



BELGIAN SOCIETY  
OF RADIOLOGY

An axial CT scan of the abdomen is shown in the background. A large yellow semi-transparent shape is overlaid on the left side of the scan, containing the title text. The scan shows internal organs, including the liver, spleen, and kidneys. A scale bar on the right side of the scan indicates '30mm'.

# Radiology Now

**Official Newsletter of the BSR**

December 2020

---





**We are pleased to present a brand new issue of Radiology Now, our BSR newsletter!**

First of all, our first virtual Annual meeting was a huge success. Thank you for attending in such big numbers! In this edition you can find some details about the meeting and the answers from a questionnaire.

Second, change is coming to our beautiful profession in many ways. Reimbursement terminology and categories, the so-called nomenclature is being reformed very profoundly and may have a huge impact. Artificial intelligence is on the horizon and may or may not be disruptive... We need to be at the forefront of these innovations and changes.

Furthermore, it is impossible to prepare for this future without acknowledging our past, hence you can find a short piece concerning the history of our profession.

As usual, you can find our classic case of the month provided by the YRS and a short report of our previous board meeting.

We wish you all a happy holiday season and a new year full of rewards!

Have a good reading!



Piet Vanhoenacker  
President BSR

Tom De Beule  
Managing director BSR

# Membership BSR

The BSR is in constant motion and now more than ever, we still need your support more than ever this year to be able to continue as the most important radiologists' organisation in Belgium. The BSR keeps offering new advantages while actively defending the profession.

## Benefits

- Free publication of articles in the free access Journal of the Belgian Society of Radiology (JBSR), meaning a saving of € 300
- Members-only pages on the new website.
- Free European Society of Radiology (ESR) membership
- Reduced membership fee for ESSR (European Society of Skeletal Radiology) and CIRSE (Cardiovascular and Interventional Radiology Society of Europe)
- BSR newsletters - Radiology Now
- Free Advice (VBS)
- Registration discount for IMAIOS e-anatomy and RAD-Primer

## Pricing

Subscription fee per member category:

- € 400 : Certified radiologists practicing in Belgium:
- € 130: Retired members or radiologists practicing abroad:
- € 50: Trainee radiologists:
- Honorary members: no subscription fees
- Discount rate for group memberships: please contact [info@bsr-web.be](mailto:info@bsr-web.be)
  
- Membership CIRSE: please contact [info@bsr-web.be](mailto:info@bsr-web.be)



# Hervorming van de nomenclatuur.

Zoals u vermoedelijk in de pers heeft kunnen lezen is de structurele hervorming van de nomenclatuur van de geneeskundige verstrekkingen van de artsen lopende, dit reeds vanaf juni 2019 en onafhankelijk van de covid-19 pandemie (in tegenstelling tot wat in de pers verschenen is).

Als één van de laatste specialistengroep is de radiologie ook gestart met fase 1 van de nomenclatuurreformering. Voor alle medisch-technische disciplines gebeurt dit met de groep van Prof. Leclercq- ULB.

**Fase 1** omvat het herstructureren van de omschrijving- descriptieve nomenclatuur.

Een kleine groep experts is bezig met de volledige nomenclatuurlijst te overlopen, waarbij niet meer gebruikte nomenclatuurnummers geschrapt worden en prestaties waarvoor geen specifiek nomenclatuurnummer bestaat, kunnen toegevoegd worden aan de nieuwe nomenclatuurlijst.

Het RIZIV zal hierna de beroepsvereniging van de radiologen, de BVR, contacteren om deze nieuwe nomenclatuurlijst te evalueren en zo nodig verder aan te passen.

Voorziene einddatum van fase 1 is **juni 2021**.

Vervolgens zal in **fase 2** de uitwerking gebeuren van de betrekkelijke waardeschalen (intensiteitsscore) voor het beroepsgedeelte-tarifierende nomenclatuur (= intellectuele component). Hierbij zal voor elke radiologische prestatie een duur, risico en complexiteit score gegeven worden.

Dit zal 2 à 3 jaar in beslag nemen, met voorziene einddatum **februari 2024**.



**Fase 3** is de evaluatie van de werkingskosten met betrekking tot de medische handelingen-tarifierende nomenclatuur, de operationele kost van elk onderzoek.

Vaststelling van de werkingskosten in lijn met de verstrekkingen om binnen de nomenclatuur de verstrekkingen van het beroepsgedeelte te isoleren.

Dit heeft dus als doel om de operationele kost of 'technische' component af te splitsen van de intellectuele acte.

De finale doelstelling is om voor alle artsen een 'zuiver' honorarium te creëren zonder afdrachten.

Meer informatie kan u terugvinden op:  
<https://www.inami.fgov.be/nl/nomenclatuur/hervorming-nomenclatuur/Paginas/default.aspx>

**Olivier Ghekiere**  
Jessa ziekenhuis Hasselt

# La réforme de la nomenclature.

Vous l'avez sans doute déjà lu dans la presse: la réforme structurelle de la nomenclature des prestations de santé des médecins est en cours et ce, depuis juin 2019, nonobstant la pandémie de la COVID-19 (contrairement à ce qui a été publié dans la presse).

La radiologie est l'une des dernières spécialités à se prêter à cet exercice et elle est donc aussi entrée dans la première phase de cette réforme. Les travaux de toutes les disciplines médico-techniques sont coordonnés par le groupe du Pr. Leclercq de l'ULB.

**La phase 1** est consacrée à la restructuration de la nomenclature descriptive, soit les libellés. Un petit groupe d'experts est chargé de passer en revue l'intégralité de la liste de la nomenclature, ce qui permettra de supprimer les numéros obsolètes tandis que les prestations pour lesquelles aucun numéro spécifique n'existe pourront être ajoutées à la nouvelle liste de la nomenclature.

Ensuite, l'INAMI prendra contact avec l'union professionnelle des radiologues, la SBR, pour évaluer cette nouvelle liste et le cas échéant, l'adapter.

La fin de cette première phase est prévue pour juin 2021.

**La phase 2** sera consacrée à l'élaboration des échelles de valeurs relatives (scores d'intensité) pour la nomenclature de la part professionnelle (composante intellectuelle). A ce stade, chaque prestation radiologique se verra attribuer une durée, un score de risque et de complexité. Cette phase durera 2 à 3 ans et devrait se terminer en février 2024

**La phase 3** sera consacrée à l'évaluation des frais de fonctionnement relatifs à la nomenclature des actes médicaux et aux coûts opérationnels de chaque examen.

Les frais de fonctionnements en lien avec les prestations seront déterminés afin qu'au sein de la nomenclature, celles-ci soient isolées de la part professionnelle.

L'objectif est donc de séparer les coûts opérationnels, ou composante "technique", de l'acte intellectuel.

L'objectif final est de créer pour tous les médecins, des honoraires « purs » exempts de toute retenue.

Vous trouverez plus d'informations sur : <https://www.inami.fgov.be/fr/nomenclature/reforme-nomenclature/Pages/default.aspx>



**Olivier Ghekierre**  
Jessa ziekenhuis Hasselt

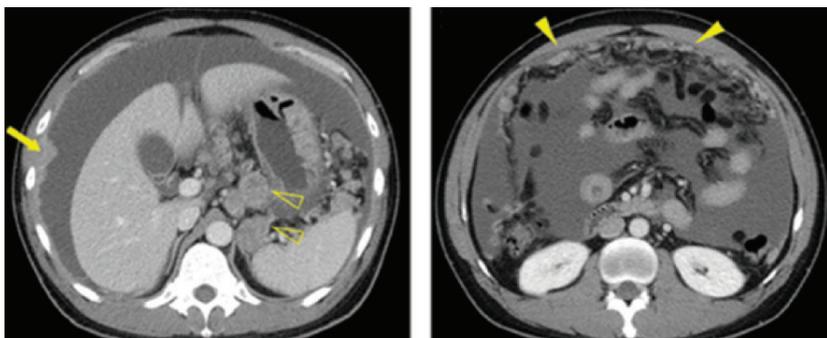
# YRS-BSR Case of the Month

## December - 2020

### Case 1:

A 40 year old male patient.

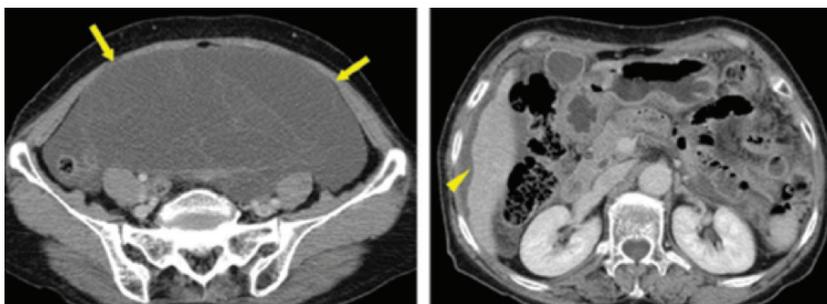
Axial portal venous phase computed tomography images:



### Case 2:

A 66-year-old femal patient.

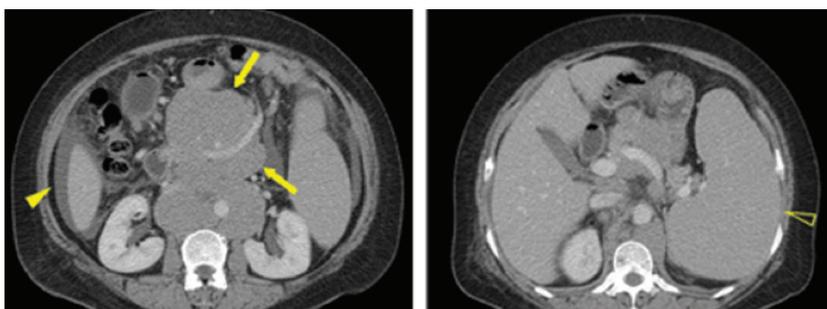
Axial portal venous phase computed tomography images:



### Case 3:

A 60-year-old femal patient.

Axial portal venous phase computed tomography images:



### Question 1

What is your diagnosis?

- Leiomyomatosis peritonealis disseminata
- Peritoneal carcinomatosis
- Peritoneal lymphomatosis
- Pseudomyxoma peritonei

### Question 2

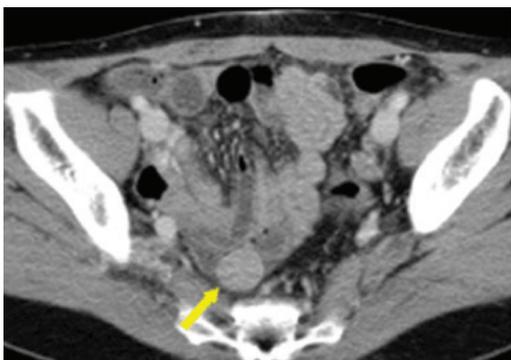
What is your diagnosis?

- Leiomyomatosis peritonealis disseminata
- Peritoneal carcinomatosis
- Peritoneal malignant mesothelioma
- Pseudomyxoma peritonei

### Question 3

What is your diagnosis?

- Leiomyomatosis peritonealis disseminata
- Peritoneal carcinomatosis
- Peritoneal lymphomatosis
- Peritoneal malignant mesothelioma

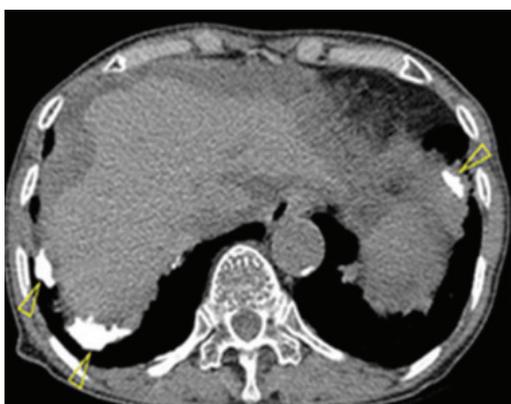
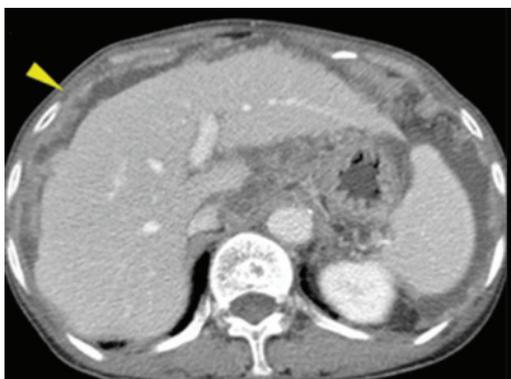
**Case 4**

39-year-old female patient.  
Axial portal venous phase computed tomography

**Question 4**

What is your diagnosis?

- Leiomyomatosis peritonealis disseminata
- Peritoneal carcinomatosis
- Peritoneal lymphomatosis
- Pseudomyxoma peritonei

**Case 5**

80-year-old female patient.  
Axial portal venous phase computed tomography

**Question 5**

Which structures delineate the supramesocolic fossa?

- Leiomyomatosis peritonealis disseminata
- Peritoneal malignant mesothelioma
- Peritoneal lymphomatosis
- Pseudomyxoma peritonei

Answers on page 10

**Hyperlink:**

<https://docs.google.com/forms/d/e/1FAIpQLSe-20XxBbo7O8Az0zOwjwhXm9CSh-8WFVKVFPcEE258vtK-eWg/viewform>

# Summary of previous board meeting:

Meeting 28/9/2020 19u30

## 1. Professional defense

### TGR - report Dr. O. GHEKIERE

#### MR arthrography-shoulder

Reference can be made to the reports of the previous meetings. The new Royal Decree is in the cabinet for signature. The BSR has asked for a renewed advice from the MSK section since substantive criticism had been voiced by colleagues. However, a modification of a previously given advice to the TGR is very unusual.

The decision is made not to change the advice, but to consider adding other joints and indications as needed in the future, guided by evidence in the literature, and with respect for the financial budget.

#### CBCT sinuses,

This problem was brought to the attention via Groeninghe Kortrijk.

Refusal to reimburse this scan when:

- (1) it has been prescribed by a general practitioner,
- (2) when the radiologist, on the basis of his right of substitution, replaces the examination (prescribed by the general practitioner) with a CBCT examination.

The BSR has to work out a memorandum for the TGR medical imaging working group in order to reach a solution.

#### Sonohysterography to replace hysterosalpingography.

Via transvaginal route the accessibility of the fallopian tubes is examined.

The nomenclature number was elaborated by the gynaecologists.

-The question is whether a number should also be provided for radiologists.

-Dr. R. Oyen informs us that for more than 10 years this number has no longer been provided at the radiology department of the UZ Leuven.

- Important is that the global expenses for this new number do not have a negative impact on the medical imaging budget.

-Within art. 17 there is a number for the radiologists for hysterosalpingography (450074-450085). It is important to keep this code.

**CT TAVI** - Working group medical imaging of the TGR. A supplement will be provided in the future.

#### Art. 34 - Interventional

-The medicomut provided for a saving of € 5 million. The savings will mainly be realized in interventional cardiology, where a large discrepancy in attestation was noted between different hospitals.

-Dr. Tom De Beule will participate as an expert in interventional radiology in the meeting of the medical imaging working group that is examining this dossier.



-Neuro-interventional services. A large variation has been noticed in pricing of cerebral angiography. Dr. T. De Beule and Sam Heye have been invited to participate in the meeting of the working group on medical imaging to clear this out. Dr. P. Goffette will be nominated as French-speaking expert. It is proposed that the experts meet before the meeting of this working group in order to obtain consensus before the meeting takes place.

#### **QUAADRIL/Quality - Report of Dr G. Villeirs**

The FPS Public Health is working on setting up cross-disciplinary quality indicators within the framework of Pay for Quality. Working groups have been active on this subject for several months.

A working group composed of radiologists and nuclear medicine met in April 2020. The report was amended in the months July/August. However, defining quality indicators is not an easy exercise.

Dr. G. Villeirs was contacted by the FPS Public Health with the question if it was possible to work out quality criteria for radiology within the BSR. An official of the FPS is willing to come and explain this project at a next meeting of the Board of Directors.

Quality-enhancing projects that may be eligible for funding must meet various conditions:

- 1) It concerns measures that are not compulsory.
- 2) Measurable by the government on the basis of existing databases.
- 3) Must be accessible to all services.
- 4) May not already be financed in any other way.

As an example, reference is made to dose recording systems set up by the hospitals. Such registration systems are not mandatory, but can provide interesting information within the framework of radio protection.

Many hospitals waive JCI or NIAZ accreditation and will define quality indicators themselves. It is proposed that the radiology departments would work together to define certain quality indicators. Inspiration can be found in B-QUAADRIL. Although this is an audit tool, it contains many interesting elements.

Dr. P. Vanhoenacker is willing to sit down with Dr. P. Aerts to formulate a proposal on behalf of the BSR. A call is made to other interested parties to participate in this.



### AI studies. Intellectual property

-It has been observed that in recent years there have been repeated attempts from interested parties (non-radiologists) to use and claim imaging databases for data curation and development of AI projects in a for-profit model.. Can these health data be sold just like that? To what extent is this in line with the GDPR? See the article 'GDPR responsibility in the medical sector: an application to medical scientific research'.

-It is proposed to create a new section, or at least an ad hoc working group 'AI'. This section/ad-hoc working group could be close to the LMQ section.

-Young colleagues need to be motivated to take an interest in AI.

-The activities of the ad hoc working group AI of the Supreme Council of Physicians Specialists and General Practitioners, in which Dr. P. Vanhoenacker participates, have come to a complete standstill due to the COVID-19 crisis.

-Dr. R. Salgado quotes the white paper of the ESR on AI.

-For the legal aspects, Michel Deneyer, member of the Order of Doctors and professor at the VUB, may be consulted on this subject (Prof. Demey).

## 2. Managing Director. Treasury

**Website** - Dr. R. Salgado gives an overview. Due to internal problems within Innomedia, the development of the website has been delayed for at least one month. One part of the website concerns, among other things, the provision of educational content.

**Radiology Now** - An electronic version of the magazine was sent at the end of September. The magazine is now being produced in-house, which significantly shortens the production time. Following the intervention of Mrs. F. Vandamme

at B-post it has been possible to obtain that, despite the fact that no issue has yet been published in 2020, a cheap rate can be maintained for the distribution of this issue in paper form.

**Financial situation:** Expenses are covered by the accumulated reserves. For the moment there is no income from membership fees.

The call for payment of the membership fee 2020 will be sent via the new website.

**Varia:** The reports of the managing director will always be sent to the members of the Board of Directors, who will be able to follow the work closely.

## 3. Scientific committee

Annual meeting:

- The program is completely finished.

- Waiting for lectures.

- The annual congress will be announced via the website.

- A flyer will be made by Mr. K. Schrije.

- The program will also be announced in Radiology Now.

- Participation in the meeting is free of charge.

## 4. Varia

-Planning committee training and education of radiologists

A tender was launched by the FPS Public Health to objectify the needs of manpower in the field. The federal planning commission had taken into account the training of 15 residents in radiology in Flanders when determining the national quota. Considering the technical evolutions, it is clear that this is undercalculated and that there will be a greater need for radiologists.

- Astra-Zeneca - Because of the CT-screening as a result of COVID-19, more lung tumours are detected than under normal circumstances. Astra-Zeneca would like to obtain collaboration of radiologists to launch an AI project concerning serendipitously detected lung tumours.

- YRS - The next meeting will take place on 15 and 16.10.2020. A survey will be conducted concerning the influence of the COVID-19 crisis

on training issues.

- Museum of Radiology. As in previous years, a donation of € 5,000 will be made.

- The ESR has launched a call for young promises as speaker/moderator. Will be followed-up by Piet Vanhoenacker.

## Summary of previous board meeting:

Meeting 03/11/2020 19u30

### 1. Professional defense.

Question RIZIV/DGEC: MR lumbar vertebral column 60 days after CT  
Consultation with Dr. P. Vanhoenacker, G. Villeirs and O. Ghekiere. It is positive that the DGEC requests the advice of the BVR before launching an audit. This shows that the BVR is regarded as a full-fledged interlocutor.

Pirson/Leclercq. The first meeting within the framework of the revision of the medical imaging nomenclature took place. These revisions concern not only the services included in art. 17 but also art. 34 of the nomenclature. Drs. O. Ghekiere, Chr. Delcour, J.P. Joris and G. Vandebossche took part in this first meeting, the same colleagues who participated in the working group on low-variable care.

With regard to the interventional nomenclature it will be necessary to meet also with the other specialisms which are entitled to perform these acts.

During this first phase of the rewriting of the nomenclature, it is the intention that the description of all the acts of the nomenclature will be reviewed and adapted. This first phase has to be completed in June 2021.

The opportunity should be taken to remove obsolete examinations or at least to adjust the description of the act if it no longer covers the load. All new examinations not yet included in the nomenclature must also be described. Attention, new nomenclature must first go through the entire procedure at the TGR/CTG before it can be considered for reimbursement.



Drs P. Vanhoenacker and R. Oyen will write to the sections to do the preparatory work for their part of the nomenclature. If the section in question does not respond before the set deadline, the Board of Directors of the BSR will seek experts by itself. A short accompanying text is needed to explain what is expected of them. This can perhaps be illustrated with some examples. Some sections are not completely familiar with the nomenclature of their specialty. It is suggested that through Dr. P. Aerts also the provincial councils should be addressed about this.

The next meetings concerning the reform are scheduled on 10 and 17.11.2020.

**TAVI** - Cfr the report of the previous meeting. The file was approved by the plenary meeting of 20.10.2020. The file is still to be approved by the medicomut and the insurance committee. Only then will it be handed over to the Minister of Health. This procedure can easily take up to 2 years. TAVI is a nice example of an achievement that is not included in the nomenclature but that undoubtedly has its place there.

**MR arthrogram shoulder:** The response of the board was forwarded to the section that did not (yet) respond.

**Artificial Intelligence (AI)** No concrete steps have been taken yet. As a result of the previous meeting, Dr. P. Vanhoenacker. took note of the ESR document and some other scientific articles.

It is absolutely necessary to stimulate young colleagues to become proficient in AI. AI is very comprehensive. It is obvious that AI should be a standard part of the curriculum of the ASO's.

To this end the necessary contacts should be made with the universities.

Dr. E. Ranschaert will be asked how AI can be better structured within the BVR. The organization of a webinar to explain AI to ASO should be considered. It is important that the radiologists do not delay otherwise other specialties will take the lead.

The companies should have the reflex to consult the BSR in this matter. Astra Zeneca e.g. recently consulted the BSR, section Thorax, but unfortunately the section did not respond.

Ideally, radiologists, industry and universities should join forces to strengthen each other in this field. It is being investigated whether there is interest within the YRS to take the lead in this dossier.

Dr. O. Ghekiere asks himself how to integrate AI in the revision of the nomenclature.

### **Paritaire commissie radiologie - Accreditering.**

Dr. J. Verschakelen took on the evaluation of the activities in radiology within the framework of the accreditation for years. He recently went into retirement. Dr. R. Oyen will check with Dr. J. Verschakelen whether he is willing to continue this work. After all, there is no age limit foreseen to be active within the joint committee. We are still looking for a French speaking candidate to actively participate in the joint committee.

### **2. Management/tresory**

**The new website** – Report Dr. R. Salgado  
The new website has finally gone live with a few months delay. The delay is mainly due to personnel problems at the company that developed the website. Some flaws

have already been noticed but these will be corrected as soon as possible. The website is not completely finished yet. On the level of the sections a number of functionalities still need to be developed.

On the website there is a section for 'educational content'. Ideally, every month at least one topic will be discussed.

Dr. R. Salgado is unanimously congratulated for the new website. He also wishes to involve Mr. St. Standaert, who has put a lot of time and energy in bringing this project to a successful conclusion.

#### **Payment invitations** - Dr. Ch. Van de Velde

Together with the launch of the website, the call was also sent to members for the payment of the 2020 contribution. A reminder email will be sent within three weeks. Only after that, perhaps another call will be sent by post.

#### **Radiology Now.**

November 2020 - In order to facilitate the layout of the next issue, some software programs still need to be purchased. Not everyone has received the electronic version of Radiology Now. Some mails could not be delivered. The email addresses of the members will be checked.

There is a positive response to the question of

Dr. R. Van Tiggelen to get a fixed section in the magazine for the museum of radiology. Through the collaboration with BSR, the museum radiology has been able to count on a lot of additional publicity for its activities.

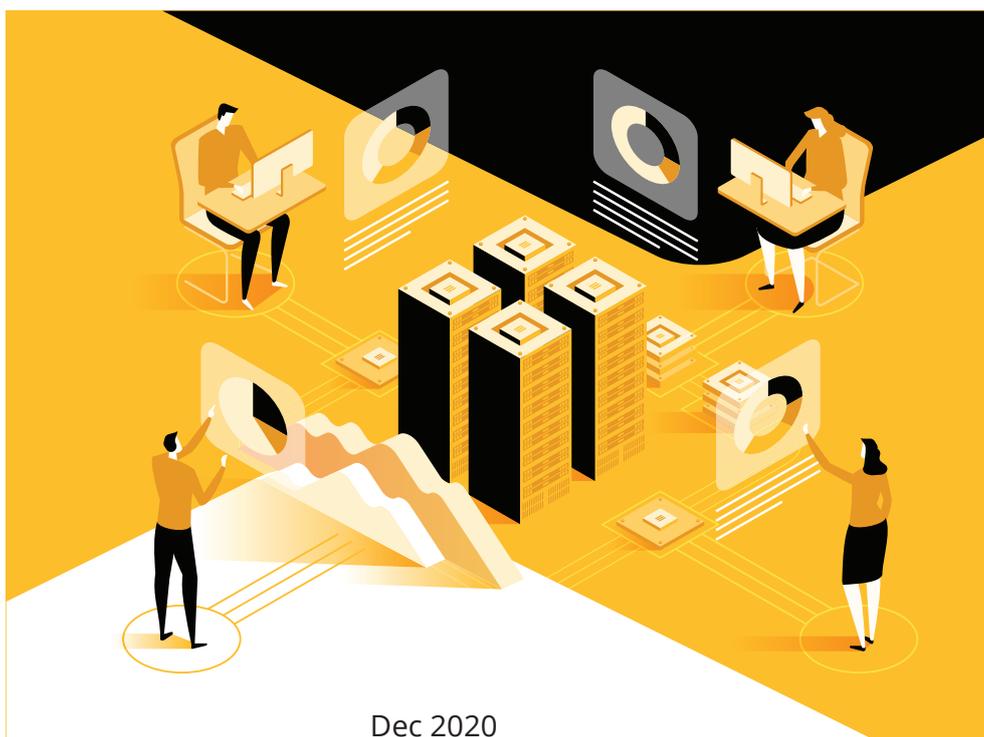
#### **3. Scientific council**

Symposium - Dr. Flavien Grandjean

As part of the COVID-19 crisis, it was decided to go to the recording studio with as few people as possible. 8 speakers have already delivered their presentation. Per block of 3 speakers 20 minutes Q & A will be provided. During the presentation questions can be submitted via the chat function. In order to appear professional, it is necessary to make sure that the moderators all have the same background.

The 2 major sponsors are each entitled to a commercial break of a few minutes.

There are already 200 registrations. The registration on the webinar is free of charge.



Dec 2020

# BSR Annual meeting Feedback

Dear BSR Members,

2020 has brought a lot of change to all our lives, and to keep everyone safe while still providing interesting content, this year we decided to organise a virtual conference. It was a successful edition and we were joined by 528 attendees on our first virtual annual meeting.

As we always want to keep improving, we sent out a feedback survey in the following week, which was filled out by 81 of the attendees (15,3%).

About 21% of the responders were radiology residents, 2.4% were retired radiologists and the rest were all certified radiologists. For 12.3% of the responders, this was the first time joining our annual meeting.

Five of the topics were found very useful by 70% or more of the responders: "How I do it" MR rectum", "Adrenal incidentaloma: how to manage them", "Abdominal internal herniations", "Imaging beyond the peak: long-term pulmonary changes after COVID-19" and "Covid-19 beyond lung parenchymal changes: neurological patterns". All topics were found to be either useful or very useful by the majority of responders (76 to 97.5% of responders). The entire virtual meeting can be re-watched for free until December 14th through the following link: <https://streaming.dbvideo.tv/bsr/login>

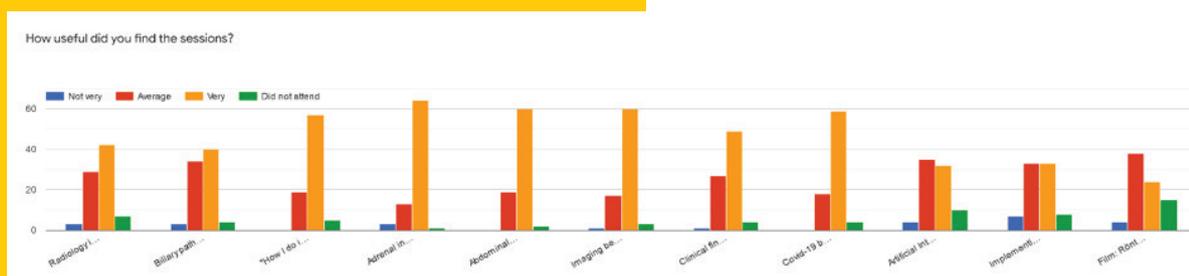


Multiple responders reported being pleasantly surprised by the organisation as well as the technical aspects. When asked how satisfied they were with session content overall, 84% of responders gave a score of 4 or 5 out of 5.

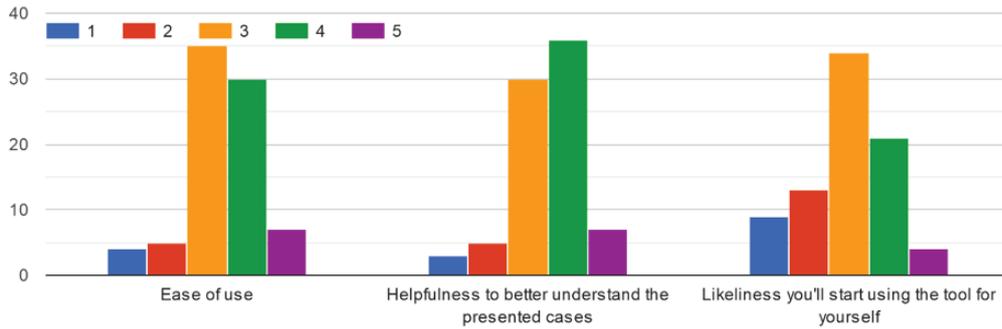
Scaling the ease of use of the CMRAD tool on a scale of 1 to 5, 43% scored it 3 out of 5 and 37% scored it 4 out of 5. The largest group of responders (37%) gave the CMRAD tool's helpfulness to better understand the presented cases a score of 4 out of 5. 31% of responders indicated they were likely to start using the tool themselves, 42% was undecided and 27% found it unlikely. (Fig 2.)

Most responders were happy with the new form of Q&A-section, liked using the chat box for questions and thought there was enough time for the questions.

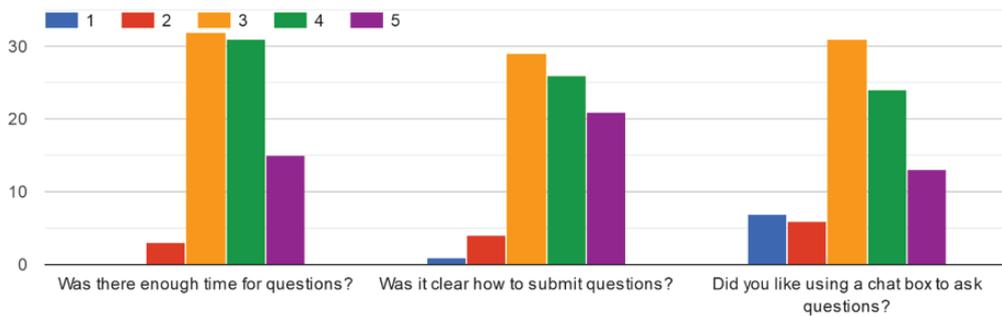
There was a very large range of requested topics to cover in future meetings and no clear front runner, so whichever topics will be decided on for next year, it's safe to say there will be interested members wanting to learn more about them.



What was your impression of the Collective Minds CMRad Tool?



How did you like the Q&A sessions?



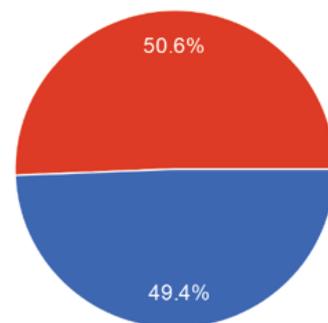
As said before, this was the first time we organised a virtual meeting, so we were surprised to see that 50.6% of the responders prefer a virtual meeting, whereas 49.4% prefer to have a meeting in person, as in past years. 59.2% of responders scored the relevance and helpfulness of this meeting  $\geq 4$  out of 5. 93.8% are likely to attend again next year and 88.8% would recommend the event to their colleagues. So we hope to see even more of you at our next meeting!

Thank you to the organisers, speakers and of course all the attendees.

We'll get started on using your feedback to work on a great annual meeting for next year.

What is your preferred type of annual meeting?

81 responses



- In person (as in past years)
- Virtual



On behalf of the YRS-board  
Tana Mwewa  
YRS JBSR Co-editor

## Hot topics in Radiology : Artificial Intelligence

AI can be defined as a branch of computer science that deals with the simulation of intelligent (human) behavior by computers. AI nowadays does the seemingly impossible, magically bringing computers and machines to life: driving cars, trading stocks, predicting customer behaviour, and even manipulating elections....

An important subcategory of AI is machine learning (ML), in which the classical programming paradigm is reversed: instead of relying on humans writing rules to provide answers based on analysis of data, ML tools just need data and corresponding answers, and generate the rules by themselves (Figure 1).

Deep learning (DL) is a subcategory of machine learning and goes even one step further. While in ML a human expert has to determine in a preliminary step which features could be relevant, DL does not need this step. In other words, DL can just learn almost anything by itself, given enough training examples consisting of data and corresponding answers ("supervised learning").

It is now clear that AI (DL, to be more precise) will impact every area of human activity. Actually "will impact" is an understatement: "is impacting" would be more accurate. The list of DL successes is long and

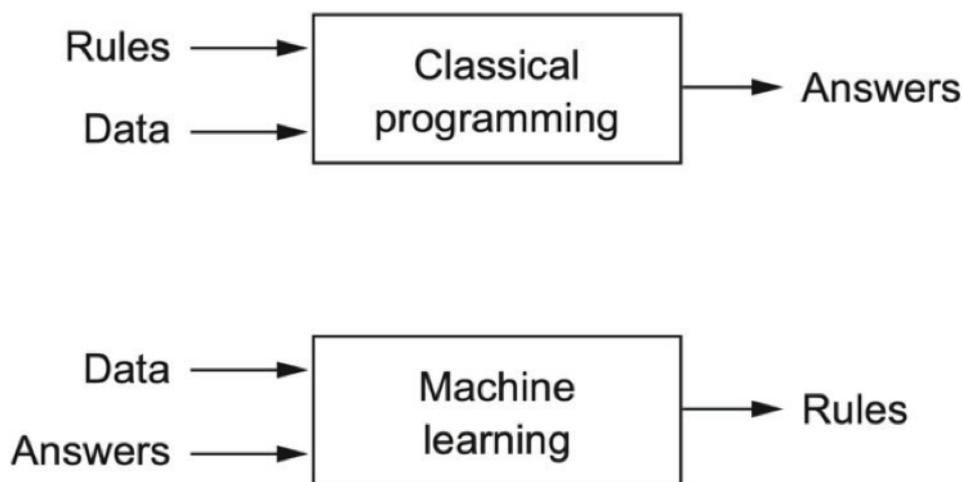
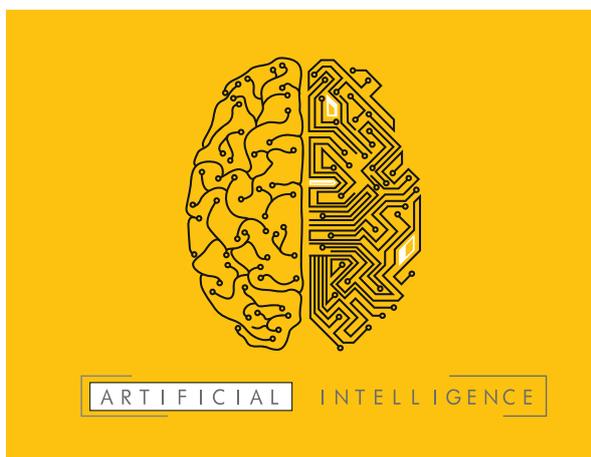


Fig 1. Machine learning versus classical programming. A new paradigm.



impressive, and growing at an astonishing rate. Examples include near-human-level image classification, near-human-level speech recognition, near-human-level handwriting transcription, improved machine translation, improved text-to-speech conversion, digital assistants such as Google Now and Amazon Alexa, near-human-level autonomous driving, improved ad targeting, improved search results on the web, ability to answer natural-language questions, etc etc.



It is obvious that radiology will not escape this exponential (r)evolution. While the famous 2016 statement by Geoff Hinton on radiology (see <https://youtu.be/2HMpRXstSvQ>), may be an exaggeration, it certainly contains some ground of truth.

While this could be perceived as bad news, we can have a different perspective: there is still time to join the (r)evolution, and this for at least 2 reasons. First of all, it has just begun. As can be seen In Figure 2, the big breakthrough in image classification unexpectedly happened in 2012, and superhuman performance was achieved around 2015. Radiologists are not the only ones who were not prepared for this: nobody was. Moreover, nobody has more than 5 years experience with the most successful DL techniques, for the simple reason that they exist only since 2015 or later. So, if we have to catch up, we are only a few years behind...

Second, for a variety of good reasons, DL applications have difficulties in entering the medical workflow. While, as radiologists, we hear and read a lot about AI and DL, we hardly have any AI/DL applications in our daily practice that show “superhuman performance” or seem threatening to our position as a medical expert. In other words, the penetration of AI into medical practices is (and, most likely, will remain) much slower than in other sectors, which gives us time to adapt.

But exactly what do we have to do if we want to learn AI? Much depends on the perspective one takes. The focus of a learning path could be on basic concepts, on mathematical background, on the details of writing code (usually python these days), on understanding how AI will affect workflow and change job content, on practical

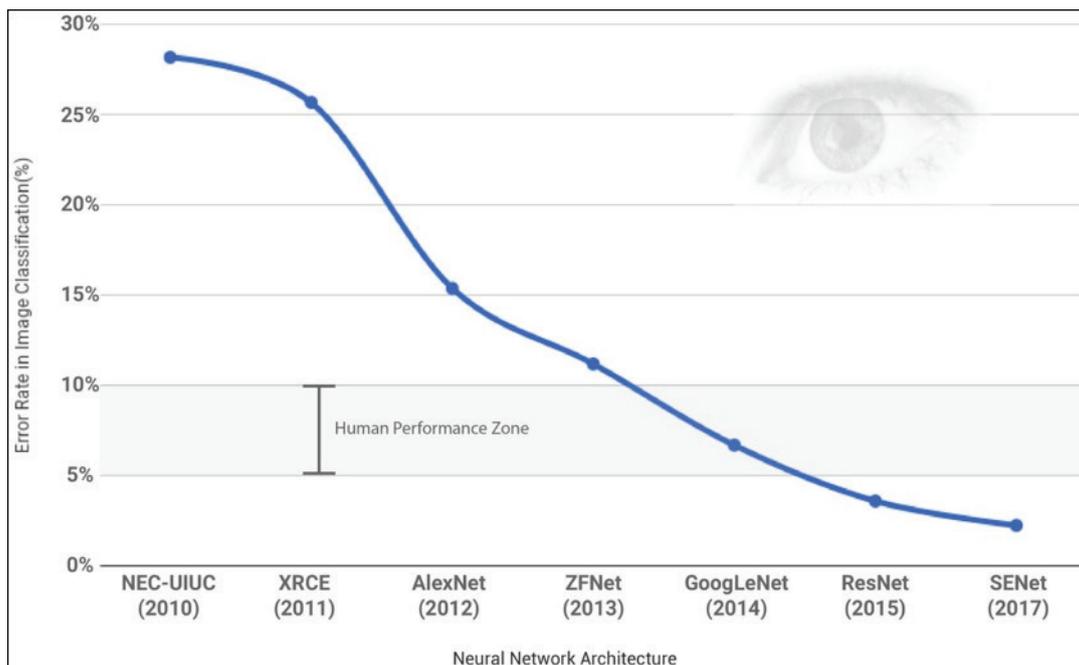


Figure 2. Error rate in image classification over time.

aspects of developing and implementing AI tools, etc.

Figure 3 shows the 9 levels of deep learning understanding / impact as defined by prof Oge Marques (Florida Atlantic University).

Achieving level 9 (“Educated lifelong learners with a technical understanding of what lies behind the deep learning AI craze”) should be possible for medical professionals, and is probably sufficient. After all, we don’t have to make the revolution, joining it is OK.

For some of us, level 8 (“Tech savvy folks ‘playing’ with demos to better understand concepts”) will be achievable. Tools such as Tensorflow and Keras provide the opportunity to “play with” DL tools without understanding the mathematical concepts and without being an expert in writing code (1-4).

Those who want to dive into the mathematics and code writing can attend one or more of the many excellent online courses on edX, Coursera,

and other online teaching platforms (5-6).

Those interested in reading about the economic consequences of AI in medicine and other sectors can read the path-breaking book “Prediction machines” by Agrawal et al. (7).

Finally, many excellent radiology-specific resources have become available (8-12).

In the ideal world, AI training would be part of the training of every radiologist (or maybe even of every child - figure 4). However, in view of the rapid evolution of the field and the shortage of AI experts, organizing this will not be an easy task. So, self-directed education will remain essential. Business as usual for radiologists...

**Lieven Van Hoe**  
OLVZ Aalst

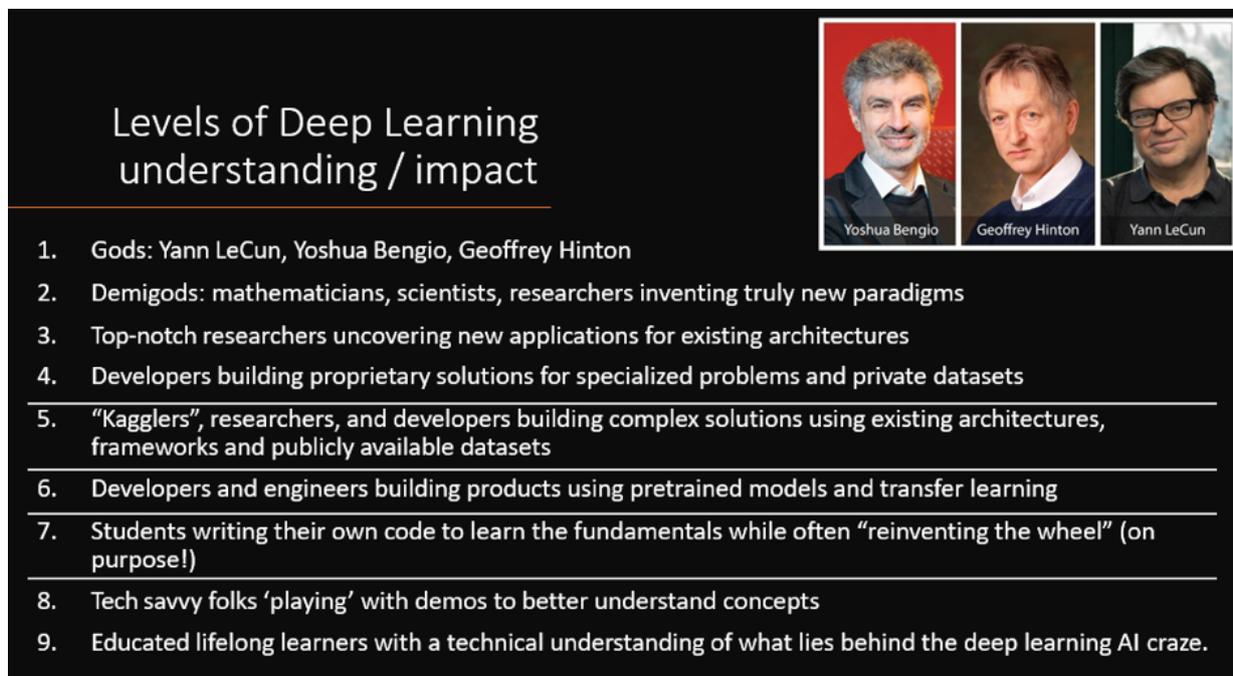


Figure 3. Levels of Deep Learning understanding / impact. Figure courtesy Prof. Oge Marques, Florida Atlantic University College of Engineering.



## If you love your child, teach them deep learning.

Figure 4. AI training for children.

### Reference:

1. Tensorflow playground. <https://playground.tensorflow.org/>
2. TensorFlow, Keras and deep learning, without a PhD. <https://codelabs.developers.google.com/codelabs/cloud-tensorflow-mnist/#0>
3. Deep learning from scratch using Keras. <https://www.adasci.org/continuous-learning/workshop-deep-learning-from-scratch-using-keras/>
4. Erickson B. Magician's Corner: How to Start Learning about Deep Learning. *Radiology: Artificial Intelligence* 2019; 1(4):e190072 • <https://doi.org/10.1148/ryai.2019190072>
5. Coursera course. Deep Learning Specialization by Andrew Ng & deeplearning.ai <https://www.coursera.org/specializations/deep-learning>
6. Massachusetts Institute of Technology. Course 6.036 online. Introduction to Machine Learning. <https://openlearninglibrary.mit.edu/courses/course-v1:MITx+6.036+1T2019/about>
7. Agrawal A, Gans J, Goldfarb A. *Prediction Machines: The Simple Economics of Artificial Intelligence*. Harvard Business Review Press 2018
8. Ranschaert E, Morozov S, Algra P. *Artificial Intelligence in Medical Imaging. Opportunities, Applications and Risks*. Springer, 2019.
9. Montagnon E, Cerny M, Cadrin-Chênevert A, et al. Deep learning workflow in radiology: a primer. *Insights into Imaging* (2020). <https://doi.org/10.1186/s13244-019-0832-5>
10. European Society of Radiology (ESR). What the radiologist should know about artificial intelligence – an ESR white paper. *Insights into Imaging* 2019 10 4. <https://doi.org/10.1186/s13244-019-0738>
11. Wiggins W, Travis Caton M, Magudia K. Preparing Radiologists to Lead in the Era of Artificial Intelligence: Designing and Implementing a Focused Data Science Pathway for Senior Radiology Residents. *Radiology: artificial intelligence*. <https://doi.org/10.1148/ryai.2020200057>
12. Willeminck M, Koszek W, Hardell C, et al. Preparing Medical Imaging Data for Machine Learning. *Radiology* 2020; 00:1–11 • <https://doi.org/10.1148/radiol.2020192224>

## YRS-BSR Case of the Month: Solutions.

### Question 1: Peritoneal carcinomatosis

Peritoneal enhancement and thickening (arrow), omental and peritoneal nodules (arrowheads), perigastric lymphadenopathy (open arrowheads) and ascites are suggestive of peritoneal carcinomatosis. The patient suffered from advanced gastric cancer.

### Question 2: Pseudomyxoma peritonei

Septations in the fluid collection (arrows) and scalloping of the liver fissure (arrowhead) are suggestive of pseudomyxoma peritonei. The patient suffered from appendiceal mucinous carcinoma.

### Question 3: Peritoneal lymphomatosis

Confluent lymphadenopathy (arrows) on both sides of the mesenteric vessels representing the 'sandwich sign' and splenomegaly (open arrowhead) are suggestive of peritoneal lymphomatosis. The patient suffered from mantle cell lymphoma.

### Question 4: Leiomyomatosis peritonealis disseminata

Multiple, well-circumscribed, solid masses (arrows) with mild-to-moderate enhancement in the peritoneal cavity, patient age and absence of other features are suggestive of leiomyomatosis peritonealis disseminata. The patient had a prior hysterectomy for uterine leiomyoma.

### Question 5: Peritoneal malignant mesothelioma

This case could fit peritoneal carcinomatosis. However, calcified pleural plaques (open arrowheads) are suggestive of prior asbestos exposure, for which peritoneal malignant mesothelioma should be considered. The patient had a history of asbestos exposure for more than 20 years.

### Want to read more?

Go to the website of JBSR and search for 'Peritoneal Carcinomatosis and Its Mimics: Review of CT Findings for Differential Diagnosis' or go to <https://www.jbsr.be/articles/10.5334/jbsr.1940/>



# Röntgen, an unknown benefactor for humankind



Röntgen, een onbekende weldoener van de mensheid

Op 10 februari 1923 stierf in München Professor Wilhelm Conrad Röntgen. Hij was 78 jaar oud. Wij beschouwen hem als een Europeaan "avant-la-lettre". Inderdaad geboren in Lennep-Remscheid (Duitsland), studeerde hij aan de Technische School in Utrecht (Nederland), volgde hij cursus aan de Universiteit van Zurich (Zwitserland) en begon zijn carrière aan de Universiteit van Straatsburg. Terug in Duitsland volgde hij nog les aan de Hogeschool van Hohenheim, de Universiteit van Würzburg (waar hij de X-stralen ontdekte die hem beroemd maakten), vooraleer zijn wetenschappelijke loopbaan te beëindigen aan de Universiteit van München. Hij overleed eenzaam in de Beierse hoofdstad. Hij had geen nakomelingen, zijn echtgenote stierf op 31 oktober 1919.

Zijn testament bepaalde, voor diverse redenen te lang om hier op te noemen, dat al zijn notities dienden verbrand te worden. Daarom, in tegenstelling met bijvoorbeeld Marie Curie, van wie nog steeds alle laboratoriumgeschriften bewaard worden, zal men nooit de verschillende stadia van de ontdekking van 8 november 1895 door deze eminente fysicus kunnen achterhalen. Om die redenen hebben wij in 2001 een film (uniek ter wereld) die de manier waarop deze briljante wetenschapper waarschijnlijk tot de ontdekking van de radiologie kwam, opgenomen. Deze film draagt als titel "De herontdekking der X-stralen".

De dagelijkse pers bracht begin januari 1896, zonder medeweten van Prof. W.C. Röntgen, de wereldpremière van deze ontdekking, waarschijnlijk de belangrijkste van de 19de eeuw, waarna het nieuws per telegraaf werd verspreid en niet via wetenschappelijke tijdschriften.

Inderdaad, niet alleen de geneeskunde, maar vele andere disciplines zoals astronomie, paleontologie, scheikunde, kunstgeschiedenis, archeologie, aeronautica, grenscontroles, douane, industrie....maken gebruik van de radiologie.

Het is dus niet verwonderlijk dat W.C. Röntgen op 10 december 1901 de Nobelprijs Fysica in ontvangst mocht nemen. Hier willen we nogmaals het uitzonderlijk vrijgevig karakter van Prof. W.C. Röntgen benadrukken: hij schonk het bedrag van de Nobelprijs aan zijn universiteit (Würzburg) en nam geen enkel brevet op zijn uitvinding die hij aan de mensheid afstond.

Indien u meer wil weten over deze belangrijke figuur en de geschiedenis van deze techniek, verwijzen wij u naar de site [www.radiology-museum.be](http://www.radiology-museum.be) of kan u zich een van onze publicaties aanschaffen.

Röntgen : un bienfaiteur méconnu de l'humanité  
Röntgen peut être considéré comme étant un Européen avant la lettre. C'est en Allemagne, à Lennep-Remscheid qu'il est né le 23 mars 1845.

Suite à l'installation de ses parents aux Pays-Bas, il a fréquenté l'école technique d'Utrecht, puis l'université de Zurich en Suisse.

Il s'est installé en Alsace pour y commencer sa carrière de physicien à l'université de Strasbourg. De retour en Allemagne, il a travaillé à l'Ecole supérieure de Hohenheim, il a ensuite été attaché à l'université de Würzburg où il a fait la découverte de l'existence des rayons qu'il a nommés X et qui l'ont rendu célèbre. Il a terminé sa carrière à l'université de Munich. Veuf depuis 1919 et sans descendance, c'est dans le plus grand anonymat qu'il est décédé dans la capitale bavaroise le 10 février 1923.

A l'insu du professeur Röntgen, dès la fin 1895, la presse internationale et la télégraphie ont diffusé son inattendue et surprenante découverte tandis que les revues scientifiques ne l'ont annoncée qu'en janvier 1896.... alors qu'il s'agissait de l'une des plus importantes découvertes du 19e siècle. De très nombreuses disciplines telles que la médecine, l'astronomie, la paléontologie, la chimie, l'histoire de l'art, l'archéologie, l'aéronautique, les contrôles des frontières, le service douanier, l'industrie, ... utilisent encore la radiologie dans le cadre de leurs investigations, recherches et examens.

Il n'est donc pas étonnant que, le 10 décembre 1901, Röntgen reçoive, à Stockholm, le premier Prix Nobel de physique dont il a offert l'intégralité du montant à l'université de Würzburg. Il convient de préciser que le professeur Röntgen n'a déposé aucun brevet quant à sa découverte qu'il a, de ce fait, léguée à l'humanité.

Contrairement à Marie Curie dont tous les carnets de laboratoire ont pu être conservés, Röntgen a exigé par testament que tous ses documents soient brûlés après sa mort. Cette volonté a été respectée : c'est la raison pour laquelle les différentes étapes allant de la découverte du « rayon » le 8 novembre 1895 à la publication des résultats obtenus le 28 décembre de la même année, ne sont pas connues. En 2001, le Musée belge de la Radiologie a réalisé un film (unique au monde) qui retrace les probables étapes ayant permis à Röntgen de devenir le premier radiologue.

De plus amples informations relatives à cette importante figure scientifique, aux différentes utilisations des techniques de l'imagerie médicale peuvent être obtenues en consultant notre site [www.radiology-museum.be](http://www.radiology-museum.be) ou en acquérant nos publications.

**Renée Van Tiggelen**  
Museum of radiology



## **Contributors BSR newsletter**

### ◇ **Content creation:**

Piet Vanhoenacker, Tom De Beule, Rodrigo Salgado, Olivier Ghekiere, Laurens De Cocker, Anne-Sophie Vanhoenacker, Jeroen Swinnen, Flavien Grandjean, Lieven Van Hoe, René Van Tiggelen , VBS & YRS

### ◇ **Graphic Design**

Paulien Leys & Tom De Beule

### ◇ **Translation & copywriting**

VBS, Anne-Sophie Vanhoenacker

### ◇ **Final editing**

Tom De Beule

### ◇ **Publisher**

Piet Vanhoenacker

**P924824**