International Journal of Biomedical Imaging

# Special Issue on
# Dealing with Uncertainty in Reporting and Diagnosis

## Call for Papers

Historically, the success of biomedical imaging applications such as computer-aided diagnosis (CADx) and computer-aided detection (CADe) has been evaluated against a ground truth, as determined by a domain expert. However, the continuing release of research datasets in which multiple experts were engaged has revealed that generally no single ground truth exists for image-based tasks; radiologists often disagree about the existence of pathology, and they disagree on the characteristics of pathology which they agree exists. Further, there is often uncertainty in radiology reports, uncertainty in pathology tests that subsequently may be ordered, and even uncertainty in the imaging modality and equipment used to perform the study. To deal with these uncertainties requires a rethinking of the way in which CADx and CADe algorithms are not only evaluated, but also on the way in which they are constructed.

We invite investigators to contribute original research as well as review articles that will stimulate continuing efforts to design CADx and CADe systems that can deal with uncertainty in a way that is useful to clinicians. We are particularly interested in articles describing methods of modeling uncertainty that generate outcomes which improve clinical diagnoses by decreasing false negatives and positives. However, we are also interested in articles that propose realistic and effective ways of reducing uncertainty prior to the training of a CADx or CADe system. Finally, we welcome contribution with regard to ROC analysis for uncertain labels. Potential topics include, but are not limited to:

- Probabilistic machine learning
- Evaluation metrics based on distributional labels
- Noise reduction on expert evaluation
- Reliable information extraction from imaging reports
- Reconciliation of imaging studies and related pathology reports
- Evaluation of scanner-specific parameters and their influence on image analysis algorithms
- Confidence in classification of tissue types or images
- Multilabel classification and hierarchical classification of medical and/or imaging data
- Expert agreement in diagnosis
- Resources allowing to evaluate uncertainty and tools dealing with it
- Establishing requirement specifications (e.g., sensitivity, specificity, lesion size, and contrast, etc.)

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### Lead Guest Editor

**Jacob Furst,** School of Computing, DePaul University, Chicago, IL 60604, USA; jfurst@cdm.depaul.edu

### Guest Editors

**Daniela Raicu,** School of Computing, DePaul University, Chicago, IL 60604, USA; draicu@cdm.depaul.edu

**Samuel Armato III,** Department of Radiology, The University of Chicago, Chicago, IL 60637, USA; s-armato@uchicago.edu

**Thomas M. Deserno,** Department of Medical Informatics, RWTH Aachen University, 52056 Aachen, Germany; tdeserno@mi.rwth-aachen.de

**Henning Muller,** University of Applied Sciences Western Switzerland (HES-SO), 2800 Delémont, Switzerland; henning.mueller@hevs.ch