KLINT KANOPKA

Graduate School of Education, Stanford University
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EDUCATION

Stanford University, Stanford, CA

PhD, Graduate School of Education, Developmental and Psychological Sciences, expected 2023
>   Advisor: Maria Araceli Ruiz-Primo
>   Burt and DeeDee McMurtry Fellow (Stanford Graduate Fellowship)

MS, Computer Science, Artificial Intelligence, 2021

Drexel University, Philadelphia, PA
MS, Education, 2012
BS, Physics, 2005

RESEARCH INTERESTS

Psychometrics, Machine Learning, Natural Language Processing, Networks, Bayesian Statistics, Graphical Models, Sociogenomics

DISSERTATION

"Computational Validity." Three studies applying computational modeling techniques to advance assessment validity. Study one develops a novel psychometric model that accounts for effects due to variation in item position and applies this new model to large item response data set from a Brazilian college admission exam. Study two applies machine learning techniques to response time and response accuracy data from an online test of reading ability to detect aberrant response behavior, using this information to contextualize ability estimates. Study three applies machine learning and natural language processing to construct flexible models of item difficulty for an online test of reading ability. These models are used to connect item features to existing models of reading development.

Advisor: Maria Araceli Ruiz-Primo
Reading Committee: Benjamin Domingue, Jason Yeatman

AWARDS/INTERNSHIPS

2021	**Gerald J. Lieberman Fellowship,** Stanford University.
2021	**Educational Testing Service**, New Competition.
2020	**Educational Testing Service,** Internship Cancelled due to COVID-19.
2017-Present	**Stanford Graduate Fellowship in Science & Engineering,** Stanford University.

PEER-REVIEWED PUBLICATIONS

Biernacki, P., Altavilla, J., **Kanopka, K.**, Hsieh, H., & Solano-Flores, G. (2022, in press). Long-Term English Learners' Mathematics Course Trajectories: Downstream Consequences of Early Remediation on College Preparation. *International Multilingual Research Journal.*

Domingue, B., **Kanopka, K.**, Trejo, S., Tucker-Drob, E. (2022). Ubiquitous bias & false discovery due to model misspecification in analysis of statistical interactions: The role of the outcome's distribution and metric properties. *Psychological Methods. Advance online publication.* *https://doi.org/10.1037/met0000532*

Domingue, B. W., **Kanopka, K.**, Stenhaug, B., Sulik, M., Beverly, T., Brinkhuis, M., Circi, R., Faul, J., Liao, D., McCandliss, B., Obradovi`c, J., Piech, C., Porter, T., Soland, J., Weeks, J., Wise, S., & Yeatman, J. (2022). Speed–Accuracy Trade-Off? Not So Fast: Marginal Changes in Speed Have Inconsistent Relationships With Accuracy in Real-World Settings. *Journal of Educational and Behavioral Statistics*, 10769986221099906.

Domingue, B., **Kanopka, K.**, Mallard, T., Trejo, S., Tucker-Drob, E. (2022). Modeling interaction and dispersion effects in the analysis of gene-by-environment interaction. *Behavior Genetics*, *52*(1), 56-64.

Domingue, B., **Kanopka, K.**, Stenhaug, B., Soland, J., Kuhfeld, M., Wise, S., & Piech, C. (2021). Variation in respondent speed and its implications: Evidence from an adaptive testing scenario. *Journal of Educational Measurement*, *58*(3), 335-363.

Yeatman, J. D., Tang, K. A., Donnelly, P. M., Yablonski, M., Ramamurthy, M., Karipidis, I. I., Caffarra, S., Takada, M. E., **Kanopka, K.**, Ben-Shachar, M., & Domingue, B. W. (2021). Rapid Online Assessment of Reading Ability. *Scientific reports*, *11*(1), 1-11.

MANUSCRIPTS UNDER REVIEW

Kanopka, K., Domingue, B. W. (2022). A Position Sensitive IRT Mixture Model. *Preprint available:* *https://psyarxiv.com/hn2p5/*

Kanopka, K., Hernandez, P., Wang, N., Ruiz-Primo, M. A., Li, M., & Minstrell, J. (2020). An Application of Multiple Correspondence Analysis to the Experimental Study of Item Context.

Ruiz-Primo, M. A., **Kanopka, K.**, Hernandez, P., Li, M., Minstrell, J., & Dong, D. (2020). Examining Confirming and Disconfirming Evidence on Students' Understanding of a Science Topic: A Test Development Approach.

SUBMITTED MANUSCRIPTS

Kanopka, K., Claro, S., Loeb, S., West, M., & Fricke, H. (2022). Are Changes in Reported Social-Emotional Skills Just Noise? The Predictive Power of Longitudinal Differences in Self-Reports. *Working paper available:* https://www.edpolicyinca.org/sites/default/files/2020-07/wp_kanopka_july2020.pdf

Kanopka, K., Lang, D., Alvero, A.J. (2022). Weighing Algorithmic Tradeoffs: Observations from 60,000 Admission Essays.

Stenhaug, B. A., Ahmed, I., **Kanopka, K.**, Siebert, J., Frank, M. C., Domingue, B. W. (2022). Agnostic identification as the first step of detecting differential item functioning.

Moeller, K. J., French, J., **Kanopka, K.**, Hook, T., Sedghi, M. (2022). Educational Capital: A framework for understanding venture capital investment in education.

Caffarra, S., **Kanopka, K.**, Kruper, J., Richie-Halford, A., Roy, E., Rokem, A., Yeatman, J. D. (2022). Development of the alpha rhythm is linked to visual white matter pathways and visual detection performance. *Preprint available:* https://www.biorxiv.org/content/10.1101/2022.09.03.506461v1.abstract

Domingue, B., Rahal, C., Faul, J., Freese, J., **Kanopka, K.**, Rigos, A., Stenhaug, B., Streeter, J., & Tripathi, A. (2021). InterModel Vigorish (IMV): A novel approach for quantifying predictive accuracy when outcomes are binary. *Preprint available:* https://osf.io/preprints/socarxiv/gu3ap/

Domingue, B., **Kanopka, K.**, Trejo, S., Freese, J. (2021). An ordinal model for analysis of years of education. *Preprint available*: https://osf.io/preprints/socarxiv/3d9zg/

MANUSCRIPTS UNDER PREPARATION

Kanopka, K., Kapoor, R., Ulitzsch, E., Pohl, S., Chalmers, R. P., Rahal, C., Rhemtulla, M., Domingue, B. W. (2022) Understanding polytomous item response models using the InterModel Vigorish.

Domingue, B. W., **Kanopka, K.**, Kapoor, R., Pohl, S., Chalmers, R. P., Rahal, C., Rhemtulla, M. (2022) The InterModel Vigorish as a lens for understanding (and quantifying) the value of item response models for dichotomously coded items. *Preprint available*: https://psyarxiv.com/q3djt/

Kanopka, K., Deane, P., Zhang, M. (2021). Finding What Works: Using Keystrokes to Identify Successful Writing Strategies for Repeat Test-Takers.

Kanopka, K., McFarland, D. (2021). Who's In Charge? Mapping Three Decades of the Struggle for Academic Jurisdiction Using Two-Mode Dynamic Networks.

Trejo, S., **Kanopka, K.** (2021). The Phenotype Differences Model: Identifying Genetic Effects with Incomplete Sibling Data.

CONFERENCE PRESENTATIONS

Kanopka, K. (2022, April). Profiling Changes in Student Writing: From Failure to Success. Presented at the NCME Annual Meeting.

Moeller, K., **Kanopka, K**. (2022, April). Who Profits from EdTech? An Intersectional Feminist Analysis of Venture Capital Investment in Education. Presented at the AERA Annual Meeting.

Kanopka, K., Domingue, B. (2022, April). Good Luck with the Blue Book: Computational Approaches to Fairness and Validy in Admissions Testing. Presented at the AERA Annual Meeting.

Kanopka, K., Domingue, B. (2021, July). Addressing the Blue Book Problem: Application of a Position-Sensitive IRT Mixture Model to ENEM 2014. Presented at International Meeting of the Psychometric Society.

Kanopka, K., Domingue, B. (2021, June). An IRT Mixture Model for Item Position Effects. Presented at the NCME Annual Meeting.

Moeller, K., **Kanopka, K.**, French, J. (2021, April). Venture Capitalists as Educational Actors: Understanding the Racialized Political Economy of Silicon Valley Investments in Education Technology. Presented at CIES Annual Meeting and AERA Annual Meeting.

Kanopka, K., Hernandez, P., Wang, N., Ruiz-Primo, M.A., Li, M., Minstrell, J. (2021, April). An Application of Multiple Correspondence Analysis to the Experimental Study of Item Context. Presented at AERA Annual Meeting.

Ruiz-Primo, M. A., Li, M., **Kanopka, K.**, Hernandez, P., Dongsheng, D., Wang, N., & Minstrell, J. (2021, April). Analysis and review of context in science: Effects in student performance. Presented at the AERA Annual Meeting.

Alvero, A., Sedlacek, Q., **Kanopka, K.** (2020, September). A Call for Critical and Constructive Data Science in Teacher Eduaction. Presented at the AERA Conference on Educational Data Science.

Claro, S., **Kanopka, K.**, West, M., Loeb, S., Fricke, H. (2020, April). Exploring the relationship Between Changes in Social-Emotional skills and Achievement. AERA Annual Meeting San Francisco. CA http://tinyurl.com/w5cp7bz (Conference Cancelled).

Ruiz-Primo, M. A., Li, M., Minstrell, J., Dong, D., **Kanopka, K.**, Hernandez, P. (2020, April). Mapping the Characteristics of Contexts in Science Items: The Case of Forces and Motion Items. AERA Annual Meeting San Francisco. CA http://tinyurl.com/rts6f3a (Conference Cancelled).

Munoz-Najar Galvez, S., **Kanopka, K.**, & Alvero, A. (2019, December). Identifying (Dis)Continuities in Ed Tech's Discourse of Invention. Presented at Text Analysis Across Domains in Berkeley, CA.

Kanopka, K. (2019, April). Addressing Defensive Objections: Adversarial Examples in Automatic Essay Scoring. Presented at the annual meeting of the American Educational Research Association in Toronto, ON.

Ruiz-Primo, M. A., Li, M., Minstrell, J., Zhai, X., **Kanopka, K.**, Hernandez, P., & Dong, D. (2019, April). Contextualized Science Assessments: Addressing the Use of Information and Generalization of Inferences of Students' Performance. Presented at the annual meeting of the American Educational Research Association in Toronto, ON.

Zhai, X., Ruiz-Primo, M. A., Li, M., Dong, D., **Kanopka, K.**, Hernandez, P., & Minstrell, J. (2019, April). Using Many-Facet Rasch Model to Examine Student Performance on Contextualized Science Assessment. Presented at the annual meeting of the American Educational Research Association in Toronto, ON.

Hernandez, P., Ruiz-Primo, M. A., Zhai, X., & **Kanopka, K.** (2019, April). Validity Study of Linked Items to Determine Student Fundamental ideas. Presented at the annual meeting of the American Educational Research Association in Toronto, ON.

Ruiz-Primo, M. A., Li, M., Minstrell, J., Zhai, X., Dong, D., **Kanopka, K.**, & Hernandez, P. (2019, April). Testing the Generalization to the Domain Inference: The Use of Contextualized Clusters of Items. Presented at the annual meeting of the National Council on Measurement in Education in Toronto, ON.

Kanopka, K. (2019, April). Diagnosing Non-Parallelism in Hierarchically Contextualized Physics Assessments. Presented at the annual meeting of the National Association for Research in Science Teaching in Baltimore, MD.

Mongkhonvanit, K., **Kanopka, K.**, & Lang, D. (2019, March). Deep Knowledge Tracing and Engagement with MOOCs. In *Proceedings of the 9th International Conference on Learning Analytics & Knowledge*(pp. 340-342). ACM.

POLICY BRIEFS

Kanopka, K., Claro, S., Loeb, S., West, M., & Fricke, H. (July 2020). What Do Changes in Social-Emotional Learning Tell Us About Changes in Academic and Behavioral Outcomes? *Policy Analysis for California Education.* https://edpolicyinca.org/publications/changes-social-emotional-learning

RESEARCH EXPERIENCE

2020-Present   **Rapid Online Assessment of Reading**. Research Assistant

Research project under PI Jason Yeatman to develop a browser-based reading assessment in clinical and educational settings. Working on analyzing response time information to improve quality and reporting of measurements using models and approaches from psychophysics, psychometrics, and machine learning.

2019-2020   **NWEA – Stanford Research Partnership.** Research Assistant

Collaboration between assessment company NWEA and Stanford researchers under Ben Domingue from the Graduate School of Education and Chris Piech from the Computer

Science department. Worked on investigating response time, item position effects, and summer learning loss using psychometric, machine learning, and deep learning techniques.

2017-2020   **DECISA**. Research Assistant

NSF Funded project under PI Maria Araceli Ruiz-Primo to study the role of context in Physics items. Worked on multiple rounds of item development and revision, administering booklets, conducting student interviews, generating teacher reports, general psychometric analysis, developing and applying coding schemes for context, administering online versions of test items, and conducting online experiments to look at context manipulations.

GRADUATE TEACHING EXPERIENCE

2022-2023   **EDUC 423B/SOC 302B: Introduction to Data Science II: Data Analysis. Teaching Affiliate**
Teacher of record for introductory modeling and machine learning course taught entirely in R. Topics covered include regression, regularization, supervised and unsupervised learning, interpreting machine learning models, model comparison, building ML workflows, and out of sample data hygiene. Restructured course and generated new content (lectures, labs, and assignments).

2021-2023   **EDUC 259A/B/C/D/E: Education Data Science Seminar, Program Assistant**
Program Assistant for new MS program in Education Data Science. This weekly seminar is structured around opportunities and challenges, developing community, and peer learning. Students also prepare seminar papers in small groups over the course of the year for dissemination. Mentored students as they designed their course plans, found internships, worked on their seminar papers, and developed their capstone projects.

2020-2021   **EDUC 423A/SOC 302A: Introduction to Data Science I: Data Processing. Teaching Assistant**
Similar to the first half of EDUC 423, as that was split into a two-course sequence. Taught entirely in R, topics covered include data visualization, data wrangling, imputation, and creating reproducible research. Generated course content (lecture videos, labs, and assignments) in addition to assisting in planning, grading and running labs. Course taught entirely online.

2019-2020   **EDUC 200A: Introduction to Data Analysis and Interpretation, Teaching Affiliate**
Teacher of record for introductory statistics course offered primarily to incoming MA students in the Graduate School of Education. Focused heavily on applying statistics to the critical reading and evaluation of research.

2018-2020   **Math Camp**, **Lead Instructor**
Math camp designed to prepare incoming GSE PhD students for their quantitative methods sequences. Content covered includes introductory statistics through linear regression, calculus, linear algebra, and statistical software as well as an unofficial welcome and orientation for arriving students.

2018-2020   **EDUC 423/SOC 302: Introduction to Data Science. Teaching Assistant**
Introductory data science course, primarily for Education and Sociology PhD students. Taught entirely in R, topics covered include data visualization, data wrangling, introductory machine learning methods, text-as-data, and social network data. Assisting in planning, grading and running labs.

PROFESSIONAL TEACHING EXPERIENCE
2010 – 2017   **The Academy at Palumbo**, Philadelphia School District

Taught AP Physics 1, AP Physics B, AP Physics C, conceptual physics, and precalculus. Sourced grants to   construct a makerspace and engineering lab with a 3D printer and CNC router. Developed professional development sessions on argumentation in science and number sense for other teachers within the district. Coached forensics and FIRST FTC robotics teams in city, state, and national tournaments.

2010 **Crossroads Accelerated Academy**, Philadelphia School District
Physical science teacher in a pilot program teaching 9th grade physical science to overage 8th graders. Developed a half-year inquiry-based physical science curriculum and over 60% of participating students received high school credit.

SEMINARS/WORKSHOPS

2020 **Policy Analysis for California Education**, Presenter
Presented research done with the support of Policy Analysis for California Education at a webinar entitled "Supporting Students' Social-Emotional Learning as a Force for Recovery" to researchers, district administrators, and teachers throughout California.

2018-2019 **Stanford Center to Support Excellence in Teaching**, Professional Development Facilitator
Designed and facilitated multiple research-based professional development sessions on argumentation, Next Generation Science Standards, and performance assessment to physics teachers in San Jose Unified School District.

UNIVERSITY SERVICES

2019-2021 **Stanford GSE Student Guild,** Academic Chair
Promoted and organized methodological training workshops to support graduate students.

2019-2021 **Computational Text Analysis in the Social Sciences**, Co-President
Invited guest speakers to campus and organized methodological training workshops to promote applied research using text analysis and natural language processing techniques.

2019-2021 **Social Science Data and Software**, Consultant
Worked with undergraduates, graduate students, postdocs, and faculty members during walk-in and by-appointment consulting. Helped them pursue their own research goals using R, Python, and Stanford-sponsored research clusters.

PROFESSIONAL CONSULTING

2017 **Teach For America,** Physics Curriculum Consultant
Designed summative and unit assessments of content mastery. Created questions and rubrics to evaluate student argumentation using the Claim-Evidence-Reasoning model. Created standards aligned (NGSS) lesson outcomes and lesson plans.

2010-2017 **Drexel University/School District of Philadelphia**, Physics Curriculum Consultant
Position was a partnership between Drexel University and the School District of Philadelphia Office of Curriculum. Wrote the official physics curriculum for the School District of Philadelphia which is accessible through an employee portal, including pacing for traditional and block scheduling, standards (NGSS & Common Core) aligned resources, internally generated screencasts and labs, and banks of assessment questions. Designed and delivered supporting professional development sessions.

PROFESSIONAL AFFILIATIONS

American Educational Research Association
National Council on Measurement in Education
Psychometric Society