

Sy-Miin Chow

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Sy-Miin Chow is an Associate Professor in the Department of Human Development and Family Studies at the Pennsylvania State University. The focus of her work has been on developing and testing longitudinal and dynamic models, including differential equation models, time series models and state-space models. She has developed novel methods that serve as practical alternatives for addressing common data analytic problems (e.g., Bayesian variable selection methods for factor analysis and structural equation models, nonparametric approaches, missing data, and nonlinearities/nonstationarities in dynamics). She has also collaborated with scholars in emotion, aging, child development, family dynamics and prevention research to bring newer methodological developments to these areas. She is a winner of the Early Career Award from the Society of Multivariate Experimental Psychology (SMEP) as well as the Psychometric Society. She has been an Associate Editor for *Psychometrika* and *Psychological Methods*, and is currently a member of the editorial advisory boards of *Multivariate Behavioral Research* and *Psychometrika*.

EDUCATION

- 2004 Ph.D. Quantitative Psychology, University of Virginia, Charlottesville, VA
 Advisor: John R. Nesselroade
 Dissertation: Fitting Linear and Nonlinear Dynamic Models Using Different Kalman Filter Approaches.
- 2001 M.A. Quantitative Psychology. University of Virginia, Charlottesville, VA
 Advisor: John R. Nesselroade
 Thesis: The Use of Differential Equations and Their Empirical Validity in Modeling Continuous Human Adaptive Processes
- 1998 B.S. Psychology, Summa Cum Laude, Drexel University, Philadelphia, PA

PROFESSIONAL AFFILIATION

- 2012 – Associate Professor, Department of Human Development and Family Studies, Pennsylvania State University
- 2007 –2012 Assistant Professor, Department of Psychology, University of North Carolina
- 2005 – 2007 Assistant Professor, Department of Psychology, University of Notre Dame

- 2005 – 2006 Visiting scientist, Max Planck Institute for Human Development, Berlin, Germany
- 2004 – 2005 Assistant Research Professor, Department of Psychology, University of Notre Dame
- 1999 – 2004 Graduate student and research assistant, Institute for Developmental & Health Research Methodology, University of Virginia
- 2000 – 2004 Teaching assistant, Department of Psychology, University of Virginia

HONORS & AWARDS

- 2015 Early Career Award, International Psychometric Society
- 2014 Cattell Early Career Award, Society of Multivariate Experimental Psychology
- 2012 Member, Society of Multivariate Experimental Psychology
- 2005 Humboldt Research fellow, Alexander von Humboldt Foundation, Germany
- 2004 Dissertation Award from the Society of Multivariate Experimental Psychology (SMEP)
- 2001 Student travel award from the Society of Multivariate Experimental Psychology (SMEP) to attend the Notre Dame Series on Quantitative Methodology.
- 2000 – 2003 Teaching fellowship, University of Virginia
- 1999 – 2003 Presidential Fellowship, University of Virginia
- 1999 Santa Fe Institute student scholarship to attend Complex Systems Summer School organized by the Santa Fe Institute
- 1995 – 1997 Distinction Award, HELP Institute (in Malaysia)
- 1997 – 1998 Anthony J. Drexel Scholarship, Drexel University

SERVICE/OUTREACH

National and International Service

Editorial Service

- 2011 – present Associated Editor, Psychometrika
- 2010 – 2012 Consulting editor, Psychological Methods

2013 – present Associate Editor, Psychological Methods
 2014 – present Editorial Advisory Board, Society of Multivariate Experimental Psychology (SMEP), publisher of Multivariate Behavioral Research
 2015 – present Editorial Advisory Board, International Psychometric Society, publisher of Psychometrika

Ad-hoc reviewer for scholarly journals

Multivariate Behavioral Research
 British Journal of Mathematical and Statistical Psychology
 Psychometrika
 Psychological Methods
 Journal of the American Statistical Association
 Journal of Multivariate Analysis
 Psychology and Aging
 IEEE Transactions on Signal Processing
 IEEE Conference on Industrial Electronics and Applications
 Infant and Child Development
 Journal of Abnormal Psychology
 Statistics and Its Interface
 Journal of Personality and Social Psychology
 Journal of Mathematical Psychology

Reviewer for grant agencies/awards

2009-2014 External reviewer, National Science Foundation

Reviewer for scholarly conferences

2011 Society for Research in Child Development 2012 Themed Meeting: Developmental Methodology

Conference organizer

2006 – 2007 Chair, Notre Dame Series on Quantitative Methodologies, University of Notre Dame. Conference title: Advances in state-space modeling techniques (co-organized with Guangjian Zhang).

2007 – 2009 Organization committee of the International and Annual Meetings of the Psychometric Society (IMPS).

University committee service

2014-2016 ICS High Performance Computing Committee
 2013-2015 ICS Research Data Committee
 2014 Strategic Planning Committee, Institute for CyberScience (ICS)

- 2013-2016 Institute for CyberScience (ICS) Coordinating Committee for Advanced Cyberinfrastructure
2014 Search Committee, Interdisciplinary Methodologist position, Department of Biobehavioral Health

Departmental committee service

- 2013 – 2014 Professional Planning Development and Evaluation (PPD&E) committee
2014 – 2016 Promotion, Tenure and Evaluation committee member

University of North Carolina

- 2009 – Organizer, quantitative psychology forum
2008 – Faculty advisor of *Zetas*, quantitative psychology student organization
2011, 2012 Review committee, Baughman Dissertation Awards

University of Notre Dame

- 2006 Member, quantitative search committee
2006 Member, data manager search committee
2006 – 2007 Member, space and security committee
2004 – 2007 Member, colloquium committee

International

- 2014 External consultant and advisor, search committee, University of Vienna methods faculty hire.

GRANT SUPPORT

External

Pending:

Principal investigator: Computational Modeling of Healthy and Disturbed Development. National Institutes of Health. 2015–2020. Multiple PI submission with Daniel Messinger (University of Miami) and James Rehg (GA Tech). Penn State budget: \$668,328

Principal investigator: Dynamical Systems Modeling of Family-Based Intervention Change Processes. National Institutes of Health. 2015–2020. Multiple PI submission with Mark Feinberg. Penn State budget: \$1,924,137

Co-investigator: Statistical Methods of Complex and High-Dimensional Missing Data Problems. National Institutes of Health. 2015-2020. PI: Joseph Ibrahim (University of North Carolina).

Funded:

Principal investigator: National Science Foundation. Developing Dynamic Tools for Analyzing Irregularly Spaced Longitudinal Affect Data (SES-1357666). March, 2014-Feb, 2017. \$297,170

Principal investigator: Modeling the Dynamics of Early Communication and Development (R01GM105004). National Institutes of Health. 2013–2017. Multiple PI submission with Daniel Messinger (University of Miami) and Jeff Cohn (University of Pittsburgh). Penn State budget: \$535,308

Co-investigator: The Prevention and Methodology Training Program (PAMT). PI: Mark Greenberg

Co-investigator: Training Interdisciplinary Education Scientists (TIES) Training program. PIs: Tom Farmer and Karen Bierman

Co-investigator: Promoting Cancer-Related Behavior Change through Positive Emotions (R01). Role: Co-investigator. PI: Barbara Fredrickson. National Cancer Institute. 2012–2015.

Co-investigator: Toward a unifying model of self-regulation and its development. National Institutes of Health 2014-2019. PIs: Pamela Cole and Nilam Ram (Penn State). Penn State budget: \$3,558,396.

Principal investigator: DHB Collaborative Research: Developing Non-Stationary and Network-based Methods for Modeling the Perception and Physiology of Emotion (Human Social Dynamics program). National Science Foundation. 8/1/2008 – 7/31/2012, \$720,070 (with UC Davis). Total costs for UNC: \$609,545. Funded.

Co-investigator: Affective and Genomic Mediators of Sustained Behavior Change (R01NR012899-01). Role: Co-Investigator. PI: Barbara Fredrickson. 2010 –2012. National Institute of Nursing Research.

Co-investigator: Selective Attention and Control Mechanisms in the Brain (R01). PI: Joseph Hopfinger. National Institute of Mental Health. 05/05/2009 – 04/30/2011. \$853,071.

Co-investigator: Notre Dame Study of Resiliency in Later Life. PI: C. S. Bergeman. National Institute on Aging. 10/2005 – 9/2009. \$1,250,000.

Statistical consultant: Naive Observers' Ratings of Behavior: A Multi-Construct Validation PI: Daniel Messinger. National Institute of Child Health and Human Development. 2007 – 2009. (R21HD052062, \$275,000).

Statistical consultant: Notre Dame Study of Resiliency in Later Life: Supplemental grant. PI: C.S. Bergeman. National Institutes of Health. 2006 – 2007.

Statistical consultant: Development of Autonomy and Relatedness in Peer Relationships.

PI: Joseph P. Allen. National Institute of Mental Health. 2003 – 2008 (R01-MH58066-06)

Internal

Principal investigator: Modeling emotion as chaotic thermostat. University Research Council, University of North Carolina; 2008–2009. \$4,950.

Principal investigator: Modeling emotion as chaotic thermostat: pilot study of intra-person dynamics. Institute for Scholarship in the Liberal Arts (ISLA), University of Notre Dame; February, 2005 – February, 2006. \$10,925.

Principal investigator: Age differences in emotion regulation and complex skill acquisition. Office of Graduate Research, University of Notre Dame; April, 2005—August, 2006. \$10,000.

Principal investigator: Integrated physiological/multi-model laboratory equipment renewal proposal. The Institute of Scholarship in the Liberal Arts, University of Notre Dame in Oct, 2006. \$110,000.

PUBLICATIONS

* Research in collaboration with graduate/undergraduate students.

Books

Ferrer, E., & **Chow, S-M.** (in progress). *The Dynamics of Dyadic Interactions*. New York: Springer.

Molenaar, P. C. M., & **Chow, S-M.** (in progress). *Analysis of Intra-individual Variation*. New York: Taylor & Francis.

Van der Ark, A., Bolt, D., Wang, W-C., Douglas, J., & **Chow, S-M.** (Eds), (2015). *Quantitative Psychology Research: Proceedings of the 79th Annual International Meeting of the Psychometric Society*. Switzerland: Springer International Publishing.

Chow, S-M., Ferrer, E., & Hsieh, F. (Eds.) (2009). *Statistical methods for modeling human dynamics: An interdisciplinary dialogue*. Notre Dame Series on Quantitative Methodology (Vol. 4). New York, NY: Taylor & Francis.

Refereed Articles and Book Chapters

* Research in collaboration with graduate/undergraduate students.

+ Equal contributions between the first and second authors

Hojtink, H., & **Chow, S-M.** (Eds, in progress). Special Issue on Bayesian Data Analysis, *Psychological Methods*.
Structural Equation Modeling.

*Lu, Z-H., **Chow, S-M.**, & Loken, E. (under review). A Comparison of Bayesian and Frequentist Model Selection Methods for Factor Analysis Models. *Psychological*

Methods.

- [†]Tang, N, [†]**Chow, S-M.**, Ibrahim, J. & Zhu, H. (under review). Bayesian local influence analysis of semiparametric nonlinear dynamic factor analysis model with nonignorable missingness. *Psychometrika*.
- Chow, S-M.**, Ong, A.D., *Hutton, R. S., *Newell, S. M. & *Yang, M. (to be revised and resubmitted). Age differences in the dynamics of facial electromyography (EMG) data. *International Journal of Psychophysiology*.
- *Jacobson, N. C., **Chow, S-M.**, & Newman, M. G. (under review). The Differential Time-Varying Effect Model (DTVEM): Identifying optimal time lags in intensive longitudinal data. *Multivariate Behavioral Research*.
- *Kim, B-R., **Chow, S-M.**, Bray, B., & Teti, D M. (revised and resubmitted). Trajectories of mothers' emotional availability: Relations with infant temperament in predicting attachment security. *Attachment & Human Development*.
- Cole, P. M., *Bendezú, J. J., Ram, N., & **Chow, S-M.** (revised and resubmitted). Dynamical Systems Modeling of Early Childhood Self-Regulation. *Emotion*.
- *Helm, J. L., Ram, N., Cole, P., Chow, S. M. (accepted with revisions). Modeling self-regulation as a process using a multiple time scale multiphase latent basis growth model.
- *Ou, L., **Chow, S-M.**, *Ji, L., & Molenaar, P. C. M. (accepted with revisions). An examination of initial condition specifications in autoregressive latent trajectory model. *Multivariate Behavioral Research*.
- *Lu, Z-H., **Chow, S-M.**, & Loken, E. (in press). Bayesian factor analysis as a variable selection problem. *Multivariate Behavioral Research*.
- Chow, S-M.**, *Bendezú, J. J., Cole, P. M., & Ram, N. (in press). A Comparison of Two-Stage Approaches for Fitting Nonlinear Ordinary Differential Equation (ODE) Models with Mixed Effects. *Multivariate Behavioral Research*.
- Chow, S-M.**, *Lu, O. Cohn, J. F., & Messinger D. S. (in press). Representing Self-Organization and Non-Stationarities in Dyadic Interaction Processes Using Dynamic Systems Modeling Techniques. In Von Davier, A. Kyllonen, P. C., & Zhu, M. *Innovative Assessment of Collaboration*. New York: Springer.
- Chow, S-M.**, *Lu, Z., Sherwood, A. & Zhu, H. (2016). Fitting linear and nonlinear differential equation models with random effects and unknown initial conditions using the stochastic approximation expectation-maximization (SAEM) algorithm. *Psychometrika*, 81(1), 102-134. Doi:10.1007/s11336-014-9431-z. PubMed #: 25416456
- *Lu, Z-H., **Chow, S-M.**, Sherwood, A, & Zhu, H. (2015). Bayesian analysis of ambulatory cardiovascular dynamics with application to irregularly spaced sparse data. *Annals of Applied Statistics*, 9(3), 1601-1620. Doi: 10.1214/15-AOAS846.
- Chow, S-M.**, Witkiewitz, K. Grasman, R., & Maisto, S. (2015). The Cusp Catastrophe Model as Cross-Sectional and Longitudinal Mixture Structural Equation Models. *Psychological Methods*, 20, 142-164. PubMed # 25822209 NIHMSID 667553
- *Hutton, R. S., & **Chow, S-M.** (2014). Longitudinal Multi-Trait-State-Method model using ordinal data. *Multivariate Behavioral Research*, 49, 269-282. [40%]
- Zhang, G., Browne, W. M., Ong, A. D., & **Chow, S-M.** (2014). Analytic standard errors for exploratory process factor analysis. *Psychometrika*,

79(3), 444-469. [20%]

- Chow, S-M.**, *Mattson, W. I. & Messinger, D. S. (2014). Representing trends and moment-to-moment variability in dyadic and family processes using state-space modeling techniques. In Booth, A., McHale, S., & Landale, N. (Eds.). *Emerging Methods in Family Research, Fourth National Symposium on Family Issues. Switzerland: Springer International Publishing.*
- Chow, S-M.**, Witkiewitz, K., Grasman, R., Hutton, R. S. & Maisto, Stephen. (2014). A regime-switching longitudinal model of alcohol lapse-relapse. In P. C. M. Molenaar, K. M. Newell, & R. M. Lerner, *Handbook of Relational Developmental Systems: Emerging Methods and Concepts* (pp. 397-422). New York: Guilford Publications, Inc.
- Messinger, Daniel S., Mahoor, M. H., **Chow, S-M.**, Haltigan, J. D., Vadavid, S., & Cohn, J. F. (2013). Early emotional communication: Novel approaches to interaction. *Social Emotions in Nature and Artifact*, 162
- ***Chow, S-M.**, Grimm, K. J., Guillaume, F., Dolan, C. V., & McArdle, J. J. (2013). Regime-switching bivariate dual change score model. *Multivariate Behavioral Research*, 48(4), 463-502.
- Chow, S-M.**, & Zhang, G. (2013). Regime-switching nonlinear dynamic factor analysis models. *Psychometrika*, 78(4), 740-768.
- Song, X.-Y., Tang, N.-S., **Chow, S-M.** (2012). Bayesian approach for generalized random coefficient structural equation models for longitudinal data with adjacent time effects. *Computational Statistics and Data Analysis*, 56(12), 4190-4203.
- *Guo, R., Zhu, H., **Chow, S-M.**, & Ibrahim, J. G. (2012). Bayesian Lasso for semiparametric structural equation models. *Biometrics*, 68, 567-577.
- Chow, S-M.** *Zu, J., Shifren, K. & Zhang, G. (2011). Dynamic factor analysis models with time-varying parameters. *Multivariate Behavioral Research*, 46(2), 303-339.
- Algoe, S. B., Fredrickson, B. L., & **Chow, S-M.** (2011). The future of emotions research within positive psychology. In K. M. Sheldon, T. B. Kashdan, & M. F. Steger (Eds.) *Designing positive psychology: Taking stock and moving forward* (pp. 115-132). New York: Oxford University Press.
- Chow, S-M.**, Tang, N., *Yuan, Y., Song, X & Zhu, H. (2011). Bayesian estimation of semiparametric dynamic latent variable models using the Dirichlet process prior. *British Journal of Mathematical and Statistical Psychology*, 64(1), 69-106.
- Zhang, G., **Chow, S-M.** & Ong, A. D. (2011). A sandwich-type standard error estimator of SEM models with a single time series. *Psychometrika*, 76 (1), 77-96.
- *Yang, M-S. & **Chow, S-M.** (2010). Using state-space models with regime switching to represent the dynamics of facial electromyography (EMG) data. *Psychometrika*, 74(4), 744-771
- Hsieh, F., Ferrer, E., Chen, Shu-Chun & **Chow, S-M.** (2010). Dynamics of dyadic interactions I: Exploring non-stationarity of intra- and inter-individual affective processes via hierarchical segmentation and stochastic small-world networks. *Psychometrika*, 75(2), 351-372.
- Chow, S-M.**, Haltigan, J. D. & Messinger, D. S. (2010). Dynamic patterns of infant-parent interactions during Face-to-Face and Still-Face episodes. *Emotion*, 10(1), 101-114.

- Chow, S-M.** & *Filteau, G. (2010). A State-space approach to representing discontinuous shifts in change processes. In P. C. M. Molenaar & K. M. Newell (Eds.) *Individual Pathways of Change in Learning and Development* (pp. 87-108). Washington, D.C.: American Psychological Association.
- Zhang, G. & **Chow, S-M.** (2010). Standard error estimation in stationary multivariate time series models using residual-based bootstrap procedures. In P. C. M. Molenaar & K. M. Newell (Eds.) *Individual Pathways of Change in Learning and Development*. Washington, D.C.: American Psychological Association.
- *Schermerhorn, A. C., **Chow, S-M.**, & Cummings, E. M. (2010). Developmental family processes and interparental conflict: Patterns of micro-level influences. *Developmental Psychology*, 46(4), 869-885.
- Chow, S-M.**, Ho, M. H. R., Hamaker, E. & Dolan, C. (2010). Equivalence and differences between structural equation modeling and state-space modeling techniques. *Structural Equation Modeling*, 17, 303-332.
- Chow, S-M.**, Hamaker, E. & Allaire, J. C. (2009). Using innovative outliers to detect discrete shifts in dynamics in group-based state-space models. *Multivariate Behavioral Research*, 44, 465-496.
- Ferrer, E., Chen, S-C., **Chow, S-M.** & Hsieh F. (2009). Exploring intra- and inter individual dynamics in dyadic interactions through hierarchical factor segmentation. In Chow, S-M., Ferrer, E., & Hsieh, F. (Eds.), *Statistical methods for modeling human dynamics: An interdisciplinary dialogue*. Taylor & Francis.
- Ong, A. D., Bergeman, C. S., & **Chow, S-M.** (2009). Positive emotions as a basic building block of resilience in later life. In J. Reich, A. Zautra, and J. Hall (Eds.). *Handbook of adult resilience: Concepts, methods, and applications*. New York: Guildford Press.
- Chow, S-M.**, Hamaker, E., Fujita, F., & Boker, S. M. (2009). Representing time-varying cyclic dynamics using multiple-subject state-space models. *British Journal of Mathematical and Statistical Psychology*, 62, 683-712.
- Messinger, D.S., Mahoor, M. H., **Chow, S-M.**, & Cohn, J. F. (2009). Automated measurement of facial expression in infant-mother interaction: A pilot study. *Infancy*. 14(3), 285-305.
- Messinger DS, Mahoor MH, Cadavid S, **Chow SM**, Cohn JF. (2008). Early Interactive Emotional Development. *IEEE Int Conf Dev Learn*, 232-237. PubMed PMID: 21804955; PubMed Central PMCID: PMC3145460.
- Chow, S-M.** & Zhang, G. (2008). Continuous-time modeling of irregularly spaced panel data using a cubic spline interpolation technique. Special issue on "Continuous-time modeling of panel data" coedited by J. H. L. Oud & H. Singer. *Statistica Neerlandica* 61(1), 131-154.
- Chow, S-M.**, Grimm, K. J. Fujita, F. & Ram, N (2007). Exploring cyclic change in emotion using item response models and frequency-domain analysis In A. Ong & M. van Dulmen (Eds.), *Handbook of Methods in Positive Psychology* (pp. 362-379). Oxford University Press.
- Chow, S-M** (2007). Factor score and parameter estimation in nonlinear dynamical systems models. In K. van Montfort, H. Oud & A. Satorra.(Eds.), *European Association of Methodology (EAM) Methodology and Statistics series (2nd Vol.): Longitudinal models in the behavioral and related sciences* (pp. 107-138).

- Lawrence Erlbaum.
- Chow, S-M.**, Hamagami, F & Nesselroade, J. R (2007). Age differences in dynamical emotion-cognition linkages. *Psychology and Aging*, 22(4), 765-780.
- Chow, S-M.**, Ferrer, E. & Nesselroade J. R. (2007). An unscented Kalman filter approach to the estimation of nonlinear dynamical systems models. *Multivariate Behavioral Research*, 42(2), 283-321.
- Chow, S-M.** & *Tiberio, S. S. (2007). Discussion on Ramsey et al.'s paper, "Parameter estimation for differential equations: A generalized smoothing approach". *Journal of the Royal Statistical Society: Series B*.
- Ram, N., **Chow, S-M.**, Bowles, R. P., Wang, L., Grimm, K. J., Fujita, F. & Nesselroade, J. R (2005). Examining interindividual differences in cyclicity of pleasant and unpleasant affects using spectral analysis and item response modeling. *Psychometrika: Application Reviews and Case Studies*, 70, 773-790.
- Chow, S-M.**, Ram, N., Boker, S. M., Fujita, F. Clore, G. (2005). Emotion as a thermostat: Representing emotion regulation using a damped oscillator model. *Emotion*. 5(2), 208-225.
- Chow, S-M.**, Nesselroade, J. R., Shifren, K. & McArdle J. J. (2004). Dynamic structure of emotions among individuals with Parkinson's disease. *Structural Equation Modeling*, 11(4), 560-582.
- Chow, S-M.** & Nesselroade, J. R. (2004) General slowing or decreased inhibition? Mathematical models of age differences in cognitive functioning. *Journals of Gerontology: Psychological Sciences*, 59B(3), 101-109.
- Walpole, S., **Chow, S-M.** & Justice, L. (2004). Literacy achievement during kindergarten: Identifying key contributors in an at-risk sample. *Early Education and Child Development*, 15(3), 245-264.
- Justice, L., **Chow, S.**, Michel, C. & Flanigan, K. (2003). Investigation of two emergent literacy enhancement approaches for vulnerable preschoolers. *American Journal of Speech-Language Pathology*, 12, 1-14.
- Chow, S.** & Nesselroade, J. R. (2002). Age differences in transitory cognitive performance. In W. Gray & C. Schunn (Eds.), *Proceedings of the Twenty-Fourth Annual Conference of the Cognitive Science Society*, 196-201.

SCHOLARLY PRESENTATIONS

Invited Presentations

- Chow, S-M. (March, 2015). Regime-switching dynamical systems models. Invited talk presented in the Department of Psychology of McGill University, Montreal, Canada.
- Chow, S-M. (March, 2015). Exploring and fitting dynamical systems models. Invited talk presented in the Department of Psychology of Georgia Institute of Technology, Atlanta, GA.
- Chow, S-M. (March, 2015). Regime-Switching dynamical Systems models. Invited talk presented in the Department of Psychology of McGill University, Montreal.
- Chow, S-M., Ou*, L., & Messinger, D. (November, 2014). Representing trends, moment-to-moment variability and non-stationarities in dyadic processes using state-space

- modeling techniques. Invited talk presented at the Innovative Assessment of Collaboration (IAC) meeting organized by the Educational Testing Services (ETS), Arlington, VA.
- Chow, S-M. (July 2014). Dynamical systems modeling in the social and behavioral sciences. Invited talk given at the Annual Psychometric Society Conference, Madison, Wisconsin.
- Chow, S-M. (April, 2014). Regime-Switching Longitudinal Models. Paper presented at the 2014 Conference of the National Council on Measurement in Education, Philadelphia, PA.
- Chow, S-M. (April 2012). *Longitudinal regime-switching models as a way to capture between- and within-person heterogeneities in change*. Invited talk presented at the Center for Research Methods and Data Analysis, Kansas University.
- Chow, S-M., *Hutton, R. S., Witkiewitz, K. & Maisto, Stephen. (Nov, 2011). *Regime-switching longitudinal models*. Invited paper presented at the Inductive Developmental Systems Theory Conference, The Pennsylvania State University, PA.
- Chow., S-M. (May, 2011). *Time-varying parameters as an idiographic filter*. Invited talk presented at the John R. Nesselrode Festschrift, University of Virginia.
- Chow., S-M. (Oct, 2010). *Dynamic models with time-varying parameters*. Invited talk presented at the Paul B. Baltes Symposium in honor of John R. Nesselrode.
- Chow, S-M. (Sept, 2010). *Applications of difference and differential equation modeling in the social sciences*. Invited paper presented at the Statistical and Applied Mathematical Sciences (SAMSI) Institute, Durham NC, special program on Analysis of Object Data (AOOD).
- Chow, S-M. (Sept, 2008). *Detecting discrete shifts in dynamics in multiple-subject state-space models*. Invited paper presented at the Individual Pathways of Change in Learning and Development Conference, The Pennsylvania State University, PA.
- Chow, S-M. (July 2007). *State-space modeling of cyclic dynamics*. Invited talk presented at the Workshop on Statistical Methods for Modeling Dynamic Systems, McGill University, Montreal.
- Chow, S-M. (May 2007). *State-space models of intraindividual change*. Invited talk presented at Michigan State University.
- Chow, S.-M. (Dec, 2006). *Representing emotion as self-regulatory processes using differential equation models*. Invited talk presented at the Katholieke Universiteit Leuven, Brussels.
- Chow, S-M. (June 2006). *Fitting nonlinear dynamical systems models using state-space modeling techniques*. Invited state-of-the-art talk presented at the 71th Psychometric Society Conference, Montreal, Canada.
- Chow, S-M. (Nov, 2005). *Nonlinear Kalman filter approaches to the estimation of dynamical systems models*. Invited talk presented at the University of California, Davis.
- Chow, S.-M. (Feb, 2004). *Differential equation models of age differences in emotion and cognitive functioning*. Invited talk presented at the Max Planck Institute for Human Development.
- Chow, S.-M. (Jan, 2004). *Modeling emotion and cognition as self-regulatory processes using differential equations*. Invited talk presented at the Western

Ontario University

Chow, S.-M. (Jan, 2004). *Differential equation models of age differences in cognitive functioning*. University of Victoria.

National and International Conference Presentations

- Chow, S.-M. (Oct, 2015). Exploring, fitting, and sensitivity analysis of nonlinear dynamical systems models: Current techniques and unresolved challenges. Cattell Award address presented at the 2015 SMEP conference, Redondo Beach, CA.
- Chow, S.-M. (July, 2015). Fitting and evaluating nonlinear dynamical systems models: Current techniques and unresolved challenges. Early Career Award address presented at the 2015 International Meeting of the Psychometric Society, Beijing, China
- Chow, S.-M., *Ou, L., Ciptadi, A., Prince, E., Rehg, J. M., Rozga, A., & Messinger, D. S. (2015, June). Differential equation modeling approaches to representing sudden shifts in intensive dyadic interaction data. Paper presented at the 2015 Conference of the Society for Ambulatory Assessment, University Park, PA.
- *Ji, L., Chow, S.-M., Jacobson, N.C., Schermerhorn, A.C. & Cummings, E.M. (2015, June). *Handling missing data in the modeling of ambulatory assessment data*. Paper presented at the biennial conference of the Society for Ambulatory Assessment, University Park, PA. Selected as a recipient of the Graduate Student Presentation Awards.
- * Jacobson, N.C., & Chow, S.-M. (2015, June). *The Differential Time-Varying Effect Model (DTVEM): A tool for diagnosing optimal measurement and modeling intervals in longitudinal data*. Paper presented at the biennial conference of the Society for Ambulatory Assessment, University Park, PA.
- Chow, S.-M., Witkiewitz, K., Grasman, R., & Maisto, S. (2015, May). The Cusp Catastrophe Model as Cross-Sectional and Longitudinal Mixture Structural Equation Models. Poster presented at the Annual Convention of the Association for Psychological Science, New York, NY.
- *Augustine, M. E., Chow, S.-M., & Stifter, C. A. (2015, March). Modeling infant engagement with novel objects: Maternal and temperament effects. Poster presented at the Biennial Meeting of the Society for Research in Child Development, Philadelphia, PA
- *Ou, L., Chow, S.-M., Ji, L., & Molenaar, P. C. M. (July 2014). An examination of initial condition specifications in autoregressive latent trajectory model. Paper presented at the Annual Psychometric Society Conference, Madison, Wisconsin.
- Chow, S.-M., Witkiewitz, K., Grasman, R., & Maisto, S. (October 2013). Regime-switching structural equation and state-space models. Paper presented at the Annual Meeting of the Society of Multivariate Experimental Psychology, St Petersburg, FL.
- Chow, S.-M., Witkiewitz, K., Grasman, R., & Maisto, S. (November 2013). The Cusp Catastrophe model as a regime-switching structural equation model. Paper presented at Society for the Study of Human Development Biennial Meeting. Fort Lauderdale, FL.
- Losardo*, D., Ou*, L., & Chow, S.-M. (July 2013). An Examination of Initial Condition

- Specification in the Structural Equations Modeling Framework. Poster presented at the Annual Psychometric Society Conference, Arnhem, the Netherlands.
- Chow, S-M., Witkiewitz, K., Grasman, R., & Maisto, S. (July 2013). The cusp catastrophe model as a regime-switching structural equation model. Paper presented at the Annual Psychometric Society Conference, Arnhem, the Netherlands.
- Chow, S-M., Lu, Zhaohua, Sherwood, Andrew, & Zhu, HT (July 2013). Fitting nonlinear differential equation models with random effects using the stochastic approximation expectation maximization algorithm. Paper presented at the fifth Conference of the European Survey Research Association, Ljubljana, Slovenia.
- Lu, Z-H., Chow, S-M., Sherwood, A., & Zhu, HT. (July 2012). *Nonlinear stochastic differential equation models for latent variables*. Paper presented at the Annual Psychometric Society Conference, Nebraska, Lincoln.
- Chow, S-M., Dolan, C. V., Filteau, G., & McArdle, J. J. (February, 2012). *Longitudinal regime-switching models*. Paper presented at the Society for Research in Child Development 2012 Themed Meeting: Developmental Methodology, Tampa, Florida.
- Chow, S-M. (July, 2011). *Examining time-varying coupling effects between positive and negative emotions using a dynamic factor analysis model with time-varying parameters*. Paper presented at the International Society for Research on Emotion (ISRE) annual conference, Kyoto, Japan.
- Chow, S-M., Zhu, HT, & Sherwood, A. (July, 2011). *Fitting nonlinear differential equation models with random effects using the stochastic approximation expectation-maximization algorithm*. Paper presented at the Annual Psychometric Society Conference, Hong Kong.
- Tuerlinckx, F. & Chow, S-M. (July, 2011). Symposium co-organizer and opening remarks for “*Modeling heterogeneity in dynamical structures and processes.*” Presented at the Annual Psychometric Society Conference, Hong Kong.
- Chow, S-M. (July, 2011). Discussant for K. Gates (chair), *Time-varying effect model of intensive longitudinal data: An application to smoking cessation behavior*. Paper presented at the Annual Psychometric Society Conference, Hong Kong.
- *Losardo, D., Chow, S-M., Panter, A. T., Burkley, M. & Burkley, E. (July, 2010). *Optimal designs for daily diary studies: Do we really need all of those time points?* Poster presented at the Annual Psychometric Society Conference, Athens, GA.
- Chow, S.-M., Tang, N., *Yuan, Y., Song, X & Zhu, H. (July, 2009). *Bayesian estimation of semiparametric dynamic latent variable models using the Dirichlet process prior*. Talk presented at the Annual Psychometric Society Conference, Cambridge UK.
- Chow, S-M., Allaire, J. C., Hamaker, E. & Marsiske, M. (July, 2008). *Examining individual shifts in learning dynamics in group-based state-space Models*. Talk presented at the Annual Psychometric Society Conference, New Hampshire, MA.
- *Yang, M., & Chow, S-M. (July, 2008). *Using State-Space Models with Regime Switching to Represent the Dynamics of Facial EMG Data*. Talk presented at the Annual Psychometric Society Conference, New Hampshire, MA.

- *Zu, J., & Chow, S-M. (July, 2008). *Examining Dynamic Factor Models with Time-Varying Parameters*. Talk presented at the Annual Psychometric Society Conference, New Hampshire, MA.
- Chow, S.-M., Bauer, C., *Spies, J. R., Li, S.-C., Lindenberger, U. & Baltes, P. B. (Aug, 2006). *Predicting optimal pathways to cognitive aging: Agent-based modeling of selection, optimization, and compensation dynamics*. Talk presented at the Annual convention of the American Psychological Association, New Orleans, LA.
- *Zu, J., Chow, S-M., Boker, S-M. (May, 2006). *A mathematical model of phase transitions in human affect*. Poster presented at the Annual Convention of the Midwestern Psychology Association, Chicago, IL.
- Ong, A. D., Chow, S. M., Bergeman, C. S., & Fujita, F. (May, 2006). *Positive emotions as a resource for shame-prone individuals*. Paper presented at the Annual Meeting of the Midwestern Psychological Association, Chicago, IL.
- Chow, S.-M., *Spies, J. R., Bauer, C., Li, S.-C., Lindenberger, U. & Baltes, P. B. (April 2006). *An agent-based mathematical modeling approach to the theory of selection, optimization and compensation*. Poster presented at the 2006 Cognitive Aging Conference, Atlanta, GA.
- Chow, S-M., Ferrer, E. & Nesselroade, J. R. (November, 2005). *Using nonlinear dynamical systems models to represent changes in affective dynamics: A dyadic interaction example*. Paper symposium titled "The dynamics of aging: Tools for the new frontier" convened by Ram, N. & Nesselroade, J. R. at the annual scientific meeting of the Gerontology Society of America, Orlando, FL
- Ong, A. D., & Chow, S. M., Fujita, F., & Bergeman, C. S. (August, 2005). *Examining the dynamic linkages between positive affect and negative affect using a coupled oscillators model*. Paper presented at the 17th Annual Convention of the American Psychological Society, Los Angeles, CA: May 28.
- *Chow, S-M., Boker, S-M., Zu, J. & Fujita, F. (July, 2005). *Representing the circumplex structure of emotions using dynamical systems models*. Poster presented at the XXV European Dynamics Days, Berlin, Germany.
- Daniel S. Messinger, Sy-Miin Chow, Seth Koterba, Changbo Hu, J.D. Haltigan, Jeffrey Cohn (July, 2005). *Smile and Emotion Dynamics in Infant Mother Interaction*. Symposium titled "New insights into the expression of positive emotion in infancy and adulthood" convened by Messinger D. & Fogel A. at the annual meeting of the International Society for Research on Emotion, Bari, Italy.
- Chow, S-M., Hamaker, E. J. & Dolan, C. (June, 2005). *Representing developmental and psychological processes using structural equation models and state-space models: Recent progress and unresolved issues*. Paper presented at the 70th Psychometric Society Conference, Tilburg, the Netherlands.
- *Zu, J., Chow, S-M. & Boker, S. M. (June, 2005). *The Effect of Number of Fourier Series Component on Power and Accuracy to Test Circumplex Structure*.

- Paper presented at the North American Association for Computational Social and Organizational Science, Notre Dame, Indiana.
- Messinger, D.S., Gaby, J., Haltigan, J. D., Chow, S. M., Koterba, S.Hu, C., Venezia, M., Hamilton, L., Cohn, J. F. (2005, April). *Interactive Influence in Mutual Smiling*. Paper presented at the Society for Research in Child Development. Atlanta, GA.
- Ong, A. D., Chow, S-M., Fujita, F. & Bergeman, C.S. (May, 2005). *Examining the dynamic linkages between positive affect and negative affect using a coupled oscillators model*. Hot topic presented at the 2005 American Psychology Society Conference, Los Angeles, CA.
- Chow, S-M. & Nesselroade, J. R. (November, 2004). *Modeling intraindividual variability as a dynamic process*. Paper symposium titled "Methodological approaches to the study of intraindividual variability" convened by Ram, N. & Nesselroade, J. R. at the annual scientific meeting of the Gerontology Society of America, Washington, D.C.
- Chow, S-M. & Nesselroade, J. R. (June, 2004). *A Monte Carlo comparison of methods for fitting nonlinear dynamic Models*. Paper presented at the 2004 Psychometric Society Conference, Pacific Grove, CA.
- Ram, N., Chow, S-M., Grimm, K. J., Fujita, F. & Nesselroade, J. R. (June, 2004). *Examining the dynamics of pleasant and unpleasant emotions using spectral analysis and the Rating Scale model*. Paper presented at the 2004 Psychometric Society Conference, Pacific Grove, CA.
- Kline, T. L., Bowles, R. P., Chow, S-M, Schmidt, K. M. & Berry, J. (April, 2004). *The Metamemory in Adulthood Scale: A rating scale analysis*. Poster presented at the 2004 Cognitive Aging Conference, Atlanta, GA.
- Bowles, R. P., Kline, T. L., Chow, S-M., Berry, J., & Schmidt, K. M. (2004, April). *An item factor analysis of the Metamemory in Adulthood (MIA) instrument*. Poster presented at the Cognitive Aging Conference, Atlanta, GA.
- Chow, S-M. & Nesselroade, J. R. (April, 2004). *General slowing or decreased inhibition? Mathematical models of age differences in cognitive functioning*. Poster presented at the 2004 Cognitive Aging Conference, Atlanta, GA.
- Chow, S-M, Kline, T. L., Bowles, R. P., Berry, J. & Schmidt, K. M. (April, 2004) *Factorial invariance of the Metamemory in Adulthood Questionnaire*. Poster presented at the 2004 Cognitive Aging Conference, Atlanta, GA.
- Ram, N., Chow, S. & Fujita, F. (January, 2004). *Dynamical modeling of emotion: stable daily and weekly patterns in seemingly random changes*. Poster presented at the 2004 Society for Personality and Social Psychology Conference, Austin, TX.
- Chow, S., Nesselroade, J. R. & Schmidt, K. M. (August, 2002). *Age differences in task-switching patterns*. Poster presented at the American Psychological Association Annual Convention, Chicago, IL.
- Chow, S. & Nesselroade, J. R. (August, 2002). *Age differences in transitory cognitive performance*. Poster presented at the Cognitive Science Society Annual Meeting, Fairfax, VA.
- Chow, S., Nesselroade, J. R. & Shifren, K. (June, 2002). *Mood fluctuations in individuals with Parkinson's disease*. Paper presented at the Psychometric

- Society Annual Meeting, Chapel Hill, NC.
- Justice, L., Capellini, C., Colton, S., Flanigan, K., Chow, S. (March, 2002). *Emergent literacy in preschool children: Intervention suggestions*. Paper presented at the Speech-Language-Hearing Association of Virginia Annual Conference, Charlottesville, VA.
- Chow, S., (April, 2001). *Modeling synthetic work performance from a structural modeling approach*. Paper presented at the 2001 Spring Convention of Virginia Psychological Association, Roanoke, VA.
- Chow, S., (June, 2000). *An agent-based model of human synthetic performance*. Student paper presented at the Summer 2000 Complex Systems Summer School, Santa Fe, NM.
- Hillary, Frank G., Miin, Sy, Moelter, S., Chute, D. L., (November, 1999). *Predictors of vocational functioning after traumatic brain injury*. Poster presented at the 19th annual meeting of the National Academy of Neuropsychology, San Antonio, TX., [Abstract published in Archives of Clinical Neuropsychology, 14 (8), 792.]

WORKSHOPS/SEMINARS

- Chow, S-M. (April 2010). *Workshop on Longitudinal Data Analysis*, Nanyang Technological University, Singapore
- Chow, S-M. (July 2006). *Introduction to time series and state-space modeling techniques*. Life seminar presented at the Max Planck Institute for Human Development.
- Chow, S.-M. & Spies, J. R. (June, 2005). *An agent-based approach to modeling changes in developmental landscape*. Workshop given at the Max Planck Institute for Human Development to members of the Center for Lifespan Psychology and other universities in Berlin.

TEACHING EXPERIENCE

Undergraduate courses

Statistical Principles in Psychological Research (PSYC 210 at UNC, PSYC341 at Notre Dame)
Spring 2006, Fall 2006, Spring 2007, Spring 2008, Fall 2008.

Statistical Principles in Psychological Research, Calculus-Based (PSYC 215)
Fall 2009.

Graduate courses

Advanced Longitudinal Data Analysis (PSYC 859)
Spring 2006, Spring 2009, Spring 2011

Statistical Methods in Psychology I (PSYC 281/830)
Fall 2006, Fall 2007, Fall 2008, Fall 2009, Fall 2010, Fall 2011

Research Methods (HDFS 516/518)
HDFS, PSU: Fall 2012, 2013, 2014

Dynamical Systems Analysis of Psychological Data
Spring 2007 (at Notre Dame)
Spring 2014 (PSU)
Spring 2016 (PSU)

MENTORING AND ADVISING

Graduate students

Primary advisor

Lu Ou (2012 – present) Chair, Master's, Comps (2015) and Dissertation committees
Linying Ji (2013 – present) Chair, Master's committee
Meng Cheng (2014 – present) Chair, Master's committee
R. Shane Hutton (2009 – 2012) Chair, Master's committee.
Diane Losardo (2008 – 2012) Chair, dissertation committee. Now working with *Wireless Generation*.
Guillaume Filteau (2008 – 2010) Now graduate student in the department of Biostatistics, UNC
Stacey Tiberio (2006 – 2007) Chair, dissertation committee at Notre Dame; co-supervise with Steve Boker and Scott Maxwell
Ji-Yun Zu (2004 – 2007): Chair, Master's committee at Notre Dame
Manshu Yang (2005 – 2007): Chair, Master's committee at Notre Dame

Quantitative minor advisor

Bethany Kok (2009 – 2012) Doctoral candidate in Social Psychology, UNC
Joe Simons (2011 – 2013). Doctoral candidate in Social Psychology, UNC
Vanessa Volpe (2012 – 2012). Doctoral student in Developmental Psychology, UNC

Doctoral Dissertation Committee member

R.J. Wirth (Department of Psychology, UNC) 2010
Joe Simons (Department of Psychology, UNC) 2012
Bethany Kok (Department of Psychology, UNC) 2012
Zhaowei Hua (Department of Biostatistics, UNC) 2012
Yao Zheng (HDFS, PSU) 2013
Hae Young Rhee (HDFS, PSU) 2015
Lauren Philbrook (HDFS, PSU) 2015
Nick Jacobson (Psychology, PSU) 2016

Wei Zhang (Department of Psychology, Notre Dame)
Kathleen Ashenfelter (Notre Dame)
Mignon Montpetit (Notre Dame)

External dissertation committee member, Laura Bringmann, University of Leuven, 2015
(Katholieke Universiteit Leuven)

Doctoral Comprehensive Exams:

Brandon McDaniel (HDFS, PSU) 2013
Lauren Philbrook (HDFS, PSU) 2013
Katharine Bamberger (HDFS, PSU) 2014
Mina Shimizu (HDFS, PSU) 2015

Doctoral Candidacy Exam Committee:

Cindy Willner (HDFS, PSU) 2013
Lauren Bangerter (HDFS, PSU) 2013
Rachel Abenavoli (HDFS, PSU) 2013
Kameron Moding (HDFS PSU) 2013
Mairin Augustine (HDFS PSU) 2014
Mengya Xia (HDFS PSU), 2014
Peter Kim (HDFS PSU), 2015
Jason Bendezú (Psychology PSU), 2015

Master's thesis:

Moé Kishida (Kinesiology, PSU) 2013
Chelsea Burfeind (Department of Psychology, UNC)
Zane Blanton (Department of Psychology, UNC)
Naomi Ekas (Department of Psychology, Notre Dame)
Nick Jacobson (Psychology, PSU) 2015

PROFESSIONAL MEMBERSHIPS

Psychometric Society (2002 –)
Association for Psychological Science (2012 –)
Society of Multivariate Experimental Psychology (2012 –)
Gerontology society of America (2004 –)