Kevin Andrew Krost, M.A.
(Updated January, 2018)
Educational Research and Evaluation
Department of Leadership, Counseling, and Research
School of Education
Virginia Polytechnic Institute and State University
800 Drillfield Drive
Blacksburg, Virginia 24060

EDUCATION

Ph.D. Educational Research and Evaluation, Virginia Tech, 2019 (expected)
Certificate: Preparing for the Future Professoriate
Advisor: Gary Skaggs
Specialization: Modern Psychometrics

M.A. Research Methodology, University of Pittsburgh, 2015
Advisor: Suzanne Lane
Master's Thesis: Detecting Differential Item Functioning among Students with Disabilities and English Language Learners using Multiple Methods
Focus: Applied Psychometrics

B.A. Psychology, Arkansas Tech University, 2012
Advisor: Jason Warnick
Minor: Political Science

CURRENT RESEARCH INTERESTS

Cognitive Diagnostic Models; English Language Learners and Foreign Language Education; Explanatory Modeling with Structural Equation Models and Hierarchical Linear Models; Multistage and Computer-Adaptive Tests; Group Comparisons and Equity; Comparisons of Methods and Simulation Studies.

PROFESSIONAL SKILLS

— Educational measurement research training as follows:

- Theoretical knowledge and extensive applied experience in classical test theory, Rasch analysis, item response theory, and cognitive diagnostic models:
  - High aptitude with dichotomous and polytomous item parameter estimation, person scoring, differential item functioning detection, and equating using several models.
  - Knowledge and experience with exploratory and confirmatory factor analysis, multidimensional, and bifactor IRT models using IRTPRO.
  - Knowledge and practical experience with several cognitive diagnostic models, including DIF-detection, item, and attribute estimation, using RStudio and FlexMIRT.
  - Technical knowledge and exceptional experience at detecting DIF using CTT, IRT, and CDM methods.

- Knowledge and proficiency with equating methods including IRT-based, linear, equipercentile, mean, mean-sigma, pre-smoothing, postsmoothing, and item banking.
- Proficiency with scaling, linking, and equating using CTT and IRT methods.
- Theoretical knowledge and practical experience with conducting computer-adaptive and multistage test simulation studies using RStudio.
- Knowledge and proficiency with conducting Monte Carlo simulations and performing Bayesian analysis using SAS, RStudio, and WinBUGS.
- Practical experience with Bayesian IRT using PROC MCMC through SAS and Bayesian item parameter estimation using jMetrik and WinBUGS.
- Proficiency with item and test development, analysis, and validation procedures based on different methodological frameworks.

— Advanced statistical methods training as follows:

- Theoretical knowledge, practical, and teaching experience with regression analyses using SPSS and STATA.
  - Experience with multiple, sequential, curvilinear, survival, multivariate, and logistic regression, including repeated-measures and interaction effects, among others.
- Knowledge and applied experience with hierarchical linear modeling.
  - Unconditional, random intercepts and slopes, means as outcomes, one-way ANCOVA, fixed effects, and compositional effects models.
  - Growth models, hierarchical generalized linear models, and three-level models.
  - Detection of differential item functioning and exploration of individual-level characteristics to moderate or mediate DIF using a Rasch-parameterized HGLM.
- Theoretical knowledge and experience with longitudinal data analysis with multilevel and structural equation modeling using HLM, Mplus, STATA, and SPSS.
  - HLM and SEM growth models, time-varying and cross-lagged models, latent curve models, and econometric regression and fixed effects models.
- Knowledge and high aptitude with factor analytic methods.
  - Exploratory and confirmatory factor analysis, path analysis, SEM, multiple-group analysis, MIMIC model, and latent class analysis, using STATA, Mplus, and RStudio.
  - Extensive experience with CFA reparameterized as IRT models, including detecting DIF, modeling covariates, and moderation and mediation of DIF.

— Knowledge and practical experience with qualitative, assessment, and evaluation research methods training as follows:

- Experience with open-ended and semi-structured interviewing, open and focused coding, paradigms, and developing categories and themes.
- Knowledge and experience with Grounded Theory, including developing research questions, designs, coding, causal inferences, and developing categories, among others.
- Knowledge and experience with mixed methods, including paradigms, mixing at stages, conducting systematic literature reviews, and developing research questions.
- Experience with program evaluation, including developing research aims, determining appropriate analyses, working with stakeholders, and disseminating results.
- Knowledge of mainstream contemporary student motivation theories, their application in educational settings, and modern quantitative and measurement developments.
  - Theories include Self-Efficacy, -Concept, and -Esteem, Expectancy-Value, Flow, Domain Identification, Attribution, Intelligence, and the MUSIC model, among others.

- Extensive experience with explaining complex methodological concepts in an understandable and practical way to individuals with minimal training.
- Experience with collaborating and working on projects of varying sizes and levels of autonomy, ranging from personal independent research to large-scale, multi-team research.

CURRENT RESEARCH PROJECTS

- Differential Item Functioning Detection using the Compensatory Reparameterized Unified Model (C-RUM) (Simulation Study)
- Comparison of the HGLM and MIMIC Model for the Detection and Prediction of Gender-Based Differential Item Functioning among PISA Mathematics Data (Empirical Study)
- Moderation of the MUSIC Model to Predict Student Effort by the Ease and Cost of an Undergraduate Geography Class (Empirical Study)
- Evaluation of Individual-Level and School-Level Predictors of the School to Prison Pipeline in Virginia (Graduate Research Assistant)

ACADEMIC & PROFESSIONAL EXPERIENCE

— **GRADUATE RESEARCH ASSISTANT** 01/2016-Present

- Department of Leadership, Counseling, and Research, Virginia Tech
- Prediction of School to Prison Pipeline (STPP) in Virginia by Individual- and School-Level Covariates
  - Funded by a $900,000+ grant from NIJ, DJJ, and DCJS (Renewed 2018-20).
  - P.I.: Dr. Gerard Lawson, Co-P.I.: Dr. Yasuo Miyazaki, Co-P.I.: Dr. Gary Skaggs
- Provided quantitative and qualitative analysis support for a multi-team, multi-year, mixed methods empirical study.
- Conducted semi-structured interviews, open coding, and category development.
- Performed statistical analyses including reliability, linear and logistic regression, exploratory factor analysis, and t-tests on multilevel data to answer research questions.
- Developed models to evaluate predictors of exclusionary discipline and discretionary reporting to law enforcement, including race, gender, disability, and type of offense.
- Provided statistical results and collaborated with qualitative team to inform research design, data collection, and analysis.

— **STATISTICAL LAB CONSULTANT AND GRADUATE TEACHING ASSISTANT** 08/2015-Present

- Department of Leadership, Counseling, and Research, Virginia Tech
- Advisor: Dr. Gary Skaggs
- Held regular office hours in the Educational Research and Evaluation (EDRE) statistics lab and helped students understand quantitative concepts and data analysis procedures.
- Provided tutoring assistance to a wide variety of students with varying quantitative knowledge in both introductory and advanced EDRE courses previously listed.
- Provided in-class assistance and guest lectures in several classes about concepts, different software packages, and novel topics on a regular basis.
- Presented multiple workshops each semester on quantitative topics listed below which were broadcasted digitally, recorded, and later disseminated.

- Managed the lab and was in charge of scheduling workshops and other GTAs' hours.
- Provided consultation services to students and faculty on both projects and research.

— **STATISTICAL CONSULTANT** 08/2013-08/2015
- Department of Psychology in Education, University of Pittsburgh
- Advisor: Dr. Kevin Kim
- Provided various statistical and research-based services on an individual basis.
- Helped design and administer surveys in a university setting.
- Interpreted research questions and determined the most appropriate statistical analysis.
- Performed statistical analyses including ANOVA, multiple regression, item analysis and person scoring, and nonparametric analyses Kruskal-Wallis and Wilcoxon paired.

— **TEST CENTER ADMINISTRATOR** 09/2013-08/2015
- Office of Measurement and Evaluation of Teaching, University of Pittsburgh
- Advisor: Lisa Votodian
- Proctored computerize-adaptive and multi-stage tests including the GRE, TOEFL, Praxis, and MCAT.
- Maintained a safe and secure testing environment, prevented cheating, and ensured the validity of inferences from the tests.
- Provided additional support to other offices during crucial periods of the year.

— **RESEARCH ASSISTANT** 09/2012-09/2013
- Learning Research and Development Center, University of Pittsburgh
- Advisor: Dr. Patricia Albacete and Dr. Sandra Katz
- Administered an online tutoring intervention in various schools around Pittsburgh.
- Conducted data cleaning and made appropriate transformations to answer particular research questions.
- Performed statistical analyses including person scoring, item analysis, t-tests, reliability, factorial ANCOVA, Pearson's r and Spearman's Rho, and chi-square.
- Disseminated the results at multiple conferences to inform other researchers.

— **PSYCHOLOGY SENIOR FELLOW** 08/2011-05/2012
- Behavioral Science Department, Arkansas Tech University
- Advisor: Dr. David Osburn
- Graded homework, tests, and papers for several courses and professors.
- Maintained a high degree of confidentiality in regard to sensitive matters.
- Helped conduct research for faculty within psychology, anthropology, and sociology.
- Tutored students for several courses, particularly statistical and research methods.

PRESENTATION EXPERIENCE

— Refereed Poster Presentations:
- Lyles, C., Kniola, D., **Krost, K.** (2018) Teaching Anxiety-Producing Content: Practical Applications from the Literature. Poster accepted for presentation at the *2018 Conference of Higher Education Pedagogy*, Blacksburg, VA.

- **Krost, K.**, Lane, S. (2016) Differential Item Functioning among Students with Disabilities and English Language Learners. Poster presented at the annual meeting of the *National Council on Measurement in Education,* Washington, D.C.
- Gao, C., **Krost, K.**, Klein, R. (2015) Mobile Phone Screen Size and Internet Use Among College Students. Poster presented at *2015 American Psychological Association Convention*, Toronto, Ontario.
- Horning, B., **Krost, K.**, Klein, R. (2015) Factors Affecting Social Media Usage. Poster presented at *2015 American Psychological Association Convention*, Toronto, Ontario.
- **Krost, K.**, Allegretti, S. (2013). Rimac: an Online Physics Tutoring System. Poster presented at the *Spring Colloquium of Council of Graduate Students in Education,* Pittsburgh, PA.
- **Krost, K.** (2013). Rimac: an Online Physics Tutoring System. Poster presented at the *Summer Workshop of Carnegie Mellon University LearnLab Institute,* Pittsburgh, PA.
- **Krost, K.**, Osburn, D. (2012). A Look at Greek Life. Poster presented at the National *Conference of Southwestern Psychological Association,* Oklahoma City, OK.

— Refereed Paper Presentations:

- **Krost, K.** (2018). Comparison of MIMIC Model and HGLM to Detect and Mediate DIF. Paper accepted for presentation at the *National Council on Measurement in Education Conference,* New York, NY.
- **Krost, K.** (2017). Prediction of Student Achievement Growth by Individual-, Teacher-, and Class-Related Covariates. Paper presented at the *2017 Virginia Educational Research Association Conference,* Charlottesville, VA.
- **Krost, K.** (2017). Psychometric Item Analysis using jMetrik and Stata. Paper presented at the *2017 Virginia Educational Research Association Conference,* Charlottesville, VA.
- **Krost, K.**, Cohen, J. (2017). Detection and Prediction of Gender-Based Differential Item Functioning using the MIMIC Model. Paper presented at the *2017 Stata Conference,* Baltimore, MD. http://ideas.repec.org/p/boc/scon17/19.html.
- **Krost, K.**, Creamer, E. (2017). Mixed Methods Analysis of Mixed Methods Instrument Development and Validation Literature. Paper presented at the *2017 Eastern Educational Research Association Convention,* Richmond, VA.
- **Krost, K.** (2017). Psychometric Evaluation of Students with Disabilities and English Language Learners on Eighth Grade Mathematics. Paper presented at the *2017 Eastern Educational Research Association Convention,* Richmond, VA.
- **Krost, K.** (2012). A Look at Greek Life. Paper presented at the *2012 Spring Symposium of Arkansas Tech University,* Russellville, AR.

— Classroom Lectures and Workshop Presentations:

- **Krost, K.**, Miyazaki, Y. (2017) Effect Sizes and Power in STATA and GPower. Workshop in EDRE statistics lab.
- **Krost, K.** (2017). Introduction to STATA 15. Workshop in EDRE statistics lab.
- **Krost, K.** (2017). Internal and External Validity. Guest lecture in Quantitative I course.
- **Krost, K.** (2017). Measurement Reliability and Validity. Guest lecture in Quantitative I course.
- **Krost, K.** (2017). Introduction to SAS and STATA for SPSS users. Workshop in EDRE statistics lab.

- **Krost, K.** (2016). Introduction to Differential Item Functioning and Analysis. Workshop in EDRE statistics lab.
- **Krost, K.** (2016, spring & fall). Introduction to SPSS for Quantitative Research. Workshop in EDRE statistics lab.
- **Krost, K.** (2015, 2016). Introduction to jMetrik for Item and Test Analysis. Workshop in EDRE statistics lab.
- **Krost, K.**, Leventhal, B. (2014). Item Response Theory Methods in Equating. Group lecture in Advanced Topics in Measurement course based on *Item Response Theory chapter in Test Equating, Scaling, and Linking (2014) by Kolen and Brennan.*
- **Krost, K.**, Scott, P., Iwatani, E. (2013). Accountability Issues in Testing. Group lecture in Psychometric Theory course based on *Accountability chapter by Koretz and Hamilton in Educational Measurement (2006) edited by Brennan.*
- **Krost, K.** (2012). T-tests and Introduction to Simple Linear Regression. Guest lecture in Statistics for Behavioral Sciences.

TECHNICAL REPORTS

- Lane, S., Stone, C., Draper, J., & **Krost, K.** (June 2013). Pennsylvania Educator Effectiveness Project 2012-2013: Results from the Intermediate Unit Leads. Pittsburgh, PA: University of Pittsburgh. (Award #4300345494).
- Lane, S., Stone, C., Draper, J., Scott, P. & **Krost, K.** (January 2013). Pennsylvania Teacher Evaluation 2011-2012 Pilot: Report for the Teachers and Principals/Evaluators. Pittsburgh, PA: University of Pittsburgh. (Award #4300345494).

SOFTWARE SKILLS

- Exceptional experience with SPSS, jMetrik, STATA, BILOG-MG, and IRTPRO.
- Proficiency in SAS, Mplus, HLM7, RStudio, Multilog, FlexMIRT, and NOHARM.
- Introductory experience in Iteman, DFIT8, CIPE, and RAGE-RGEQUATE.
- Hands-on experience with Microsoft products, most notably Word, Excel, and PowerPoint.

RELEVANT COURSES (*Teaching Assistant Experience)

- Advanced Item Response Theory*
- Longitudinal Data Analysis
- Instrument Development and Validation*
- Data Simulation and Bayesian Analysis
- Hierarchical Linear Modeling*
- Data Analysis with SAS
- Program Evaluation Methods
- Applied Qualitative Research Methods
- Multivariate Analysis*
- Grounded Theory
- Quantitative Methods I and II*
- Advanced Research Methods*
- Measurement Theory*
- Educational and Psychological Measurement
- Structural Equation Modeling*
- Advanced Measurement Topics: Equating
- Mixed Methods Research
- Experimental Design
- Regression Analysis*
- Introduction to Probability
- Participant Observation Methods
- Educational Outcome Assessment
- Statistics for the Behavioral Sciences*
- Motivation and Cognition

ONGOING EDUCATION

- Application of Artificial Intelligence (AI) to Assessment
  - 17th Annual Maryland Assessment Research Center Conference (College Park, MD)
- Computerized Adaptive Testing and Multistage Testing with R
  - International Meeting of the Psychometric Society 2016 (Asheville, N.C.)
- Diagnostic Measurement: Theory, Methods, Applications, and Software
  - National Council on Measurement in Education 2016 (Washington, D.C.)
- Virginia Data Management Bootcamp
  - Digital live-stream March 2016 with many presenters from Virginia Tech, Old Dominion University, University of Virginia, George Mason University, William & Mary, and Virginia Commonwealth University
- Ethics and Test Interpretation: Measurement Matters
  - American Psychological Association 2015 (Toronto, Canada)
- Introduction to FlexMIRT
  - International Meeting of the Psychometric Society 2014 (Madison, WI)
- Collaborative Problem Solving: Definition, Psychometric Models, and Assessment
  - CMART: Carnegie Mellon and RAND Traineeship in Methodology and Interdisciplinary Education Research 2013 (Pittsburgh, PA)
- Equating Observed-Scores: The Percentile Rank, Gaussian Kernel, and IRT Observed-Score Equating Methods
  - CMART: Carnegie Mellon and RAND Traineeship in Methodology and Interdisciplinary Education Research 2013 (Pittsburgh, PA)

PROFESSIONAL ASSOCIATIONS

- Academy for Graduate Teaching Assistant Excellence, Member, Virginia Tech Graduate School, 2016-Present.
- National Council on Measurement in Education, Member, 2015-Present.
  - Publications Committee, Graduate Student Member, April 2016-April 2017.
  - Graduate Student Issues Committee, Student Member, April 2017-April 2019.
  - Social Media Committee, Student Member, April 2017-2018.
- American Educational Research Association, Member, 2015-Present.
  - Division D, Member, 2015-Present.
  - Cognition and Assessment SIG, Member, 2016-Present.
  - Measurement and Assessment in Higher Education, Member, 2017-Present.
- Psychometric Society, Member, 2015-Present.
- American Psychological Association, Member, 2015-Present.
  - Division 5, Member, 2015-Present.
- Council of Graduate Students in Education, Events Co-Chair, University of Pittsburgh, 2013-2015.
- Psi Chi, the International Honor Society in Psychology, Member, 2010-Present.
- Debate and Forensics Team, Member, Arkansas Tech University, 2010-2012.
- Orientation Leader, Member, Arkansas Tech University, 2010-2011.

HONORS & AWARDS

- Department of Leadership, Counseling, and Research, Graduate Teaching Assistantship, Virginia Tech, 2015, 2016, 2017.
- Graduate School, Conference Travel Grant, Virginia Tech, 2015.
- Department of Psychology in Education, Graduate Student Assistantship, University of Pittsburgh, 2013, 2014.
- Council of Graduate Students in Education (C.G.S.E.), Conference Travel Grant, University of Pittsburgh, 2014.
- Graduate and Professional Student Government (G.P.S.G.), Conference Travel Grant, University of Pittsburgh, 2014.
- Applied Psychological Measurement, Inc., Software Grant, University of Pittsburgh, 2014.
- Who's Who among Students in American Universities and Colleges, Arkansas Tech University, 2012.
- Behavioral Sciences Department, Senior Fellowship, Arkansas Tech University, 2012.
- Speech Department, Debate and Forensics Scholarship, 2012, 2011, 2010.

REFERENCES

Gary Skaggs, Program Leader,	540-231-9734	gskaggs@vt.edu
Yasuo Miyazaki, Associate Professor,	540-231-9731	yasuom@vt.edu
David Kniola, Visiting Assistant Professor,	540-231-2246	dkniola@vt.edu