

MATTHEW LINEBERRY, PH.D.

Assistant Professor, Department of Medical Education
Assistant Director for Research, Graham Clinical Performance Center
University of Illinois at Chicago

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EXPERTISE / RESEARCH INTERESTS

I am focused in three interconnected areas of learning science:

- (1) **Assessment for learning** - designing assessments to *foster* achievement rather than just measure it;
- (2) **Adaptive learning technology** - customizing learners' practice regimens using computer-intelligent algorithms and "big data"; and,
- (3) **Healthcare simulation** - designing deliberate practice environments that support robust, real-world-applicable learning and assessment.

EDUCATION

Ph.D., Industrial & Organizational Psychology August 2012
University of South Florida, Tampa, FL
Emphasis: Statistical Methods
Honors: Presidential Doctoral Fellowship (USF's highest graduate academic award)

B.A., Psychology December 2004
Truman State University, Kirksville, MO
Minors: East Asian Studies, Music
Honors: Valedictorian;
Psychology Student of the Year, 2004;
General John J. Pershing Scholarship (TSU's highest academic award)

PROFESSIONAL HISTORY

November 2014 – present: Assistant Director for Research
Graham Clinical Performance Center
University of Illinois at Chicago, Chicago, IL

October 2012 – present: Assistant Professor, University of Illinois at Chicago
Department of Medical Education, Chicago, IL

Past:

July 2010 – October 2012: Research Psychologist, U.S. Navy,

Naval Air Warfare Center Training Systems Division,
Orlando, FL

June 2008 – December 2008: Research Contractor, U.S. Navy,
Naval Air Warfare Center Training Systems Division,
Orlando, FL

April 2007 – April 2008: Research Assistant,
Personnel Decisions Research Institute, Tampa, FL

GRANTS AND CONTRACTS

Lineberry, M. et al. (2015; principal investigator). Leveraging assessment for learning: Optimizing challenge and engagement in an intelligent formative assessment system. National Board of Medical Examiners, Stemmler Medical Education Research Fund. Funded, \$149,995 over two years.

Julian, D. et al. (2015; co-investigator). Development of a simulation-based application for teaching human physiology through guided discovery, pure discovery, and authentic research. National Science Foundation. Funded, \$247,129 over two years.

Luciano, C. et al. (2015; co-investigator). Augmented reality proctor for simulation and training of central line placement. UIC Chancellor's Discovery Fund for Multidisciplinary Pilot Research. Funded, \$40,000 over two years.

Chua, I. et al. (2015; co-investigator). Patient experience debriefs: Medical student interviews of hospitalized patients guiding reflections on future practice. Association of American Medical Colleges (AAMC) Northeastern Group on Educational Affairs (NEGEA) Collaborative Research Grant. Funded, \$4,990 over two years.

Lineberry, M. (2013; principal investigator). Facilitating knowledge mastery with an intelligent study scheduler. University of Illinois at Chicago Center for Excellence in Teaching and Learning Curriculum and Instruction Grant. Funded, \$10,777 over one year.

Lineberry, M., & Campbell, G. (2011; principal investigator). Enhancing knowledge retention using a spaced repetition system. Naval Aviation Enterprise Chief Technology Office, Patuxent River, MD. Funded, \$285,000 over three years.

Lineberry, M., & Landsberg, C. (2011; principal investigator). Optimal learner support for improving adaptive reasoning about complex simulated systems. Naval Aviation Enterprise Chief Technology Office, Patuxent River, MD. Funded, \$138,000 over two years.

PUBLICATIONS (22)

- Bordage, G., **Lineberry, M.**, & Yudkowsky, R. (under submission). Conceptual frameworks to guide research and development in health professions education.
- Lineberry, M.**, Park, Y. S., Cook, D. A., & Yudkowsky, R. (online ahead of print). Making the case for mastery learning assessments: Key issues in validation and justification. *Academic Medicine*.
- Lineberry, M.**, Osta, A., Barnes, M., Tas, V., Atchon, K., & Schwartz, A. (online ahead of print). Educational interventions for international medical graduates: A review and agenda. *Medical Education*.
- Lee, J. Y., McDougall, E. M., **Lineberry, M.**, & Tekian, A. (accepted). Optimizing the timing of expert feedback during simulation-based spaced practice of endourological skills. *Simulation in Healthcare*.
- Cook, D. A., & **Lineberry, M.** (accepted). Consequences validity evidence: A narrative review of approaches to evaluate the impact of educational assessments. *Academic Medicine*.
- Mejia, E. I., Yudkowsky, R., Bui, J., **Lineberry, M.**, & Luciano, C. (accepted). Overview of multimodality motion tracking for training of central venous catheter placement. In L. Yilmaz, W. K. V. Chan, I. Moon, T. M. K. Roeder, C. Macal, & M. D. Rossetti (Eds.), *Proceedings of the 2015 Winter Simulation Conference*, Huntington Beach, CA, December 2015.
- Yudkowsky, R., Park, Y. S., **Lineberry, M.**, Knox, A., & Ritter, E. M. (in press). Setting mastery learning standards. *Academic Medicine*.
- Cohen, E. R., McGaghie, W. C., Wayne, D. B., **Lineberry, M.**, Yudkowsky, R., & Barsuk, J. H. (in press). Recommendations for curriculum evaluation reporting of mastery education research (CERMER). *Academic Medicine*.
- Yudkowsky, R., Cohen, E., **Lineberry, M.**, McGaghie, W. C., Kozmic, S., Gaske, M., & Barsuk, J. (2015). Setting mastery learning standards for central venous catheter insertion: A patient safety focused approach. *Simulation in Healthcare*, 10(6), 406.
- Dickter, D. N., Stielstra, S., & **Lineberry, M.** (2015). Inter-rater reliability of standardized actors vs. non-actors in a simulation-based assessment of interprofessional collaboration. *Simulation in Healthcare*.
- Mangold, K., Adler, M., **Lineberry, M.**, & Mobley, B. (2015). Development of a multi-station assessment of senior pediatrician residents. *Simulation in Healthcare*, 9(6), 419.
- Lineberry, M.** (2014). Missing the mark: The faulty logic of aggregate scoring in script concordance tests. *Medical Education*, 48, 1038-1040.
- Lineberry, M.**, Kreiter, C. D., & Bordage, G. (2014). Script concordance tests: Strong inferences about examinees require stronger evidence. *Medical Education*, 48, 451-453.
- Lineberry, M.**, Kreiter, C., & Bordage, G. (2013). Threats to validity in the use and interpretation of script concordance test scores. *Medical Education*, 47(12), 1175-1183.

- Dickter, D., Stielstra, S., & **Lineberry, M.** (2013). Not all raters are created equal: Using generalizability theory for rater-specific reliability estimation in a simulation-based assessment of interprofessional collaboration. *Simulation in Healthcare*, 8(6), 530.
- Park, Y. S., **Lineberry, M.**, Hyderi, A., Bordage, G., Riddle, J., & Yudkowsky, R. (2013). Validity evidence of a scoring rubric for the new USMLE Step 2 Clinical Skills patient note. *Academic Medicine*, 88(10), 1552-1557.
- Lineberry, M.**, Walwanis, M., & Reni, J. (2013). Comparative research on training simulators in emergency medicine: A methodological review. *Simulation in Healthcare*, 8, 253-261.
- Lineberry, M.**, Holness, D., Bryan, E., Brush, T., Carolan, T., Salas, E., & King, H. (2013). Measurement and training of TeamSTEPPS dimensions using the Medical Team Performance Assessment Tool. *The Joint Commission Journal on Quality and Patient Safety*, 39, 89-95.
- Landsberg, C. R., Mercado, A. D., Van Buskirk, W. L., **Lineberry, M.**, & Steinhauser, N. (2012). Evaluation of an adaptive training system for submarine periscope operations. Proceedings of the 56th Annual Meeting of the Human Factors and Ergonomics Society, Boston, MA, October 2012.
- Mangos, P. M., Campbell, G. E., **Lineberry, M.**, & Bolton, A. E. (2012). Emergent assessment opportunities: A foundation for configuring adaptive training environments. In P. J. Durlach & A. M. Lesgold (Eds.), *Adaptive Technologies for Training and Education*. Cambridge, UK: Cambridge UP.
- Lineberry, M.**, Ricci, K., Pharmer, J., & Milham, L. (2011). Generalizability of combat trauma procedure performance assessments for training modality research. *Simulation in Healthcare*, 6, 427.
- Burke, J., Pratt, K.S., Murphy, R., **Lineberry, M.**, Taing, M., & Day, B. (2008). Toward developing HRI metrics for teams: Pilot testing in the field. Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction, Amsterdam, The Netherlands, March 2008.

CONFERENCE PRESENTATIONS (Peer-reviewed) (26)

- Yudkowsky, R., Cohen, E., **Lineberry, M.**, McGaghie, W. C., Kozmic, S., Gaske, M., & Barsuk, J. (accepted). Setting mastery learning standards for central venous catheter insertion: A patient safety focused approach. 16th Annual International Meeting on Simulation in Healthcare, San Diego, CA, January 2016.
- Wood, S. C., Patton, S., Hubb, A. J., Lineberry, M., & Veronikis, D. K. (2015). Mid-urethral sling revision in women with recurrent stress urinary incontinence and prior anti-incontinence surgery. American Urogynecologic Society (AUGS) 36th Annual Scientific Meeting, Seattle, WA, October 2015.
- Vora, S. **Lineberry, M.**, Dobiesz, V., Robinson, D., & Snow, D. (accepted). Training the trainers: Needs assessment for procedural skill maintenance training among academic emergency

- medicine faculty. Society for Academic Emergency Medicine Annual Meeting, San Diego, CA, May 2015.
- Luciano, C., Gangemi, A., **Lineberry, M.**, Villalta, J., de la Vara, D., Yudkowsky, R., & Giulianotti, P. C. (2015). What would be the role of haptics if incorporated in robotic surgery? American College of Surgeons Accredited Education Institutes Meeting, Chicago, IL, March 2015.
- Lineberry, M.**, Osta, A., Barnes, M., Tas, V., Atchon, K., & Schwartz, A. (2014). Effectiveness of targeted educational interventions for international medical graduates during residency: A systematic review and research agenda. Association of American Medical Colleges Annual Meeting, Chicago, IL, November 2014.
- Schwartz, L., Hyderi, A., **Lineberry, M.**, & Park, Y. S. (2014). Effects of a student-initiated test preparation curriculum redesign on USMLE Step 1 examination scores. Association of American Medical Colleges Annual Meeting, Chicago, IL, November 2014.
- Schwartz, L., Hyderi, A., **Lineberry, M.**, & Park, Y. S. (2014). The “10 for ’15 Program”: A student-initiated redesign of USMLE Step 1 preparation curriculum. Association of American Medical Colleges Annual Meeting, Chicago, IL, November 2014.
- Knox, A., Elias, K., Anastakis, D., **Lineberry, M.**, Tekian, A., & Brydges, R. (2014). Comparing dynamic vs. static multimedia as preparation for complex procedural skills learning. Association of American Medical Colleges Annual Meeting, Chicago, IL, November 2014.
- Vora, S., Dobiesz, V., & **Lineberry, M.** (2014). Innovation in assessing communication and professionalism milestones of emergency medicine residents utilizing standardized patients. International Forum on Quality & Safety in Healthcare, Paris, France, April 2014.
- Lineberry, M.** (2014). Memory strength prediction accuracy in learner-adaptive software for application of the spacing and testing effects. American Educational Research Association Annual Meeting, Philadelphia, PA, April 2014.
- Lineberry, M.**, Kreiter, C., Bordage, G., & Boulet, J. (2014). Some promise and pitfalls of clinical reasoning assessment: A critical examination of the Script Concordance Test. 16th Ottawa Conference on the Assessment of Competence in Medicine and Healthcare Professions, Ottawa, ON, April 2014.
- Dickter, D. N., Stielstra, S., & **Lineberry, M.** (2014). Not all raters are created equal: Using generalizability theory for rater-specific reliability estimation in a simulation-based assessment of interprofessional collaboration. 14th Annual International Meeting on Simulation in Healthcare, San Francisco, CA, January 2014.
- Park, Y. S., **Lineberry, M.**, Hyderi, A., Bordage, G., Riddle, J., & Yudkowsky, R. (2013). Validity evidence of a scoring rubric for the new USMLE Step 2 Clinical Skills patient note. Association of American Medical Colleges Annual Meeting, Philadelphia, PA, November 2013.

- Lineberry, M.,** & Covert, M. (2013). Typical expatriate adjustment measures do not capture important differences in acculturation strategies. 25th Association for Psychological Science Annual Convention, Washington, DC, May 2013.
- Barnes, M., **Lineberry, M.,** Schwartz, A., Tas, V., Atchon, K., & Osta, A. (2013). Acculturation challenges faced by international medical graduates in the transition to residency: A systematic review of the literature. 24th Annual Meeting of the Pediatric Academic Societies, Washington, DC, May 2013.
- Adler, M., **Lineberry, M.,** Calhoun, A., & McBride, M. (2013). Understanding generalizability theory: Making sense of the data. 13th Annual International Meeting on Simulation in Healthcare, Orlando, FL, January 2013.
- Grichanik, M., **Lineberry, M.,** & Schocken, D. (2013). Stress inoculation through simulation: Measurement and design considerations. 13th Annual International Meeting on Simulation in Healthcare, Orlando, FL, January 2013.
- Ricci, K., Stout, R., Bowers, C., Cannon-Bowers, J., & **Lineberry, M.** (2012). The identification of training system requirements for combat casualty care. Interservice/Industry Training, Simulation, and Education Conference, Orlando, FL, November 2012.
- Lineberry, M.,** Walwanis, M., & Reni, J. (2012). Comparative research on training simulators in emergency medicine: A methodological review. Medical Technology, Training, and Treatment (MT3) Conference, Orlando, FL, May 2012.
- Conway, J., Way, J., Shockley, K., Jackson Walker, E., **Lineberry, M.,** & Rossi, M. (2012). Predicting teamwork attitudes using optimal distinctiveness theory. 27th Annual Meeting of the Society for Industrial and Organizational Psychology, San Diego, CA, April 2012.
- Lineberry, M.,** Campbell, G. E., & Scott, C. (2011). Toward computer adaptive training: Modeling simulator performance using item response theory. 26th Annual Meeting of the Society for Industrial and Organizational Psychology, Chicago, IL, April 2011.
- Conway, J., Way, J., Shockley, K., Jackson Walker, E., **Lineberry, M.,** & Rossi, M. (2011). The relationship between the Big 5 and team performance. 26th Annual Meeting of the Society for Industrial and Organizational Psychology, Chicago, IL, April 2011.
- Mangos, P., Campbell, G., **Lineberry, M.,** & Bolton, A. (2009). Modeling simulation-based training performance to identify emergent assessment opportunities. 24th Annual Society for Industrial-Organizational Psychology Conference, New Orleans, LA, April 2009.
- Lineberry, M.,** Mangos, P. M., Campbell, G., & Bolton, A. E. (2008). Hierarchical linear modeling of command and control prioritization performance. Department of Defense Human Factors Engineering Technical Advisory Group Meeting, Washington, D.C., November 2008.
- Prewett, M. S., Stilson, F. R. B., Willis, T. J., Jagustyn, N., **Lineberry, M.,** Tuttle, M. D., & Covert, M. D. (2006). Team process: Its consistency and relationship to team performance. *Association for Psychological Science*, New York, NY, May 2006.

INVITED PRESENTATIONS (5)

- Lineberry, M.** (2016). Digital coaching: Adaptive technology to optimize learners' deliberate practice. Invited lecture for the Northwestern University Tomorrow's Innovations in Medical Education (TIME) Series, Chicago, IL, January 2016.
- Lineberry, M.** (2015). Digital coaching: Adaptive technology to optimize learners' deliberate practice. Invited keynote address for the American College of Surgeon's Accredited Education Institutes Postgraduate Course, Stanford University, Palo Alto, CA, November 2015.
- Lineberry, M.** (2015). Learning and self-regulation. Invited talk for American Dental Education Association Annual Meeting, Boston, MA, March 2015.
- Lineberry, M.** (2014). Desirable difficulties: Strategies for supporting high-yield self-directed learning. Invited workshop for Rush University College of Medicine faculty development series.
- Lineberry, M.** (2014). Gamification in surgical education. Invited talk for Stanford University Department of Surgery Grand Rounds series, November 2014.

SPEAKING ENGAGEMENTS

- Lineberry, M.** (2015). Making it stick: Using computer intelligence for adaptive learning and enduring mastery. The American Medical Association's ChangeMedEd conference, Chicago, IL, October 2015.

HONORS AND AWARDS

- UIC College of Medicine Rising Star Award, 2015
- Semi-finalist, National Board of Medical Examiners (NBME) Centennial Prize Competition, 2015

PROFESSIONAL SERVICE

Journal Editorial Boards

- | | |
|--|----------------|
| Associate Editor, <i>Advances in Health Sciences Education</i> | 2015 – present |
| Review Board member, <i>Teaching and Learning in Medicine</i> | 2013 – present |

Committees

- | | |
|--|----------------|
| Research and Development Committee Member,
<i>American College of Surgeons Accredited Education Institutes Consortium</i> | 2014 – present |
| Research Conference Taskforce, <i>Society for Simulation in Healthcare</i> | 2015 – present |
| Research Committee Member, <i>Society for Simulation in Healthcare</i> | 2012 – 2015 |
| Research Grant Review Committee, <i>Medical Council of Canada</i> | 2015 – present |

Collaborative Research Committee Co-Chair, <i>Chicago Simulation Consortium</i>	2013 – 2015
Medical Education Liaison, University of Illinois College of Medicine Central Committee on Instruction and Assessment	2013 – present
UIC College of Medicine M1-M2 Curriculum Subcommittee	2015 – present
UIC DME Advisory Committee	2013 – present
UIC DME Graduate Studies Committee	2014 – present

TEACHING EXPERIENCE

Graduate level:

- Introduction to Quantitative Data Analysis
- Leadership in Health Professions Education
- Medical Simulations
- Psychometrics
- Research Design & Grant Writing
- Scholarship in Health Professions Education

Undergraduate level:

- Experimental Design and Analysis
- Psychological Statistics
- Research Methods in Psychology

THESIS MENTORING

Defended Master's in Health Professions Education Theses

Knox, A. (2014). Comparing dynamic and static multimedia as preparation for complex procedural skills learning. Ara Tekian, chair; Matthew Lineberry, Ryan Brydges, & Dimitri Anastakis, committee members.

Lee, J. (2014). Simulation-based endourological skills training: Does timing of expert feedback matter? Ara Tekian, chair; Matthew Lineberry & Elspeth McDougall, committee members.

Post-Proposal Master's in Health Professions Education Theses

Ahn, J. (2015). An investigation of the Milestone Level 4 in Emergency Medicine Airway Management subcompetency. Ara Tekian, chair; Matthew Lineberry & Ernest Wang, committee members.

Chan, T. (2014). Prioritization by emergency physicians: An exploratory study. Matthew Lineberry, chair; Alan Schwartz, Geoff Norman, & Jonathan Sherbino, committee members.

Endo, J. (2015). A needs assessment for geriatric curriculum for dermatology residents. Matthew Lineberry, chair; Laura Hirshfield & Carol Kamin, committee members.

Nguyen, L. (2015). Teaching and assessing error recovery in surgical education. Matthew Lineberry, chair; Meredith Young & Ilene Harris, committee members.

Vaporciyan, A. (2014). Development of a checklist of coronary anastomotic construction using a broad consensus building methodology. Ara Tekian, chair; Matthew Lineberry & Yoon Soo Park, committee members.

Pre-Proposal Master's in Health Professions Education Theses

Alaki, S. (2015). Can pre-admission interviews predict future academic integrity and attitude toward professionalism in undergraduate dental students? Matthew Lineberry, chair; Ara Tekian, committee member.

Bahammam, L. (2015). Factors affecting research productivity of junior faculty at King Abdulaziz University Faculty of Dentistry. Matthew Lineberry, chair; Jack Boulet, committee member.

Paniagua, M. (2015). Identifying triggers of meaningful and measureable behaviors of individuals functioning in healthcare team scenarios. Matthew Lineberry, chair; Gail Furman, Mark Raymond, Eduardo Salas, & Rachel Yudkowsky, committee members.

Rambihar, S. (2015). Validation of a simulation-based echocardiography competence assessment tool for formative assessment in cardiology training programs. Matthew Lineberry, chair; Ryan Brydges & Ara Tekian, committee members.

INTERNATIONAL EXPERIENCE

Taif University, Taif, Saudi Arabia June & October 2015
Course director for Scholarship in Health Professions
Education and Research Design and Analysis for the TU
Master's in Health Professions Education (MHPE) program.

King Abdulaziz University, Jeddah, Saudi Arabia February 2014
Course director for Research Design & Grant Writing and
Introduction to Quantitative Data Analysis for the KAU
Master's in Health Professions Education (MHPE) program.

Peking University, Beijing, China Fall 2002 - Spring 2003
Studied Mandarin at China's top liberal arts university.
Honors: 1st place, intermediate Mandarin public speaking contest

SKILLS

Languages: English (native), Mandarin Chinese (intermediate)
Software: SAS, SPSS, R, Visual Basic, assorted specialized statistical software
(e.g., MULTLOG, HLM)

PROFESSIONAL AFFILIATIONS

Association of American Medical Colleges Group on Educational Affairs
American College of Surgeons Accredited Education Institutes Consortium
Society for Simulation in Healthcare