

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

Stewart*, Jonathan R. and **Michael Schweinberger** (2021). Pseudo-likelihood-based M -estimation of random graphs with dependent edges and parameter vectors of increasing dimension. Submitted.

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](#).

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.

Selected papers: Large-scale learning from dependent and high-dimensional 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, 165, 1–20.

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.

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. **These methods are the default methods for approximating standard errors, score-type tests, and t -type tests in the (R)Siena software (\gg 145,000 downloads). The (R)Siena manuals have been cited more than 900 times based on Google Scholar.**

Schweinberger, Michael and Tom A.B. Snijders (2003). Settings in social networks: A measurement model. *Sociological Methodology*, 33, 307–341. **One of the first two latent space models for network data.**

Selected papers: Applications in computational social science and other areas

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*, 1–35. [Detecting potential superspreaders.](#)

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. [Providing teachers with visual student-problem interaction maps, with a view to detecting students who need more support.](#)

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. [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 do terrorists 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?](#)

Preprints

Past and present students funded by me are indicated by *. Students funded by collaborators and others are indicated by **.

Stewart*, Jonathan R. and **Michael Schweinberger**. Pseudo-likelihood-based M -estimation of random graphs with dependent edges and parameter vectors of increasing dimension. Submitted.

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. Submitted.

Jeon, Minjeong, **Schweinberger, Michael**, Baugh**, Samuel, and Eric Ho**. *Student learning through learning progression maps, with application to online educational assessment data*. To be submitted.

Sean Eli* and **Michael Schweinberger**. *A note on non-asymptotic model selection for network models with parameter vectors of increasing dimension*. Submitted.

With Johannes Lederer. *Scalable model selection with a single observation of dependent random variables: pseudolikelihood-based Dantzig selectors*.

With Johathan R. Stewart*. *Composite likelihood in dependent-data problems with parameter vectors of increasing dimension*.

Publications

Past and present students funded by me are indicated by *. Students funded by collaborators and others are indicated by **.

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*, 1–35.

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*, 1–20.

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.**

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.**

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.

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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 (2020). Statistical inference for continuous-time Markov processes with block structure based on discrete-time network data. *Statistica Neerlandica*, 74, 342–362.

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.**

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.

Schweinberger, Michael and Pamela Luna** (2018). hergm: Hierarchical exponential-family random graph models. *Journal of Statistical Software*, 85, 1–39.

Cao**, Ming, Chen, Yong, Fujimoto, Kayo, and **Michael Schweinberger** (2018). A two-stage working model strategy for network analysis under hierarchical exponential ran-

dom graph models. *Proceedings of the 2018 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, 290–298. **Acceptance rate: 15%.**

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, 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.

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.**

Schweinberger, Michael (2012). Statistical modeling of network panel data: goodness-of-fit. *British Journal of Mathematical and Statistical Psychology*, 65, 263–281.

Schweinberger, Michael (2011). Instability, sensitivity, and degeneracy of discrete exponential families. *Journal of the American Statistical Association, Theory & Methods*, 106, 1361–1370.

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.

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.

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.

Schweinberger, Michael and Tom A.B. Snijders (2003). Settings in social networks: A measurement model. *Sociological Methodology*, 33, 307–341.

Other publications

- **Schweinberger, Michael** (2007). Statistical Methods for Studying the Evolution of Networks and Behavior. Ph.D. thesis, University of Groningen, NL.

Unpublished preprints

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.**

Vu**, Duy Q. and **Michael Schweinberger** (2014). Model-based clustering of large random graphs with high-dimensional predictors.

Schweinberger, Michael and Tom A.B. Snijders (2007). Random effects models for digraph panel data.