

PAVEL N. KRIVITSKY
LECTURER IN STATISTICS
SCHOOL OF MATHEMATICS AND STATISTICS
UNIVERSITY OF NEW SOUTH WALES
AUSTRALIA
p.krivitsky@unsw.edu.au
www.krivitsky.net/research

The Red Centre, Centre Wing
Room 1032
Kensington Campus
UNSW Sydney, NSW 2052
+61 (2) 9385 7022

Education

- '03-'09 **PhD in Statistics**
University of Washington, Seattle, WA, USA
Thesis: Statistical Models for Social Network Data and Processes
Advisor: Mark S. Handcock
- '03-'06 **MS in Statistics**
University of Washington, Seattle, WA, USA
Advisors: Adrian E. Raftery and Mark S. Handcock
- '99-'03 **BS in Biometry and Statistics, Cum Laude with Distinction in Research**
Cornell University, Ithaca, NY, USA
Thesis: The Effect of Integration Cell Size and *In Situ* Target Strength Calculation Method on Acoustic Fish Density Estimates for Alewife Lakes of New York State
Advisors: Steven J. Schwager and Lars G. Rudstam

Positions

- 7/'19- **Lecturer (Assistant/Associate Professor) in Statistics** at University of New South Wales School of Mathematics and Statistics, Sydney, NSW, Australia
- 7/'13-7/'19 **Lecturer (Assistant/Associate Professor) in Statistics** at University of Wollongong School of Mathematics and Applied Statistics and National Institute for Applied Statistics Research Australia (NIASRA), Wollongong, NSW, Australia
Confirmed (Tenured): 5/'16
- 9/'11-6/'13 **Research Associate** at Pennsylvania State University Department of Statistics, University Park, PA, USA
Topic: Modelling of social networks; statistical computing
Principal Investigator: David R. Hunter
- 9/'09-8/'11 **Visiting Research Scientist** at Carnegie Mellon University iLab at Heinz College and Department of Statistics; and Instituto Superior Técnico Institute for Systems and Robotics, Pittsburgh, PA, USA; and Lisbon, Portugal
Topic: Modelling of social networks, particularly dynamic networks and telecommunications networks; analysis of mobile phone network data
Principal Investigator: Pedro M. A. Ferreira

Publications

Under Review **Foundations of Finite-, Super-, and Infinite-Population Random Graph Inference** (Michael Schweinberger, Pavel N. Krivitsky, and Carter T. Butts). July 2017. <https://arxiv.org/abs/1707.04800>

Investigating Foreign Portfolio Investment Holdings: Gravity Model with Social Network Analysis (Luke Mazur, Thomas Suesse, and Pavel N. Krivitsky). September 2015. <http://niasra.uow.edu.au/workingpapers/UOW205811.html>

Modeling Network Data From Subjective Ratings (Francis Lee, Pavel N. Krivitsky, and Carter T. Butts). May 2019.

Fitting Marginalized Exponential Random Graph Models via GEE (Thomas Suesse, Pavel N. Krivitsky, and Olivier Thas). June 2019.

Impact of Egocentric Survey Design on Estimable Network Features (Pavel N. Krivitsky, Michał Bojanowski, Martina Morris). July 2019.

Peer-Reviewed

Journal **Exponential-Family Random Graph Models for Rank-Order Relational Data** (Pavel N. Krivitsky and Carter T. Butts). *Sociological Methodology*, 47(1):68–112, 2017. doi:10.1177/0081175017692623

Inference for Social Network Models from Egocentrically-Sampled Data, with Application to Understanding Persistent Racial Disparities in HIV Prevalence in the US (Pavel N. Krivitsky and Martina Morris). *Annals of Applied Statistics*, 11(1):427–455, 2017. doi: <http://dx.doi.org/10.1214/16-AOAS1010>

Using Contrastive Divergence to Seed Monte Carlo MLE for Exponential-Family Random Graph Models (Pavel N. Krivitsky). *Computational Statistics and Data Analysis*, 107:149–161, March 2017. doi:10.1016/j.csda.2016.10.015

Sharing Social Network Data: Differentially Private Estimation of Exponential-Family Random Graph Models (Vishesh Karwa, Pavel N. Krivitsky, and Aleksandra B. Slavković). *Journal of the Royal Statistical Society, Series C*, 66(3):481–500, 2017. doi:10.1111/rssc.12185

Capturing Multivariate Spatial Dependence: Model, Estimate, and then Predict (Discussion Paper) (Noel Cressie, Sandy Burden, Walter Davis, Pavel N. Krivitsky, Payam Mokhtarian, Thomas Suesse, and Andrew Zammit-Mangion). *Statistical Science*, 30(2):170–175, May 2015. doi:10.1214/15-STS517

On the Question of Effective Sample Size in Network Modeling: An Asymptotic Inquiry (Pavel N. Krivitsky and Eric D. Kolaczyk). *Statistical Science*, 30(2):184–198, May 2015. doi:10.1214/14-STS502

An Approximation Method for Improving Dynamic Network Model Fitting (Nicole Bohme Carnegie, Pavel N. Krivitsky, David R. Hunter,

and Steven M. Goodreau). *Journal of Computational and Graphical Statistics*, 24(2):502–519, 2015. doi:10.1080/10618600.2014.903087

A Separable Model for Dynamic Networks (Pavel N. Krivitsky and Mark S. Handcock). *Journal of the Royal Statistical Society, Series B*, 76(1):29–46, January 2014. doi:10.1111/rssb.12014

Computational Statistical Methods for Social Network Models (Invited Paper) (David R. Hunter, Pavel N. Krivitsky, and Michael Schweinberger). *Journal of Computational and Graphical Statistics*, 21(4):856–882, 2012. doi:10.1080/10618600.2012.732921

Exponential-Family Random Graph Models for Valued Networks (Pavel N. Krivitsky). *Electronic Journal of Statistics*, 6:1100–1128, June 2012. doi:10.1214/12-EJS696

Adjusting for Network Size and Composition Effects in Exponential-Family Random Graph Models (Pavel N. Krivitsky, Mark S. Handcock, and Martina Morris). *Statistical Methodology*, 8(4):319–339, July 2011. doi:10.1016/j.stamet.2011.01.005

Representing Degree Distributions, Clustering, and Homophily in Social Networks with Latent Cluster Random Effects Models (Pavel N. Krivitsky, Mark S. Handcock, Adrian E. Raftery, and Peter D. Hoff). *Social Networks*, 31(3):204–213, July 2009. doi:10.1016/j.socnet.2009.04.001

Fitting Position Latent Cluster Models for Social Networks with `latentnet` (Pavel N. Krivitsky and Mark S. Handcock). *Journal of Statistical Software*, 24(5):1–23, May 2008. <http://www.jstatsoft.org/v24/i05>

Proceedings **Quantifying Protection Level of a Noise Candidate for Noise Multiplication Masking Scheme** (Yue Ma, Yan-Xia Lin, Pavel N. Krivitsky, and Bradley Wakefield). *Privacy in Statistical Databases: Lecture Notes in Computer Science*, 11126:279–293, September 2018. doi:10.1007/978-3-319-99771-1_19

Reviewing the Methods of Estimating the Density Function Based on Masked Data (Yan-Xia Lin and Pavel N. Krivitsky). *Privacy in Statistical Databases: Lecture Notes in Computer Science*, 11126:231–246, September 2018. doi:10.1007/978-3-319-99771-1_16

Differentially Private Exponential Random Graphs (Vishesh Karwa, Aleksandra Slavković, and Pavel N. Krivitsky). *Privacy in Statistical Databases: Lecture Notes in Computer Science* (J. Domingo-Ferrer (ed.)), 8744:143–155, 2014. doi:10.1007/978-3-319-11257-2_12

Network Neighbor Effects on Customer Churn in Cell Phone Networks (Pavel N. Krivitsky, Pedro M. A. Ferreira, and Rahul Telang). *Proceedings of the 7th Symposium on Statistical Challenges in E-Commerce Research (SCECR 2011)*, 2011. <http://ro.uow.edu.au/eispapers/4505/>

Estimating the Integrated Likelihood via Posterior Simulation Using the Harmonic Mean Identity (Adrian E. Raftery, Michael A. Newton, Jaya M. Satagopan, and Pavel N. Krivitsky). *Bayesian Statistics 8: Proceedings of the Eighth Valencia International Meeting* (J. M. Bernardo, M.J. Bayarri, J. O. Berger, A. P. Dawid, D. Heckerman, A. F. M. Smith, and M. West (eds.)), 8:371–416, 2007. <http://www.bepress.com/mskccbiostat/paper6>

Other **Inference for Exponential-Family Random Graph Models from Egocentrically-Sampled Data with Alter–Alter Relations** (Pavel N. Krivitsky, Michał Bojanowski, and Martina Morris). *University of Wollongong National Institute for Applied Statistics Research Australia Working Paper*, 08-19, July 2019. <https://niasra.uow.edu.au/workingpapers/UOW255140.html>

A note on the role of projectivity in likelihood-based inference for random graph models (Michael Schweinberger, Pavel N. Krivitsky, and Carter T. Butts). July 2017. <https://arxiv.org/abs/1707.00211>

Modeling of Dynamic Networks based on Egocentric Data with Durational Information (Pavel N. Krivitsky). *Pennsylvania State University Department of Statistics Technical Report*, TR12-01, April 2012. http://stat.psu.edu/research/technical-reports/copy2_of_2012-technical-reports

Modeling Tie Duration in ERGM-Based Dynamic Network Models (Pavel N. Krivitsky). *Pennsylvania State University Department of Statistics Technical Report*, TR12-02, April 2012. http://stat.psu.edu/research/technical-reports/copy2_of_2012-technical-reports

Teaching

Semester Courses

University of Wollongong

'19 MATH100: Introduction to Mathematics

'14–'16, '18–'19 STAT 902: Advanced Data Analysis

'13–'18 STAT 251: Fundamentals of Biostatistics

'14,'17–'18 STAT 903: Model-Based Survey Design and Analysis

'16 INFO 411/911: Data Mining

'14–'15 STAT 131: Understanding Variation and Uncertainty

'14 MATH 131: Mathematics for Primary School Teachers

External Workshops and Tutorials

International Network for Social Network Analysis Annual Conference: Sunbelt

'09–'16, '18 Exponential-family Random Graph (ERG or p*) Modeling with `statnet`

Extending ERGM Functionality within `statnet`: Building Custom User Terms

STERGM—Separable Temporal ERGMs for Modeling discrete relational dynamics with **statnet**

Latent variable network Modeling with **latentnet**

Introduction to Egocentric Network Analysis with ERGMs in **statnet**

Valued Network Modeling with **statnet**

with Martina Morris, Mark S. Handcock, Steven M. Goodreau, Skye Bender-deMoll, Carter T. Butts, David R. Hunter, and others

StatsWeek@UOW

4–5/2/'16 Social Network Analysis with **statnet** with Martina Morris

Supervision

PhD

'16– **Yue Ma** (co-supervisor, with Yan-Xia Lin primary)

'16– **Victoria Leaver** (part-time) (primary, with Robert Clark and Carole Birrell)

MS

'15–'18 **Georgina Davies** (part-time) (co-supervisor, with Noel Cressie primary)

Honours

'19– **Samuel Brown** (primary, with James Ng)

'18 **Aidan Mison** (primary)

'15 **Luke Mazur** (equal co-supervisor, with Thomas Suesse)

Grants

NIH: US National Institutes of Health

EIS: University of Wollongong Faculty of Engineering and Information Sciences

Successful

'18–'22 **Co-Investigator** on NIH Grant R01AI138783

Title: “EpiModel 2.0: Integrated Network Models for HIV/STI Prevention Science”

Principal Investigator: Samuel M. Jenness

Co-Investigators: Kimberly Workowski, Patrick Sullivan, Gregory Phillips II, Brian Mustanski, Michelle Birkett, Patrick Janulis, Martina Morris, Steven Goodreau, Deven Hamilton, Karen Kuntz, and Eva Enns

Amount: 2,974,839 USD

'18 **Awardee** on EIS Strategic Investment Grant

Amount: 10,000 AUD

'11–'16 **Co-Investigator** on NIH Grant R01HD68395

Title: “Statistical Methods for Network Epidemiology”

Principal Investigator: Martina Morris
Co-Investigators: Steven M. Goodreau, David R. Hunter, Carter T. Butts,
and Skye Bender-deMoll
Amount: 3,040,740 USD

Pending

- '19 **Co-Principal Investigator** on US Army Research Office Grant
Title: “Covert Networks: How to Learn as much as Possible About the
Structure of a Network from Sampled Subnetworks”
Principal Investigator: Michael Schweinberger
Co-Investigator: Johan Koskinen

Awards and Honours

- '19 **Freeman Award** by *International Network for Social Network Analysis*
for significant contributions to the scientific study of social structure by a
young investigator
- '19 **Richards Award** by *International Network for Social Network Analysis*
for Development of **Statnet** Social Network Analysis Software (with
Martina Morris, Mark Handcock, David Hunter, Steven Goodreau, and
Skye Bender-deMoll)

Presentations

Invited

(* — travel funded by organisers)

- 16/7/'19 * **Inference for Network Models based on Egocentrically-Sampled Data.** Invited presentation at *International Society for Clinical Biostatistics Annual Conference*, Leuven, Belgium
- 21/3/'19 * **Inference for Network Models based on Egocentrically-Sampled Data.** Invited presentation at *Joint Statistical Meeting of the German Statistical Societies*, Munich, Germany
- 5/1/'18 * **Exponential-Family Random Graph Models for Multi-Layer Networks** with Christopher S. Marcum and Laura Koehly. Invited presentation at *Next Generation Network Analytics Meeting at University College London*, London, UK
- 17/12/'16 * **Inference for Exponential-Family Random Graph Models and Their Dynamic Extensions from Egocentrically-Sampled Data** with Martina Morris and others. Invited paper at *Isaac Newton Institute Workshop on Dynamic Networks*, Cambridge, UK
- 1/8/'11 **A Separable Model for Dynamic Networks** with Mark S. Handcock. Invited paper at *American Statistical Association Joint Statistical Meeting*, Miami Beach, FL, USA
- 16/6/'11 **Latent Space Cluster Models for Social Networks.** Invited paper at *Classification Society Annual Meeting*, Pittsburgh, PA, USA

- 11/1/'11 **A Separable Model for Dynamic Networks** with Mark S. Handcock. Invited presentation at *SAMSI Complex Networks Modeling Workshop*, Research Triangle Park, NC, USA

Refereed

- 3/12/'15 **Inference and Simulation for Dynamic Network Models from Egocentrically Sampled Data.** Contributed paper to *MODSIM 2015: 21st International Congress on Modelling and Simulation*, Gold Coast, QLD, Australia
- 7/12/'12 **Fitting Dynamic Network Models to Static Network Data.** Poster presentation at *Neural Information Processing Systems Conference, Workshop on Algorithmic and Statistical Approaches for Large Social Networks*, Lake Tahoe, NV, USA
- 10/6/'11 **Network Neighbor Effects on Customer Churn in Cell Phone Networks** with Pedro M. A. Ferreira (presenter), Rahul Telang. Contributed paper to *Seventh Symposium on Statistical Challenges in Electronic Commerce Research (SCECR 2011)*, Rio de Janeiro, RJ, Brazil
- 12/12/'08 **Adjusting for Network Size and Composition Effects in Exponential Family Random Graph Models** with Mark S. Handcock and Martina Morris. Poster presentation at *Neural Information Processing Systems Conference, Workshop on Analyzing Graphs*, Whistler, BC, Canada

Recent External Seminar

- 22/2/'19 The University of Sydney, Sydney, NSW, Australia
- 29/11/'18 Australian National University, Canberra, ACT, Australia
- 17/8/'18 The University of Sydney, Sydney, NSW, Australia
- 5/7/'18 ETH Zurich, Zurich, Switzerland
- 15/5/'18 Kirby Institute, University of New South Wales, Sydney, NSW, Australia
- 10/1/'18 University of Groningen, Groningen, Netherlands
- 8/1/'18 Hasselt University, Hasselt, Belgium
- 1/11/'17 NIASRA Fellows Meeting, Goulburn, NSW, Australia
- 29/3/'17 University of Washington, Seattle, Seattle, WA, USA
- 2/2/'17 University of California, Irvine, Irvine, CA, USA
- 9/6/'16 Australian National University, Canberra, ACT, Australia
- 2/4/'15 University of New South Wales, Sydney, NSW, Australia
- 26/11/'15 NIASRA Fellows Meeting, Goulburn, NSW, Australia

Other Recent

- 20/6/'19 **Representativeness and Generalisability of Inference for Exponential-Family Random Graph Models from Samples of Networks** with Pietro Coletti and Neil Hens. Presentation at *International Network for Social Network Analysis Annual Conference: Sunbelt XXXIX*, Montreal, QC, Canada

- 28/11/'18 **Representativeness and Generalisability of Inference for Exponential-Family Random Graph Models from Samples of Networks** with Pietro Coletti and Neil Hens. Presentation at *3rd Australian Social Network Analysis Conference*, Canberra, ACT, Australia
- 30/6/'18 **Exponential-Family Random Graph Models for Many-Layer Networks** with Christopher S. Marcum and Laura Koehly. Presentation at *International Network for Social Network Analysis Annual Conference: Sunbelt XXXVIII*, Utrecht, Netherlands
- 29/11/'17 **Exponential-Family Random Graph Models for Multilayer Networks** with Christopher S. Marcum and Laura Koehly. Presentation at *2nd Australian Social Network Analysis Conference*, Sydney, NSW, Australia
- 17/11/'16 **Estimation of Exponential-Family Random Graph Mixed Models with Dyadic Dependence: Combining MCMC with Analytic Approximation.** Presentation at *1st Annual Australian Social Network Analysis Conference*, Hawthorn, VA, Australia
- 8/4/'16 **Estimation of Exponential-Family Random Graph Mixed Models With Dyadic Dependence.** Presentation at *International Network for Social Network Analysis Annual Conference: Sunbelt XXXVI*, Newport Beach, CA, USA
- 28/6/'15 **Quantifying Uncertainty in Dynamic Network Models Fit to Egocentrically Sampled Data.** Presentation at *International Network for Social Network Analysis Annual Conference: Sunbelt XXXV*, Brighton, UK

Administration

- '16-'19 **Statistician** on the University of Wollongong Animal Ethics Committee.
- '18 **Member** of the School of Mathematics and Applied Statistics Research Committee.
Member of the School of Mathematics and Applied Statistics Statistical Science Lecture Committee.
- '17 **Academic Program Director** of the Bachelor of Medical Mathematics Program.
- '16 **Academic Program Director** of the Masters in Statistics Program.
Chair of the School of Mathematics and Applied Statistics Awards Committee.
Member of the School of Mathematics and Applied Statistics Internationalisation Committee.
- '14-'16 **Member** of the School of Mathematics and Applied Statistics Computing Committee.
Seminar Convener for the National Institute for Applied Statistics Research Australia.

Service

Software

- Statnet Project** an open-source project to develop a suite of R packages for analysis and statistical Modeling of network data
<http://www.statnet.org>
Contributor since 2007; Core developer since 2008
- ergm** an R package in the statnet suite for fitting, visualization, and diagnosing of exponential random graph models (ERGMs)
<http://cran.r-project.org/package=ergm>
Contributor since 2007; Core developer since 2008; Maintainer since 2012
- tergm** an R package in the statnet suite for fitting, visualization, and diagnosing of dynamic network models based on ERGMs
<http://cran.r-project.org/package=tergm>
Creator and maintainer since 2012
- ergm.count** an R package in the statnet suite extending ergm to fit and simulate ERGMs for networks of counts
<http://cran.r-project.org/package=ergm.count>
Creator and maintainer since 2012
- ergm.rank** an R package in the statnet suite extending ergm to fit and simulate ERGMs for networks of ranks
<http://cran.r-project.org/package=ergm.rank>
Creator and maintainer since 2016
- ergm.ego** an R package in the statnet suite extending ergm to fit and simulate ERGMs for egocentrically sampled data
<http://cran.r-project.org/package=ergm.ego>
Creator and maintainer since 2016
- latentnet** an R package in the statnet suite for fitting latent space and latent cluster models to binary and weighted networks
<http://cran.r-project.org/package=latentnet>
Core developer and maintainer since 2005
- networkDynamic** an R package in the statnet suite for storing and processing dynamic network data
<http://cran.r-project.org/package=networkDynamic>
Contributor since 2012
- Yet Another Bayes's Rule Applet** an interactive Java applet illustrating the Bayes's Rule
<http://www.krivitsky.net/teaching/BayesRule.html>
Creator and maintainer since 2012

Organisational

'19 **Chair** of the International Network for Social Network Analysis Best Student Paper Award Committee.

Co-Organiser and Chair of the International Network for Social Network Analysis Sunbelt Conference Session on Inference and Generalisability in Modelling Samples of Networks and Multi-Level Networks.

Co-Organiser and Co-Chair of the International Network for Social Network Analysis European Social Networks Conference (EUSN) Session on Inference and Generalisability in Modelling Samples of Networks and Multi-Level Networks.

'12 **Co-Organiser and Co-Chair** of the 2012 Neural Information Processing Systems Workshop on Algorithmic and Statistical Approaches for Large Social Networks.

Peer Review

'18 for *Computational Statistics, Annals of Applied Statistics, Computational Statistics and Data Analysis, Annals of Statistics, Electronic Journal of Statistics, Bernoulli, Statistical Science*, Swiss National Science Foundation (Grant).

'17 for *Statistical Science, Journal of the American Statistical Association, Journal of the Royal Statistical Society Series B, Journal of Selected Topics in Signal Processing, Computational Statistics, Annals of Applied Statistics*.

'16 for *Science, Journal of Statistical Software, Journal of the American Statistical Association, Journal of the Royal Statistical Society Series B*.

'15 for *Journal of Statistical Software, Social Networks, Sociological Methodology, Annals of Applied Statistics, Computational Statistics and Data Analysis, Journal of the Royal Statistical Society Series B*, Swiss National Science Foundation (Grant).

'14 for Health Research Council of New Zealand (Grant), *Journal of Computational and Graphical Statistics, Journal of Statistical Software, Annals of Applied Statistics*.

'08–'13 for *Social Networks, Annals of Applied Statistics, Journal of the American Statistical Association, IMS Electronic Journal of Statistics, Journal of Mathematical Psychology, Science, Sociological Methodology, Annals of Statistics, Journal of Statistical Theory and Practice, Statistica Sinica, Journal of Computational and Graphical Statistics*.

Memberships and Certifications

Memberships **International Network for Social Network Analysis**

Member since February 2009

Australian Network for Social Network Analysis

Founding member since November 2016

American Statistical Association

Member since July 2007

Certifications **Society of Actuaries/Casualty Actuarial Society**
Passed Level 1 Exam in June 2002

Other Information

Citizenship **United States of America**
Naturalised in 2000

Languages **Russian** (native speaker)
English (native-level)
French (some competence)
Japanese (some competence)

Programming R, PYTHON, C, C++, JAVA, SQL (MySQL, PosgreSQL, and Oracle),
S-PLUS, MATLAB

Software *WinBUGS, JAGS, SAS, MINITAB, DataDesk, SPSS*