BULLETIN

April 2022

SGSMP
SSRPM
SSRFM

Schweizerische Gesellschaft für Strahlenbiologie und Medizinische Physik
Société Suisse de Radiobiologie et de Physique Médicale
Società Svizzera di Radiobiologia e di Fisica Medica
Swiss Society of Radiobiology and Medical Physics

No 102 ssrpm.ch

Editorial

Letter from the Editors

Dear SSRMP members,
the year opened with a much more dramatic challenge than any we could foresee at the end of 2021. Pictures and videos on the news about the war in Ukraine appear all surreal to look at from the safety of our homes or meanwhile we go about our daily routine at work; maybe even getting upset about wrongly named PTVs, late approved treatment plans, unexpected QA or trouble-shooting at the treatment machine. It feels impossible and perhaps a little unfair that everything can go on as usual, meanwhile terrible events are happening to other people and colleagues not far from us. And yet, indeed we are permitted so far to go on as usual.

Within this context, I was touched by the "Blotter" painting that was published in the EFOMP Newsletter of this Spring and I wanted to share it with everyone using it as cover page of the Bulletin: *"it exemplifies totally absorbed presence in the moment. This quality of attention, without ego or agenda is valuable in science … when we are intensely attentive, insight or revelation can follow, often as a surprise – like something given."*
(***Prof. Jim Malone***, EFOMP Spring Newsletter pg 79).

With this premises, I hope as usual that you can find the content of this issue useful and interesting. There are few announcements of upcoming conferences in the Newsletter session, as well as updates from our SSRMP delegates involved in EFOMP projects. I would also like to point your attention on a **new initiative** launched by two colleagues from the radiation protection group at USZ to **improve data collection from dose management systems**.
Besides the official communication, don't forget to read through the conference reports in the Issues of Interest. Among them, a report from the Dosimetry Block-Course run within the ETH-MAS in Medizinphysik gives us an insight on how medical physicists are educated in Switzerland.
The SpotLightOn reveals the existence of a brand new high-tech neuro radiosurgery center that has been operating "right under my nose" since already 9 months.
Finally, the Personalia welcomes (back!) a new colleague. Undertaking her training to become Swiss certified medical physicist, we wish her the best of luck and to have a lot of fun along the way!

The Editorial team of the Bulletin welcomed for the preparation of this issue two new colleagues who expressed their interest in joining the team! We were very happy of receiving their enthusiastic support and we hope we can soon introduce them to everybody!

Along the wave of novelties, you were also enquired to provide your preference in which format you wished to receive the Bulletin. Most of you have opted for the online version. However, if you missed the chance to request the pint version, get in touch with the editorial board.

Francesca Belosi,
On behalf of the Editorial Team

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SSRMP News

Cover Image: The Blotter (1993) by Peter Doig (1959-). Permanent collection at the Walker Gallery, Liverpool, UK. Oil on Canvas. Permission to use this image was kindly asked and granted to Prof. Jim Malone (Medical Physics - School of Medicine at Trinity College Dublin), and appears with a short comment by Prof J. Malone in the EFOMP Spring Newsletter (pg 79).

Issues of Interest

PRESIDENT'S LETTER

Dear colleagues,

Do you recall *Gödel's incompleteness theorems*? *Laplace's demon*? Or *Zenon's paradoxes*? And how those are linked to *Heisenberg's uncertainty principle*, chaos theory or even with the term *Bodhisattva*?

Well, I came across those terms recently and all started with one of the previous president's letters, namely the one a year ago related to the *Habit Loop*. Back then I mentioned the re-discovery of walking and hiking with my family, but a few weeks ago – in the middle of the winter season so to speak – it came back to my mind. Once again reflecting on this topic, I thought winter time also used to be reading time ... In a kind of *Barnes and Noble* store I was looking around for an exciting crime story for some enjoyable leisure reading hours. After a while, the book entitled "**The Einstein Enigma**" from José Rodrigues dos Santos (Portugal) caught my attention. The short description provided on the cover stated:

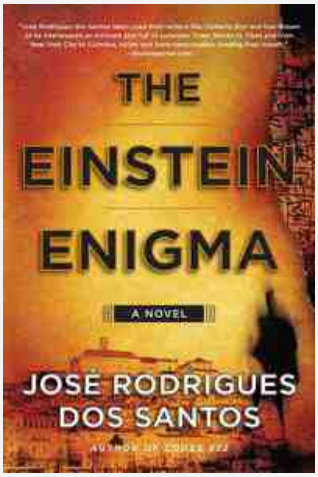
*"**Princeton, New Jersey, 1951**: As a CIA operative watches from the shadows, two old men Israeli prime minister David Ben-Gurion and world-renowned scientist Albert Einstein enter Einstein's home to speak privately about nuclear weapons and the existence of God.*

***Present Day Cairo, Egypt**: Over lunch in the Muslim quarter, world-famous cryptanalyst Thomas Noronha is hired by a beautiful dark-haired woman, Ariana Pakravan, to decipher a cryptogram hidden in a recently discovered secret document under heavy security in Tehran. A manuscript penned by Albert Einstein, it is titled **Die Gottesformel: The God Formula**. So begins a remarkable adventure that spans the world, as Thomas and Ariana pursue the dangerous truth behind an incredible document.*

The Einstein Enigma is a breathtaking fusion of science, thriller, and religion, a mind-bending trip to the source of time, the essence of the universe, and the meaning of life itself." (orellfuessli.ch)

"Wow" I was thinking to myself and got the book and started reading immediately. Unbelievably, dos Santos embedded complex natural science theories and paradoxes, religious gospels and different

PRESIDENT'S LETTER



orellfuessli.ch

human cultures with a crime story, the latter not being the best though. However, it is remarkable to recognize the persistence and the curiosity of Thomas Noronha to dive deep into all of those theories and all the different attitude of life over the whole globe, to take the risk of new paths and thoughts with all the challenges as well as the rewards. Overall, the reading definitely was a cue in the habit loop, along with some flashbacks from physics studies :-). I can recommend this book and I would also like to encourage you to share the persistence, the curiosity, the open-mindedness and trying out new things including their challenges.

Why not becoming an SSRMP board member candidate or taking over a task in the editorial team of SSRMP?

Next, I hope that all of you are well even in the current pandemic situation with its high infection rate. It is still not over and might never be, however, I imploringly wish that with the upcoming summer there is at least a break in the pandemic. Instead, I am looking forward to upcoming face-to-face activities, especially the upcoming conferences and meetings. It will be a pleasure to meet again and see colleagues directly from head to toe. There will be many different conferences in spring and early summer, one of which is the **SCR'22** taking place from June 23 to June 25 in Fribourg including many different sessions organized in cooperation with SSRMP. Thus, come and join the meeting!

To finish, I again would like to reiterate the message from my previous letters: **Let's stick together within our society in the best possible way**. A big "Thank you" to all of you for your individual efforts and contributions towards your family, neighborhood and society at large. This is not only covering the pandemic situation, but also the war in Ukraine.
Thank you all and take care!

Michael K Fix,
SSRMP president

PROFESSIONAL AFFAIRS

SSRMP Delegate in EFOMP Working Group 17

The Role of the Medical Physics Professional in the Life Cycle Management of Medical Devices

Some years ago, the medical devices industry stopped simply selling machines but began to offer health care solutions instead, in a bid to provide for the changing needs of their customer base. After years of increasing complexity in the application of medical devices the demand for human centered solutions became an important factor in business. The promise was to improve quality and versatility at both reduced cost and risk. In the health care community, we began to talk about modalities, plug and play integration and life cycle management ...

Unfortunately, in reality not every technical solution can actually be integrated smoothly and seamlessly into every health-care environment. There is always a technical supporting infrastructure required such as information and communication technology (ICT), where the new device must fit in. Following implementation, a gap can often be observed between the solution desired and the solution actually delivered. This can often be a result of failings in the initial analysis or description of the use-case specification for the required solution.

And this is the point in the story where the medical physics professional (MPP) enters the scene. Possessing a scientific educational background with advanced technical and analytical skills on one hand and a profound understanding of the clinical aspects of the application and their implications on the other, the MPPs are well suited to play a leading role in the life cycle management of medical devices and solutions. The MPP is the human link between the clinical requirement for a specific solution, the system to be purchased and the vendor's ability to provide the solution. Furthermore, the MPP can manage or contribute to each stage of the life cycle including the establishment of requirements with use-case assessment, investment planning, tendering, procurement of equipment, acceptance testing especially in regards to safety and physical properties, quality management, effective and safe use and maintenance, user training, interfacing with IT systems, and safe decommissioning and removal of the equipment.

Do you know your delegate?

Although the SSRMP president is the first representative of the society, the executive board may require the support of additional delegates.
The board can appoint a delegate to represent the SSRMP to another society or authority's body.
This article describes the tasks of one of your delegates.

https://ssrpm.ch/the-society/board/

-> Section "Delegates to other societies"

Stephan Klöck,
SSRMP delegate in EFOMP WG17

PROFESSIONAL AFFAIRS

During the EFOMP Council meeting in October 2019 in Warsaw, a proposal of the Maltese delegation was accepted to develop a **policy statement** concerning the involvement of MPPs in the procurement process and in the other stages of the **life cycle of medical equipment**. Until now, there are no clear EU guidelines for healthcare institutions regarding this issue.

In November 2020, EFOMP assembled a working group consisting of 10 delegates from their national member organisations (NMOs): **Erato Styliano Markidou** (Cyprus), **Christian Gromoll** (Germany), **George Gourzoulidis** (Greece), **Susan Maguire** (Ireland), **Gabriele Guidi** (Italy), **Eric Pace** (Malta), **Wim van Asten** and **Hugo Spruyt** (Netherlands), **Jaime Martinez** (Spain) and **Stephan Klöck** (Switzerland). Wim van Asten from the Zuyderland hospital group in the Netherlands was announced as chairperson of the working group. Since 2020, the working group have met several times. Unfortunately, due to COVID restrictions, never in person.

To begin the process of developing the document, a descriptive comparison of the current situations in the countries of the working group members was performed. In the next phase, different approaches and potential tasks and responsibilities of MPPs in the life cycle of a medical device were discussed. Finally, a responsibility assignment matrix for a project or business process was derived, describing the participation of MPPs playing various complementary roles in completing tasks or deliverables.

The draft of the policy statement will be presented during the 4th **European Congress of Medical Physics** (ECMP) in August 2022 in Dublin and submitted for approval of the EFOMP council in the autumn of 2022.

The working group believes that an institutional involvement of MPPs in the life cycle management of medical devices is a crucial step in implementing true solutions, addressing the actual clinical needs while taking account of on-site constraints and maintaining the highest quality and most cost-efficient service.

According to the final document, institutions will be invited to review their processes and adapt the complete system as described, or elements thereof as relevant. By evaluation of the outcome in a follow-up phase, the need for the involvement of MPPs in the various stages of a medical device life cycle can thus be determined, giving MPPs a stronger position in healthcare organisations throughout Europe.

Stephan Klöck
Swiss delegate in the working group on
"EFOMP Policy Statement 17: involvement of MPPs in the different stages of a medical device life cycle".

PROFESSIONAL AFFAIRS

SSRMP delegate in EFOMP project MEDIRAD

As SSRMP delegate to the MEDIRAD project, hereby I provide an update.

As a reminder, MEDIRAD is an **European research project** funded by EURATOM 2020 research program. It has just been concluded in February 2022, and the final recommendations will be published soon at the webpage: http://www.medirad-project.eu/#top. Four documents have been prepared by the consortium. In each of the documents there are several recommendations.

Recommendation Nr. 1

Large European patient data repositories are an essential source of information for improving scientific knowledge as well as good medical practice. The objective of the following recommendation is to facilitate the development of **large-scale multinational epidemiological studies**, by proposing guidelines to help European countries implement at the national level European regulatory requirements on ethics (including compliance with General Data Protection Regulation directive). Moreover, to make patients more willing to allow the use of their personal data, informative material such as flyers, social network contents etc. should be developed to enhance the awareness of the patients and the general public about the scientific research topic.

Recommendation Nr. 2

Further **optimisation of ionising radiation-based medical protocols** for Diagnostics or Therapy. Five actions have been identified within this recommendation:

i) Optimisation of image quality and dose in CT scanning, including CT in multimodality imaging scanning. Indeed, CT is the largest contributor to the European population's collective dose from the medical sector and poses a risk of potential harmful health effects to patients, especially to the paediatric population. To effectively optimise exposure from CT and multimodality imaging examinations, optimisation techniques should be based upon patient and organ dosimetry, image quality, patient characteristics and clinical

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-> Section "Delegates to other societies"

Marta Sans Merce, SSRMP delegate in MEDIRAD project

indications. The recommendation is to develop robust optimisation tools that account for each of these contributing factors.

ii) The evaluation of patient dosimetry in nuclear medicine on an individual basis can help to highlight the range of absorbed dose delivered from fixed administrations of activity and the consequent range of likely outcomes, including long-term risks of secondary malignancies. The recommendation is to facilitate and promote the development and implementation of an optimized and harmonious deployment of molecular radiotherapy dosimetry-based protocols across Europe for the treatment of thyroid cancer.

iii) Radiotherapy plays a major role in the treatment of breast cancer but may induce cardiac damage and subsequent major cardiac events, which may occur relatively early or up to decades after completion of radiation treatment. The recommendation is to establish risk models for clinical support and improving individual risk assessment with the help of specific biomarkers in breast radiotherapy.

iv) Although there is an increasing awareness among radiation oncologists that sparing the heart is essential to broaden the therapeutic ratio in breast cancer patients, not all currently available technological options are always applied in routine clinical practice. The recommendation is to actively promote the application of the elements of good practice in breast radiotherapy, specifically targeted to reduce secondary cardiovascular risks.

v) Patient dosimetry is an essential part of ensuring quality and safety both in radiotherapy and diagnostic imaging. Today, to a great extent, only radiation dose indices are used to document patient doses. In some cases, this can lead to miss the radiation related risk to specific organs. The recommendation is to accelerate the evolution towards a generalized use in clinical practice of modelled total delivered doses to individual patients.

Recommendation Nr. 3

Further optimisation of **radiation protection for patients and medical workers**. Three actions have been identified within this recommendation:

i) Characterisation of gamma camera performance for high activity quantitative imaging enables personalised treatment planning in molecular radiotherapy. It also enables standardised collation of quantitative image data and absorbed dose calculations to facilitate multi-national, multi-centre clinical studies and to allow accurate absorbed dose estimations. The recommendation is to optimise the systems for quantitative imaging.

ii) Patient centered care can be improved by ensuring that the different medical specialties and healthcare professionals better engage via a more structured and related approach. The recommendation is to encourage the harmonization of protocols, procedures and guidance documents to improve linking among professionals and medical disciplines.

iii) During fluoroscopically-guided procedures staff can be exposed to low doses of ionising radiations on a daily basis, eventually resulting in high doses throughout a complete career. The protection of the staff depends on the correct use of the protective equipment. MEDIRAD research has identified that increased independent testing of such equipment, with reference to typical and realistic conditions of use would be an effective way to promote best protection practice for the medical workers concerned.

Recommendation Nr. 4

Development of recommendations on **future medical radiation protection research** towards research communities. Four actions have been identified within this recommendation:

i) Radiation-adverse effects following radiotherapy have a significant impact on treatment outcome and on the patient's health and quality of life.

The physiopathology of radiation effects in healthy tissue surrounding the tumour, depends on many parameters. Knowledge of the biological mechanisms of radiation adverse effects and adverse outcome pathways would help to identify relevant molecular biomarkers of sensitivity, adverse effects and of susceptibility, which could be used to personalise treatment and patient follow-up. The recommendation is to conduct research into healthy tissue response and sensitivity to radiation.

ii) During routine clinical activities, a large amount of multisource data is produced. AI for empowering big data management in diagnostic and therapeutic applications will facilitate to translate multisource data into clinical decision aids. Indeed, it will help to develop treatment approaches that are better tailored to the specific characteristic of the patients and their tumour, to improve therapeutic outcome and minimise short and long-term adverse effects of radiation. The recommendation is to promote an EU-wide research strategy to use AI for optimizing RP in medicine.

iv) While the role of radiation in gene mutations is undisputed, research in the last decades has uncovered a multitude of other biological effects that contribute, or eventually govern the detrimental effects of ionizing radiation towards cancer or non cancer disease, such as cardiovascular disease. The recommendation is to intensify and facilitate the development of biologically based models that relate disease risk to underlying biological processes.

v) The adverse effects of radiation exposure are particularly important in cohorts of patients who may live for decades after exposure, particularly children. The success of such studies relies on careful patient follow-up and collection of detailed patient demographic, clinical and dosimetric data, images and biological samples. The recommendation is to conduct large scale clinical radiation epidemiological studies to better understand and quantify late health effects of radiation and provide science-based evidence for setting high quality and safety standards for diagnostic and therapeutic radiation applications.

For more detailed information, don't hesitate to consult the MEDIRAD webpage.

Marta Sans Merce, PhD
SSRMP delegate in MEDIRAD

Swiss-wide initiative: improve data collection for Dose Management Systems

Nowadays the power and necessity of the x-ray imaging procedures hardly can be underestimated. In Switzerland more than 1200 x-ray imaging procedures per 1000 inhabitants are performed yearly, resulting in an average dose of 1.49 mSv per person. Modern imaging departments are facing multiple, and sometimes conflicting, demands: they are continuously trying to improve image quality and simultaneously minimize the radiation dose. For this purpose, systematic monitoring of radiation dose is indispensable. Such monitoring allows for protocol optimization and rapid correction of wrong practices. Additionally, it helps to increase risk awareness among hospital staff members.

Dose monitoring systems and opportunities

Dose monitoring has not been a simple activity until now. Medical physicists obtained dosimetry statistics by long manual work, which resulted in lack of systematic control and/or were based on small amount of datasets. The introduction of **dose management software** (DMS) significantly improved radiation dose collection and analysis. These tools allow hospitals to aggregate all dose values in one place, perform real-time comparison, detect outliers or perform retrospective analyses, as for instance, evaluate the Diagnostic Reference Levels (DRL) compliance.
Most advanced DMS can calculate dose descriptors based on patient-specific body size, automatically evaluate organ doses in CT or peak skin dose (PSD) in interventional procedures and set up automatic alerts. Moreover, DMS may be used for staff training and protocol optimization.

Problems to be solved

Of course, accurate radiation dose management is only possible if the data registered by DMS is reliable and complete. Usually, the DMS collects exposure parameters and patient data either directly from the machine or from the picture archiving and communication system (PACS). It must be ensured that for each modality the dose descriptor and the respective examination parameters are transferred to the DMS database to enable further evaluation. In theory, nearly all modalities are compatible with dose management systems. However, in practice it is sometimes not trivial to collect the right data. For instance in case of CT scanners, all exposure parameters are usually stored together with the image information either in the image DICOM headers or Radiation Dose Structured Report (RDSR). However, in case of intraoperative imaging and radiography, essential dose information in older systems is usually stored as a secondary capture image or screenshot. Therefore, the DMS needs to extract the exposure parameters from these reports. The latter requires optical character recognition (OCR) technology to correctly assign the information, which is cumbersome.
The second problem is related to the RDSR itself. Although the International Electrotechnical Commission (IEC) defines the standard DICOM tags that must be included in structured dose reports, the information might vary a lot. It can be caused by either DMS failing to read accurately a valid identification, by incomplete versions of structured report itself, or by wrong data imported by the vendors.

Initiative

Elina Samara and Natalia Saltybaeva on behalf of the radiation protection team of the University Hospital Zürich have contacted the EFOMP in order to find a solution that would help to improve the DMSs around Switzerland. We would like to launch an initiative to collect data related to the following issues:
a) dose reports' format that can't be recognized by the DMS
b) missing or incorrect information in DICOM tags

We are pleased to invite all Swiss Hospitals for active participation! Feel free to get in touch with us by email.

Elina Samara (**EleniTheano.Samara@usz.ch**) and
Natalia Saltybaeva (**Natalia.Saltybaeva@usz.ch**),
Radiation Protection team of the University Hospital Zürich

SCIENCE

SCR' 22 Announcement

Save the date:
June 23-25, 2022

Congress venue:
Forum Fribourg
Route du Lac 12,
CH-1763 Granges-Paccot

Congress President:
Prof. Dr. Hatem Alkadhi,
Congress President SGR-SSR

Registration:
Open!
https://congress.sgr-ssr.ch/registration/

SCIENCE

SSRMP Annual Meeting Announcement

Save the Date:
October 27-28, 2022

Congress venue:
Kultur- und Kongresszentrum Thun
Seestrasse 68,
CH-3604 Thun

Congress Chairmen:
Daniel Frauchiger
Prof. Dr. Michael Fix
Dr. Silvan Mueller

Registration:
Open!
Deadline: October 9, 2022
https://ssrpm.ch/event/55th-ssrmp-annual-meeting/

Call for Abstracts:
Deadline: August 2, 2022

SSRMP General Assembly:
October 27, 2022
@4.30pm

European School for Medical Physics Experts: "*Hybrid Approaches in Radiation Therapy*"

on-line webinar, 12th-13th of October 2021

The school, chaired by **Prof. Alberto Torresin**, was a great opportunity for medical physicists to expand their knowledge in hybrid radiation therapy approaches. It focused on the therapies and devices using hybrid concepts and gave excellent live lectures on the background, practical methodology, current and future developments. The content of the school included five parts:

1. Radiation therapy concepts;
2. Image guided radiation therapy (IGRT);
3. Brachytherapy;
4. Surface guided radiation therapy (SGRT)
5. Adaptive radiation therapy (ART).

As **Prof. Christoph Bert** pointed out in the opening lecture, the concept "hybrid" is in fact everywhere, e.g. the combination of imaging modalities, of different therapies, of imaging and therapy, etc. Therefore, the goal of the school is to shine light on the most recent developments in these "hybrid" fields.

The first session *Radiation Oncology* gave participants a chance to refresh their knowledge as well as learn more about combined therapies: what is behind combining chemotherapy, radiation therapy, immunotherapy, and/or surgery and which kind of hybrid functionality does not exist, but would be useful. **Dr. Conchita Vens** (Netherlands Cancer Institute, Amsterdam, the Netherlands) gave us general concepts and illustrations on the topic "Radio-sensitization". She pointed out some novel concepts in the tumor-specific radio-sensitization based on "synthetic lethality". **Dr. Radolfo Chicas Sett** (Ascires Biomedical Group Valencia, Spain) followed giving an investing overview about the (neo-) adjuvant setting. The last lecture was presented by **Dr. Eric Deutsch** (Gustave Roussy Center Campus, Villejuif, France) about hybrid approaches in radiation therapy. He demonstrated that lymphocytes are the key to radiation response. Therefore, there is a need to refine target volumes and estimating the dose to immune organs at risk (immune cells).

The afternoon focused on various IGRT integrated systems on different treatment machines: 2D-3D kV/kV image registration at Cyberknife for cranial and spinal radiosurgery, for direct tumor tracking (lung tumors) and for intra-fractional patient motion correction by **Dr. Oliver Blanck** (Department of Radiation Oncology, Saphir Radiosurgery, Kiel, Germany); CBCTs at Linac based systems by **Dr. Marcel van Herk** (University of Manchester) with his lecture "*CBCT in the RT: current status and improving protocol*"; proton therapy in combination with MRI Imaging by **Aswin L. Hoffmann** (Medical Radiation Physics Section, OncoRay, Dresden, Germany). Of special note is the interesting contribution from our well-known lecturer in Switzerland, **Prof. Raphael Moeckli** (Institute of Radiation Physics, Lausanne University Hospital) on the topic "*IGRT: MVCT & kVCT in Tomotherapy*". The lecturer pointed out that the Tomotherapy has native IMRT and IGRT. A MVCT imaging system is used for volumetric imaging of the patient and for online acquisition of beam data during the treatment while kVCT offers better image quality. These two imaging systems are relevant for motion management.

Q&A with the lecturers at the end of the first school day

On the second day, the morning session focused on different hybrid systems in brachytherapy (BT) and their recent developments. **Prof. Dimos Baltas** (University of Freiburg, Germany) gave us an overview of different systems used in interventional radiation oncology. Hybrid systems with CT, US and/or CBCT are often used for imaging, localisation and guidance under interventional and intraoperative treatment delivery conditions. **Prof. Hellebust** (Oslo University Hospital, Norway) gave an impressive lecture on the MR-based Image Guidance Brachytherapy, proposing some nice possibilities such as creating a biological target volume using contrast enhanced

MR imaging. **Prof. Nesvacil** (Medical University of Vienna, Austria) showed hybrid approaches using CT-based imaging. He suggested that hybrid applicators for cervix BT could be used with CT, but certain level of MR information is nevertheless recommended. Aspects of quality assurance in brachytherapy were also covered in this session by **Dr. Kolkmann-Deurloo** (Erasmus MC, the Netherlands). The electromagnetic tracking system (EMT) for treatment verification in BT and the recent developments on EMT integrated in hybrid brachytherapy were presented.

After the lunch break, two methods for surface guided radiotherapy (SGRT) were presented, namely the "Optical-based SGRT" and the "Thermo-based SGRT". **Dr. Kükele** (Lunds University, Sweden) showed the possibilities, pitfalls, and clinical experience with optical-based SGRT. **Dr. Retif** (CHR Metz-Thionville, France) showed the "*Brainlab ExacTrac Dynamic (ETD): an SGRT/X-ray integrated imaging solution*". In fact, this is a highly hybrid system due to the combination of several positioning/checking methods, e.g. SGRT (optical) for pre-positioning, X-rays to refine the position, and optical/thermal SGRT for the real-time monitoring during beam on.

The last hours of the school were devoted to adaptive radiation therapy (ART) with two exciting lectures: one on the "CBCT-based ART" and another on "MRI-based ART". For me, this part is particularly interesting, because ART is the way most clinics wish to head towards in the future. In the first lecture, **Dr. Garcia** (Hospital from Valencia, Spain) presented a workflow of the CBCT-based ART. IGRT is the first step to determine the lever of action. Then, using the CBCT, dosimetric evaluation of each fraction is performed. After some fractions, a new CT and the estimation of delivered dose on it for each fraction are carried out. The adaptation would then start with a new plan with suitable fraction dose and number of fractions to be adapted. The proposed protocol could be suitable for several clinics since most Linacs are equipped with CBCT. However, this workflow requires intensive work and a number of uncertainties have to be taken into account. In the second exciting lecture on "MRI-based adaptive radiotherapy", **Prof. Thorwarth** focused on answering an interesting question "*Is there an MRI-based ART w/o an MR-Linac?*". Firstly, she discussed the basic concepts of ART and four ART-paradigms. Then she highlighted technical aspects of two different methods of ART: online ART to adapt dose every fraction and offline ART to adapt the dose every week or every two weeks. Using a MR-Linac Unity (Elekta), online/real-time adaptive MRgRT shows advantages for several groups of patients such as prostate, liver cancers, etc. Clearly, a MR-Linac could offer ideal conditions to perform online ART for each fraction to ensure dose to the target, reduce dose to OARs, and reduce safety margins. Especially, a functional MRI-based RT could enable the possibility to perform response-ART/biological ART in the future. However, most clinics could not afford this in the near future due to its very high cost. A more realistic solution would be the offline ART every one/two weeks which can be realized by the combination of normal Linac and additional MRI with patient in the treatment position.

In addition to the lectures mentioned above, exciting company lectures gave us an impression of the new developments in hybrid approaches in radiation therapy, e.g AI-contouring with deep learning, CBCT-based adaptive RT with the EthosTM system, "*Elekta Unity-Designed for today and the future*", and Real-time Adaptive Radiotherapy with Synchrony.
The school finished with interesting general discussions. There is a tendency that more MR dedicated machines will be developed and implemented in the clinics for both brachytherapy and external beam radiation therapy, therefore, medical physicists should start preparing. In addition, the therapy is likely to go in the direction of biological adaptive RT. Therefore, we should be ready to be open-minded and innovative. We should explore different approaches that are most cost effective and have best outcomes.

All the lectures of this school were live and will be uploaded to the EFOMP platform.

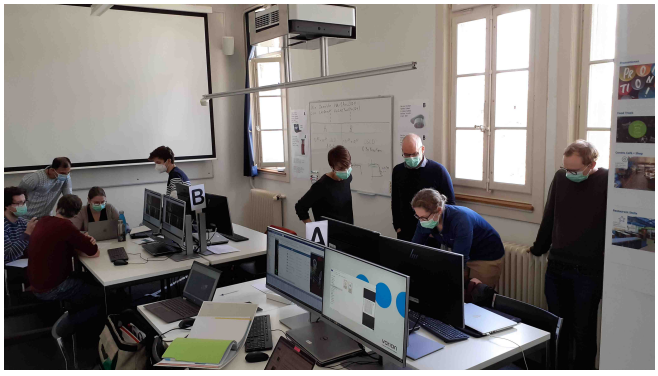
Hai Nguyen,
KSA-KSB

MAS in Medical Physics - Dosimetry Block-Course

InselSpital Bern, 19th-30th of January

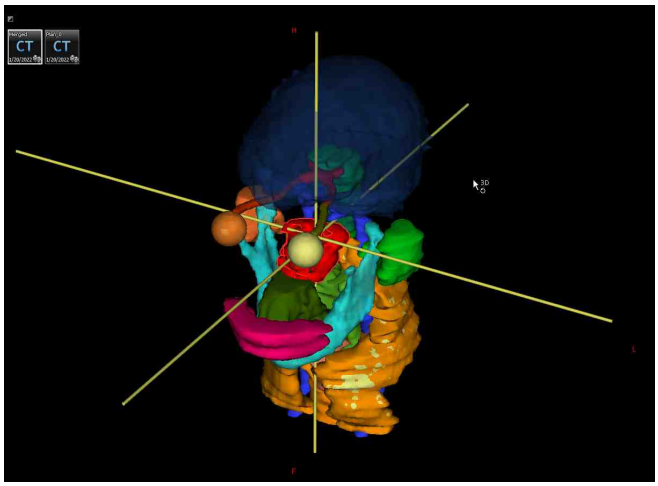
On January 19 at 15:15 two special patients were admitted at Inselspital in Bern. Both diagnosed with advanced stage cancer, in the two following weeks they were the subject of interviews, biopsies, CT-scans, contouring and treatment planning by a team of young and motivated physicists. When not working on the patients, the physicists focused on dosimetry and QA measurements on the various clinical devices. Both patients received their first fraction on Sunday, 30th January: their names are Bruno Cirs and Philipp Phantom ...

The Block Course in Dosimetry is a two-week, intensive, hands-on course organized by the *Abteilung für Medizinische Strahlenphysik (AMS)* at Inselspital in Bern; it concludes the third semester of the ETH-MAS in Medical Physics and is an essential part of the studies for the MAS students aiming at the SSRMP certification. The two weeks provide a full-immersion experience on Radiation Therapy where practical activities occupy most of the schedule.



The two groups of physicists are completing their presentations for the post-treatment meeting. The block course ended on a bright Sunday afternoon with a review of all the activities performed during the two weeks.

As a participant to this year's edition, together with my colleagues, I found myself thrown in the action from day one. We were grouped in two smaller groups of 5 physicists, each associated with either an Alderson or a CIRS thorax phantom; our first task was to come up with a plausible diagnosis and then navigate through a simplified but realistic workflow leading to the actual application of one treatment fraction.

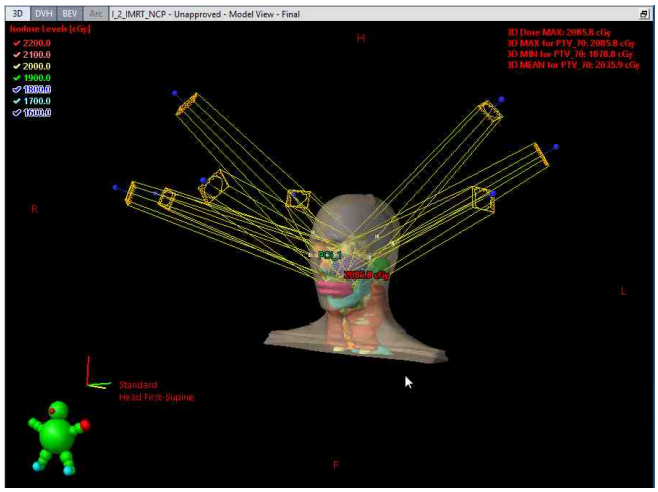


Contouring all the organs at risk in the head/neck region is an exercise of skill and patience ...

I must say that after discussing the tumor type and performing the first CT scan we felt quite emboldened, at least until the time came for contouring the tumor volumes and the Organs At Risk. Even when considering the inexperience of most of us, the process seemed to take forever! On the positive side I'm now deeply convinced that a possible strategy to teach anatomy would be to have students start from 3D scans and manually contour all the organs one after the other (especially the Lymphnodes!).

Once the patients were modeled, it was time to create and evaluate one or more treatment plans with the Eclipse software. To get a first impression of the different capabilities and limitations of each technique we were encouraged to compare 3D-CRT, IMRT and VMAT in different configurations.

One of the things that surprised us is the huge amount of work that is performed "behind the scenes" compared to the actual treatment time. The planning phase makes use of a high degree of software automation, and nevertheless the necessary human workload (and knowledge!) is still extensive.



8-beam IMRT planning for a head-neck carcinoma. We were supported in the development of at least one "reasonable" treatment plan but we could also experiment with some non-standard solution.

The planning sessions alternated with other hands-on sessions aimed at getting to know the devices (Brachytherapy and LINACs - Cyberknife, Truebeam, Ethos) and see what they can do and which QA they need, together with sessions explicitly focused on absolute and relative dosimetry.

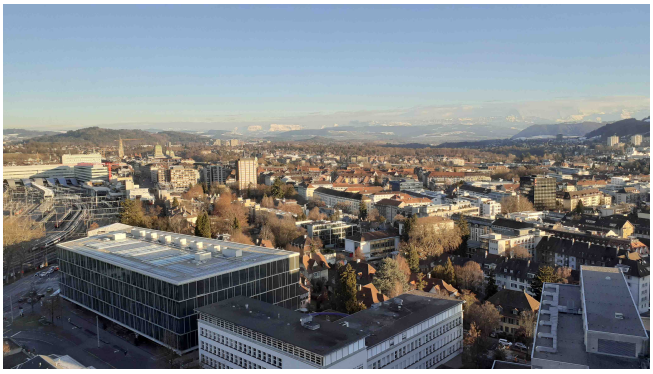
Among the other topics discussed during the two weeks I should not forget to explicitly mention the evaluation of films and OSL dosimeters, shielding calculations, radiation protection, QA phantoms, quality metrics and of course the ongoing developments regarding DTRT and DYMBER.

The perduring of the pandemic situation during the winter had seriously jeopardized our possibility to attend the course, which has a strong hands-on nature and includes a lot of interaction with the AMS physicists; all of this could not have reasonably be converted to an online format. Luckily the organizers managed to adapt the program until the very last day in order to allow us an in-presence attendance. In addition to the high educational interest of the course, we also received great benefit from finally having some social contact and we are grateful that the course could take place in its intended form.

Davide Cester,
Diagnostic and Interventional Radiology department,
University Hospital Zürich

Links

- Abteilung für Medizinische Strahlenphysik
  https://www.ams.unibe.ch/
- ETH MAS in Medical Physics
  https://mas-mp.ethz.ch/



Bern in Winter (view from the hospital). The course of 2022 has been blessed by good weather.

Swiss Neuro Radiosurgery Center (SNRC)

High-precision treatment with focused X-rays effectively and sustainably destroys tumors and spares healthy tissue to the maximum. Surgery can thus often be avoided.

Radiosurgery refers to a borderline area between radiation therapy and neurosurgery. In this process, X-rays are directed at a target (e.g. tumor) in the head or brain from different directions with an accuracy of less than 1 mm. In this "focal point" the tumor cells are destroyed, while the surrounding healthy tissue is spared because the damage occurs only where the beams meet (intersection). Outside the desired target area, the rays have too little energy to cause any damage.

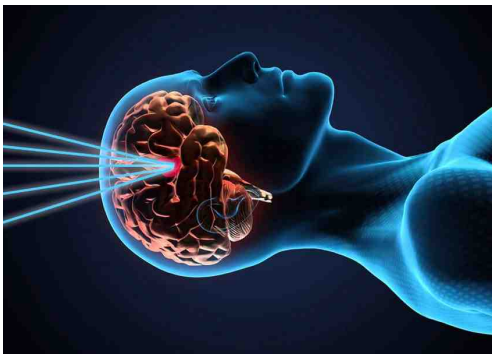


Fig.1 Principle of radiosurgery: a large number of beams meet at one point to trigger the desired radio-biological effect.
http://www.radiationoncologysolutions.in/stereotactic-radiation.html

This procedure represents a non-invasive, very low-risk therapy option for diseases within the skull, which (depending on the type of tumor) can be an alternative to open brain surgery. More than 4,000 scientific publications have been published on the effectiveness of radiosurgery. Radiosurgery was already developed in the 1950s; important milestones were the *Gamma-Knife* and the *CyberKnife*. The continuous further development led to the "**ZAP-X®**".

The SNRC in Zürich operates this latest generation device as the first and only center in Switzerland. The center is located in central Zürich and started treating patients in June 2021. The SNRC team includes two medical physicists: Dr. Boris Dettinger and Dipl. Phys. Dirk Weltz.

Each individual case is discussed by experienced specialists. We create an individual treatment concept for each patient based on the current state of science and are in close exchange with the University Hospital Basel.

Fig.2 ZAP-X®: self-shielded, gyroscopically suspended linear accelerator.

The treatment usually takes less than an hour, is absolutely painless and is performed on an outpatient basis. Anesthesia or other medical measures (hospitalization, infusion, intensive care, rehabilitation) are not necessary. The ambience is pleasantly soothing and the treatment is performed in comfortable clothing. All costs are covered by the compulsory health and care insurance.

Treatment procedure

1. Consultation

A detailed and confidential discussion with our radiation oncologists and neurosurgeons provides the patient with a sound basis for making a decision about treatment.

All possible therapy options are discussed. Due to the close cooperation between the two departments and with the medical physicists, the patient receives an individual and independent recommendation.

2. Imaging and mask fabrication

A computed tomography (CT) scan and a magnetic resonance imaging (MRI) scan of the head are required for individual dose planning. Before the CT, a mask is made. It is used to fix the head in order to guarantee a highly precise therapy. All imaging examinations can be performed in-house.

3. Dose planning

In order to ensure sub-millimeter precision of the irradiation, the image data sets are used for the irradiation planning. This is prepared by the radiation oncologist or neurosurgeon in collaboration with our medical physicists. Great importance is attached to the best possible sparing of healthy tissue.

4. Treatment

The one-time outpatient treatment on the ZAP-X® lasts up to 50 minutes in a lying position and is painless. During this treatment the head is fixed with the mask. This does not cause any pain either. Since the device is much more spacious than an MRI, claustrophobia rarely occurs.

If desired, a sedative medication can be administered. The treatment is video-monitored throughout and the patient can communicate via an intercom system. The treatment can be interrupted immediately at any time.

5. Follow-up

Regular check-ups are important. They can take place at our institute. If desired, follow-up appointments can also be made with the patient's treating neurosurgeon, neurologist, oncologist, ear, nose and throat specialist or family doctor.

PD Dr. Dr. Andreas Mack
CEO

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"Welcome!"

Rosalind Perrin

There and back again

Some may recognise my British face from my *halcyon days* at PSI doing proton therapy research with the LuCa phantom. Well, since then, I went to Bavaria, worked in Siemens and Erlangen University Clinic for three years, and here I am back again in my favourite land of lonely mountains (although there are no dragons to be found).
It's great to be back, this time in the more "extrovert" Romandie, working at the HUG after a fun interlude in a cardiac radioablation start-up!

I have now been fully converted to the virtues of VMAT (achieving my DGMP-MPE certificate in Bavaria), convinced of the beautiful dose distributions painted by the dancing MLC leaves of the linac. But I am still excited about the proton FLASH treatments from the research ongoing at PSI.
Here in Geneva, we are excited about the Cyberknife to be installed very soon and I'm enjoying the dynamic and fun teamwork. Now, I am working on achieving my first non-EU medical physics certification (no, not the British - but the Swiss).

I hope to catch up with old colleagues soon over the Röstigraben!

Rosalind Perrin,
HUG, Genève

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Also, you are invited to participate in the construction of our bulletins. Of desirability are all contributions that could be of interest to members of our society, such as

- Reports of conferences, working group meetings, seminars, etc.
- Reports on the work of various committees and commissions
- Succinct results of surveys, comparative measurements etc.
- Short portraits of individual institutions (E.g. apparatus equipment, priorities of work, etc.)
- Reports on national and international recommendations
- Short Press Releases
- Photos
- Cartoons & caricatures
- Announcement of publications (E.g. books, magazines)
- Announcement of all kinds of events (E.g. conferences, seminars, etc.)
- Short articles worth reading from newspapers or magazines (if possible in the original)
- Member updates (E.g. appointments, change of jobs, etc.)

The easiest way to send your document is as a MS Word document via email to one of the editor addresses above.

Deadline for submissions to Bulletin No. 103 (02/2022): 07.2022

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Conference Calendar

CALENDAR 2022

April 28 **Lausanne**	SASRO Multidisciplinary workshop April 28 @10:00 - 17:00 https://ssrpm.ch/event/sasro-multidisciplinary-workshop-2022/
May 6 Copenhagen, DK	ESTRO 2022 May 6 - May 10 https://www.estro.org/Congresses/ESTRO-2022/
May 30 Budapest, H	6th European Congress on Radiation Protection May 30 - June 3 https://akcongress.com/irpa2022/
June 7 Dallas, USA	AAPM Summer School 2022 June 7 - June 12 https://w4.aapm.org/meetings/2022SS/
June 12 Singapore, SG	World Congress on Medical Physics and Biomedical Engineering June 12 - June 17 https://wc2022.org/
June 19 Pichl, AT	Winterschule Pichl für Medizinische Physik 2022 June 19 - July 1 https://www.winterschule-pichl.de/
June 23 **Fribourg**	SCR' 22 June 23 - June 25 https://congress.sgr-ssr.ch/
July 10 Washington, DC	AAPM 64th Annual Meeting July 10 - July 14 https://w4.aapm.org/meetings/2022AM/
August 17 Dublin, IR	4th European Congress of Medical Physics August 17 - August 20 https://www.ecmp2022.org/
September 1 **Baden**	26th SASRO Annual Meeting September 1 - September 3 https://www.sasro.ch/2022
September 5 **Geneva**	International Conference on Occupational Radiation Protection September 5 - September 9 https://www.iaea.org/events/occupational-radiation-protection-2022/
October 27 **Thun**	55th SSRMP Annual Meeting October 27 - October 28 https://ssrpm.ch/event/55th-ssrmp-annual-meeting/

And please, if you participate in any conference or meeting, think of writing a few lines or sending a picture for the Bulletin.

THANK YOU!