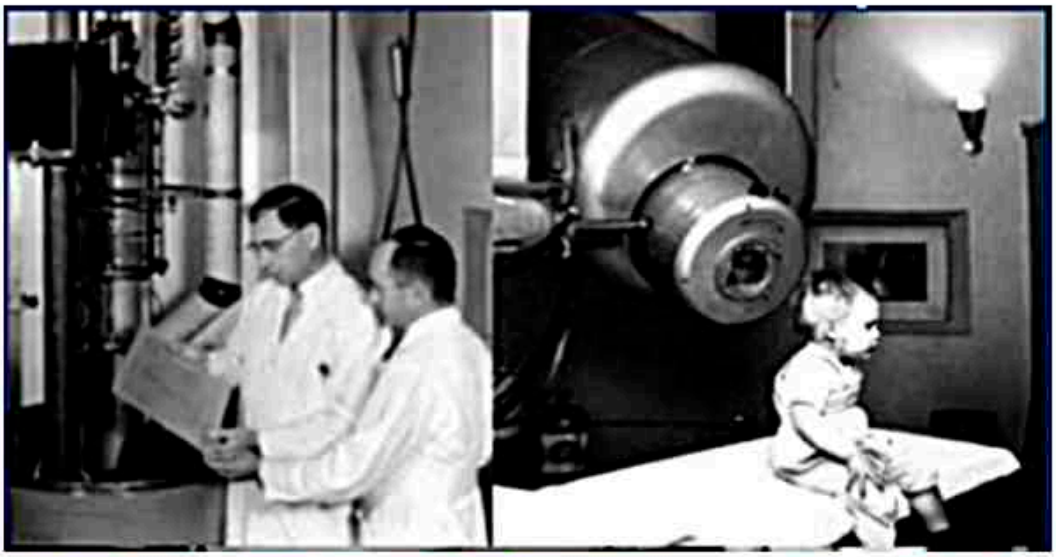
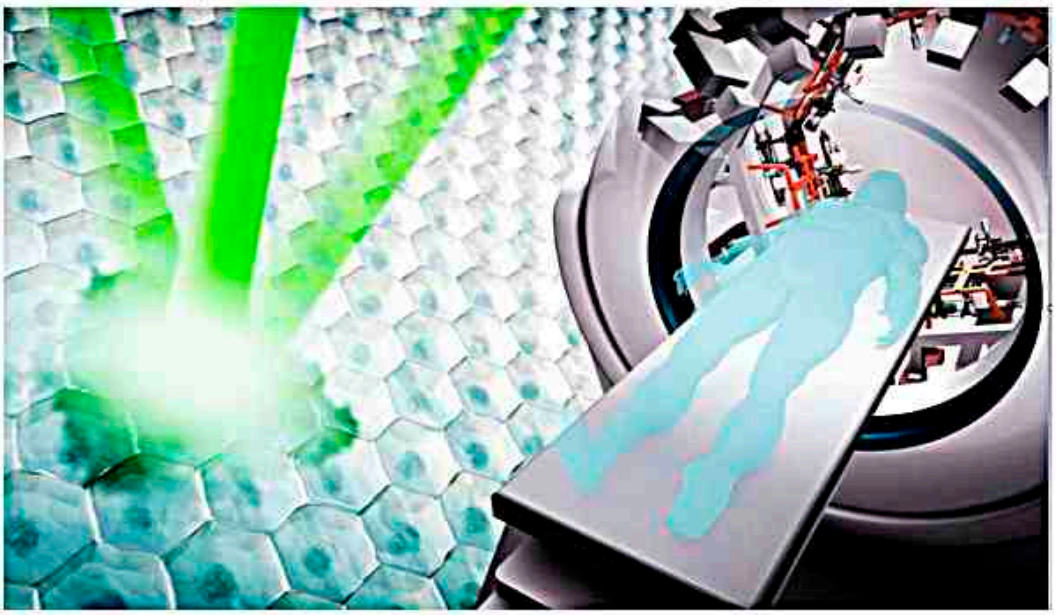
BULLETIN

August 2019





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 95 www.ssrpm.ch

Editorial

Letter from the Editors

Dear SSRMP members,

You will find, not intentionally, this editorial much in line with the president letter. Apparently, the nice weather and being outside makes both me and Michael Fix travel with our minds.

Has it ever happened to you visiting a site from the past (an amphitheater, a castle, ruins of an old city …) to travel with the imagination trying to figure how it was to live there many years ago? Or reading an old book, to wish having had the opportunity to meet the author and exchange few words with him? (for instance, I often wonder how special it would be to be part of the literary discussions that were taking place among the "Inklings" at the "Eagle and Child" in Oxford in the late '30-'50s with Tolkien, Lewis, Williams …). Or, as medical physicists, have you ever tried to imagine how it would have been to participate in epic moments which set milestones in our field? Old pictures like the top one on the front cover always fascinate me. I sometimes regret being born in an age where the major discoveries and implementations in our field have already been done and to have missed crucial historical moments.

In fact the grass is always greener in the neighbor's garden (or "time" in this case), and I might underestimate the deep changes we are witnessing even right now. The cover's bottom figure and the reports from this summer's conferences kindly provided by some of you testify to that.

The Issues of Interest section merits some special attention as it contains few "new entries" enlightening on the existence of conferences some of you might not be aware of. For instance, the article on the Particle Therapy Co-Operative Group (PTCOG) annual meeting, structured as interview to different attendees so to offer multiple-points of view on the congress' highlight and best talks. Especially very encouraging and motivating for our profession is the link to a youtube video by a patient treated with proton therapy, displayed during the social event of this conference.
The conference reports on Biology Guided Adaptive RT (of whose existence I did not know myself) and the one on the International Conference on the Use of Computers in Radiation Therapy (ICCR) and the International Conference on Monte Carlo Techniques for Medical Applications are surely other examples.

Editorial

Also, don't jump too quickly on the SSRMP News section. In June the SSRMP Intranet website has been launched! The professional affairs committee has worked hard to provide this new platform where content is restricted to SSRMP members only, especially to comply with the introduction as of May last year of the General Data Protection Regulation (GDPR) by the EU. Let's say a big thank you to Jean-Yves Ray for having extensively worked (making scarce much of his free time) and managed the work for this project to take the light. Among the News you will also find some important "Save the Dates", i.e. the SSRMP Annual meeting (this year taking place at PSI!) and the Applied Medical Physics meeting.

Time for reading! Maybe you can take along this issue of the Bulletin during one of your coffee or lunch breaks enjoying the warm sun in a green spot outside your department!

Francesca Belosi,
On behalf of the Editorial Team.

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Cover Image:
Top - first patient to receive RT from a linear accelerator in Stanford (1956) [https://www.slideshare.net/lokpreeth/radiotherapy-past-present-future-kmio-2015];
Bottom: Department of Energy's SLAC National Accelerator Laboratory and Standford University researchers are developing a new accelerator-based technology allowing RT treatments in less than 1 sec.
[The future of fighting cancers, https://phys.org/news/2018-11-future-cancer-zapping-tumors.html]

PRESIDENT'S LETTER

Dear colleagues,

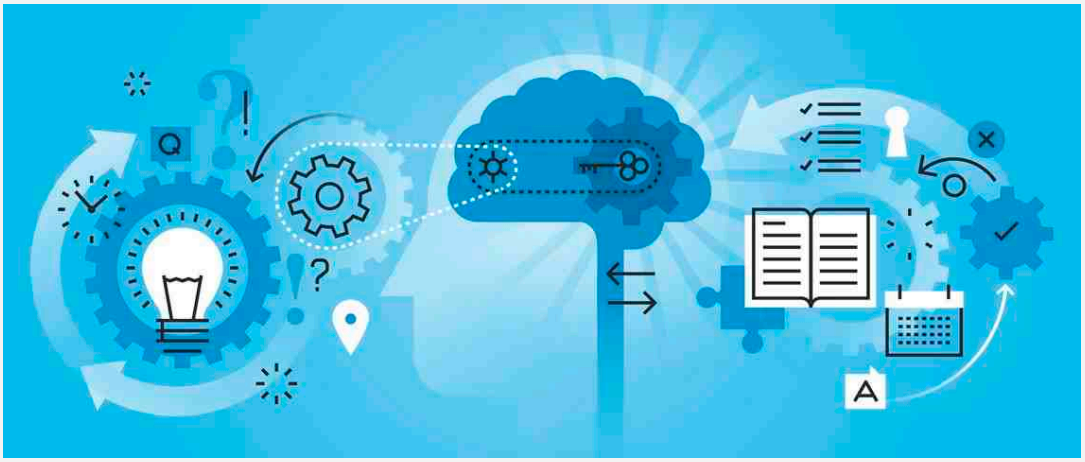
Finally, the summer arrived with a lot of sun power and also a new issue of our Bulletin. I invite you to take the Bulletin outside for a break and give all the interesting contributions a thought maybe along with a lunch or an after-work drink with colleagues or friends.

Being outside and enjoying the nature also invites to travel, however I am not only thinking of taking vacation and going to some exciting places on earth. It also happens just with thoughts going on a journey, as e.g. some thoughts about medical physics or radiobiology. How the field looked like 5 years or 10 years ago or even longer when you are in this field for quite some time already. From there the thoughts should also turn to the future and thinking about what is needed to engage our young colleagues and even students in medical physics and radiobiology.

When I recently participated in the ESTRO conference in Milano, this happened to me when recognizing all the deep learning, machine learning, artificial intelligence as well as radiomics being everywhere in this conference, of course combined with automation. Now the time seems to be ready for some applications of such algorithms after several hype cycles, one of which was about the time when I entered the field of medical physics. The more recent ICCR conference was even more emphasizing the possibilities and opportunities to create magic algorithms of layered convolution and de-convolution networks trained and configured by existing data. These u-nets (reminding me more on the underground network in large cities) seem to have a solution ready for all kind of problems being too complex for a single human brain – at least for mine.

Coming back to the ESTRO conference and my thinking of the past and the future. As if the organizer were anticipating my thinking, there was a debate about “In 10 years physicists will need different training to include more…”. Five experts in the field provided their opinion on what is needed for a trainee.

PRESIDENT'S LETTER



(www.aim.com.au)

First, Daniela Thorwarth from Tübingen believes in *Image Knowledge* motivated by her vision for 2029: "In 10 years every patient will receive personalized, online-adaptive, functional image guided, biologically individualized radiotherapy treatment". More training in *predictive models* and *big data* is the way to go for Ludvig Muren from Aarhus supported by the above mentioned hot topics. Ben Heijmen from Rotterdam is in favor to include more *broad computational skills* which for sure is based on his experience with i-cycle. A different perspective was proposed by Julian Malicki in improving *management and leadership* in order to gain more impact and influence at a decision taking level. Last but not least Giovanna Gagliardi from Stockholm was advertising *basic physics skills* as we should reinforce physics knowledge. It was a very interesting debate and of course the key point for all was on the cost of what additional training should be included as no-one wanted to extend the training duration. The ideas ranged from omitting basic dosimetry up to "outsource" some training into the bachelor/master programs already.

Personally, I think the training should include more science to be prepared for all kind of challenges ahead of us. Scientific projects could also be easily linked to different aspects from basic physics and imaging knowledge, predictive models and naturally include computational skills. Additionally, scientific visibility would be supportive for Management and Leadership.

Speaking of science brings me to the SSRMP meeting in November at PSI. The program takes shape already and, of course, its success will strongly depend on the active contribution of all of you: as presenter of your scientific work and as participant. I encourage you to join the meeting and sharing your thoughts with your colleagues. In the meantime, enjoy reading the Bulletin.

Michael K Fix,
SSRMP President

PROFESSIONAL AFFAIRS

SSRMP Newsletter and Intranet Website for Members

The committee for professional affairs has recently launched a Newsletter and an intranet website dedicated to you, the members of SSRMP. The Newsletter is a new channel for your society representatives to regularly inform the members about the society activities. In addition, the intranet website is a platform to provide restricted material shared with all the members.

Although the executive board has no strategy to limit the spread of information about the society, managing the society showed that there was a need to provide subject matters dedicated only to the members. Both the main website and the former mailing list were not designed to fulfill that need but aimed to share the society's interests with a wider audience.
In May 2018, the introduction of the General Data Protection Regulation (GDPR) by the EU obliged the board to take action. This law, which applies beyond the EU border, triggered the implementation of the Newsletter that takes over the former mailing list and brings it up to a higher standard. Both the Newsletter and the intranet comply with the GDPR.
Both the two development projects were adapted using available manpower and consequently, were kept to a rather simple technical level. Accordingly, the projects did not require too much web developer contributions, both users' subscription processes were not automated and no modification was brought to the actual SSRMP membership database. Hence, automatic synchronization of the subscribed users against the membership database can be developed in the future.

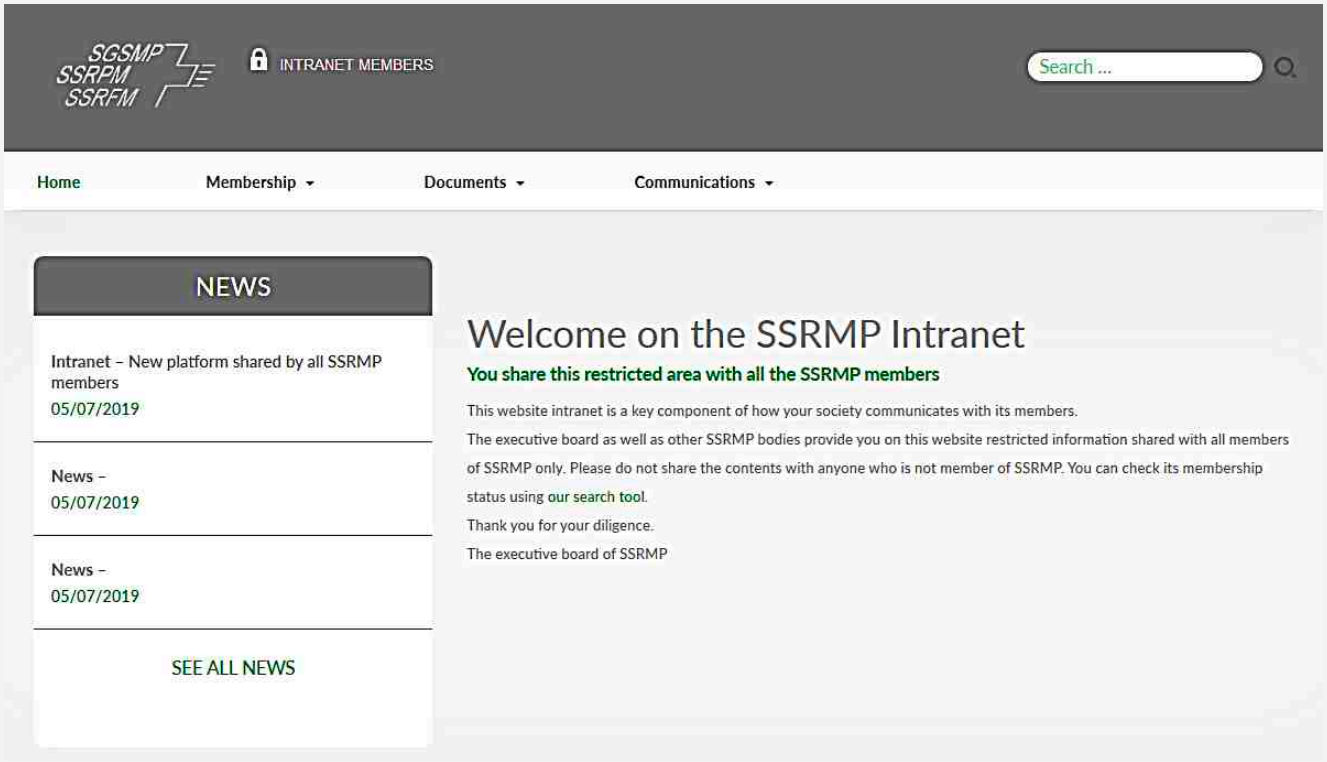
Subscription

Both the Newsletter and intranet users' subscriptions are based on your primary email address. It is, therefore, important that you keep the society secretary office updated about your personal contact details.

SSRMP Newsletter and Members' Communication

As already revealed by the first newsletter, the executive board, the committee chairs and other representatives will now use this new channel for distributing information as well as formal communications with members. Information about the society will no longer be brought up through the former mailing list that will be deactivated by 2020.
Still, the Newsletter distribution tool is also at the members' disposal. You may inquire or communicate with the whole membership, or eventually with a predefined subgroup. Contact the webmaster, if you would like to send an email to the members.

PROFESSIONAL AFFAIRS



SSRMP Intranet Website

The intranet website has been set up to share information and documents among all the members. The intranet can be accessed from the sign in link available in the footer of the main website https://ssrmp.ch. It requires an authentication of the member's username. Either the email address you had provided to the society or a username that has been recently set for you, can log you in.
Regarding the contents, the search tool, which allows retrieving the contact details of members known to you, is now only available from the intranet page "Membership data". You can request an update of your personal contact details using the enclosed contact form. The page "Documents" will propose drafts of recommendations and other sensible documents under consultation, which are usually discussed at the AMP meetings. The section "Communications", which includes news and the newsletter archive are still under development.

Your ideas for further developing your intranet and bringing in useful materials are very welcome. Contact the chair of the professional affairs committee.

On behalf of the SSRMP board,
Jean-Yves Ray

SCIENCE

SSRMP Annual Meeting Announcement

53rd SSRMP Annual Meeting

21-22 of November 2019

Venue
Paul Scherrer Institute
Auditorium WHGA/001 West Area
Forschungsstrasse 111
CH-5232 Villigen

Congress Chairman
Sairos Safai

Registration
registrations are open till: **20th of October 2019**
indico.psi.ch/event/7318/registrations/963/
registration is free of charge, but mandatory

Social Event
Thursday 21st of November 2019

Abstract submission deadline
30th of August 2019

SCIENCE

Save the date!

Continuing Education Day

Radiation protection training/education and medical physics – current challenges and solutions

On this year's continuous education day, we address current implementations and challenges of training and education in radiation protection - with a special focus on medical physics. Attendees will not only learn about the background of the changes associated to revised radiation protection ordinance but will also learn about already established teaching courses at different institutes and organizations and about future projects. Moreover, experts will talk about subjects like copyright issues in regard to teaching or about the difficulties and promises of e-learning solutions. In essence, attendees will get an update about the current state of training and education of radiation protection related issues in Switzerland.

25th of October, 9h15
Bern

Applied Medical Physics (AMP) Meeting

This meeting is a general platform for all interested persons in medical physics. Traditionally, the AMP meeting is split in two parts: a dedicated topic is discussed in the first half of the meeting; the second part is focused on the current state of the the different working groups of SSRMP.

Medical Imaging Physics (MIP) Meeting

On the same day in the morning, the meeting of the working group on MIP is taking place.

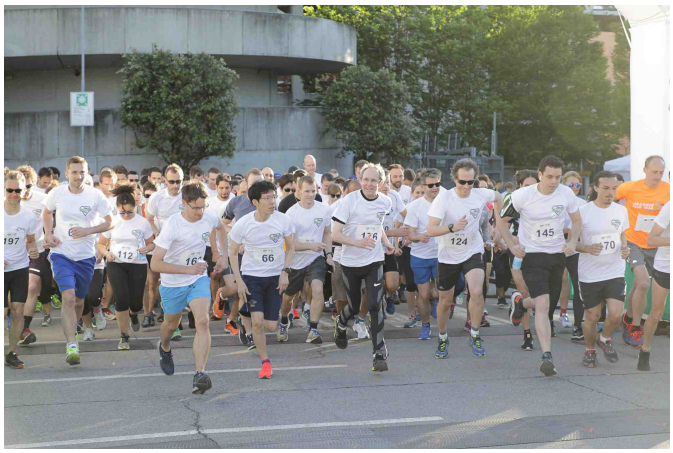
11th of December, 13h15
Bern

ESTRO 2019
Milan, 26th - 30th of April

This year, the ESTRO congress took place in the beautiful frame of Milano city (Italy) between the 26th and the 30th of April.

The congress being a big annual event, it collected 2250 abstracts and 3700 participants were present from all over the world, as well as 94 industries.
New features were available this year, such as «*The Stage*» where the congress Meet & Greets and industry pitches would take place. Also, the «*Selfie Corner*» gave everybody the opportunity to win a free registration at ESTRO 39 in Vienna.

As it has become a tradition by now, the Super Run took place also this year, an occasion to challenge everyone in a common effort. We were able to spot between the participants some known faces :)



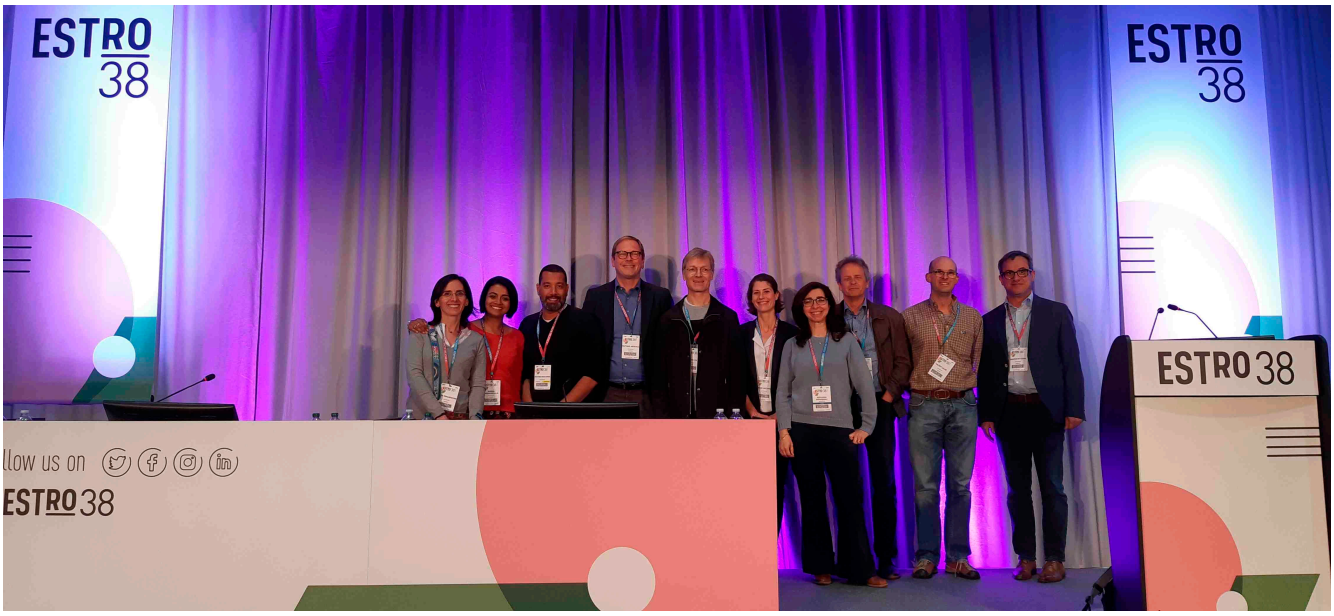
For the first time in the history of ESTRO an informal meeting for women in Medical Physics was planned. The goal was to promote networking, share experiences, meet new friends, guide young female physicists to find a mentor or just to have a coffee with great colleagues.

The ESTRO congress allows clinicians, physicists and RTTs to be together in order to exchange discussions about radiotherapy, as the theme of this year suggested: «**Targeting optimal care, Together**».
Starting from the first lights of the morning the teaching lectures introduced the participants into refreshing courses on a variety of topics: from artificial intelligence to detectors specific correction factors; from gating and breath-hold technique to overview of SRS and SBRT in clinical practice.
The sessions focusing on medical physics included very interesting topics. Some exciting areas of expertise are confirming their entry in medical physics, such as machine learning (ML). ML is becoming more and more present in our field, and in this respect a pre-meeting course has been organized to provide the participants the fundamental basics of machine learning and the concepts of artificial intelligence. Image segmentation and recognition greatly benefit from this methodology which allows the detection of certain elements in medical images and the outline of organs or anatomical structures.
Radiomics has become in recent years another hot topic in medical physics. The amounts of features that can be extracted from medical images have the potential to predict prognosis and therapeutic response of great importance for personalized therapy.

The community is also moving towards automation in all the steps involved in patient care, starting from contouring, passing through planning and going to treatment data analysis. The last one reflects the increasing need for adapting the treatment in a reactive/proactive way. Indeed adaptive treatments are becoming routinely available in clinical practice, for example with MR-linacs.

Radiobiology was also represented in several interdisciplinary sessions, with increasing interest in the role and possibilities of immunotherapy in conjunction with radiotherapy.

The Swiss participation to the conference has been significant with multiple medical, physics and radiobiological contributions from Geneva, Bern, Zürich, PSI and Lausanne.



Do not miss the next congress in 2020 in Vienna, as it is an excellent opportunity to see what's next in the field of radiotherapy and to meet with (new) colleagues!

Vera Magaddino
Hôpital de La Tour, Meyrin

Olivier Pisaturo
HFR – Hôpital fribourgeois

BiGART
Aarhus, Denmark 22nd - 24th of May

This photo was kindly provided by professor Jens Overgaard

The 18th Acta Oncologica Symposium on Biology-Guided Adaptive Radiotherapy (BiGART) was held on May 22-24, 2019 in Aarhus, Denmark. The bi-annual meeting took place at the Hotel Marselis, located at the coast just south of Aarhus. Beautifully situated and providing excellent accommodation, gastronomy and other facilities, this venue offered the perfect setting for social and scientific interaction between the conference attendees. This year's edition was organized back-to-back with the opening symposium of the Danish Center for Particle Therapy at the Aarhus University Hospital, where clinical operation started earlier this year.
The scientific program contained a mixture of very interesting invited and proffered presentations on biology, physics and clinical topics. With around 200 conference participants only, the oral presentations all took place in a single meeting room, which resulted in highly interdisciplinary and interactive sessions. This interaction between attendees reached a high during the excellent poster discussion sessions that concluded the scientific program on the first and second conference days. Divided into several smaller groups and headed by capable moderators, researchers briefly presented their posters after which typically a lively exchange of thoughts took place. The poster presenters were encouraged to give their best by the three poster presentation prizes that were awarded at the end of the conference. The social and culinary highlight of the BiGART meeting was the traditional conference dinner at the Varna Mansion, which is beautifully located in the forest next to the conference venue.

One personal scientific highlight, although probably biased by the research interests of the undersigned, was the session with the title: "**Building clinical evidence for particle therapy – the European approach**". This session revealed the remarkable differences in the organizational, clinical and scientific environment throughout the different European countries, and how this can impact the adoption and acceptance of particle therapy. First, professor Damien Weber (Paul Scherrer Institut, CH) acknowledged the lack of clinical data on proton therapy treatments and emphasized the need for European collaboration, and elaborated on the efforts in this respect of the European Particle Therapy Network (EPTN). Karin

Haustermans from Leuven (BE) pointed out that the Belgian situation is complicated politically, but also financially, as reimbursement for proton therapy treatments is limited to standard indications due to recent conclusions of a Belgian scientific advisory institute that there is no evidence in favor of proton therapy for other indications. The German situation concerning reimbursement of particle therapy treatments is complicated due to the sheer number of different insurance parties, which can all decide differently on reimbursing these treatments, as was explained by Esther Troost from Dresden (DE). Hans Langendijk from Groningen (NL) explained the model-based approach that has been adopted nationally in the Netherlands to decide whether an individual patient is eligible for proton therapy, and how these NTCP-models should be updated in the future based on clinical data. David Sebag-Montefiori from Leeds (UK) shared his views and efforts on how to properly and efficiently set up clinical trials for particle therapy. Sweden has the unique situation in which the Skandion proton therapy facility is jointly owned and operated by seven academic hospitals, and Håkan Nyström (SE) explained that the proton therapy facility still remains underused even though proton therapy is typically reimbursed, and that joint scientific initiatives are limited due to the decentralized research organization. In Denmark on the other hand, there is a strongly centralized organization for cancer care, as was finally shown by Cai Grau from Aarhus (DK), with proton therapy treatments being paid from public funds, national multidisciplinary cancer groups per tumor site and a well-established Danish Cancer Registry. The enlightening session was concluded by a panel discussion. When the panelists were asked to share their worst nightmare with respect to building the clinical evidence, they typically expressed the concern that the particle therapy community would fail to produce convincing evidence (either in favor or against particle therapy), due to bad clinical trials being performed, too few randomized trials being performed, or a lack of referral of patients to particle therapy.

Overall, the 2019 BiGART conference was an outstanding meeting, both scientifically and socially, with very interesting and exciting presentations from a number of disciplines, and with a high degree of interaction also due to the limited number of attendees. It was therefore definitely a breath of fresh air in a landscape of conferences that tend to attract more and more participants. Although this year's focus might have been slightly more on particle therapy, due to the preceding opening symposium of the Danish Center for Particle Therapy, I would highly recommend future editions of the BiGART conference to anyone working in our field. But hold on … not all together please! Let's try to keep it the relatively small and highly interactive meeting that it has been so far.

Steven van de Water
Postdoctoral fellow
Center for Proton Therapy, Paul Scherrer Institut

PTCOG58
Manchester, 10th- 15th of June 2019

The 58th Annual Conference of the Particle Therapy Co-Operative Group (PTCOG58) was held in Manchester on 10-15 of June 2019. In total, more than 1300 people from 39 countries visited the conference. This year PSI was represented by a 25 person delegation, whereof many had an oral presentation or a poster presentation.
From the amount of talks on FLASH therapy and grid therapy, it is clear that these are the hot topics within particle therapy at the moment. For those of you not familiar with the topic: FLASH therapy refers to treatment with short pulses of a very high dose rate >40 Gy/s, which in animal studies has been shown to reduce the toxicity to healthy tissue (the FLASH effect) and at the same time maintains tumor control at the same level as conventional therapy. Grid therapy is a treatment that moves away from the homogenous dose distribution to a more grid-like dose distribution to reduce the side effects to healthy tissue.

The social event was held in Manchester Cathedral, a quite unusual place for a dinner, which rendered a few comments, but a very nice setting with a string quartet welcoming us at the entrance.
The PTCOG beer, which was brewed just for this conference, was served at the dinner as well as any other receptions organized by the conference and was very much appreciated by those drinking beer.
In between the dinner courses, we heard stories/speeches from four former patients. These young patients, ages between 10 and 30, gave us insight on how it is to be on the "receiving end" of radiation therapy. All the speakers were very good and their talks had a very high standard. I can imagine it is not always easy to talk about such an emotional topic in front of 500 people, but they all did an outstanding job. It was very encouraging and touching to hear their stories and be reminded about the reason why we do the work we do.
The last story was a video clip from a young YouTuber, who recently received proton therapy and had made a video about it. In case you are interested, you can find her clip here:
https://www.youtube.com/watch?v=1DjV4fvLMpU#action=share

To get a wider insight on how people experienced the conference I asked a selection of the PSI representatives which talk caught their attention the most and what was the highlight of the conference.

Personally, I really liked a talk by M. Parkes on Hyperventilation assisted breath-hold. In his talk, he showed that by letting breast cancer patients inhale 60% oxygen before breath-hold, the time they can hold their breath can be doubled. He also showed that by using a mechanical ventilator in combination with preoxygenation with 60% oxygen, breath-holds of more than 5 minutes can safely be achieved and breast cancer patients could endure multiple prolonged breath-holds, which gave 41 minutes of radiotherapy treatment time in 66 minutes session. He was also questioning why not all radiotherapy centers are using 60% oxygen to double the duration of short breath-holds, since this seems to be such an easy way to increase the breath hold.

from left to right: Alessandra Bolsi, Serena Psoroulas, Nada Fachouri

Alessandra Bolsi, Medical Physicist

The quality of all the presented work at the conference was very high. I found the Keynote speech by Marco Schwarz very interesting; he gave an introduction of new challenges in proton therapy, keeping the focus on what could be clinically applicable.

Serena Psoroulas, Beam Line Scientist

Highlight: High quality presentation in the Industrial Symposium by Varian. They were disclosing interesting and substantial work and results about FLASH therapy.

There were some interesting talks and posters on how centers that are using commercial systems perform technical studies on shaping the beam using for example quadrupoles and octopoles. Previously this type of work was only done at few laboratories like PSI and it is interesting to see more centers doing this.

Nada Fachouri, Junior Medical Physicist

The Highlight of the conference were the patients' stories during the social dinner; it was interesting to hear the "other side" of the story. The talk by E. Felcini on Novel toroidal configuration for hadron therapy gantry I found very interesting.

Nicola Bizzocchi, Dosimetrist

I have enjoyed the central location of the congress as well as Manchester itself. In my opinion, it is an amazing location for further events like this one. As often happens in Medical Physics related congress, I have seen a lack of presentations on planning techniques. Everything we do aims to treat patients as good as possible. We treat patients using plans. A plan can be scored from very good to sub-optimal (I have seen several sub-optimal clinical plans in my experience, unfortunately), mainly due to the used technique. There are always a lot of speeches about robustness/optimizer/Montecarlo & other algorithms and so on ... and almost none about the used technique for that specific site or this specific tumor.

On the other hand, I have attended great presentations about biology and clinic. Having left space for clinic and biology presentations was a great move.

Frank Emert, Medical Physicist

The highlight of the conference was that they managed to match the session title with the talks in the session, which made it easier to find interesting and good talks.
My favorite talk was the Keynote speech by M. Pruschy with the title "Advances in Combined Treatment Modality of Ionizing radiation with Anticancer Agents".

Francesca Albertini, Medical Physicist

Since I was not here for the whole conference, the visit at the Christie Proton Beam Therapy Center was the highlight for me. It was well organized and a nice opportunity to see the center. There were many interesting talks, for example talks about combining different types of therapy, such as hypothermia, with proton therapy. Other interesting topics were including NTCP modeling in treatment planning, talks on FLASH therapy as well as adaptive therapy.

Stefan Zepter, Medical Physicist

The most interesting talk was the one given by E. Felcini on Novel toroidal configuration for hadron therapy gantry and the highlight was all the Indian food.

David Oxley, Scientific Software Engineer

I find it interesting to see and hear about things that are new to me, for example a talk by K. Akabori with the title "A real-time neutron fluence measurement system for boron neutron capture therapy", was very interesting.
The highlight of the conference was the patients' talk on the social dinner; it was both powerful and inspiring.

David Meer, Beam Line Scientist

The best talk I think was the Keynote speech by A. Mazal on Proton grid and FLASH irradiations.
I think the conference was well organized especially since it has grown quite a bit since last time I took part.

Tony Lomax, Head Medical Physicist

Highlight: Cheese and pickle sandwiches over lunch
Best talk: A. Mazals talk on Grid and FLASH therapy.

Dario Veghini, Clinical operation

Most interesting talk: Visual outcome after Proton Therapy in children with Craniopharyngioma by T. Merchant.

Anna Fredh, Medical Physicist
Paul Scherrer Institut

ICCR and MCMA 2019
Montreal, Canada 17th - 21st of June

Top: Swiss delegation at ICCR and MCMA and the conference venue;
Bottom: View on the beautiful city of Montreal

The 19th International Conference on the Use of Computers in Radiation Therapy (ICCR) and the 2nd International Conference on Monte Carlo Techniques for Medical Applications (MCMA) were jointly organized and took place between June 17th and 21st, with two days of overlap on the 19th and 20th of June. The joint conference venue Double Tree by Hilton is located in the heart of the city of Montreal.
The ICCR conference hosted educational sessions, keynote lectures, talks and moderated poster sessions. Except for the keynote lectures held by leading scientists from the respective fields, there were two parallel scientific sessions on different topics related to machine learning, optimization, big data, patient modelling and dose quantization, just to name a few.

The ICCR opening keynote speaker was Yoshua Bengio, one of the world's leading experts in artificial intelligence and deep learning. He predicts that healthcare will be profoundly transformed by the immense progress in artificial intelligence and increasing ability to take advantage of large quantities of medical data. Joelle Pineau's keynote speech on Monte Carlo and Machine Learning in Radiotherapy Treatment Planning represented the smooth transition between the two conferences, illustrating the connection of the two fields and the seemingly natural symbiosis of ICCR and MCMA. Consequently, the first day the MCMA conference featured more sessions on Monte Carlo and machine learning. On the following days, MCMA offered many different MC related topics including Monte Carlo physics, dosimetry, micro dosimetry, brachytherapy, nuclear medicine and imaging. Similar to ICCR, the different contributions had different formats such as talks, posters, keynote lectures, invited speakers and Monte Carlo courses. Monte Carlo all-star Iwan Kawrakow gave an interesting as well as entertaining talk on the "use or not to use" of GPU implementations in Monte Carlo dose calculations, showcasing his own private super-fast non-GPU Monte Carlo treatment planning system running on his secret computer in eastern Europe.
Overall the two conferences fit well together with little contentwise overlap. Choosing a highlight of the conferences is difficult. The conferences featured a series of talks by keynote and invited speakers that all could be seen as a highlight themselves. Exciting novel scientific talks were well mixed with more casual presentations, for example Marcel van Herk talking about his weekend project on restoring a computer from the world's first CT scanner for image reconstruction today.

From a Swiss perspective there are two highlights to be reported. The first one being the two Rising Stars Competitions, where Miriam Krieger (PSI) won the second price in the ICCR session and Lena Nenoff (PSI) won the first price in the MCMA session. The second highlight is the overall Swiss presence at ICCR and MCMA, which included 5 talks and 3 posters presented by 8 persons representing PSI, AMS at Inselspital and ETH.

Montreal is a nice city in the French speaking province of Québec. Compared to European cities of similar size it feels quite relaxed, calm and - except for the city center - less dense. As a special treat to the attendees of the conference, Francos de Montreal - a French music festival - spread out in the inner city in the same week as the conference. Several roads were blocked for cars and claimed by street artists, little booths and dozens of free concerts on many stages in the entire city center.

Stefan Tessarini & Reto Kueng,
Inselspital Bern

SSRMP Clinical Education Day
UniS, Bern 19th of June 2019

Around 20 trainees in medical physics attended the SSRMP clinical education day in Bern. After having learned about urogenital cancer during the last education day in January, this lecture covered lung cancer. Prof. F. Zimmermann and Prof. N. Andratschke were the speakers.

The first part of the course aimed to refresh and enlarge our knowledge about anatomy and physiology. Prof. F. Zimmermann asked us what we knew about lungs and he completed our answers with more details in an interactive way. Lung lobes, tidal volume, lung diseases were some of the evocated topics. The next part of the course concentrated on epidemiology, etiology and risk factors. Afterwards, the different imaging modalities for lung cancers and the induced brain metastases were discussed. Tumor staging was the last topic before looking at the radiotherapy aspects of the different types of lung cancer.

Prof. N. Andratschke did an interesting presentation about stereotactic body radiotherapy for stage I non-small-cells lung cancer. We learnt, for example, that a prescription dose of 60 Gy in the PTV could lead to different dose distributions depending on the definition used. Indeed, some centers plan with a 60 Gy homogeneous dose in the PTV, while others consider the 60 Gy as the peripheral dose, allowing much more dose in the middle of the target for a steeper dose gradient at the edge. The last topic before lunch was the management of brain metastases from lung cancers.

During the break, we enjoyed lunch at the university restaurant. It was a nice time of exchanges between the course participants and both professors. In the afternoon, lectures went on with radiotherapy of non-small-cells lung cancer, logically followed by small-cells lung cancers. Palliative treatment was the last topic of the day. After a round of questions, we thanked Prof. F. Zimmermann and Prof. N. Andratschke for an interesting and rewarding overview on lung cancers.

Térence Risse,
Universitätsspital Basel

PhD platform: Diem Vuong

Radiomics as biomarker in multi-modality treatment of locally advanced non-small cell lung cancer

Cancer is a heterogeneous disease with respect to etiology, pathogenesis, therapy response and prognosis and hence, tumor response to therapy varies not only among patients but also within the tumor itself. Nowadays, increasing number of cancer treatment options are available due to rapid technical developments and therefore decision support systems are needed to offer the right treatment to the right patient. One possibility to optimize treatment strategies is the identification of biomarkers. In recent years, imaging has become increasingly important due to its non-invasive nature for the identification of new prognostic biomarkers. Radiomics describes the extraction of a large number of meaningful quantitative features from medical images to describe tumor shape, intensity and texture. These radiomic features are potential biomarkers of the cancer phenotype, and hence can be used for patient outcome prognosis or for correlation to the tumor biology using advanced statistical methods. Often, radiomics models are based on single institution imaging data. However, models based on a multi-centric imaging dataset are highly desired. In these imaging datasets, scanning and imaging protocols are highly heterogeneous and infer challenges in the development of robust models. Hence, the aim of this PhD is to establish and to use comprehensive radiomics analyses in CT and FDG-PET images to develop patient outcome models using a randomized prospective multi-centric Swiss trial (SAKK 16-00) for locally advanced NSCLC. This PhD is carried out at the University Hospital Zürich and contains three main parts:

Part 1: Radiomic features can be sensitive to scanning setting variability. In this study, robustness of radiomic features calculated from CT and PET scans was analyzed with respect to commonly used imaging and scanning settings. It was shown that radiomic features are differential sensitive to individual imaging and scanning settings variability and only a low number of features (~10%) are stable across all investigated effects.

Part 2: The use of non-robust features can result in scenarios where model predictions depend not on patient-individual characteristics but also on where the patient was scanned. Strategies to develop multi-centric radiomic models are based on either (1) the entire multi-centric imaging dataset with pre-selection of robust features or (2) on a subset of the imaging data with highly standardized scanning settings with no prior robust feature selection. For both strategies, a model was developed based on CT primary tumor radiomics to predict 12 months overall survival. The model on the standardized dataset indicated better estimated AUC* performance on the small validation set, however no significant performance difference between the models could be demonstrated. The final model based on standardized imaging data consisted of features identified prior as non-robust, which indicated the standardized model to be more favorable.

Part 3: Different studies have shown that the primary tumor location with respect to the lung anatomy can be prognostic. In this part, the anatomical spatial distribution of the primary tumors within the lungs is systematically quantified to develop new scanner-independent biomarker using a mapping approach to a standard lung anatomy. We also plan to investigate the spatial distribution of involved lymph nodes to create a complete spatial location based outcome model.

**Area Under ROC curve*

Interview with the Doctor

Marta Bogowicz (PostDoc), Stephanie Tanadini-Lang (Head of radiomics group), Diem Vuong, Hubert Gabrys (PostDoc), at an USZ Retreat in Emmetten

1. What brought you to choose that topic for your PhD?

I was always interested in medicine and therefore focused my Physics studies in medical physics and biomedical imaging. Meanwhile, I also discovered my enthusiasm for programming and modeling. So, when I first learnt about radiomics, I was immediately intrigued by the concept of extracting useful quantitative information from medical images to perform outcome modeling.

2. What did you enjoy the most about the project?

The most joyful part of my PhD is the large variety of skills I am learning and using on an every day basis. All aspects are covered from image generation, image processing to statistical modeling. Further, a great part of my PhD is the highly interdisciplinary environment. To address clinical needs, I am not only working with physicists but also closely with clinicians. These discussions are a fantastic chance to think "out-of-the-box" and broaden the horizon!

3. Which part of the project was the most challenging?

Typical for radiomics studies are limited data. In the first PhD year, I collected imaging data from different institutions in Switzerland.
Even with great effort from all involved people, we collected less data than expected. With too little data, radiomics modeling is always challenging.

4. Which impact do you think your results will bring into the med phys society/world?

In this work, medical images were collected from a multi-centric clinical trial. Even though it was a prospective trial, the image acquisition and reconstruction were not standardized. Hence, this dataset reflects a typical real-world scenario. With the first results of my PhD, I could show that radiomic models can be successfully developed based on this highly heterogeneous multi-centric imaging dataset.

5. Would you do it again?

Yes, definitively!

6. What are your prospective for the future?

I will finish in a year and have not decided yet. I can imagine continuing to work in a clinical environment, academia or industry.

Cantonal Hospital St. Gallen

Medical Physics team in 2014 (unchanged since 2012 except Robert Schöpflin), from left to right: Robert Schöpflin (retired), Samuel Peters, Markus Arn, Hans Schiefer, Konrad Buchauer, Simon Heinze, Friedemann Herbert, Anisoara Socoliuc-Toquant

In St. Gallen we are in a place with a strong radio-oncological tradition, standing on the shoulders of giants. At the same time, we are a young team with a strong passion to provide the rapid technological developments of the last few years for the benefit of the patients, and to collaborate on the developments of the future as well as possible in a non-university house.

Professor Wilhelm Conrad Röntgen personally opened the first X-ray institute in Switzerland in 1897 in St. Gallen, in the "Hecht" pharmacy of Caspar Friedrich Hausmann, only one year after his discovery of X-rays. Another year later, in 1898, an X-ray cabinet for diagnostic and therapeutic use was set up in the Cantonal Hospital of St. Gallen. In 1913, new equipment for gynaecological deep therapy was purchased and an X-ray assistant was hired. The help of X-rays in the treatment of benign and malignant tumors was already indispensable at that time. From 1915, mesothorium was used to treat uterine and other malignant growths.
In 1936, the X-ray therapy was modernized by the purchase of a new apparatus for deep therapy. At the same time, an installation was created to protect personnel against radiation damage.

House lettering of the former Hecht pharmacy in St. Gallen.

In 1937, an X-ray tomograph and in 1939 a 50 kV “Nahbestrahlungsapparat nach Chaoul“ was acquired. This apparatus was in clinical use until 2016 and can now be admired in the Medical Museum in Zürich. In 1964, an "AECL Theratron 60" cobalt device was installed. Brachytherapy was performed in the women's clinic. In the beginning with radium, then with cesium needles and cesium beads.

In 1982, the Central Radiological Institute was split. Prof. U. Lütolf (chief physician), Dr. O. Adaman (consulting physician) and Dr. W. Seelentag (medical physicist) came from Zürich to bring the state of the radiotherapy St.Gallen up to date. Several X-ray therapy devices (10-250 kV) and the cobalt device were in clinical use at that time. A Selectron brachytherapy device was purchased and the first radiotherapy simulator was put into operation. At the beginning of their activities in St.Gallen, the head MTRA and Wolf Seelentag drove to Winterthur once a week for the therapy planning. There, a terminal was available to connect to a planning computer of the Zürich University. The planning system "AECL-Theraplan" came in 1982/1983. The computer was a PDP/11 with 30 MB hard drive. Later, an additional external 30 MB hard drive was purchased. The image transfer from the CT took place via 8" floppy, one image was stored on the front side of the floppy and one on the back side.

In 1983/84, a BBC Linac was installed in a basement room as a provisional location - after the dumpsters stored there were removed. To ensure that the upper floor is protected against radiation, 70 tons of lead were placed on a steel plate and then hydraulically pressed upwards - the same team, specialized in hydraulic lifting systems, had moved the Quaibrücke in Zürich at that time.

Conversion of a garbage room to the provisional location of one of the major irradiation units. In use until now.

The "BBC Dynaray-CH-6" was the first Linac worldwide, which was designed from the outset with computer control (digital) and integrated Record-and-Verify (R&V) system. The R&V system was significantly influenced by the suggestions from the St. Gallen team. The St. Gallen facility was the first of that kind in the world in clinical use.
In 1984, the TRIM software came on the Theraplan computer. On that database system, Wolf Seelentag developed the first electronic patient database of the KSSG. The data have been migrated several times. That is the reason why the current ARIA hospital database already contains data since 1984. At the BBC accelerator, a prototype of a device for electronic field recordings was already present.

In 1990, two new linear accelerators were put into operation in a new building, a Clinac 600C and a 2100C. The Clinac 600C was more flexible than the BBC device. Even if electronic field recordings were no longer available, the field was shaped with asymmetrical apertures, allowing more than 5 cm overtravel of the collimators. The bunker design with longitudinally shifted (and in this way, not completely closed) doors even at 15 MV has led to long discussions with the supervisory authority. Once the patient operation ran completely and safely on the new accelerators, the "BBC Dynaray-CH-6" was decommissioned. The HDR afterloading technique was introduced in 1991, including intraoperative operation. Since that time, the Theratron device was used only for TLD dosimetry and for blood irradiation (the source from 1982 was never replaced). In 2001, prostate seed implantation was started.

Cantonal Hospital St. Gallen in the evening light. Over the next 10 years, several new buildings will be built on the fundament of 7 new basements, 30 m deep into the ground.

2004 saw the renewal of our linear accelerators with two Elekta machines, connected to the VISIR R&V System. Due to the end of life of the VISIR R&V system, the acquisition of ARIA took place in 2009. This software decision was pre-eminent for the acquisition of the next generation of linear accelerators. In 2011, a tomotherapy facility was procured. It was installed in the old BBC bunker, which served as a provisional location since 1984. In 2015, two Truebeam STx linear accelerators took up the clinical operation. With this equipment, we apply the following strategy: the Tomo device is used for large, long and bulky target volumes. Smaller target volumes are irradiated with our Linacs, which are equipped with fine MLCs.

With the new generation of devices, modern treatment methods were introduced: surface scanning, breath-hold and gating techniques, and stereotactic radiation therapy. In 2019, our workflow switched to paperless R&V, full electronic workflow support and paperless patient file management. We are dedicated planners and participate regularly and successfully in international planning competition events.

Nowadays, we treat about 1100 patients per year, mainly from the region of the Canton of St. Gallen, both of Appenzell and Thurgau. Our team consists of 7 radiation oncologists, 3 assistant doctors, 7 members of the physics team, of them 5 certified physicists and 2 engineers with master's degree (or equivalent), 18 RTTs, 4 secretaries, 2 nurses in the ambulatorium, some of them partially employed. Currently, the clinic is involved in many clinical studies. In addition to the tasks within the radiotherapy department, we provide technical and physics support for the Nuclear Medicine department of the KSSG. Further, we are responsible for the ongoing radiation protection tasks at the KSSG. In this field, the KSSG has a successful cooperation with the medical physics team of the KSA, which advises the cantonal hospital in St.Gallen.

Konrad Buchauer, Deputy Head Medical Physicist
Kantonsspital St. Gallen

"Welcome!"

Jarno Bouveret

After a childhood on skis, and a young adulthood pursuing a career in biathlon (the great combination of precision shooting and cross-country skiing!) at the French training center in Prémanon (a French village just over the border in the Jura), I discovered Physics. While still a full-time athlete, I obtained a bachelor's degree in physics and chemistry by distance learning, and then I put the sport aside to study for a Master's degree in Physics at Grenoble University. I finished the DQPRM Medical Physics training in France in 2013.

After working first as a medical physicist at the "Centre privé de radiothérapie de Metz" and then at the "hospices civils de Lyon", I reopened my school notes to study for the equivalence examination for the SSRPM certification, which I got in 2018.

A few months after the exam, I had the opportunity to join the physics team at the Clinique de Genolier. I have discovered a great team with lots of exciting projects!

I am looking forward to meeting all of you during the different events of the Swiss medical physics community.

Jarno Bouveret,
Clinique de Genolier

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Impressum

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Schweizerische Gesellschaft
für Strahlenbiologie
und Medizinische Physik
(SGSMP/SSRPM/SSRFM)

Printing Press

Valmedia AG
Pomonastrasse 12
CH-3930 Visp
www.mengisgruppe.ch

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- Short portraits of individual institutions (E.g. apparatus equipment, priorities of work, etc.)
- Reports on national and international recommendations
- Short Press Releases
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- 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.

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Conference Calendar

CALENDAR 2019

August 29
Lausanne

23rd SASRO Annual Meeting
August 29 - August 31
https://www.sasro.ch/

September 8
Santiago, CI

24th International Conference on Medical Physics
September 8 - September 11
https://icmp2019.org/

September 15
Chicago, USA

2019 ASTRO Annual Meeting
September 15 - September 18
https://www.astro.org/

September 18
Stuttgart, DE

50. Jahrestagung der DGMP
September 18 - September 21
https://www.dgmp-kongress.de/

October 12
Barcelona, ES

European Association of Nuclear Medicine EANM'19
October 12 - October 16
https://eanm19.eanm.org/

October 25
Budapest, HU

3rd ESTRO Physics workshop – Science in development
October 25 - October 26
https://www.estro.org/Workshops/2019/Physics/

October 25
Bern

SSRMP Continuing Education Day
https://ssrpm.ch/continued-education/calendar/

November 8
St. Gallen

3rd St. Gallen Radiation Oncology Informatics Meeting
https://www.kssg.ch/radioonkologie/lehreforschung/fortbildungsveranstaltungen/3rd-st-gallen-radiation-oncology

November 21
PSI, Villigen

53rd SSRMP Annual Meeting
November 21 - November 22
https://indico.psi.ch/event/7318/overview/

December 1
Chicago, USA

RSNA 2019
December 1 - December 6
https://www.rsna.org/annual-meeting/

December 11
Bern

MIP Meeting 9h15 - 12h00
AMP Meeting 13h15 – 17h00
https://ssrpm.ch/continued-education/calendar/

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!