

**NBOME 2017  
RESEARCH ADVISORY FORUM**

**INNOVATIVE  
ITEM TYPES AND  
ASSESSMENTS**

**OCT. 17  
2017**

**NBOME  
CHICAGO  
CORPORATE  
OFFICES  
AND  
CONFERENCE  
CENTER**

# 2017 Research Advisory Forum

This year's Research Advisory Forum brings together experts in the field of **innovative item types and assessments** for roundtable discussions and presentations on the development, practice and implementation of innovative measurement for high-stakes licensure testing. In its mission to protect the public, by providing the means to assess competencies for osteopathic medicine and related health care professions, the NBOME promotes scholarly research to disseminate evidence to support validity of assessments. Our research team has been presenting and publishing research work at professional conferences and journals. For details, please visit NBOME website at <https://www.nbome.org/publications/published-research/>.



## About the National Board of Osteopathic Medical Examiners

The National Board of Osteopathic Medical Examiners (NBOME) is an independent, nongovernmental, not-for-profit organization whose mission is to protect the public by providing the means to assess competencies for osteopathic medicine and related health care professions.

# Agenda

Oct. 17

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- 7:30 AM**      **Breakfast**
- 8:00 AM**      **Welcome & Introductions**  
*David Kuo, DO*
- 8:20 AM**      **Overview of the 2017 Research Advisory Forum**  
*Edward Tsai, PhD*
- 8:30 AM**      **About NBOME**  
*Joseph Flamini, MBA and Jeanne Sandella, DO*
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## INNOVATIVE ITEMS

- 9:00 AM**      **NCSBN Research on Nursing Clinical Judgment and Next Generation NCLEX Item Prototypes**  
The National Council of State Boards of Nursing (NCSBN) developed a clinical judgment framework to better address the regulatory needs of assessing clinical judgment skills of entry-level nurses. This session will introduce the NCSBN clinical judgment framework, discuss clinical judgment components, and demonstrate several new item prototypes developed using this framework.  
*Ada Woo, PhD, introduced by Cathy Shao, PhD*
- 9:20 AM**      **Point-of-Care, Knowledge, Education, and Testing: Developing a New Item Format**  
This presentation will describe the rationale for developing Point-of-Care, Knowledge, Education, and Testing (POCKET), the outcomes of the initial pilot study, and next steps for testing.  
*Dot Horber, PhD, introduced by David Kuo, DO*
- 9:40 AM**      **Research on Automated Item Generation**  
In this presentation, a project to automate the process of generating test items for the COMLEX-USA examination process, collecting diagnostic data from websites and item generation using the program R will be discussed. The ultimate goal of this project is to reduce costs associated with the item generation process and to increase our available item pool.  
*Ruben Castaneda, PhD and Qiuming Zhang, MS, introduced by Cathy Shao, PhD*
- 10:00 AM**      **Break**
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## EVALUATION OF INNOVATIVE ITEMS

- 10:20 AM**      **Designing Effective Psychometric Feedback for Evaluating and Revising Innovative Items**  
This presentation will discuss possible methods for response and score analysis for innovative items, as well as experimental research that has evaluated the effect of providing different forms of feedback to content developers. Our research has shown that response analysis for multiple response items produced a statistically significant improvement in item revisions, while our work with ordered list items has not shown improvements.  
*Kirk A. Becker, PhD, introduced by Kimberly Hudson, MEd*

# NBOME 2017 RESEARCH ADVISORY FORUM

- 10:40 AM**     **Applying the Classification Tree Method to Predict a “Killer” in Clinical Decision-Making**  
This study proposes to apply different supervised learning procedures such as classification tree to examination and demographics data and build a predictive model for misdiagnosis and overtreatment as evidenced in performance on the clinical decision-making/key features cases. Identified predictors and their effects will connect a DO’s school learning with patient outcomes.  
*Qiongqiong Liu, MS, introduced by Edward Tsai, PhD*
- 11:00 AM**     **Practice Effects and Score Gains on Innovative Items**  
This presentation summarizes evidence suggesting that novel assessment formats are more susceptible than multiple-choice questions (MCQs) to score gains from repeat examinees and to non-ignorable drift in item difficulty parameters. Specially, the presentation will cover a summary of retest effects and assessment format on personnel tests and credentialing exams, and a recent study demonstrating large amounts of item parameter drift for a novel MCQ format involving the use of multi-media for the assessment of cardiac auscultation skills. Following, the implications for examinee preparation and score scaling are discussed.  
*Mark Raymond, PhD, introduced by Anthony Errichetti, PhD*
- 11:20 AM**     **Innovative Items Discussion Room A-B**  
*Ada Woo, PhD, Dot Horber, PhD, Ruben Castaneda, PhD, Qiuming Zhang, MS, moderated by Kimberly Hudson, MEd*
- Evaluation of Innovative Items Discussion Room C**  
*Kirk A. Becker, PhD, Qiongqiong Liu, MS, Mark Raymond, PhD, moderated by Edward Tsai, PhD*
- 11:50 AM**     **Lunch**
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## INNOVATIVE ASSESSMENTS

- 12:20 PM**     **Computerized Adaptive Testing: Introduction, Theory, Application, Issues, and Research**  
The presentation will provide the essential background information on computerized adaptive testing (CAT) with an emphasis on operational CAT algorithm design, application, issues, and research for different types of assessment including diagnostic, summative, and placement examination. Through this presentation, the audience will have a deeper understanding of various CAT algorithms and realize the insightful information through various examples.  
*Chingwei David Shin, PhD, introduced by Edward Tsai, PhD*
- 12:40 PM**     **Using the Continuous Knowledge Self-Assessment**  
In January 2017, the American Board of Family Medicine (ABFM) introduced the Continuous Knowledge Self-Assessment (CKSA) as a self-assessment activity. Although it was not intended as a learning (about medical content) activity, it is quite likely that participants will learn some medical content. It was meant to be easy and convenient to use, as well as to provide useful feedback to guide the physicians’ continuing medical education and seems to be reasonably successful so far. This presentation will discuss the ABFM experience with this assessment and efforts to improve the usefulness and ease of use of the feedback.  
*Thomas R. O’Neill, PhD, introduced by Larissa Smith, PhD*
- 1:00 PM**     **Action Design and the Assessment Program**  
Research from several fields has identified a number of tools that can help provide the right kind of additional support, to help keep the individual on track. When these methods are implemented well they can support a person in making behavioral changes that he or she wants to make and that help the person become his or her best self. This presentation will discuss applications of action design for instruction and assessment potentially including:

better retention in courses and programs; increased completion of entire surveys; reduced cheating in remote assessments; and greater candidate trust for the sponsoring organization.

*Cynthia G. Parshall, PhD, introduced by Melissa Turner, MS*

**1:20 PM**      **Scoring Performance-Based Assessments**

The presentation will provide an overview of the psychometric issues that should be considered when developing and scoring performance-based assessments. Some emerging scoring technologies will also be highlighted.

Following this presentation, the learner will be able to: 1) understand fundamental scoring and scaling issues, 2) develop (or choose) appropriate scoring rubrics that are aligned with skills being assessed, and 3) identify factors that could impact the reliability and validity of scores.

*John (Jack) R. Boulet, PhD, introduced by Jeanne Sandella, DO*

**1:40 PM**      **Break**

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## INNOVATIVE ASSESSMENTS APPLIED TO MEDICAL LICENSURE

**1:50 PM**      **A Continuous Assessment Model for Maintaining Certification**

Rapid changes in modern medicine, along with advances in the science of learning and memory, are necessitating a shift in the way medical knowledge is assessed across the span of one's career. In 2017, the American Board of Pediatrics launched a pilot that reexamined how it assesses cognitive knowledge to include a continuous model, rather than a point-in-time examination, that also incorporates lifelong learning. The presentation will provide an overview of the new assessment model along with preliminary pilot results.

*Linda A. Althouse, PhD, introduced by Dot Horber, PhD*

**2:10 PM**      **Integrating an OSCE into Board Certification for Anesthesiology**

In 2018, the American Board of Anesthesiology (ABA) will add an Objective Structured Clinical Examination (OSCE) to its staged examination system for certification in the specialty of anesthesiology. This presentation will provide an overview of what skills the ABA's OSCE has been designed to assess, as well as how the examination is being developed and validated.

*Ann E. Harman, PhD, introduced by Joseph Flamini, MBA*

**2:30 PM**      **Use of Longitudinal Assessment Methods for Maintenance of Certification by ABMS Boards**

The majority of the 24 member boards in the American Board of Medical Specialties (ABMS) are developing longitudinal assessment programs (LAP) as part of the Maintenance of Certification (MOC) programs required of practicing diplomates. This presentation will review LAP design to make MOC more relevant, effective, and enjoyable, by incorporating principles of test-enhanced learning (spaced repetition and rehearsal practice) and advances in internet-based assessment (including delivery on mobile devices).

*David B. Swanson, PhD, introduced by Sandra Waters, MEM*

**2:50 PM**      **Innovative Assessments Discussion Room A-B**

*Chingwei David Shin, PhD, Thomas R. O'Neill, PhD, Cynthia G. Parshall, PhD, John (Jack) R. Boulet, PhD, moderated by Jeanne Sandella, DO*

**Innovative Assessments Applied to Medical Licensure Discussion Room C**

*Linda A. Althouse, PhD, Ann E. Harman, PhD, David B. Swanson, PhD, moderated by William Roberts, EdD*

**3:20 PM**      **Summary and Wrap-up**

*David Kuo, DO*

# NBOME 2017 RESEARCH ADVISORY FORUM

## RESEARCH ADVISORY FORUM PRESENTERS

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### Linda A. Althouse, PhD

Linda A. Althouse, PhD, is the Vice President of Psychometrics and Assessment Services at the American Board of Pediatrics (ABP) where she oversees the test development and psychometric activities for all ABP examinations. She manages and is active in numerous collaborative projects involving innovative assessment approaches, lifelong learning, and the next generation of continuous professional development models for physicians. Dr. Althouse holds a master's degree in Mathematics, a PhD in Educational Psychology from the University of North Carolina (UNC) at Chapel Hill and completed a post-doctoral fellowship at the UNC School of Medicine Office of Educational Development. She has also taught graduate and undergraduate level courses in mathematics, measurement, research design, and statistics.

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### Kirk A. Becker, PhD

Kirk A. Becker, PhD, is a Senior Research Scientist with Pearson. He has over twenty years' experience conducting research and performing operational work in measurement and psychometrics. Dr. Becker has conducted research and worked operationally with innovative test items, performance testing, principled item development, and exam formats including adaptive testing computerized adaptive testing (CAT) and multi-stage testing (MST). His current research focuses on efficient methods for evaluating and coding large item pools using natural language processing. Dr. Becker received his PhD in Educational Psychology from the University of Illinois at Chicago.

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### John (Jack) R. Boulet, PhD

John (Jack) R. Boulet, PhD, is Vice President, Research and Data Resources for both the Educational Commission for Foreign Medical Graduates (ECFMG®) and the Foundation for Advancement of International Medical Education and Research (FAIMER®). Dr. Boulet holds a BSc in Mathematics from the University of Western Ontario. He is also a graduate of the University of Ottawa with an MA in Education and a PhD in Education-Measurement and Evaluation. Over the past 20 years, Dr. Boulet has worked on the development of performance-based credentialing assessments in medicine. He has published extensively in the field of medical education, focusing specifically on measurement issues pertaining to performance-based assessments, including objective structured clinical examinations (OSCEs) and various mannequin-based evaluation methodologies.

## Ruben Castaneda, PhD

Ruben Castaneda, PhD, is an Associate Psychometrician in the NBOME Assessment Services department. He received his Bachelor of Arts degree in Psychology from California State University, Fresno, and his PhD in Quantitative Psychology from the University of California, Merced. Dr. Castaneda has been an active participant in developmental and clinical research since 2008. Most recently, his focus has been on issues with IRT including model fit, violations of assumptions and multidimensionality. Dr. Castaneda is responsible for performing psychometric operations including test design, item and test analyses, and reporting for various NBOME examinations. He also participates in the designing and executing original and applied psychometric research.



## Joseph Flamini, MBA

Joseph Flamini, MBA, joined the National Board of Osteopathic Medical Examiners in January 2014 as the Vice President for Administration/Chief Operations Officer (VPA/COO). Mr. Flamini has extensive, progressive experience in health care operations, customer satisfaction improvements and development of effective, collaborative working relationships with staff and medical leaders. He has been part of the leadership team in various organizations including Philadelphia College of Osteopathic Medicine, Lourdes Health System, St Francis Medical Center and Bancroft. In his role as VPA/COO, Mr. Flamini serves as the “chief of staff” for the organization as a whole, and has direct oversight of Administration, Information Technology, Legal and Facilities activities.



## Ann E. Harman, PhD

Ann E. Harman, PhD, is Chief Assessment Officer for the American Board of Anesthesiology (ABA). She provides overall leadership and management of all ABA programmatic functions, including credentialing services, examination development and administration, the Maintenance of Certification in Anesthesiology (MOCA) Program and psychometric and research services. Dr. Harman earned a Bachelor of Science in Philosophy from the University of Utah, a Master of Education in Counselor Education and a PhD in Educational Research Methodology, both from the University of North Carolina at Greensboro (UNCG). She completed a post-doctoral fellowship with the UNCG Center for Educational Research and Evaluation, where she supported the development and validation of a national performance-based assessment and certification system for K-12 teachers through the National Board for Professional Teaching Standards (NBPTS). Dr. Harman’s research interests include large-scale performance assessment, validation, and standard-setting.



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### Dot Horber, PhD

Dot Horber, PhD, holds a PhD in Experimental Psychology with concentration in Tests and Measurements from Fordham University in NYC. Her doctoral dissertation investigated the relationship between attitudes toward, and performance on, multiple-choice testing and creativity. She is a member of Phi Beta Kappa. Dr. Horber is currently the Director of Continuous Professional Development at the National Board of Osteopathic Examiners, the leading assessment organization for the osteopathic medical profession. Her research interests focus on the development of novel assessments.

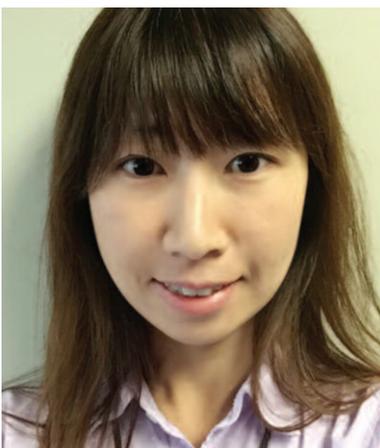
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### David Kuo, DO

David Kuo, DO, is the Associate Dean for Graduate Medical Education and Associate Professor of Family Medicine at the Philadelphia College of Osteopathic Medicine (PCOM). Dr. Kuo is a 1996 graduate of PCOM who joined the Family Medicine faculty in 1999 after completing his family medicine internship and residency at PCOM. He has been actively involved with graduate medical education since he started at PCOM. Dr. Kuo serves as the National Chair for the COMLEX-USA Level 2-PE, and is a member of the Level 2-PE Advisory Committee, the SOAP Note Misrepresentation Subcommittee and the COMLEX-USA Composite Examination Committee. He became a member of the NBOME Board in December 2015.

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### Qiongqiong Liu, MS

Qiongqiong Liu, MS, received her undergraduate degree from Dalian Medical University in Liaoning, China. She earned a MS in Applied Statistics from Wright State University in Fairborn, Ohio. She currently works as Senior Research Associate in the NBOME's Assessment Services department. She has worked on the Clinical Decision Making project since 2015. She collaborates with psychometricians to conduct research on data mining and predictive modeling.

## Thomas R. O'Neill, PhD

Thomas R. O'Neill, PhD, earned his BS in Psychology and his MA in Clinical Psychology at Xavier University in Cincinnati. He earned his PhD in Educational Psychology from the University of Illinois at Chicago. Since 1990, Dr. O'Neill has specialized in the application of psychometric procedures to certification and licensure examinations. Starting in 2008, he has served as the Vice President of Psychometric Services for the American Board of Family Medicine (ABFM). He has presented many papers on psychometrics at national and regional conferences. His areas of interest are the application of measurement principles to certification and licensure tests, the theory of measurement, validity studies, computerized adaptive testing (CAT), rater mediated performance assessments, and the detecting of cheating.



## Cynthia G. Parshall, PhD

Cynthia G. Parshall, PhD, is the Principal Consultant with Touchstone Consulting. She holds a PhD in Educational Measurement and Research and a MEd in Instructional Technology, both from the University of South Florida. Dr. Parshall's work focuses on the intersection of technology with assessment, especially in the design of innovative item types to improve assessment fidelity and in the application of action design tools to help our examinees be their best selves.



## Mark R. Raymond, PhD

Mark Raymond, PhD, is Research Director and Principal Assessment Scientist at the National Board of Medical Examiners. For 30 years he has worked for and consulted with licensing agencies, professional associations, and universities on test development and psychometric activities ranging from item-writing workshops to standard-setting studies. His scholarly interests include job analysis and test blueprint development, generalizability theory, and performance-based assessment. He serves on editorial boards for journals in health care and testing, and recently coedited the *Handbook of Test Development* (2nd ed., 2016) with Suzanne Lane and Tom Haladyna. Dr. Raymond received his doctorate in Educational Psychology from Penn State in 1985.



# NBOME 2017 RESEARCH ADVISORY FORUM

## RESEARCH ADVISORY FORUM PRESENTERS



### Jeanne Sandella, DO

Jeanne Sandella, DO, accepted the position of Vice President for Clinical Skills Testing at the National Board of Osteopathic Medicine in April 2012. Dr. Sandella is responsible for the COMLEX-USA Level 2-Performance Evaluation and the NBOME's two National Centers for Clinical Skills Testing (NCCST), as well as other NBOME initiatives in clinical skills assessment and continuous professional development. Dr. Sandella has been affiliated with the NBOME since 2002, and has served as the organization's full-time Associate Director for Case Development and Standardized Patient Training at the NCCST since 2008.



### Chingwei David Shin, PhD

Chingwei David Shin, PhD, Manager, Principal Research Scientist at Pearson, graduated from the Educational Measurement and Statistics at the University of Iowa, develops and maintains computer-adaptive testing (CAT) algorithms for state testing programs including the Virginia (VA) Standards of Learning (SOL) tests and the Minnesota MCAIII testing program. Previously, Dr. Shin led psychometric research efforts for developing Pearson's TestNav™ CAT algorithm and for the CAT algorithm implemented in the ACCUPLACER™ test. Dr. Shin is the author of more than 30 publications, software, software manual, research reports, and presentations. His research interests include subscale score estimation, ability estimation, computerized testing, and equating. Dr. Shin also serves as a reviewer for several professional journals and organizations.



### David B. Swanson, PhD

David B. Swanson, PhD, is Vice President in the Academic Affairs unit at the American Board of Medical Specialties (ABMS); he also holds an honorary professorial appointment at the University of Melbourne Medical School. Before joining ABMS, he worked at the National Board of Medical Examiners for 25+ years and the American Board of Internal Medicine for seven years. His research interests include assessment of medical decision making with multiple-choice tests and written/computer-based clinical simulations; measurement of clinical and communication skills with real and standardized patients; patterns of performance on admissions, in-training, licensure and certification examinations; and computer-based testing. Dr. Swanson received his doctorate in Educational Psychology from the University of Minnesota in 1978.

## Edward Tsai, PhD

Edward Tsai, PhD, joined the NBOME in March 2016 as Associate Vice President for NBOME Assessment Services and Research. Dr. Tsai oversees the operations for NBOME Assessment Services department, assuring and maintaining the quality of the assessments and standards for testing. In collaboration with other team members, he assists with long-range planning, design and execution of test development and psychometric operations, and serves as lead for the NBOME research program. Dr. Tsai earned a BBA in Statistics from Tung-Hai University in Taiwan, and both an MA and PhD in Educational Measurement and Applied Statistics from the University of Iowa. Dr. Tsai has more than 15 years of experience leading and managing large-scale, high-stakes examination programs and as a supervisor of psychometric staff. His professional experience includes directing and managing psychometrics, research and development for related assessment organizations. He has been published widely in the areas of psychometrics in the health professions, including standard setting, validity, and reliability research.



## Ada Woo, PhD

Ada Woo, PhD, assumed the role of Senior Director of Strategy Implementation and Operations at the ACTNext division of ACT in September 2017. Until recently, she was Director of Measurement and Testing at the National Council of State Boards of Nursing (NCSBN). NCSBN develops four nursing and allied health examinations, including its flagship NCLEX program. Dr. Woo was responsible for the psychometrics and research of NCSBN's examinations. She has over a decade of experience in the testing industry. In 2016, Dr. Woo served as chairperson of the Association of Test Publishers (ATP) Certification and Licensure Division. Prior to joining NCSBN, she was a part of the psychometric team at the Federation of State Boards of Physical Therapy. She holds a doctorate in Quantitative Psychology from the University of Texas at Arlington.



## Qiuming Zhang, MS

Qiuming Zhang, MS, is a Research Associate in the NBOME Assessment Services department. She received her Bachelor of Science from Liaocheng University and her Master of Science in Mathematics from Purdue University at Calumet. Previously, Ms. Zhang worked as a Research Assistant at Purdue University, where she did some research about applications on statistical distribution theory, and for the past months has provided vital support to the NBOME's psychometric team. She is responsible for scoring and reporting NBOME examinations, and assisting test development by equating and providing statistics for item analysis and key validation. Her interest in assessment is identifying enemy item and applying artificial intelligence (AI) to real problems.





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# NBOME

NATIONAL BOARD OF OSTEOPATHIC MEDICAL EXAMINERS

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