

CURRICULUM VITAE

STEPHEN HENRY CHARLES DU TOIT

CONTACT INFORMATION

Name: Stephen Henry Charles du Toit
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EDUCATION

1979 PhD (Math Stat) University of South Africa
1974 MSc (Math Stat) University of Pretoria (cum laude), South Africa
1972 BSc (Hons)(Math Stat) University of Pretoria, South Africa
1971 BSc (Math Stat) University of Pretoria (cum laude), South Africa
1960 National Engineering Diploma, Witwatersrand Technical College, South Africa

EMPLOYMENT HISTORY

2001 – Sr. VP Technical Operations, Scientific Software International, Inc.,
Lincolnwood, IL.
1997 – 2001 Manager Technical Operations, Scientific Software International, Inc.,
Lincolnwood, IL.
1996 – 1997 Lead Statistical Programmer, Muthén & Muthén, Los Angeles
1986 – 1995 Professor, Department of Statistics, University of Pretoria, South Africa.
(Professor Emeritus June 1995 to present.)
1981 – 1986 Chief Research Officer, Institute of Statistical Research, Human
Sciences Research Council, Pretoria, South Africa.
1972 – 1980 Assistant Professor, Department of Statistics, University of Pretoria,
South Africa.
1967 – 1980 Lab Assistant, Department of Electrical Engineering, University of
Pretoria.
1965 – 1966 Lecturer, Technical College of the Witwatersrand

HONORS AND AWARDS

- Professor Emeritus, Department of Statistics, University of Pretoria, South Africa.
- Recipient of University of Pretoria Medal for outstanding achievement in research (1990).
- Recipient of P.M. Robbertse Medal for outstanding contribution towards research at the Human Sciences Research Council of South Africa (1985).
- Adjunct Professor, Department of Psychology, The University of North Carolina, Chapel Hill

RESEARCH SUPPORT

HHSN-2612007-00013C

NIH, SBIR Phase 1 and 2 contracts
Grant period: 1 September 2005 through 10 May 2010.
Title: MEDPRO: Developing Item Response Theory Software for Outcome and Behavioral Measurements.
Role: Principal Investigator

N44MH32065 Stephen du Toit

NIH, SBIR Phase 1 and 2 contracts
Grant period: 1 October 2003 through 30 October 2008.
Title: SUPERMIX: Analysis of clustered and longitudinal data.
Role: Principal Investigator

5R44AA014999-03 Stephen du Toit

NIAAA, SBIR Phase 1 and 2 grants
Project period: 5 May 2004 through 30 April 2009
Title: Longitudinal analysis of complex survey data with LISREL
Role: Principal Investigator

PUBLICATIONS

- Gibbons, R.D., Hedeker, D. & du Toit, S.H.C. (in Press). Advances in the analysis of longitudinal data. *Annual Review Clinical Psychology*.
- Cudeck, R. & du Toit, S. H. C. (in Press). *General Structural Equation Models*. In Roger E. Millsap and Alberto Maydeu-Olivares (Eds.), *The Sage Handbook of quantitative methods in Psychology*, Chapter 21 (pp. 515-2009). Los Angeles, Sage.
- Du Toit, S.H.C. & Cudeck, R. (2009). Estimation of the nonlinear random coefficient model when some random effects are separable. *Psychometrika*, March 2009, Vol 74, No 1: pages 65-82.
- Cudeck, R., Harring, J.R., & du Toit, S.H.C. (2009). Marginal Maximum Likelihood Estimation of a Latent Variable Model with Interaction. *Journal of Educational and Behavioral Statistics*, March 2009, Vol 34, No1: pages 131-134.
- Du Toit, S.H.C. & du Toit, M. (2008). Multilevel Structural Equation Modeling. In *The analysis of multilevel models*. DeLeeuw and Meijer (Eds.), Springer-Verlag.
- Du Toit, S. H. C. & Browne, M. W. (2007). Structural equation modeling of multivariate time series. *Multivariate Behavioral Research*, 42, 67-101.
- Harring, J.R., Cudeck, R., & du Toit, S.H.C. (2006). Fitting partially nonlinear random coefficient models as SEMs. *Multivariate Behavioral Research*, Vol 41, No 4: pages 579-596.
- Raykov, T., du Toit, S. H. C. (2005). Evaluation of Reliability for Multiple-Component Measuring Instruments in Hierarchical Designs. *Structural Equation Modeling*, 12, 536-550.
- Bock, R.D. & du Toit, S.H.C. (2004). Parameter estimation in the context of

- non-linear longitudinal growth models. In R.C. Hauspie, N. Cameron & L. Molinari (Eds.), *Methods of Human growth Research*, pp. 234-257. Cambridge, UK: Cambridge University Press.
- Cudeck, R. & du Toit, S. H. C. (2003). *Nonlinear multilevel models for repeated measures data*. In Duan, N. & Reise, S. P. (Eds.), *Multilevel modeling: Methodological advances, issues and applications* (pp. 1-24). Mahwah, NJ: Erlbaum.
- Cudeck, R. & du Toit, S. H. C. (2002). A nonlinear form of quadratic regression with interpretable parameters. *Multivariate Behavioral Research*, 37, 501-519.
- Cudeck, R., Du Toit, S.H.C. & Sörbom, D. (Editors, 2001). *Structural Equation Modeling: Present and Future. A Festschrift in honor of Karl Jöreskog*. Lincolnwood: Scientific Software International.
- Du Toit, S. H. C. & Browne, M. W. (2001) *The covariance structure of a vector time series*. In: Cudeck, R. & du Toit, S. H. C. & Sörbom, D.(eds.) *Structural Equation Modeling: Present and Future*, pp. 279-314. Chicago: Scientific Software International Inc.
- Du Toit, S.H.C. & Cudeck, R. (2001). *The analysis of nonlinear random coefficient regression models with LISREL using constraints*. Cudeck, R., du Toit, S.H.C. & Sörbom, D. (Eds). *Structural Equation Modeling: Present and Future*. ISBN: 0-89498-049-1
- Du Toit, M. & du Toit, S.H.C. (2001). *Interactive LISREL: User's Guide*. Lincolnwood: Scientific Software International.
- Jöreskog, K.G., Sörbom, D., du Toit, S.H.C. & du Toit, M. (1999). *LISREL 8: New statistical features*. Lincolnwood: Scientific Software International.
- Steyn, A.G.W., Smit, C.F., Du Toit, S.H.C. & Strasheim, C. (1996). *Moderne statistiek vir die praktyk*. Afrikaans: fifth edition. J.L. van Schaik, Pretoria, South Africa.
- Steyn, A.G.W., Smit, C.F., Du Toit, S.H.C. & Strasheim, C. (1995). *Modern statistics in practice*. English: first edition. J.L. van Schaik, Pretoria, South Africa.
- Browne, M.W. & Du Toit, S.H.C. (1992). Automated fitting of nonstandard models. *Multivariate Behavioral Research*, 27, 269-300.
- Browne, M. W., & Du Toit, S. H. C. (1991). *Models for learning data*. In L. M. Collins & J. L. Horn (Eds.), *Best methods for the analysis of change* (pp. 47-68). Washington, DC: American Psychological Association.
- Du Toit, S.H.C. & Gonin, R.C. (1987). *Numerical algorithms for solving nonlinear Lp-norm estimation problems: Part II. Communications in Statistics, Theory and Methods*. Vol 16(4), p 969-986.
- Du Toit, S.H.C., Steyn, A.G.W. & Stumpf, R.H. (1986). *Graphical Exploratory Data Analysis*. Springer-Verlag, New York (314 pages).
- Van Vuuren, D.P., De Beer, J.J. & Du Toit, S.H.C. (1985). Television viewing and personality needs of South African adolescents. *Communicare*, 4(1).
- Du Toit, S.H.C. & Gonin, R.C. (1984). The choice of an appropriate nonlinear model for the relationship between certain variables in respiratory physiology. *South African Statistical Journal*, 18(2).
- Du Toit, S.H.C., Van Aarde, R.J. & Steyn, A.G.W. (1980). Sex determination of the feral house cat *Felis Catus* using multivariate statistical techniques. *South African Wildlife Research*, 10(2), 82-87.
- Du Toit, S.H.C. (1980). *Aspects of linear least squares estimation*. Publication 80-08, University of Pretoria, Pretoria, South Africa.

- Du Toit, S.H.C. (1980). *Profile analysis*. Publication 80-07, University of Pretoria, Pretoria, South Africa.
- Grunow, J.O., Groeneveld, H.T. & Du Toit, S.H.C. (1980). Above ground dry matter dynamics of the grass layer of a South African tree-savanna. *Journal of Ecology*.
- Viljoen, S. & Du Toit, S.H.C. (1979). Postnatal growth of South African Tree Squirrels in the genera FUNISCIURIS and PARAXERUS. *American Journal of Mammalogy*, 66.
- Du Toit, S.H.C. *The Analysis of Growth Curves*. Ph.D. dissertation (unpublished). University of South Africa, Pretoria, South Africa.
- Bothma, J du P., Steyn, A.G.W. & Du Toit, S.H.C. (1976). Determination of sample size in feeding habits studies using the Black-Backed Jackal in the Western Transvaal. *South African Wildlife Research*, 692), 129-132.

RESEARCH REPORTS AND TECHNICAL PAPERS

- Muthén, B. O., du Toit, S. H. C., & Spisic, D. (2002). Robust inference using weighted-least squares and quadratic estimating equations in latent variable modeling with categorical and continuous outcomes. Technical Report.
- Du Toit, S.H.C. & Barnardt, M. (1993). *An introduction to PC-SAS (DOS-version)*. University of Pretoria, Pretoria, South Africa (200 pages).
- Du Toit, S.H.C. (1993). *Aspects of Multilevel Modelling*. HSRC research report, Pretoria, South Africa (75 pages).
- Du Toit, S.H.C. & Bock, R.D. (1991). *The Analysis of Multiphasic growth curve models*. Technical report, University of Pretoria, Pretoria, South Africa.
- Du Toit, S.H.C. (1990). *The analysis of repeated measurement time series models. Part 2*. Technical report, Department of Statistics, Stanford, USA.
- Du Toit, S.H.C. (1990). *The analysis of repeated measurement time series models. Part 1*. Technical report, Department of Statistics, Stanford, USA.
- Du Toit, S.H.C. & Grimbeek, R.J. (1989). *Regression analysis and the intraclass correlation structure*. Publication 89-02, University of Pretoria, Pretoria, South Africa.
- Du Toit, S.H.C. & Du Preez, A. (1989). *graphical display of repeated measurement ARMA correlation structures*. Publication 89-01, University of Pretoria, Pretoria, South Africa.
- Shapiro, A., Du Toit, S.H.C. & Boraine, H. (1988). *Asymptotic properties of Guttman's Coefficient of Weak Monotonicity*. UNISA report 68/88 (13 pages). Pretoria, South Africa.
- Browne, M.W. & Du Toit, S.H.C. (1988). *Automated fitting of nonstandard models*. Report WS-39, HSRC, Pretoria, South Africa (42 pages).
- Du Toit, S.H.C. & Strasheim, C. (1987). *The Optimal Scaling Technique for the analysis of Multivariate Categorical Data*. Office Report, HSRC, Pretoria, South Africa (55 pages).
- Möller, V., Schlemmer, L. & Du Toit, S.H.C. (1987). *Quality of life in South Africa: Measurement and Analysis*. HSRC Research Report S-167, Pretoria, South Africa (150 pages).
- Du Toit, S.H.C. (1986). *Guttman's techniques for the exploratory analysis of data*. Report WS-34, HSRC, Pretoria, South Africa.
- Shaw, T.M. & Du Toit, S.H.C. (1985). *Causal relationships in longitudinal data*. Report WS-33. HSRC, Pretoria, South Africa.

- Du Toit, S.H.C. & Strasheim, C. (1985). *The use of PROC MATRIX in exploratory data analysis*. Proceedings of the third SAS conference. Johannesburg, South Africa.
- Stoker, D.J., Engelbrecht, C.S., Crowther, N.A.S., Du Toit, S.H.C. & Herbst, A. (1985). *Investigation into differential entrance requirements for tertiary educational institutions*. Report WS-32, HSRC, Pretoria, South Africa.
- Du Toit, S.H.C. & Lamprecht, T. (1984). *Analyzing data with an ordinal dependent variable*. Occasional Paper no 12, HSRC, Pretoria, South Africa.
- Du Toit, S.H.C., Steyn, A.G.W. & Stumpf, R.H. (1984). *Statistical Graphics*. Report WS-30, HSRC, South Africa.
- Du Toit, S.H.C. (1983). *Time Series Covariance Structures*. Occasional paper no 10, HSRC, South Africa.
- Du Toit, S.H.C. (1982). *Non-linear latent variable model*. Report PR-78, HSRC, South Africa.
- Stumpf, R.H. & Du Toit, S.H.C. (1982). *Analysis of data from the national investigation into sport*. Report PR-80, HSRC, Pretoria, South Africa.
- Du Toit, S.H.C. & Browne, M.W. (1982). *A computer program for the automated fitting of nonstandard models for means and covariances*. Report WS-27, HSRC, Pretoria, South Africa.
- Du Toit, S.H.C. & Stumpf, R.H. (1982). *Guidelines for the analysis of extensive datasets*. Report WS-28, HSRC, Pretoria, South Africa.
- Du Toit, S.H.C. & (1982). *an extension of the Richards family of growth curves*. Report PR-77, HSRC, Pretoria, South Africa.
- Du Toit, S.H.C., Stoker, D.J., Stumpf, R.H., Browne, M.W. & Glas, A.P. (1982). *Statistical techniques for the analysis of qualitative and quantitative data*. Report PR-79, HSRC, Pretoria, South Africa.
- Stoker, D.J., Stumpf, R.H., Du Toit, S.H.C. & Glas, A.P. (1981). *The statistical analysis of qualitative data*. Report PR-64, HSRC, Pretoria, South Africa.
- Du Toit, S.H.C. (1980). *Multivariate analysis of variance*. Publication 80-06, University of Pretoria, Pretoria, South Africa.
- Du Toit, S.H.C. (1979). *An interactive program for the analysis of non-linear curves*. Publication 79-05, University of Pretoria, Pretoria, South Africa.

PAPERS PRESENTED AT CONFERENCES

- Du Toit, S.H.C. (2009). *Analysis of Structural Equation Models in the Case of Complex Survey Data*. Invited Paper at the 2009 ISI conference Durban, South Africa.
- Cudeck, R., Harring, J. & Du Toit, S.H.C. (2006). *Yet another method for estimating latent variable interactions*. Paper presented at SMEP conference, October 19, 2006.
- Du Toit, S.H.C. (2005). *A general framework for the analysis of SEM Models in the Case of Complex Survey Data*. Invited paper, SAMSI workshop, September 11-14, Durham, North Carolina.
- Du Toit, S.H.C., Du Toit, M, & Mels, G.M. (2004). *Fitting models to data collected from longitudinal studies based on complex survey designs*. Poster Session, SAMSI workshop, September 11-14, Durham, North Carolina.
- Du Toit, S.H.C. (2004). *Analysis of Structural Equation Models for Continuous Random Variables in the Case of Complex Survey Data*. 24th Biennial Conference of the Society for Multivariate Analysis in the Behavioral Sciences

- (SMABS July, 2004), Jena, Germany.
- Du Toit, S.H.C., Du Toit, M., & Mels, G.M. (2004). *The implementation and evaluation of SurveyGlim in LISREL 8.7*. 24th Biennial Conference of the Society for Multivariate Analysis in the Behavioral Sciences (SMABS July, 2004), Jena, Germany.
- Kurdek, L.A., Du Toit, S.H.C. & Du Toit, M. (2002). *Multilevel modeling of repeated measurements utilizing dummy variables: Examples from growth-curve analyses with individuals and spouses from married couples*. Psychometric Society 2002 Annual Meeting, Chapel Hill, North Carolina.
- Cudeck, R. & Du Toit, S.H.C. (2001). *Estimating the Partially Nonlinear Mixed-Effects Model with SEM Software*. Psychometric Society 2001 Annual Meeting, Pennsylvania.
- Du Toit, S.H.C. & Du Toit, M. (2001). *Multilevel Structural Equation Modeling Using LISREL 8.50 for Windows*. Psychometric Society 2001 Annual Meeting, Pennsylvania.
- Du Toit, S.H.C. & Du Toit, M. (2001). *Theoretical aspects of Multilevel Structural Equation Modeling*. Invited paper at the Chicago Chapter of the American Statistical Association, April, Chicago, Illinois.
- Du Toit, S.H.C. & Cudeck, R. (2000). *The Analysis of Nonlinear Latent Coefficient Regression Models with LISREL Using Constraints*. Invited address for Factor Analysis and Structural Equation Modeling: Perspectives and Visions. An international symposium honoring the research of Karl G Jöreskog. Uppsala, Sweden.
- Du Toit, S.H.C. & Browne, M.W. (2001). *Vector Autoregressive Time Series Processes*. Structural Equation symposium honoring research of K. G. Jöreskog. St Charles, IL.
- Browne, M.W. & Du Toit, S.H.C. (1999). *Multiplicative Covariance Structures for Longitudinal Studies*. VOC Spring Meeting, University of Leiden.
- Du Toit, S.H.C. & Du Toit, M. (1999). *Multilevel Logit and Cumulative Logit Models*. Presentation at University of Illinois, Urbana-Champaign, Illinois.
- Du Toit, S.H.C. & Du Toit, M. (1999). *Multilevel Logit and Cumulative Logit Models*. Psychometric Society 1999 Annual Meeting, Lawrence, Kansas.
- Cudeck, R. & Du Toit, S.H.C. (1998). *Mixed-Effects Models with a Re-specification of the Marginal Maximum Likelihood Method*. Psychometric Society 1998 Annual Meeting, Urbana Champaign, Illinois
- Segawa, E., Bock, R.D & Du Toit, S.H.C. (1996) *Approximations to the log-likelihood function in the high-dimensional nonlinear mixed-effects model*. Joint Statistical Meetings, American Statistical Association August, 4-8, Chicago, Illinois.
- Du Toit, S.H.C. (1995). *Marginalization for Multiphasic Logistic Growth Models by Fractional Quadrature*. Psychometric Society 1995 Annual Meeting, Minneapolis, Minnesota.
- Du Toit, M. & Du Toit, S.H.C. (1995). *Multivariate multilevel modeling of the knowledge of AIDS*. Psychometric Society 1995 Annual Meeting, Minneapolis, MN.
- Du Toit, M. & Du Toit, S.H.C. (1994). *Variance estimation in the case of complex sampling*. South African Statistical Association (SASA) conference, Kruger National Park, South Africa.
- Du Toit, S.H.C. (1994). *An overview of methods for the analysis of non-linear*

- random parameter models*. SASA conference, Kruger National Park, South Africa.
- Browne, M.W. & Du Toit, S.H.C. (1993). *A Direct Product Model for Repeated Multivariate Time Series*. European Meeting of the Psychometric Society, Universitat Pompeu Fabra, Barcelona, Spain.
- Du Toit, S.H.C. & Grimbeek, R.J. (1993). *General linear models with Laplace errors*. SASA Conference, Pietermaritzburg, South Africa.
- Minnaar, M-L & Du Toit, S.H.C. (1993). *Handling of time series with missing data using an interactive computer program*. SAS Conference, Pietermaritzburg, South Africa.
- Du Toit, S.H.C. (1992). *The analysis of non-linear stochastic parameter models with time series deviations*. Annual conference of the Psychometric and Classification Societies, Columbus, Ohio.
- Cudeck, R. & Du Toit, S.H.C. (1992). *graphical display of correlations structures*. Annual conference of the Psychometric and Classification Societies, Columbus, Ohio.
- Herbst, A. & Du Toit, S.H.C. (1992). *ARMA(1,1) models for non-consecutive data*. SASA Conference, Port Elizabeth, South Africa.
- Du Toit, S.H.C. & Grimbeek, R.J. (1992). *A comparison between normal maximum likelihood and L_p norm estimators*. SASA Conference, Port Elizabeth, 1992.
- Du Toit, S.H.C. & Crowther, G. (1992). *The use of SAS/IML for the analysis of multilevel models*. SAS Conference, Port Elizabeth, South Africa.
- Boraine, H. & Du Toit, S.H.C. (1992). *Stochastic parameter time series models*. SAS Conference, Port Elizabeth, South Africa.
- Mostert, P.J. & Du Toit, S.H.C. (1991). *Stochastic parameter non-linear regression*. Annual conference of the South African Statistical Association, Pretoria.
- Du Toit, S.H.C. (1991). *The accuracy of numerical integration in stochastic parameter regression*. Conference of the Classification and Psychometric Societies, News Brunswick.
- Du Toit, S.H.C. & De Villiers, A. (1990). *Multivariate statistical quality control*. SASA Conference, Cape Town, South Africa.
- Du Toit, S.H.C. & Grimbeek, R.J. (1989). *Nonlinear regression analysis and intraclass correlation structure residuals*. SASA Conference, Johannesburg, South Africa.
- Browne, M.W. & Du Toit, S.H.C. (1989). *Models for learning data*. Best methods for the analysis of change conference. APA, Los Angeles, CA.
- Strasheim, C., Browne, M.W. & Du Toit, S.H.C. (1989). *the simultaneous normalization of test scores over various age levels*. Annual conference of the Psychometric and Classification Societies of Europe, Belgium.
- Du Toit, S.H.C. (1988). *Aspects of Quality of Life: Urban Blacks in South Africa*. Second International Facet Theory Conference, Guildford, UK.
- Du Toit, S.H.C. (1988). *the graphical display of correlation structures*. Seminar of the University of the Witwatersrand, Johannesburg, South Africa.
- Schoeman, H.S., Du Toit, S.H.C. & Du Preez, A. (1988). *A test for significant differences between 2 measures of absolute deviation*. SASA Conference.
- Du Toit, S.H.C. & Du Preez, A. (1988). *Graphical display of correlation matrices using maximum likelihood*. SASA Conference.
- Browne, M.W. & Du Toit, S.H.C. (1987). *Graphical display of a correlation matrix under a radex model*. SASA Conference.
- Du Toit, S.H.C. & Boraine, H. (1987). *Some aspects of non-metric scaling and*

- facet theory*. SASA Conference.
- Du Toit, S.H.C. (1986). *The role of facet theory in social sciences research*. SAS Conference.
- Du Toit, S.H.C. & Strasheim, C. (1985). *The use of PROC MATRIX in exploratory data analysis*. SAS Users Group Conference, Johannesburg, South Africa.
- Du Toit, S.H.C. & Gonin, R.C. (1985). *Efficiency of least squares and L_p -norm estimation in regression models with time series deviations*. SASA Conference.
- Du Toit, S.H.C. (1984). *Interaction between statisticians working for universities, technical colleges and other institutions*. Symposium on the teaching of Statistics, Pretoria, South Africa.
- Du Toit, S.H.C. (1984). *The role of the computer in the training of statisticians*. Symposium on the teaching of Statistics, Pretoria, South Africa.
- Du Toit, S.H.C. (1984). *Partial order scalogram analysis*. SAS Conference.
- Du Toit, S.H.C. & Stumpf, R.H. (1984). *Multidimensional scaling*. Annual Conference of the South African Operational Research Society, Johannesburg, South Africa.
- Du Toit, S.H.C. & Lamprecht, T. (1983). *The analysis of ordinal data*. SASA Conference.
- Du Toit, S.H.C. (1983). *Time series covariance structures*. Annual conference of the Psychometric and Classification Societies of Europe, Paris, France.
- Stumpf, R.H. & Du Toit, S.H.C. (1982). *Analysis of data from the national investigation into sport*. SAS Conference.
- Du Toit, S.H.C. (1982). *Stochastic parameter nonlinear repeated measurement model*. Annual Conference of the Psychometric and Classification Societies, Montreal, Canada.
- Du Toit, S.H.C. & Gonin, R.C. (1981). *An extension to the Richards family of growth curves*. SASA Conference.
- Du Toit, S.H.C. & Browne, M.W. (1979). *The analysis of growth curves with time series deviations*. SASA Conference.
- Browne, M.W. & Du Toit, S.H.C. (1979). *Simplifying the analysis of nonstandard structures for mean vectors and covariance matrices*. SASA Conference.
- Du Toit, S.H.C. (1977). *Analysis of latent variable growth curve models*. SAS Conference.
- Du Toit, S.H.C. & Browne, M.W. (1976). *A general procedure for the analysis of covariance structures*. SASA Conference.
- Du Toit, S.H.C. & Browne, M.W. (1975). *The choice of estimators in the repeated measurement model*. SASA Conference.

SEMINARS

Organized and presented the following seminars with the purpose of introducing the participants to statistical techniques and training them in the use of the associated computer programs.

1. *A series of 3 introductory courses in SAS (Statistical Analysis System)*. 1993-1994.
2. *Introduction to facet theory*. Seminar held at the University of Natal on invitation of CSDS (Centre for Social and Development Studies) on 22 November 1988.
3. *HSRC seminar on the statistical analysis of surveys*. 6-7 June 1988.

4. *Graphical exploratory data analysis*. SUGISA Mini-seminar, June 1985, Johannesburg.
5. *The analysis of categorical data*. September 1984. (Seminar, Stellenbosch).
6. *Statistical graphics*. Three day seminar, June 1984 (Seminar, Pretoria).
7. *Practical correlation and regression*. 6-10 September 1982 (HSRC – UNISA Seminar, University of South Africa).
8. *Useful statistical techniques for market researchers*. 27-30 April 1982. (School of Business Administration, University of the Witwatersrand).

WORKSHOPS

1. Hedeker, D., Gibbons, R.D. & du Toit, S.H.C. (May 2006). 3-day SuperMIX workshop, Chicago, IL.
2. Jöreskog, K.G., Sörbom, D. & du Toit, S.H.C. (1997 – 2004). 3-day LISREL workshops, Chicago, IL.
3. Du Toit, S.H.C. & du Toit, M. (September 2002). LISREL/HLM 2-day workshop, PIRE, Louisville, KY.
4. Jöreskog, K.G. & du Toit, S.H.C. (August 2002). 3-day LISREL workshop, London School of Economics, London, UK.
5. Du Toit, M. & du Toit, S.H.C. (April 2002). 3-day HLM workshop, Vanderbilt University, Nashville, TN.
6. Widaman, K. & du Toit, S.H.C. (October 2000). 3-day LISREL workshop, UC-Davis, Davis, CA.
7. Schumacher, R., Jöreskog, K.G. & du Toit, S.H.C. (May 1999). 3-day LISREL workshop, Dallas, TX.
8. Du Toit, S.H.C. & du Toit, M. (April 1999). 2-day Multilevel workshop, AERA, Montreal, Canada.
9. Du Toit, S.H.C., Du Toit, M. & Cudeck, R. (September 1999). *Introduction to the analysis of multilevel models with LISREL 8.30*. LISREL workshop, Chicago, Illinois.

SOFTWARE DEVELOPMENT

NLREG: Du Toit, S.H.C. An interactive program for fitting nonlinear growth curves to data.

AUFIT: Du Toit, S.H.C. & Browne, M.W. A program for the automated fitting of non-standard mean covariance structures.

AUXAL: Bock, R.D., Du Toit, S.H.C. & Thissen, D. A program for the Auxological Analysis of longitudinal measurements of Human Stature.

LISREL: Structural Equation Program written by Joreskog, K.G. and Sorbom, D. with the following modules written by Du Toit, S.H.C.:

- Multiple imputation
- Multilevel random parameter non-linear regression

- Full information maximum likelihood for missing data (continuous variables)
- Quasi-likelihood procedure for Multilevel Generalised Linear models
- Multilevel Structural Equations module (In collaboration with Du Toit, M.)
- Multilevel Models module (In collaboration with Du Toit, M.)
- Generalized Linear Models (In collaboration with Du Toit, M. and Mels, G.M.)

SUPERMIX: Program for multilevel modeling of continuous and categorical outcomes. Hedeker, D., Gibbons, R.D. & Du Toit, S.H.C. The following modules contributed by Du Toit, S.H.C.:

- Multilevel modeling for continuous outcome variables
- MAP estimation procedure for categorical outcomes
- Adaptive quadrature procedure for categorical outcomes

MPLUS: Muthen & Muthen with significant contributions by Du Toit, S.H.C.

BILOGMG, MULTILOG, PARSCALE and TESTFACT:

Several contributions were also made to these IRT programs published by Scientific Software International, For example:

- Graphical displays
- Dynamic allocation
- Print out of results
- Improvement of optimization algorithms

MEMBERSHIP OF SOCIETIES

- Fellow of the South African Statistical Association (was executive member for three years and also member of the Education Committee for a further three years).
- Member of the American Psychometric Society.

VISITS OVERSEAS

1. **May/June 1982:** England and the United States of America to acquire knowledge on optimization techniques and techniques for the analysis of repeated measurement data, and to visit SAS and BMDP in the USA (statistical software companies).
2. **June/July 1983:** England and France to acquire knowledge on the theory and computational procedures with respect to the analysis of longitudinal data, multivariate time series models, and the analysis of data with ordinal dependent variables.
3. **June 1984:** The Guttman Institute for Applied Social Research in Israel. The purpose of the visit was to acquire knowledge on the computational aspects of Guttman techniques for the exploratory analysis of data. Of special interest was the facet theory approach as well as partial order scalogram analysis.
4. **October 1989:** United States of America. University of Minnesota to present a colloquium on graphical displays of correlation structures and to participate in the conference on *Best methods for the analysis of change* at UCLA.

5. **January - March 1990:** Stanford University to do research on time series models and to develop computer programs for the analysis of time series.
6. **April - May 1990:** University of London, Department of Education to do research on prediction of growth models and multilevel modeling and to develop a program for the clinical prediction of growth.
7. **June - July and October 1990:** University of Chicago, Department of Psychology to continue research on prediction of growth models.
8. **June - July 1991:** United States of America to participate in conference and to continue research at the University of Chicago (Department of Psychology).
9. **June - July 1992:** United States of America to do research and for the development of multilevel software at the Department of Psychology, University of Chicago.
10. **June - July 1993:** United States of America to complete Phase I of the research and computer program for the clinical prediction of growth.
11. **December 1993 - February 1994:** England (University of London) and U.S.A. (University of Chicago) to do research and develop computer software for the analysis of multilevel models. Spent one month at SYSTAT (Statistical software company in Evanston, Illinois).
12. **December 1994:** England (University of London) to continue research on the analysis of multilevel models.
13. **June 1995 - December 1995:** United States of America to start research on Phase II of the prediction of growth project at the Department of Psychology, University of Chicago.

OTHER

- Dissertation supervisor (1987-1997) during which time sixteen students obtained Master degrees in statistics and four students obtained Ph.D. degrees in statistics.
- Reviewed technical papers for a number of journals, for example, *Psychometrika*, *Multivariate Behavioral Research*, and *Structural Equation Modeling*.
- Member of the Broadcasting Research Committee of the South African Broadcasting Corporation (SABC). 1990 – 1995.
- Part time consultant for a wide range of companies such as the South African Breweries (SAB), South African Electricity Supply Commission (ESCOM), South African Airways (SAA), pharmaceutical companies, Nissan and BMW motor corporations, Volkskas Bank, the United Building Society and Human Sciences Research Council. 1986 – 1995.