



AMERICAN ASSOCIATION *of* PHYSICISTS IN MEDICINE

Advancing the Science, Education & Professional Practice of Medical Physics

WHITHER THE AAPM: PAST, PRESENT AND FUTURE

Bruce Thomadsen

AAPM Chair of the Board



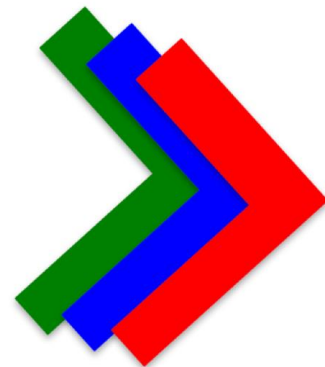
DISCLOSURES



- Professor emeritus of Medical Physics at the University of Wisconsin. **I receive no remuneration for the University of Wisconsin.**



- The President of the Center for the Assessment of Radiological Sciences, a 501(c)(3) non-profit Patient Safety Organization listed with the Agency for Healthcare Research and Quality, dedicated to improving quality and patient safety in radiotherapy and radiology. ***I receive no remuneration from CARS.***





LEARNING OBJECTIVES

1. Understand some of the challenges facing medical physics and the AAPM, and
2. What the AAPM is doing to address the challenges and try to create a rewarding future for medical physicists.



THE PAST

- The AAPM is 61 years old, starting in 1958, and incorporated in 1965.
- Medical physics is 124 years old.
- For a long time, medical physics was mostly divided into therapy, diagnostic and nuclear medicine. Some practitioners just did medical health physics but for the most part, that was covered by someone in one of the three major disciplines.
- In the 1960s and 70s there were many, if not most, who did all of the above.
- Many medical physicists also worked in radiobiology, physiology and biophysics.



BACK THEN...

- My mentor in my residency used to make the x-ray tubes used in her radiology department.
- I started in medical physics (called radiological physics then) in 1970, training in a residency just out of a bachelorette program.
- The AAPM had a Quarterly Bulletin but no journal until 1974.
- The University of Wisconsin formed the first department of medical physics at a university in 1981.
- The AAPM did have meetings from the beginning, mostly meeting in conjunction with the RSNA.



AAPM'S ORGANIZATION

- Before 2004, medical physics science was divided into Rx, DX, NM and HP. There were equivalent committees for Clinical Practice and Education, and other assorted topics.
- In about 2005, the organization of the AAPM was restructured into four councils: Education, Professional, Administrative (formed a little later) and Science.
- Science was mostly divided into Therapy Committee and Imaging Committee.
- The new organization was intended to help communications within a given topic within a council.
- This led us to...



THE PRESENT

- The AAPM has grown to almost 9000 members, about 6000 full members.
- We have 21 chapters, a few predate the national association.
- There are three major meetings each year, along with the summer school and various specialty meetings.
- There are about 340 committees (councils, committees, subcommittees, etc.)
- Almost 40% of the membership participate in committees.
- A staff of 29 assist the members and volunteers (and do so effectively and efficiently with a smile).



AN IRONY ABOUT THE PRESENT

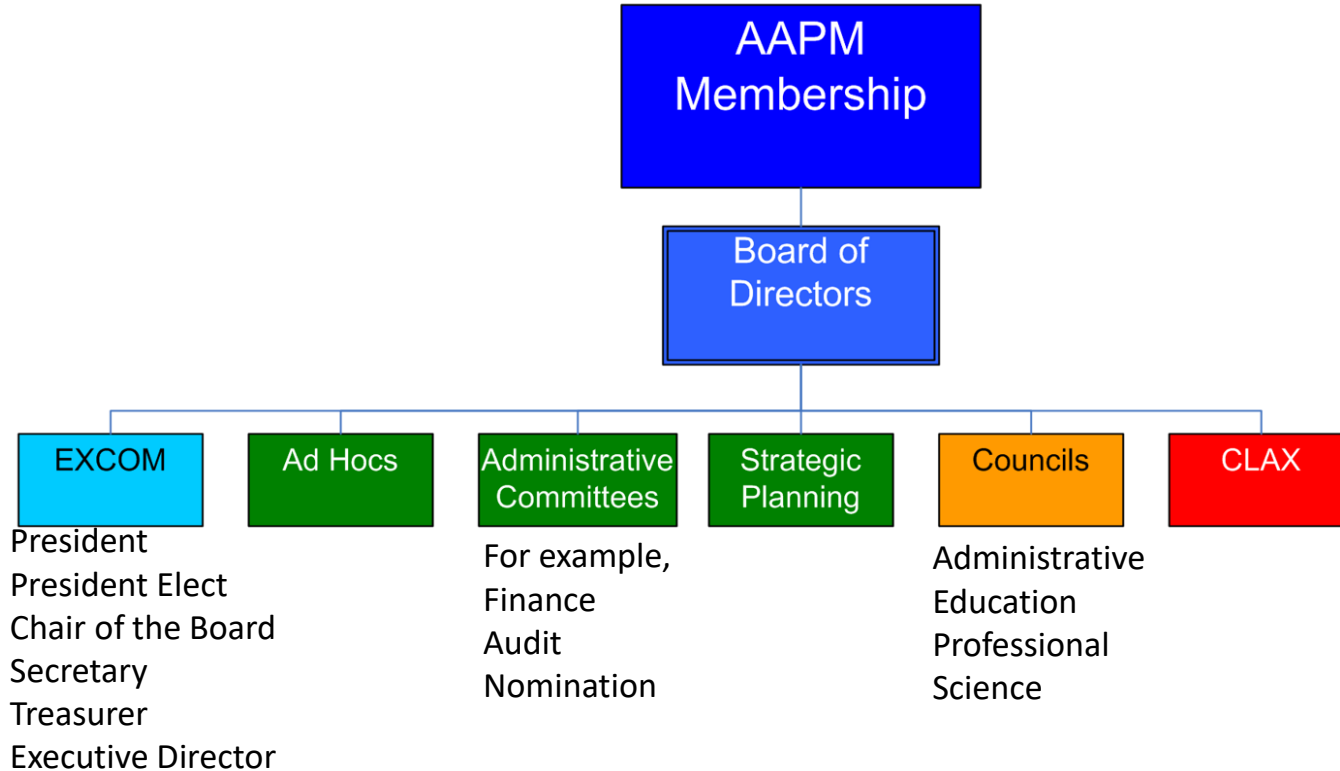
- The current council structure came about, in part, because therapy and imaging were drifting apart (and most medical physicists in nuclear medicine were in imaging).
- However, shortly after that separation, imaging in therapy started becoming a hot topic which never cooled. In addition, therapy in imaging (cardiac, neuro, liver, etc.) also began a rise.
- The structure started behaving more like silos, not just in Science Council but across councils also. Two examples:
 - International, split between the International Educational Affairs Committee in EC and the International Affairs Committee in AC.
 - WG on Implementation of TG-100 Recommendations, which touches all councils.



WHAT IS THE AAPM DOING TO BRING HARMONY TO CHAOS

Just a moment and we will look at that. First, let's take a higher-level view.

AAPM Structure



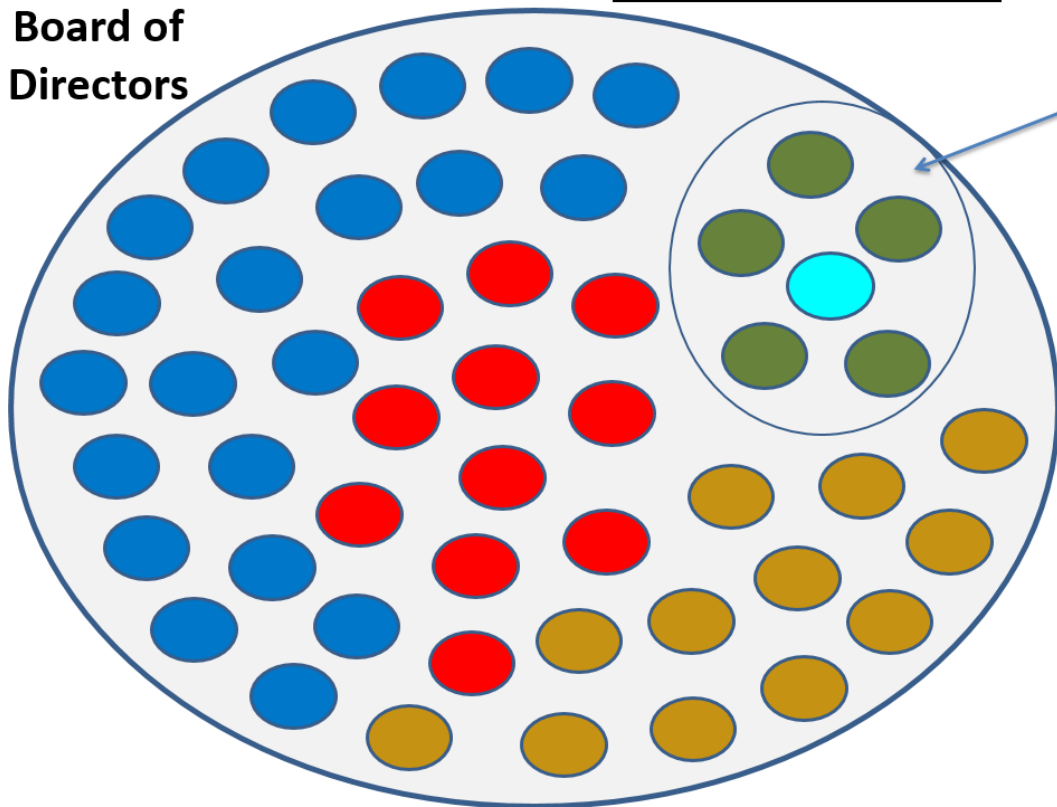


AAPM Board Structure

Board of Directors

EXCOM

(reports to the Board)



Executive Director



Presidential Chain,
Treasurer, Secretary (5)



Chapter
representatives (21)



Member-at-Large
board member (12)



Non-voting board
member (11)

Total = 50





WHAT CAN SUCH A BOARD ACCOMPLISH? PREPARING FOR THE FUTURE

- That was a question for a long time.
- The Board should be involved in strategic planning. But they never tried, said it was too big.
- For the last two years, the Board has spent most of its meeting during the Spring Clinical Meeting doing strategic planning.
 - In 2018, they finalized the current strategic plan, which really is a statement of our values that could help guide our actions.
 - In 2019, they started grappling with the future...



2019 board doing strategic planning

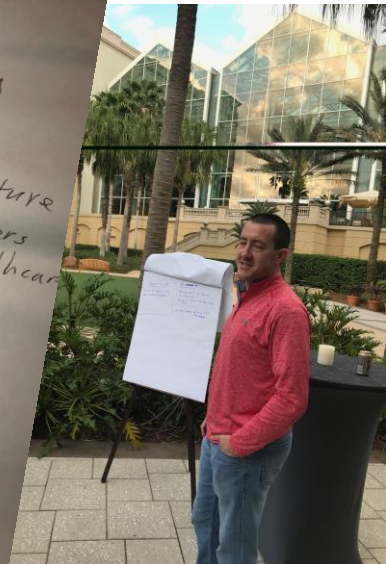


Future we want

- Global
- MP. AAPM more multidiscip.
- Mole. Bio
- IT - Data - Comp. Sci.
- Business
- Integrators - SI
- Patient Facing
- Jobs for all MPs
- Decision Makers
- Quality
- Disruptors
- Leader in Science
- Pt COMM.
- Know Low Dose
- Locked for

Steps to Take

- AAPM Seed Funding
- Design of data System
- Training → Prepare as on future
- Interact with HIM, Sisters
- Exposure Members to Healthcare changes
- Aggressive Fundraising
- Sponsor more events.
- Funding internships
- Non-medical physicist on board
- International jobs.
- Entice bright minds





WHAT HAS COME FROM THIS?

- The top priority that surfaced was to raise the profile of medical physics and the AAPM. An ad-hoc committee is being formed to chart a path to do this.
- Global initiatives also were considered a very high priority. An ad-hoc committee of that soon will report, and it supports unifying the IEAC and the IAC into a single council.
- Most importantly, going forward the Board will reserve one of its meetings to work on strategic planning.
 - The size has been a benefit providing many viewpoints and types of expertise.
 - The size has not hindered discussion or agility.

	Strongly Disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)	AVG	Std. Deviation
AAPM disseminates scientific and technical information in medical physics.	1.04% 24	0.87% 20	6.15% 142	41.85% 966	48.18% 1112	4.41	0.76
AAPM promotes the highest quality medical imaging and radiation therapy.	1.13% 26	1.21% 28	8.62% 199	40.77% 941	44.97% 1038	4.36	0.82
AAPM promotes improvements in patient safety.	0.87% 20	0.95% 22	7.24% 167	45.23% 1044	44.28% 1022	4.35	0.75
AAPM provides helpful opportunities for members to share cutting edge research.	1.00% 23	3.21% 74	11.79% 272	44.24% 1021	37.13% 857	4.20	0.87
AAPM encourages research and development to advance medical physics.	1.56% 36	2.25% 52	12.65% 292	43.33% 1000	37.74% 871	4.20	0.88
AAPM helps keep me informed regarding advances in medical physics.	1.13% 26	2.34% 54	12.39% 286	47.75% 1102	34.79% 803	4.18	0.84
AAPM provides valuable opportunities for networking.	1.26% 29	2.04% 47	13.99% 323	48.70% 1124	32.63% 753	4.13	0.83
AAPM supports the medical physics education of physicians and other medical professionals.	1.34% 31	4.55% 105	19.45% 449	39.95% 922	27.25% 629	4.08	1.02
AAPM provides valuable professional development opportunities to advance the careers of members.	1.56% 36	4.12% 95	16.38% 378	45.71% 1055	29.33% 677	4.05	0.93
AAPM provides genuine opportunities for members to share best practices.	1.21% 28	4.25% 98	16.51% 381	46.71% 1078	28.64% 661	4.05	0.91
AAPM helps members to anticipate the challenges and trends that will likely impact the medical physics community.	1.52% 35	6.11% 141	20.58% 475	45.36% 1047	24.57% 567	3.90	0.94

Do not try to read. Look at the dark squares under Agree and Strongly Agree.



HOW IS EXCOM USING THE SURVEY RESULTS

- We use the identification of area that are rated the least positive to work to improve,
- We are paying attention to the comments to also note where improvements can be made.
 - Anticipating changes that would affect medical physicists.
 - Connecting AAPM membership and leadership.
 - We are working through the list of not-so-great comments and seeing what we can do to address the issues.



WHAT OTHER INITIATIVES FOR THE FUTURE ARE UNDERWAY?

- Medical Physics Leadership Academy and Medical Physic 3.0
 - Both support medical physicists to expand their capabilities, increasing their value.
- Workforce Assessment Working Group and the Dx Workforce Supply and Demand Ad-Hoc
- The mentor – or apprentice – program, to add junior or student member, or members never on committees, to almost all AAPM groups.
- Forming a Targeted Radionuclide Committee, where the future looks strong.



WHAT OTHER INITIATIVES FOR THE FUTURE ARE UNDERWAY?

- Reforming the task-group review process to make it smoother, faster and more effective (and much less frustrating).
- Reforming and automating the task-group (and other types of committees) proposal process.
- Coordinating TG and MPPG creation.
- Establishing a single, official key-word taxonomy that would be used for indexing video material, abstracts, articles, task groups ... and everything.
- Implementation of a tool logs the forming a task group or committee (automatically from the proposal screen), and by key words used, notifies other potentially interested committees. (Remember this tool for later)



WHAT OTHER INITIATIVES FOR THE FUTURE ARE UNDERWAY?

Closer and clearer relationships with other organizations

- Setting up methods for joint work.
- Use of the tool from the last slide that we and our sister societies can alert each other when thinking about forming a writing panel or task group.
- Sharing a key-word taxonomy
- Clarifying expectations for liaisons



WHAT OTHER INITIATIVES FOR THE FUTURE ARE UNDERWAY?

The Ad-Hoc Committee to Help Integration of Effort

- The goal is to help break down the silos, or at least cut windows into them.
- It is supposed to report before the end of the year.

The Ad-Hoc on the Nomination Procedure

- Remember the bylaws change making seats on the Nomination Committee to try to have better representation on the Board and Officers?
- It did not work well. The Board may try something else.



FROM 2018 PRESIDENT'S SYMPOSIUM: SOME CHALLENGES FOR THE FUTURE

- Decreases in funding:
 - For clinical medical physics
 - Decrease in CPT reimbursements for radiotherapy, No CPT for imaging.
 - For medical physics research funding
 - Almost none for radiotherapy physics, imaging hanging on by a thread, but for how long?
- Encroachment on medical physics positions
 - From other disciplines
 - BME, HPs
 - From medical physicists' assistants
- Changing face of medical physics
 - Increased automation
 - Big data and artificial intelligence



FROM 2018 PRESIDENT'S SYMPOSIUM: SOME CHALLENGES FOR THE FUTURE **THAT IS HERE NOW**

- Decreases in funding:
 - For clinical medical physics **This process is starting!**
 - Decrease in CPT reimbursements for radiotherapy, No CPT for imaging.
 - For medical physics research funding **This is ongoing**
 - Almost none for radiotherapy physics, imaging hanging on by a thread, but for how long?
- Encroachment on medical physics positions **Very complicated, and is now**
 - From other disciplines
 - BME, HPs
 - From medical physicists' assistants
- Changing face of medical physics
 - Increased automation **Yup, look at the technical exhibits**
 - Big data and artificial intelligence **Holy Hannah, we are knee deep in this**



WHAT ARE WE DOING ABOUT ALL THIS?

- The Data Science Committee is working medical physicists into the international discussion on various big-data activities.
- Future Working Group has been looking into where medical physicists could move to answer very different questions than we have been thinking about.
- All of this is going to require major changes in medical physics curricula.



MEDICAL PHYSICS CURRICULA

- The clean division between imaging and therapy needs to blur.
 - The physics is the same
 - Much of the math is the same (this deconvolution and convolution)
- Medical physicists need to know more about things like molecular biology.
- Graduate education should *not* focus on clinical skills – that is what a residency teaches.



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"THERE IS NO LINEAR TIME"

- Past performance is not indicative of future results.
- Linear interpretation over time ignores possible large changes.





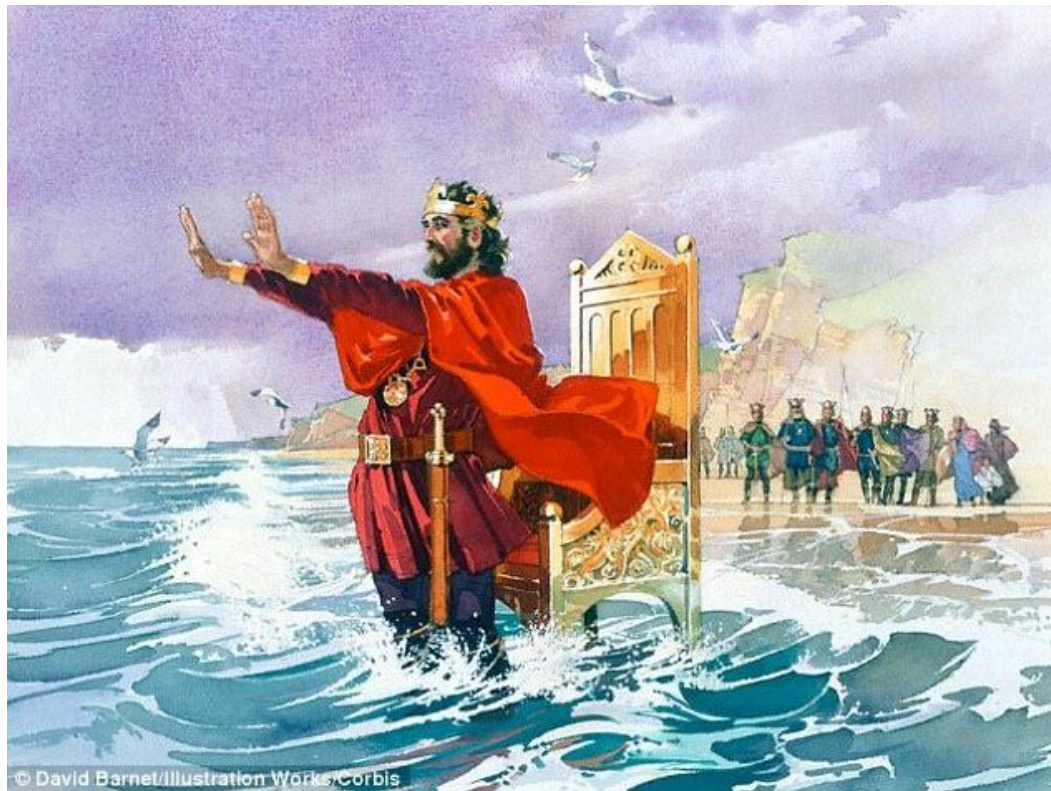
OF COURSE

- We are on the road to the future already.
- The question is whether it is the future we want or the future we will let overtake us.



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KING CNUT ATTEMPTS TO HOLD BACK THE TIDE

- It did not work for him.
- It will not work for us.

(Footnote: He was not really trying, but demonstrating the king's limitations to flattering courtiers.)



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YOU CAN CHOOSE!

- We can go along hoping that things don't change too much because we like where we are.
- Or, we can expect unexpected changes and try to own our future.
- The choice is yours and you have to make it.



...there are **known knowns**; there are things we know we know. We also know there are **known unknowns**; that is to say we know there are some things we do not know. But there are also **unknown unknowns** – the ones we don't know we don't know...it is the latter [sic] category that tend to be the difficult ones.

Donald Rumsfeld
February 12, 2002



“Prediction is very difficult, especially about the future.”

~~Yogi Berra~~

~~Samuel Goldwyn~~

~~Niels Borh~~

Piet Hein?

Robert Storm Petersen?

(Mark Twain? With no evidence)



WHITHER MEDICAL PHYSICS?

- In the clinic, the medical physicist may become more managerial
 - Fewer MPs needed
 - Supervising medical physicists' assistants and dosimetrist
- Much of the work will be automated
 - Automatic QA of units, imaging and therapy
 - Dosimetry and planning due to artificial intelligence
 - This is not a bad thing, and is what we have been working on for a long time
- Medical Physics will move into other aspects of MP
 - Optical and microscopy
 - Oncology and biophysics



WHAT DOES THIS PLANNING FOR THE FUTURE LOOK LIKE?

1. See what our situation is now.
 - a. What do we like?
 - b. What do we dislike?
2. Understand how that situation is changing now.
3. Understand why the situation is changing now.
4. Visualize many possible scenarios for the future that could be supportable.
5. Go to the next slide



WHAT DOES THIS PLANNING FOR THE FUTURE LOOK LIKE?

5. For the scenarios that sound good, think about what would have to happen to bring that about.
6. Think about what steps now could start in motion the forces that can create what would have to happen for the good scenario.
7. Start working on those steps...now!
8. Keep in mind there are going to be many scenarios to work on.



THE FUTURE

- Of course, we have to have some idea of what we **want** the future to look like.
- Do not hope that things will not change.
- The future is ours to make if we make our opportunities and go boldly.
- *Your responsibilities*
 - Think about the future, talk about it, keep it in mind.
 - Make sure your Board representative keeps the Board planning.