

## RATNA NANDAKUMAR

University of Delaware  
School of Education  
Newark, DE 19711  
USA

Phone: 302-831-1635  
Fax: 302-831-4110  
Email: nandakum@udel.edu

### Education

Ph.D. (Education)	University of Illinois at Urbana-Champaign
A.M. (Statistics)	University of Illinois at Urbana-Champaign
M.Sc. (Statistics)	Bangalore University, India
B.Sc. (Honors) (Mathematics)	Bangalore University, India

### Professional Positions

1999-Present	Professor, School of Education, University of Delaware
1993 - 1999	Associate Professor, Dept. of Educational Studies, University of Delaware
1987 - 1993	Assistant Professor, Dept. of Educational Studies, University of Delaware
1984 - 1987	Research Assistant, Dept of Statistics, University of Illinois at Urbana-Champaign.
1982 - 1985	Research Assistant, Institute for Child Behavior and Development, University of Illinois at Urbana-Champaign.

### Refereed Publications

Nandakumar, R., Natesan, P., Palka, J., Shrestha, P. (under review). Comparing Bayesian Unknown Change-Point Model and Simulation Modeling Analysis to Quantify Immediacy and Measure Treatment Effect in Single Case Experimental Designs.

Coster, W. J., Pengsheng, N, Slavin, M., Kisala, P., **Nandakumar, R.**, Mulcahey, M., Tulskey, D., Jettey, A. (2016). Differential Item Functioning in PROMIS® Pediatric Short Forms in a Sample of Youth with Cerebral Palsy. Developmental Medicine and Child Neurology, 58, 1132-1138.

Natesan, P., **Nandakumar, R.** Minka, T., & Roubright, J. (2016). Bayesian prior choice in IRT estimation using MCMC and variational Bayes. *Frontiers in Psychology*, 7, Article 1422.

Mouza, C., **Nandakumar, R.**, Yilmaz Ozden, S., & Karchmer-Klein, R. (2017). A longitudinal investigation of pre-service teachers' development of technological pedagogical content knowledge in the context of teacher preparation. Action in Teacher Education (<http://dx.doi.org/10.1080/01626620.2016.1248301>).

- Rubright, J. D., **Nandakumar, R.**, & Karlawish, J. (2016). Identifying an appropriate measurement modeling approach for the Mini-Mental State Examination. Psychological Assessment, 28, 125-133.
- Kieftenbeld, V., & **Nandakumar, R.** (2015). Alternative Hypothesis Testing Procedures for DIMTEST. Applied Psychological Measurement, 1, 1-14.
- Rubright, J. D., **Nandakumar, R.**, & Glutting, J. (2014). A Simulation study of missing data with multiple missing X's. Practical Assessment, Research & Evaluation, 19, No. 10.
- Hou, L., de la Torre, J., & **Nandakumar, R.** (2014). Differential Item Functioning Assessment in Cognitive Diagnosis Modeling: Application of the Wald Test to Investigate DIF in the DINA model. Journal of Educational Measurement, 51, 98-125.
- MouzaC., Karchmer-KleinR., **Nandakumar R.**, Yilmaz OzdenS. & HuL. (2014). Investigating the Impact of an Integrated Approach to the Development of Preservice Teachers' Technological Pedagogical Content Knowledge (TPACK), Computers & Education, 71, 206-221.
- Herman, J. & **Nandakumar, R.** (2012). Adolescent perceptions of teen parenting: The journey of instrument development. Journal of Nursing Measurement, 20, 1, 3-20.
- Nandakumar, R.** & Hotchkiss, L (2012). PROC NLMIXED: For Estimating Parameters of IRT Models. Applied Psychological Measurement, 36, 1, 60 – 63.
- Leung, C., Silverman, R., **Nandakumar, R.**, Qian, X., and Hines, S. (2011). A Rasch analysis of difficulty of vocabulary from first-grade basal readers for preschool monolingual English speakers and English language learners. American Educational Research Journal, 48, 2, 421-461.
- Nandakumar, R.**, Yu, F., & Zhang, Y (2011). The Impact of Conditional Covariance on the Performance of the DETECT Procedure. Applied Psychological Measurement, 35, 2, 127-144.
- Harik. P., Clauser.B., Grabovsky. I, , Nungester, R, Swanson, D, & **Nandakumar. R.** (2009). An Examination of rater drift within a generalizability theory framework. Journal of Educational Measurement, 46, 1, 43-58.
- Nandakumar, R.** & Roussos, L. (2004). Evaluation of CATSIB procedure in pretest setting. Journal of Educational and Behavioral Statistics, 29, 177-199.
- Roussos, L. A., **Nandakumar, R.**, & Cwikla-Banks, J. (2009). Theoretical formula for statistical bias in CATSIB DIF estimator due to discretization of the ability scale. LSAC Computerized Testing Report. Newtown, PA: Law School Admission Council.
- Nandakumar, R.**, & Roussos, L. A. (2001). CATSIB: A modified SIBTEST procedure to detect differential item functioning in computerized adaptive tests. LSAC Computerized Testing Report, 97-11. Newtown, PA: Law School Admission Council.

Yu, F., & **Nandakumar, R.** (2001). Poly-Detect for quantifying the degree of multidimensionality. Journal of Educational Measurement, 38, 99-120.

**Nandakumar, R.**, Yu, F., Li, H., & Stout, W. (1998). Assessing unidimensionality of polytomous data. Applied Psychological Measurement, 22, 99-115.

Stout, W., Li, H., **Nandakumar, R.**, & Bolt, D. (1997). MULTISIB - A procedure to investigate DIF when a test is intentionally multidimensional. Applied Psychological Measurement, 21, 195-213.

**Nandakumar, R.**, & Yu, F. (1996). Empirical validation of Dimtest on nonnormal ability distributions. Journal of Educational Measurement, 33, 355-368.

Stout, W., **Nandakumar, R.**, & Habing, B. (1996). Analysis of latent dimensionality of dichotomously and polytomously scored test data. Behavior Metrika, 23, 37-65.

Golinkoff, R. M., Jacquet, R. C., Hirsh-Pasek, K., & **Nandakumar, R.** (1996). Lexical principles may underlie the learning of verbs. Child Development, 67, 3101-3119.

**Nandakumar, R.** (1994). Assessing latent trait unidimensionality of a set of items - - comparison of different approaches. Journal of Educational Measurement, 31, 1-18.

**Nandakumar, R.** (1993). Simultaneous DIF amplification and cancellation: Shealy-Stout's test for DIF. Journal of Educational Measurement, 30, 293-311.

**Nandakumar, R.** (1993). A FORTRAN 77 program for detecting differential item function through Mantel-Haenszel Statistics. Educational and Psychological Measurement, 53, 679-684.

**Nandakumar, R.**, & Stout, W. (1993). Refinements of Stout's procedure for assessing latent trait unidimensionality. Journal of Educational Statistics, 18, 41-68.

**Nandakumar, R.** (1993). Assessing essential unidimensionality of real data. *Applied Psychological Measurement*, *1*, 29-38.

**Nandakumar, R.** (1993). A FORTRAN program for assessing essential unidimensionality data using Holland and Rosenbaum's methodology. Multivariate Behavioral Research, 28, 63-66.

**Nandakumar, R.** (1993). Assessing dimensionality of real data. Applied Psychological Measurement, 17, 29-38.

**Nandakumar, R.**, Glutting, J., & Oakland, T. (1993). Mantel-Haenszel methodology for detecting item bias: An introduction and example using the Guide to the Assessment of Test Session Behavior. Journal of Psychoeducational Assessment, 11, 108-119.

Stout, W.F., **Nandakumar, R.**, Junker, B., Chang, H., & Steidinger, D. (1992). DIMTEST: A FORTRAN program for assessing dimensionality of binary item responses. Applied Psychological Measurement, 16, 236.

**Nandakumar, R.** (1991). Traditional dimensionality vs. essential dimensionality. Journal of Educational Measurement, 28, 99-117.

### **Conference Proceedings and Technical Reports**

Nandakumar, R., Cwikla, J., and Roussos, L. (2000). Kernel-Smoothed DIF Detection Procedure for Computerized Adaptive Tests. LSAC Computerized Testing Report. Newtown, PA: Law School Admission Council.

Nandakumar, R. (1993). Simultaneous item bias cancellation and amplification: Shealy-Stout test for bias. In Steyer, R., & Wender, K.F., (Eds), *Psychometric methodology: Proceedings of the 7th European Meeting of the Psychometric Society in Trier* (pp. 355-360). Stuttgart: Gustav Fischer Verlag.

Nandakumar, R., & Stout, W. (1992a). *Refinements of Stout's procedure for assessing latent trait unidimensionality*. Research Report 1992-1. Urbana, IL: Office of Naval Research Technical Report.

Nandakumar, R. (1992b). *Assessing dimensionality of real data*. Research Report 1992-2. Urbana, IL: Office of Naval Research Technical Report.

Nandakumar, R. (1992c). *Assessing latent trait unidimensionality of a set of items-Comparison of different approaches*. Research Report 1992-3. Urbana, IL: Office of Naval Research Technical Report.

Nandakumar, R. (1992d). *Simultaneous item bias amplification and cancellation: Shealy-Stout's test for DIF*. Research Report 1992-4. Urbana, IL: Office of Naval Research Technical Report.

### **Book Chapter**

Nandakumar, R., and Ackerman, T. (2004). Test Modeling. In Kaplan (Ed.), Handbook of Quantitative Methodology in the Social Sciences. Sage.

### **Book Review**

Nandakumar, R. (1991). [Review of A handbook of introductory statistical methods]. *Journal of Educational Statistics*, *16*, 373-376.

### **Conference Presentations**

- Chen, D., & Nandakumar, R. (2016, April). A Rasch Analysis of Teachers' Use of School Discipline Techniques Survey: Perceptions of Teachers and Students. Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.
- Rubright, J., & Nandakumar, R. (2014, April). Examinee Classification Decisions in the Presence of Residual Dependencies – A Simulation Study. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia.
- Hou, L, Nandakumar, R, & de la Torre, J (2014, April). CDMSIB: Differential Item Functioning Detection Procedure in Cognitive Diagnostic Assessment. Paper presented at the annual meeting of the American Educational Research Association, Philadelphia.
- Hou, L, Nandakumar, R, & de la Torre, J (2014, April). DIF in CDM: Comparing Wald Test with Mantel-Haenszel and SIBTEST. Paper presented at the annual meeting of the National Council of Measurement in Education, Philadelphia.
- Rubright, J., Nandakumar, R, & Glutting, J. (2013, April). A Simulation study of missing data with multiple missing X's. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.
- Kieftenbeld, V. & Nandakumar, R. ( 2013, July). Dimensionality assessment using parametric bootstrap hypothesis testing. Paper presented at the 78th annual meeting of the Psychometric Society in Arnhem, The Netherlands.
- Natesan, P., Nandakumar, R., Minka, T., & Rubright, J. (2012, March). Comparison of Priors in Bayesian Estimation of 1-PL Item Response Models. Paper presented at the annual meeting of the American Educational Research Association, Vancouver, Canada.
- Rubright, J., Nandakumar, R, & Glutting, J. (2012, March). What Do We Do When Data Are Missing on Multiple Variables? Paper presented at the annual meeting of the American Educational Research Association, Vancouver, Canada.
- Feinberg, R., Wainer,H., Nandakumar, R., & Jodoin, M. (2012, March). Subscores that add value in a licensure context: A Simulation Study. Paper presented at the annual meeting of the National Council of Measurement in Education, Vancouver, Canada.
- Natesan, P., Nandakumar, R., Minka, T., Qian, X., & Rubright, J. (2010, July). 1-PL models: A comparison of MML, Bayesian and Variational Bayesian Approximation Estimation methods. Paper presented at the International Meeting of the Psychometric Society, Athens, Georgia.
- Qian X. Y. & Nandakumar, R. (2010, April). A Multi-level Differential Item Functioning Analysis of Trends in International Mathematics and Science Study (TIMSS) 2003: Potential Sources of Gender Difference among U.S. 8TH Graders' Science Achievement. Paper presented at the annual meeting of the American Educational Research Association, May, 2010, Denver, Colorado.

Rubright J, Nandakumar R, Harkins K, and Karlawish J. (2010, April). Polytomous differential item functioning and research attitudes: Does Race Matter? Paper presented at the National Council on Measurement in Education annual meeting, Denver, Colorado.

Feinberg, R., Kahraman, N., Kimberly A. Swygert, Nandakumar, R. (2010, April). Modeling Computer-Based Case Simulations Using Mixed Models. Paper presented at the National Council on Measurement in Education annual meeting, Denver, Colorado.

Qian X. Y., Nandakumar, R., & Fifield, S. (2009, April). A polytomous item response data analysis of Science Teaching Efficacy Belief Instrument-B in an inquiry-based elementary teacher education program. Paper presented at the annual meeting of the American Educational Research Association, San Diego, CA.

Silverman, R., Leung, C., & Nandakumar, R. (2009, April). A Rasch analysis of difficulty of words in first –grade basal readers for preschool ELL and monolingual English speakers. Paper presented at the annual meeting of the American Educational Research Association, San Diego, CA.

Nandakumar, R, Hou, L. & Burkes, L.(2008, March). DIF in dichotomous item data: Comparison of HGLM with Mantel-Haenszel and SIBTEST Procedures. Paper presented at the annual meeting of the National Council on Measurement in Education, New York.

Nandakumar, R, Yu. F., Burkes, L, & Ramineni, C. (2005, April). Performance of the new-DIMTEST procedure for assessing the dimensional structure of short tests and small samples. Paper presented at the annual meeting of the American Educational Research Association, Paper presented at the annual meeting of the National Council on Measurement in Education, Montreal, Canada.

Uribe-Zarain, X, Nandakumar, R, & Yu, F. (2005, April). Determining the dimensional structure of real data. Paper presented at the annual meeting of the National Council on Measurement in Education, Montreal, Canada.

Nandakumar, R., & Hotchkiss, L. (2004). Diagnostic Tools for Modeling Attitudinal Data. Paper presented at the International Meeting of the Psychometric Society, Pacific Grove (Monterey), California, USA, June 14- 17, 2004

Nandakumar, R, Yu, & Zhang (2003, July). Conditional Scores of DETECT. Paper presented at the International Meeting of the Psychometric Society, Sardinia.

Zhang, Yu, and Nandakumar. (2003, April). The Impact of Conditional Scores on the Performance of DETECT. Paper presented at the annual meeting of the National Council on Measurement in Education, Chicago.

Nandakumar, R., Hotchkiss, L., & Roberts, J. (2002, June). Dimensionality assessment of attitudinal data. Paper presented at the annual meeting of the Psychometric Society, University of North Carolina, Chapel Hill.

The conference session **Chair: Instrument Development**. At the annual meeting of the Psychometric Society, The University of North Carolina at Chapel Hill. Chapel Hill, North Carolina (June, 2002).

Nandakumar, R., Hotchkiss, L., & Roberts, J. (2002, April). Attitudinal Data: Dimensionality and Start Values for Estimating Item Parameters. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Finch, H., Habing, B., Roberts, J., and Nandakumar, R. (April, 2002). A Q3 statistic for unfolding item response theory models. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

Oh, H., Nandakumar, R., Glutting, J. and Zhang, L. (June, 2002). DIF in mathematics in on Delaware student testing program for 3<sup>rd</sup> grade: Comparison of Mantel-Haenszel, logistic regression, and SIBTEST procedures. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

The conference session **Discussant: Assessing multi-dimensionality: Measure twice; cut once**. At the annual meeting of the American Educational Research Association, New Orleans (April, 2002).

Nandakumar, R. (2001, November). *Yoga in Education*. Session Chair at the 12<sup>th</sup> International Conference on Frontiers of Yoga Research and Applications, Prashanti Kutiram, Bangalore, India.

Nandakumar, R., Roberts, J. (2001, June). *Dimensionality Structure of Attitudinal Data*. Paper presented at the annual meeting of the Psychometric Society, Valley Forge Conference Center, King of Prussia, PA.

Nandakumar, R., Roussos, L., & Cwikla, J. (2000, April). *DIF assessment of CAT data: Kernel-smoothed CATSIB*. Paper presented at the annual meeting of the National Council on Measurement in Education, New Orleans.

Yu, Feng., & Nandakumar, R. (2000, April). *Pretest item calibration under CAT environment*. Paper presented at the annual meeting of the National Council on Measurement in Education, New Orleans.

Roussos, R., Nandakumar, R., and Cwikla, J. (1999, June). *Matching variable for CATSIB: Number of intervals and scaling*. Paper presented at the annual meeting of the Psychometric Society, Lawrence, Kansas.

Roussos, R., Nandakumar, R., and Cwikla, J. (1999, April). *Kernel-smooth CATSIB DIF detection*. Paper presented at the annual meeting of the American Educational Research Association, Montreal, Canada.

Nandakumar, R., Roussos, L. A., and Stout, W. (1999, April). *Development of a unidimensional DIF-free matching subtest for DIF assessment*. Paper presented at the annual meeting of the National Council on Measurement in Education, Montreal, Canada.

Roussos, L. and Nandakumar, R. (1998, June). *Kernel-Smoothed CATSIB*. Paper presented at the annual meeting of the Psychometric Society, Champaign-Urbana, IL.

Roussos, L. and Nandakumar, R. (1997, June). *Using a modified SIBTEST procedure to detect CATDIF*. Paper presented at the annual meeting of the Psychometric Society, Gatlinburg, Tennessee.

Nandakumar, R., and Roussos, L. (1997, March). *Validation of CATSIB to investigate DIF of computerized adaptive test data*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Yu, F., and Nandakumar, R. (1997, March). *Validation of Poly-Detect procedure to assess the degree of multidimensionality of polytomous data*. Paper presented at the annual meeting of the American Educational Research Association, Chicago, IL.

Yu, F., and Nandakumar, R. (1997, March). *The impact of second ability dimension on the unidimensional BILOG estimation of item and ability parameters*. Paper presented at the annual meeting of the National Council on Measurement in Education, Chicago, IL.

Ross, L., Clauser, B., and Nandakumar, R. (1997, March). *A simulation study of the use of Mantel-Haenszel and Logistic Regression procedures for assessing DIF in a computerized adaptive testing environment*. Paper presented at the annual meeting of the National Council on Measurement in Education, Chicago, IL.

Nandakumar, R., and Yu, F. (1996, June). *DETECT for polytomous item response data*. Paper presented at the annual meeting of the Psychometric Society, Banff Center for Conferences, Banff, Alberta, Canada.

Ross, L., Clauser, B., and Nandakumar, R. (1996, April). *Assessing differential impact: Effects of DIF screening on examinee performance, test characteristics, and test dimensionality*. Paper presented at the annual meeting of the National Council on Measurement in Education, New York.

Nandakumar, R., and Yu, F. (1995, June). *Validation of Poly-Dimtest to assess unidimensionality of polytomous data*. Paper presented at the annual meeting of the Psychometric Society, University of Minnesota, Minneapolis.



Nandakumar, R. (1995, June). *Using small groups to improve instruction*. Paper presented at the third annual teaching retreat, Wakonse-East, Sandy Hill Conference Center, MD. Sponsored by the Center for Teaching Effectiveness, University of Delaware.

Yu, F., and Nandakumar, R. (1995, April). *Assessing unidimensionality of polytomous data*. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Nandakumar, R. and Yu, F. (1994, April). *Testing the robustness of DIMTEST on nonnormal ability distributions*. Paper presented at the annual National Council on Measurement in Education meeting, New Orleans.

Nandakumar, R. (1994, April). *Development of a valid subtest for the assessment of DIF/bias*. Paper presented at the annual National Council on Measurement in Education meeting, New Orleans.

Nandakumar, R. and Junker, B. (1993, April). *Estimation of latent ability distributions under essential unidimensionality*. Paper presented at the annual American Educational Research Association meeting, Atlanta, Georgia.

Nandakumar, R. and Junker, B. (1992, July). *Estimating the latent ability distribution*. Paper presented at the annual meeting of the Psychometric Society, Columbus, Ohio.

Nandakumar, R. (1991, July). *Simultaneous item bias cancellation and amplification: Shealy-Stout test for bias*. Paper presented at the European Meeting of the Psychometric Society, Trier, Germany.

Nandakumar, R. (1991, June). *Applications of Shealy-Stout procedure for detection of item/test bias*. Paper presented at the joint meeting of the Classification and Psychometric Societies, New Brunswick, New Jersey.

Nandakumar, R. (1991, May). *Application of Stout's test of dimensionality and Shealy and Stout's test of bias to real data*. Paper presented at the Office of Naval Research contractors meeting, Princeton, New Jersey.

Nandakumar, R. (1991, April). *Assessing dimensionality of a set of items- Comparison of different approaches*. Paper presented at the American Educational Research Association meeting, Chicago.

Nandakumar, R. (1989, July). *Validation of Stout's procedure for assessing latent trait unidimensionality with real tests*. Paper presented at the European Meeting of the Psychometric Society, Leuven, Belgium.

Nandakumar, R. (1989, March). *Traditional Dimensionality vs. essential unidimensionality*. Paper presented at the annual American Educational Research meeting, San Francisco, California.

Nandakumar, R. (1988, April). *Refinements of Stout's procedure for assessing latent trait dimensionality*. Paper presented at the annual American Educational Research Association meeting, New Orleans.

Nandakumar, R. (1984, April). *An application of Heckman's correction for specification error*. Paper presented at the annual American Educational Research Association meeting, New Orleans.

Ambuel, B., Hill, K.T., Hartman, A., & Nandakumar, R. (1983, April). *Testing children how to take tests: overcoming negative motivational and test taking skill deficits*. Paper presented at the annual meeting of American Educational Research Association meeting, Montreal, Canada.

### **Invited Addresses, Workshops and Conferences**

Nandakumar, R. (2001, November). *Statistical assessment of item bias (DIF) in the context of computerized adaptive testing*. Invited talk presented at Indian Statistical Institute, Bangalore, India.

Nandakumar, R. (2001, fall). *Seminar course in Psychometrics*. Department of Statistics, Bangalore University, Bangalore, India.

Nandakumar, R. (2001, fall). *Seminar Series in Educational and Psychological Measurement*. Department of Psychology, Bangalore University, Bangalore, India.

Nandakumar, R. (2001, August). *Testing and Item Response Theory*. Invited talk given at the Birla Institute of Technology, Pilani, India.

Nandakumar, R. & Davis, J. (1998, February). *Constructing Better Tests*. Workshop presented at the Center for Teaching Effectiveness, University of Delaware.

Nandakumar, R. (1997, March). *Assessing multidimensionality of polytomous data*. Invited talk presented at the symposium on "Integrating test design with psychometric theory: Using a nonparametric toolbox for assessing dimensionality" at the annual meeting of the National Council on Measurement in Education, Chicago, IL.

Nandakumar, R. (1996, December). *Robustness of item and ability parameter estimates under the violation of unidimensionality assumption*. Invited talk presented at the Law School Admission Council, Psychometrics Research Group, December 12, 1996, Newtown, PA.

Yu, F. & Nandakumar, R. (1996, April). *Dimensionality of NEAP Data*. Invited paper presented at the annual meeting of the American Educational Research Association, New York.

Nandakumar, R. (1995, May). *SIBTEST: A statistical test for assessing DIF, and its applications for assessing DIF in various situations*. Invited talk presented at the National Board of Medical Examiners, Philadelphia.

Nandakumar, R. (1995, April). *Application of SIBTEST in dealing with issues of DIF in the context of multidimensional data*. Invited talk presented at the symposium "Perspectives on Differential Item Functioning Analysis in the Context of Multidimensional Test Data" at the annual meeting of the National Council on Measurement in Education.

Nandakumar, R. (1993, November). *Item Response Theory*. Invited talk presented at the American Statistical Association-Delaware Chapter, Newark, Delaware.

Nandakumar, R. (1992, April). *Statistical Analysis of multidimensionality for real data sets*. Invited talk presented at the annual American Educational Research Association meeting, San Francisco, California.

Nandakumar, R. (1992, March). *Assessing the essential dimensionality of the latent space underlying binary item responses*. Invited talk presented in the Operations Research Seminar Series, University of Delaware.

Nandakumar, R. (1992, February). *Assessing essential dimensionality of latent space underlying binary item responses*. Invited talk presented in the Quantitative Methods Group Seminar Series, University of Delaware.

Nandakumar, R. (1988, July). *Unidimensionality and Stout's procedure for assessing unidimensionality*. Invited colloquium presented at the Division of Psychometry, Indian Statistical Institute, Calcutta, India.

### **Grants Funded**

**Gordon and Betty Moore Foundation.** December 1, 2017-November 30, 2020. *Patient- and Family-Centered Interpretation of Outcome Measures for Adults with Neurogenic Communication Disorders*. Matthew Cohen (PI). Role: Co-Investigator.

**Department of Defense,** 2017-21. Title: Assessing Rehabilitation Outcomes after Severe Neuromusculoskeletal Injury: Development of Patient Reported Outcomes Assessment Instruments. David Tulsky (PI). Role: Co-Investigator

**Craig H. Nielsen Foundation.** March 1, 2016-March, 2018. Title: *Clinical Adaptation of the SCI-QOL Psychosocial Measures*. Role: Co-PI

**Rick Hansen Institute.** July 1, 2014 – March 31, 2016. Title: Establishing the Sensitivity, Specificity, and Clinical Utility of the SCI-QOL Common Data Elements (CDEs). Pamela Kisala, Joseph Glutting, Ratna Nandakumar, David Tulsky. Role: Co-PI

**Institute for Education Sciences** June 1, 2011 – May 31, 2015. Title: Using developmental science to design a computerized preschool language assessment. Co-principal investigators: Roberta Golinkoff, Kathryn Hirsh-Pasek, Aquiles Iglesias, Jill deVilliers, Mary Wilson. Role: Statistics and measurement consultant.

**National Science Foundation** 8/1/2009 – 7/31/2014. Title: A Longitudinal Study of the Effects of K-8 Mathematics Teacher Preparation on Teacher Knowledge, Teaching Practices, and Student Learning. PI: Dawn Berk. Role: Statistical Consultant.

**Delaware Department of Education** /1/ 2010 – 9/1/2012. Title: Converging Curriculum Project. PI: Jon Manon. Role: Statistics and measurement consultant.

**Spencer Foundation** 2002-03. Title: Dimensionality Assessment of Attitudinal Data. PI: Nandakumar, R.

**Law School Admission Council** 1998-2000. Title: Kernel-smoothed DIF detection procedure for computerized adaptive tests. PI: Nandakumar, R.

**Office of Naval Research Cognitive Science Research** 1990-1992. Title: Further modifications of DIMTEST for assessing unidimensionality. PI: William Stout  
Role: Subcontract

**Class of 1949 Summer Research Grant**, University of Delaware. 1990.  
Title: Development of software for Mantel-Haenszel DIF statistic.  
PI: Nandakumar, R.

**General University Grant**, University of Delaware. 1987-1988.  
Title: Validation and comparison of Stout's procedure for assessing unidimensionality.  
PI: Nandakumar, R.

**Dissertation Research Grant**. University of Illinois at Urbana-Champaign, 1985-1986.

## **Teaching**

### Doctoral Advisees

Feng Yu (graduated in 1996)  
Oliver Zhang (graduated in 2005)  
Lashona Burkes (graduated in 2009)  
Polina Kharik (graduated in 2009)  
Xiaoyu Qian (graduated in 2011)  
Richard Feinberg (graduated in 2012)  
Jonathan Rubright (graduated in 2012)  
Likun Hu (graduated in 2013)

### Graduate Courses Taught:

Elementary Statistics  
Statistical Inference  
Design and Analysis of experiments  
Multivariate Data Analysis in Education  
Educational Measurement Theory  
Advanced Educational Measurement  
Educational Research Procedures

**Undergraduate Course Taught:**

Measurement Theory and Techniques for Classroom Teachers

**Teaching Abroad****Co-Director: University of Delaware's Winter Study Abroad Program**

England/Scotland, 1997

India. Mysore, 2009

**Professional Activities****Editorial Board:**

Advisory Editor, Journal of Educational Measurement (1989-2007).

Review Editor, Frontiers in Quantitative Psychology and Measurement

**Reviewer:**

Applied Measurement in Education, Applied Psychological Measurement, Multivariate Behavioral Research, Educational Measurement: Issues and Practice, Psychological Methods, Psychometrika, American Educational Research Association, Division D, National Council on Measurement in Education.

**Committee Chair:**

Training and Professional Development Committee of National Council on Measurement in Education (1999-01).

**Conference Session Chair and Discussant:**

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

**Grant Reviewer:**

National Board of Medical Examiners' Medical Education Research Fund (1995-1996).

**Delaware State Department of Education:**

Technical Advisor, Assessment and Accountability Branch (1994-).

Member, Technical Advisory Committee (1998-99).

Member, Validation Panel of Praxis II Subject Assessment (1994-96).

Consultant, Examination of alternative tests to PPST to recruit teachers (1987-88).

**University Activities****School of Education**

Coordinator, MSE Doctoral Specialization Area (1991-94; 1998-00; 2009-2012).

Chair, School of Education Promotion and Tenure Committee (1999-00; 2011-13; 2014-15).

Member, SOE Director Search Committee (2016-17).

Member, SOE Associate Professor in Quantitative Methods (2016-17).

**College of Human Resources, Education, and Public Policy**

Member, International Teacher Education Committee (1996-97).

Member, Promotion and Tenure Committee (1997-98).

Chair, Search Committee, Quantitative Methodologist (2011-12).

Member, Diversity, Equity, and Inclusion Committee (2016-).

**University**

1. Member, 2000 Eugene duPont Scholars Selection Committee (1999-01).

2. Member, American Association of University Professors Steering Committee (1995-1999).

3. Member at Large, American Association of University Professors. Executive Council (1999-01).

4. Member, Center for Teaching Effectiveness, Third Annual Wakonse-East Teaching Retreat Planning Committee (1994-95).

5. Member, Senate Committee on Research (1996-98).

6. Faculty Advisor, Indian Students Association (1997-99).

7. Faculty Advisor, University of Delaware Yoga Club (1996-).