SCMPCR
South Asia Centre for Medical Physics and Cancer Research
SCMPCR Newsletter
A sister organization of Alo-BT
July 2025 / Volume 7 / Issue 2
QUALITY EDUCATION AND HEALTH SCIENCE FOR PATIENT BENEFIT

A deep dive into the challenges, advancements and future directions in Medical Physics: Insights for South Asia

Prof. Dr. Mary Joan
Radiological Safety Officer and Vice Principal Academics (IAHS) at the Christian Medical College and Hospital, Ludhiana, India

The South Asia Centre for Medical Physics and Cancer Research (SCMPCR) is committed to enhancing the fields of medical physics and cancer research across South Asia, with the ultimate goal of improving patient care and advancing global health. Through a range of comprehensive teaching and training programs, SCMPCR actively addresses the unique challenges faced by medical physicists in the region. What began as a foundational vision by pioneering leaders has evolved into a period of dynamic growth, driven by strategic collaborations and partnerships. Building on these early efforts, SCMPCR has accelerated progress with impactful and innovative training initiatives. The SCMPCR newsletter is another initiative which celebrates the accomplishments of medical physicists and promotes active medical physics endeavors, fostering sustainable partnerships and cooperative efforts throughout South Asia.

In this issue, we delve into the challenges, advancements, and future directions in Medical Physics: Insights for South Asia," featuring an interview with Dr. Frank Hensley. Join us as Dr. Hensley shares his expert perspectives on the evolving landscape of medical physics, exploring both the advances that are transforming the field and the regional challenges that remain. Here is a snippet of the chat with Dr Hensley by Dr. Mary Joan regarding his contributions and involvement in establishing SCMPCR activities.

Dr. Frank Hensley studied physics and mathematics in Heidelberg where he majored in nuclear physics and astrophysics. He entered medical physics in 1979 at Essen University Hospital as postdoc in a project on radiotherapy with neutrons. After this term he worked in radiotherapy and nuclear medicine at several hospitals in Germany. He returned to academia at Heidelberg University Hospital in 1990 where apart from general radiotherapy he specialized in Brachytherapy and treatment with electrons, including intra operative radiotherapy, Total Skin Electron Therapy and Total Body Irradiation. During his career he had the opportunity to gain experience in teaching students from emerging countries including Mongolia, Turkey, Chile and

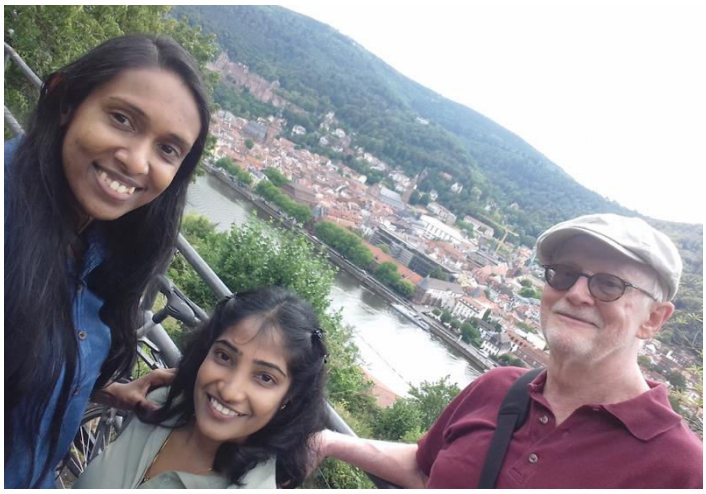
Bangladesh. After retirement from the clinical in 2014, he continues working in standardization of radiotherapy and on basic topics in dosimetry. He is member of the German Society for Medical Physics DGMP, the German Physical Society DPG, the American Association of Physicists in Medicine AAPM and the German and European Societies for Radiation Oncology DEGRO and ESTRO.

MJ: Glad to have this opportunity to hear you. Would you please share your early experiences and what prompted you to venture into medical physics as a career?

FH: Originally I had not planned to end up in medical physics. I majored and obtained my PhD in nuclear physics. But by the time I had finished my thesis, physics jobs had become rare, both at the university and in nuclear engineering. So I joined a project in radiation therapy with neutrons at the university hospital in Essen. As circumstances play, neutron therapy was abandoned about a year after I had started, due to unacceptable complications in the patients. So I looked into conventional radiation therapy at the neighbouring radiotherapy department and found that there was a lot to do. Those were still the early days in modern radiotherapy, planning with computers and very scarcely with CT information was just beginning. And the situation for medical physicists was not unsimilar to that in parts of South Asia today: physicists were scarce and not very well accepted in medicine. But I learned that there were always a few MDs around who were eager to work together with physicists - to get things going and to make use of all the new developments. And I learned that it was fun to work in an interdisciplinary team where everybody put in his or her share of expertise to improve therapy – for the patients. So I stayed in the field, ventured through several hospitals until I ended back at a University Hospital in Heidelberg. And all along, I always found MDs and RTTs –and physicists - who were a lot of fun to work with. And I learned that medical physicists have an extremely important job, implementing new technology into medicine and then being responsible for organizing and maintaining its safe use. And there is a lot of interesting physics in the job, too.

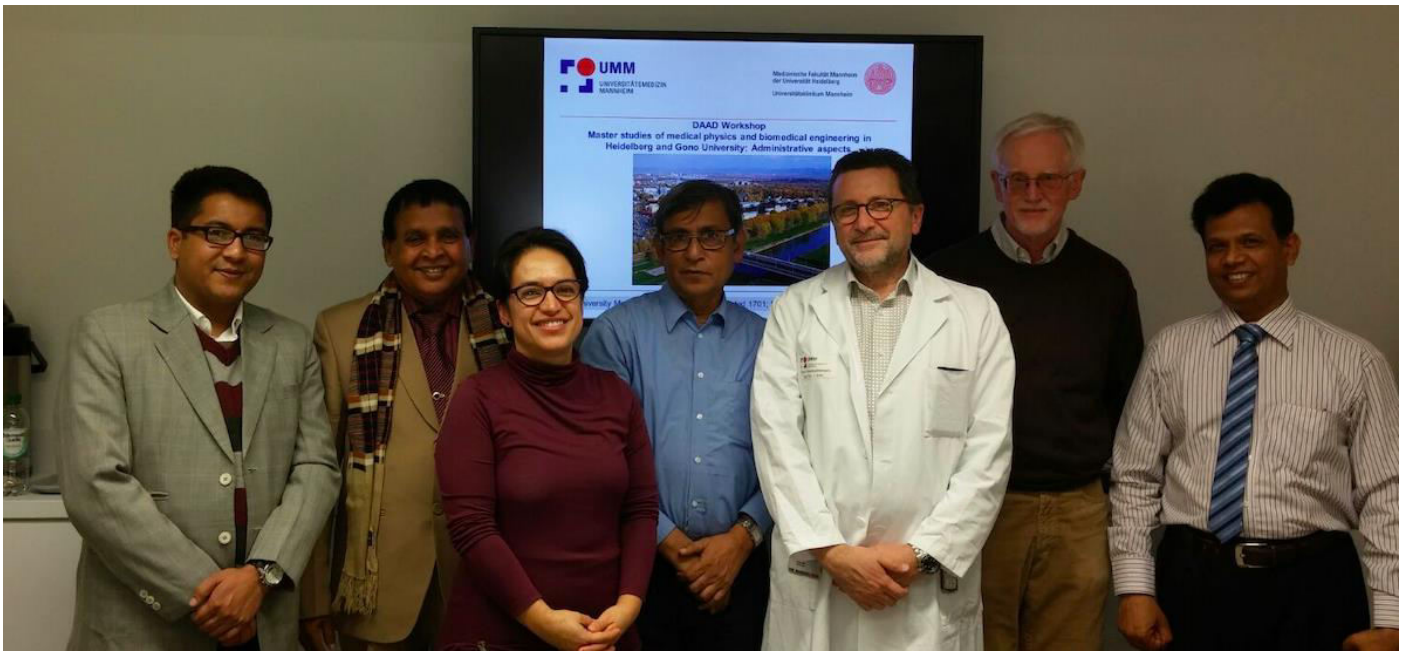
MJ: what are the professional differences in being a medical physicist in Germany compared to South Asia? Please elaborate on the important aspects?

FH: I guess the obvious difference is in the availability of resources. In an industrial country like Germany all the new technical developments are immediately available and desired by both physicians and patients. But that does not mean that they are immediately present in your work. You need to clarify together with the MDs what can be used and afforded, and what fits into the procedures applied at your hospital. Then you must analyse how within these constraints the new techniques can be adjusted safely to workflows at your institution, reflecting the present state of science. You must design workflows that comply with the active regulations, and develop commissioning and quality assurance procedures adapted to the planned methods. So actually there are large similarities and our work is mainly happening at a different stage of technical development: while in many places in South Asia you must first convince the medical and political society of the priority of technological medicine, in an industrial company you must convince the people who finance and direct your work of the priority of a certain new development. And following that you have to do largely the same kind of work.



MJ: You have personally nurtured many collaborations for SCMPCR. Please enlighten us on the early status and challenges?

FH: Actually the Bangladesh-German collaboration had begun several years before I entered, when Abu Zakaria gathered a group of medical physicists from Germany who travelled to Bangladesh and held seminars at universities and hospitals to inform the scientific and medical society of the need for physics in modern radiation medicine. This led to the installation of the first training program in clinical medical physics at Gono University and even to the foundation of professional association of physicists interested in the development of medical physics, the BMPA. I myself got involved in the project when some of the first students from Gono University came to Germany to perform experiments for their graduation theses. That was when I got to know a number of the people who are now active in medical physics in Bangladesh: Hasin Anupama Azhari, who worked on her thesis at my department at Heidelberg University Hospital, Md. Akhtaruzzaman, Anwarul Islam, Masud Rana, Sinha Khalid, Harun Rashid and more who all worked at the German Cancer Research Center in Heidelberg.



In the following years we were lucky to achieve sponsoring by the German Academic Exchange Service DAAD who supported the collaboration between Heidelberg and Gono universities. With these funds we could finance equipment, scientific exchange and travel. In this program we could invite a substantial number of medical physics students for study years at Heidelberg University's Medical Facilities in Mannheim. In this period fell the foundation of SCMPCR which in its beginning phase could profit from equipment funded by the project for teaching purposes and whom we helped recruiting speakers, and also with travel grants. Many of the young students that visited us in Germany now belong to the leaders in the field of medical physics in Bangladesh and we are all very proud of the excellent work they are doing.

Regretfully, the work of two important early foundations is momentarily somewhat disturbed. The university training course in medical physics has been interrupted, and a new course must be established at a new university. This is momentarily well under way in negotiations, and we hope it will be soon continued. Second, some misunderstandings have arisen among the physicists involved in medicine which has led to the separation of the professional societies into BMPS who represent the interests of clinical medical physics and BMPA who represent physicists working on medical topics at classical universities. It is paramount that these two groups of physicists recognize the importance of working together: medical physics needs the basic education and university physics must support the extended pathway to medical applications required by society. The competitive situation today blocks many important developments when government and administration hear only one group's argumentation or international agencies like IAEA are allowed to support only one national society.

MJ: How do you look at the present professional scenario for medical physicists in South Asia?

FH: The professional perspective of medical physics is excellent, or at least should be so. South Asia includes many countries with huge populations and therefore – regretfully – also large numbers of patients in need of radiation medicine. For this, many physicists are needed, and also many radiotherapy and radiation medicine institutions must be founded to treat the large number of patients needing this service. Also universities should acknowledge this need and recognize the large number of valuable positions this can yield for their graduates: positions in radiation therapy and diagnostics, in nuclear medicine, and also in the biomedical engineering field, in the development of instrumentation, and also in sales and maintenance. The foundation of all of this is a sound basic scientific education which schools and universities must provide. The specialized training in clinical medical physics is then a task which universities cannot easily fulfil. Training must happen with real, newest-generation medical equipment and with real patient cases. For this specialized training, teaching institutions are needed which collaborate closely with hospitals, and continuing education for professionals must be organized. And for the institutions providing this training, qualified teachers are needed which again opens a large number of positions and a large requirement of training. And all of these positions and institutions should be generously embursed because they provide an important service to society.

MJ: Kindly share your most memorable experiences in your collaborations?

FH: The great experience is to see how the people who started off as students many years ago have now matured to be among the leaders in their profession. And it is especially exciting to see how this is happening in a completely different cultural setting. Challenges in South Asia are different and some are probably larger than in Europe. Basically, we all have the same interest to be of help in the battle for our patient's health. But in the different lifestyle and even life philosophy in South Asia (and other parts of the world) it is an additional challenge to to combine the need of a very strict and exact analytical perspective in modern science to the rich and colorful, but technologically less experienced cultures and life styles in your countries. And at the same time one must acknowledge that developing all the technology and the political culture behind technology also in the industrialized countries, was (and still is) a struggle against many aberrations that also occur, and can lead to social injustice, or as we are presently observing, to the destruction of our planet. Working in technological development you need to deal with all of these issues. I am optimistic that South Asia can succeed in this struggle, given the overwhelming hospitality and devotion of the people here. But on the other side it is disturbing to see how large parts of society are neglected and excluded from the benefits of technical development. So, I believe it would be a wonderful experience to see our partners integrating solid scientific work into the advancement of unique cultures, adjusted to their countries and heritage, but at the same time working towards social balance and equal opportunities.

MJ: What are the future prospects medical physicists in South Asia needs to be prepared for?

FH: Medicine is making large advancements in many fields – beginning with the omnipresent use of artificial intelligence, but also in the more basic fields of computerization, automation and robotics. This is happening in all medical disciplines, not only in radiology. Handling and mining big data will achieve a major role in understanding causes and cures of diseases but also in organizing healthcare. We are presently seeing this development in our field in radiomics and the development of image guided and automatically adapted

radiotherapy. Physics is the scientific basis of all of this, and specialized physicists are needed in the development and engineering in advanced applications in almost all fields of medicine. Experimental physics develops and exploits all of these techniques for its own scientific use, so it is an ideal training ground from which technical methods can be translated into many other applications. It is therefore helpful when young physicists have broad interests and also look into in other scientific fields, medicine is only one of them. And then they need to keep updated during their entire professional life by continuing education.

A completely different area in which medical physicists should take a leading role in is the development of general organizational issues in the topics related to their work. This begins with the development of the regulations needed to ensure quality and safety in the technical field, as well as regulations for preventive maintenance to ensure sustainable and long-living operation of the expensive technical facilities. Such a framework of regulations should be based on the collaboration of all medical professions but also the universities and teaching institutions and it should be integrated into a forward-looking development of general healthcare for all of the society.

MJ: What would be your advice to young medical physicists of South Asia for career development?

FH: Start off with a good physics and mathematics background. You need math not only to calculate things, but to logically analyse how things work and what causes malfunctions. That is something you spend a lot of time with as medical physicist. And then, stay curious and keep updated on new developments. Implementing new methods is a core part of medical physics work. And do this in collaboration with Rad Oncs and RTTs. – For this you need a solid understanding of the medical background so you can collaborate at eye-level with the MDs, and mutually understand why and what you need to do.

Keep involved and informed in the ongoing science in physics, but also in medicine and the other fields. Hospital work leaves only a small amount of time for scientific work but you need to use scientific methods to understand new techniques and to test and adapt them to the specific workflows in your own hospital, and then to develop individually adjusted quality assurance. So, organize some work time for measurements and developments. Convince your superiors that a thorough understanding of new developments and how to correctly apply them is essential to maintain the desired standards.

And then network and share your expertise, and learn to work in large teams. Organize professional exchange and training visits, for yourself, but also provide this to others at your own department. It is always advisable to teach – other physicists, RTTs, MDs, and also the general public. A rewarding fact is that the teacher himself always learns the most.

MJ: SCMPCR is planning to venture into publishing a medical physics journal in the coming years. What ground works needs to be done before that?

FH: Well, actually I think we should be careful in expanding the number of publications. Too many publications are typically connected with a loss in quality and more difficulty for readers to distinguish between important and unimportant papers, and, simply spoken, it requires more reading effort. We presently already have around 15 journals publishing medical physics content. So if one wants to start an additional journal, it should be dedicated to some content that is not yet sufficiently represented. On the other side, practically oriented journals tailored to the specific needs of a certain group can be helpful. I believe a starting point could be such an application-oriented journal in which physicists can share practical experiences, in technical but also in organizational affairs; a journal where you can find information on job and training opportunities, organize mutual help in every day work, and discuss common unified ways of advocating medical physics needs and interests This could be specially dedicated to the situation in South Asia. To share scientific content, I would rather suggest submitting high quality manuscripts to the existing international

journals (being accepted there is also a good quality control) and encourage strengthening larger local journals like the Indian Journal of Medical Physics.

Such a practical journal could be published electronically, similar to the SCNPCR newsletter and it should be open access. That would also make it interesting for vendors to disseminate commercial information and advertisement.

MJ: What are your visions for SCMPCR and where do we need to focus more?

FH: First of all I would like to congratulate SCMPCR for the great job they are already doing. I would wish the center continues providing first class information to the large numbers of physicists they are now already addressing. Using the possibilities of virtual meetings and e-learning, SCMPCR is now reaching an audience across entire South Asia and into Africa in a quality that even causes European listeners to tune in. I am also happy about SCMPCR's activities in strengthening public health. Using its resources to organize vaccination campaigns and cancer awareness education underlines SCMPCR's importance as a valuable contributor to the development of health care for all. And of course, the future still requires large efforts in basic medical physics training. SCMPCR should play an active role in the development of a medical physics training program customized to the local needs. In this field there is a large potential in active collaboration: SCMPCR should collaborate with the training universities and hospitals but also with the general universities providing basic science education. Teachers and students could be exchanged and attend lectures at several cooperating universities. In this way missing expertise could be completed and information shared. Curricula should be adjusted to another so bachelors entering medical physics have a solid foundation. SCMPCR should continue collaborating with MDs in seminars and training courses so that physics education keeps close pace with the medical applications and vice versa. SCMPCR should serve as a hub for communication and networking between physicists and also with MDs, and it should be a bridge to international institutions like IAEA ant the international physics organizations. One of the early goals was establishing a virtual library including access to electronic media and journals. However this is an expensive project, so it requires support by external financers, mainly the state, but also the vendors who are also interested and rely on working with well-educated users could contribute.

And finally, SCMPCR should take an active role in the development of therapy but also in healthcare and the development of regulations as I have already mentioned earlier. This is needed to provide the safe use and maintenance of medical equipment and methods, to define the educational requirements, and the requirement and availability of expert staff. All this helps achieving acceptance in the medical world, where physicists should work together at eye-level with the MDs for the patient's well-being. And to earn this acceptance we must convince the medical world by the quality of our work.

So, there is plenty to do in the future - let's get into it!

MJ: As we wrap up this insightful conversation with Dr. Frank Hensley, it's clear that the journey of medical physics in South Asia is at a critical juncture—rich with both challenges and immense potential. We extend our heartfelt thanks to Dr. Frank Hensley for sharing his valuable insights, experiences, and vision for the future of medical physics. His perspectives have not only shed light on the current landscape but also inspired a proactive approach to the development of the field in South Asia. We deeply appreciate his time and thoughtful contributions to this important dialogue. His call to action highlights the essential role organizations like SCMPCR must play, not only in advancing therapeutic practices but also in shaping healthcare policy, regulation, and education. By prioritizing quality, collaboration, and a shared commitment to patient care, medical physicists can secure their rightful place alongside clinicians. The path ahead is demanding, but also inspiring—let's rise to the challenge together.

Prof. Dr. Mary Joan serves as the Radiological Safety Officer and Vice Principal Academics (IAHS) at the Christian Medical College and Hospital, Ludhiana, India. She is the Chair of the Professional Relations Committee of AFOMP, a member of the Science Committee of IOMP, and part of the Executive Committee of AMPI-NC. She also holds the position of Co-Editor-in-Chief of the SCMPCR Newsletter.