble of Ronacher in Bodyguard by Kasdan & Dinelaris © VBW / Deen van Meer
People & Places
ECR delegates will encounter a true panorama of AI in medical imaging at the AIX, with more than 25 companies presenting their AI solutions. A dedicated theatre and the opportunity to undertake deep learning training will add further depth to this vibrant scene.

The AIX Theatre, open today and tomorrow, 11:00–15:30, will feature short presentations from participating companies, as well as keynote presentations and panel discussions with experts in the field. Talks will tackle a wide variety of topics, such as how to clinically validate AI solutions; how AI should be integrated into clinical environments; and what the future of medical imaging may look like. Ethical and regulatory issues arising in this field will also be discussed.

Content has been designed for a wide range of attendees, from absolute beginners through to established researchers in the field, as Dr. Hugh Harvey, AIX Theatre moderator and medical director of Kheiron Medical, explained.

“We are targeting a broad audience; not just radiologists, but anyone who is interested in research and development in AI, as we believe that it will be a mainstream and fundamental part of radiology in the future,” he said.

“If AI play an important role in radiology, so this programme is interesting for all ECR participants,” echoed Dr. Wim Van Hecke, CEO and founder of the radiology AI startup Aidoc.

Among the keynote speakers will be Prof. Charles Kahn, Dr. Liz O’Riordan of TedX fame, and two bright young guns, Dr. Filippo Pesapane and Dr. Marina Kahn, Dr. Liz O’Riordan of TedX fame, and two bright young guns, Dr. Filippo Pesapane and Dr. Marina Kahn, as well as many others, including Jonny Hancock, Deep Learning Solution Architect at NVidia, and Elad Walach, co-founder and CEO of the radiology AI startup Aidoc.

Eight-minute pitches from representatives of participating companies will also provide a wide overview of what AI has to offer in radiology today.

Those AI technologies that focus on providing real solutions will make a difference in the future, according to Van Hecke, who founded his company about eight years ago to develop tools for neurological disorders such as multiple sclerosis, Alzheimer’s disease and traumatic brain injury. “These approaches use AI as a means to improve care and help patients, rather than AI being the goal itself. They are extremely promising,” he said.

The most promising areas of development for AI in medical imaging at the moment are cancer tracking over time; trauma settings; and routine tasks such as screening, according to Harvey, who published his research thesis on computational analysis of prostate MRI in 2011 and now designs AI tools for cancer screening with his team.

Radiologists have generally adopted and accepted AI as part of their tool set. “Everybody agrees that those AI solutions enhance the profession and will become standard of care soon,” Van Hecke said.

The biggest challenges to AI use in medical imaging now are access to medical imaging data and labelling of that data, validation and regulation of algorithms, and integration and deployment of algorithms into the clinical workflow, which has not been comprehensively solved yet, according to Harvey. Reinforcement frameworks are also lacking, Van Hecke added.

1 Participating companies are: 12 Sigma Technologies, AGFA HealthCare, Aldenbos, Aidoc, BioMind, Cercare Medical, Combiotix, contextflow, CorTecch Labs, Derivatec, Emory AI, ICAD, Icometrix, Incepto Medical, Infervision, Kheiron Medical, Medan Technologies, M’Medical, NVidia, OnePacs, OsiriX, Ospeki, Quantis, Quibim, Smart Reporting. The AIX is proudly supported by Caner Medical.
**Pondering the impact of digitalisation in radiology**

By Mélisande Rouger

To reflect the increasing role of digital solutions in radiology practice, ECR 2019 introduces a brand new feature in cooperation with Siemens Healthineers: the Digital Experience Hall. In an interview with ECR Today, Rahma Samow, Head of Marketing, Sales and Communications Digital Services at Siemens Healthineers, shared her thoughts about the new ECR feature, developed by the ESR in cooperation with Siemens Healthineers, the Digital Experience Hall.

**ECR Today: What is the Siemens Healthineers Digital Experience Hall about?**

Rahma Samow: In nearly all the conversations with our customers, digitalisation comes up. Everyone wants to talk about it, but there are many levels of understanding and interpretation. Some are excited by the future prospects, some are curious; but many also have a feeling of uncertainty. We often get questions like “how will this affect me in my daily work?”, “what does this mean for the future of radiology?”, or even “what can AI exactly do for radiologists?” Therefore the idea for a Digital Experience Hall was born. Digital technologies are likely to fundamentally transform diagnostic imaging into a much more data-driven research discipline. Technologies like AI and VR are on the table, but how will they impact radiology?

The idea is to make digitalisation more tangible and not only talk about possible future paths but also give everyone a chance to really experience what radiology could be tomorrow. Digitalisation will affect everyone in the healthcare business.

**ECRT: What can ECR delegates expect in terms of content?**

RS: We are doing something that has not happened before at radiology congresses. It is a product-free zone, dedicated to current trends and developments that will shape the future of healthcare. We have an Open Space area where visitors can join thought-provoking talks, discussions, and presentations on topics like artificial intelligence, cybersecurity and computational models.

In parallel, there is a Doing Space, with interactive and instructive high-speed workshops, where someone can really experience how technologies like AI and virtual reality might fit into the future of their clinical routine. There are also plenty of opportunities to experience the technologies hands-on and discuss ideas with experts and developers.

**ECRT: Which technologies are presented?**

RS: The Digital Experience Hall is a cooperation with the European Society of Radiology. We conducted a survey amongst pre-registered ECR participants and asked for their fields of interest, and topics like AI, big data, VR and cybersecurity were at the top of the list. Their feedback also reflected a varying degree of understanding of these topics. Our programme is aligned with this feedback. For example, we have presentations that explain the general mechanism behind AI and how it works, but also talks that go a little deeper and investigate the concept of the digital twin and its relevance for medicine.

In our Doing Space, visitors can experience a digital twin of the heart, try VR and see how it can be used in radiology, discover how neural networks process medical images through our interactive application, and see how 3D printing works. You can even build your own sensor in the Maker Space workshop.

**ECRT: How does digitalisation impact daily practice in radiology?**

RS: We have seen a huge increase in medical imaging data over recent years, with around a 10-12% increase in the number of CT and MRI exams, but at the same time an increase in the radiologist workforce of only 3-4%. This affects the reading times – on average, radiologists now only have 3-5 seconds to read an image. Such time pressure can lead to an increase in diagnostic errors. Digitalisation can really add value here, for example, by offering AI-assisted solutions that help to read through the multi-organ area of a chest CT image, i.e. conducting the interpretation of the heart, vertebra, lung and vascular system to ultimately assist radiologists in speeding up their workflows and help increase the accuracy of their readings. That is one of many examples of opportunities offered by digitalisation.

**ECRT: The digitalisation of radiology services started about 20 years ago. What are the challenges today?**

RS: Radiology is very much used to digitalisation, maybe even more than other fields. Think about the digital disruption from printed films to PACS systems and other challenges like vendor-neutral archiving in the DICOM and non-DICOM eras. And digitalisation will probably shape how radiologists do their jobs in the future even further.

What we see is that more and more institutions are forming departments that integrate radiology and pathology into a joint diagnostic department, providing information that is not only imaging related, but also other data like family history, lab information and other biomarkers. This might also enrich the diagnostic results that we might see in the future. And all of this is driven by data aggregation and data correlation, with the help of AI, for example. We can tell that radiology can still benefit from digitalisation in a way where it will positively affect clinical effectiveness and operational efficiency.
MAKING ITS GRAND DEBUT AT ECR 2019, THE ARTIFICIAL INTELLIGENCE EXHIBITION (AIX) WILL BRING AI TO THE HEART OF THE TECHNICAL EXHIBITION. THE AIX IS THE BEST PLACE TO EXPLORE HOW MACHINE LEARNING, DEEP LEARNING AND BIG DATA ARE REShAPING MEDICAL IMAGING AND TO FIND OUT WHAT THE FUTURE HOLDS.