North American Chinese Medical Physicists Association

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NACMPA NEWSLETTER

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Inside this issue:

President's Corner

X. Allen Li, Ph.D., FAAPM
NACMPA President

Once again, NACMPA Executive Committee is in the process of planning our annual dinner meeting for all NACMPA members in Nashville, TN. The organization committee made up of NACMPA leadership and local NACMPA members have been actively working to finalize meeting venue, meeting program and to conduct fundraising for this event. As always, we are anticipating a highly enjoyable evening.

Similar to 2017, NACMPA will participate in the Chinese medical physics annual meeting organized by the Physics Group of Chinese Society of Radiation Oncology (CSTRO-PG). The meeting will be held in Fuzhou, China, during September 20-23, 2018. The NACMPA delegations, including both invited and proffered speakers, will present the latest developments in radiation oncology physics at the meeting. I anticipate that this meeting will facilitate strong scientific exchange and enhance communications, collaborations and friendship between members of CSTRO-PG and NACMPA. I encourage our NACMPA members to participate.

I would like to thank the members of Executive Committee for your high-quality service and our members for your support. I wish you all have lovely summer and look forward to seeing you in Nashville or Fuzhou.

祝贺华人新 *AAPM Fellows*

NACMPA非常高兴地祝贺下列华人物理师获得今年AAPM Fellow名誉，他们是:Jing Cai, Guang-Hong Chen, Tinsu Pan, Brian Wang, Yulong Yan, Lifeng Yu。AAPM Fellow是一种荣誉，给为AAPM做出贡献的会员。主要评审指标包括对AAPM的服务贡献，例如是AAPM的官员，会议组织者，各个区域地区的官员等；研究上有杰出贡献的，例如获得很多奖项，发表很多文章，写了很多书籍等；还有就是在教学方面有很多贡献，例如培养了很多学生，是一些大学的主任，为教学推广事业做出贡献等，另外就是参加了其它相关AAPM活动，例如ABR考官，NCI评审等等。总之，这个名誉是积领导才能，研究能力，教学水平，社会活动于一体的综合考虑。

Seeking Contributors

NACMPA NEWSLETTER is published by the North American Chinese Medical Physicists Association on a semiannually schedule. We welcome all readers to send us any suggestions or comments on any of the articles or new features to make this a more effective and engaging publication and to enhance the overall readership experience. Next issue: June 2018.

Contact us: nacmpa@yahoo.com 欢迎大家投稿,并希望大家关注北美华人物理师公众号.

Editors: Zhigang (Josh) Xu, Ph.D. , Chao Guo, M.S., Xiaoyu Duan, M.S.

CSTRO 2018 Annual Meeting, Fuzhou, China (Sept.21 - 22)

NACMPA members are cordially invited to participate in the 2018 Chinese Annual Meeting of Radiation Oncology Physics in Fuzhou, China, on September 20-23, 2018. This meeting is organized by the Physics Group of Chinese Society of Radiation Oncology (CSTRO-PG) and sponsored by NACMPA. This meeting is intended to facilitate scientific exchange and to provide a platform for radiation oncology physicists worldwide to foster communications, collaborations and friendship. For meeting registration and hotel reservation, please follow: http://rtpam2018.medmeeting.org/

The NACMPA delegations, including both invited and proffered speakers, will present the latest developments in radiation oncology physics at the meeting. NACMPA members are encouraged to submit their abstracts in the similar format as for AAPM by emailing: nacmpa@yahoo.com, by June 1st, 2018. Abstracts previously submitted or presented at AAPM or ASTRO are acceptable. All abstracts will be reviewed by the NACMPA Scientific Committee. Abstracts with the highest scores will be selected as oral presentations in the meeting. Presentations either in Chinese or English are acceptable. Each proffered presenter will receive a travel award of $500 from NACMPA. All proffered presenters are required to register at the meeting website and to make their own travel arrangements.

We look forward to seeing you in Fuzhou!

X. Allen Li, PhD, FAAPM

President, NACMPA

Dates to Remember

June 1st, 2018: *NACMPA abstract submission deadline*

June 15th, 2018: *NACMPA proffered presenters notified*

August 12, 2018: *CSTRO-PG online Meeting Registration deadline*

August 12, 2018: *Hotel reservation deadline*

September 20, 2018: *Arrival and on-site registration*

September 21 & 22, 2018: Meeting programs

NACMPA 2018 Annual Meeting, Nashville, TN (August 1)

Time：August 1st, 2018 5：30PM – 9:00 PM

Place：New Century Buffet 5436 Bell Forge Ln E, Antioch, TN 37013

Bus service: SHOFUR company will provide 4 buses

1. Bus pickup time and location: 8/1/2018, 5:00 PM at Music City Center (downtown) 201 5th Ave S, Nashville, TN 37203
2. Bus drop off location: New Century Buffet 5436 Bell Forge Ln E, Antioch, TN 37013 (It is a round trip.)
3. Bus pickup time and location: 8/1/2018, 9:00 PM at New Century Buffet 5436 Bell Forge Ln E, Antioch, TN 37013
4. Bus drop off location: Music City Center (downtown) 201 5th Ave S, Nashville, TN 37203

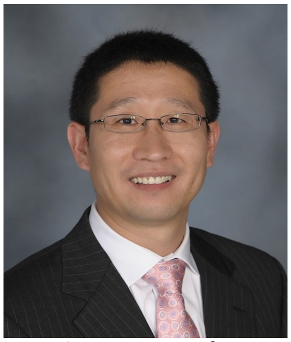
Meeting Agenda

6:15 PM:	Members Arrival
6:30 PM:	Introduction of Officers
	Recognition of Local Organizers
	Introduction of Sponsors
	President's Report
	Financial Report
7:00 PM:	Award Ceremony
7:15 PM:	Keynote Lecture
7:45 PM:	Election
	1. President-elect
	2. Treasurer
8:45 PM:	New Business
9:00 PM:	End (Executive Meeting Follows)

NACMPA will honor the following award winners during the award ceremony event. Congratulation to all.

1) Yu Chen Excellent Community Service Award: **TBD**
2) IJMPCERO Best Paper Award: **Y Liu, et al**
3) NACMPA Best Paper Award: **Junwei Shi,** et al
4) NACMPA Service Award: **Brian Wang, Cai Jing, Maria Chan, and Zhu Xiaofeng**
5) 2018 NACMPA Hall of Fame Award: **John Wong**

Candidate for President –Elect



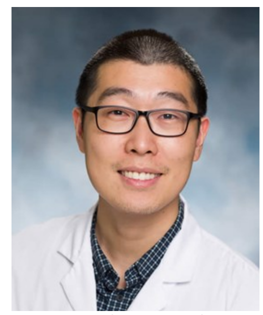
Brian Wang, PhD

Past NACMPA Board Members

I graduated from Tsinghua with BS and MS degrees, and received my PhD in nuclear engineering from Rensselaer Polytechnic Institute (Troy, NY) in 2005. I have been the chief of physics and medical physics residency director at University of Louisville since 2013. At AAPM, I served as a program director and subcommittee chair for the Spring Clinical Meeting and its predecessor ACMP meeting for eight years. Currently, I am the practical track director for the AAPM annual meeting. I am an associate editor for the JACMP and a reviewer for several other journals. I also serve on several committees at ASTRO and RSS, and I am an ABR oral examiner. For medical physics activities related to China, I was invited to present at the first and second Hefei International Forum for Radiological Medical Physics. I am the current treasurer of SANTRO. I was the immediate past board member-at-large for NACMPA and I have worked closely with most of the current officers. I am ready to lead our organization with my connections in China and experience at AAPM, ASTRO and RSS.

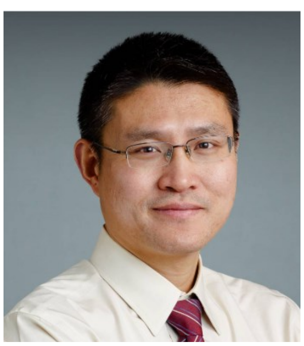
Candidates for Treasurer

I received my BS degree in physics from University of Science and Technology of China and PhD degree from the University of Wisconsin – Madison in 2006 and 2013 respectively. I finished my residency training in the department of Radiation Oncology at the Johns Hopkins University in 2015. I am currently an Assistant Professor at Rutgers University. I have published over 40 publications and over 40 abstracts. NACMPA is a great communication platform and excellent organization for the Chinese medical physicists in North America, which is a wonderful asset for students and junior medical physicists. It would be a great privilege to serve the Chinese physicist community in North America.



Yin Zhang, PhD

NACMPA Member



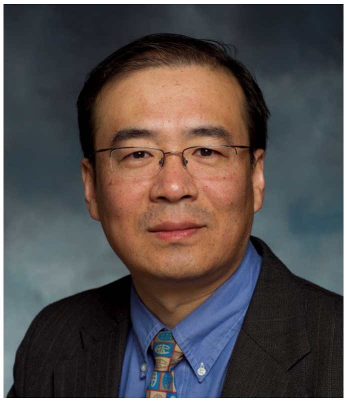
Ting Chen, PhD

NACMPA Member

Ting Chen PhD received his BE of Biomedical Engineering from Tsinghua University, Beijing, China in 1998, and PhD in Bioengineering from University of Pennsylvania in 2003. Dr. Chen joined New York University as a research scientist in the Department of Radiology from 2004 to 2008. He completed medical physics residency training in the radiotherapeutic branch at the Cancer Institute of New Jersey in 2010. He served as a faculty member at the Rutgers Cancer Institute of New Jersey until 2017. Currently Dr. Chen is a medical physicist and faculty member at the Radiation Oncology Department of New York University Perlmutter Cancer Center, where he conducts clinical support, translational research, and academic education/training activities in medical physics. Dr. Chen has been a prolific researcher and collaborator in the medical physics field over the last decade. His research interest includes motion modeling and monitoring in image guided radiation therapy, MRI based image analysis and modeling, and medical image segmentation & registration. Dr. Chen has published more than 40 academic research papers at various prestigious journals. He is an active reviewer for Medical Physics, International Journal of Radiation Oncology, Biology and Physics, and Radiotherapy and Oncology. He is currently served as an associate editor at JACMP. Dr. Chen has been an active AAPM member since 2008. He served as the president of the AAPM NJ chapter in 2013-2015, and is the sitting member at the AAPM board of directors representing the NJ chapter.

Dr. Chen has been a member of NACMPA since 2009. He has conducted multiple research collaborations with medical physicists and radiation oncologists from China.

New Technologies, Emerging Treatment Paradigms and Challenges in Radiotherapy



Ning J. Yue Ph.D. , FAAPM
Past-Treasure/Secretary
NACMPA

In October of 2017, the 2017 Chinese Radiation Oncology Physics Annual Meeting was held in Chongqing, China. In conjunction with the meeting, North American Chinese Medical Physicists Association (NACMPA) held a symposium with the Physics Group of Chinese Society of Radiation Oncology (CSTRO-PG). NACMPA has a long history of collaboration with CSTRO-PG in promoting academic and educational exchanges between USA and China. The medical physicists and radiation oncologists of both USA and China have greatly benefited from the collaborative efforts of NACMPA and CSTRO-PG. It was a pleasure and honor that I was invited to present a talk titled" New Technologies, Emerging Treatment Paradigms and Challenges in Radiotherapy" at the symposium.

It is estimated that more than 13 million people are diagnosed with cancer and 8 million people die of cancer each year in the world; about 30% of these cancers can be prevented and 30% of the cancer patients can be cured if detected earlier. It is also estimated that by 2030 there will likely be 22 million cancer incidents and 13 million of people are likely to die of cancer each year in the world. Although radiotherapy is beneficial to 60-70% of cancer patients and the technologies have experienced significant advancement in the past decade, there are disparities in terms of availability and utilization of radiation technologies in the world. There is urgent need to not only make the technologies available to the underserved people in the world but also ensure appropriate implementation of the technologies. Many studies have clearly demonstrated the benefits of radiotherapy technologies and have shown that the implementation of advanced radiotherapy technologies, such as IMRT, IGRT, and proton therapy, improves the quality of cancer treatment, in terms of survival, local control and life quality. However, despite of the utilization of modern radiotherapy technologies, the radiation treatments of a significant portion of cancer patients still do not achieve desired outcomes due to reasons such as tumor size, cancer cell distribution heterogeneity, genomic instability, etc. To a certain degree, the efficacy of radiotherapy may be limited by how and what it is implemented to do. To further improve the treatment efficacy, more and more treatment paradigms are emerging and are introduced in radiotherapy. Typical examples are molecular imaging, molecular targeting, immunotherapy, and molecular and genetic oncology. These paradigms combine the new radiotherapy delivery technologies with the modern biological advancements and may take the quality of radiation treatment to the next higher level and may broaden the application scope of radiotherapy.

For the past 20 years, the significant advancement of radiotherapy has been achieved through macroscopic technologies and sciences of physics, engineering and computer. This advancement will continue in the near future and beyond. However, the treatment efficacy and benefits brought by the advancement may reach a plateau unless we think outside of the box to explore new paradigms combining radiotherapy with sciences and technologies at the microscopic levels as well as other therapeutic modalities in some non-traditional and innovative ways. As such, the roles of medical physicist may also evolve, leading to challenges and opportunities; we as medical physicists need to get actively involved in the process to move the field forward as we have been.

Participation in Professional Organizations Will Help Your Career

Cedric Yu, D.Sc , FAAPM
NACMPA Hall of Fame 2016

When I was a young engineer just entering the field of medical physics (having earned the distinction of senior citizenship, I guess I could start this way), I focused on my own research work and regarded participation in AAPM and ASTRO activities both unreachable and waste of time. It is only after taking physics chief positions, I started to involve myself more in the task groups and committees. Looking back, I wish I had participated much earlier.

If you are a medical physicist trying to pursue an academic career, you are most likely chronically sleep deprived, especially if you are also trying to raise a young family at the same time. Among papers, grants, and clinical duties, you can hardly find any time for organizational politics. Such non-participation, often limits your career success.

We all want our research to have a greater impact – more people in the field knowing about the work and stirring more interests in the field on your research direction. This requires equal opportunity of exposure. In medical physics, beside publications through the different journals, being accepted for presentations in our annual meetings and in other scientific programs and symposia organized by the societies is an important route of exposure. It would be very naïve to think that being solely a contributor will get you equal opportunity of exposure. A significant portion of every scientific meeting is devoted to invited panel presentations and lectures. Getting the recognition to give these lectures requires both excellence of your work and connections.

Such connections are also crucial for obtaining research funding. As the competitions for the ever shrinking research money intensifies, having recognition in your research area and personal interactions with the would-be reviewers will give you a better winning chance.

If you are a medical physicist more clinically focused, having a voice in the organization is also vitally important. Many clinical policies as well as the rules and limitations on our career path are increasingly set by our professional organizations. In the latest drive by the AAPM leadership to limit the number of board seat, the defeated proposition would further concentrate power to a few people. Because policies affect our career, when the powerful few sets a wrong vision for the society, the entire field will suffer, and in turn, patient care can be compromised. Case in point: the mandate of CAMPEP accredited training programs as the only path to becoming a clinical medical physicist was implemented without the membership buying in. Although the mandate standardized the training requirements, it also created a “cookie cutter” model that stifled innovation and diversity.

Participation in scientific and profession societies does not equal to playing politics. There is no lack of self-promoting people whose primary goal of participation is to rise to prominence through politicking. Unfortunately, these people are often favored against those who just do the work. I believe that politicking with principle and core values is career smart.

Participation is also easy. If you are research oriented, you may start by attending the task group meetings that are open to all members and attend the open sessions of the Scientific Council Meetings, where the new topics and proposals of task groups are determined. Just sit in and make notes. Not being a member, you may also ask questions or make a short comment. If the question or comments is not silly, but uniquely constructive, you may be invited to join. You can also initiate with other members in your research area to start and chair a new task group. For those do not have a high academic aspiration, you can start by participating in local chapters.

Of the approximately 6500 voting members of AAPM, about 1800 are of oriental origin. However, in all governing bodies of the organization, different councils, committees and boards, we are underrepresented. To gain a fair representation, we not only need to be as active as other ethnic groups, we must be more active.

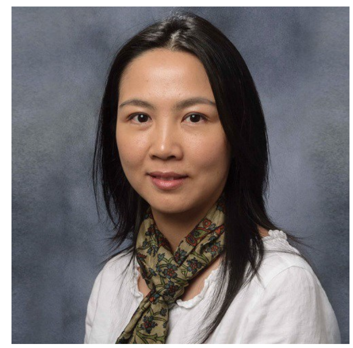
More Diverse AAPM Leadership

Back in October, I wrote an email to Dr. John Boone, the Chair of the AAPM Nominating Committee and again sent another email to the successor, Dr. Bruce Curran, in January 2018. I expressed the following in my email:

"*I am writing to you since you are the Chair of the AAPM Nominating Committee. There are many physicists who have made significant scientific contributions, such as Drs. Charlie Ma, John Wong, Fang-Fang Yin, Cedric Yu, Lei Dong, Ying Xiao, Allen Li, Xing Lei, Ping Xia, Ning Yue, etc., and there is a large population of us in this society. However, there has never been any representative in the governing entity. We have discussed among ourselves that we are looking to serve the AAPM with more extended responsibilities by participating the executive level. Therefore, we are suggesting Dr. Charlie Ma as the candidate for the future president-elect.*

There are a lot of Chinese physicists in the AAPM; somehow, we have not voiced ourselves with the suitable executive channel. We have many excellent volunteers to serve, and we like to get involved in more to contribute. Would you discuss this request with your Nominating Committee and give this proposal a formal consideration? It will be much appreciated."

Dr. Boone responded to me that he agreed wholeheartedly with the need to increase the number of Asian members in leadership. Dr. Curran also responded to my request and expressed that they were very aware of the lack of Chinese / Asian physicists in leadership roles. He said that John Boone, while President, made a significant effort to recruit such individuals; however, most declined to be nominated. One of the indicators that the Nominating Committee uses in its determination of strong candidates is their record of service. The committee receives a graph of the FTE-equivalent service records of all individuals who have served on the Board and are thus eligible for officer election. He noted that, in reviewing the list of individuals I have suggested, Charlie is the highest ranking. Total service, however, is only one of many factors used in the selection process.



Maria F. Chan, Ph.D. , FAAPM
Past-President & Board Member, NACMPA

Indeed, there has not been a Chinese physicist as the president in the entire history of the AAPM. In case in the future whoever Chinese physicist is called upon for nomination, don't just say "no" as the nomination committee Chairs indicated. If you are not willing to serve or too busy to serve, please recommend another outstanding colleague from NACMPA or at least contact the current officers of NACMPA so that we can act on it and **make the history together**!

国内放疗医学印象

Hai Luo, Ph.D.
NACMPA Member

秋高气爽，晴空万里，去年十一月份我踏上了回国走亲访友的愉快旅程。在饱览祖国大好河山之余，通过华人医学物理师微信群创始人老编的精心安排，我有机会探访了国内好几家医院的放疗部门。其主要目的是想进一步了解一下国内医院放疗科的具体运转模式，特别是国内物理师同行工作状况。尽管这次只是一个极小范围的走访，但是通过与国内物理师的面对面零距离交流，以及同行们在微信群里的积极互动，本人受益匪浅，感触良多。现在就请允许我和大家一起分享一下我的一些个人的感受，这也算是我探访国内放疗系统的一个小小的剪影吧。

我对国内放疗印象比较深刻的有以下几点：

繁忙的日程

物理师的地位

专业培训

医疗事故申报制度

剂量质控监督系统

<u>繁忙的日程</u>

我觉得国内物理师非常忙碌和辛苦，他们每天工作的时间绝对超过了法定的八小时。一台机器一天治疗六，七十个病人是常有的事情，而且机器的周检和月检常常是不得不在周末完成。在每天如此繁忙的治疗期间，大部分情况下对病人的计划验证也只能有选择性的抽样进行。

不言而喻，国内的放疗设备都是世界一流的，而且它们甚至比美国很多大医院的治疗设备还要齐全和先进。但是鉴于病人众多，为了节约时间，治疗时国内医院一般都不常用OBI 和 CBCT 定位，而是只用EPID，更不用说使用Vision RT 和RPM 这样精确的定位系统。这样一来众多的先进设备和软件只能“刀枪入库”，不知何时才能派上用场，能使广大患者在治疗时更加受益。另外，国内没有剂量师的职位，因此物理师还要承担所有剂量师原本应该可以胜任的工作。如此一来，物理师还能有多少时间和精力来做质控和质检就不言而喻了。

物理师的地位

据说国内物理师因为没有相应的职称，所以他们的工资和待遇与其工作性质并不相吻合，连在医学界的地位也不敢恭维。比如说医院在购买大型放疗设备时，在美国基本上是由医师和物理师根据所在医疗单位的具体情况而作出决定。但是在中国却完全不一样，有些医院在购买任何医疗仪器设备时候，大多是由非专业的院级领导或者更高层的管理人员决定，而专业的物理师大部分时候几乎是没有任何话语权的。

再者，有些医疗单位的医生也认为物理师可有可无，从而使物理师们在夹缝中很难呈现他们的存在感。再加上国家还没有建立完善的辐射安全体系，这些年虽然有很多相关的政策法规出炉，但其监管措施还不是十分地完善。由其可见，物理师真可谓任重而道远啊！

专业培训

国内放疗界各种名目的专业会议繁多，除了国家级的学术会议外，各省市地区也经常举行各种研讨会或者报告会。对参加的人员也少有限制，对物理师来说，这一件非常好的事情，医务人员可以相互促进专业交流，不断地提高肿瘤的治疗水平。但是对于基层的物理师们而言，这种高大上的会议，学术理论偏多，而实际操作和运用的比例却太小，因此对提高基层放疗水平的效果自然也就不那么显著了。

医疗事故申报制度

通过参观和交流，我发现国内放疗界缺乏一整套健全的医疗事故申报制度和系统。西方对放疗事故有一个专门的术语或定义，叫 Recordable and Reportable Incident。 一起放疗事故经报告后，必须再反馈到全国各治疗中心，充分起到了从错误或事故中吸取教训的巨大作用。但是国内基本上是事故单位自己处理，充其量处分一下事故当事人而一了了之。据说有的时候，个别医疗事故单位害怕承担责任，还故意隐瞒事实真相。固然基于国内目前的医疗环境，这也是无奈之举，但从更广的层面上讲，这无意间极大地阻碍了医师之间的交流。其实，对于医师间的交流来说，正面的，先进经验的交流固然重要，但相较之下，诊疗过程中的失误甚至错误地相互交流更为重要，自是不言而喻的。

现在让我们试想一下：一个庞大的放疗市场，从事放疗多年，却从来没有听到过或者报道过比较重大的放疗事故，这合乎正常的情理吗？反观西方国家，他们的放疗市场相对而言应该比中国成熟得多，在放疗人员的培训及教育等方面也绝对优胜于刚刚起步的中国放射从业人员，但在西方国家大家每年都可以看到相关机构 公布的 放射事故报告。

因此，我非常希望中国能建立一个类似于美国的ASTRO的RO-ILS (Radiation Oncology Incident Learning System)系统。这个系统的宗旨十分明确：一是医疗事故共享；二是收集和分析事故原因，吸取失败的经验和教训；三是为了消除事故方的顾虑，建立一个绝对保密的，非惩罚性的环境，让大家都能毫无后顾之忧地举报事故。

剂量质控监督系统

希望国内能认真地考虑建立一个类似西方比较合理化的MD Anderson 质控监督系统，这一系统就相当于给国内所有的医用加速器上“户口”，尤其是对于开展SRS, SBRT 治疗项目的放疗单位，则需要制定一套特别的质量验证标准，达标者方可准许开展进行放疗程序。而且每年定期检查其剂量输出的数据，以确保剂量输出的精确度，为患者提供更好的服务与保障。有了这套系统，物理师的地位与作用也会随之提升。在微信群里，经常看到国内物理师询问有关电离室送检结果的问题。一个电离室，送到两个不同的计量检测单位，报告呈不同的计量因子，不知道该相信哪一家的？如果这些计量单位都不统一，怎能保证从业人员不误判，从而导致不可想像的后果？即使是使用检验正确的电离室，也不能完全保证物理师的测量与调试是完全正确的。要是有第三方检测，安全系数会相对更大一些。

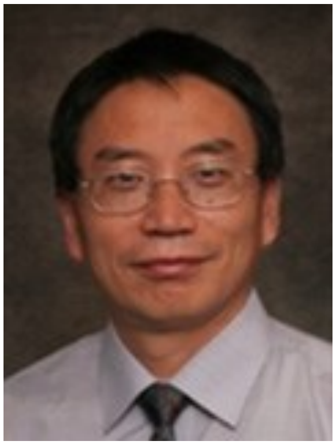
总而言之， 这几年来国内的放疗事业的发展日新月异，突飞猛进，但是在其质控和质检方面还是发展和重视的尚显不足，且重视程度不够理想。

我认为其中原因是多方面的：第一个原因是由于国内病人众多，资源相对不足。可是尽管如此，本着对患者负责任的科学精神，这也不能成为任何放疗机构忽视质控和质检的理由。第二个原因是国内的物理师队伍尚不甚不健全，他们的专业水平也参差不齐，高低不一。物理师队伍里什么教育背景的都有，而真正受到过正规专业培训的相对较少。第三个原因是国内大学医学物理专业甚少，其中有权授与医学物理硕士点或博士点更是了如星辰，屈指可数，后继缺口很大。

另外借此机会，我想与大家一起分享一个令人振奋的好消息：我们二零一八年华人物理师巡讲团在北京墨琳文化传媒责任有限公司总经理周光玉先生的主导下已正式成立。巡讲团成员们由美国多所大学及放疗中心的资深物理师们组成，该团将于九月十二号至九月二十二号分赴国内的十五所大学及医院进行巡讲。国内各大学及医疗系统对此活动反应非常强烈，纷纷报名要求参与。目前报名要求参加二零一九年巡讲活动的大学或医院已达二十所之多。谨此我们向“海外华人物理师讲师团”，“海外华人物理师义工团”的发起人严祥胜先生，“华人医学物理师交流平台”的发起人周光玉先生表示我们大家深深的敬意！感谢他们的数年来的不懈的努力和无私的奉献！

最后， 请允许我本人向北京墨琳文化传媒责任有限公司总经理周光玉先生以及其团队致以衷心的感谢和深深的敬意！正是因为有了他们的精心组织和大力支持，才使得本人去年年底的放疗巡回演讲取得了圆满的成功。在此，也恳请有意参加此项公益活动的同行们积极报名参加我们的巡讲团，让我们大家一起共同为祖国的放疗行业贡献我们的一份微薄力量吧！

MR-Linac



Xinfeng Chen, Ph.D.
NACMPA Member

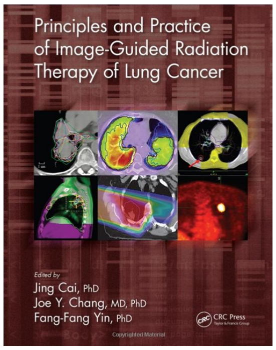
MR-Linac is an emerging radiation therapy (RT) technique that combines a MR-scanner with a linear accelerator. The MR-Linac system developed by Elekta AB (Stockholm, Sweden) in cooperation with Philips Healthcare (Best, Netherlands) consists of an Elekta linear accelerator with a nominal 7MV flattening filter free photon beam (160-leaf MLC oriented in fixed superior-inferior direction), and a Philips 1.5 T integrated wide-bore MRI scanner. Owing to MRI's capability to provide excellent soft-tissue contrast images and biological/functional information, the systems enable adaptive RT and provide real-time, high quality image guidance during delivery with the potential to significantly improve RT outcomes. To account for different levels of anatomy changes, the strategies of the adaptive RT includes: 1) simply dose shift to correct for translational shift, and plan re-optimization to correct for all interfraction changes.

A research consortium which involves 7 institutions around the world was founded to focus on the design and execution of high quality research and treatment using the Elekta MR-Linac. These institutions include: Sunnybrook Health Sciences Center (Toronto, Ontario), The Royal Marsden Hospital (London, England), University Medical Center Utrecht (Utrecht, Netherlands), The Christie NHS Foundation Trust, (Manchester, England), MD Anderson Cancer Center (Houston, Texas), the Netherlands Cancer Institute (Amsterdam, Netherlands) and Froedtert-Medical College of Wisconsin (Milwaukee, Wisconsin). The consortium members are currently engaged in various stages of evaluation of the technology and are collaborating to establish new clinical protocols and develop methods for data collection and analysis.

The first clinic trial in Froedtert-Medical College of Wisconsin is called Solid Tumor imaging MR-Linac (STIM) trial. It is focusing on optimizing MR imaging and providing tumor and normal organ radiation response information. Currently nearly 60 volunteer patients and healthy people have been enrolled in the trial. The test of MR-Linac work is focusing on the dosimetry properties and its capability of the adaptive replanning and delivery workflow for major tumor sites.

The MR-Linac is designed to improve targeting of tumor tissue while reducing exposure of healthy tissue to radiation. It will allow physicians to precisely locate a tumor and lock onto it during treatment, even when tumor tissue is moving during treatment or changes shape, location or size between treatment sessions.

Principles and Practice of Image-Guided Radiation Therapy of Lung Cancer



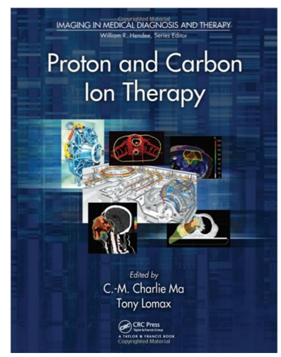
This book gives a comprehensive overview on the use of image-guided radiation therapy (IGRT) in the treatment of lung cancer, covering step-by-step guidelines for clinical implementations, fundamental principles and key technical advances. It covers benefits and limitations of techniques as well as quality and safety issues related to IGRT practice. 1) Addresses imaging simulation, treatment planning, verification, and delivery, 2) Discusses important quality assurance issues, 3) Describes current methods using specialized machines and technologies.

Edited by: Jing Cai, PhD, Joe Y. Chang, MD, PhD, and **Fang-Fang Yin, PhD.**

Proton and Carbon Ion Therapy

Proton and Carbon Ion Therapy is an up-to-date guide to using proton and carbon ion therapy in modern cancer treatment. The book covers the physics and radiobiology basics of proton and ion beams, dosimetry methods and radiation measurements, and treatment delivery systems. It gives practical guidance on patient setup, target localization, and treatment planning for clinical proton and carbon ion therapy. The text also offers detailed reports on the treatment of pediatric cancers, lymphomas, and various other cancers.

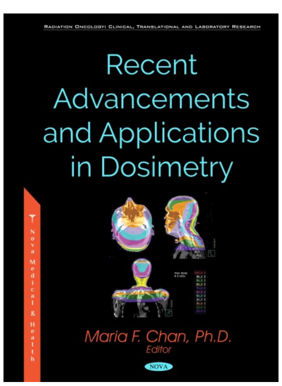
After an overview, the book focuses on the fundamental aspects of proton and carbon ion therapy equipment, including accelerators, gantries, and delivery systems. It then discusses dosimetry, biology, imaging, and treatment planning basics and provides clinical guidelines on the use of proton and carbon ion therapy for the treatment of specific cancers.



Suitable for anyone involved with medical physics and radiation therapy, this book offers a balanced and critical assessment of state-of-the-art technologies, major challenges, and the future outlook of proton and carbon ion therapy. It presents a thorough introduction for those new to the field while providing a helpful, up-to-date reference for readers already using the therapy in clinical settings.

Edited by: C M Charlie Ma, Tony Lomax

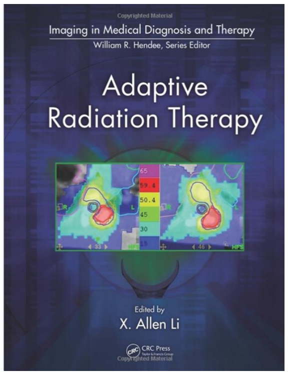
Recent Advancements and Applications in Dosimetry



This book provides a comprehensive collection of the newly emerging treatment modalities, covering high intensity ultrasound treatment, photodynamic therapy, MR-guided treatment machines, nanoparticle-enhanced radiotherapy, and proton beam therapy. The invited expert authors cover a wide range of the latest advancements and developments in dosimetry techniques as well as their clinical implications, including calorimetry, radiochromic film, transmission detectors, real-time portal dosimetry, TLD, thermal imaging dosimetry, 3D dosimetry, best feasible DVH planning, 5D planning and delivery, 3D printing, as well as machine learning in medical dosimetry. This book will bring the reader up-to-date with the state of the art in radiation dosimetry and best clinical practices using such advanced detectors.

Edited by: Maria Chan

Adaptive Radiation Therapy



The editor and authors are to be commended for putting together this excellent book describing the rationale, technologies, implementation, and future research for adaptive radiation therapy (ART). This topic is very timely as ART is the most logical approach to personalized medicine for cancer patients requiring radiation therapy as a single or combined modality treatment. The book contains a wealth of useful information ranging from practical workflow issues to directions of future research. I recommend this book for medical physicists and radiation oncologists who are interested in clinical practice and research utilizing advanced imaging and radiation therapy technology.
—James C.H. Chu, Ph.D., Professor and Director of Medical Physics, Rush University Medical Center.

Edited by: X. Allen Li

医学物理词汇中英对照表(第二部分) 段晓雨 郭超 徐志岗 编缉

A
Acetabulum
髋臼
Adaptive Radiotherapy
自适应放射治疗
Adenocarcinoma
腺癌
Affine Registration
伪射配准
Angiosarcoma
血管肉瘤
Anterior
前
Aorta
主动脉
Artery
动脉
Artifact
伪影
Atrium
心房
Attenuation
衰减
B
Beam Flatness
射束平坦性
Bladder
膀胱
Bone Marrow
骨髓
Bronchi
支气管
C
Capillary
毛细血管
Carcinoma
恶性肿瘤（癌）
Caudal
尾侧
Central Nervous System
中枢神经系统
Cervical Vertebrae
颈椎
Chemical Dosimetry
化学计量法
Clavicle
锁骨
Coccyx
尾骨
Collecting Electrode
收集极
Colon
结肠
Complication-free
无并发症
Cornea
角膜
Correlation Coefficient (CC)
相关系数
Cortex
皮质
Costal bone
肋骨
Cranial
颅侧
Cranium, skull
颅
D
Deformable Registration
形变配准
Diaphragm
膈
Distal
远侧
Distortion
失真
Domain of Transformation
域变换
Dorsal
背侧
Duodenum
十二指肠
Dysgerminoma
恶性胚胎瘤
E
Esophagus
食管
External
外
F
Femur
股骨
Fibrosarcoma
纤维肉瘤
Fibula
腓骨
Finite Element Methods (FEM)
有限元方法
Frontal Plane
冠状面
G
Gallbladder
胆囊
Geometry-based Metrics
基于几何的度量标准
Global Spline-based Methods
基于全局样条函数的方法
Graphite Calorimety
石墨量热法
Gray Matter
灰质
H
Hepatoma
肝癌
Humerus
肱骨
I
Image Fusion
图像融合
Image Registration
图像配准
Image Segmentation
图像分割
Inferior
下
Inhomogeneity Corrections
非均匀修正
Intensity-based Metrics
基于灰度的度量标准
Internal
内
Ionometry
电离法
L
Lateral
外侧
Leukemia
白血病

Level of Accuracy
精度
Local Spline-based Methods
基于局部样条函数的方法
Lumbar Vertebrae
腰椎
Lymphangiosarcoma
淋巴管肉瘤
M
Mass Collision Stopping Power
质量碰撞停止力
Mean Squared Difference (MSD)
平均平方差
Medial
内侧
Medulla
髓质
Melanoma
黑素瘤
Meningioma
脑膜瘤
Mesothelioma
间皮瘤
Multimodality
多模态
Multiple Myeloma （Kahler's disease）
多发性骨髓瘤
Mutual Information (MI)
互信息
N
Neuroblastoma
神经母细胞瘤
Nucleus
神经核
O
Ovary
卵巢
P
Pancreas
胰
Patella
髌骨
Pelvis
骨盆
Penumbra Degradation Effect
半影退化效应
Phyllodes tumor
分叶状肿瘤
Posterior
后
Profoundal
深
Prostate
前列腺
Proximal
近侧
Pubis
耻骨
R
Radius
桡骨
Rectum
直肠
Registration (or similarity) Metric
配准（或相似性）度量标准
Response Assessment
疗效评估
Rigid Registration
刚性配准
S
Sacrum
骶骨
Sagittal Plane
矢状面
Salivary Gland
唾液腺
Sarcoma
肉瘤
Scan Parameters
扫描参数
Scapula
肩胛骨
Seminoma
精原细胞瘤
Structure Mapping
结构映射
Superficial
浅
Superior
上
Synapse
突触
T
Tendon
肌腱
Testis
睾丸
Thoracic Vertebrae
胸椎
Tibia
胫骨
Trachea
气管
Transient Cahrged Particle Equilibrium
瞬态带电粒子平衡
Transverse Plane
水平面（横切面）
U
Ulna
尺骨
Urinary System
泌尿系统
Uterus
子宫
V
Validation
验证
Vein
静脉
Ventral
腹侧
Ventricle
心室
Vermiform Appendix
阑尾
Vertebra
椎骨
Vertebral Column
脊柱
Viscera
内脏
W
Water Caloimetry
水量热法
White Matter
白质

Reference：AAPM TG65，AAPM TG132, Fundamental of Anatomy & Physiology 7th Ed.,