
3.0?
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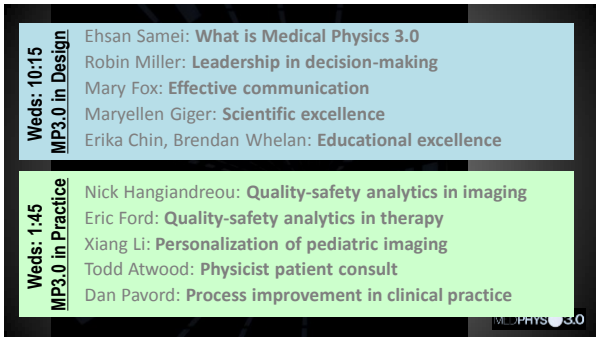
Weds: 10:15
MP3.0 in Design
Ehsan Samei: What is Medical Physics 3.0
Robin Miller: Leadership in decision-making
Mary Fox: Effective communication
Maryellen Giger: Scientific excellence
Erika Chin, Brendan Whelan: Educational excellence
Weds: 1:45
MP3.0 in Practice
Nick Hangiandreou: Quality-safety analytics in imaging
Eric Ford: Quality-safety analytics in therapy
Xiang Li: Personalization of pediatric imaging
Todd Atwood: Physicist patient consult
Dan Pavord: Process improvement in clinical practice
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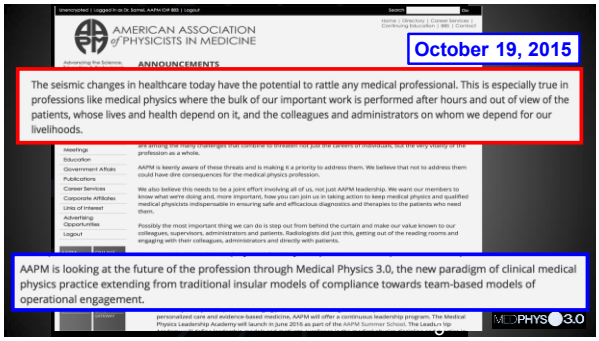
AMERICAN ASSOCIATION of PHYSICISTS IN MEDICINE
October 19, 2015
ANNOUNCEMENTS
The seismic changes in healthcare today have the potential to rattle any medical professional. This is especially true in professions like medical physics where the bulk of our important work is performed after hours and out of view of the patients, whose lives and health depend on it, and the colleagues and administrators on whom we depend for our livelihoods.
AAPM is looking at the future of the profession through Medical Physics 3.0, the new paradigm of clinical medical physics practice extending from traditional insular models of compliance towards team-based models of operational engagement.
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What and who?
AAPM Ad Hoc committee, Jan. 2016

Dan Bourland
Erika Chin
Shiva Das
Mary Fox
Nick Hangiandreou
David Jordan
Melissa Martin
Robin Miller
Bill Pavlicek
Dan Pavord
Todd Pawlicki (V-Chair)
Ehsan Samei (Chair)
Lisa Schober (Admin)
Bruce Thomadsen
Brendan Whelan

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Rationale

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Overarching need and presuppositions

Medicine: Discerning and intervening in the health state of the patient with sufficient accuracy, precision, and safety for definitive clinical outcome

Healthcare is about the patient, not the particularities of the techniques – techniques are valued to the extent they benefit the patient

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Reality check 1:
Clinical practice

Heterogeneous, Compounded, Complex

- Varying technologies
- Varying technical parameters
- The patient factor
  - limited dynamic adaptation of technology to the patient
- The human factor
- Competing interests

Variability in the quality of care

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Reality check 2:
Cultural shifts in healthcare

Evidence-based medicine

Practice informed by science

Precision medicine

Personalization of care in quantification terms

Comparative effectiveness - meaningful use

Enhanced focus on actual utility

Value-based medicine

Scrutiny on safety, performance, consistency, stewardship, efficiency (leanness), ethics

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Key questions

- What is the role of medical physics in all this?
- How medical physicist can/should add value?
- How the physicist should (re)posture her/himself in view of the new realities?
- How can we live up to our potential?
  - (Re)define our value before others do?

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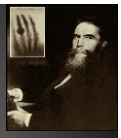
Historical grounding



- Remember Roentgen!
- The foundational discipline behind Radiology and Radiation Oncology
- Physics applications to
  - Design technologies with superior performance
  - Ensure intrinsic performance of equipment
  - Ensure accurate therapeutic dosimetry
  - Claim compliance and accreditation

Medical Physics 1.0

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Why 1.0 is not enough

- Impending healthcare tsunami?
- *Clinical* performance?
- Optimization of use?
- Consistency of quality?
- Expanding technologies?
- Lagging compliance vs needs and innovation?
- Physics not contributing its full potential?
- Medical Physics beyond radiation medicine?

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Call to action!

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Why Med Phys 3.0?

- The crucial role of Medical Physics has to be broadly claimed
- In the face of a challenge, it is crucial to **understand the goals** and **set a standard** that can **define the trajectory and motivate the progression**.

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Why not 2.0?

- Alignment with ACR Imaging 3.0 movement
- Prior 2.0 imaging only focus
  - 2011: Samei and Seibert. The tenuous state of clinical medical physics in diagnostic imaging (editorial). *Medical Physics* 38(12).
  - 2013-2015: 10s of 2.0 imaging sessions and RSNA and AAPM

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Drive towards high-quality, consistent, patient-centric, evidential, precise, safe healthcare

What is the role of medical physics?

Innovative precision care through clinical application of physical sciences

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Why precision care needs medical physicists?

- Our unique skillset
- Our unique perspective
- Our ethical mandate
  - Optimum care needs purposeful contribution of medical physics

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What is Medical Physics 3.0

Redefining and reinvigorating the role of physics in modern medicine

An initiative to define and practice **sustainable excellence** in medical physics

A set of trajectories to grow, express, and enact the value of medical physics

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To position physicists to have the competence and the confidence to fulfill their unique calling: scientific agents of precision, innovation, and value in the development and practice of medicine

Future of our Profession

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Medical Physics 3.0 foundations

1. **Re-visiting our roots** and re-envisioning our desired contributions to quality healthcare
2. Asking the question of whether we are **fulfilling our potential**, and if not, how can we
3. Fostering a **culture of excellence**
4. Seizing opportunities to **engage proactively** and meaningfully in patient care
5. Growing and building upon the **unique skills** of medical physicists.

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Medical Physics Progression

1.0	3.0
Equipment	Operation
Specifications	Performance
Quality check	Consistency
Presumption	Actual utility
Compliance	Excellence
Physics *in* Medicine	Physics *for* Medicine
	Physics *of* Medicine

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Does that apply to everybody?

- The clinic
- The academy
- The industry
- The government
- Research organizations
- Professional organizations
- …

Multiple practice settings, one overarching goal

How?

How are we going to get there?

Trajectories of MP3.0

1. Realizing who we are (or ought to be)
2. Extending the competencies of medical physicists
3. Actualizing the constituents of precision care
4. Developing sustainable models of 3.0 practice
5. Changing the expectations from medical physics
6. Extending the boundaries of medical physics

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1. Realizing who we are (or ought to be)

Dealing with the subject:

1. **Scientist** in discovery AND application
   - **Scholarship**: evidence-based, methodical pursuit
   - **Quantitation**: measurement, numerical orientation, 'value'
   - **Innovation**: agency of advancement
     - better understanding, practice solutions, care delivery, technological solutions, education, regulations

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1. Realizing who we are (or ought to be)

Dealing with the setting:

2. **Context-aware:**
   - **Dual-vision**: Myopic AND systemic visions
   - **Dual-calling**: Scholar AND healthcare provider

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1. Realizing who we are (or ought to be)

Dealing with the goal:

3. **Service-oriented**
   - **Care**: Care and customer mindset
   - **Clinic**: Ultimate clinical application

2. Extending the Competencies of Medical Physicists: Leadership Skills

Dealing with	Skillsets
• Self • People • Projects • Finances • Constraints, voids (ethics, regulations, …)	• Emotional intelligence • Effective communication • Leadership in visioning • Management in orchestrating, execution

2. Extending the Competencies of Medical Physicists: Leadership Skills

- Gain ability to articulate our essential and contextual value proposition
- Medical Physics Leadership Academy (MPLA)

2. Extending the Competencies of Medical Physicists: Education

- Deep medical physics competency
- Focus on *actual* effectiveness of education
- Context-aware clinical and leadership skills
- The actual process of critical thinking
- New hard skills: process engineering, optimization, bio-informatics, bio-statistics, …

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3. Actualizing the Constituents of Precision Care

1. Technology assessment
2. Prospective use definition
3. Retrospective quality audit

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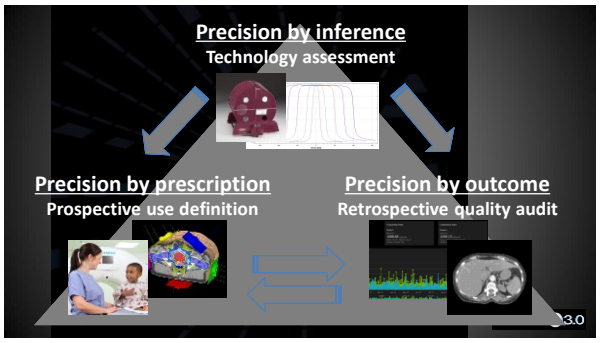

4. Developing Sustainable Models of 3.0 Practice

- Devise and encourage pragmatic resources, smart tools for "busy clinical people"
- Clinically-relevant metrology and tools
- Automation and tracking tools

5. Extending the Boundaries of Medical Physics

- Claim and advance the profession beyond radiation medicine
  - Medical photonics, dentistry, surgery, 3D printing, virtual reality, nano-medicine, emerging medicine, radiomics, radiogenomics, data science, …
- AAPM FUTURE working group: The future of medical physics science

6. Changing the Expectations from Medical Physics

- Seek meaning beyond checklists
- Devise pathways for translation of science to practice
- Identify and encourage clinical growth where care can be excelled with physics contribution
- Own the quantification of value in value-based care
- Update the regulatory framework

MedPhys 3.0 Resources

MedPhys 3.0 resources

- MP3.0 Booth @ AAPM'17
- 3.0 webpage (https://www.aapm.org/MedPhys30)
- Good practices
  - Videos
  - List of opportunities
  - Case example stories
- White papers and editorials

Conclusions

- Competent and effective medical physics is
  - Essential
  - About quality patient care
  - more than "doing medical physics"
- MP3.0: claiming our roles as scientists, care providers, and leaders aimed towards patient centric, value-based promotion of health


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3.0