

CAI, Li

Education

- 2001 **B.A.**, *Business communication (Finance minor)*, Nanjing University.
- 2003 **M.A.**, *Journalism*, The Ohio State University.
- 2006 **M.S.**, *Mathematical statistics*, University of North Carolina.
- 2008 **Ph.D.**, *Psychometrics*, University of North Carolina.

Academic Appointments

- 2008–2011 **Assistant Professor**, UCLA.
- 2011–2014 **Associate Professor**, UCLA.
- 2014–present **Professor**, UCLA.

As a faculty member at UCLA, I engage in a wide variety of research, teaching, mentoring, advising, and leadership roles with increasing responsibilities.

Management Experience

- 2010–present **Managing Partner**, Vector Psychometric Group, LLC.

VPG is a small software and consulting company based in Chapel Hill, NC. I am a co-owner of VPG (under APM-025 VC-level approval) along with two other colleagues from graduate school days, who started the company in a garage. VPG markets psychometric software and technical assistance capabilities in the pharmaceutical and medical device industries, and in the development of large-scale educational assessment programs.

- 2012–2015 **Co-Director**, CRESST/UCLA .
- 2015–present **Director**, CRESST/UCLA.

The Center for Research on Evaluation, Standards, and Student Testing (CRESST for short) is a national R&D center focused on educational assessment, evaluation, technology, and methodology. I oversee a complex portfolio of over \$10m in expenditure per year from externally funded contracts and grants and provide overall intellectual and organizational leadership.

Publications on Statistics and Quantitative Methodology

MacCallum, R. C., Browne, M. W., & **Cai, L.** (2006). Testing differences between nested covariance structure models: Power analysis and null hypotheses. *Psychological Methods*, 11, 19–35.

- Cai, L.** (2006). Multi-response permutation procedure as an alternative to the analysis of variance: An SPSS implementation. *Behavior Research Methods*, *38*, 51–59.
- Maydeu-Olivares, A., & **Cai, L.** (2006). A cautionary note on using $G^2(\text{dif})$ to assess relative model fit in categorical data analysis. *Multivariate Behavioral Research*, *41*, 55–64.
- Hayes, A. F., & **Cai, L.** (2007). Further evaluating the validity of the conditional decision rule for comparing two independent means. *British Journal of Mathematical and Statistical Psychology*, *60*, 217–244.
- Cai, L.**, & Hayes, A. F. (2008). A new test of linear hypotheses in OLS regression under heteroscedasticity of unknown form. *Journal of Educational and Behavioral Statistics*, *33*, 21–40.
- Hayes, A. F., & **Cai, L.** (2008). Using heteroscedasticity-consistent standard error estimators in OLS regression: An introduction and software implementation. *Behavior Research Methods*, *39*, 709–722.
- Cai, L.** (2008). SEM of another flavour: Two new applications of the supplemented EM algorithm. *British Journal of Mathematical and Statistical Psychology*, *61*, 309–329.
- Bauer, D. J., & **Cai, L.** (2009). Consequences of unmodeled nonlinear effects in multilevel models. *Journal of Educational and Behavioral Statistics*, *34*, 97–114.
- Cai, L.**, & Lee, T. (2009). Covariance structure model fit testing under missing data: An application of the supplemented EM algorithm. *Multivariate Behavioral Research*, *44*, 281–304.
- Maydeu-Olivares, A., **Cai, L.**, & Hernandez, A. (2011). Comparing the fit of IRT and factor analysis models. *Structural Equation Modeling*, *18*, 333–356.
- Cai, L.** (2012). Latent variable modeling. *Shanghai Archives of Psychiatry (Biostatistics in Psychiatry Section)*, *24*, 118-120.
- MacCallum, R. C., Edwards, M. C., & **Cai, L.** (2012). Commentary: Hopes and cautions in implementing Bayesian structural equation modeling. *Psychological Methods*, *17*, 340-345.
- Lee, T., & **Cai, L.** (2012). Alternative multiple imputation inference for mean and covariance structure modeling. *Journal of Educational and Behavioral Statistics*, *37*, 675-702.
- Yang, J. S., & **Cai, L.** (2014). Estimation of contextual effects through nonlinear multilevel latent variable modeling with a Metropolis-Hastings Robbins-Monro algorithm. *Journal of Educational and Behavioral Statistics*, *39*, 550-582.

Monroe, S., & **Cai, L.** (2015). Evaluating structural equation models for categorical outcomes: A new test statistic and a practical challenge of interpretation. *Multivariate Behavioral Research*, *50*, 569-583.

Lee, T., **Cai, L.**, & Kuhfeld, M. (2016). A poor person's posterior predictive checking of structural equation models. *Structural Equation Modeling*, *23*, 206-220.

Cai, L., Choi, K., Hansen, M., & Harrell, L. (2016). Item response theory. *Annual Review of Statistics and Its Application*, *3*, 297-321.

Bonifay, W. E. & **Cai, L.** (2017). On the complexity of item response theory models. *Multivariate Behavioral Research*, *52*, 465-484.

Edwards, M. C., Houts, C. R., & **Cai, L.** (2018). A diagnostic procedure to detect departures from local independence in item response models. *Psychological Methods*, *23*, 138-149.

Cai, L., & Hansen, M. (2018). Improving educational assessment: Multivariate statistical methods. *Policy Insights from the Behavioral and Brain Sciences*, *5*, 19-24.

Chung, S. W. & **Cai, L.** (in press). Alternative multiple imputation inference for categorical structural equation modeling. *Multivariate Behavioral Research*.

Publications on Educational and Psychological Measurement

Cai, L., Maydeu-Olivares, A., Coffman, D. L., & Thissen, D. (2006). Limited-information goodness-of-fit testing of item response theory models for sparse 2^P tables. *British Journal of Mathematical and Statistical Psychology*, *59*, 173–194.

Curran, P. J., Hussong, A. M., **Cai, L.**, Huang, W., Chassin, L., Sher, K. J., & Zucker, R. A. (2008). Pooling data from multiple prospective studies: The role of item response theory in integrative analysis. *Developmental Psychology*, *44*, 365–380.

Cai, L. (2010). High-dimensional exploratory item factor analysis by a Metropolis-Hastings Robbins-Monro algorithm. *Psychometrika*, *75*, 33-57.

Cai, L. (2010). Metropolis-Hastings Robbins-Monro algorithm for confirmatory item factor analysis. *Journal of Educational and Behavioral Statistics*, *35*, 307–335.

Cai, L. (2010). A two-tier full-information item factor analysis model with applications. *Psychometrika*, *75*, 581-612.

Reise, S., Preston, K., **Cai, L.**, & Hays, R. D. (2011). Using the nominal response model to evaluate response category discrimination in the PROMIS emotional distress item pools. *Educational and Psychological Measurement*, *71*, 523–550.

Cai, L., Yang, J. S. & Hansen, M. (2011). Generalized full-information item bifactor analysis. *Psychological Methods*, *16*, 221–248.

- Yang, J. S., Hansen, M., & **Cai, L.** (2012). Characterizing sources of uncertainty in IRT scale scores. *Educational and Psychological Measurement, 72*, 264–290.
- Cai, L.**, & Hansen, M. (2013). Limited-information goodness-of-fit testing of hierarchical item factor models. *British Journal of Mathematical and Statistical Psychology, 66*, 245–276.
- Woods, C. M., **Cai, L.**, & Wang, M. (2013). The Langer-improved Wald test for DIF testing with multiple groups: Evaluation and comparison to two-group IRT. *Educational and Psychological Measurement, 73*, 532–547.
- Tian, W., **Cai, L.**, Thissen, D., & Xin, T. (2013). Numerical differentiation methods for computing error covariance matrices in item response theory modeling: An evaluation and a new proposal. *Educational and Psychological Measurement, 73*, 412–439.
- Cai, L.** (2013). Potential applications of latent variable modeling for the psychometrics of medical simulation. *Military Medicine, 178*, 115-120.
- Cai, L.**, & Monroe, S. (2013). Commentary: IRT model fit evaluation from theory to practice: Progress and some unanswered questions. *Measurement: Interdisciplinary Research and Perspective, 11*, 102–106.
- Monroe, S., & **Cai, L.** (2014). Estimation of a Ramsay-curve item response theory model by the Metropolis-Hastings Robbins-Monro algorithm. *Educational and Psychological Measurement, 74*, 343–369.
- Paek, I., & **Cai, L.** (2014). A comparison of item parameter standard error estimation procedures for unidimensional and multidimensional IRT modeling. *Educational and Psychological Measurement, 74*, 58–76.
- Paek, I., Park, H.-P., **Cai, L.**, & Chi, E. L. (2014). A comparison of three IRT approaches to examinee ability change modeling In a single group anchor test design. *Educational and Psychological Measurement, 74*, 659-676.
- Cai, L.** (2015). Lord-Wingersky algorithm version 2.0 for hierarchical item factor models with applications in test scoring, scale alignment, and model fit testing. *Psychometrika, 80*, 535–559.
- Monroe, S., & **Cai, L.** (2015). Examining the reliability of student growth percentiles using multidimensional IRT. *Educational Measurement: Issues and Practice, 34*, 21-30.
- Falk, C. F., & **Cai, L.** (2016). Maximum marginal likelihood estimation of a monotonic polynomial generalized partial credit model with applications to multiple group analysis. *Psychometrika, 81*, 434-460.
- Falk, C. F., & **Cai, L.** (2016). Semi-parametric item response functions in the context of guessing. *Journal of Educational Measurement, 53*, 229-247.

Hansen, M., **Cai, L.**, Monroe, S., & Li, Z. (2016). Limited-information goodness-of-fit testing of diagnostic classification item response theory models. *British Journal of Mathematical and Statistical Psychology*, *69*, 225-252.

Baker, E. L., Chung, G. K. W. K., **Cai, L.** (2016). Assessment gaze, refraction, and blur: The course of achievement testing in the last hundred years. *Review of Research in Education*, *40*, 94-142.

Falk, C. F., & **Cai, L.** (2016). A flexible full-information approach to the modeling of response styles. *Psychological Methods*, *21*, 328-347.

Li, Z., & **Cai, L.** (2018). Summed score likelihood based indices for testing latent variable distribution fit in item response theory. *Educational and Psychological Measurement*, *78*, 857-886.

Monroe, S., Kuhfeld, M., & **Cai, L.** (submitted). Limited-information goodness-of-fit testing for advanced IRT models. *British Journal of Mathematical and Statistical Psychology*.

Publications on Substantive Topics

Ennett, S. T., Bauman, K. E., Hussong, A., Faris, R., Foshee, V. A., DuRant, R., & **Cai, L.** (2006). The peer context of adolescent substance use: Findings from social network analysis. *Journal of Research on Adolescence*, *16*, 159–186.

David, P., Lu, T., Kline, S., & **Cai, L.** (2007). Social effects of an anthropomorphic help agent: The fairness of man and machine. *Cyber Psychology and Behavior*, *10*, 471–474.

Ennett, S. T., Faris, R., Hipp, J., Foshee, V. A., Bauman, K. E., Hussong, A. M., & **Cai, L.** (2008). Peer smoking, other peer attributes, and adolescent cigarette smoking: A social network analysis. *Prevention Science*, *9*, 88–98.

Hussong, A. M., **Cai, L.**, Curran, P. J., Flora, D. B., Chassin, L. A., & Zucker, R. A. (2008). Disaggregating the distal, proximal, and time-varying effects of parent alcoholism on children's internalizing symptoms. *Journal of Abnormal Child Psychology*, *36*, 335–346.

Ennett, S. T., Foshee, V. A., Bauman, K. E., Hussong, A. M., Faris, R., Hipp, J., **Cai, L.**, et al. (2008). The social ecology of adolescent alcohol misuse. *Child Development*, *79*, 1777-1791.

Ennett, S. T., Foshee, V. A., Bauman, K. E., Hussong, A. M., Faris, R., Hipp, J., **Cai, L.**, et al. (2010). A social contextual analysis of youth cigarette smoking development. *Nicotine & Tobacco Research*, *12*, 950-962.

- Cole, D. A., **Cai, L.**, Martin, N. C., Findling, R. L., Youngstrom, E. A., Garber, J., Curry, J. F., Hyde, J. S., Essex, M. J., Compas, B. E., Goodyer, I. M., Rohde, P., Stark, K. D., Slattery, M. J., & Forehand, R. (2011). Structure and measurement of depression in youth: Applying item response theory to clinical data. *Psychological Assessment, 23*, 819-33.
- Swartz, R. J., Schwartz, C., Basch, E., **Cai, L.**, Fairclough, D. L., McLeod, L., Mendoza, T., & Rapkin, B. (2011). The King's Foot of patient-reported outcomes: Current practices and new developments for the measurement of change. *Quality of Life Research, 20*, 1159–1167.
- Carle, A. C., Cella, D., **Cai, L.**, Choi, S. W., Crane, P. K., Curtis, S. M., Gruhl, J., Lai, J., Mukherjee, S., Reise, S., Teresi, J., Thissen, D., Wu, E. J., & Hays, R. (2011). Advancing PROMIS's methodology: Results of the third PROMIS Psychometric Summit. *Expert Review of Pharmacoeconomics & Outcomes Research, 11*, 677–684.
- Edelen, M. O., Tucker, J. S., Shadel, W. G., Stucky, B. D., & **Cai, L.** (2012). Toward a more systematic assessment of smoking: Development of a smoking module for PROMIS. *Addictive Behaviors, 37*, 1278–1284.
- Hansen, M., **Cai, L.**, Stucky, B. D., Tucker, J. S., Shadel, W. G., & Edelen, M. O. (2014). Methodology for developing and evaluating the PROMIS smoking item banks. *Nicotine and Tobacco Research, 16*, S175-S189.
- Shadel, W. G., Edelen, M. O., Tucker, J. S., Stucky, B. D., Hansen, M., & **Cai, L.** (2014). Development of the PROMIS nicotine dependence item banks. *Nicotine and Tobacco Research, 16*, S190-S201.
- Shadel, W. G., Edelen, M. O., Tucker, J. S., Stucky, B. D., Hansen, M., & **Cai, L.** (2014). Development of the PROMIS coping expectancies of smoking item bank. *Nicotine and Tobacco Research, 16*, S202-S211.
- Tucker, J. S., Shadel, W. G., Edelen, M. O., Stucky, B. D., Li, Z., Hansen, M., & **Cai, L.** (2014). Development of the PROMIS positive emotional and sensory expectancies of smoking item banks. *Nicotine and Tobacco Research, 16*, S212-S222.
- Edelen, M. O., Tucker, J. S., Shadel, W. G., Stucky, B. D., Cerully, J., Li, Z., Hansen, M., & **Cai, L.** (2014). Development of the PROMIS health expectancies of smoking item banks. *Nicotine and Tobacco Research, 16*, S223-S231.
- Stucky, B., Edelen, M., Tucker, J., Shadel, W., Cerully, J., Kuhfeld, M., Hansen, M., & **Cai, L.** (2014). Development of the PROMIS negative psychosocial expectancies of smoking item banks. *Nicotine and Tobacco Research, 16*, S232-S240.
- Tucker, J., Shadel, W., Edelen, M., Stucky, B., Kuhfeld, M., Hansen, M., & **Cai, L.** (2014). Development of the PROMIS social motivations for smoking item banks. *Nicotine and Tobacco Research, 16*, S241-S249.

Edelen, M., Stucky, B., Hansen, M., Tucker, J., Shadel, W., & **Cai, L.** (2014). The PROMIS smoking initiative: Initial validity evidence for six new smoking item banks. *Nicotine and Tobacco Research, 16*, S250-S260.

Emmert, M. C., & **Cai, L.** (2015). A pilot study to test the effectiveness of an innovative interprofessional education assessment strategy. *Journal of Interprofessional Care, 29*, 451-456.

Zhang, S. X., & **Cai, L.** (2015). Counting labour trafficking activities: An empirical attempt at standardized measurement. *United Nations Office on Drugs and Crime Forum on Crime and Society, 8*, 37-61.

Ennett, S. T., Jackson, C., Cole, V. T., Haws, S., Foshee, V. A., Reyes, H. L. M., Burns, A. L., Cox, M. J., & **Cai, L.** (2016). A multidimensional model of mothers' perceptions of parent alcohol socialization and adolescent alcohol misuse. *Psychology of Addictive Behaviors, 30*, 18-28.

Huang, W., Stucky, B. D., Edelen, M. O., Tucker, J. S., Shadel, W. G., Hansen, M., & **Cai, L.** (2016). Calibration of the Spanish PROMIS smoking item banks. *Nicotine and Tobacco Research, 18*, 1635-1641.

Kim, J. J., Silver, R. K., Elue, R., Adams, M. G., La Porte, L. M., **Cai, L.**, Kim, J. B., & Gibbons, R. D. (2016). The experience of depression, anxiety, and mania among perinatal women. *Archives of Women's Mental Health, 19*, 883-890.

Liu, H., Hays R.D., Marcus, M., Coulter I., Maida C., Ramos-Gomez, F., Shen, J., Wang, Y., Spolsky, V., Lee, S., **Cai, L.**, Crall J. (2016). Patient-reported oral health outcome measurement for children and adolescents. *BMC Oral Health, 16:95*.

IsHak, W. W., Bonifay, W., Collison, K., Youssef, H., Parisi, T., Cohen, R. M., **Cai, L.** (2017). The recovery index: A novel approach to measuring recovery and its association with remission in major depressive disorder. *Journal of Affective Disorders, 208*, 369-374.

Gibbons, R. D., Alegria, M., **Cai, L.**, Herrera, L., Markle, S. L., Collazo, F., Garcia, E. B. (in press). Successful validation of the CAT-MH scales in a sample of Latin American migrants in the U.S. and Spain. *Psychological Assessment*.

Sturm, A., McCracken, J. T., & **Cai, L.** (in press). Evaluating the hierarchical structure of ADHD symptoms and invariance across age and gender. *Assessment*.

Book Chapters

Preacher, K. J., **Cai, L.**, & MacCallum, R. C. (2007). Alternatives to traditional model comparison strategies for covariance structure models. In T. D. Little, J. A. Bovaird, & N. A. Card (Eds.), *Modeling contextual effects in longitudinal studies* (pp. 33–62). Mahwah, NJ: Lawrence Erlbaum Associates.

MacCallum, R. C., Browne, M. W., & **Cai, L.** (2007). Factor analysis models as approximations: some history and some implications. In R. Cudeck & R. C. MacCallum (Eds.), *Factor analysis at 100: Historical developments and future directions* (pp. 153–175). Mahwah, NJ: Lawrence Erlbaum Associates.

Thissen, D., **Cai, L.**, & Bock, R. D. (2010). The nominal categories item response model. In M. L. Nering & R. Ostini (Eds.), *Handbook of polytomous item response theory models: Development and applications* (pp. 43–75). New York, NY: Taylor & Francis.

Lee, T., **Cai, L.**, & MacCallum, R. C. (2012). Power analysis for tests of structural equation models. In R. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 181–194). New York, NY: Guilford.

Cai, L. (2013). Factor analysis of tests and items. In Geisinger, K. F. (Ed.), *APA Handbook of Testing and Assessment in Psychology*. Washington, DC: American Psychological Association.

Cai, L. (2013). Three cheers for the asymptotically distribution free theory of estimation and inference: Some recent applications in linear and nonlinear latent variable modeling. In MacCallum, R. C. & Edwards, M. C. (Eds.), *Current Topics in the Theory and Application of Latent Variable Models*. New York, NY: Taylor & Francis.

Cai, L., & Thissen, D. (2014). Modern approaches to parameter estimation in item response theory. In S. P. Reise & D. Revicki (Eds.), *Handbook of Item Response Theory Modeling: Applications to Typical Performance Assessment*. New York, NY: Taylor & Francis.

Cai, L. (2015). Two-tier item factor analysis modeling. In W. J. van der Linden (Ed.), *Handbook of item response theory: Vol. 1*. Boca Raton, FL: Chapman & Hall/CRC: Chapman & Hall.

Cai, L. (2015). IRTPRO: Flexible, multidimensional, multiple categorical IRT modeling. In W. J. van der Linden (Ed.), *Handbook of item response theory: Vol. 3*. Boca Raton, FL: Chapman & Hall/CRC: Chapman & Hall.

Thissen, D., & **Cai, L.** (2015). Nominal categories models. In W. J. van der Linden (Ed.), *Handbook of item response theory: Vol. 1*. Boca Raton, FL: Chapman & Hall/CRC: Chapman & Hall.

Gibbons, R., & **Cai, L.** (2015). Dimensionality assessment. In W. J. van der Linden (Ed.), *Handbook of item response theory: Vol. 3*. Boca Raton, FL: Chapman & Hall/CRC: Chapman & Hall.

Cai, L., Choi, K., & Kuhfeld, M. (2016). On the role of multilevel item response models in multi-site evaluation studies for serious games. In H. F. O’Neil, E. L. Baker, R. Perez. (Eds.), *Issues regarding the use of games and simulations for teaching and assessment*. New York, NY: Taylor & Francis.

Cai, L., & Moustaki, I. (2018). Estimation methods in latent variable models for categorical outcome variables. In P. Irwing, T. Booth & D. Hughes (Eds.), *The Wiley-Blackwell Handbook of Psychometric Testing*. West Sussex, UK: John Wiley & Sons, Ltd.

Computer Software

Cai, L., Thissen, D., & du Toit, S. H. C. (2011). *IRTPRO: Flexible, multidimensional, multiple categorical IRT modeling* [Computer software]. Lincolnwood, IL: Scientific Software International.

Cai, L. (2012). *flexMIRT[®] 1.0: Flexible multilevel item factor analysis and test scoring* [Computer software]. Seattle, WA: Vector Psychometric Group, LLC.

Cai, L. (2013). *flexMIRT[®] 2.0: Flexible multilevel and multidimensional item response theory analysis and test scoring* [Computer software]. Chapel Hill, NC: Vector Psychometric Group, LLC.

Cai, L. (2015). *flexMIRT[®] 3.0: Flexible multilevel and multidimensional item response theory analysis and test scoring* [Computer software]. Chapel Hill, NC: Vector Psychometric Group, LLC.

Cai, L. (2017). *flexMIRT[®] 3.51: Flexible multilevel and multidimensional item response theory analysis and test scoring* [Computer software]. Chapel Hill, NC: Vector Psychometric Group, LLC.

Editorial Appointments

- 2011- **Editorial Board Member**, *Communication Methods & Measures*.
- 2011-2014 **Editorial Board Member**, *Journal of Educational & Behavioral Statistics*.
- 2012-2014 **Associate Editor**, *Multivariate Behavioral Research*.
- 2013-2014 **Associate Editor**, *American Education Research Journal*.
- 2016-2018 **Editorial Board Member**, *AERA Open*.
- 2013-2018 **Editorial Board Member**, *Educational Researcher*.
- 2015- **Editorial Board Member**, *KEDI Journal of Educational Policy*.
- 2015-2019 **Co-Editor**, *Journal of Educational & Behavioral Statistics*.

Select Funded R&D Support

- 2007–2008 **National Science Foundation, SES-0717941.**
Title: *Doctoral Dissertation Research: A Metropolis-Hastings Robbins-Monro Algorithm for Maximum Likelihood Confirmatory Item Factor Analysis*
Co-PI (MacCallum, PI, UNC-Chapel Hill; \$7,000 total award)

- 2010-2014 **Institute of Education Sciences, R305D100039.**
 Title: *Nonlinear Multilevel Latent Variable Modeling with a Metropolis-Hastings Robbins-Monro Algorithm*
 PI (\$994,000 total award)
- 2009-2014 **National Institute on Drug Abuse, R01DA026943.**
 Title: *Development and Evaluation of a Smoking Module for PROMIS*
 PI of UCLA Sub (Prime: RAND; \$454,248 UCLA subaward)
- 2010-2014 **National Institute on Drug Abuse, R01DA030466.**
 Title: *Measurement of Recovery from Drug Addiction*
 PI (\$659,208 total award)
- 2012-2013 **UCLA Office of the Vice Chancellor for Research, Seed Grant.**
 Title: *Interactive Data Visualization Tools for Evidence-Based Decision Making: Training Health Practitioners in Essential Assessment Skills*
 PI (\$20,200 total award)
- 2013-2016 **US Department of Education, S368A120002.**
 Title: *Enhanced Assessment Grant: The English Language Proficiency Assessment for the 21st Century (ELPA21)*
 PI of UCLA Sub (Prime: Oregon Department of Education; \$269,997 UCLA subaward)
- 2013-2014 **National Science Foundation, SES-1260746.**
 Title: *Doctoral Dissertation Research: Hierarchical Item Response Models for Cognitive Diagnosis*
 PI (Mark Hansen, advisee; \$11,596 total award)
- 2012-2015 **William and Flora Hewlett Foundation, 2012-8075.**
 Title: *On the Road to Deeper Learning*
 Co-PI (Joan Herman, PI; \$796,712 total award)
- 2013-2015 **Bill and Melinda Gates Foundation, OPP1088937.**
 Title: *Toward Next Generation Assessments: Building Tools for Understanding Comparability in a General Validity Framework*
 Co-PI (Eva Baker, PI; \$942,527 total award)
- 2013-2015 **Smarter Balanced Assessment Consortium, 20141186.**
 Title: *Mathematical Reasoning Project*
 PI (\$400,000 total award)
- 2013-2019 **National Institute of Dental and Craniofacial Research, U01DE022648.**
 Title: *Patient-Reported Oral Health Outcomes Measurement Information System*
 Co-Investigator (Honghu Liu, PI; \$35,570.92 component award)
- 2014 **WA State Office of Superintendent of Public Instruction, 20140363.**
 Title: *Development and Testing of Smarter Balanced Assessment Consortium Test Delivery Certification Package*
 Co-PI (Eva Baker, PI; \$1,024,668 total award)

- 2014-2016 **Pelagique, LLC., W81XWH.**
 Title: *Integration of Simulation-Based Measures and Models for Ultrasonography Assessment*
 PI (\$265,000 total award)
- 2014-2015 **The Roddenberry Foundation, 20150038.**
 Title: *Evaluation of State-of-the Art Cognitive Skills Training and Curricular Content Games to Making Learning More Engaging and Effective*
 PI (\$190,000 total award)
- 2014-2017 **Smarter Balanced Assessment Consortium, No Grant or Contract Number.**
 Title: *Psychometric and Validity Studies*
 Project Director (\$7 million total award)
- 2014-2018 **Institute of Education Sciences, R305D140046.**
 Title: *Novel models and methods to address measurement error issues in educational assessment and evaluation studies*
 PI (\$895,108 total award)
- 2016 **American Institutes for Research, 20163211.**
 Title: *Independent Evaluation of Utah's SAGE Item Pool Alignment and Adaptive Algorithm*
 PI (\$70,200 total award)
- 2016-2017 **Imbellus, Inc., 20163499.**
 Title: *Simulation/Game-based Assessment of Higher-order Skills*
 PI (\$390,720 total award)
- 2016-2018 **Pelagique, LLC., W81XWH-16-C-0146.**
 Title: *Design and Validation of User Performance Models for Fundamentals of Ultrasound*
 PI (\$750,000 total award)
- 2016-2017 **California State University Dominguez Hills, U336140042.**
 Title: *Independent Evaluation of the STEM Teachers in Advanced Residency*
 PI (\$332,640 total award)
- 2017 **California State University Dominguez Hills, U336140042.**
 Title: *CSUDH HIS-STEM Academy*
 PI (\$75,485 total award)
- 2017 **Duolingo, 20170975.**
 Title: *Dimensionality Analysis of the Duolingo Test Center Assessment*
 PI (\$30,595.06 total award)
- 2016-2018 **US Department of Education, S368A150011.**
 Title: *Enhanced Assessment Grant: Development of Enhanced Career and College Readiness Indices for Smarter Balanced High School Assessments*
 PI of UCLA Sub (Prime: CA Department of Education; \$2,614,746 UCLA subaward)
- 2018 **LA'S BEST, 20182858.**
 Title: *An Evaluation of LA's BEST Short and Long-term Outcomes*
 PI (\$81,815 total award)

- 2017-2018 **Hawaii State Department of Education, CO-10748.**
 Title: *Hawaii Student Growth Model Analysis*
 PI (\$93,000 total award)
- 2014-2018 **National Institute on Drug Abuse, R25DA038167.**
 Title: *Training Institutes for Mobile Health (mHealth) Methodologies*
 Co-Investigator (Vivek Shetty, PI; \$15,120 component award)
- 2017-2022 **National Science Foundation, 1743336.**
 Title: *Collaborative Research: Researching Equity, Access, & Learning in CS Education*
 Co-Investigator (Jane Margolis, PI; \$38,045.02 component award)
- 2014-2018 **Northwestern University, 60037274.**
 Title: *The National Person-Centered Assessment Resource (PCAR)*
 Co-Investigator (Ron Hays, PI; \$17,742.27 component award)
- 2016– **English Language Proficiency Assessment for the 21st Century (ELPA21) Consortium, No Grant or Contract Number.**
 PI (\$6.0 million per year)

Awards and Honors

- 1998, 1999 **University Scholarship, Nanjing University.**
- 1999 **Best Non-Native English Speaker, The English-Speaking Union, International English Public Speaking Competition, London, Britain.**
- 1999 **First Prize, China Daily, National College English Public Speaking Competition.**
- 1999 **University President's Special Scholarship, Nanjing University.**
- 2000 **Guang-Hua Scholarship, Nanjing University.**
- 2001 **Graduate with Distinction, Nanjing University.**
- 2003 **Elected to Kappa Tau Alpha, National Honor Society of Journalism & Mass Communication.**
- 2003 **Research Award, Kappa Tau Alpha, National Honor Society of Journalism & Mass Communication.**
- 2003 **Chaffee-McLeod Award, Association for Education in Journalism & Mass Communication, Communication Theory & Methodology Division.**
 Best student paper in the open paper competition
- 2006 **Lyle V. Jones Award, L. L. Thurstone Psychometric Laboratory.**
 Annual award to one graduate student for outstanding scholarship and citizenship in the Thurstone Psychometric Laboratory at UNC-Chapel Hill
- 2007-2008 **Gulliksen Psychometric Research Fellowship, Educational Testing Service.**
 A competitive year-long research fellowship awarded by the ETS
- 2008 **Dean's Distinguished Dissertation Award, University of North Carolina.**
 For best dissertation research in social, behavioral, and economic sciences

- 2009 **AERA Outstanding Quantitative Dissertation Award**, *American Educational Research Association*.
For best dissertation in educational measurement and methodology
- 2009 **NCME Brenda H. Loyd Outstanding Dissertation Award**, *National Council on Measurement in Education*.
The award honors an outstanding dissertation in educational measurement.
- 2010 **Outstanding Reviewer Award**, *American Educational Research Association*.
For outstanding service to *Journal of Educational and Behavioral Statistics*
- 2011 **Anne Anastasi Early Career Award**, *American Psychological Association*.
For outstanding contributions and promise of continued work of outstanding quality to Division 5 areas (Evaluation, Measurement, and Statistics).
- 2011 **Elected Member**, *Society of Multivariate Experimental Psychology*.
The Society of Multivariate Experimental Psychology was founded in 1960 as a small and elective organization of researchers interested in multivariate quantitative methods and their application to substantive problems in psychology. Membership is limited to 65 regular active members.
- 2012 **Presidential Early Career Award for Scientists and Engineers**.
Award citation: *For pioneering contributions to measurement and statistical analysis, including the development of the new and transformative Metropolis-Hastings Robbins-Monro algorithm, and for leadership in shaping statistical practice in education, psychology, and health*. PECASE is the highest honor bestowed by the US Government on science and engineering professionals in the early stages of their independent research careers.
- 2012 **Cattell Early Career Award**, *Society of Multivariate Experimental Psychology*.
Named for Raymond B. Cattell, this award is an early-career award given annually by the Society of Multivariate Experimental Psychology to a young researcher who has made outstanding contributions to multivariate experimental psychology and who shows promise of continued work of a very high quality.
- 2013 **Outstanding Reviewer Award**, *American Educational Research Association*.
For outstanding service to *Journal of Educational and Behavioral Statistics*
- 2015 **Early Career Impact Award**, *Federation of Associations in Behavioral and Brain Sciences*.
This award is presented to early career scientists of FABBS member societies during the first 10 years post-PhD and recognizes scientists who have made major contributions to the sciences of mind, brain, and behavior.
- 2016 **Tanaka Award**, *Society of Multivariate Experimental Psychology*.
This award is given annually to the authors of the most outstanding paper published in *Multivariate Behavioral Research*. Members of SMEP vote to select the paper.

Invited Sessions and Workshops

- November 2006 **Cai, L.** A Markov chain Monte Carlo stochastic approximation algorithm for item factor analysis. *Advances in Adaptive Quadrature Meeting, Center for Health Statistics, University of Illinois at Chicago, Chicago, IL.*

- November 2006 **Cai, L.** A Metropolis-Hastings Robbins-Monro algorithm for item factor analysis. *Department of Psychology, The Ohio State University, Columbus, OH.*
- June 2007 **Cai, L.** A Metropolis-Hastings Robbins-Monro algorithm for maximum likelihood nonlinear latent structure analysis. *Research & Development Division, Educational Testing Service, Princeton, NJ.*
- September 2007 **Cai, L.** A Metropolis-Hastings Robbins-Monro algorithm for maximum likelihood nonlinear latent structure analysis. *Department of Psychology, University of Notre Dame, Notre Dame, IN.*
- May 2008 **Cai, L.** A Metropolis-Hastings Robbins-Monro algorithm for maximum likelihood nonlinear latent structure analysis. *Annual Convention of the Association for Psychological Science, Chicago, IL.*
- June 2008 **Cai, L.** Full information confirmatory item factor analysis with a Metropolis-Hastings Robbins-Monro algorithm. *The Second Patient Reported Outcomes Measurement Information System (PROMIS) Psychometric Summit, Evanston, IL.*
- July 2008 **Cai, L.** Stochastic approximation for maximum likelihood parameter estimation in nonlinear latent variable models. *2008 International Meeting of the Psychometric Society, Durham, NH.*
- May 2009 **Cai, L.** Modern psychological measurement: New developments in item response theory. *Annual Convention of the Association for Psychological Science, San Francisco, CA.*
- May 2009 **Cai, L.** Flexible multidimensional, multiple categorical IRT modeling. *Annual Convention of the Association for Psychological Science, San Francisco, CA.*
- July 2009 **Cai, L.** Multidimensional IRT in longitudinal assessment of Patient Reported Outcomes. *Statistical and Applied Mathematical Sciences Institute (SAMSI), Summer Psychometric Program, Durham, NC.*
- September 2009 **Cai, L.** Some recent advances in multidimensional item response theory. *CCH/HSRC/EXPORT Methods Seminar, UCLA.*
- January 2010 **Cai, L.** Extended item factor analysis and its applications. *Department of Biostatistics, UCLA.*
- Feb 2010 **Cai, L.** Contributions to CRESST conference on the psychometrics of games and simulations. *National Center for Research on Evaluation, Standards, and Student Testing, UCLA.*
- Feb 2010 **Cai, L.** Introduction to item response theory in drug abuse research. *Center for Advancing Longitudinal Drug Abuse Research, UCLA.*
- May 2010 **Cai, L.** Bootstrapping methods for latent variable models. *Annual Convention of the Association for Psychological Science, Boston, MA.*

- July 2010 **Cai, L.** A two-tier full-information item factor analysis model with applications. *2010 International Meeting of the Psychometric Society, Athens, GA.*
- August 2010 **Cai, L.** Current development in multidimensional item response theory. *Center for National Assessment of Educational Quality, Beijing Normal University, China.*
- September 2010 **Cai, L.** Three cheers for the asymptotically distribution free theory of estimation and inference: Some recent applications in latent variable modeling. *Current Topics in the Theory and Application of Latent Variable Models: A Conference Honoring the Scientific Contributions of Michael W. Browne, Columbus, OH.*
- September 2010 **Cai, L.** Alternative multiple imputation inference for mean and covariance structure modeling. *Department of Psychology, University of Kansas.*
- September 2010 **Cai, L.** Longitudinal Item response theory and applications. *The Third Patient Reported Outcomes Measurement Information System (PROMIS) Psychometric Summit, Chicago, IL.*
- Jan 2011 **Cai, L.** A two-tier item factor analysis model with applications. *Department of Statistics, Department of Health Studies, and Committee on Education, University of Chicago, Chicago, IL.*
- April 2011 **Cai, L.** The role of item response theory in psychological data analysis. *Department of Psychology, Department of Human Development, University of Chicago, Chicago, IL.*
- July 2011 **Cai, L.** Lord-Wingersky algorithm after 25+ Years: Version 2.0 for hierarchical item factor models. *2011 International Meeting of the Psychometric Society, Hong Kong, China.*
- July 2011 Hansen, M., & **Cai, L.** Limited-information goodness-of-fit testing of hierarchical item factor models. *2011 International Meeting of the Psychometric Society, Hong Kong, China.*
- July 2011 Lee, M., Hansen, M., & **Cai, L.** Calibration, scaling, DIF, and projection: A common framework using multidimensional IRT. *2011 International Meeting of the Psychometric Society, Hong Kong, China.*
- July 2011 Yang, J. S., Monroe, S., & **Cai, L.** A multilevel item bifactor model. *2011 International Meeting of the Psychometric Society, Hong Kong, China.*
- July 2011 **Cai, L.** Multilevel and hierarchically multidimensional latent variable measurement models for item response modeling in large-scale assessments. *Workshop on Modern Psychometric and Statistical Methods for Large Scale Education Assessments, Center for National Assessment of Education Quality, Beijing Normal University, China.*
- August 2011 Edwards, M. C., & **Cai, L.** A new diagnostic procedure to detect departures from local independence in item response models. *Annual Convention of the American Psychological Association, Washington, DC.*

- August 2011 **Cai, L.** Second-generation, multidimensional, and multilevel item response theory modeling framework. *Annual Convention of the American Psychological Association, Washington, DC.*
- April 2012 **Cai, L.** Second-generation, multidimensional, and multilevel item response theory modeling. *Annual Meeting of the National Council on Measurement in Education, Vancouver, Canada.*
- July 2012 **Cai, L.** Multi-level and multidimensional IRT: Theory and software implementation. *Center for National Assessment of Education Quality, Beijing Normal University, China.*
- August 2012 **Cai, L.** Item response theory modeling in drug abuse research. *Summer Institute of the Center for Advancing Longitudinal Drug Abuse Research (CALDAR), Marina del Rey, CA.*
- April 2013 **Cai, L.** Remembering L. L. Thurstone. *Annual Meeting of the National Council on Measurement in Education, San Francisco, CA.*
- April 2013 **Cai, L.** Hierarchical multidimensional item response models with alternative latent variable distributional assumptions: A discussion and some applications. *Quantitative Research Methods in Education, Health, and Social Sciences Workshop, University of Chicago.*
- May 2013 **Cai, L.** Item response theory. *Center for National Assessment of Education Quality, Beijing Normal University, China.*
- September 2013 **Cai, L.** Hierarchical multidimensional item response models with alternative latent variable distributional assumptions: A discussion and some applications. *Department of Statistics, University of South Carolina, Columbia, SC.*
- October 2013 **Cai, L.** Flexible multidimensional item response theory analysis and model fit evaluation. *2013 meeting of the Society of Multivariate Experimental Psychology, St. Pete Beach, FL.*
- April 2014 **Cai, L., Baker, E., Choi, K. C., & Buschang, R.** CRESST functional validity model: Deriving formative and summative information from Common Core assessments. *Annual Meeting of the American Educational Research Association, Philadelphia, PA.*
- April 2014 **Cai, L., & Houts, C.** flexMIRT®: Flexible multilevel multidimensional item analysis and test scoring. *Annual Meeting of the National Council on Measurement in Education, Philadelphia, PA.*
- May 2014 **Cai, L.** Developments in item response theory research. *Center for National Assessment of Education Quality, Beijing Normal University, China.*
- July 2014 **Cai, L., & Houts, C.** flexMIRT®: Flexible multilevel multidimensional item analysis and test scoring. *2014 International Meeting of the Psychometric Society, Madison, WI.*

- September 2014 **Cai, L.** Introduction to flexMIRT®: Flexible multilevel multidimensional item analysis and test scoring. *Department of Education, Seoul National University, Republic of Korea.*
- September 2014 **Cai, L.** Using flexMIRT® for multilevel item response and diagnostic classification modeling. *Korea Society for Educational Evaluation, Seoul, Republic of Korea.*
- September 2014 **Cai, L.** Flexible hierarchical item factor and diagnostic models for educational assessments. *Korea Institute for Curriculum and Evaluation, Seoul, Republic of Korea.*
- October 2014 **Cai, L.** Introduction to flexMIRT®: Flexible multilevel multidimensional item analysis and test scoring. *Department of Psychology, University of Southern California, Los Angeles, CA.*
- April 2015 **Cai, L., & Houts, C.** flexMIRT®: Flexible multilevel multidimensional item analysis and test scoring. *Annual Meeting of the National Council on Measurement in Education, Chicago, IL.*
- April 2015 **Cai, L.** Developments in factor analysis. *Center for National Assessment of Education Quality, Beijing Normal University, China.*
- July 2015 **Cai, L., & Wirth, R.J.** flexMIRT®: Flexible multilevel multidimensional item analysis and test scoring. *2015 International Meeting of the Psychometric Society, Beijing, China.*
- July 2015 **Cai, L.** The utility of multidimensional item response models in educational assessment and evaluation studies. *2015 International Meeting of the Psychometric Society, Beijing, China.*
- April 2016 **Cai, L., & Houts, C.** flexMIRT®: Flexible multilevel multidimensional item analysis and test scoring. *Annual Meeting of the National Council on Measurement in Education, Washington, DC.*
- Feb 2017 **Cai, L.** Three stories about two things. *2017 Southwest Educational Research Association Meeting, San Antonio, TX.*
- April 2018 **Cai, L.** Measurement Problems – A look back to help us look ahead. *Annual Meeting of the National Council on Measurement in Education, New York, NY.*
- May 2018 **Cai, L.** Beyond the ivory tower: Multivariate methods for improvement of educational measurement. *Annual Convention of the Association for Psychological Science, San Francisco, CA.*

Conference Presentations

- November 2002 Eveland, W. P., Eastin, M., Marton, K., Liu, K., & **Cai, L.** Non-response bias, context dependency, social desirability, and response set: An experimental comparison of web vs. telephone surveys. *Paper presented at the 2002 meeting of the Midwest Association for Public Opinion Research, Chicago, IL.*

- October 2002 David, P., Lu, T., & **Cai, L.** Computers as social actors: Testing the fairness of man and machine. *Paper presented at the Fifth Annual International Workshop, Presence 2002, Universidade Fernando Pessoa, Porto, Portugal.*
- May 2003 **Cai, L.**, David, P., Lu, T., Liu, K., Cortese, J., & Seo, M. Testing the boundaries of the Media Equation in a computer game situation: When an evaluation by a human means more than an evaluation by a computer. *Paper presented at the 2003 meeting of the International Communication Association, San Diego, CA.*
- August 2003 **Cai, L.** Assessing co-termination between coders in unitizing textual data: A Multi-response Randomized Blocks Permutation approach. *Paper presented at the 2003 meeting of the Association for Education in Journalism & Mass Communication, Kansas City, MO. (Top Student Paper).*
- May 2004 Eveland, W. P., Seo, M., Cortese, J., **Cai, L.**, Wang, Z., Thomson, T., Seitman, R., & Sipos, I. News use, discussion, and knowledge of local public affairs: An experimental and observational study. *Paper presented at the 2004 meeting of the International Communication Association, New Orleans, LA.*
- June 2004 MacCallum, R. C., Browne, M. W., & **Cai, L.** Testing differences between structural equation models: Power analyses and null hypotheses. *Paper presented at the 2004 International Meeting of the Psychometric Society, Monterey, CA.*
- October 2004 **Cai, L.** Limited information goodness-of-fit testing for latent variable models fitted to sparse 2^P tables. *Paper presented at the 2004 Society of Multivariate Experimental Psychology graduate student pre-conference, Naples, FL.*
- April 2005 Pungello, E. P., Campbell, F. A., Burchinal, M. R., **Cai, L.**, Wasik, B. H., & Ramey, C. T. Early risk and educational intervention predicting to young adult outcomes within a high-risk population. *Paper presented at the 2005 biennial meeting of the Society for Research in Child Development, Atlanta, GA.*
- March 2006 Ennett, S. T., Foshee, V. A., Bauman, K. E., Hussong, A., Faris, R., Hipp, J., & **Cai, L.** The social context of adolescent substance use. *Paper presented at the 2006 biennial meeting of the Society for Research on Adolescence, San Francisco, CA.*
- June 2006 Thissen, D., **Cai, L.**, & Bock, R. D. A new parameterization of the nominal item response model. *Paper presented at the International Meeting of the Psychometric Society, Montréal, Canada.*
- June 2006 **Cai, L.** SEM of another flavor: Two new applications of the supplemented EM algorithm. *Paper presented at the 2006 International Meeting of the Psychometric Society, Montréal, Canada.*
- October 2006 **Cai, L.** Full-information item factor analysis by Markov chain Monte Carlo stochastic approximation. *Paper presented at the 2006 Society of Multivariate Experimental Psychology graduate student pre-conference, Lawrence, KS.*

- February 2007 Curran, P. J., Hussong, A. M., **Cai, L.**, & Huang, W. The integrative analysis of three data sets: Internalizing symptomatology from ages 10 to 33. *Paper presented at the 2007 meeting of the Conference on Emerging Adulthood, Tucson, AZ.*
- July 2008 **Cai, L.**, & Thissen, D. Implementation of a Supplemented EM algorithm to compute the error covariance matrix for ML parameter estimates in item response theory models. *Paper presented at the 2008 International Meeting of the Psychometric Society, Durham, NH.*
- April 2010 Yang, J. S., Hansen, M., & **Cai, L.** Characterizing sources of uncertainty in IRT scale scores. *Paper presented at the 2010 Meeting of the National Council on Measurement in Education, Denver, CO.*
- April 2010 **Cai, L.**, Yang, J. S. & Hansen, M. Generalized full-information item bifactor analysis. *Paper presented at the 2010 Meeting of the National Council on Measurement in Education, Denver, CO.*
- April 2010 **Cai, L.** On the shape of likelihood surface in item factor analysis. *Paper presented at the 2010 Meeting of the American Educational Research Association, Denver, CO.*
- July 2010 Hansen, M., **Cai, L.**, & Yang, J. S. Alternative bifactor model specifications: Estimation, diagnosis, and consequences of model choice. *Paper presented at the 2010 International Meeting of the Psychometric Society, Athens, GA.*
- July 2011 Lee, T., **Cai, L.** A poor person's posterior predictive checking of structural equation models. *Paper presented at the 2011 International Meeting of the Psychometric Society, Hong Kong, China.*
- July 2011 Edwards, M. C., Houts, C. R., **Cai, L.** A new procedure for detecting departures from local independence in item response models. *Paper presented at the 2011 International Meeting of the Psychometric Society, Hong Kong, China.*
- October 2011 Hansen, M., & **Cai, L.** Limited-information goodness-of-fit testing of hierarchical item factor models. *Paper presented at the 2011 Meeting of the Society of Multivariate Experimental Psychology, Norman, OK.*
- April 2012 Yang, J. S., Monroe, S., & **Cai, L.** A multiple group multilevel item bifactor analysis model. *Paper presented at 2012 Meeting of the National Council on Measurement in Education, Vancouver, Canada.*
- April 2012 Hansen, M. & **Cai, L.** The potential of local dependence diagnostics to inform or mislead. *Paper presented at 2012 Meeting of the National Council on Measurement in Education, Vancouver, Canada.*
- April 2012 Lee, T., Hansen, M., Yang, J. S., & **Cai, L.** Variability of estimates in generalizability theory: A simulation based confidence interval for reliability coefficients. *Paper presented at 2012 Meeting of the National Council on Measurement in Education, Vancouver, Canada.*

- July 2012 Monroe, S., & **Cai, L.** Estimation of a Ramsay-Curve IRT model Using the Metropolis-Hastings Robbins-Monro algorithm. *Paper presented at the 2012 International Meeting of the Psychometric Society, Lincoln, NE.*
- July 2012 Woods, C. M., & **Cai, L.** Evaluation of the Langer improved Wald test for DIF testing. *Paper presented at the 2012 International Meeting of the Psychometric Society, Lincoln, NE.*
- July 2012 Li, Z., & **Cai, L.** Summed score based fit indices for testing latent variable distribution assumption in IRT. *Paper presented at the 2012 International Meeting of the Psychometric Society, Lincoln, NE.*
- July 2012 **Cai, L.**, & Woods, C. M. Maximum marginal likelihood item bifactor analysis with estimation of the general dimension as an empirical histogram. *Paper presented at the 2012 International Meeting of the Psychometric Society, Lincoln, NE.*
- July 2012 Yang, J., & **Cai, L.** Estimation of contextual effects through nonlinear multilevel latent variable modeling with a Metropolis-Hastings Robbins-Monro algorithm. *Paper presented at the 2012 International Meeting of the Psychometric Society, Lincoln, NE.*
- July 2012 Hansen, M., & **Cai, L.** When local independence diagnostics mislead. *Paper presented at the 2012 International Meeting of the Psychometric Society, Lincoln, NE.*
- July 2012 Lee, T., & **Cai, L.** A note On a Tucker-Lewis index For item response theory modeling. *Paper presented at the 2012 International Meeting of the Psychometric Society, Lincoln, NE.*
- April 2013 Yang, J., & **Cai, L.** Estimation of contextual effects through nonlinear multilevel latent variable modeling with a Metropolis-Hastings Robbins-Monro algorithm. *Paper presented at the 2013 Meeting of the National Council on Measurement in Education, San Francisco, CA.*
- July 2013 Hansen, M., & **Cai, L.** A hierarchical item response model for cognitive diagnosis. *Paper presented at the 2013 International Meeting of the Psychometric Society, Arnhem, the Netherlands.*
- July 2013 Kuhfeld, M., & **Cai, L.** The user of Jeffreys prior in IRT estimation of latent traits. *Paper presented at the 2013 International Meeting of the Psychometric Society, Arnhem, the Netherlands.*
- July 2013 Li, Z., Yang, J. S., & **Cai, L.** Item response growth modeling: A new application of multilevel factor model for longitudinal item response data. *Paper presented at the 2013 International Meeting of the Psychometric Society, Arnhem, the Netherlands.*
- July 2013 Monroe, S. & **Cai, L.** Limited information goodness-of-fit testing for structural models of categorical data. *Paper presented at the 2013 International Meeting of the Psychometric Society, Arnhem, the Netherlands.*

- July 2013 Falk, C. F. & **Cai, L.** A logistic function of a monotonic polynomial for estimating item response functions. *Paper presented at the 2013 International Meeting of the Psychometric Society, Arnhem, the Netherlands.*
- July 2013 Yang, J. S. & **Cai, L.** Estimation of cross-level interactions in a three-level nonlinear latent variable model with a Metropolis-Hastings Robbins-Monro algorithm. *Paper presented at the 2013 International Meeting of the Psychometric Society, Arnhem, the Netherlands.*
- August 2013 **Cai, L.** Item response theory analysis in the case of complex survey data. *Paper presented at the 59th World Statistics Congress, Hong Kong, China.*
- April 2014 Yang, J. S. & **Cai, L.** Estimation of a three-level latent variable model With Metropolis-Hastings Robbins-Monro algorithm. *Paper presented at the 2012 Meeting of the National Council on Measurement in Education, Philadelphia, PA.*
- April 2014 Hansen, M. & **Cai, L.** Detecting and characterizing misspecification of cognitive diagnostic models. *Paper presented at the 2012 Meeting of the National Council on Measurement in Education, Philadelphia, PA.*
- July 2014 Kuhfeld, M. & **Cai, L.** Model fit assessment in multilevel exploratory factor analysis. *Paper presented at the 2014 International Meeting of the Psychometric Society, Madison, WI.*
- July 2014 Monroe, S. & **Cai, L.** Multidimensional item factor analysis with semi nonparametric latent densities. *Paper presented at the 2014 International Meeting of the Psychometric Society, Madison, WI.*
- July 2014 Falk, C. F. & **Cai, L.** A flexible and efficiently estimated high-dimensional response style model. *Paper presented at the 2014 International Meeting of the Psychometric Society, Madison, WI.*
- August 2014 Harrell, L., Belin, T., & **Cai, L.** Multiple imputation and multidimensionality in large-scale educational assessments. *Paper presented at the 2014 Joint Statistical Meetings, Boston, MA.*
- April 2015 Monroe, S., **Cai, L.**, & Choi, K. Student Growth Percentiles based on MIRT: Implications of calibrated projection. *Paper presented at the 2015 Meeting of the National Council on Measurement in Education, Chicago, IL.*
- April 2015 Thomas, L., & **Cai, L.** A crossed random effect MIRT model for multiple rater data. *Paper presented at the 2015 Meeting of the National Council on Measurement in Education, Chicago, IL.*
- April 2015 Harrell, L., & **Cai, L.** Plausible value imputation from multidimensional IRT models using stochastic approximation methods. *Paper presented at the 2015 Meeting of the National Council on Measurement in Education, Chicago, IL.*

- April 2015 Kuhfeld, M., & **Cai, L.** Multilevel item factor analysis with covariates for teacher evaluation surveys. *Paper presented at the 2015 Meeting of the National Council on Measurement in Education, Chicago, IL.*
- June 2015 **Cai, L.** , & Harrell, L. The role of item response theory in assessment and evaluation studies. *Paper presented at the 13th ICSEA/Graybill Conference, Fort Collins, CO.*
- April 2016 Monroe, S., & **Cai, L.** Cluster growth percentiles: An alternative to aggregated student growth percentiles. *Paper presented at the 2016 Meeting of the National Council on Measurement in Education, Washington, DC.*
- April 2016 **Cai, L.**, Choi, K., & Kuhfeld, M. On the role of multilevel item response models in multisite evaluation studies. *Paper presented at the 2015 Meeting of the National Council on Measurement in Education, Washington, DC.*
- April 2016 Choi, K., **Cai, L.**, & Seltzer, M. Three-level latent variable hierarchical model with level-2 measurement model. *Paper presented at the 2016 Meeting of the National Council on Measurement in Education, Washington, DC.*
- April 2016 Harrell, L., & **Cai, L.** Multidimensional IRT calibration with simultaneous latent regression in large-scale survey assessments. *Paper presented at the 2016 Meeting of the National Council on Measurement in Education, Washington, DC.*
- April 2016 Kim, J., **Cai, L.**, & Choi, K. Estimating effects of reclassification of English learners using a propensity score approach. *Paper presented at the 2016 Meeting of the National Council on Measurement in Education, Washington, DC.*
- April 2016 Shin, N., Hansen, M., **Cai, L.** Comparability study of computer-based and paper-based tests for English Language Learners. *Paper presented at the 2016 Meeting of the National Council on Measurement in Education, Washington, DC.*
- April 2016 Kuhfeld, M., & **Cai, L.** School-level subscores using multilevel item factor analysis. *Paper presented at the 2016 Meeting of the National Council on Measurement in Education, Washington, DC.*
- April 2016 Bo, Y. E., Hansen, M., & **Cai, L.** An alternative perspective on subscores and their value. *Paper presented at the 2016 Meeting of the National Council on Measurement in Education, Washington, DC.*
- April 2017 **Cai, L.**, Choi, K. Multilevel item factor model with multiple latent predictors in level-1 model. *Paper presented at the 2017 Meeting of the National Council on Measurement in Education, San Antonio, TX.*
- April 2017 Choi, K., Seltzer, M., & **Cai, L.** Treating mediator as a latent variable in multisite cluster randomized trials. *Paper presented at the 2017 Meeting of the National Council on Measurement in Education, San Antonio, TX.*

- April 2017 Chung, S., & **Cai, L.** Alternative multiple imputation inference for categorical structural equation modeling. *Paper presented at the 2017 Meeting of the National Council on Measurement in Education, San Antonio, TX.*
- April 2017 Schenke, K., Kuhfeld, M., & **Cai, L.** How do teachers change the distribution of their classroom's achievement? *Paper presented at the 2017 Meeting of the American Educational Research Association, San Antonio, TX.*
- April 2018 **Cai, L.**, & Hansen, M. Application of Multidimensional IRT to a Test of K-12 English Language Proficiency. *Paper presented at the 2018 Meeting of the National Council on Measurement in Education, New York, NY.*
- April 2018 Hansen, M., & **Cai, L.** Characterizing classification accuracy using posterior densities from multidimensional IRT scoring. *Paper presented at the 2018 Meeting of the National Council on Measurement in Education, New York, NY.*
- April 2018 **Cai, L.** Developing career-readiness indices through quantitative psychometric modeling. *Paper presented at the 2018 Meeting of the American Educational Research Association, New York, NY.*
- Jun 2018 **Cai, L.** Career readiness inferences from high school assessments through feature analysis. *Paper presented at the 2018 National Conference on Student Assessment, San Diego, CA.*

Professional Activities

affiliations	American Educational Research Association National Council on Measurement in Education Psychometric Society
professional service	Member, AERA Division D Dissertation Award Committee (2010-2011) Co-Chair, AERA Division D Dissertation Award Committee (2011-2012) Chair, AERA Division D Dissertation Award Committee (2012-2013) Member, NCME Annual Awards Committee (2011-2012) Co-Chair, NCME Annual Awards Committee (2012-13) Chair, NCME Annual Awards Committee Chair (2013-14) Co-Chair, AERA E. F. Lindquist Award Committee (2013-14) Chair, AERA E. F. Lindquist Award Committee (2014-15) Trustee, Society of Multivariate Experimental Psychology (2013-2015) Member, Psychometric Society Conference Program Committee (2013-2015) Trustee, Psychometric Society (2015-2017) Member, UK Standards and Testing Agency TAC (2015-) Member, NCME Publications Committee (2017-) Member, GRE Board Research Committee (2017-)
university service	Member, Education Department Academic Personnel Committee (2009-2011) Member, GSE&IS Faculty Executive Committee (2010-2012) Member, UCLA Hellman Fellowship Awards Committee (2012)
grant review	Institute of Education Sciences, National Institutes of Health, National Science Foundation, Patient-Centered Outcomes Research Institute

ad hoc reviewer American Educational Research Association (Division D), The American Journal of Psychiatry, The American Statistician, Applied Psychological Measurement, Behavior Research Methods, Biometrics, British Journal of Mathematical and Statistical Psychology, Computational Statistics and Data Analysis, Educational Measurement: Issues and Practice, Educational and Psychological Measurement, Human Communication Research, Journal of Clinical Epidemiology, Journal of Clinical Psychiatry, Journal of Educational Measurement, Journal of Multivariate Analysis, Methodology, National Council on Measurement in Education, NeuroImage, Psychometrika, Psychological Assessment, Psychological Methods, Quality of Life Research, Society for Research on Educational Effectiveness, Sociological Methodology, Structural Equation Modeling

Mentoring

postdocs Taehun Lee (2010-2012; Assistant Professor, University of Oklahoma)
Ji Seung Yang (2012-2013; Assistant Professor, University of Maryland)
Jordan Rickles (2012-2013; Research Scientist, American Institutes for Research)
Carl Falk (2012-2015; Assistant Professor, McGill University)
Scott Monroe (2014-2015; Assistant Professor, UMass - Amherst)
Emily Yuanchao Bo (2015-2016; Research Scientist, NWEA)
Katerina Schenke (2015-2016; Research Scientist, CRESST/UCLA)
Alex Sturm (2016-)

chair/co-chair of Wes Bonifay (AQM; Assistant Professor, University of Missouri)
dissertation Seungwon Chung (AQM)
committees Michelle Emmert (ELP; Assistant Dean for Student Affairs, Western University)
Mark Hansen (AQM; Research Assistant Professor, UCLA)
Sijia Huang (AQM)
Megan Kuhfeld (AQM; Postdoctoral researcher, University of Texas - Austin)
Moonsoo Lee (AQM; Research Scientist, KICE)
Scott Monroe (AQM; Assistant Professor, UMass - Amherst)
Yonsoo Suh (AQM)
Larry Thomas (AQM; Research Scientist, WestEd)
Ji Seung Yang (AQM; Assistant Professor, University of Maryland)
Li Zhen (AQM; eMetric)

member of the-
sis/dissertation
committees

Yourim Chai (Education)
Miles Chen (Statistics)
Ikkyu Choi (Applied Linguistics)
Tondra De (Education)
Lauren Harrell (Biostatistics)
Dierdre Kerr (Education)
James Lewis (Statistics)
Johnny Lin (Psychology)
Monica Lin (Education)
Sam Nagashima (Education)
Jordan Rickles (Education)
Kathleen Preston (Psychology)
Jason Sommerville (Statistics)
Thomas Soehl (Sociology)
Kekona Sorenson (Statistics)
Hanna Spinosa (Education)
Alex Sturm (Education)
Connie Tan (Education)
Kirsten Trickey (Psychology)
Denise Tsai (Statistics)
Jason Tsui (Education)

Trivia

Erdős number 5
h-index 29 (Google Scholar data)