

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

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

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.