

## QIBA Multi-parametric Metrology Call

29 June 2020 at 2 PM CT

### Call Summary

#### In attendance

Nancy Obuchowski, PhD (Chair)  
Huiman Barnhart, PhD  
Patricia Cole, PhD, MD  
Jana Delfino, PhD

Alex Guimaraes, MD, PhD  
Erich Huang, PhD  
Chaya Moskowitz, PhD  
Gene Pennello, PhD

David Raunig, PhD  
Daniel Sullivan, MD  
Ying Tang, PhD

#### RSNA

Joe Koudelik  
Julie Lisiecki

**Moderator:** Dr. Raunig

#### Approval of Call Summary

- The notes from June 17, 2020 were approved as presented

#### Use Case #1, Multi-dimensional descriptor: (Dr. Raunig)

- The paper will concentrate on a purely mathematical endpoint/biomarker
- Introduction text is the same as Dr. Huang's (use case #3); Dr. Raunig thinks this brief use case summary might be good to add to all of the papers
- Question: What are we trying to measure?
  - Identification of disease constructs
  - How correlated are these constructs to each other?
    - Example used was tumor volume and necrosis
      - Need multi-dimensional constructs
      - May have biomarkers that are anti-complementary
      - Need to understand univariate operating characteristics
- The context of use (COU) has been slightly changed; intended use is part of the COU, defined by the type of biomarker or study
- Intended use may pertain to clinical care, whereas COU may more likely pertain to trial use
- All diseases are multi-dimensional and must measure construct, i.e., the loss of long-term memory cannot be measured, but hippocampal atrophy, which is the result of long-term memory loss, can be measured
- A concrete example should be inserted for section 5.2
  - The prostate and Alzheimer's Disease are good examples
  - A description of the methods to be used will be needed to finalize the model
    - A discussion of the advantages and disadvantages of each method would be helpful
    - GLMnet was mentioned
    - Interpretable machine learning was discussed in the context of predictors being explainable and interpretable, demonstrating the validity of the components
- The Letter of Intent (LOI) was discussed regarding drug development and qualification packages
  - A better understanding of clinical outcomes is needed
  - Biomarkers must be correlated to outcomes as a reasonable surrogate
- Mr. Buckler may have some helpful data based on multiple variables for use case #1 from atherosclerosis studies

#### Action items:

- Dr. Barnhart to share article in *Nature* by Dr. Cynthia Rudin on interpretable machine learning
- Dr. Raunig to reach out to Mr. Buckler re: access to atherosclerosis study data

**Next call:** Dr. Delfino to present on Phenotype classification (Use case 2) on Wednesday, July 15<sup>th</sup> at 10 am CT

**Call Schedule:**

<b>Date:</b>	<b>Topic:</b>	<b>Lead:</b>
Wednesday, July 15 (10 am CT)	<b>Use case 2:</b> Phenotype classification	Dr. Delfino
Monday, July 27 (2 pm CT)	<b>Use case 3:</b> Risk prediction	Dr. Huang
Wednesday, Aug 12 (10 am CT)	<b>Use case 4:</b> Radiomics	Dr. Wang
Monday, August 24 (2 pm CT)	<b>Use case 1:</b> Multi-dimensional descriptor	Dr. Raunig

**Use cases:**

- **Use case 1:** (Multi-dimensional descriptor) a panel to determine how to care for a patient
- **Use case 2:** (Phenotype classification) rule or decision tool to diagnose phenotype
- **Use case 3:** (Risk prediction) several biomarkers will be evaluated to create a prediction or risk score
- **Use case 4:** (Radiomics) may not have a specific biomarker for reference