Selected papers: Foundations of statistical learning from dependent and high-dimensional network data

- Stewart*, Jonathan R. and **Michael Schweinberger** (2020). Pseudo-likelihood-based *M*-estimation of random graphs with dependent edges and parameter vectors of increasing dimension. Submitted, *The Annals of Statistics*.
- Schweinberger, Michael, Krivitsky, Pavel N., Butts, Carter T., and Jonathan R. Stewart* (2020). Exponential-family models of random graphs: Inference in finite, super, and infinite population scenarios. *Statistical Science*, 35, 627–662.
- Schweinberger, Michael and Jonathan R. Stewart* (2020). Concentration and consistency results for canonical and curved exponential-family models of random graphs. *The Annals of Statistics*, 48, 374–396.
- Schweinberger, Michael (2020). Consistent structure estimation of exponential-family random graph models with block structure. *Bernoulli*, 26, 1205–1233.
- Schweinberger, Michael (2019). Random graphs. Wiley StatsRef: Statistics Reference Online. Edited by Brian Everitt, Geert Molenberghs, Walter Piegorsch, Fabrizio Ruggeri, Marie Davidian, and Ron Kenett. The online successor of the Encyclopedia of Statistical Sciences. Invited.
- Schweinberger, Michael, Babkin*, Sergii, and Katherine B. Ensor (2017). High-dimensional multivariate time series with additional structure. *Journal of Computational and Graphical Statistics*, 26, 610–622.
- Schweinberger, Michael and Mark S. Handcock (2015). Local dependence in random graph models: Characterization, properties and statistical inference. *Journal of the Royal Statistical Society, Series B (Statistical Methodology)*, 77, 647–676.
- Schweinberger, Michael (2011). Instability, sensitivity, and degeneracy of discrete exponential families. *Journal of the American Statistical Association, Theory & Methods*, 106, 1361–1370.

Additional structure helps construct models and estimate parameter vectors of increasing dimension based on a single observation of dependent data. The general idea is elaborated in the simplest possible setting: exponential families.

Selected papers: Large-scale statistical learning from dependent and high-dimensional network data

- Park, Jaewoo, Jin, Ick Hoon, and **Michael Schweinberger** (2021+). Bayesian model selection for high-dimensional Ising models, with applications to educational data. Accepted, *Computational Statistics & Data Analysis*.
- Babkin*, Sergii, Stewart*, Jonathan R., Long*, Xiaochen, and Michael Schweinberger (2020). Large-scale estimation of random graph models with local dependence. Computational Statistics & Data Analysis, 152, 1–19.
- Schweinberger, Michael and Pamela Luna* (2018). hergm: Hierarchical exponential-family random graph models. *Journal of Statistical Software*, 85, 1–39.
- Schweinberger, Michael, Babkin*, Sergii, and Katherine B. Ensor (2017). High-dimensional multivariate time series with additional structure. *Journal of Computational and Graphical Statistics*, 26, 610–622.
- Schweinberger, Michael and Mark S. Handcock (2015). Local dependence in random graph models: Characterization, properties and statistical inference. *Journal of the Royal Statistical Society, Series B (Statistical Methodology)*, 77, 647–676.
- Vu*, Duy Q., Hunter, David R., and **Michael Schweinberger** (2013). Model-based clustering of large networks. *The Annals of Applied Statistics*, 7, 1010–1039.
- Hunter, David R., Krivitsky, Pavel N., and Michael Schweinberger (2012). Computational statistical methods for social network models. *Journal of Computational and Graphical Statistics*, 21, 856–882. Equal contributions. Invited.
- Snijders, Tom A.B., Koskinen, Johan, and **Michael Schweinberger** (2010). Maximum likelihood estimation for social network dynamics. *The Annals of Applied Statistics*, 4, 567–588.
- Schweinberger, Michael and Tom A.B. Snijders (2007). Markov models for digraph panel data: Monte Carlo-based derivative estimation. *Computational Statistics and Data Analysis*, 51, 4465–4483.

Selected papers: Applications to computational social science, public health, and national security

- Jeon, Minjeong, Jin, Ick Hoon, **Schweinberger**, **Michael**, and Samuel *Baugh. Mapping unobserved item-respondent interactions: A latent space item response model with interaction map. Accepted, *Psychometrika*. **Educational assessment data:** Providing teachers with visual student-problem interaction maps.
- Schweinberger, Michael, Bomiriya*, Rashmi P., and Sergii Babkin* (2020). A semi-parametric Bayesian approach to epidemics, with application to the spread of the coronavirus MERS in South Korea in 2015. Invited major revision, Journal of Nonparametric Statistics. Detecting potential superspreaders.
- Stewart*, Jonathan R., **Schweinberger**, **Michael**, Bojanowski, Michal, and Martina Morris (2019). Multilevel networks facilitate statistical inference for curved ERGMs with geometrically weighted terms. *Social Networks*, 59, 98–119. **School networks**: How do children form bonds?
- Schweinberger, Michael, Babkin*, Sergii, and Katherine B. Ensor (2017). High-dimensional multivariate time series with additional structure. *Journal of Computational and Graphical Statistics*, 26, 610–622. How is air pollution related to air pollution in neighboring areas?
- Schweinberger, Michael and Mark S. Handcock (2015). Local dependence in random graph models: Characterization, properties and statistical inference. *Journal of the Royal Statistical Society, Series B (Statistical Methodology)*, 77, 647–676. How did the terrorists behind the Bali bombing in 2002 communicate?
- Schweinberger, Michael, Petrescu-Prahova, Miruna, and Duy Q. Vu* (2014). Disaster response on September 11, 2001 through the lens of statistical network analysis. Social Networks, 37, 42–55. How did the responders to the September 11, 2001 terrorist attacks coordinate the disaster response?
- Vu*, Duy Q., Hunter, David R., and **Michael Schweinberger** (2013). Model-based clustering of large networks. *The Annals of Applied Statistics*, 7, 1010–1039. **Online trust networks: Whom to trust?**

Selection of preprints in preparation

- With Johannes Lederer. Scalable model selection with a single observation of dependent random variables: pseudolikelihood-based Dantzig selectors.
- With Minjeong Jeon, Samuel Baugh, and Eric Ho. Student learning through learning progression maps, with application to online educational assessment data.
- With Sean Eli. A note on non-asymptotic model selection for network models with parameter vectors of increasing dimension.
- With Johathan R. Stewart. Composite likelihood in dependent-data problems with parameter vectors of increasing dimension.

Peer-reviewed publications, including preprints under peer-review

Google Scholar: $\geq 2,750$ citations. Students*: Stewart* is tenure-track Assistant Professor, Department of Statistics, Florida State University. Babkin* is senior data & applied scientist, Microsoft.

- (31) Stewart*, Jonathan R. and **Michael Schweinberger.** Pseudo-likelihood-based *M*-estimation of random graphs with dependent edges and parameter vectors of increasing dimension. Submitted, *The Annals of Statistics*.
- (30) Jin, Ick Hoon, Jeon, Minjeong, **Schweinberger**, **Michael**, and Lizhen Lin. Hierarchical network item response modeling for discovering differences between innovation and regular school systems in Korea. Invited major revision, *Journal of the Royal Statistical Society, Series C (Applied Statistics)*.
- (29) Park, Jaewoo, Jin, Ick Hoon, and **Michael Schweinberger** (2022). Bayesian model selection for high-dimensional Ising models, with applications to educational data. *Computational Statistics & Data Analysis*, 165, 1–20.
- (28) **Schweinberger, Michael**, Bomiriya*, Rashmi P., and Sergii Babkin* (2021). A semiparametric Bayesian approach to epidemics, with application to the spread of the coronavirus MERS in South Korea in 2015. Accepted, *Journal of Nonparametric Statistics*.

- (27) Jeon, Minjeong, Jin, Ick Hoon, **Schweinberger**, **Michael**, and Samuel Baugh* (2021). Mapping unobserved item-respondent interactions: A latent space item response model with interaction map. *Psychometrika*, 86, 378–403. The first three authors have made equal contributions.
- (26) **Schweinberger**, **Michael** (2021). Discussion of "Bayesian graphical models for modern biological applications" by Yang Ni, Veerabhadran Baladandayuthapani, Marina Vannucci, and Francesco C. Stingo. *Statistical Methods & Applications*, 1–7. **Invited**.
- (25) **Schweinberger**, **Michael** and Jonathan R. Stewart* (2020). Concentration and consistency results for canonical and curved exponential-family models of random graphs. *The Annals of Statistics*, 48, 374–396.
- (24) **Schweinberger**, **Michael** (2020). Consistent structure estimation of exponential-family random graph models with block structure. *Bernoulli*, 26, 1205–1233.
- (23) Schweinberger, Michael, Krivitsky, Pavel N., Butts, Carter T., and Jonathan R. Stewart* (2020). Exponential-family models of random graphs: Inference in finite, super, and infinite population scenarios. *Statistical Science*, 35, 627–662.
- (22) Babkin*, Sergii, Stewart*, Jonathan R., Long*, Xiaochen, and Michael Schweinberger (2020). Large-scale estimation of random graph models with local dependence. Computational Statistics & Data Analysis, 152, 1–19.
- (21) **Schweinberger, Michael** (2020). Statistical inference for continuous-time Markov processes with block structure based on discrete-time network data. *Statistica Neerlandica*, 74, 342–362.
- (20) Schweinberger, Michael (2019). Random graphs. Wiley StatsRef: Statistics Reference Online. Edited by Brian Everitt, Geert Molenberghs, Walter Piegorsch, Fabrizio Ruggeri, Marie Davidian, and Ron Kenett. Invited.
- (19) Stewart*, Jonathan R., **Schweinberger**, **Michael**, Bojanowski, Michal, and Martina Morris (2019). Multilevel networks facilitate statistical inference for curved ERGMs with geometrically weighted terms. *Social Networks*, 59, 98–119.
- (18) **Schweinberger**, **Michael** and Pamela Luna* (2018). hergm: Hierarchical exponential-family random graph models. *Journal of Statistical Software*, 85, 1–39.

- (17) Cao*, Ming, Chen, Yong, Fujimoto, Kayo, and Michael Schweinberger (2018). A two-stage working model strategy for network analysis under hierarchical exponential random graph models. Proceedings of the 2018 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining, 290–298. Acceptance rate: 15%.
- (16) **Schweinberger, Michael**, Babkin*, Sergii, and Katherine B. Ensor (2017). High-dimensional multivariate time series with additional structure. *Journal of Computational and Graphical Statistics*, 26, 610–622.
- (15) **Schweinberger**, **Michael** and Mark S. Handcock (2015). Local dependence in random graph models: Characterization, properties and statistical inference. *Journal of the Royal Statistical Society, Series B (Statistical Methodology)*, 77, 647–676.
- (14) **Schweinberger, Michael**, Petrescu-Prahova, Miruna, and Duy Q. Vu* (2014). Disaster response on September 11, 2001 through the lens of statistical network analysis. *Social Networks*, 37, 42–55.
- (13) Vu*, Duy Q., Hunter, David R., and **Michael Schweinberger** (2013). Model-based clustering of large networks. *The Annals of Applied Statistics*, 7, 1010–1039.
- (12) Hunter, David R., Krivitsky, Pavel N., and **Michael Schweinberger** (2012). Computational statistical methods for social network models. *Journal of Computational and Graphical Statistics*, 21, 856–882. **Equal contributions. Invited.**
- (11) **Schweinberger, Michael** (2012). Statistical modeling of network panel data: goodness-of-fit. *British Journal of Mathematical and Statistical Psychology*, 65, 263–281.
- (10) **Schweinberger, Michael** (2011). Instability, sensitivity, and degeneracy of discrete exponential families. *Journal of the American Statistical Association, Theory & Methods*, 106, 1361–1370.
- (9) Lospinoso*, Joshua, **Schweinberger, Michael**, Snijders, Tom A.B., and Ruth Ripley (2011). Assessing and accounting for time heterogeneity in stochastic actor oriented models. *Advances in Data Analysis and Classification*, 5, 147–176.
- (8) Snijders, Tom A.B., Koskinen, Johan, and **Michael Schweinberger** (2010). Maximum likelihood estimation for social network dynamics. *The Annals of Applied Statistics*, 4, 567–588.

- (7) **Schweinberger, Michael** and Tom A.B. Snijders (2007). Markov models for digraph panel data: Monte Carlo-based derivative estimation. *Computational Statistics and Data Analysis*, 51, 4465–4483.
- (6) Snijders, Tom A.B., Steglich, Christian E.G. and **Michael Schweinberger** (2007). Modeling the co-evolution of networks and behavior. In: Van Montfort, K., Oud, H. and A. Satorra (editors). Longitudinal models in the behavioral and related sciences. Mahwah, NJ: Lawrence Erlbaum.
- (5) **Schweinberger, Michael** (2007). Statistical Methods for Studying the Evolution of Networks and Behavior. Ph.D. thesis, University of Groningen, NL.
- (4) **Schweinberger, Michael** and Tom A.B. Snijders (2003). Settings in social networks: A measurement model. *Sociological Methodology*, 33, 307–341.

Preprints

- (3) **Schweinberger**, **Michael**, Krivitsky, Pavel N., and Carter T. Butts (2017). A note on the role of projectivity in likelihood-based inference for random graph models. The first two authors have made equal contributions.
- (2) Vu*, Duy Q. and **Michael Schweinberger** (2014). Model-based clustering of large random graphs with high-dimensional predictors.
- (1) **Schweinberger, Michael** and Tom A.B. Snijders (2007). Random effects models for digraph panel data.