QIBA Ultrasound Shear Wave Speed (SWS)
Phantom-System Measurement Testing
Monday, August 6, 2012; 1 PM CT
Call Summary

In attendance

Brian Garra, MD (Co-Chair)	Ted Lynch, PhD	Clark Zhe Wu, PhD
Timothy J. Hall, PhD (Co-Chair)	Andy Milkowski, MS	Hua Xie, PhD
Cristel Baiu, MS	Nicolas Rognin, MSc, PhD	
Jeremy Bercoff, PhD	Cedric Schmitt, PhD	**RSNA**
Paul L. Carson, PhD, (QIBA Sci. Coord)	Gale Sisney, MD	Julie Lisiecki
Steven E. Fick, PhD	Keith Wear, PhD	Madeleine McCoy

Elastography Phantoms Based on Hydrogels from Agar, Gelatin and Their Mixtures (Dr. Hall)

- Discussion of the advantages of gelatin vs. agar for use in US phantoms
  - Both agar and gelatin can be used for multi-modality phantoms
  - Gelatin may be the best choice presently, because
    - Agar doesn't bond to agar
    - Agar doesn't bond to gelatin
    - Gelatin *does* bond to gelatin

- Hydrogels have a long history as tissue-mimicking ultrasound phantoms
  - More than 15 years of development and testing as elastography phantom materials
  - Nearly independent control over all compressional and shear wave properties
  - Small-strain shear properties range from <<1kPa to >1MPa
  - Elastic nonlinearity at least similar to breast tissues
  - Tan δ values similar to liver are achievable by NIST, academia and manufacturers.

- Phantom material development still underway
  - Active area of research in the University of Wisconsin-Madison lab
  - Many variables to investigate:
    - Polysaccharide type
    - Gel component concentrations
    - Cross-linking agent (e.g. formaldehyde) concentration

- Long-term stability needs to be documented
  - Exposure to air is the only problem with gel-based hydrogels
    - Hydrogels may be the best materials for use in a phantom now
  - Polyacrylamides are also a consideration, given their similar properties

- Dr. Hall's presentation will be available on the WIKI for group reference at: http://qibawiki.rsna.org/index.php?title=Phantom_Development_Subcommittee

Next steps:

- For the next t-con, Dr. Hall will discuss the device for measuring complex shear moduli that was developed by the University of Wisconsin-Madison, and Dr. Schmitt will present a discussion of measurements and biomaterial characterization with commercially available systems.

Next calls:

- Phantom Subcommittee – **Monday, August 27, 2012 at 1:00 PM CT** (Drs. Hall and Garra to moderate)