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 semiparametric 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.