

BIOGRAPHICAL SKETCH

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NAME: Obuchowski, Nancy A

eRA COMMONS USER NAME (credential, e.g., agency login): NANCYOBUCHOWSKI

POSITION TITLE: Vice Chair, Department of Quantitative Health Sciences, Professor of Medicine, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Completion Date MM/YYYY	FIELD OF STUDY
University of New Hampshire, Durham, NH	BS	1984	Biology
University of Pittsburgh, Pittsburgh, PA	MS	1987	Biometry
University of Pittsburgh, Pittsburgh, PA	PhD	1991	Biometry

A. Personal Statement

I have been analyzing imaging data (diagnostic, screening, and quantitative biomarker data) and developing new study designs and methods of analysis for over 30 years. I have authored or co-authored 200+ journal papers in the imaging literature, as well as three books on statistical methods for diagnostic test imaging. I have served as co-director of metrology workshops on quantitative imaging biomarkers, editor of a special series on quantitative imaging for Statistical Methods in Medical Research, co-director of RSNA's clinical trials methodology workshops, and steering committee member and statistician for the Quantitative Imaging Biomarker Alliance. I am a fellow of the American Statistical Association. I have strong interests in the role of quantitative imaging biomarkers in clinical trials.

B. Positions, Scientific Appointments, and Honors**Positions and Employment**

2019 – Present Chairman of QIBA's metrology committee on multi-parametric imaging biomarkers
 2012 – 2014 Co-director of RSNA workshop on Clinical Trials in Imaging
 2011 – 2014 Co-director of RSNA workshop on Quantitative Imaging Biomarkers
 2009 – Present Professor of Medicine, Cleveland Clinic Lerner College of Medicine of Case Western Reserve University
 2005 – Present Vice Chair, Department of Quantitative Health Sciences, Cleveland Clinic
 2003 – Present Full Staff, Cleveland Clinic, Department of Quantitative Health Sciences

Other Experience and Professional Memberships

2017 – Present NCI Clinical Imaging Steering Committee member
 2014 – 2015 Statistical Methods in Medical Research (SMMR) Editor of Special Series on Quantitative Imaging Biomarkers
 2013 – Present ECOG-ACRIN DSMB member for imaging studies
 2013 – Present Steering Committee for Quantitative Imaging Biomarker Alliance (QIBA)

Honors

2021 Distinguished Lecturer in Modern Statistical Modeling, AAPM
 2015 University of Pittsburgh Public Health Distinguished Alumni
 2008 Fellow of the American Statistical Association

C. Contributions to Science

1. Obuchowski has investigated study design issues, particularly sample size, for a variety of multi-reader ROC study designs. The statistical methodology, which she developed, is commonly used to plan multi-reader ROC studies.
 - a. Obuchowski NA. Multi-reader ROC Studies: A Comparison of Study Designs. *Academic Radiology* 1995; 2:709-716.
 - b. Obuchowski NA and McClish DK. Sample Size Determination for Diagnostic Accuracy Studies Involving Binormal ROC Curve Indices. *Statistics in Medicine* 1997; 16: 1529-1542.
 - c. Obuchowski NA. Reducing the number of reader interpretations in MRMC studies. *Acad Radiol.* 2009; 16: 209-217.
2. Obuchowski has investigated the estimation and comparison of accuracy data (i.e. ROC area, sensitivity, specificity) when the data are clustered, which is a common scenario in imaging data. The methods for clustered data can be applied to scenarios where radiologists are asked to locate all suspicious findings on an image (a special case of clustered data). Several papers on clustered imaging data and lesion location data were written:
 - a. Obuchowski NA. Nonparametric Analysis of Clustered ROC Curve Data. *Biometrics* 1997; 53:170.
 - b. Obuchowski NA. On the Comparison of Correlated Proportions for Clustered Data. *Statistics in Medicine* 1998; 17: 1495-1507.
 - c. Obuchowski NA, Mazzone PJ, Dachman AH. Bias, underestimation of risk, and loss of statistical power in patient-level analyses of lesion detection. *European Radiology* 2010; 20: 584-594.
 - d. McGowan LD, Bullen JA, Obuchowski NA. Location bias in ROC studies. *Statistics in Biopharmaceutical Research* 2016; 8: 258-267.
3. Obuchowski has been interested in conducting collaborative studies on screening with imaging, with particular consideration to patient-reported outcomes. These collaborations have triggered many clinical questions about the role of MRI:
 - a. Jensen MC, Brant-Zawadzki MN, Obuchowski N, Modic M, Malkasian D, and Ross JS. Magnetic Resonance Imaging of the Lumbar Spine in People Without Back Pain. *New England Journal of Medicine* 1994; 331:69-73.
 - b. Modic MT, Ross JS, Obuchowski NA, Browning K, Cianflocco AJ and Mazanec DJ. Contrast Enhanced MR Imaging in Acute Lumbar Radiculopathy: A Pilot Study of the Natural History. *Radiology* 1995; 195:429-435.
 - c. Obuchowski NA, Modic MT, Magdinec M and Masaryk TJ. An Assessment of the Efficacy of Noninvasive Screening for Patients with Asymptomatic Neck Bruits. *Stroke*, 1997; 28:1330-1339.
4. Obuchowski and colleagues wrote about common biases in screening studies, as well as developed new statistical approaches for designing screening studies:
 - a. Obuchowski NA, Graham RJ, Baker ME, Powell KA. Ten criteria for effective screening: their application to multi-slice CT screening for pulmonary and colorectal cancers. *AJR* 2001; 176: 1357.
 - b. Obuchowski NA, Lieber M. The effect of misclassification in screening trials: a simulation study. *Contemporary Clinical Trials* 2008; 29: 125-135.
 - c. Obuchowski NA. Estimating sample size for a randomized clinical trial of lung cancer screening. *Contemporary Clinical Trials* 2008; 29: 466-77.
5. Recently, Obuchowski has been interested in statistical methods for quantitative imaging biomarkers. New methods are being developed and applied to work by the Quantitative Imaging Biomarker Alliance:
 - a. Obuchowski, NA, Reeves, AP, Huang, EP et al. Quantitative imaging biomarkers: A review of statistical methods for computer algorithm comparisons. *Stat. Methods Med. Res.* 2015; 24:68-106.
 - b. Obuchowski NA, Buckler A, Kinahan P, Chen-Mayer H, Petrick N, Barboriak DP, Bullen J, Barnhart H, Sullivan DC. Statistical Issues in Testing Conformance with the Quantitative Imaging Biomarker Alliance (QIBA) Profile Claims. *Academic Radiology* 2016; 4: 496-506.
 - c. Obuchowski NA, Bullen J. Quantitative Imaging Biomarkers: Effect of Sample Size and Bias on Confidence Interval Coverage. *Statistical Methods in Medical Research* 2018; 27: 3139-3150.
 - d. Obuchowski NA, Mozley DP, Matthews D, Buckler A, Bullen J, and Jackson E. Statistical Considerations for Planning Clinical Trials with Quantitative Imaging Biomarkers. *Journal National Cancer Institute* 2019; 111: 19-26.
 - e. Obuchowski NA, Remer E, Sakaie K, Schneider E, Fox R, Nakamura K, Guimaraes A. Importance of Incorporating Quantitative Imaging Biomarker Technical Performance Characteristics when Estimating Treatment Effects. *Clinical Trials* 2021, 18: 197-206.