

Workshop on Standards for Quantitative MRI

Sunday July 13

- 4p Meet in the NCAR parking lot for hiking
- 6p Informal gathering at West Flanders Brewing Co. (1125 Pearl St., wfbrews.com)

Monday July 14

- 7:30a Registration and Breakfast/Coffee
- 8:15a Welcome from James Olthoff, Acting Director of the Physical Measurement Laboratory, NIST
- 8:30a Session 1: Overview of standards activities
(3 sub-sessions with 10 minute breaks following each sub-session.)
- 12:20p Lunch
- 1:30p Session 2: How *well* do we measure fundamental MR parameters? Scanner Validation and Comparison
- 3:10p Break
- 3:20p Session 3: Standards for diffusion and angiography
- 4:40p Break
- 4:50p Session 4: Standards for dynamic contrast and susceptibility
- 6:10p End of sessions for day one

Tuesday July 15

- 8:00a Gather and Breakfast/Coffee
- 8:30a Session 5: It's not too late for standards
- 10:10a Break
- 10:30a Session 6: A Round-Up of Day 1: What is needed?
- 12:00p Lunch
- 1:30p Session 7: Apples & Oranges: standards for data transfer and processing
- 2:50p Break
- 3:00p Session 8: Emerging technologies in MRI (and old modes gaining a new use?)
- 5:00p Tours of NIST, hiking, explore Boulder & Colorado, etc.

Wednesday July 16

- 8:00a Gather and Breakfast/Coffee
- 8:30a Session 9: Standards for computational and virtual phantoms
- 9:50a Break
- 10:00a Session 10: Standards for MRI: What is needed and who should do it? Workshop Wrap-Up
- 12:00p End of workshop.
- 1:30p Tours of NIST available. Meet in Building 1 Lobby.

Monday July 14

8:15a **Welcome from James Olthoff, Acting Director of the Physical Measurement Laboratory, NIST**

Session 1: Overview of Standards Activities

8:30a	ISMRM/SQMR (Ed Jackson), RSNA/QIBA (Dan Sullivan), Army Medicine (LTC Gerald York)	15 min per talk, 20 min of moderated panel questions per group, 10 min break following each group
9:45a	IAC (Jennifer Stickel), ACR (R. Edward Hendrick), ECOG/ACRIN (Mark Rosen), NEMA/MITA (Michael Steckner/Scott Hinks)	
11:15a	NCI/QIN (Huiming Zhang), FDA (Jana Delfino), NIST (Stephen Russek)	
12:20p	Finish.	Christina Liu (NIBIB) and Michael Boss (NIST)

Session 2: Fundamental MRI measurements/Scanner validation & comparison

Time	Topic	Speaker
1:30p	Standardization and Validation of T1 Measurements	Nikola Stikov (Montreal Neurological Institute)
1:50p	Measuring T2	Wendy Oakden (Univ of Toronto)
2:10p	SNR in the land of parallel imaging	Riccardo Lattanzi (NYU)
2:30p	Geometric Performance in ADNI	Jeff Gunther (Mayo Clinic)
2:50p	Discussion (moderator led, 20 minutes)	Luca Marinelli (GE GRC)

Session 3: Diffusion & Angiography

Time	Topic	Speaker
3:20p	Anisotropic Diffusion (& phantoms)	Walt Schneider (Pitt)
3:40p	Isotropic Diffusion: Phantom development for quality assurance and control	David Newitt (UCSF)
4:00p	ASL Perfusion Imaging	Matthias van Osch (LUMC)
4:20p	Discussion (moderator led, 20 minutes)	Tom Chenevert (Michigan)

Session 4: Dynamic Contrast & Susceptibility

Time	Topic	Speaker
4:50p	Dynamic Contrast Enhanced (DCE) MRI	Ed Jackson (Wisconsin)
5:10p	Quantitative Susceptibility Mapping	Mark Haacke (Wayne State)
5:30p	Dynamic Susceptibility Contrast (DSC): Challenges with Standardization and Quantitation	Kathleen Schmainda (Medical College of Wisconsin)
5:50p	Discussion (moderator led, 20 minutes)	Paul Summers (European Institute of Oncology)

Tuesday July 15**Session 5: Not too late for standards**

Time	Topic	Speaker
8:30a	MR Elastography	Richard Ehman (Mayo Clinic)
8:50a	Thermometry and HIFU	William Grissom (Vanderbilt)
9:10a	MR Spectroscopy: Beyond Braino	Peter Barker (Johns Hopkins)
9:30a	Standardization of fMRI	Byron Mueller (Univ of Minnesota)
9:50a	Discussion (moderator led, 20 minutes)	Scott Hinks (GE Healthcare)

Session 6: Round-up of Day 1: what is needed?

Time	Topic	Moderator
10:30a	Summary of Day 1	
10:45a	Discussion (moderator led, 1.25 hours) - Overview of standards process	Jeff Evelhoch (Merck) and Ajit Jillavenkatesa (NIST)

Session 7: Data transfer & processing

Time	Topic	Speaker
1:30p	Clinical Trials perspective	Mark Rosen (ACRIN/UPenn)
1:50p	Virtual Datasets	Dan Barboriak (Duke)
2:10p	ISMRMRD: A standard for MRI Raw Data	Michael Hansen (NIH)
2:30p	Discussion (moderator led, 20 minutes)	Julie DiCarlo (Spire Sciences)

Session 8: Emerging Technologies in MRI (Future standards)

Time	Topic	Speaker
3:00p	Hyperpolarized ¹³ C MRI - Standardization	John Kurhanewicz (UCSF)
3:20p	Quantitative Fat measurement	Michael Middleton (UCSD)
3:40p	Simultaneous MR PET Imaging: Challenges for Accurate Quantification and Standards	David Faul (Siemens)
4:00p	Standards for MT and CEST	Peter van Zijl (Johns Hopkins)
4:20p	Discussion (moderator led, 20 minutes)	Karl Stupic (NIST)

Tours of NIST available.

Wednesday July 16**Session 9: Computational and virtual phantoms**

Time	Topic	Speaker
8:30a	Medical device and MRI simulations	Sunder Rajan (FDA)
8:50a	MRI simulators and their performance	Zydrunas Gimbutas (NIST)
9:10a	SAR measurements and models	Christopher Collins (NYU)
9:30a	Discussion (moderator led, 20 minutes)	Stephen Russek (NIST)

Session 10: Standards for MRI: What is needed and who should do it?

Time	Topic	Moderator
10:00a	Summary of workshop	
10:15a	Discussion (moderator led, 1+ hours)	Ajit Jillavenkatesa (NIST) and Ed Jackson (Wisconsin)
	- Review what is needed by our community	
	- Outline who will work on what	

Tours of NIST available at 1:30p. Please meet in the Building 1 lobby (along Broadway).