AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

IMPROVING HEALTH
THROUGH MEDICAL PHYSICS

AAPM NEWSLETTER

November/December 2023 | Volume 48, No. 6

IN THIS ISSUE:

AAPM SPRING CLINICAL MEETING 2024

Mark your Calendar

MARCH **23–26** | St. Louis, MO

Important Dates to Remember

- **December 20:**
  Proffered Disposition Notifications Available
- **January 10:**
  Registration and Housing Available
- **January 17:**
  Program Available

Hyatt Regency St. Louis at the Arch

save the date for

AAPM 2024

66TH ANNUAL MEETING & EXHIBITION JULY 21–25 | LOS ANGELES, CA

EMBRACING CHANGE. **IMPACTING** PATIENT CARE.

AAPM NEWSLETTER is published by the American Association of Physicists in Medicine on a bi-monthly schedule.
AAPM is located at 1631 Prince Street, Alexandria, VA 22314

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EDITORIAL BOARD

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SUBMISSION INFORMATION

To keep all reports uniform, we kindly request that submissions be made through a QuestionPro portal.

Questions? Contact Nancy Vazquez

PUBLISHING SCHEDULE

The AAPM Newsletter is produced bi-monthly.
Next issue: January/February 2024
Submission Deadline: December 1
Posted Online: Week of January 8

CORPORATE AFFILIATE ADVERTISING

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EDITOR'S NOTE

I welcome all readers to send me any suggestions or comments on any of the articles or features to assist me in making the AAPM Newsletter a more effective and engaging publication and to enhance the overall readership experience. Thank you.

SEASON'S GREETINGS

and warmest wishes for a wonderful holiday season filled with peace & joy!

– From Your AAPM Headquarters Team

Angela • Michael • Mariana • Farhana • Robert • Justin • Linda • Payton
Julia • Viv • Shana • Corbi • Zailu • Patricia • Jennifer • Melissa • Karen • Laurie
Jill • Jackie • Abby • Janelle • Lisa • Rohan • Elle • Emily • Nancy • Nick
Yan-Hong • Rachel • Ange • Myron • David

AMERICAN ASSOCIATION *of* PHYSICISTS IN MEDICINE

Happy Holidays and Best Wishes for the New Year

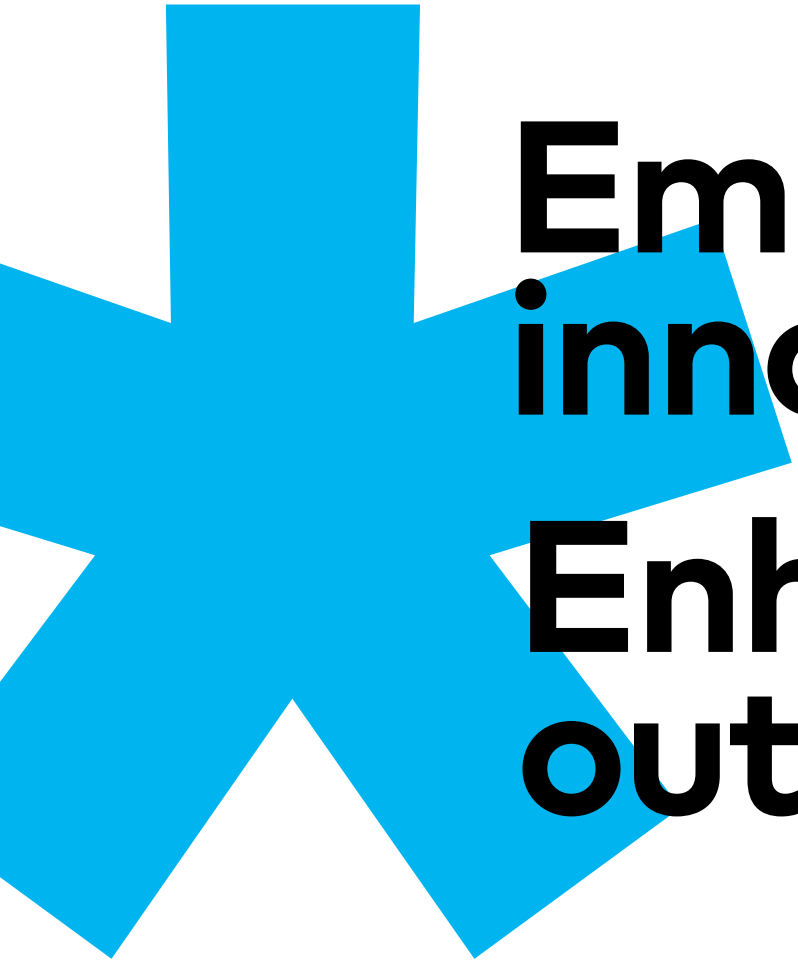
NEWSLETTER EDITOR'S REPORT

This year raced by, and here we are with the final edition of the 2023 AAPM Newsletter, the November/December issue. I hope every AAPM member can look back on their year with a sense of accomplishment, whether it's for a graduation, a new job or promotion, a completed project, or just surviving another year's challenges. After all, these are challenging times, as we are continually rocked with news of another natural disaster, another conflict. I hope everyone can spend the holidays with their family and loved ones as we prepare for the new year.

In this issue of the Newsletter, Chair of the AAPM Board of Directors **Dan Bourland** reflects on his three years as an officer in the presidential chain and the future of AAPM. This is also the last issue of the Newsletter in which **Angela Keyser** will deliver the Executive Director's Report; we are grateful for all of her years spent at AAPM and wish her the best for her retirement. The Special Interest Group for this issue is the Women's Professional Subcommittee, with reports including a recap of the WPSC Luncheon held at the AAPM Annual Meeting in July, a summary of the recent webinar on providing care for pregnant patients, and a call to AAPM members to improve the representation of women and minorities in AAPM's awards by nominating deserving members. Also in this issue, we have a report from the Education Council on updating the core physics curriculum for Radiation Oncology residents, a report from IHE-RO on improving interoperability between Electronic Health Record Systems and Radiation Oncology Information Systems, and a report on AAPM member **Randall Ten Haken** who received the ASTRO Gold Medal this year!

We hope every AAPM member finds something of interest in this issue of the newsletter. Our goal is to keep the AAPM Newsletter relevant to everyone who wants to learn what's happening in medical physics. We accept submissions and suggestions from all AAPM members, which can be submitted directly through the link on the Newsletter page. Please enjoy this issue of the Newsletter and send us your feedback and ideas for the future. And as always, please share the Newsletter articles you enjoy with your social media network. Best wishes for happy holidays and we'll see you next year! ■

Jennifer Pursley, PhD
Massachusetts General Hospital



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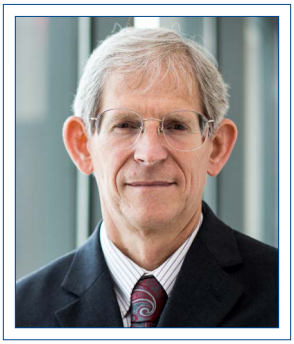
CHAIR OF THE BOARD'S REPORT



J. Daniel Bourland, MSPH, PhD
Wake Forest School of Medicine

Dear AAPM Colleagues:

Reflections on Three Years on EXCOM

This newsletter article is my last one as Chair of the AAPM Board of Directors. With humility and great appreciation for the AAPM community, I reflect on the dynamic time that occurred for AAPM during my three years as an officer in the presidential chain — in 2021, we transitioned from the last year of COVID to (maybe) "normal", in July 2022 we had our first face-to-face annual meeting since 2019, in Washington, DC — a joyous occasion indeed — and a number of social and political issues arose nationally and internationally, with a wide range of considerations for AAPM and the practice of medical physics. I thank all of you for entrusting me with the opportunity to serve AAPM as one of our elected leaders and as a representative to peer associations and the field of medical physics. There are a few important aspects that I want to highlight from my three years on the Executive Committee (EXCOM):

- EXCOM has sought to work together for AAPM's good, recognizing our different perspectives and opinions bring richer content and results to our deliberations.
- We have prioritized the continuity of AAPM's mission - the three presidential chain roles (President-Elect, President, and Board Chair, each having a one-year term) have pledged for the past three years in succession to provide support and continuity for initiatives that were started by the previous president, so that initiatives underway are continued and don't founder as the next president moves into office.
- The five AAPM officers — Board Chair, President, President-Elect, Treasurer, and Secretary — dedicate significant time to AAPM activities. In particular, the AAPM President essentially serves as a type of CEO, leading AAPM as a type of company. EXCOM has deliberated on how to make AAPM officer positions, especially the presidential role, more tractable for the volunteers serving in these roles — this strategic discussion continues.
- And here is what really makes AAPM "Go" — It is all of the volunteers, committed to AAPM's mission of "improving health through medical physics", that are the heart of AAPM. Your intellect, curiosity, dedication, and compassion are the driving factors to our success in service to human health. Thank you for this outstanding commitment and for bringing your ideas and energy to the field of medical physics.
- Next, AAPM has an enthusiastic, long-standing, and high-quality Headquarters Staff who support our volunteer activities to ensure they happen.

AAPM has an internationally distinguished stature as a premier medical physics association. It has been a privilege and honor to serve AAPM these last three years.

Great Future Opportunities for AAPM

And now, what about the future of AAPM? Well, AAPM remains in a dynamic time, and our future opportunities are plentiful. Here is a short list for your

consideration, with some in the shorter-term and others taking longer time to develop:

- Of great importance — a new Executive Director is arriving soon. With the December 2023 retirement of Angela Keyser, recruitment is underway. It is expected to conclude soon with the appointment of a new Executive Director to further assist with AAPM's continuing and growing mission. Membership will be rapidly informed of the new ED.
- Ad Hoc committee reports of strategic importance coming soon. These include Government Policy Impacts, Journal Vision, New Science, and Administrative Proficiency. These Ad Hocs have focused tasks that will be reported to the Board of Directors for consideration.
- Summer 2024, immediately prior to the July Annual Meeting in Los Angeles — A special one-day meeting on artificial intelligence for the practicing medical physicist. This meeting was organized by the Ad Hoc Committee on AI Boot Camps. This meeting is relevant for imaging and therapy physicists and others. It is designed to be an "AI-101" for medical physicists, with the goal that 70% of our membership has the fundamentals for implementing AI-based devices in the clinic.
- Board Discussion of Values — The Board of Directors has been considering the designation of AAPM's Values to complete our institutional triad of MVV: Mission, Vision and Values. AAPM has delineated Mission and Vision – the Board will now be working on Values.
- Board Strategic Planning — One descriptor from the Board's recent strategic discussions has been to "Do Less — Better." AAPM will benefit from better coordination of our efforts, to prevent duplication and provide for efficiency. This kind of guidance from the Board will benefit AAPM's future.

Who We Are As Medical Physicists

For the 2022 Annual Meeting (*theme: Celebrating Medical Physics Transforming Human Health*), the meeting logo was designed to represent who we are as medical physicists. I remain convinced of the character and essential role we have in impacting human health, as reflected in the meeting logo, summarized here.

Elements of Medical Physicists

- We Transform and Impact
  - We Think Critically
    - We Solve Problems
      - We Are Scholars of All Types
        - We Communicate Our Work

And Key Reminders for Each of Us

- Don't Stop Learning
  - The Patient Comes First
    - Small Tasks are Indeed Significant
      - Transform Your World

Retiring Executive Director and Headquarters Staff

We have a significant event at the end of this year with the retirement of **Angela Keyser**, who has served as our Executive Director for twenty (20!) years, for a total of 30 years with AAPM! We are celebrating her time with AAPM, including honoring her with the **AAPM Lifetime Achievement Award** at the 2023 Awards and Honors Ceremony. There was an immediate standing ovation upon introducing Angela and inviting her to the podium to receive the award. I recommend that you read Angela's articles on her career with AAPM in the special 50th Anniversary Edition of *Medical Physics* and the September/October *Newsletter*, and please thank and congratulate Angela on her noteworthy AAPM career. Angela's retirement means there will be a new Executive Director at Headquarters, and our AAPM Headquarters Staff are to be commended for their tremendous service to AAPM and for their patience and continuing contributions during this leadership transition. HQ Staff, we are with you in this — we thank you for your dedication to our ongoing mission and to AAPM as an employer. Thank You!

Closing Remarks

I will repeat what I've written previously: The richness of AAPM resides in our remarkable members, volunteers, board members, officers, headquarters staff, and other colleagues. Together, we bring a diverse mix of expertise, experiences, interests, and cultures to AAPM's mission of Improving Health.

I am grateful and humbled to have had the opportunity to have served AAPM as an officer.

Best regards, and please let me know if you have comments or suggestions about AAPM's mission, priorities, and strategic planning; my email remains bourland@wakehealth.edu. ■

Farewell With Gratitude

EXECUTIVE DIRECTOR'S REPORT

As I pen my final message for the AAPM Newsletter, I do so with profound gratitude and a heart full of emotions. After an incredible journey spanning 30 years as a member of the AAPM HQ team, the last two decades as Executive Director, the time has come for me to bid adieu. My journey with AAPM began on November 1, 1993, and it has been a privilege beyond words to witness the growth, transformation, and unwavering commitment of this incredible community. Together, we have embarked on a path of meaningful change and positive impact on the medical physics profession and surrounding communities.

My role as Executive Director has been both an honor and a calling, one that I embraced with unwavering passion. I am immensely proud of the culture of compassion, collaboration, and shared purpose that we have cultivated within the organization. The relationships forged and the incredible people I have had the privilege of working alongside have been a constant source of inspiration. Throughout these years, we have celebrated monumental achievements, embarked on inspiring initiatives, and fostered enduring partnerships that have expanded AAPM's reach and influence. This journey has been nothing short of extraordinary, and it wouldn't have been possible without the dedication, hard work, and support of each AAPM volunteer and the amazing HQ team.

As I step away from my position as Executive Director, I leave with a profound sense of optimism for the future of AAPM. I am confident that the organization will continue to thrive, and I trust that the next AAPM Executive Director will receive the unwavering support and encouragement that I have received over these 30 years. A large part of my optimism is due to the dedicated group of high-performing association management professionals that make up the HQ team. They are poised to continue to serve with distinction, as illustrated by the years of service documented below. My heart is filled with gratitude for the privilege of serving alongside you all. Thank you.

Dedicated HQ Team Members

Nancy Vazquez – 27 years of service
Michael Woodward – 27 years of service
Farhana Khan – 25 years of service
Zailu Gao – 22 years of service
Jennifer Hudson – 22 years of service
Karen MacFarland – 20 years of service
Lisa Schober – 18 years of service
Yan-Hong Xing – 17 years of service
Corbi Foster – 16 years of service
Laurie Madden – 16 years of service
Jackie Ogburn – 16 years of service
Viv Dennis – 13 years of service

Angela R. Keyser
AAPM

"The time has come for me to bid adieu."

Who does what on the AAPM HQ team?
See a list with contact information and brief descriptions of responsibilities online. An organization chart is also provided. We also provide information about the diversity of our team as welll

Melissa Liverpool – 12 years of service
Rachel York – 12 years of service
Abby Pardes – 10 years of service
Robert McKoy – 9 years of service
Rohan Tapiyawala – 8 years of service
Nick Wingreen – 8 years of service
Jill Moton – 6 years of service
Janelle Priestly – 6 years of service
Julia Colque – 4 years of service
Justin Stewart – 4 years of service
Shana Donchatz – 3 years of service
Elle Thomas – 3 years of service
Emily Townley – 3 years of service
Payton Brown – 2 years of service
Mariana Gallo – 2 years of service
Linda Minor – 1 year of service
Patricia Lavey – 2023 hire
David Crowley – 2023 hire
Angela Dombroski – 2023 hire
Myron Zambrano – 2023 hire

As I embark on new adventures in my life's journey, I carry with me the indelible memories and the profound impact of our collective efforts. Our paths may diverge, but the impact we've made together will forever remain in my heart. ■

Our Condolences

Eugene A. Beck, MS

Paul M. DeLuca Jr., PhD

Herbert W. Mower, ScD

Chandra Prakash Joshi, PhD

Thomas J. O'Dea, PhD

Martin Trefler, PhD

Our deepest sympathies go out to the families. We will all feel the loss in the Medical Physics community.

If you have information on the passing of members, please inform HQ ASAP so that these members can be remembered appropriately. We respectfully request the notification via email to: 2023.aapm@aapm.org
(Please include supporting information so that we can take appropriate steps.)

Response to 'Boycott…'

RESPONSE TO "BOYCOTT OF THE 2023 ANNUAL AAPM MEETING IN TEXAS AND FUTURE PLANS"

An article titled "Boycott of the 2023 Annual AAPM Meeting in Texas and Future Plans" appeared in the September/October 2023 issue of the *AAPM Newsletter*. We support the right and opportunity of the authors, any AAPM member, and any other person to boycott a meeting event, if they feel unsafe attending or believe attending is in some aspect against their principles. The purpose of this article is not to argue principles or the decisions of the authors to boycott the 2023 AAPM Annual Meeting, but to provide additional clarifying details regarding AAPM meetings and the 2023 meeting in particular.

Annual Meeting Attendance

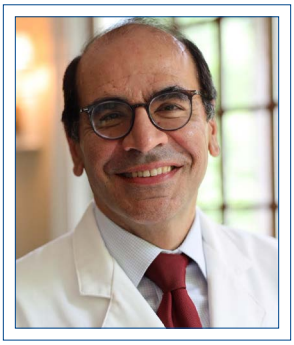
The attendance at AAPM meetings varies from site to site based on the location and from year to year. The attendance in 2022 and 2023 is further being influenced by the shadow of the pandemic. The detailed numbers of attendees at AAPM meetings over the last six years are provided in Table 1. Meeting attendance over these years is subject to interpretation because of changes in categories. For instance, the On-Demand registration option did not exist before the pandemic. The 2023 Annual Meeting had the largest in-person scientific attendance since the pandemic (2588), higher than the attendance in 2022. This contrasts with a smaller number of On-Demand registrants (402 in 2023 vs 779 in 2022), leading to an overall 2.4% drop in the total number of attendees. This drop may have been influenced by the special circumstances surrounding Houston, as the authors relayed, and is also at least partially explained by the location effect: Washington, DC has traditionally been a popular destination for our meetings, drawing higher numbers of attendees. Note that the difference in the total number of attendees between the 2022 and 2023 meetings (2.4%) is smaller than that between the 2018 and 2019 meetings (8.1%).

Year, Location	Scientific In-Person	Scientific On-Demand	Scientific Total	Exhibitor	Guest	Total
2023, Houston, TX	2588	402	2990	976	200	4166
2022, Washington, DC	2425	779	3204	902	163	4269
2021, Virtual	0	3069	3069	259	0	3328
2020, Virtual	0	3330	3330	287	60	3677
2019, San Antonio, TX	2745*	0	2745*	1065	205	4015
2018, Nashville, TN	3017*	0	3017*	1063	291	4371

** Inclusive of 389 in 2018 and 430 in 2019 Daily registrants, a category that was eliminated in 2020.*

Robin Stern, PhD
University of California, Davis

J. Daniel Bourland, MSPH, PhD
Wake Forest University School of Medicine



Ehsan Samei, PhD
Duke University Health System

On-Demand Registration Option

Since 2020, the Annual Meeting has offered all program content on-demand to all meeting registrants as a way of allowing people who do not attend in-person to participate. It further allows those who attend in-person to view content they would otherwise have missed because of time conflicts. In addition, in 2023, speakers who could not or chose not to attend in-person could request to present remotely, a policy that was approved by the AAPM Board of Directors, explicitly in view of the unique situation with Houston, that provided for a certain number of remote presentations as requested by meeting participants.

In 2022 (Washington, DC), which was the first in-person meeting since 2019, one full track of sessions was live-streamed; however, actual viewing was low, with most sessions viewed by less than 10% of the On-Demand registrants (2.5% of total scientific registrants). Live-streaming for the entire 2023 meeting was considered but would have cost an estimated $285,000, which would have required a 20% raise in registration fees, a prohibitively large increase.

Virtual Only vs. In-Person with On-Demand

During the pandemic, AAPM was forced to hold the 2020 and 2021 meetings virtually, or on-line only, with no in-person component. Total registration fell from 2019 to 2020 and from 2020 to 2021. Many exhibitors stated that, although they support AAPM, they would not participate in another virtual-only meeting, as there was inadequate benefit to them for the cost. Our exhibitors are also dependent on strong in-person participation. We were pleased to see an increase in in-person participation from 2022 and 2023, with AAPM still maintaining the flexibility of on-demand participation and remote presentation for those who could not or choose not to attend the meeting in-person.

Wellness Considerations

Additional careful thought and work went into an added provision for the 2023 meeting. In recognition of the special circumstances in Houston, EXCOM voted to allow people who had registered for the meeting but developed a health or well-being condition that prevented them from attending in-person to request a refund of their registration fee after the normal refund deadline all the way up until the actual start of the meeting.

Also in 2023, a "Health and Wellness" section was added to the meeting website. It was listed in the website menu, and links were put in several locations, including a large-font link on the home page. The section consolidated many provisions of wellness that are standard in many of our meetings, included new resources, and made the material more visible and more easily accessible.

Board Actions

The AAPM Board of Directors was very aware of the SCOTUS decision, and received numerous comments about how to proceed with 2023 AAPM meetings at their designated venues. Input was received via the AAPM Bulletin Board System (BBS), e-mail, and during the Town Hall at the July 2022 meeting in Washington, DC. The Board carefully considered all the input received. Of particular note was the fact that location decisions and contracts for annual meetings take place years in advance. Upward of $1,000,000 would have been lost, not to mention significant reorchestration of our administrative processes if we had moved our annual meeting from a contracted location. Added to that hardship was the fact that governmental actions and policies have a shorter time horizon than our processes. In view of these facts and our stewardship of the resources of the association, the Board voted to continue the 2023 Annual Meeting at its contracted location[1], while also affirming its commitment to patient autonomy, dignity, and privacy.[2] It also voted to instigate an Ad Hoc Advisory Committee on Government Policy Impacts (AHGPI), whose first report to the Board .is expected imminently..

Summary

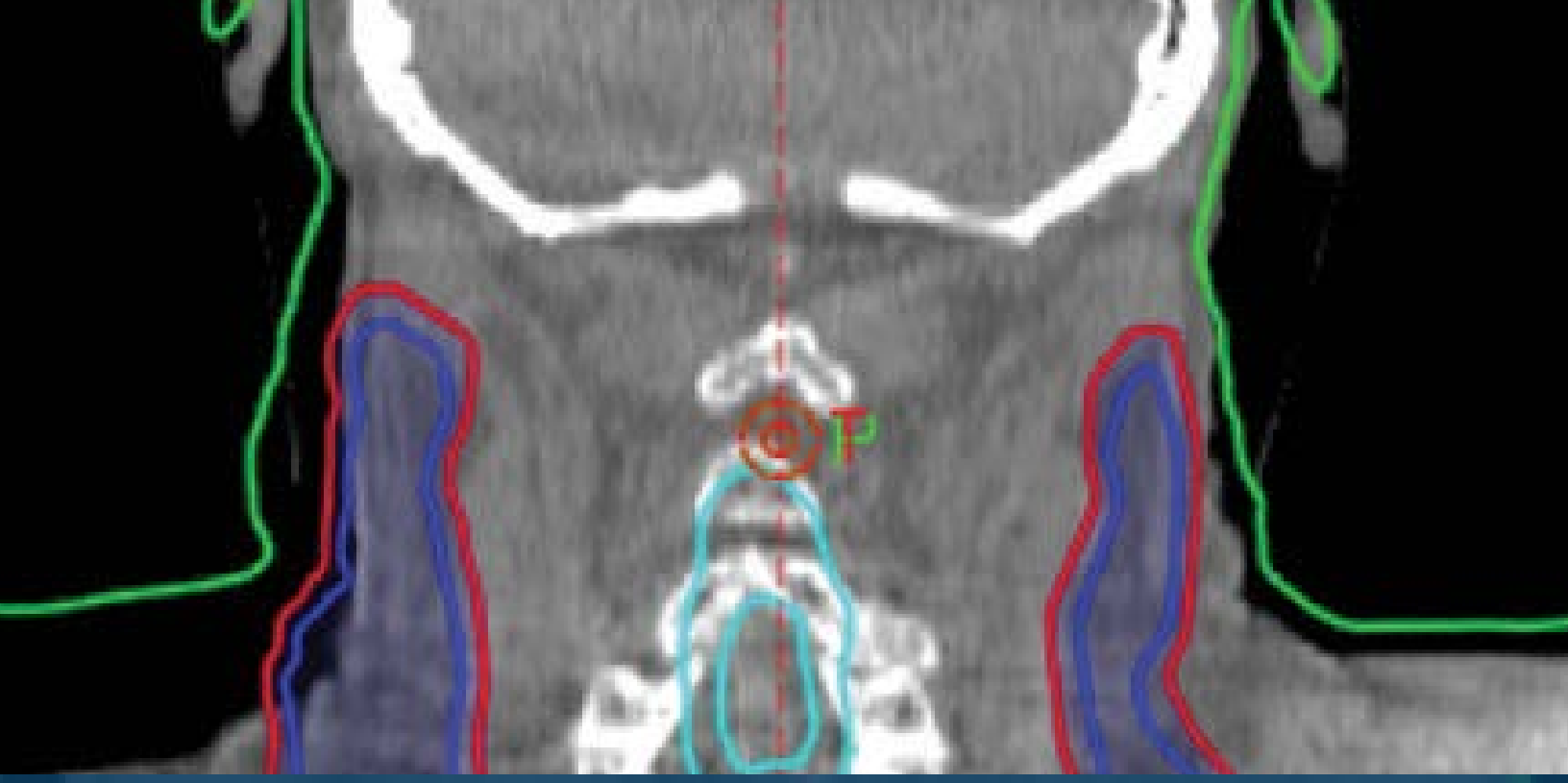
AAPM deeply values an individual's freedom to choose what they may or may not support with their time and resources. The authors of the Boycott newsletter article have expressed their perspectives as to why they boycotted the AAPM 2023 Annual Meeting in Houston, TX. We respect their perspectives. Many people also faced the same or similar circumstances and drew different conclusions in balancing their communal imperative with their personal convictions. One may not readily judge the ethics or rationale of another. Yet, we remain certain that

RESPONSE TO "BOYCOTT OF THE 2023 ANNUAL AAPM MEETING IN TEXAS AND FUTURE PLANS", Cont.

we hold a unity across the diversity of such persuasions: putting our physics in service of human health.[3]

AAPM leadership and staff are dedicated to responsibly managing the resources entrusted to them, and to use these resources wisely to hold professional meetings in safe environments that foster quality networking, education, scholarship, and exposition. While we have limitations on what we can and cannot do, the 2023 meeting was characteristically nothing less, and perhaps even more. The 2023 meeting was a success, conducted in best AAPM fashion and standards. As our Board reminds us,[1] "AAPM is stronger as an organization when we listen carefully, think deeply, talk respectfully, and work together," so we can continue to effectually put our physics in service of human health. ■

1. *https://www.aapm.org/announcements/AAPMStatementOnFutureMeetings.asp*
2. *https://w3.aapm.org/media/releases/StatementSCOTUSRuling.php*
3. *https://www.aapm.org/pubs/newsletter/references/4705PresidentElectSupplemental.pdf*



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Evy Bossuyt, M.Sc.,
Iridium Netwerk

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**Assessing the impact of adaptations to the clinical workflow using transit in vivo dosimetry E. Bossuyt, et al., Iridium Netwerk, Medical Physics, Antwerpen, Belgium, Physics and Imaging in Radiation Oncology 25 (2023) 100420*

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AAPM Annual Meeting Undergraduate Events

2023 AAPM ANNUAL MEETING UNDERGRADUATE EVENTS REPORT

This year the AAPM Annual Meeting held two events specifically for undergraduate students, returning to its partnership with the Society of Physics Students (SPS). SPS, the national organization for undergraduate students in physics and astronomy, is a peer organization to AAPM through its affiliation with the American Institute of Physics.

The first event was an Undergraduate Poster Competition. The competition featured seven registrants; each presenting research projects conducted before the conferral of their undergraduate degrees. SPS generously sponsored the honoraria received by the winners.

The winners were:

First Place ($500):
Erika Jank (Creighton University)

Exploring the Use of Contour-Based Intrafraction Motion Review for Spine Stereotactic Body Radiotherapy Treatments

*Advisor: **Ashley Cetnar**, PhD (The Ohio State University)*

Second Place ($300):
Syoma Ide (Komazawa University)

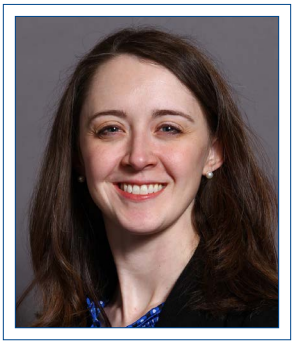
Radiomic and dosiomic modeling to predict vertebral compression fractures after stereotactic body radiation therapy for spinal metastases

*Advisor: **Yujiro Nakajima, PhD** (Komazawa University)*

Third Place ($200):
Krishnateja Konduri (University of Texas at Arlington)

Multi-Phase Cardiac CT Angiography (CTA) Denoising Using a Spatiotemporal Deep Learning Method

*Advisor: **Mingwu Jin, PhD** (University of Texas at Arlington)*



Heather Whitney, PhD
University of Chicago

This year two undergraduate student-focused events, a poster competition, and a panel, were held at the American Association of Physicists in Medicine (AAPM) Annual Meeting, returning to its partnership with the Society of Physics Students (SPS).

AAPM ANNUAL MEETING 2023 UNDERGRADUATE EVENTS REPORT, Cont.

The panel of judges included **Daniel Alexander, PhD; Frederic Fahey, DSc; Peter Jermain, PhD; Stephanie Parker, MS; Guillem Pratx, PhD; Courtney Oare, PhD; John Roeske, PhD; Heather Whitney, PhD**; and **Jeffrey Wong, MS**.

The second event was an undergraduate student gathering, where SPS provided fun swag for students and hosted a panel Q&A. The panel was comprised of new faculty in medical physics, **William Donahue, PhD** and **Jie Fu, PhD**; and medical physics resident **Nada Abu Khalaf, MS**. **Kip Matthews, PhD** also provided crucial insights to the undergraduate students that bridged applying to graduate school and thinking ahead to residency.

We congratulate the poster competition winners and express gratitude to all participants, advisors, reviewers, and the Society of Physics Students for their generous sponsorship of the awards. Many thanks also to the panel contributors and the undergraduate students for participating. We look forward to future undergraduate-focused programming at the AAPM Annual Meeting. ■

Special Interest Feature: Women's Professional Subcommittee Report

AAPM 2023 WPSC LUNCHEON

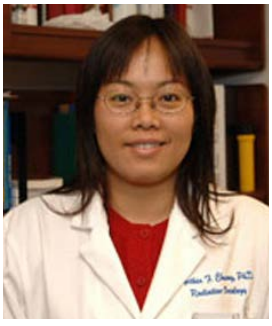
Emily Draeger, PhD | Yale University School of Medicine
Cynthia Chuang, PhD | Stanford University

The highly anticipated Women's Luncheon at the 65th AAPM Annual Meeting in Houston was yet another resounding success in 2023. Despite the provision of additional seats to accommodate 300 attendees, a waiting list was formed, underlining the immense popularity and importance of the event. With a full house in attendance, some of whom were male medical physicists interested in the topics presented, the ambiance was both electric and collaborative. This gathering serves as a platform for women medical physicists, regardless of their career stage or specific medical physics discipline, to connect, cultivate friendships, exchange ideas, and gain valuable insights.

Kicking off the luncheon, **Jennifer Pursley, PhD**, Chair of the Women's Professional Subcommittee (WPSC), set the stage with a heartfelt welcome. This was followed by an empowering message from AAPM President, **Ehsan Samei, PhD**. He welcomed everyone to the event, emphasized the significance of women in leadership within AAPM, acknowledged the women awarded AAPM fellowship status this year, and invited all female leaders, volunteers, including AAPM committee, task group, and working group chairs, to stand and receive due recognition. He further encouraged active participation from those who hadn't yet ventured into these roles.

Keeping the momentum going, Dr.

E. Draeger



C. Chuang

Pursley outlined the agenda of the luncheon meeting, and introduced three distinguished speakers from the professional session that took place before the luncheon. As they entered the stage, each presented a summary of their topics, aiming to fill in those who might have missed the professional session. **Caridad Borras, PhD** highlighted the global status for female medical physicists. The gender pay-gap survey result presented by **Emily Hirata, PhD** was of great interest to the audience, and the talk given by **Emily Draeger, PhD** about negotiation techniques was also greeted with enthusiasm.

Seven thought-provoking topics were presented for the luncheon discussions:

1. Compared to other fields, are women ahead or lagging in medical physics?
2. At your institution, how transparent are salaries? What are the barriers to increasing that transparency?
3. Delving into the reasons for the reduced Professional Survey response rate and potential ways to boost it.
4. Major obstacles faced by women during negoti-ations.
5. Are there any situations you have been in where the suggested negotiation tactics would have been beneficial?
6. Are there other tactics women can use to become better negotiators?
7. Brainstorm targeted initiatives that AAPM, WPSC, and physics leadership could do to help reverse the gender pay gap.

Once the speakers were reseated, the room was filled with animated discussions for a solid 40 minutes. Nearing the culmination of the luncheon with 10 minutes remaining, Dr. Pursley prompted tables to share some of their conversation highlights.

Murat Surucu, PhD, Chief of Clinical Physics at Stanford, proudly spoke about Stanford's commendable strides in narrowing and eliminating the gender pay gap. Another

attendee emphasized that one of the major discussion points at their table is the prevalent uncertainty regarding what is negotiable in terms of salary, relocation perks, and board certifications, and when is the most appropriate time for these negotiations. They also pointed out the challenges in discerning the true work environment of an institution during interviews, without relying on mere anecdotes and comments from the current staff.

Furthermore, the necessity of a dedicated AAPM session focused on communicating and working with hospital administrators was brought up. This aimed to bridge the understanding gap, as administrators, who often decide on salaries, might lack insight into the roles of physicists. They also stressed the importance of effectively sharing tools like the AAPM Professional Survey to underline the relevance and importance of physics staffing for patient safety, and reasonable salary scales.

Numerous attendees were keen on AAPM introducing workshops and mentorship sessions centered on these pivotal topics, deeming them instrumental and invaluable for not only women, but also budding physicists entering the field.

Concluding the event, Dr. Pursley extended her gratitude to the vendor sponsors, dedicated WPSC members, and attendees for making the luncheon a memorable and hugely successful event. She also encouraged the attendees to share their contact details for future networking and collaboration.

The WPSC is immensely grateful to all its sponsors. Special thanks go to Varian and Imalogix who were platinum sponsors; UT MD Anderson Cancer Center and Phantom Laboratory, who were ruby sponsors; and lastly, Sun Nuclear, RadCalc, PTW, Accuray, and ABMP for being silver sponsors.

We eagerly await next year's Women Physicist's Luncheon at the 2024 AAPM Annual Meeting in Los Angeles. ■

Notice:

Effective with the 2024 volume, *Medical Physics* will be published in an online-only format. Please see the Volume 50 October Editorial for more details.

Special Interest Feature: Women's Professional Subcommittee Report

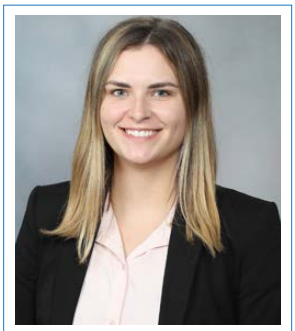
IN SEARCH OF THE NEXT WOMAN COOLIDGE AWARD WINNER

Julianne Pollard-Larkin, PhD | MD Anderson Cancer Center
Krystal M. Kirby, PhD | Mary Bird Perkins Cancer Center
Emily Draeger, PhD | Yale University School of Medicine

AAPM has three major distinguished honors that members can potentially receive in their lifetime, with the highest being the William D. Coolidge Gold Medal, named after the famed medical physicist. Dr. Coolidge studied at MIT and the University of Leipzig, and during his career, he developed ductile tungsten (used in incandescent light bulbs) and made major improvements to the X-ray tube, allowing for better image quality and visualization of anatomy. The award was given to its namesake in 1972, and since then has been awarded an additional 41 times. Only twice has the award been given to a woman: in 1977 to **Edith Quimby** and in 2015 to **Maryellen Giger, PhD**.

Since 2002, female membership has been on the rise within AAPM: Figure 1 illustrates an increase in female membership from just over 15% in 2002 to 23.3% in 2019. However, rates of awards to female members have not seen the same type of increase. In April 2020, **Elizabeth Covington, Jean Moran**, and **Kelly Paradis** authored an article in *Medical Physics* titled "The state of gender diversity in medical physics" (*Med Phys*, 2020 Apr, 47(4):2038-2043). One of the categories they analyzed was the percentage of female award winners compared to female membership in 2019, as shown in Figure 2. To date, the percentage of women award winners greatly trails the percentage of women in the AAPM.

J. Pollard-Larkin



K. Kirby

E. Draeger

There are several potential explanations for why some groups don't receive awards comparable to their membership rates, and these range from the belief that some groups are too reticent to nominate themselves, to impostor syndrome, all the way to outright systemic bias. The real cause of the disparity in receiving awards might well be a combination of several factors, but the need for every AAPM member to understand the nomination process and the types of awards available is the first step in ensuring all of us have a more equitable chance at receiving the awards we have earned. That is why this year, we are encouraging all members to learn about the award criteria and consider nominating eligible members for the awards, positions, and recognitions they deserve. The Equity, Diversity, and Inclusion Committee (EDIC) is working with leadership now to create an automated eligibility email alert to allow members to know when they have met some basic criteria for certain awards. The goal is to take the mystery out of the process and provide transparency and equity overall for everyone. All of us in EDIC want this award nomination round to be the most open and transparent round yet with more people of all backgrounds being nominated for the great work they have accomplished in our field. The nomination process for each award is detailed below, and additional information for top awards can be found on our website.

The three highest awards given by AAPM include the Marvin M.D. Williams Professional Achievement Award, the Edith H. Quimby Lifetime Achievement

"IN SEARCH OF THE NEXT WOMAN COOLIDGE AWARD WINNER", Cont.

Award, and the William D. Coolidge Gold Medal. The Marvin M.D. Williams Professional Achievement Award is given in recognition of AAPM members with distinguished careers in medical physics and emphasizes work in clinical medical physics. The nomination criteria for this award include:

- Full/Emeritus member of AAPM for at least 10 years
- Significant influence on the development of the profession through professional, educational, and clinical practice development
- Leadership in national/international organizations
- Fellowship status in AAPM

The Edith H. Quimby Lifetime Achievement Award is given in recognition of AAPM members with remarkable careers evidenced by their outstanding achievements. The nomination criteria for this award include:

- Full/Emeritus member of AAPM for at least 10 years
- Significant scientific achievement in medical physics, significant influence on the profession, or leadership in national/international organizations
- Active participation in AAPM
- Fellowship status in AAPM

Finally, the William D. Coolidge Gold Medal is given in recognition of AAPM members for their distinguished career in medical physics. The nomination criteria for this award include:

- Full/Emeritus member of AAPM for at least 10 years
- Significant achievements in medical physics, significant influence on the careers and development of other medical physicists, and leadership in national/international organizations
- Active participation in AAPM (Committee Chair, Member of the Board of directors, AAPM officer, etc.)
- Fellowship status in AAPM

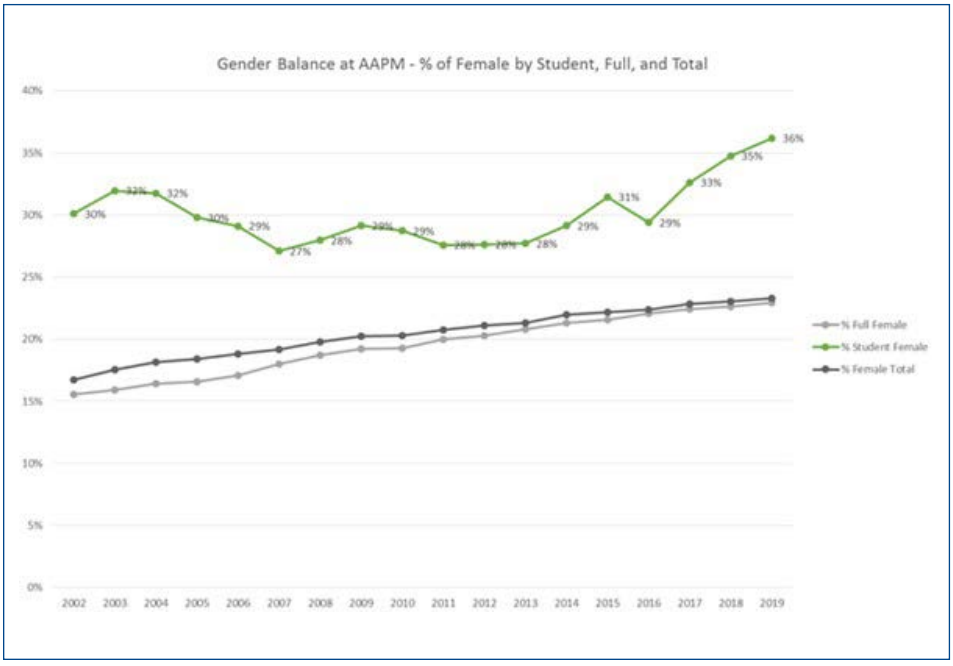


Figure 1: Percentage of female membership in the AAPM from 2002 to 2019.

"IN SEARCH OF THE NEXT WOMAN COOLIDGE AWARD WINNER", Cont.

Nomination for any of these awards includes the submission of a nomination letter (by the nominator), up to four additional support letters, and submission of a CV by the nominee. Members of the AAPM Awards and Honors Committee are not eligible for nomination to these awards. The nominator must be an AAPM member, but letters of support may be submitted by non-members of AAPM.

We would like to end this article by encouraging all members of AAPM to consider nominating other members that meet the requirements for these prestigious awards, particularly those from underserved groups that may not be well represented throughout AAPM. ■

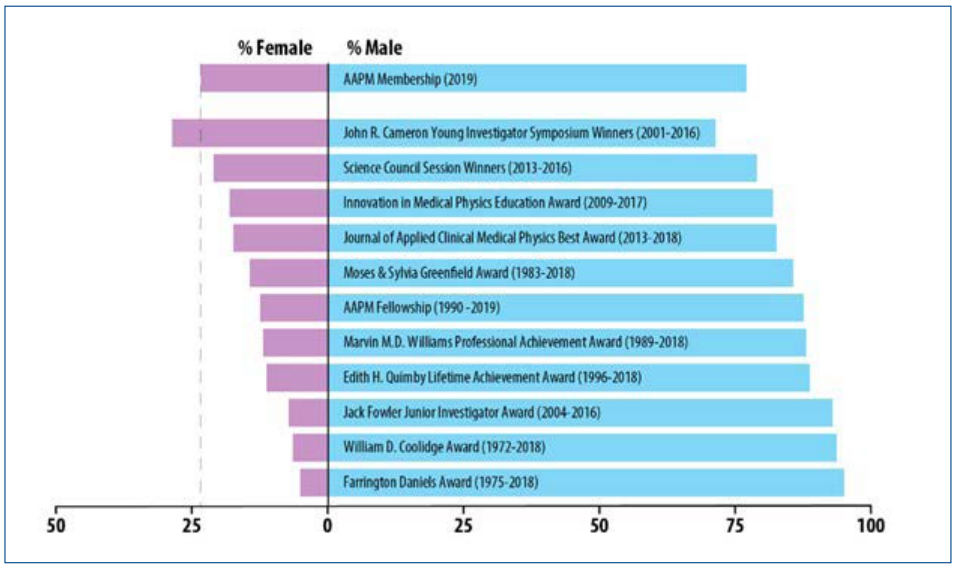


Figure 2: Percentage of male and female award winners compared to 2019 membership. Reproduced with permission from Covington EL, Moran JM, Paradis KC. The state of gender diversity in medical physics. Med Phys. 2020 Apr;47(4):2038-2043. doi: 10.1002/mp.14035. Epub 2020 Feb 12

Special Interest Feature: Women's Professional Subcommittee Report

AAPM WEBINAR HIGHLIGHTS THE MODERN CHALLENGES OF PROVIDING CARE FOR PREGNANT PATIENTS

Kelly Kisling, PhD | University of California, San Diego
Sandra Meyers, PhD | University of California, San Diego

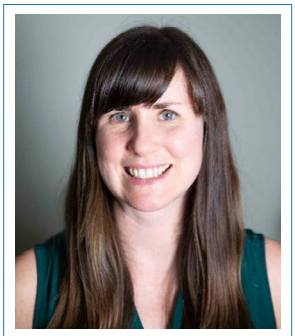
This webinar on the complex issues surrounding pregnancy and radiation, especially within the context of restrictions on reproductive care, attracted 443 attendees. That's more attendees than any AAPM webinar in the past three years.

The topic of providing medical care for pregnant patients is at the forefront now more than ever. In June 2022, the Dobbs decision from the Supreme Court overturned Roe v Wade, and now abortion is banned in 14 states with few exceptions[1]. Even more states have gestational limits, some as low as six weeks, which is before many people know they are pregnant.

This topic is relevant to AAPM because thousands of people receive a cancer diagnosis while pregnant in the United States every year. Radiation therapy can expose a fetus to doses that can cause severe consequences[2]. Imaging pregnant patients results in lower fetal doses but is more common. Appropriate management of pregnant patients receiving radiation therapy or diagnostic imaging is a serious issue and should consider both the benefits to the patient and the risks to the patient and fetus from radiation exposure.

On August 24, 2023, AAPM hosted a webinar entitled 'Pregnant Patients and Radiation – a Modern Refresher,' which featured four speakers with diverse expertise and covered multiple facets of this important topic. Over 400 people attended the webinar — more than any other AAPM webinar in the last three years — indicating that this topic is of great interest to members. With the current restrictions on reproductive care in many states, we foresee that this will continue to be an important issue for medical physicists, in addition to our colleagues, our trainees, and especially our patients. In this article, we highlight the key takeaways from the webinar, which is available for viewing on the Webinar Archives on the AAPM website.

K. Kisling



S. Meyers

The first speaker was Dr. Christina Chapman, an Assistant Professor and radiation oncologist at the Baylor College of Medicine. She provided an invaluable physician's perspective on the management of pregnant patient care from cancer diagnosis up until treatment. She led with a clinical case that featured a patient with an arteriovenous malformation, who was found to have an unintended pregnancy at the time of simulation for stereotactic radiosurgery. Because termination was not legal in her state, her care team opted to postpone radiotherapy until after giving birth, and she suffered from a catastrophic rebleed. This exemplifies the severe consequences that can occur when the option for an abortion is restricted. Additionally, providers in her state had declined to place an intrauterine device, which would have prevented the pregnancy and highlights the need for adequate provision of birth control. In Dr. Chapman's second case, diagnostic imaging was declined for a woman on two occasions – once while breastfeeding and a second time while pregnant. As a result, a positive node was not caught during workup, and she received sub-optimal care for her breast cancer, which was found to be metastatic after giving birth. In the final case, a woman who was 12-weeks pregnant was diagnosed with head and neck cancer. Unlike the first case, this patient was provided the option of radiotherapy, and she elected to proceed with radiation treatment.

AAPM WEBINAR HIGHLIGHTS THE MODERN CHALLENGES OF PROVIDING CARE FOR PREGNANT PATIENTS, Cont.

Physicists played an important role in the multidisciplinary team, providing both consultation and management of fetal dose.

The second speaker, **Jeff Masten, JD**, practiced as a lawyer for 47 years and a radiotherapy physicist for 25 years. He discussed legal issues related to healthcare of pregnant patients, which has become very relevant since abortions have been banned in many states. Not only may a patient wish to terminate their pregnancy in order to receive standard of care treatment or prevent radiation-related defects to the fetus, there is also a risk of unintended termination due to radiation dose. This puts physicians and members of the treatment team at risk from punitive laws in states such as Texas, which subject healthcare providers to civil lawsuits, large fines, and even imprisonment. The webinar introduced important terminology - "aiding and abetting" - which means to assist or encourage someone in committing a crime. Such a person is liable to the same extent as someone who commits the crime, which means a medical physicist providing a calculation or consult could be at risk of similar legal ramifications as physicians. This risk could be greater if a physicist uses the phrasing "physics recommends," especially since recommendation could be considered outside of a physicist's scope of practice. Because this is a complex issue that is highly variable between states, the major takeaway was for clinicians to talk to their management and legal teams for guidance.

The final two presentations were focused on practical considerations for both imaging and treating pregnant patients with radiation and were delivered by medical physicists. **Rebecca Milman, PhD**, an Associate Professor and Division Chief of Radiological Sciences at University of Colorado Anschutz Medical Campus, provided her perspective on diagnostic imaging. Diagnostic imaging features doses that are typically under 100 mGy and energies under 150 keV. Imaging such as radiography, CT, and fluoroscopy is commonly performed on pregnant patients, especially for life-threatening conditions such as appendicitis. Outside of the field of view, doses are less than 1 mGy, and about 80% of that dose is due to internal scatter. For this reason, AAPM has a position statement (2019) that fetal shielding is not recommended. Inside the field of view, doses can range from 0.1-40 mGy for most modalities. Despite the low risks to the fetus at these doses, there is a lot of misinformation that imaging with x-rays is not recommended during pregnancy. This can have very negative consequences for detecting or staging disease. Dr. Milman recommended developing center-wide policies for imaging pregnant patients, as well as informational brochures. She also brought up an important point – institutions should carefully consider which team members have the knowledge required to accurately educate patients on radiation risks and limit those conversations to those that do. Dr. Milman described several case studies that demonstrated the value that diagnostic imaging procedures can have for pregnant patients.

Sara Thrower, PhD, an Assistant Professor in the Radiation Physics Department at MD Anderson Cancer Center, reviewed methods to safely deliver radiation therapy to pregnant patients. Physicists can play a key role in estimating the fetal dose for treatment plans, measuring dose with a phantom, determining appropriate shielding, and monitoring dose during treatment. Dose outside the field is due to leakage and both internal and external scatter. Multiple strategies can be employed to reduce fetal dose, including use of lead shielding, minimizing modulation, and avoiding non-coplanar fields. Guidance was provided for estimating fetal dose, where both TG-36[2] and TG-158[3] can be helpful. Conformal radiotherapy, IMRT, Cyberknife, GammaKnife, proton therapy, and brachytherapy were discussed. Interestingly, scanning proton beams can have significantly lower out-of-field dose than photons, and therefore could be a good option for irradiating pregnant patients. Dr. Thrower highlighted the need for an update to TG-36, which includes modern modalities, fractionations, and best practices.

The webinar received many questions from the audience, which were answered during the round-table discussion. One question asked the panelists' thoughts on whether the restriction of reproductive care was a purely political topic and therefore outside of the purview of AAPM. Dr. Chapman responded with "Everything is political. Our healthcare policy, our education policy are dictated by politics…so to use that as a justification for not taking action does not make sense." Dr. Milman added that "Science and medical physics does

AAPM WEBINAR HIGHLIGHTS THE MODERN CHALLENGES OF PROVIDING CARE FOR PREGNANT PATIENTS, Cont.

not happen in a vacuum. We are not treating phantoms. We are not treating mathematical equations. We are treating and imaging people."

Another participant asked whether it could be appropriate for physicists to include phrasing such as "based on the estimated dose… termination of pregnancy is not necessary" in their consults. Dr. Chapman remarked on the phrase "termination of pregnancy is not necessary" from the perspective of a physician and health equity researcher. She stated, "even, for example, if the dose to the fetus is going to be very, very low, and the risk based on the best available evidence is going to be very low, there are numerous other ways that continuation of pregnancy can negatively impact the quality of cancer care... Termination of pregnancy is necessary if the person who is pregnant determines it's necessary."

In conclusion, this webinar highlighted how abortion restrictions will dramatically affect the ability of pregnant persons to receive standard-of-care radiation treatment and imaging. It also emphasized the important role medical physicists have in their care, and the risks that may be involved in providing that care. Given the ongoing complex legal landscape surrounding reproductive care, the subject of pregnancy and radiation will likely continue to be an important topic for our membership. ■

1. *Times TNY. Tracking Abortion Bans Across the Country. The New York Times. https://www.nytimes.com/interactive/2022/us/abortion-laws-roe-v-wade.html. Published May 24, 2022. Accessed October 9, 2023.*
2. *Stovall M, Blackwell CR, Cundiff J, et al. Fetal dose from radiotherapy with photon beams: report of AAPM Radiation Therapy Committee Task Group No. 36. Med Phys. 1995;22(1):63-82. doi:10.1118/1.597525*
3. *Kry SF, Bednarz B, Howell RM, et al. AAPM TG 158: Measurement and calculation of doses outside the treated volume from external-beam radiation therapy. Med Phys. 2017;44(10):e391-e429. doi:10.1002/mp.12462*

Shielding setup used for treatment of pregnant patients at MD Anderson Cancer Center. Image courtesy of Dr. Sara Thrower.

The AAPM webinar on the topic of pregnancy and radiation featured four speakers and two moderators. Clockwise from top left: Dr. Rebecca Milman, Mr. Jeff Masten, Dr. Sara Thrower, Dr. Kelly Kisling, Dr. Sandra Meyers, and Dr. Christina Chapman.

Special Interest Feature: Women's Professional Subcommittee Report

FEATURED PHYSICIST: HANIA AL-HALLAQ, PHD, FAAPM

Kristi Hendrickson, PhD | University of Washington
Erika Kollitz, PhD | University of Florida

Hania Al-Hallaq, PhD, FAAPM

K. Hendrickson

E. Kollitz

"My advice is to always strive for excellence in every aspect of your professional life and be a good team player. Continue to learn and grow by embracing professional development opportunities and getting involved in professional committees and organizations as a way to interact and learn from leaders outside your institution."

Hania Al-Hallaq, PhD, FAAPM is the incoming Vice Chair of Medical Physics and Director of the Division of Medical Physics for the Department of Radiation Oncology at Emory University. She is currently a professor at the University of Chicago, where she has served on the faculty for almost 20 years. She earned a bachelor's degree in Physics from Bryn Mawr College in Pennsylvania in 1994, then completed her PhD and residency in medical physics at the University of Chicago in 2000 and 2002, respectively. At the University of Chicago, Dr. Al-Hallaq served as Associate Director of the Graduate Program in Medical Physics and as Director of the Medical Physics Certificate Program. She has an extensive history of research excellence and professional service, particularly in graduate and resident education, and has won multiple teaching awards. Her research is focused on image guidance including x-ray and 3D surface imaging, and she has been the physics PI on multiple clinical trials studying the effectiveness of SBRT for metastatic disease. As part of her work, she has served as the Chair of Task Group 302 on Surface Image Guided Radiotherapy. Dr. Al-Hallaq is also a member of SDAMPP, where she currently acts as Chair of the Board, as liaison to CAMPEP, and as a member of multiple SDAMPP committees. Beginning in January 2024, she will be a member of the AAPM Board of Directors and is currently the Chair of the Medical Physics Residency Training and Promotion Subcommittee, the Vice Chair on the Education and Training of Medical Physicists Committee, and a member of the Working Group on Entrustable Professional Activities for Medical Physics Residents.

How did you decide on medical physics as a career?

As an undergrad, I had the opportunity to do research in solid state physics and learned about NMR spectroscopy, which was the topic of my undergrad thesis. I became interested in applied science and considered switching majors from physics to engineering but I would have had to leave my small liberal arts college, Bryn Mawr College, which I loved. When I learned that the principles of NMR could be used for MR imaging and I saw the potential to exercise my physics education in an applied field, I didn't look back and only applied to PhD programs in medical physics.

FEATURED PHYSICIST: HANIA AL-HALLAQ, PHD, FAAPM, Cont.

What about medical physics do you find most rewarding and most challenging?

I love that medical physics is a "team sport." I'm not particularly athletic but I enjoy the comradery of working with others towards a common goal and I am humbled that the goal is to help cancer patients. I envision that I am helping every one of my friends and family who have been affected by this disease. I guess that's why I gravitate towards services such as HDR brachytherapy where the team must work closely together. Even collaborating on research projects is another team, where the whole is hopefully greater than the sum of its parts.

In academic medicine, we are expected to contribute to clinical service, education, and research. One challenge is juggling all these balls, particularly in times when the clinical service is busy or we are short-staffed.

Did you encounter anything unexpected during your career?

When I finished my residency, I took a clinical position in a non-academic center. There were many reasons for this decision but one of them was that I wasn't sure about staying in academic medicine because I didn't see many women in similar positions. After two years, I was fortunate enough to be recruited back to the University of Chicago. This experience was important for me because I returned with a renewed enthusiasm for the academic environment and I was able to contribute both to innovating the educational mission by initiating a certificate program and the breast cancer radiotherapy service in terms of planning and positioning improvements. When I tell trainees this story, I emphasize that career decisions aren't black and white and we can wander off our true path but still find our way back.

You recently accepted a leadership role in the Radiation Oncology Physics Division at Emory University. What advice would you give women physicists interested in leadership roles in clinical physics groups?

I'm honored to be starting in this new role in 2024 with an innovative team at Emory University and under an inspiring Chair, Dr. Reshma Jagsi. My advice is to always strive for excellence in every aspect of your professional life and be a good team player. Continue to learn and grow by embracing professional development opportunities and getting involved in professional committees and organizations as a way to interact and learn from leaders outside your institution. While this advice applies to everyone, my specific advice for women is to be daring and take risks.

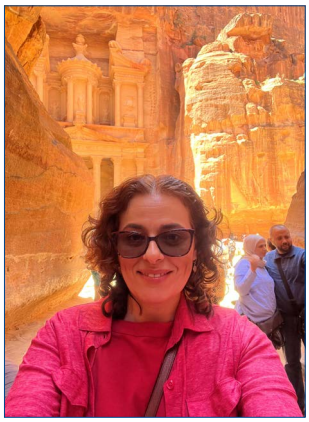
If you weren't a medical physicist, what do you think you would be doing today?

Probably something in which science is applied. When I was little, I wanted to be an astronaut, so I seem to have stuck to a consistent theme.

What activities do you enjoy outside of your job?

I enjoy spending time with my family, traveling, and reading. I love to read all sorts of genres, both fiction and nonfiction. My favorite books are those that give us a glimpse into the human experience. One that I have read multiple times is "When Breath Becomes Air" by Paul Kalanithi. ■

Hania participates in her favorite team sport, HDR brachytherapy.



Hania outside the breathtaking Al-Khazneh of Petra, Jordan.

Hania and her sister on a trip to Paris, admiring the beautiful Eiffel Tower at night.

Special Interest Feature: Women's Professional Subcommittee Report

BOOK REVIEW: *THE EXCEPTIONS: NANCY HOPKINS, MIT, AND THE FIGHT FOR WOMEN IN SCIENCE*, BY KATE ZERNIKE (2023)

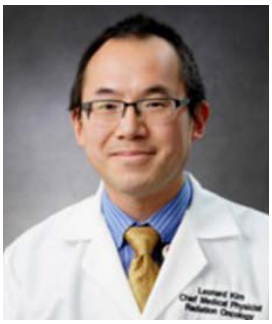
Leonard Kim, MS, AMusD | MD Anderson Cancer Center at Cooper

"What if we treated great female scientists like they were stars?"

The particular value of this book for AAPM members is that it is a book about scientists. This is a no preaching-to-the-choir book. As a scientist, Professor Hopkins herself had to be convinced through incontrovertible evidence of the non-meritocratic conditions under which she and her colleagues worked. This same evidence eventually convinced an institution that prided itself on scientific objectivity, culminating in MIT's 1999 admission of discrimination against its senior women faculty. For readers who may similarly believe science trained them to see objectively, it may be hard to believe society and culture's strong, often subconscious influence on the profession. Reading about scientists becoming convinced of this becomes, in itself, convincing.

In 2021, AAPM sponsored a screening of the documentary, *Picture a Scientist*, followed by a panel discussion hosted by the Women's Professional Subcommittee. One of the heroes of *Picture a Scientist*, MIT professor and biologist Nancy Hopkins, is now the subject of the 2023 book, *The Exceptions: Nancy Hopkins, MIT, and the Fight for Women in Science*, by Kate Zernike.

The Exceptions is a compelling and inspiring biography of Professor Hopkins and her colleagues as well as an enlightening and infuriating history of



L. Kim

discrimination against women scientists in the second half of the 20th-century. It is the best book I've read this year and one every AAPM member should read.

"I asked how all of this had started. She told me about the space wars, how she had needed more room for her fish tanks and been told no, only to discover that men with less experience than her had more space than she did. How did you know the men had more? I asked. 'I measured.' 'With a tape measure,' she added, as if it were the most obvious answer in the world."

"Now is the moment to try a little harder, to care a little more. . ."

Zernike first broke this story in 1999, but the book's longer chronology allows her to demonstrate its continued relevance for 2023. Professor Hopkins was later drawn into another well-publicized incident when she walked out of a talk by Larry Summers, president of Harvard and "one of the most brilliant economists of his generation", whose attempts at "provocation" were the same tired arguments against equity that "had been trotted out for decades, since the middle of the last century" as the reader knows from seeing them hundreds of pages earlier.

When MIT President Jerome Wiesner wrote, "Now is the moment," in 1973, it was the hundredth anniversary of MIT's first female graduate, Ellen Swallow Richards, and the year Hopkins arrived at MIT, a quarter century before the book's key events. MIT had five times as many women students than it had in 1960. But Wiesner recognized progress is no excuse for complacency — women were still just 11% of the undergraduate population — and Zernike's history repeatedly proves it.

"Nancy had not forgotten the admonition. . . that students would not accept scientific information if the person at the front of the lecture hall was a woman. She knew it remained true, and that students could be cruel in their evaluations. Of the twenty-five professors teaching required courses in the School of Science, she was the only woman. The new course would have to be spectacular."

There is a nearby alternate universe where I didn't have AP Biology credit, and I would have taken Professor Hopkins' Introductory Biology class, one of the flashpoints of The Exceptions. MIT had just voted to

BOOK REVIEW, Cont.

add biology as an undergraduate core requirement, and designing and teaching this course was an important and prestigious assignment given to Professor Hopkins, whose career "spanned the breadth of the course" and who had, in another class, received student ratings that were "by far the highest in the Biology Department." The course was a huge success, but Professor Hopkins' "reward" was to have the teaching assignment taken away from her as fellow instructors tried to monetize the course material — for a course she created — without her. Had I taken Introductory Biology, it would have been my only class in four years taught by a tenured woman professor. Out of 30-odd classes I took in college, two were taught by women, both in the humanities, neither at the rank of even assistant professor. This sorry fact completely and utterly did not register with me at the time. It took this book, 30 years after the fact, to make me realize it. ■

Data Sciences Committee Report

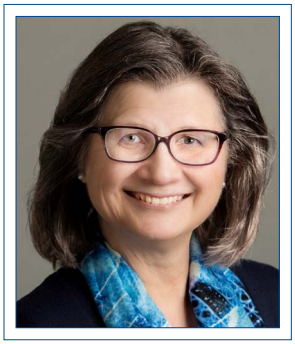
SCIENCE COUNCIL REPORT

As we approach the end of another fruitful year, the Data Sciences Committee (DSC) is pleased to provide you with updates from some of its subcommittees along with key highlights of our 2023 achievements, ongoing initiatives, and plans for the future, as we continue to promote excellence in data sciences within AAPM. I have been honored to be the inaugural Chair of the AAPM Data Sciences Committee, created in 2018 (along with Vice Chair **Joseph Deasy, PhD**, now **Charles Mayo, PhD**). While my six-year term is up, I will still be involved in DSC as the contact PI of MIDRC. Thank you.

Updates on Current Efforts

The Big Data Subcommittee (BDSC) aims to improve the usefulness of data collected in imaging and radiation oncology for input to radiomics and machine learning projects; for example, data collection, standardization, anonymization, contextualization, labeling (truth), distribution, infrastructure, linkage, workflow, and archival functions. BDSC has developed standardizations encompassing all aspects of cancer care. It has maintained a public access website for several years to detail the broad range of metadata elements encompassed in its work for transparency, distribution, and gathering public comment. This Operational Ontology for Oncology (O3) was published in *IJORBP* this year, along with an editorial and a podcast with the editor. BDSC is moving toward projects for implementing O3 infrastructure pilots and is progressing on adding Head and Neck specific items to O3. Soon, they will release a white paper on standardized clinical approaches to reference points that enables electronic automation supporting monitoring of delivered dose progression. Notable is that O3 reporting standards for re-irradiation are forming the basis for ESTRO reporting recommendations for re-irradiation. For the future, BDSC is working on an ARPA-H application to support infrastructure pilots.

The Imaging Metrology and Standards Subcommittee (MSSC) was formed as part of the initiation of the DSC and led by the late **Edward Jackson, PhD**. The planned activities were to collaboratively develop and disseminate metrological processes and standards to characterize and mitigate the bias and variance of quantitative imaging biomarkers. This collaborative effort was based on Dr. Jackson's RSNA Quantitative Imaging Biomarker Alliance (QIBA) leadership. One of the planned use cases was to provide reviews of draft profiles generated by QIBA. These reviews would be from a medical physics viewpoint. With the passing of Dr. Jackson, **Paul Kinahan, PhD** became the Chair, and the membership roster was refreshed to represent all modalities. However, from that point, there were no draft QIBA Profiles for several years, and despite attempts to find other meaningful tasks, none emerged. In 2021, the DSC reviewed the role of MSSC, which led to the planned reconfiguration of the DSC subcommittees (see later in this article). Some of the activities on



Maryellen Giger, PhD, Chair
University of Chicago

Charles S. Mayo, PhD, Vice Chair
University of Michigan

MSSC will be taken on by the new 2024 Imaging Data Standards and Harmonization Subcommittee (IDSH), including the Medical Imaging and Data Resource Center's (MIDRC) efforts on the anonymization, curation, and harmonization of diverse imaging data. These efforts have been very productive over the last three years, leading to new processes for image quality assessment and curation using common terminology from the RSNA Radlex effort to standardize procedures' names in radiology. The MIDRC contributions have leveraged the Logical Observation Identifiers, Names, and Codes (LOINC) standard for identifying laboratory and clinical test orders and results. First developed in 1994 and maintained by the Regenstrief Institute, LOINC is part of UMLS, UCUM, and other standards. By creating a MIDRC-LOINC Mapping Table (publicly available on Github), the MIDRC group developed an approach to harmonize DICOM metadata using the LOINC standard that was tested on ~80,000 MIDRC imaging studies and was able to match over 95% of those to 65 unique LOINC terms. In addition, AI-based methods for image curation are in development, as well as a multi-institution image quality assessment for CT using quantifiable phantom imaging.

The Machine Learning Subcommittee (MLSC) aims to improve and coordinate algorithms related to machine learning as applied to imaging and radiation oncology. Algorithms include those related to supervised and non-supervised classification methods, data reduction, outcome prediction, and imaging reconstruction relevant to the mission of AAPM. Various task groups are being developed or already working on coordinating these algorithms. Progress has been made within TG-384, which has a working draft that is being edited, with an expected submission for review by the end of the year. Various task groups are under development, including those focused on "quality assurance, acceptance, commissioning, performance monitoring, and training" and "image reconstruction and denoising", as well as one on "outcome modeling", which will be created jointly with ESTRO. They are also participating in a meeting to be organized by the AAPM Ad Hoc Advisory Committee on Artificial Intelligence Boot Camps (AHAIBC) in July 2024.

The AAPM MIDRC Subcommittee (MIDRC) aims to coordinate and integrate the activities of AAPM MIDRC investigators into DSC subcommittees as well as throughout AAPM, relevant to the mission of AAPM. Multiple AAPM members are leaders within the Medical Imaging and Data Resource Center (MIDRC), providing domain expertise on medical imaging for data harmonization and curation, as well as for resources such as (i) AI bias mitigation, (ii) metrology for evaluating AI algorithms, (iii) algorithmic methods for splitting datasets such as in sequestering test sets and creating task-based distributions of data for conducting rigorous methods of evaluation for translation, (iv) grand challenges, (v) user data portals, and (vi) AI research with multi-modal data obtained through MIDRC's interoperability with other data commons. Please see the AAPM-MIDRC Subcommittee Report, which also discusses MIDRC's new role in the ARPA-H Biomedical Data Fabric.

Data Sciences Committee Reorganization

Since the inception of the Data Sciences Committee, there has been a noticeable evolution in the activities and dynamics of various subcommittees, an evolution that's crucial for understanding the changing landscape of data science within AAPM and for guiding our future efforts. As such, this year, DSC underwent a structural reformation to better reflect our members' most active areas of focus and activities in data sciences. In addition, there was recognition that there have evolved two major clusters of collaboration and activity in the data science and informatics groups that are relevant for AAPM members. One is based with BDSC and is linked but not exclusive to radiation oncology activities within ASTRO, ESTRO, and other groups. The other is based within MIDRC and linked but not exclusive to radiology activities, including oncologic and non-oncologic diseases with RSNA, ACR, and other groups. While some common themes exist in both clusters, the specific activities often differ substantially.

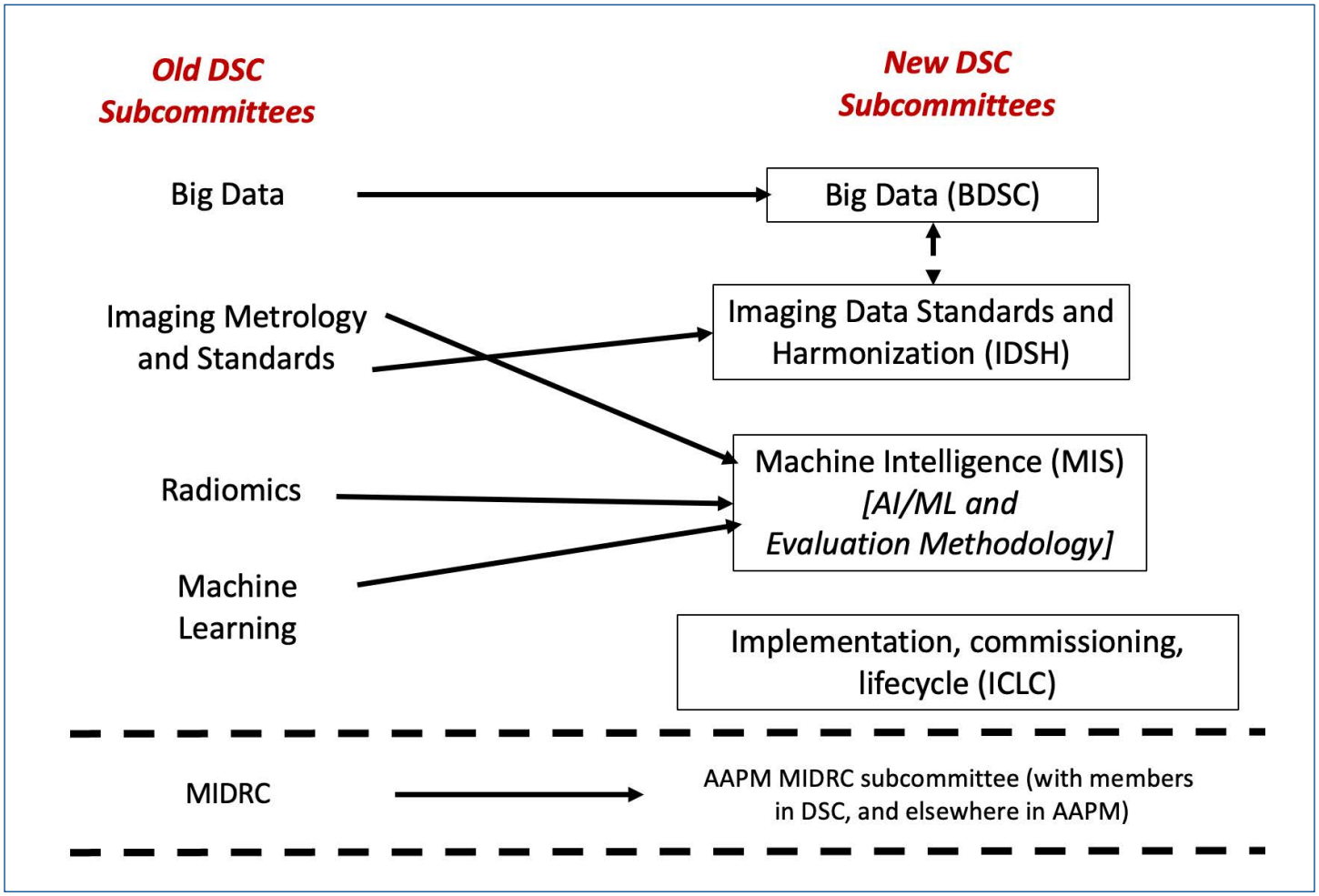
Based on these assessments, a proposal to match the structure of DCS to the established activities was raised, discussed, and voted on. The new approved structure, which was unanimously approved by DSC and subsequently approved by Science Council, is shown below on the following page.

Of interest is the new 2024 Implementation, Commissioning, Lifecycle Subcommittee (ICLC), which will assess and disseminate processes for implementing and commissioning AI devices in diagnostic imaging and radiation therapy practices and develop tools for assessing

SCIENCE COUNCIL REPORT, Cont.

the lifecycle of such devices.

Keep posted by regularly visiting the AAPM DSC Committee Tree page, and attending committee and subcommittee meetings, which are always open. As always, we immensely thank AAPM members and the AAPM staff (especially **Shana Donchatz** and **Emily Townley**). ■



AAPM EDUCATION & RESEARCH FUND

2024 AAPM FUNDING OPPORTUNITIES

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AMERICAN ASSOCIATION OF PHYSICISTS IN MEDICINE

RSRCH Re-Boot, Evolution, and Transition

SCIENCE COUNCIL REPORT

The beginning of 2024 will also mark the start of new leadership for the AAPM Research Committee (RSRCH), and the end of our terms as Chair and Vice-Chair. Here we look back at the path that RSRCH has taken over the last six years to summarize the priorities and accomplishments of the hardworking members of the committee. There are too many members to recognize them here, but over the last six years there have been over 35 members and many guests including trainees. There are currently 20 voting members, five guest members (including three trainees, two of whom are Science Council Associates Mentorship Program (SCAMP) appointees), and two AAPM staff members. Over the last six years, RSRCH has made membership diversity a priority, which has been emphasized both in the AAPM classified ads for committee membership, and in its activities, some of which are noted below. Currently the membership of RSRCH is 36% women, compared to 24% for the AAPM as a whole.

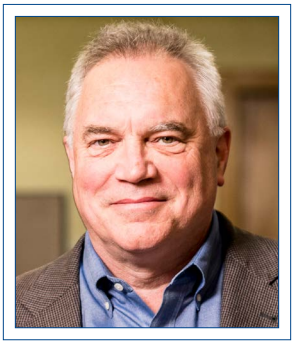
The committee benefited enormously from two in-person retreats at AAPM headquarters over this period. The first, in 2019, helped RSRCH collectively define the goals of RSRCH, i.e., answering "why are we here"? For context, RSRCH was formed in 2009 to merge the efforts of separate research subcommittees operating under the Imaging Physics and Therapy Physics Committees. During this formation, the Purpose defined in the AAPM rules was "To facilitate and promote scientific research involving physics in medicine". While the Purpose provides an important goal, it still leaves open a wide range of potential activities to focus on. During the 2019 retreat the consensus arose that research by AAPM members is an important component of working towards the AAPM's mission and objectives. As opposed to, for example, RSRCH members conducting research on behalf of AAPM. As an operating guide we rephrased the Purpose as:

"To facilitate and promote scientific research by AAPM members"

This has been the guiding principle of RSRCH. This may change in the future, but over the last term it has served us well. In addition, the retreat also assisted in setting diversity of membership as one goal and focusing on early-career development in research as another goal.

The reboot of RSRCH has evolved into important contributions in many areas by committee members that are briefly listed here:

- Continuation of the Joint Working Group for Research Seed Funding Initiative (JWGRSF), which manages the AAPM Research Seed Funding Grants. In 2021 there was a dramatic drop in the number of qualified female applicants (10%). In response the JWGRSF started a multi-tiered approach to advertising and recruitment including providing feedback on submitted Letters of Intent and hosting well-attended seminars on proposal submission, which is central to RSRCH's role of supporting research by

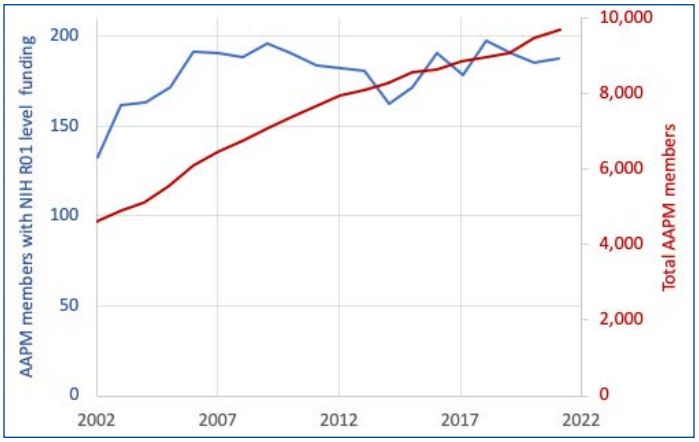


Paul Kinahan, PhD, Chair
University of Washington

Eduardo Moros, PhD, Vice Chair
H. Lee Moffitt Cancer Center

AAPM members. In 2023 there were 37 applications for Seed Grants, and half were from women, which was both an increase in the number of applicants and the percentage of female applications. Also worthy of note is that three of the four awardees in 2023 are women.

- Increasing the number of Research Seed Grants from three to four annually. With the support of the AAPM Development Committee (DEV), AAPM was able to offer one more of these prestigious $25,000 grants annually.
- Initiation of the Science Council travel award for the Council for Early Career Investigators in Imaging (CECI[2]). This enables early-career research-oriented AAPM members to participate in the Medical Imaging Technology Showcase (MedTech), sponsored by the Academy of Radiology and Biomedical Imaging Research (the Academy). The Academy hosts the event on Capitol Hill to educate members of Congress and their staff about the impact of imaging technology. CECI2 also allows for valuable networking with Federal officials (FDA, NIH etc.) and other future leaders in medical imaging science. Since the initiation of the program in 2019, there have been six awardees in the CECI2 program.
- Creation of the Working Group on Early Career and Clinical Research Opportunities (WGECCRO). Formed in 2021, after a year of discussion internally and with Science Council, WGECCRO is an active program working to identify barriers for early career and clinical medical physicists to contribute meaningful research to the field of medical physics. The path for this consists of identifying early career and ongoing funding opportunities for clinical research, connecting early career and clinical medical physicists seeking collaborations, mentorship, and information to research resources, and recommending mechanisms that foster a research community and improve collaboration between AAPM members.
- Revitalization of the Work Group on Research Funding (WGFG). Members manage the Symposium on Research Funding at the annual meeting and other initiatives for funding opportunities and grant application strategies. In July 2023, WGFG hosted a grant symposium titled "Grant Funding Pathways for Clinical Medical Physicists" at the Annual Meeting. In addition, the WGFG is home to the database on NIH funding by AAPM members (Whelan et al. *Med Phys*, 2017). While NIH funded research is only one part of the research efforts of AAPM members, it is an important metric. The number of AAPM members with NIH funding has remained consistent over the last two decades (median of 184) as shown in the figure. This is nonetheless a small number that is vulnerable to increasing challenges in funding. These challenges are expected to intensify. There is also a lack of viable career pathways for AAPM members that are primarily interested in research activities (i.e., 20% or less clinical effort). Last, the percentage of AAPM members with NIH funding is steadily declining due to the steady increase in total membership. This is valuable information for policy development in the Science Council and AAPM.



- Sustained activities of the Working Group on Student and Trainee Research (WGSTR). This trainee-led group connects students and trainees seeking research-related information related to medical physics. A continuing centerpiece is the Student and Trainee Luncheon at the AAPM Annual Meeting. The WGSTR also hosts the Expanding Horizons Review Board. The Expanding Horizon grants provide trainees with an opportunity to broaden their scope of scientific inquiry by attending a scientific meeting that is not related to medical physics. The Expanding Horizons program now includes international students.
- The Research Spotlight article in the AAPM Newsletter, which showcases leading-edge research relevant

to AAPM members. The format has evolved over the years with support of the Newsletter Editor. The RSRCH Coordinator is now a member of the Newsletter editorial team and oversees the efforts of volunteers from WGECCRO. WGECCRO members propose topics to review with at least two thought-leaders in the area of interest. If approved, they interview the thought-leaders (intended to be a networking opportunity for the WGECCRO members) and write the article with their names listed on the byline.

- The AAPM Webinar Series on Advances in Medical Physics has now produced 35 sessions, a staggering number for the series, which was introduced in 2016. For this we are indebted to the excellent support from the AAPM staff for hosting the webinars.

The second in-person retreat in the fall of 2022 helped the RSRCH members revisit and refine the priorities of the committee. One priority continues to be the need for both mentorship and recruitment of AAPM members involved in research. There were many ideas generated, one of which was the creation of a list of resources (and explanations where needed) to aid AAPM members. Generation of this list has recently launched as a SCAMP project.

While RSRCH has come a long way in the six years since the reboot, the members of RSRCH are the reason for the progress described above. We thank them for their efforts and are grateful for the opportunity to have worked with them and look forward to their progress after the transition to a new Chair and Vice Chair. We also gratefully acknowledge the exceptional support from AAPM staff, and specifically that of **Shana Donchatz** and **Emily Townley**, and previously from Shayna Knazik. ■

2024
RESEARCH SEED FUNDING GRANT

$25,000 grants will be awarded to provide funds to develop exciting investigator-initiated concepts, which will hopefully lead to successful longer term project funding from the NIH or equivalent funding sources. Funding for grant recipients will begin on August 1 of the award year. Research results will be submitted for presentation at future AAPM meetings. The award is not intended to provide salary support for the applicant, however any other research-related expenses, including travel to scientific meetings, will be supported. Travel expenses should be included in the submitted budget. At the end of the 12-month period a report must be forwarded to AAPM, along with itemized expenses. The award will not support indirect costs. Any unspent funds should be returned to AAPM.

Sponsored by the AAPM Science Council through the AAPM Education and Research Fund.

A list of Award Recipients can be found here.

Eligibility:

- Ten years or less since receipt of a terminal research degree or medical physics residency, whichever is later. (Excludes those who have reached Associate Professor level.)
- Eligibility extension is possible and will be reviewed on a case-by-case basis, following similar NIH guidelines.
- Must be a member of AAPM at the time of application (any membership category). Pending membership status not eligible.
- No previous grants greater than $50,000 as principle investigator (including institutional startup funding, industrial awards, other external grants).
- Previously funded projects are ineligible.
- Prior Seed Grant recipients are ineligible.

Application Requirements:

Five-page description of research project (including figures and tables), separated as follows:

a. Specific aims
b. Background and significance
c. Preliminary results
d. Research plan
e. Literature cited
f. Budget
g. Letter of support from division/ department chair demonstrating support for the project and authorization of time and resources to complete the proposed research
h. CV (no more than four pages)

Note that sections (e), (f), (g), and (h) do not count towards the five-page limit.

Review Criteria

Peer review will be conducted by members of the Joint Working Group on Research Seed Funding. The scientific merit of the proposal will be judged based on significance, qualifications of investigator, innovation, soundness of approach, research environment, and potential for future funding.

Deadline to provide three key words and upload a letter of intent of your proposed topic: March 18, 2024

Application Deadline: April 17, 2024

All supporting documents are due by the application deadline.

Award duration:

August 31, 2024 – August 31, 2025

Recipients notified by:

May 30, 2024

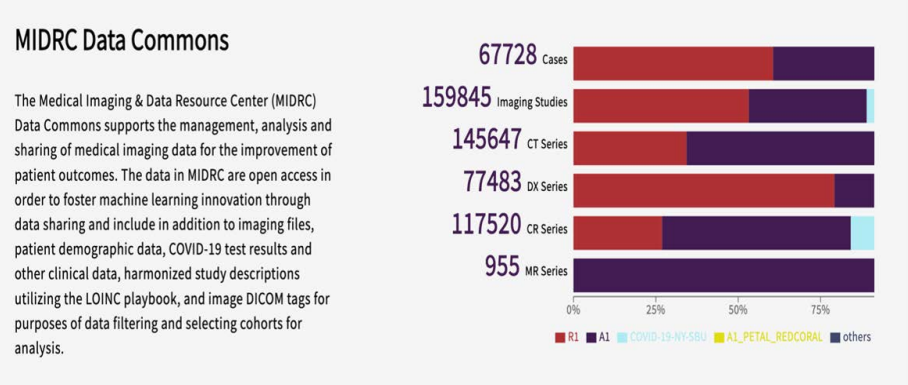
FOR MORE DETAILS, VISIT:
https://aapm.me/SEED

Report from the Medical Imaging and Data Resource Center (MIDRC)

MIDRC SUBCOMMITTEE REPORT

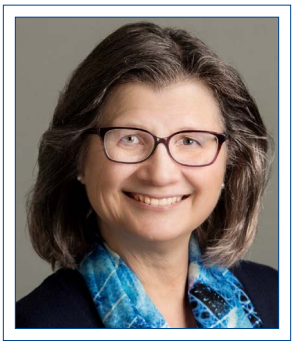
Created in response to the global COVID-19 pandemic, and with the understanding that efficient data management, curation and access in this era of accelerated digital transformation is the backbone of modern healthcare, the Medical Imaging and Data Resource Center (MIDRC) was conceived as a multi-institutional endeavor with a visionary goal; provide a publicly available, representative, diverse, and curated open medical imaging data commons, aimed at accelerating machine intelligence research, while also creating a sequestered data commons for performance evaluation and benchmarking of algorithms.

Poised to begin its fourth federally-funded year, with over $33 million received to date, MIDRC continues to play a pivotal role in artificial intelligence research through the collection of medical imaging, annotations and related metadata. With its unique infrastructure – a collaboration between AAPM, RSNA, ACR, and the Gen3 data ecosystem, funded by NIH's National Institute of Biomedical Imaging and Bioengineering (NIBIB) – MIDRC is able to leverage expertise, share resources, and drive innovation in medical imaging and data management, while supporting the development of innovative algorithms and tools, ultimately revolutionizing how healthcare professionals diagnose and treat patients.

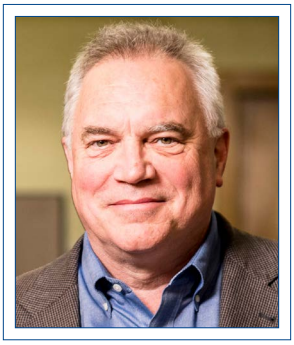


An Exciting New Chapter for MIDRC

We are very pleased to announce that MIDRC is now lending its expertise to an ambitious endeavor — **the ARPA-H Biomedical Data Fabric (BDF) Toolbox project**. This initiative seeks to de-risk technologies for an easily deployable, multi-modal, multi-scale, connected data ecosystem for biomedical data. MIDRC was selected in September 2023 as a key performer in the ARPA-H BDF project to provide domain expertise and database technology development in the realm of medical imaging.



Maryellen Giger, PhD
University of Chicago



Paul Kinahan, PhD, FAAPM
University of Washington

Please direct inquiries to:
Maryellen Giger, PhD, **FAAPM,**
Paul Kinahan, PhD, **FAAPM, or**
Emily Townley, **AAPM MIDRC Program Manager**

MIDRC
MEDICAL IMAGING AND DATA RESOURCE CENTER.

MIDRC's involvement in the ARPA-H BDF Toolbox will include the development and deployment of medical imaging data commons architectures and resources to support various diseases (beyond COVID) and applications for the toolbox. Its selection as a performer in the ARPA-H BDF project is a testament to MIDRC's capabilities as a harmonized and vetted image repository, with an open-access user portal for cohort building and downloading, providing flexibility for AI/ML developers to utilize MIDRC data for various specific tasks. To learn more and find out how you can get involved, go to ARPA-H BDF.

MIDRC Collaborations and a Dynamic Future for Healthcare

Interoperability — the seamless exchange of data and resources across platforms and repositories — has become a critical necessity in healthcare research. The fusion of diverse multi-modal datasets holds the promise of uncovering hidden insights that can improve health outcomes for all. By tokenizing data, connecting different types of data sources across repositories for a given patient via globally unique identifiers (GUIDs), and allowing researchers to analyze data in privacy-preserving, cloud-based platforms, MIDRC has already forged interoperable connections with other data repositories. Such interoperability will enhance the efficiency and effectiveness of medical research, leading to better prevention and treatment strategies for COVID and other medical conditions and pathologies.

MIDRC interoperability has already been achieved with NIH's NCATS National COVID Cohort Collaborative (N3C), an initiative aimed at advancing COVID-19 research that relies on a wealth of clinical and biomedical data, and NHLBI's BioData Catalyst, a commons that is opening doors to multi-modal research possibilities through its genomic, clinical, and phenotypic data. MIDRC is also collaborating with NIH's *All of Us* Research Program, a diverse cohort of contributed data from electronic health records (EHRs), biospecimens, surveys, and other measures to build a comprehensive set of biological, environmental, and behavioral data. The All of Us data platform will be open to researchers all over the world.

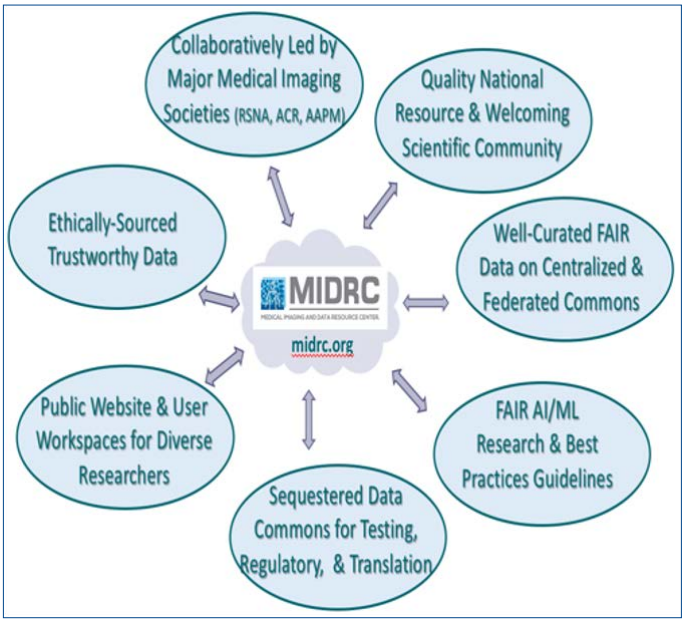
Other Notable MIDRC Advances

MIDRC thrives on collaboration to accelerate breakthroughs, and is proud to partner with government agencies (including the US FDA), healthcare institutions (over 120 investigators from over 25 institutions comprise MIDRC's team!), innovative sites (like CodaLab's MedICI challenge platform), technology companies (such as MD.ai and SIFT), and research organizations (like Argonne National Laboratories) nationwide. A few other notable recent achievements and advances:

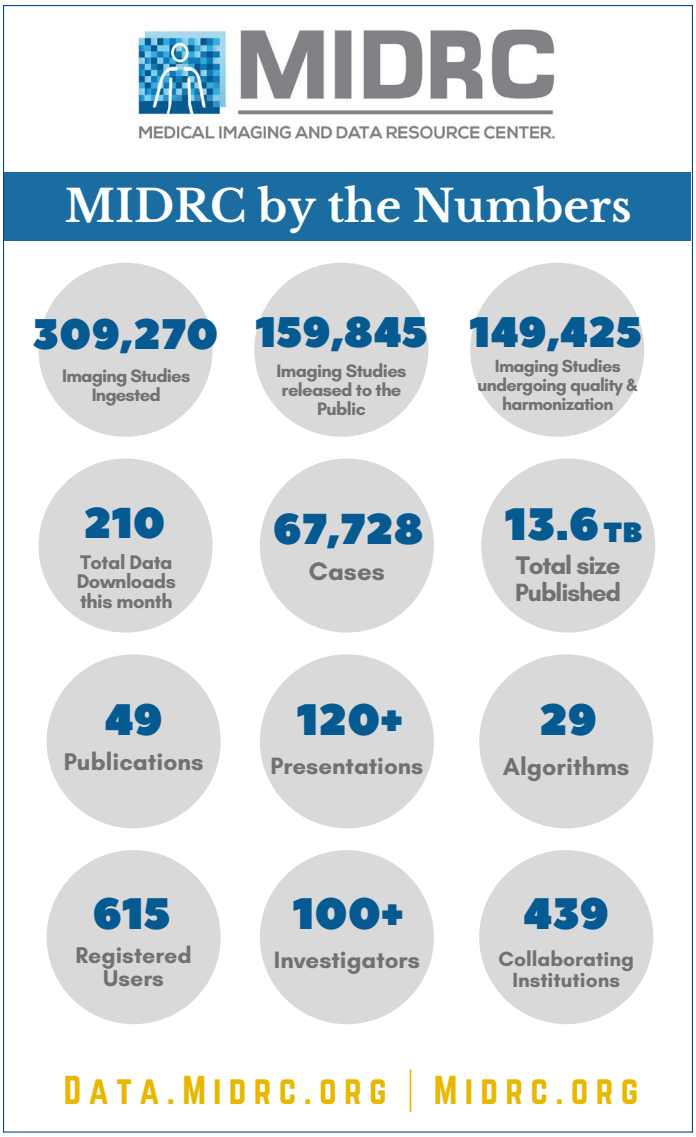
- MIDRC has ingested and curated over **300,000 imaging studies to date**, representing a wide range of patient demographics and imaging modalities, like chest radiographs, CTs, MRIs and ultrasounds.
- MIDRC successfully completed its second scientific Grand Challenge this summer, the mRALE Mastermind Grand Challenge, an AI to predict COVID severity challenge using MIDRC chest radiographs. The challenge awarded $50,000 in prize monies (generously sponsored by NIBIB) to the top-ranked finishers. A webinar of the challenge winners presenting on their AI methodologies, along with other recorded MIDRC seminars and presentations, can be found on MIDRCMedia's free YouTube channel.
- MIDRC will have a standout presence again this year at RSNA2023 in Chicago, with multiple presentations and sessions and a dedicated booth on the exhibit floor, as well as being selected to be part of the hands-on Learning Lab (look for MIDRC at the upcoming SPIE Medical Imaging Conference, February 2024!)
- MIDRC research teams, spearheaded by AAPM-member investigators, have created open-access tools and resources, such as the MIDRC-MetricTree, an interactive online decision tree-type tool for evaluating algorithm performance for various machine learning tasks, and the MIDRC AI / Machine Learning Bias Awareness Tool, a resource for identifying potential sources of biases, giving definitions, real-world examples, literature references, software suggestions, and mitigation strategies.
- MIDRC has created mapping tables (available on the MIDRC public GitHub) for harmonizing the varied incoming DICOM study descriptions using the Logical Observation Identifier Names and Codes (LOINC) ontology. Supplying LOINC terms and codes enables researchers in cohort building.

A Bright Future Beckons, as We End the Year with Gratitude

We hope you join us in celebrating MIDRC's many accomplishments, as we look to the continued future of this initiative with optimism and determination! Remember also that MIDRC is listed by NIH as an accepted repository in its updated Data Management and Sharing (DMS) policy (requiring all researchers applying for NIH funding to supply a data management plan), released January 2023. You can also make an important contribution to MIDRC's efforts by facilitating a data contribution from your academic institution or hospital system (we are especially interested in data from rural or traditionally under-represented communities) — you can contact any member of the AAPM-MIDRC Subcommittee or find information about data contributions on MIDRC's website (our team is available to help ease administration burden and answer any questions, as well provide some limited funding, if available).



Thank you for your continued support of MIDRC (and Maryellen and Paul thank AAPM staff member **Emily Townley** for her fantastic contributions as the AAPM project manager for MIDRC!). We invite you to stay connected with us, follow our research advances and join us in our vital mission — together we can shape the future of artificial intelligence research and healthcare through innovation, collaboration, and dedication towards improving patient outcomes! ■



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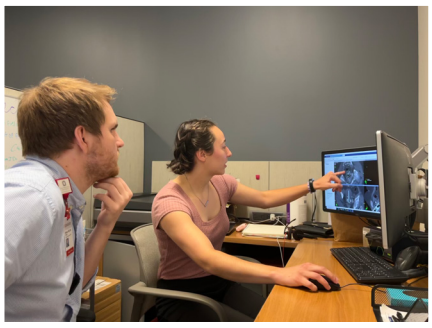
WANT TO MAKE A CLINICAL IMPACT THIS SUMMER?

APPLICATION DEADLINE:
February 5, 2024



Then the **SUMMER UNDERGRADUATE FELLOWSHIP PROGRAM** is for you!

Summer Undergraduate Fellows are selected on a competitive basis. The top candidates select from a comprehensive list of mentor-defined (research and/or clinical) projects based at institutions in the U.S. and Canada.

$6,000 stipends will be awarded to selected students on a competitive basis. The stipend is based upon an expectation of 40-hours per week for 10 weeks during the summer (May through September).

For more details, visit:
https://aapm.me/SUFP

Sponsored by the AAPM Educational Council through the AAPM Education and Research Fund

PROGRAM CONTACT:
Karen MacFarland
karen@aapm.org or 571-298-1282

AMERICAN ASSOCIATION *of* PHYSICISTS IN MEDICINE

Mathematical Oncology Drives Evolution in Cancer Care

RESEARCH SPOTLIGHT

In 1954, Peter Armitage, a medical statistician, and epidemiologist Richard Doll, both from England, proposed a simple statistical model of cancer. The model, which posited that cancer was the result of an accumulation of mutations, is considered one of the important early applications of mathematical modeling in oncology.

Mathematical oncology — the use of mathematical and computational models to study cancer — has grown dramatically in the ensuing decades to become an indispensable subdiscipline of oncology. Recent developments like artificial intelligence and cancer genome sequencing, along with a surge of imaging data, have made it a vital tool in today's push to personalize cancer care.

"The use of mathematics in oncology is the focus of increasing effort as more people realize you really need high-level mathematics to describe and analyze genomic and imaging datasets," said **Joseph O. Deasy, PhD**, Chair of the Department of Medical Physics at Memorial Sloan Kettering (MSK) Cancer Center in New York City.

Dr. Deasy and his team focus on the optimization of radiation therapy planning and delivery at his eponymous lab at MSK. His research has led to one of the more significant developments in mathematical oncology in recent years: a model that predicts outcomes from different fractionation schedules.

Fractionation, the division of a radiation dose across multiple days or weeks, is crucial for safe and effective treatment. Medical physicists have long relied on the linear-quadratic (LQ) model for decisions on fractionation. But the LQ model, first developed in the 1970s, has limitations.

Drawing from data on fractionation schemes for non-small cell lung cancer (NSCLC), the most common type of lung cancer, Dr. Deasy and **Jeho Jeong, PhD**, assistant attending physicist at MSK Cancer Center, created a tumor response simulation model that accounts for the competition among tumor cells for resources like glucose and oxygen. The model incorporates three different categories based on the tumor cells' oxygen status, including one for hypoxia, extremely low levels of oxygen that can protect tumors from radiation damage.

"We wanted to create a simple model, so that we can explain the observed effects like fractionation and especially hypoxia, because we thought it was the most important factor for tumor response to radiation," said Dr. Jeong.

The researchers applied the model to 38 cohorts of patients with early-stage NSCLC, totaling 2,701 patients. They validated the analysis with an additional 23 patient cohorts totaling 1,628 patients. The study, published in Clinical Cancer Research in 2017, showed that the model can accurately predict overtreatment or undertreatment for various treatment regimens.

Eric Aliotta, PhD
Memorial Sloan Kettering Cancer Center

Richard S. Dargan
Contributing Writer, AAPM

"We were pretty amazed that the model fit all the data, from a single fraction to conventional fractionation and everything in between," said Dr. Deasy. "Just as importantly, it helped make sense of the radiobiology of the tumor."

The model has numerous prospective applications, including use in cutting-edge treatments like proton and carbon ion therapy. It also may allow clinicians to experiment with different fractionation schedules before treating a single patient.

"It's better to do modeling first and see what the radiobiology says as a guide to reasonable clinical protocol," Dr. Deasy said.

The model's reliability has Dr. Deasy likening it to a Toyota sedan he owned many years ago.

"This model keeps going and going and seems to have a lot more life left in it," he said.

Mathematical oncologists like Kristin R. Swanson, PhD, from the Mayo Clinic in Scottsdale, AZ, are able to leverage their background in math to create equations that help predict the course of disease on a patient-by-patient basis.

"Every patient deserves their own equation," she said. "That's the motto that drives the decisions we make in the lab."

As head of Mayo's Mathematical Neuro-Oncology Lab, Dr. Swanson focuses much of her research on gliomas, a type of brain cancer that carries a particularly poor prognosis. Historically, similar treatments in different glioma patients have produced widely different results.

Early in her career, Dr. Swanson developed a model that predicts patient-specific glioma invasion by taking into account the cancer's tendency to aggressively invade surrounding tissue in a diffuse pattern. The model uses pretreatment MR images to predict the diffuse extent of a specific tumor and therefore its response to surgery. It is realistic enough to predict treatment effectiveness in individual patients without knowledge of any other clinical or pathological information.

"We know a ton about the mathematics and physics of radiation, so we can overlay those mathematical models onto the MR images and generate patient-specific predictions of radiation response," Dr. Swanson said.

This ability to predict treatment outcomes points to an important role for modeling in patient selection for clinical trials.

From imaging results alone, Dr. Swanson has developed radiogenomic models that predict molecular and genetic characteristics typically only available from tissue biopsies. For example, by correlating over 1,000 localized biopsy samples with multiparametric MRI information, her group developed models that predict where the epidermal growth factor receptor (EGFR) gene is present or amplified, helping to identify patients who would be good candidates for trials on EFGR-targeted drugs.

Promising applications also abound in newer treatment approaches like immunotherapy, often referred to as the fourth pillar of cancer care after radiotherapy, chemotherapy and surgery. Dr. Swanson's team built a radiogenomic model to predict T cell abundance in patients receiving dendritic cell vaccine therapy, a treatment that recruits immune cells to fight cancer. In a patient predicted to have poor T cell enrichment, imaging showed that the immune response burned out quickly, although the tumor had shrunk. The patient survived only five months. The patient predicted to have robust T cell enrichment survived more than three years.

"Even in a small-scale clinical trial, we were able to figure out which patients ultimately benefited from this treatment," Dr. Swanson said.

In the course of her research, Dr. Swanson learned that the relationships among pretreatment imaging variables, tumor biology, and treatment outcomes is highly sex specific. Tumor radius, for instance, was linked with overall survival for males but had no impact on overall survival in females with glioblastoma, the most aggressive type of glioma.

"To really train these models, even at the relatively low data end, it's better to have separate models for males and females," Dr. Swanson said. "We cannot assume that the models that connect imaging changes to biology are the same between the sexes."

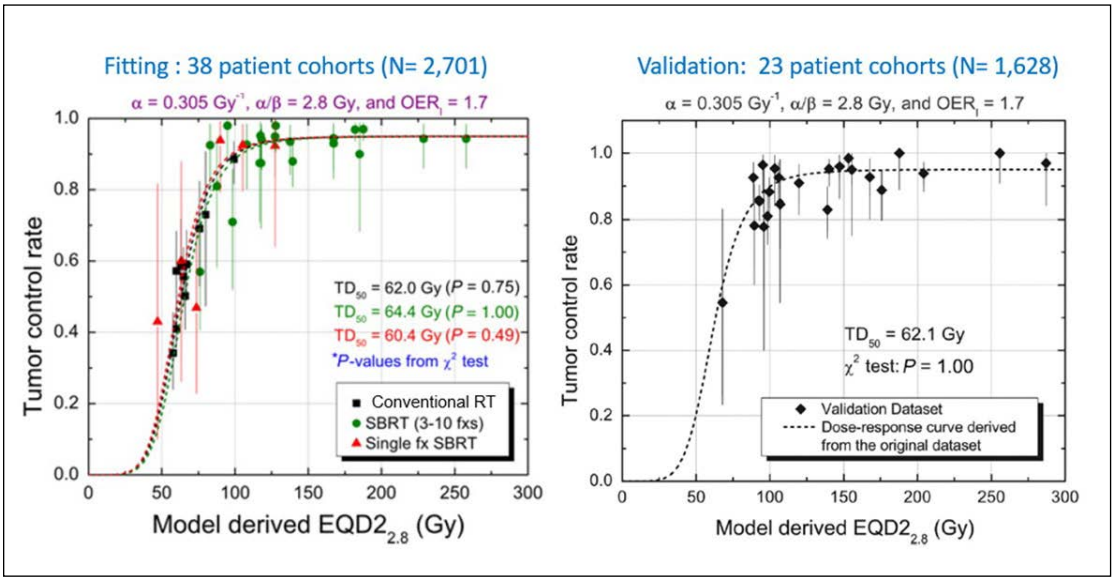
Mathematical modeling has myriad future directions. At MSK, Dr. Deasy's lab is looking at combining imaging data with the model on a patient-specific basis to do a better

RESEARCH SPOTLIGHT, Cont.

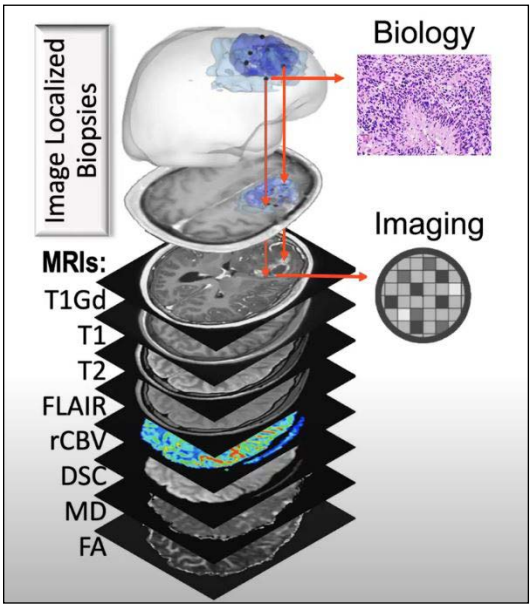
job predicting the correct radiation dose for the patient. They are also looking at the model's potential to guide dose painting, or the practice of varying the dose to different parts of the tumor.

Dr. Swanson's group is working to combine artificial intelligence (AI) with mechanistic models, as they have found their combination may be more powerful than either alone.

Mathematical oncology has seen remarkable progress in the 70 years since the Armitage-Doll model was published. The current state of research suggests that many more breakthroughs are on the horizon. ■



(model2) Image-guided biopsies can be combined with multiparametric MRI features to map tumor biology from imaging alone and predict the course of cancer. Courtesy: Kristin Swanson, PhD, Mayo Clinic, Scottsdale, Arizona



A tumor response simulation model for patients with non-small cell lung cancer was accurate In both the fitting and validation sets for predicting tumor control probability in various fractionation regimens. Courtesy: Joseph Deasy, PhD, Jeho Jeong PhD, Memorial Sloan Kettering Cancer Center, New York City

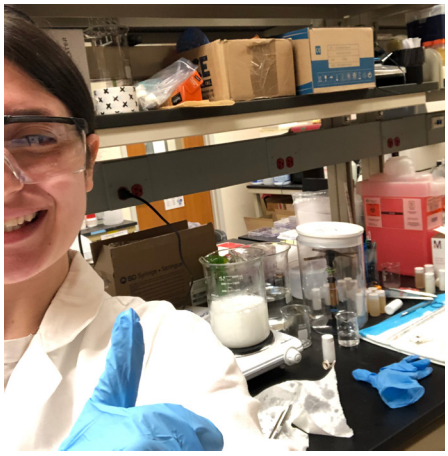
AAPM EDUCATION & RESEARCH FUND

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

DIVERSITY RECRUITMENT through EDUCATION AND MENTORING

DREAM

APPLICATION DEADLINE: February 5



THE DREAM PROGRAM is a 10-week summer program designed to increase the number of women and racially underrepresented groups in medical physics by offering research opportunities, outreach and strategic mentorship geared towards recruiting a more robust and diverse group of skilled undergraduate students in the field of medical physics. Once DREAM fellows are selected on a competitive basis, they select from a comprehensive list of mentor-defined projects based at institutions in the US and Canada. Selected fellows will be awarded a $6,000 stipend with the expectation of a 40- hour per week effort for 10 weeks.

FOR MORE DETAILS, VISIT:
https://aapm.me/DREAM

ELIGIBILITY

- Undergraduate sophomores and juniors majoring in physics, engineering or other science.
- Students graduating in Spring 2024 are not eligible.
- US Citizens, Canadian Citizens, or Permanent Citizens of the US.

HOW TO APPLY

Go to: https://aapm.me/DREAM

PROGRAM CONTACT: Karen MacFarland, karen@aapm.org or (571) 298-1282

Sponsored by the AAPM Professional Council through the AAPM Education and Research Fund.

Update of the Core Physics Curriculum for Radiation Oncology Residents

EDUCATION COUNCIL REPORT

(written on behalf of the Radiation Oncology Medical Physics Education Subcommittee)

The Radiation Oncology Medical Physics Education Subcommittee (ROMPES) is pleased to announce that an update to the core physics curriculum for Radiation Oncology residents is available online ahead of print through the International Journal of radiation oncology·Biology·Physics (DOI: 10.1016/j.ijrobp.2023.08.063). This update is the result of a collaboration between AAPM and ASTRO to ensure that radiation oncology practitioners are well-versed in appropriate physics topics through consistent inclusion of subject matter and clear expectations of teaching intensity. There has been a substantial span of time since the previous update, especially in a field such as radiation oncology, where rapid adoption of major technical innovations and treatment techniques is commonplace. Additionally, following the suboptimal results of the 2018 American Board of Radiology (ABR) Radiation Oncology Physics qualifying examination, there was a push to promote concordance between the guides for radiation oncology resident education and exam preparation guidelines.

The first core curriculum for teaching radiation physics to residents was published in 2004 and subsequently updated three times, with the most recent revision in 2015. With the rapidly changing landscape in radiation oncology, there have been significant changes in the technology available in clinics over the past eight years. In addition to modernizing the topics to include new technology, the updated curriculum was re-aligned to promote concordance with the educational domain weighting recommended by the ABR Physics Study Guide Working Group.

ROMPES assumed the role of updating the curriculum after ASTRO sunset the Physics Core Curriculum Subcommittee in 2019. Thirteen ROMPES members collaborated with resident and faculty physicians from ASTRO to update the curriculum. ROMPES members included both MS and PhD physicists from the USA and Canada in both clinical and academic roles. All members were actively involved in educational projects in their institutions.

The revised version maintained the same didactic workload (56 hours) as the 2015 curriculum but was re-structured to provide resident education that facilitates best clinical practice and scientific advancement in radiation oncology. The new structure of the curriculum focuses more on clinical aspects of radiation physics, such as treatment planning. The inclusion of new technology was also a priority in this updated curriculum; adaptive radiotherapy, artificial intelligence (AI) and automation, contemporary radiopharmaceutical physics and dosimetry, brachytherapy isotopes, and extended discussions on motion management were all added.

Matthew Studenski, PhD
University of Miami

After eight years, ROMPES has updated the core physics curriculum for Radiation Oncology residents. In addition to providing a comprehensive curriculum to promote best practice for Radiation Oncology practitioners, the updated curriculum aligns with recommendations from the ABR Physics Study Guide Working Group. New technology has been integrated into the curriculum. The updated curriculum provides a framework to appropriately cover the educational topics for Radiation Oncology residents in preparation for their subsequent career development. ■

ACR Accreditation & More: Info for Medical Physicists

UPDATES FROM ACR HQ

Updates to MRI Accreditation Program

The MRI Accreditation Program has made a few recent changes to the clinical submission requirements, as follows:

1. Cardiac exam — the black blood sequence has been removed and name of the exam has been updated. Article here.
2. The requirement to submit scout/localizer images for all clinical exams has been removed. The requirement is now exam specific. Article here.
3. Updated requirement language from submitting entire exam to submitting only required sequences with corresponding reconstruction images. Article here.

ACR Convenes Blue Ribbon Panel on Fluoroscopy Safety

Approximately 30 Panelists from 20 organizations visited ACR headquarters in Reston, VA on October 2 and 3. The Panel deliberated the current state of safety practices in fluoroscopy, including training, credentialing, and privileging for fluoroscopy operators, both physicians (radiologists and non-radiologists) and non-physicians (radiologic technologists, radiologist assistants, advanced practice providers, and other providers). The primary goal for the multistakeholder Panel was to arrive at consensus recommendations on how to improve and standardize safety practices in fluoroscopy for both patients and personnel, standardizing expectations for safe fluoroscopy use across the United States. The Panel is working on a consensus white paper with hopes to publish simultaneously in multiple organizational journals.

The Panel was co-chaired on behalf of ACR by **M. Mahesh, PhD**, FACR, FAAPM, Chair of ACR's Commission on Medical Physics, and Kevin W. Dickey, MD, FACR, FSIR, Vice Chair of ACR's Commission on Interventional and Cardiovascular Imaging. AAPM was represented by **Kevin A. Wunderle, PhD**, FAAPM and **A. Kyle Jones, PhD**, FAAPM. Other medical physicists on the Panel included **Andrew Kuhls-Gilcrist, PhD** (representing MITA), **Sarah E. McKenney, PhD** (representing Image Gently), **Richard Miguel** (representing AHRA), **Steve Balter, PhD**, FACR, FAAPM (representing NCRP) and myself (representing Image Wisely).

BICOE Program is Renamed

ACR's Breast Imaging Centers of Excellence have been renamed ACR Designated Comprehensive Breast Imaging Centers (CBIC). ACR believes this new name better reflects clinical practice. Updated certificates and marketing materials should have been received by the time this column is published. You and your clinics can find more information about the ACR CBIC program in this article. ■

Dustin A. Gress, MS
Senior Advisor for Medical Physics
ACR Quality and Safety

In each issue of this newsletter, I present information of particular importance or relevance for medical physicists. You may also check out the ACR's accreditation support page for more accreditation information and QC forms. **Thank You** to all the other staff that keep ACR programs running and assist with creating the content in this column.

As part of this year's Image Wisely® scope expansion, monthly educational exhibits presented by the Radiological Society of North America (RSNA) will include MR and contrast media safety content. Recent RSNA exhibits (poster/slide presentations) have included MR imaging of patients with implanted devices, demystifying the dose summary page in IR, and RF safety in MR imaging. Access all of the RSNA educational exhibits provided by Image Wisely.

2024 AAPM/RSNA DOCTORAL AND MASTERS GRADUATE FELLOWSHIPS

Doctoral Graduate Fellowships:
Four Doctoral awards of $10,000 each
Two awards will be for first year Doctoral Students.

Two awards will be for second year or higher Doctoral Students.

- Paid to institution which in turn transfers it to student. Money can be used for tuition, professional and research development.

MS Graduate Fellowships:
Three MS awards of $10,000 each
All first and second year MS students are eligible to apply.

- Paid to institution which in turn transfers it to student. Money can be used for tuition, professional and research development.

Sponsored by the AAPM Education and Research Fund.

A list of Award Recipients can be found here.

Each applicant must be a graduate of an undergraduate program in physics or equivalent majors (e.g., engineering-physics, math-physics, or nuclear engineering or applied physics) from an accredited university or college in North America. The undergraduate grade point average must be greater than 3.5 (based on a 4.0). Each applicant must have submitted an application for graduate study to one of the accredited programs with subsequent acceptance. Applicants must be a member of AAPM at the time of application (any membership category). Pending membership status not eligible.

Required Supporting Documentation:

- All post-secondary study transcripts (official transcripts only)
- Copy of Graduate Record Exam results (If applicable)
- TWO Recommendation Forms and ONE Reference letter
- A (<300 word) statement of how funds are to be used, and how the funds will benefit your graduate study or career should you receive the award
- Acceptance letter from intended CAMPEP Accredited Program
- CV including GPAs and publications (use CV Template)

Contact for questions:

ATTN: Karen MacFarland
karen@aapm.org

Application Deadline: April 24, 2024

(All supporting documents are due by the application deadline.)

Recipients Notified by: May 30, 2024

FOR MORE DETAILS, VISIT: https://aapm.me/FELLOW

Launch of the ABR's Continuing Certification Advisory Committee

ABR UPDATE

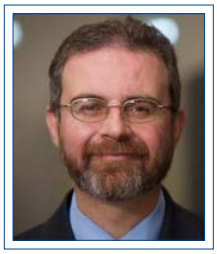
As part of the ABR's ongoing efforts to improve the relevance and effectiveness of its processes, the medical physics Continuing Certification Advisory Committee (CC-AC) was formed earlier this year. The CC-AC is a counterpart to the Initial Certification Advisory Committee that was described in the May/June 2023 issue of the AAPM Newsletter. The kick-off meeting of the CC-AC was held virtually in July 2023. The charge of the CC-AC is to assist the ABR by evaluating its continuing certification (CC, formerly MOC) program from the diplomate's vantage point, and to offer suggestions for improvement and enhanced user-friendliness, while maintaining processes that are navigable for the diplomates and that can be easily integrated into daily workflow.

Committee members pictured, from left to right, top to bottom: ***Kalpana Kanal, PhD*** *(Chair of CC-AC and DMP Trustee);* ***Joseph Santoro, PhD; Erin Angel, PhD; Geoff Ibbott, PhD*** *(ABR staff);* ***Matthew Podgorsak, PhD*** *(ABR TMP Trustee);* ***Megan Blackburn, PhD; Michael Price, PhD; Jonathon Mueller, MS; Stephanie Leon, PhD,*** *Brent Wagner, MD (ABR Executive Director). Members not pictured:* ***Kiaran McGee, PhD; Matt Vanderhoek, PhD; Michelle Kritzman, MS; Kristin McConnell, PhD; Robert Gandy, MS;*** *David Laszakovits, MBA (ABR staff)*

The Committee is comprised of MS and PhD diplomates from all medical physics specializations: Diagnostic Medical Physics (DMP), Nuclear Medicine Physics (NMP) and Therapeutic Medical Physics (TMP), and represents a mix of academic, private practice, and industry medical physicists. Members are appointed to a three-year term which may be renewed once. It is anticipated that the CC-AC will meet in person during the annual AAPM meeting (when possible) and virtually on a quarterly basis.

Kalpana Kanal, PhD
ABR Trustee
University of Washington

Robert Pooley, PhD
ABR Trustee
Mayo Clinic



Matthew Podgorsak, PhD
ABR Trustee
Roswell Park Cancer Institute

Geoffrey Ibbott, PhD
ABR Associate Executive Director

ABR diplomates representing all specializations and practices contribute to improvements and enhancements of the Continuing Certification program. About 4,000 medical physicists participate in OLA, of whom 51% have volunteered to rate OLA questions. More than 901,000 questions have been deployed and answered by medical physicists.

Some of the topics discussed during the inaugural meeting are listed below:

Online Longitudinal Assessment (OLA) development and statistics

ABR staff and volunteers continue to standardize development processes, including how comments from OLA participants are evaluated and reviewed by various OLA committees. Some meaningful statistics describing the first four years of the MP OLA program include:

- ~4k (99.5%) of MP participants have answered at least one OLA question.
- ~901k is the cumulative number of answers given to OLA questions.
- ~51% of MP diplomates volunteer to rate OLA questions
- <6% of OLA questions are declined (declines are not available for NMP).
- Average question response times
  - ✓ 1-minute questions: 28 seconds
  - ✓ 3-minute questions: 57 seconds

OLA satisfaction scores

The OLA satisfaction scores shown below may help in guiding the committee on future directions with the CC process.

- 66% Agree or Strongly Agree that OLA "positively impacts my daily clinical work."
- 78% Agree or Strongly Agree that OLA "helps me identify clinical knowledge gaps."
- 73% Agree or Strongly Agree that OLA "helps me remediate clinical knowledge gaps."
- MP diplomates gave OLA an overall rating of 4.1 (out of 5)

Future directions of OLA

Some of the discussion on dissatisfaction with the OLA is centered around current OLA questions not being individualized according to the participant's practice profile and the possibility of that being altered in the future. There was significant interest and discussion on this topic, and we will dive deeper into this at our next meeting.

Continuing Certification Exam (CCE)

For those diplomates who do not meet the OLA passing requirement, and for those who chose not to participate in OLA, the continuing certification exam (CCE), a computer-based 125-question exam will be offered for each of the medical physics specialties. In 2023, the Medical Physics CCE will be held remotely on December 12. In 2024, the CCE will be held twice: on March 6 and November 21.

Based on the discussions at the kick-off meeting, several action items were identified for the next meeting, to be held on October 24. The ABR trustees and the ABR staff will continue to work with the CC-AC to address topics that generated significant interest in CC and further investigate how the committee can assist in improving the process and shaping the future of OLA. ■

The RO-ILS Wheel and Road of Culture: Celebrating Physics Safety Stars for International Day of Medical Physics

AMERICAN SOCIETY FOR RADIATION ONCOLOGY (ASTRO) UPDATE

Almost a decade ago, ASTRO and AAPM partnered to develop and sponsor the RO-ILS: Radiation Oncology Incident Learning System®. This initiative aims to facilitate safer and higher quality care in radiation oncology by providing a mechanism for shared learning in a secure and non-punitive environment.

Cycles, such as plan-do-study-act, are seen throughout quality and safety tools and models. Incident learning is no different (Figure 1). In this spirit, one can also visualize RO-ILS as a wheel driving the radiation oncology field forward. The RO-ILS portal — the wheel's center — is a mechanism to enter safety events and receive privileged and confidential protections afforded by a federally listed patient safety organization (PSO). From the initial information entered by staff at participating facilities, designated reviewers within the facility can explore what happened, identify the underlying contributing factors, and ultimately report the event to the PSO and aggregate database. But this is just a start.

The wheel's spokes are based on user and/or PSO driven activities that hold the program together. The tools within the portal, such as the dashboard and AnalysisWizard, enable reviewers to identify high-level trends and develop personalized reports and graphs. Additional spokes come from PSO education developed by radiation oncology safety experts who analyze the aggregate database. To date, RO-ILS has publicly released more than 50 written resources, including case studies, themed reports and aggregate reports.

Opportunities for users to gather and engage with the data and one another is another important spoke. At the 2023 AAPM Annual Meeting, approximately 50 physicists from RO-ILS participating facilities attended a user meeting to discuss de-identified events. **Sarah Han-oh, PhD**, from Johns Hopkins University shared in her continuing education evaluation, "this hands-on workshop was great! It was a good chance to learn other hospitals' clinical processes." The important work of engaged facilities and the PSO facilitates quality and safety improvement within participating practices and the broader community. However, for the smoothest ride, external conditions must be considered and addressed.

If tools and processes are the wheel driving us forward, culture can be seen as the road, ranging from freshly paved concrete to gravel or dirt. Without a strong culture of safety, the wheel can get stuck. A culture of safety encourages staff to speak up, prioritizes patient safety and engages in initiatives that benefit quality such as incident learning and accreditation. Therefore, an underpinning goal of RO-ILS is to support and encourage a culture conducive to learning and progress, both within participating practices and the entire field. An example of this is a RO-ILS great catch, an event that demonstrates particularly well a safety best practice (e.g., stopping the line, clarifying questions, use of well formulated processes) that should be recognized.

Ksenija Kujundzic, BS
ASTRO, Senior Quality Improvement Manager

- RO-ILS, co-sponsored by ASTRO and AAPM, is an important mechanism to move the field forward, however it requires a strong culture of safety.
- To celebrate the vital role medical physicists play in patient safety, RO-ILS has selected three physics safety stars for International Day of Medical Physics.

Figure 1: Incident Learning Cycle

Incident learning is based on a cyclical process of detecting, gathering, analyzing, and responding to safety information. It should generate a positive feedback loop and encourage more event submission and reporting.

AMERICAN SOCIETY FOR RADIATION ONCOLOGY (ASTRO) UPDATE, Cont.

The 11th annual International Day of Medical Physics is November 7, 2023. Last year, RO-ILS released the 2022 great catch for this event to highlight a case where an attentive physicist reviewing a 4-D CT scan identified incorrect contours that occurred upstream in the planning process. The newly released 2023 great catch shares a de-identified RO-ILS case with lessons learned and safety questions to provoke introspection.

To promote practices that are making headway on that safety highway, RO-ILS is recognizing specific medical physicists for their contributions to patient safety. RO-ILS participants were invited to nominate their colleagues. Many fantastic physicists were nominated, and all are worthy of acknowledgement in their own right. ASTRO's and AAPM's RO-ILS committee volunteers reviewed anonymized information and focused on how the nominees exemplified safety culture principles, invested in incident learning and led quality improvement initiatives.

Congratulations to the 2023 Physicist Safety Stars! (Listed in alphabetical order.)

Ryan Manger, PhD
Associate Professor and Associate Division Director, University of California San Diego
San Diego, CA
RO-ILS Enrolled 2014

"Ryan is the associate director of our department responsible for standards and guidelines and in this role has had a tremendous impact on our ability to ensure consistent high quality of plans through compliance with guidelines on treatment protocols and dose constraints. These efforts have follow-on effects such as simplifying peer review and physics plan checks. Ryan also serves on the department Quality Committee ensuring enterprise-wide adoption of these standards."

— Jeremy Hoisak, PhD, Associate Professor

Jason Pukala, PhD
Chief of Clinical Physics, Orlando Health Cancer Institute
Orlando, FL
RO-ILS Enrolled 2017

"Jason exemplifies a safety leader by providing high-quality patient care while guiding our department in all aspects of incident learning. No recognition can reflect the ongoing commitment that Jason has put toward ensuring that we have the proper practices in place to deliver the best possible outcomes for our patients. However, it would be wonderful way to remind him that we all appreciate how he has made our department a place where safety and culture are on the forefront of patient care."

— Amish Shah, PhD, Chief of Physics; Director of Radiation Oncology

Cassandra Stambaugh, PhD
Associate Professor, Tufts Medical Center & Tufts University School of Medicine
Boston, MA
RO-ILS Enrolled 2018

"Cassandra's residency research proposed clinically relevant IMRT QA workflows to improve efficiency and value. At Tufts, she serves as Chair of the QA Committee, and she developed a program where residents perform RO-ILS follow-up and engaged in process improvement. She worked with the RO-ILS program to evaluate features and improve user experience. Within AAPM, she is a leader in the Medical Physics Leadership Academy."

— Christopher S. Melhus, PhD, Chief of Radiation Oncology Physics

Join RO-ILS, AAPM and ASTRO in congratulating these well-deserving safety champions and take this opportunity to celebrate all physicists for their contributions to improving safety!

Quality and safety are health care staples: a critical component to every task, every interaction and every treatment. The intent of every action seeps into the foundation of an organization and, importantly, can be felt in the culture. By continuously working to ensure that the road is well maintained, and all potholes are addressed, our wheels can make headway and get us where we need to go. ■

Massachusetts Physicists Testify for Licensure

LEGISLATIVE AND REGULATORY AFFAIRS REPORT

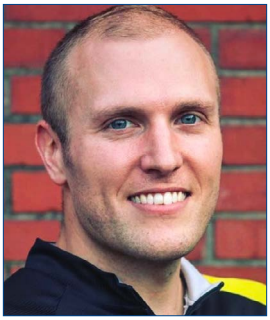
Thursday, September 21, 2023 — two members of AAPM's Unit No. 18 - Massachusetts State (UN18), **Navneeth Hariharan, MEng** and **Martin Fraser, MS**, FAAPM, FACR, testified before the Massachusetts Joint Committee on Public Health. Their goal — to convince the committee members that establishing a professional board and licensure for medical physics is in the best interest for patients and the profession. The two provided an excellently coordinated live testimony via remote connection to the Massachusetts State House.

Specifically, both Navneeth and Martin testified to voice support for House Bill (H.B.) 2175, *An Act Relative to Medical Physics*. Representative Sean Garballey introduced the bill in early 2023, and he aims for it to create a board of registration for medical physics. The board would license and regulate the medical physics profession throughout the Commonwealth. The testimonies given stressed that licensure is important due to the integral role that medical physicists serve in the delivery of high quality, accurate, safe, and effective radiation for therapies and diagnosis. Additionally, it is in the best interest of patients to ensure that all practicing medical physicists are appropriately trained, educated, board certified, and licensed to practice in Massachusetts.

Prior to the hearing, AAPM sent a call-to-action to over two hundred physicists located in the Commonwealth of Massachusetts. Members were asked to provide written testimonies to the committee or to their respective state legislators. AAPM's UN18 is hopeful that many of their fellow Massachusetts physicists submitted letters supporting H.B. 2175. If successful, the Joint Committee on Public Health will advance the bill to the Joint Committee on Health Care Financing. If it is reported out favorably, then the bill will be read before the legislators and voted upon by the House and Senate. If passed in both chambers, the final stop will be with the Governor to sign it into law.

UN18 is a group within the Medical Physics Licensure and Regulatory Recognition Subcommittee (JMPLSC). JMPLSC is a subcommittee of the Government and Regulatory Affairs Committee, and it focuses exclusively on strengthening the regulatory recognition of medical physicists. This can be achieved in a couple of ways, typically by licensure or registration. Licensure is often viewed to be the stronger approach, lending the most credence to the profession and to the physicists who acquire it. According to AAPM's PS 11-A, "AAPM supports and endorses programs such as licensure and registration which: define the authorized scope of practice of clinical medical physics; require medical physicists to hold and maintain certification from an appropriate board, engage in appropriate continuing education, and adhere to established standards of ethics and professionalism; and provide due process for revocation of the license or registration."

If you wish to learn more about AAPM's government and regulatory activities, or if you want to notify AAPM about legislation or rulemaking in your state, please email david@aapm.org. ■



David Crowley
Senior Government Relations Manager, AAPM

"In the years that our committee has been pursuing this cause, I have been personally encouraged by the positive response from our legislators, particularly our sponsor, Sean Garballey, as well as the by the broad support of the membership. I hope this is the year in which our bill will finally see the House floor."

— Martin Fraser, MS, FAAPM, FACR, Past President, NEAAPM

Navneeth Hariharan (top left) and Martin Fraser (top right) addressing the MA Joint Committee on Public Health (below) via MS Teams on September 21, 2023.

AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE

RSNA 109th Scientific Assembly and Annual Meeting
November 26 – 30, 2023
in Chicago, IL

Be Sure to Book Your Room at the AAPM Headquarters Hotel:

The Hyatt Regency Chicago

151 E. Wacker Drive

AAPM Meetings will be held at the Hyatt Regency Chicago

View Meeting Details:

www.aapm.org/meetings/rsna2023

CHICAGO

RSNA® 2023
LEADING THROUGH CHANGE

AAPM-SCC Mock Oral Exams: A Morning of Learning, Uniting Experiences, and Uplifting Fun

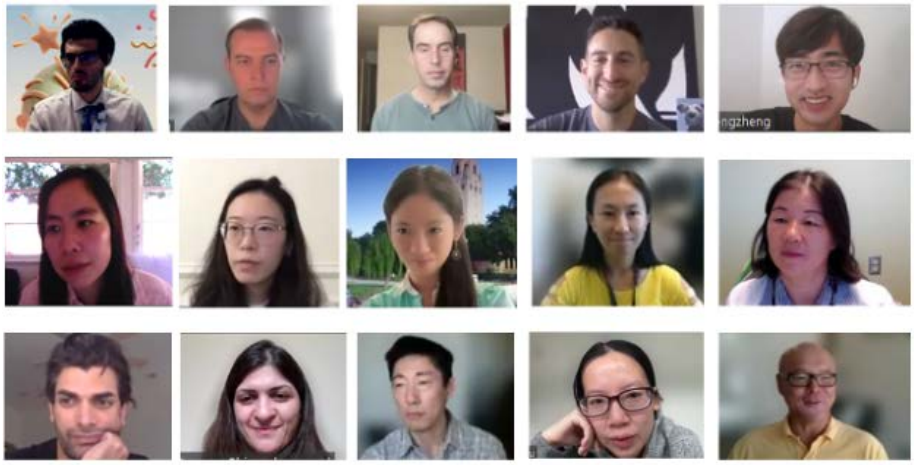
AAPM SOUTHERN CALIFORNIA CHAPTER MOCK ORAL EXAMS

(written on behalf of the AAPM Southern California Chapter)

The AAPM Southern California Chapter officers are excited to share a story of camaraderie, mentorship, and professional growth that took place during our first-ever AAPM-SCC Mock Oral Exams. On August 26, 2023, instead of a lazy Saturday morning, ten dedicated members acted as examiners to four enthusiastic examinees for a day of learning and professional growth.

During the two-hour mock exam process, examinees faced three rounds of challenging questions posed by our experienced examiners. What made this experience truly valuable was the immediate feedback provided after each round. Five minutes of constructive critique allowed the examinees to understand their strengths and areas needing improvement, helping them hone their skills for future formal oral board examinations.

The impact for our examinees was profound. From the coaching, they not only gained insights into the examination process but also the confidence and knowledge to help them in their upcoming challenges. And the examiners,



Top row from left to right: Joshua Salazar, Michael Reilly, Benjamin Ziemer, Adam Torres, Zhengzheng Xu; middle row from left to right: Jieming (Iris) Liang, Mengying Shi, Shu-Jung (Amy) Yu, Zhilei (Julie) Liu Shen, Xiaoyu (Sherry) Liu; bottom row from left to right: Ala Amini, Maryam Shirmohammad, Taka Natsuaki, Qihui Lyu, Chengyu Shi.

who generously volunteered their Saturday mornings, found this experience equally rewarding. Many recalled their own examination days, realizing the immense value of mentorship and guidance during this critical phase of a physicist's career.

David Hoffman, PhD
California Cancer Associates for Research and Excellence

Zhilei Shen, PhD
University of Southern California

Amy Shu-Jung Yu, PhD
Stanford University

Xiaoyu Liu, PhD
Kaiser Permanente

Chengyu Shi, PhD
City of Hope

Beyond the knowledge exchange and mentorship, this event also demonstrated the sense of community that defines our organization. Laughter, collaboration, and a shared passion for medical physics were evident throughout the day. It was not just a learning experience but also a day of bonding and celebration.

Our colleagues from the Northern California Chapter have been providing mock exams to support California junior physicists. Inspired by their dedication and the value it brings to our community, we decided to extend our Mock Exam initiative this year to benefit our junior physicists as well. Initially, our focus is on supporting junior physicists within California due to limited resources, but our ultimate goal is to expand this opportunity nationally. To make this vision a reality, we are reliant on the support of our dedicated volunteers.

We want to extend our gratitude to all the participants who made this event possible. Your dedication to our community and willingness to support one another are commendable. A special thanks goes out to **Shu-Jung (Amy) Yu** from Stanford University for sharing her experience in organizing Mock Exams over the years with the Northern California Chapter and to **Chengyu Shi**, the current AAPM-SCC president, for making this initiative a reality and successfully hosting the virtual event. ■

Bridging the Interoperability Gap Between Electronic Health Record Systems and Radiation Oncology Information Systems: IHE-RO's XRTS Profile and CodeX RTTD Efforts

IHE-RO REPORT

In the ever-evolving landscape of healthcare, the importance of interoperability between different systems cannot be overstated. Ensuring that information flows seamlessly between various medical disciplines is vital for patient care and coordination. One area where this interoperability has been a challenge is in the field of radiation oncology. This is where Integrating the Healthcare Enterprise – Radiation Oncology (IHE-RO) comes into play.

IHE-RO, sponsored by AAPM, has been diligently working since 2004 to enhance the interoperability of systems used in radiation oncology. Comprised of radiation oncology clinical team members, administrators, and industry vendor representatives, the group's mission is to harness existing industry standards such as DICOM, HL7, and FHIR to address clinical issues related to interoperability and interconnectivity among various vendor systems. Rather than creating new data communication standards, IHE-RO assists vendors in finding common ground to use existing standards effectively, tailored to specific clinical use cases.

One of the most pressing issues identified through biannual surveys of ASTRO, ESTRO, and AAPM members has been the inability to share radiotherapy treatment summary information from radiation oncology information systems to electronic health record systems (EHRs) in electronic form. This limitation results in significant variation in the documentation of radiation therapy-specific data and often necessitates manual data transfer, leading to inefficiency and potential inaccuracies.

Over the past three years, the IHE-RO Technical Committee has been hard at work, developing the Exchange of Radiotherapy Summary (XRTS) integration profile based on the Fast Healthcare Interoperability Resources (FHIR) standard. This initiative aims to bridge the critical communication gap by making minimal treatment summary information readily available for sharing across systems. Collaborating with CodeX, an HL7 FHIR Accelerator, IHE-RO has joined forces with ASTRO, AAPM, MITRE, Varian, COMP, SIIM, Telligen, NRG Oncology, Evernorth, Elekta, Epic, and Wemedoo, with inputs from clinical subject matter expert physicians and physicists to build FHIR-based data communication protocols. HL7 FHIR is a next-generation standards framework that combines the best features of previous HL7 standards, making it suitable for a wide range of healthcare data sharing scenarios. The CodeX RTTD initiative focuses on achieving interoperability, in part, through the implementation of the mCODE (minimal Common Oncology Data Elements) standard, defining key cancer characteristics in an interoperable framework, and is contributing to the Radiation Therapy Treatment Data (RTTD) use case (Radiation Therapy Treatment Data for Cancer - CodeX -

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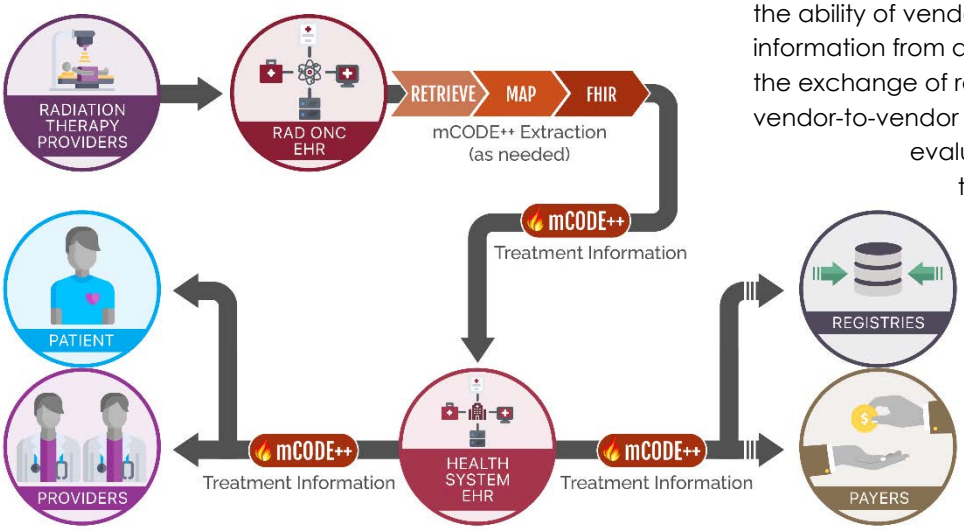
Discover how IHE-RO's XRTS Profile and CodeX RTTD initiatives are revolutionizing data exchange in radiation oncology with HL7 FHIR interoperability data standards. These efforts are ensuring seamless interoperability between Electronic Health Record Systems and Radiation Oncology Information Systems, promising more accurate, efficient patient care coordination. Learn about the strides we have made to bridge the interoperability gap and enhance patient care through innovative data models and robust vendor to vendor testing initiatives.

Confluence (hl7.org)). This collaborative effort has led to the development of the Radiotherapy Contents of mCODE Standard for Trial Use (STU 2) FHIR-based specifications, as well as the recently published CodeX Radiation Therapy Implementation Guide (STU 1) linked here.

To ensure the success of these endeavors, the IHE-RO Technical Committee has also developed an XRTS Validator Test Tool, enabling vendors to test their software products against the XRTS profile. This testing process has already been initiated through informal testing events, providing a real-world perspective and feedback to improve implementations. IHE-RO plans to host a formal Connectathon (vendor to vendor testing events) for the XRTS profile in the near future, where vendor systems will demonstrate their adherence to the profile by transmitting and receiving information with at least three other vendors supporting the exchange of radiotherapy summaries.

Vendor to Vendor Interoperability Testing — Progress



So Far

IHE-RO has organized three informal testing events known as IHE-RO XRTS Workshops. During these workshops, vendors have had the opportunity to evaluate their adherence to the XRTS profile and engage in system-to-system testing. This testing has focused on using clinically relevant scenarios, derived from a real-world context. The primary objective has been to collect the necessary discrete data elements within radiation oncology information systems and electronically transmit end-of-treatment and in-progress treatment summaries to electronic health record systems. These scenarios mirror real-world situations, including cases with single or multiple treatment targets, treated in single or multiple treatment phases and courses. The insights gained from these workshops have proven highly valuable for vendors, enabling them to refine their implementations and aiding the Technical Committee in gaining perspectives for future testing. These testing events have played a crucial role in advancing communication protocols, transactions, and other aspects defined in the integration profile. Major vendors, including Varian, Elekta, RaySearch, and Epic deserve much credit for their substantial contributions in shaping the development of the profile, test tools, and their active participation in these workshops.

Looking ahead, IHE-RO is preparing to host a formal Connectathon early next year dedicated to the XRTS profile. In this event, the goal will be to demonstrate the ability of vendor systems to transmit and receive information from at least three other vendors who support the exchange of radiotherapy summaries. This rigorous vendor-to-vendor testing process will be overseen and evaluated by independent IHE-RO members, typically consisting of medical physicists. Vendors who successfully demonstrate adherence to the profile for their applications will be able to showcase their achievement by publishing it in their IHE Integration Statements.

How can AAPM Members contribute?

For these important initiatives to thrive, increased vendor participation is crucial. We encourage AAPM members to request and utilize IHE-RO-adherent products, be aware of IHE-RO activities in the radiation oncology community, incorporate IHE-RO integration profiles in request for proposals, and recommend vendor participation in IHE-RO. As part of this exciting journey toward improved interoperability in radiation oncology, interested AAPM members can join the IHE-RO Technical Committee's XRTS

workgroup meetings or participate in CodeX RTTD Work Group meetings to contribute to the ongoing development of these essential initiatives. The IHE-RO XRTS workgroup, comprising of IHE Technical Committee members interested in the XRTS profile, meet bi-weekly for one-hour teleconferences. Interested AAPM members are welcome to join this committee as guests by contacting Jill Moton at AAPM Headquarters. However, only IHE members are considered voting members of the Technical Committee. The terminology and FHIR data model discussions are held in the CodeX RTTD Work Group meetings on a bi-weekly basis. Interested AAPM members can ask to become guest members on this committee by contacting Anthony DiDonato.

In conclusion, the IHE-RO's XRTS profile and the collaborative efforts with CodeX RTTD are driving significant advancements in the field of radiation oncology data interoperability. These initiatives are streamlining data exchange, ensuring the availability of precise information for coordinated patient care between radiation oncology and other medical disciplines, and ultimately elevating the quality of patient care. We look forward to continued collaboration, aiming to develop increasingly interoperable data models in the future that not only improve retrospective data collection but also enable valuable insights and learning from the data, benefiting both patients and the broader healthcare community. ■

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Randall Ten Haken — 2023 ASTRO Gold Medal Recipient

PERSON IN THE NEWS

R. Ten Haken

At the October 2023 ASTRO meeting in San Diego, **Randall Ten Haken, PhD**, was awarded the ASTRO Gold Medal, the highest honor an ASTRO member can receive. Only three years earlier, in 2020, Dr. Ten Haken received the William D. Coolidge Gold Medal from AAPM. Randy Ten Haken has applied the scientific skills we physicists are trained with to make uniquely important clinical contributions, in particular, the design of new clinical study methods and a career-long series of detailed analyses of clinical study results. Very few physicists have had such an important and long-lasting effect on clinical radiation oncology. Even fewer people who have worked at the forefront of their field for 40 years demonstrate how humble they are at every opportunity.

Randy and I met at an AAPM Summer School in East Hammond, LA, early in the 80s while he was a medical physicist at the Fermilab Neutron Therapy facility. After he joined us in starting the University of Michigan Department of Radiation Oncology in 1984, I had the amazing opportunity to work alongside him while he progressed from Assistant to Associate to Full Professor. Throughout his 39 years (and counting) in Ann Arbor, he has been a leader and mentor for everyone in the group: always questioning, applying scientific techniques, and not accepting the status quo, behavior that he continues to apply to this day. And in spite of those four decades in Michigan, everyone knows where to find Randy if the Packers are playing.

Randy's efforts have produced more than 250 peer-reviewed publications ranging from basic photon, electron and neutron dosimetry to the design, analysis and evaluation of novel clinical radiation dose escalation and normal tissue tolerance studies, and, more recently, to incorporation of biomarker-based adaptive therapy into clinical dose escalation studies. He published one of the very first papers to demonstrate the improvements possible with 3D conformal therapy treatment of the prostate (1989), followed soon by the first dose escalation trial for prostate using conformal therapy. His work on use of DVH guidance for liver irradiation (1989) was followed by a series of dose escalation trials which led to the prediction of radiation induced liver disease using DVH analysis, and then to normal tissue complication probability-driven studies for liver, lung, and other volume-effect organs which changed the entire landscape of therapeutic options for treatment of liver, lung, and other similar types of organs. Randy and his colleagues also published the first description of prostate motion and planning issues due to rectal/bladder filling (1991) which led to projects involving setup uncertainty and target

Benedick A. Fraass, PhD
Cedars-Sinai Medical Center

motion, use of fiducials and the design, fabrication and clinical implementation of a 6-degree of freedom table for treatment positioning (1998). His work in head/neck cancer included analysis of the use of conformal therapy for parotid sparing (1996) and Simultaneous Integrated Boost (SIB) plans and treatments (1996) well before IMRT optimization made SIB planning more straightforward.

One more crucial project deserves special mention: the QUANTEC project to document the current understanding of normal tissue toxicity dependence on dose and volume across all organs for which there are published data. QUANTEC, a joint effort by ASTRO and AAPM, was led by Co-Chairs Randy Ten Haken, **Larry Marks, MD**, and **Mary Martel, PhD**. The QUANTEC issue of the Red Journal quickly became the reference source for all the best data on dose-volume-effect for normal tissues, a crucial part of the planning process. One thing that may not be obvious from the outside is that the writing groups and especially the review process set up by Drs. Ten Haken and Marks led to extremely high-quality papers, a hallmark of Dr. Ten Haken's participation and leadership.

Dr. Randy Ten Haken is one of the most effective and accomplished medical physicists in radiation oncology. As everyone who knows him realizes, Randy has never been one to trumpet his own accomplishments, even though he has steadily throughout his career led the field in the application and study of new techniques while rigorously evaluating their clinical benefits. I am extremely happy to congratulate my friend and colleague Randy Ten Haken on the award of the ASTRO Gold Medal. ■

James Hevezi Receives the Texas Radiological Society Gold Medal

PERSON IN THE NEWS

J. Hevezi

James M. Hevezi, PhD, FAAPM, FACR, received the Texas Radiological Society (TRS) Gold Medal for his outstanding service to radiology and radiologists in Texas. The award was presented at the TRS 110th Annual Meeting during the Awards Dinner on Feb 17, 2023. Dr. Hevezi, who is a 50+ year member of AAPM, has had a long and illustrious career in medical physics. He served as a member for two Task Group reports, TG101 on Stereotactic Body Radiotherapy and TG135 on QA for Robotic Radiosurgery. His leadership roles within AAPM include serving as Chair of the Professional Economics Committee (2003-2008) and as AAPM's liaison to the American College of Radiology (ACR, 2006-2014). Dr. Hevezi also served as Chair of the ACR Commission of Medical Physics from 2006 to 2012. He spent many years living and working in Texas, as the Director of Medical Physics at the Cancer Therapy and Research Center in San Antonio from 1991-2005 and afterward as the lead Cyberknife physicist at the Austin Cyberknife Center and served as vice-chair on the AAPM unit for outreach to Texas medical physicists from 2014-2016. His many publications range from topics such as Cyberknife treatments to optimizing CT dose and image quality for radiotherapy patients to professional topics such as the importance of practice standards. AAPM congratulates Dr. Hevezi on this well-deserved recognition of his impact on the field and specifically in the state of Texas. ■

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