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## ERIC D. KOLACZYK

### Curriculum Vitae

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Boston University  
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### EDUCATION

1994	Ph.D.	Statistics, Stanford University, Stanford, CA
1992	M.S.	Statistics, Stanford University, Stanford, CA
1990	B.S.	Mathematics, The University of Chicago, Chicago, IL

### ACADEMIC POSITIONS

#### Primary

2018 – present	Data Science Faculty Fellow, Boston University
2015 – present	Founding Director, MS in Statistical Practice (MSSP) program Department of Mathematics and Statistics, Boston University
2009 – present	Professor, Department of Mathematics and Statistics, Boston University
2002 – present	Director, Program in Statistics Department of Mathematics and Statistics, Boston University
2003 – 2009	Associate Professor (with tenure). Department of Mathematics and Statistics, Boston University
1998 – 2003	Assistant Professor, Department of Mathematics and Statistics, Boston University
1994 – 1998	Assistant Professor, Department of Statistics, The University of Chicago

#### Visiting

2011- present	Visiting Professor, ENSAE, Paris, France. [Teaching one course per year.]
Fall 2011	Visiting Professor, l'Université d'Evry, France.
Spring 2005	Visiting Associate Professor, Department of Statistics, Harvard University
Fall 2004	Visiting Research Associate, LIAFA, l'Université Paris 7, France.
1997 – 1998	Visiting Assistant Professor, Department of Statistics, Harvard University

#### Affiliations

2011 – present	Member, Program in Neuroscience, Boston University
2008 – present	Member, Division of Systems Engineering, Boston University
2005 – present	Member, Program in Bioinformatics, Boston University

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2004 – present Member, Center for Information & Systems Engineering, Boston University

## **AWARDS and HONORS**

2017 Fellow (Elected), American Assoc. for the Advancement of Science (AAAS)  
2017 Fellow (Elected), Institute of Mathematical Statistics (IMS)  
2012 Gordon C. Ashton Memorial Lecturer, Biomathematics & Biostatistics  
Symposium, University of Guelph  
2011 Fellow (Elected), American Statistical Association (ASA)  
2011 Member (Elected), International Statistical Institute (ISI)  
2006 Senior Member (Elected), Inst. of Electronics and Electrical Engineers (IEEE)  
1996 Project Kaleidoscope Faculty for the 21<sup>st</sup> Century  
1993 Stanford University Centennial Teaching Assistant Award  
1990 Sigma Xi, Associate Member  
1990 Mulvaney Scholar Athlete, The University of Chicago  
1988-90 University of Chicago Stagg Scholarship

2012 ACM SIGKDD Best Student Paper Award (Student: Qi Ding)

Keynote/Plenary speaker at various workshops. (See Invited Talks)

## **EDITORIAL RESPONSIBILITIES**

Associate Editor, *SIAM Journal on Mathematics of Data Science* (2018 – present)  
Associate Editor, *Journal of the Royal Statistical Society, Series B* (2015 – present)  
Associate Editor, *Network Science* (2012 – 2018)  
Associate Editor, *Journal of the American Statistical Association* (2010 – 2018)  
Associate Editor, *Statistics Surveys* (2008 -- 2018).  
Associate Editor, *IEEE Transactions on Network Science & Engineering* (2014 – 2017)  
Associate Editor, *Electronic Journal of Statistics* (2010 – 2015)  
Associate Editor, *IEEE Transactions on Image Processing* (2007 – 2009).

Guest Editor, *Proceedings of the National Academy of Sciences*, 2013

## **RESEARCH GRANTS**

(Currently (Co)PI on active awards totaling over \$2.2M. )

2018 – 2021 Army Research Office grant, “Statistical Methods for Percolation in Practice: Random Graph Hidden Markov Models.” (Kolaczyk (PI); \$360,000)  
2018 – 2019 DARPA grant, “High-throughout Chemistry Platform (HTCP) for Reaction Screening.” (Beeler (PI), Kolaczyk (CoPI), Portco, Schaus; \$972,008)  
2015 – 2018 National Institutes of Health grant, “Dynamic network analysis of human seizures: Towards targeted therapeutic intervention.” (Kolaczyk (PI), Kramer, Cash; \$950,217)

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- 2015 – 2018 Army Research Office grant, “Statistical Foundations for Analyzing Large Collections of Network-Data Objects.” (Kolaczyk (PI), Lin, Rosenberg; \$330,000)
- 2014 – 2016 National Science Foundation EAGER grant, “Initiative for Physics and Mathematics of Neural Systems.” (Hasselmo (PI), Howard, Kolaczyk (CoI), Rosene, Stanley; \$300,000)
- 2014 – 2017 National Science Foundation grant, “Boston University / Keio University Workshops.” (Devaney, Kolaczyk (CoPI), Li, Rosenberg (PI); \$30,000)
- 2012 – 2017 Air Force Office of Scientific Research award, “Statistical Foundations for Measurement-based System Verification in Complex Networks.” (Kolaczyk (PI); \$1,142,505)
- 2012 – 2015 National Institutes of Health grant, “Multi-cohort, Network-guided Regression for GE/GG Interactions in Disease Traits.” (Dupuis, Kolaczyk (PI); \$450,029)
- 2012 – 2015 National Institutes of Health grant, “Common Genetic Variation and Quantitative Diabetes Traits.” (BU Subaward: Dupuis (PI), Kolaczyk (CoI), & others; \$375,000 for BU subcontract)
- 2009 – 2014 National Science Foundation grant, “Wide-Aperture Traffic Analysis for Internet Security.” (Crovella (PI), Kolaczyk (CoPI), Barford; \$723,053)
- 2009 – 2012 Office of Naval Research grant, “Statistical Propagation of Low-Level Uncertainty to High-Level Knowledge and Decision-Making in Network Information Environments.” (Kolaczyk (PI); \$721,819)
- 2006 – 2011 National Institutes of Health grant, “Predicting Drug Mechanism via Chemo-genomic Profiling and Sparse Simultaneous Equation Models of Gene Regulation.” (Kolaczyk (PI), Schaus; \$1,000,081)
- 2005 – 2008 Office of Naval Research award, “Statistical Aspects of Information Integration in Net-Centric Environments.” (Kolaczyk (PI); \$236,946)
- 2003 – 2007 National Science Foundation grant, “Complexity of Spatial and Categorical Scale in Landcover Characterization: A Statistical and Computational Framework.” (Gopal, Kolaczyk (PI), Skekhar; \$535,914)
- 2003 – 2009 National Science Foundation grant, “Modular Strategies for Internetwork Monitoring.” (BU Sub-award: Kolaczyk (PI), Crovella; 7 (co)PIs at UMich, UWisc, and BU. \$618,030 for BU subcontract)
- 2003 – 2006 Office of Naval Research Grant, “A Multiscale Framework for Whole-Network Information Superiority: Representation, Analysis, and Inference.” (Kolaczyk (PI); \$248,357)
- 2003 National Science Foundation grant, “REU Supplement to A Multiscale Framework for Spatial Modeling in Geograph.” (Gopal, Kolaczyk (PI); \$12,000)
- 2000 – 2003 National Science Foundation grant, “A Multiscale Framework for Spatial Modeling in Geography.” (Gopal, Kolaczyk (PI); \$249,410)

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1999 – 2002 Office of Naval Research grant, “Towards a Class of Multi-granular Models.”  
(Kolaczyk (PI); \$227,334)

## **PUBLICATIONS**

### **Books**

Kolaczyk, E.D. (2017). *Topics at the Frontier of Statistics and Network Analysis: (Re)visiting the Foundations*. Cambridge University Press (Elements). Cambridge, UK.

Kolaczyk, E.D. and Csardi, G. (2014). *Statistical Analysis of Network Data with R*. Springer, New York.

Kolaczyk, E.D. (2009). *Statistical Analysis of Network Data: Methods and Models*. Springer, New York.

### **Peer-reviewed Journal Articles**

#### **Methodology**

Gan, H.L. and Kolaczyk, E.D. (2018). Approximation of the difference of two Poisson-like counts by Skellam. *Journal of Applied Probability*, 55(2), 416 – 430.

Griffin, P.J., Johnson, W.E., and Kolaczyk, E.D. (2018). Detection of multiple perturbations in multi-omics biological networks. *Biometrics*, yy, xxx-xxx.

Ginestet, C., Liu, J., Balachandran, P., Rosenberg, S., and Kolaczyk, E.D. (2017). Hypothesis testing for network data in functional neuroimaging. *Annals of Applied Statistics*, 11(2), 725-750.

Balachandran, P., Kolaczyk, E.D., and Viles, W. (2017). On the propagation of low-rate measurement error to subgraph counts in large networks. *Journal of Machine Learning Research*, 18(61):1 - 33.

Lu, C., O’Connor, G.T., Dupuis, J., and Kolaczyk, E.D. (2016). Meta-analysis for penalized regression methods with multi-cohort Genome-wide Association Studies. *Human Heredity*, 81, 142-149.

Viles, W., Ginestet, C.E., Tang, A., Kramer, M.A., and Kolaczyk, E.D. (2016). Percolation under noise: Detecting explosive percolation using the second-largest component. *Physical Review E*, DOI: 10.1103/PhysRevE.93.052301.

Pham, L.M., Carvalho, L., Schaus, S., and Kolaczyk, E.D. (2016). Perturbation detection through modeling of gene expression on a latent biological pathway network: a Bayesian hierarchical approach. *Journal of the American Statistical Association*, 111, 73-92.

Li, Y., O’Connor, G.T., Dupuis, J., and Kolaczyk, E. (2015). Modeling gene-covariate interactions in sparse regression with group structure for genome-wide association studies. *Statistical Applications in Genetics and Molecular Biology* 14(3).

Zhang, Y., Kolaczyk, E.D., and Spencer, B.D. (2015). Estimating network degree distributions under sampling: an inverse problem, with applications to monitoring social media networks. *Annals of Applied Statistics*, 9(1), 166-199.

Krivitsky, P.N. and Kolaczyk, E.D. (2014). On the question of effective sample size in network modeling: an asymptotic inquiry. *Statistical Science*, 30(2), 184-198.

Christadore, L.M., Pham, L., Kolaczyk, E.D., and Schaus, S.E. (2014). Improvement of experimental testing and network training conditions with genome-wide microarrays for more accurate predictions of drug gene targets. *BMC Systems Biology*, 8:7.

Ding, Q. and Kolaczyk, E.D. (2013). A compressed PCA subspace method for anomaly detection in high-dimensional data. *IEEE Transactions on Information Theory*, 59(11), 7419-7433.

Lu, C., Latourelle, J., O'Connor, G.T., Dupuis, J., and Kolaczyk, E.D. (2013). Network-guided regression modeling for detection of gene-by-gene interactions. *Bioinformatics*, 29(10), 1241-1249.

Katenka, N. and Kolaczyk, E.D. (2012). Multi-attribute networks and the impact of partial information on inference and characterization. *Annals of Applied Statistics*, 6(3), 1068-1094.

Jiang, X. and Kolaczyk, E.D. (2012). A latent eigen-probit model with link uncertainty for prediction of protein-protein interactions. *Statistics in Biosciences – Special Issue on Networks*, 4:1, 84-104.

McCormick, T.H., He, R., Kolaczyk, E.D., and Zheng, T. (2012). Surveying hard-to-reach groups through sampled respondents in a social network: a comparison of two survey strategies. *Statistics in Biosciences – Special Issue on Networks*, 4:1, 177-195.

Ginestet, C.E., Simmons, A., and Kolaczyk, E.D. (2012). Weighted Fréchet means as convex combinations in metric spaces: Properties and generalized median inequalities. *Statistics and Probability Letters*, 82(10), 1859-1863.

Pham, L., Christadore, L., Schaus, S., and Kolaczyk, E.D. (2011). Network-based prediction for sources of transcriptional dysregulation using latent pathway identification analysis. *Proceedings of the National Academy of Sciences*, 108(32), 13347 - 13352.

Jiang, X., Gold, D.L., and Kolaczyk, E.D. (2010). Network-based auto-probit modeling for protein function prediction. *Biometrics*, 67(3), 958 - 966.

Cosgrove, E.J., Gardener, T.S., Kolaczyk, E.D. (2010). On the choice and number of microarrays for transcriptional regulatory network inference. *BMC Bioinformatics*, 11:454.

Di, J., and Kolaczyk, E.D. (2010). Complexity-penalized estimation of minimum volume sets for dependent data. *Journal of Multivariate Analysis*, 101(9), 1910-1926.

Yang, S. and Kolaczyk, E.D. (2010). Target detection via network filtering. *IEEE Transactions on Information Theory*, 56(5), 2502-2515.

Scott, C. and Kolaczyk, E.D. (2010). Nonparametric assessment of contamination in multivariate data using generalized quantile sets and FDR. *Journal of Computational and Graphical Statistics*, 19(2), 439-456.

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Kramer, M.A., Eden, U.T., Cash, S.S., and Kolaczyk, E.D. (2009). Network inference – with confidence – from multivariate time series. *Physical Review E*, 79, 061916.

Gandhi, V., Kang, J.M., Shekhar, S., Ju, J., Kolaczyk, E.D., and Gopal, S. (2009). Context-inclusive function evaluation: A case study with EM-based multi-scale multi-granular image classification. *Knowledge and Information Systems*, doi10.1007/s10115-009-0208-0.

Kolaczyk, E.D., Chua, D.B., and Barthelemy, M. (2009). Group-betweenness and cobetweenness: Inter-related notions of coalition centrality. *Social Networks*, 31:3, 190-203.

Cosgrove, E.J., Zhou, Y-C., Gardner, T.S., and Kolaczyk, E.D. (2008). Drug target prediction via Lasso regression analysis of mRNA expression compendia. *Bioinformatics*, 24(21):2482-2490.

Jiang, X., Steffen, M., Kasif, S., and Kolaczyk, E.D. (2008). Integration of relational and hierarchical network information for protein function prediction. *BMC Bioinformatics*, 9, 350.

Nariai, N., Kolaczyk, E.D., and Kasif, S. (2007). Probabilistic model for protein function prediction from multiple types of genome-wide data. *PLoS ONE*, 2:3, e337.

Viger, F., Barrat, A., Dall'Asta, L., Zhang, C-H., and Kolaczyk, E.D. (2007). What is the real size of a sampled network? The case of the Internet. *Physical Review E*, 75, 056111.

Chua, D.B., Kolaczyk, E.D., and Crovella, M. (2006). Network kriging. *IEEE Journal on Selected Areas in Communications, Special Issue on Sampling the Internet*, 24:12, 2263-2272.

Louie, M.M. and Kolaczyk, E.D. (2006). Multiscale detection of localized anomalous structure in aggregate disease incidence data. *Statistics in Medicine*, 25:5, 787-810.

Louie, M.M. and Kolaczyk, E.D. (2006). A multiscale method for disease mapping in spatial epidemiology. *Statistics in Medicine*, 25:8, 1287-1306.

Kolaczyk, E.D., Ju, J., and Gopal, S. (2005). Multiscale, multigranular statistical image segmentation. *Journal of the American Statistical Association*, 100, 1358-1369.

Ju, J., Gopal, S., and Kolaczyk, E.D. (2005). On the choice of spatial and categorical scale in remote sensing land cover characterization. *Remote Sensing of Environment*, 96:1, 62-77.

Kolaczyk, E.D. and Nowak, R.D. (2005). Multiscale generalized linear models for nonparametric function estimation. *Biometrika*, 92:1, 119-133.

Kolaczyk, E.D. and Nowak, R.D. (2004). Multiscale likelihood analysis and complexity penalized estimation. *Annals of Statistics*, 32, 500-527.

Louie, M.M. and Kolaczyk, E.D. (2004). On the covariance properties of certain multiscale spatial processes. *Statistics and Probability Letters*, 66:4, 407-416.

Kolaczyk, E.D. (2003). On the use of prior and posterior information in the sub-pixel proportion problem. *IEEE Transactions on Geoscience and Remote Sensing*, 41(11), 2687-2691.

Ju, J., Kolaczyk, E.D., and Gopal, S. (2002). Gaussian mixture discriminant analysis and sub-pixel land cover classification in remote sensing. *Remote Sensing of Environment*, 84(4), 550-560.

Morales, C.J. and Kolaczyk, E.D. (2002). Wavelets-based fractal analysis of human balance. *Annals of Biomedical Engineering*, 30, 588-597.

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- Kolaczyk, E.D. and Huang, H. (2001). Multiscale statistical models for hierarchical spatial aggregation. *Geographical Analysis*, 33:2, 95-118.
- Nowak, R.D. and Kolaczyk, E.D. (2000). A Bayesian multiscale framework for Poisson inverse problems. *IEEE Transactions on Information Theory*, 46:5, 1811-1825.
- Kolaczyk, E.D. and Dixon, D.D. (2000). Nonparametric estimation of intensity maps using Haar wavelets and Poisson noise characteristics. *The Astrophysical Journal*, 534:1, 490-505.
- Kolaczyk, E.D. (1999). Bayesian Multi-Scale Models for Poisson Processes. *Journal of the American Statistical Association*, 94, 920-933.
- Kolaczyk, E.D. (1998) Wavelet Shrinkage Estimation of Certain Poisson Intensity Signals Using Corrected Thresholds. *Statistica Sinica*, 9, 119-135.
- Chipman, H.A., Kolaczyk, E.D., and McCulloch, R.E. (1997) Adaptive Bayesian Wavelet Shrinkage. *Journal of the American Statistical Association*, 92, 1413-1421.
- Kolaczyk, E.D. (1997) Non-Parametric Estimation of Gamma-Ray Burst Intensities Using Haar Wavelets. *The Astrophysical Journal*, Vol. 483, 340-349.
- Kolaczyk, E.D. (1996) A Wavelet Shrinkage Approach to Tomographic Image Reconstruction. *Journal of the American Statistical Association*, 91, 1079-1090.
- Kolaczyk, E.D. (1994) Empirical Likelihood and Generalized Linear Models. *Statistica Sinica*, 4, 199-218.

### **Applications**

- Kramer, J., Helfrich, C., Levin, M., Hwang, I., Samuel, P., & Carralles, A., Schwartz, A., Goeva, A., & Kolaczyk, E. (2018). Initial evaluation of the effects of an environmental-focused problem-solving intervention for transition-age youth with developmental disabilities: Project TEAM. *Developmental Medicine and Child Neurology*, 60(8), 801-809.
- Hachigian, L.J., Carmona, V., Fenster, R.J., Kulicke, R., Heilbut, A., Sittler, A., Pereira de Almedia, L., Mesirov, J.P., Gao, F., Kolaczyk, E.D., and Heiman, M. (2017). Control of Huntington's disease-associated phenotypes by the striatum-enriched transcription factor Foxp2. *Cell Reports*, 21(10), 2688-2695.
- Zhang, S., Wei, J.S., Li, S.Q., Badgett, T.C., Song, Y.K., Agarwal, S., Coarfa, C., Tolman, C., Hurd, L., Liao, H., He, J., Wen, X., Liu, Z., Thiele, C.J., Westermann, F., Asgharzadeh, S., Seeger, R.C., Maris, J.M., Guidry Auvil, J.M., Smith, M.A., Kolaczyk, E.D., Shohet, J., Khan, J. (2016). MYCN controls an alternative RNA splicing program in high-risk metastatic neuroblastoma. *Cancer Letters*, 371(2), 214-224.
- Chen, B.H., Hivert, M-F., Peters, M.J., Pilling, L.C., Hogan, J.D., Pham, L.M., Harries, L.W., Fox, C.S., Bandinelli, S., Dehghan, A., Hernandez, D.G., Hofman, A., Hong, J., Joehanes, R., Johnson, A.D., Munson, P.J., Rybin, D.V., Singleton, A.B., Uitterlinden, A.G., Ying, S., MAGIC Investigators, Melzer, D., Levy, D., van Meurs, J.B.J., Perrucci, L., Florez, J.C., Dupuis, J., Meigs, J.B., and Kolaczyk, E.D. (2016). Peripheral blood transcriptomic signatures of fasting glucose and insulin concentrations. *Diabetes*, 65(12), 3794-3804.
- Sloas, D.C., Zhuo, R., Xue, H., Chambers, A.R., Kolaczyk, E., Polley, D.B., and Sen, K. (2016). Interactions across multiple stimulus dimensions in primary auditory cortex. *eNeuro*, DOI: 10.1523/ENEURO.0124-16.2016 .

Heiman, M., Heilbut, A., Francardo, V., Kulicke, R., Fenster, R.J., Kolaczyk, E.D., Mesirov, J.P., Surmeier, D.J., Cenci, M.A., and Greengard, P. (2014). Molecular adaptations of striatal spiny projection neurons during levodopa-induced dyskinesia. *Proceedings of the National Academy of Sciences*, doi:10.1073.

Hahm, H.C., Kolaczyk, E.D., Jang, J., Bhindarwala, A., and Swenson, T. (2012). Binge drinking trajectories from adolescence to young adulthood: the effects of peer social network. *Substance Use and Misuse*.

Hahm, H.C., Kolaczyk, E., Lee, Y., Jang, J., and Ng, L. (2012). Are Asian-American women who were maltreated as children at higher likelihood for HIV risk behaviors, depression, or suicidality? *Women's Health Issues*, 22(1), e35-e43.

Fast, E.M., Toomey, M.E., Panaram, K., Desjardins, D., Kolaczyk, E.D., and Frydman, H.M. (2011). *Wolbachia* enhance *Drosophila* stem cell proliferation and target the germline stem cell niche. *Science*, 334(6058), 990-992.

Kramer, M.A., Eden, U.T., LePage, K.Q., Kolaczyk, E.D., Bianchi, M.T., and Cash, S.S. (2011). Emergence of persistent networks in long-term intracranial EEG recordings. *Journal of Neuroscience*, 31(44), 15757 – 15767.

Kramer, M.A., Eden, U.T., Kolaczyk, E.D., Zepeda, R., Eskandar, E.N., Cash, S.S. (2010). Coalescence and fragmentation of cortical networks during focal seizures. *Journal of Neuroscience*, 30(30), 10076-10085.

Kramer, M.A., Kolaczyk, E.D., and Kirsch, H.E. (2008). Emergent network topology at seizure onset in humans. *Epilepsy Research*, 79, 173-186.

Dixon, D.D., Harmann, D.H., Kolaczyk, E.D., Samimi, J., Diehl, R., Kanbach, G., Mayer-Hasselwander, H., and Strong, A.W. (1998) Evidence for a gamma-ray halo. *New Astronomy*, 3:7, 539-561.

### **Peer-reviewed Conference Proceedings Papers and Abstracts**

Kang, X., Ganguly, A., and Kolaczyk, E.D. (2017). Dynamic networks with multi-scale temporal structure. *Proceedings of the 51<sup>st</sup> Asilomar Conference on Signals, Systems, and Computers*.

Ganguly, A., and Kolaczyk, E.D. (2017). Estimation of vertex degrees in a sampled network. *Proceedings of the 51<sup>st</sup> Asilomar Conference on Signals, Systems, and Computers*.

Zhang, Y., Lappas, T., Crovella, M., and Kolaczyk, E.D. (2014). Online ratings: convergence towards a positive perspective? *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*.

Yang, S., Pham, L., Christadore, L.M., Schaus, S.E., and Kolaczyk, E.D. (2013). Multiscale gene sets from protein interaction networks. *Proceedings of the IEEE GlobalSIP 2013*.

Ding, Q., Katenka, N., Barford, P., Kolaczyk, E.D., and Crovella, M. (2012). Intrusion as Anti(social) Communication: Characterization and Detection. In *Proceedings of the ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD) 2012. Beijing, China*. [Note: Winner of Best Student Paper Award.]



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Jiang, X., Nariyai, N., Steffen, M., Kasif, S., Gold, D., and Kolaczyk, E.D. (2008). Combining hierarchical inference in ontologies with heterogeneous data sources improves gene function prediction. *Proceedings of the IEEE International Conference on Bioinformatics and Biomedicine*.

Chhabra, P., Scott, C., Kolaczyk, E., Crovella, M. (2008). Distributed spatial anomaly detection. *Proceedings of the IEEE INFOCOM*, Phoenix, AZ.

Scott, C. and Kolaczyk, E.D. (2007). Annotated minimum volume sets for nonparametric anomaly discovery. *Proceedings of the IEEE Statistical Signal Processing Workshop*. Madison, WI.

Chua, D., Kolaczyk, E.D., and Crovella, M. (2005). A statistical framework for efficient estimation of end-to-end network properties. *Proceedings of the Sigmetrics 2005*.

Chua, D., Kolaczyk, E.D., and Crovella, M. (2005). Efficient estimation of end-to-end network properties. *Proceedings of the IEEE Infocom 2005*.

Lakhina, A., Papagiannaki, K., Crovella, M., Diot, C., Kolaczyk, E.D., and Taft, N. (2004). Structural analysis of network traffic flows. *Proceedings of the ACM Sigmetrics 2004*.

Crovella, M. and Kolaczyk, E.D. (2003). Graph wavelets for spatial traffic analysis. *Proceedings of the IEEE Infocom 2003*.

Nowak, R.D. and Kolaczyk, E.D. (2002). Multiscale maximum penalized likelihood. *Proceedings of the 2002 IEEE International Symposium on Information Theory*.

Ju, J., Kolaczyk, E.D., and Gopal, S. (2002). Gaussian mixture discriminant analysis and sub-pixel land cover classification in remote sensing. *Proceedings of the 34<sup>th</sup> Annual Conference on the Interface of Computing Science and Statistics*, Montreal, Canada.

Kolaczyk, E.D. and Nowak, R.D. (2000). Reconstruction in emission tomography via a Bayesian multiscale statistical framework. *Proceedings of 45<sup>th</sup> Annual SPIE Conference*, San Diego, CA.

Nowak, R.D., Kolaczyk, E.D., Lalush, D. and Tsui, B. (2000). A Bayesian multiscale framework for SPECT. *Proceedings of the IEEE Medical Imaging Conference*, Seattle, WA.

Nowak, R.D. and Kolaczyk, E.D. (1999). A Bayesian multiscale framework for Poisson inverse problems. *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing*.

Nowak, R.D. and Kolaczyk, E.D. (1999). Multiscale methods for Poisson inverse problems. *Proceedings of the IEEE Information Theory Workshop on Detection, Estimation, Classification, and Imaging*.

Nowak, R.D. and Kolaczyk, E.D. (1998). A multiscale MAP estimation method for Poisson inverse problems. *Proceedings of the 32<sup>nd</sup> Asilomar Conference on Signals, Systems, and Computers*.

Kolaczyk, E.D. (1997) Methods for Analyzing Certain Poisson Signals and Images in Astronomy. *Proceedings of the 31<sup>st</sup> Asilomar Conference on Signals, Systems, and Computers*.

Hartmann, D.H., Dixon, D.D., Kolaczyk, E.D., and Samimi, J. (1997) Evidence for GeV emissions from the Galactic Center Fountain. *Proceedings of the 4<sup>th</sup> Compton Symposium: AIP Conference Proceedings*.

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Dixon, D.D., Kolaczyk, E.D., Samimi, J. and Saunder, M.A. (1997) Non-parametric estimates of high energy gamma-ray source distributions. *Proceedings of the 4<sup>th</sup> Compton Symposium:AIP Conference Proceedings*.

Kolaczyk, E.D. (1996) Signal De-Noising Using Adaptive Bayesian Wavelet Shrinkage. *Proceedings of the 3<sup>rd</sup> IEEE-SP International Symposium on Time-Frequency Time-Scale Analysis*.

Kolaczyk, E.D. (1994) Wavelet Shrinkage in Tomography. *Proceedings of the 16<sup>th</sup> Annual International Conference of the IEEE-EMBS*.

### **Invited Book Chapters**

Ginestet, C., Kramer, M., and Kolaczyk, E.D. (2016). Network analysis. In *Handbook of Neuroimaging Data Analysis*, Ombao, H., Lindquist, M., Thompson, W., and Aston, J. (ed.). CRC Press.

Jiang, X. and Kolaczyk, E.D. (2010). Integration of network information for protein function prediction. In *Systems Biology for Signaling Networks*, Choi, S. (Ed.). Springer, New York.

Kolaczyk, E.D. and Nowak, R.D. (2003). Multiscale statistical models. In *Nonlinear Estimation and Classification*, Denison *et al.* (eds.). Springer-Verlag: New York.

Kolaczyk, E.D. (2003). Bayesian multiscale methods for Poisson count data. In *Statistical Challenges in Modern Astronomy III*, Babu and Feigelson (eds.). Springer-Verlag: New York.

Kolaczyk, E.D. (1999). Some observations on the tractability of certain multiscale models. In *Bayesian Inference in Wavelet-Based Models*, Muller and Vidakovic (eds). Springer-Verlag: New York.

Kolaczyk, E.D. (1996) An Application of Wavelet Shrinkage to Tomography. In *Wavelets in Medicine and Biology*. Aldroubi and Unser (eds):CRC Press.

### **Invited Discussion Papers**

Goeva, A. and Kolaczyk, E.D. (2016). Comment on "A regularization scheme on word occurrence rates that improves estimation and interpretation of topical content." *Journal of the American Statistical Association*, (in press).

Kolaczyk, E.D. (2003). Comment on "Wavelet-based nonparametric modeling of hierarchical functions in colon carcinogenesis." *Journal of the American Statistical Association*, 98, 585-587.

Kolaczyk, E.D. (1995) Comment on "Wavelet Shrinkage: Asymptopia?" *Journal of the Royal Statistical Society, Series B*, 57, 356.

### **Manuscripts Under Review/Revision**

Shappell, H., Tripodis, Y., Killiany, R.J., and Kolaczyk, E.D. Longitudinal network analysis in resting-state fMRI for Alzheimer's disease. (under review, following minor revisions)

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Kang, X., Ganguly, A., and Kolaczyk, E.D. Dynamic networks with multi-scale temporal structure. (arxiv:1712.08586; under invited revision for JRSSB)

Kolaczyk, E.D., Lin, L., Rosenberg, S., Walters, J. Averages of unlabeled networks: geometric characterization and asymptotic behavior. (arxiv:1709.02793; under invited revision for AoS)

Ahelegbey, D.F., Carvalho, L.E., Kolaczyk, E.D. A Bayesian covariance graphical and latent position model for multivariate financial time series. (arxiv:1712.06797; under invited revision for AoAS)

## **INVITED PRESENTATIONS**

### **Keynote / Plenary Talks**

“Why Aren’t Network Statistics Accompanied by Uncertainty Statements?” 3<sup>rd</sup> Graph Signal Processing Workshop (Keynote Speaker). EPFL. Lausanne, Switzerland. June, 2018.

“On the Impact of Network Inference on Network Science: Propagation of Uncertainty.” SIAM Workshop on Inferring Networks from Non-network Data (Keynote Speaker). Austin, Texas. April, 2017.

“Estimating network degree distributions from sampled networks: an inverse problem.” Conference on Applied Statistics in Defense (Plenary Speaker). Washington, DC. October, 2016.

“Statistical analysis of network data in the context of ‘Big Data’: Large networks and many networks.” IMA-HK-IAS Joint Program on Statistics and Computational Interface to Big Data (Keynote speaker). Hong Kong University of Science & Technology. January, 2015.

“Inference of network summary statistics through network denoising”. Symposium on Graph Signal Processing (Keynote speaker). 1<sup>st</sup> IEEE Global Conference on Signal and Information Processing. Austin, Texas. December, 2013.

“A compressed PCA subspace method for anomaly detection in high-dimensional data.” Symposium on New Sensing and Statistical Inference Methods (Keynote speaker). 1<sup>st</sup> IEEE Global Conference on Signal and Information Processing. Austin, Texas. December, 2013.

“Network-based statistical models and methods for identification of cellular mechanisms of action.” Guelph Biomathematics and Biostatistics Symposium - Frontiers in Networks: Models and Applications. (Keynote speaker – Gordon C. Ashton Memorial Lecture) University of Guelph, Ontario. June, 2012.

### **Conference / Workshop Talks**

“Why Aren’t Network Statistics Accompanied by Uncertainty Statements?” ICSA Applied Statistics Symposium. New Brunswick, New Jersey. June, 2018.

“On the Propagation of Uncertainty in Network Summaries.” Workshop on Statistics of Network Analysis. Alan Turing Institute, London, England. May, 2018.

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“Dynamic Networks with Multi-scale Temporal Structure.” GraphEx Symposium. MIT Lincoln Labs. Lincoln, MA. April, 2018.

“Dynamic Networks with Multi-scale Temporal Structure.” Workshop on Complex Time Series Modeling and Forecasting: Dynamic Networks, Spatio-temporal Data, and Functional Processes.” Tsinghua-Sanya International Mathematics Forum, China. January, 2018.

“Estimation of Vertex Degrees in a Sampled Network.” 51<sup>st</sup> Asilomar Conference on Signals, Systems, and Computers. Asilomar, CA. October, 2017.

“Dynamic Causal Networks with Multi-scale Temporal Structure.” 51<sup>st</sup> Asilomar Conference on Signals, Systems, and Computers. Asilomar, CA. October, 2017.

“Statistics and Network Science: Overview and Open Problems” Annual Joint Statistical Meetings. Baltimore, Maryland. August, 2017.

“Challenges in Network Sampling: Open Problems and Some Progress.” Annual Joint Statistical Meetings. Baltimore, Maryland. August, 2017.

“Dynamic causal networks with multi-scale temporal structure.” Cowles Foundation / Yale Econometric Conference on Networks. Yale University. June, 2017.

“Dynamic causal networks with multi-scale temporal structure.” Workshop on Dynamic Networks. Isaac Newton Institute. Cambridge, England. December, 2016.

Comment on “A regularization scheme on word occurrence rates that improves estimation and interpretation of topical content.” Best paper session, Journal of the American Statistical Association – Applications & Case Studies. Annual Joint Statistical Meetings. Chicago, Illinois. August 2016.

“Estimating Network Degree Distributions from Sampled Networks: An Inverse Problem.” SIAM Annual Meeting. Boston, Massachusetts. July, 2016.

“Dynamic causal networks with multi-scale temporal structure.” 4<sup>th</sup> IMS-APR Meeting. Hong Kong, China. June, 2016.

“Dynamic causal networks with multi-scale temporal structure.” Workshop on a Celebration of Statistics at Chicago (60<sup>th</sup> anniversary celebration). University of Chicago. Chicago, Illinois. May, 2016.

“Estimating network degree distributions from sampled networks: an inverse problem.” Workshop on Networks, Random Graphs, and Statistics. Columbia University. New York, New York. May, 2016.

“Dynamic causal networks with multi-scale temporal structure.” Workshop on Complex Systems in Time Series. London School of Economics. London, England. December, 2015.

“Statistical analysis of network data objects, with applications in functional neuroimaging.” Annual Joint Statistical Meetings. Seattle, WA. August, 2015.

“Inference of network summary statistics through network denoising.” Annual Meeting of the Institute of Mathematical Statistics. Sydney, Australia. July, 2014.

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“Online ratings: Convergence towards a positive perspective?” IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP). Florence, Italy. May, 2014.

“Modeling and prediction of financial time-series: should we network?” McGill/Bellairs Research Workshop on Financial Data Modeling. Barbados. January, 2014.

“Estimating network degree distributions from sampled networks: An inverse problem.” Workshop on Social Network Data: Collection and Analysis. Statistical and Applied Mathematical Sciences Institute (SAMSI). RTP, North Carolina. October, 2013.

“Estimating network degree distributions from sampled networks: An inverse problem.” World Statistics Congress. Hong Kong. August, 2013.

“Detecting perturbed biological pathways through latent network modeling of gene expression.” Annual Joint Statistical Meetings. Montreal, Canada. August, 2013.

“Characterizing evolving patterns of cohesiveness in high-frequency dynamic networks.” 2<sup>nd</sup> Workshop on Industry and Practices for Forecasting. Paris, France. June, 2013.

“The effect of noise and uncertainty on the analysis of large networks.” SIAM Conference on Computational Science and Engineering. Boston, MA. March, 2013.

“Multi-attribute networks and the impact of partial information on inference and characterization.” ICSA Applied Statistics Symposium. Boston, MA. June, 2012.

“Biologically-structured Latent Factor Models for Identification of Cellular Mechanism of Action.” ENAR International Biometric Society Spring Meeting. Washington, D.C. April, 2011.

“Impact of Measurement on Network Inference: Examples from Social, Communication, and Biological Networks.” Workshop on Network Links: Connecting Social, Communication, and Biological Network Analysis. Institute for Mathematics and its Applications. Minneapolis, MN. February, 2012.

“Statistics and Complex Networks: The Next Frontier”. Annual Joint Statistical Meetings. Miami, Florida. August, 2011

“What is ‘n’ in Network Modeling”. ICSA Applied Statistics Symposium. New York, New York. June, 2011.

“A Compressed PCA Subspace Method for Anomaly Detection in High-dimensional Data.” International Conference on Statistics and Society, Renmin University. Beijing, China. July, 2010.

“Drug Targets Prediction: Finding Biological Needles in a Haystack of Networks.” Statworks Workshop, University of Bristol. Bristol, England. June, 2010.

“(Anti)social Behavior in Malicious Internet Source IPs: Characterisation and Detection.” Statistics of Networks Workshop, Isaac Newton Institute. Cambridge, England. June, 2010.

“Network Filtering with Application to Drug Target Prediction.” First IMS Asia-Pacific Rim Meeting. Seoul, Korea. June, 2009.

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“Network-based Auto-probit Modeling for Protein Function Prediction.” Workshop on Network Modeling: Statistical Analysis of Network Data in Practice. Dublin, Ireland. June, 2009.

“Network Filtering with Application to Detection of Gene Drug Targets.” ENAR International Biometric Society Spring Meeting. San Antonio, Texas. March, 2009.

“Statistical Multiresolution Analysis of Internet Traffic on Graphs: Good Idea or Wishful Thinking?” Workshop on Multiscale Representation, Analysis and Modeling of Internet Data and Measurements. IPAM, UCLA, Los Angeles. September, 2008.

“Whole-Network Methods for Traffic Analysis and Anomaly Detection.” MITACS/MASCOS Joint Workshop on Fusion, Mining, and Security for Networks. McGill University. June, 2008.

“Distributed Spatial Anomaly Detection.” DIMACS/DyDAn Workshop on Internet Tomography. Rutgers University. May, 2008.

“Network Filtering: Finding ‘Needles’ in Haystacks.” Workshop on Theoretical Aspects and Models of Large, Complex and Open Information Networks. ISI Foundation, Turin, Italy. November, 2007.

“Topics in Network Measurement and Inference.” AFOSR Workshop on Complex Networks. May, 2007.

“Network Kriging.” Annual Joint Statistical Meetings. Salt Lake City, Utah. August, 2007.

“Improving RDM Through Network Sparseness: It's not as complex as it seems.” AFOSR Workshop on Robust Decision Making. February 2007.

“Multiscale, Multigranular Image Segmentation.” IS&T/SPIE 19<sup>th</sup> Annual Symposium on Electronic Imaging. San Jose, California. January, 2007.

“Multiscale, Multigranular Statistical Image Segmentation.” Graybill Conference. Fort Collins, Colorado. June, 2006.

“Network Kriging.” Network Science Conference. Bloomington, Indiana. May, 2006.

“Path-based Sampling and Inference in the Internet: Implications of Network Structure.” Classification Society of North America 2006 Meeting on Network Data Analysis and Data Mining. DIMACS Center, Rutgers University. May, 2006.

“On Network Sampling and Inference of Network Structure: A Case Study Using Traceroute and the Internet.” SAMSI Satellite Workshop on Dynamic Networks. Carnegie Mellon, Pennsylvania. April, 2006.

“Implications of Path-Based Sampling in the Internet.” National Academies of Science, Workshop on ‘Statistics on Networks’. Washington, D.C. September, 2005.

“Multiscale, Multigranular Image Analysis.” Annual Joint Statistical Meetings. Minneapolis, Minnesota. August, 2005.

“Efficient Monitoring of End-to-End Computer Network Traffic.” Graybill Conference. Fort Collins, Colorado. June, 2005.

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“Empirical Analysis of Structure in Computer Network Traffic Flows”. 36<sup>th</sup> Symposium on the Interface of Computing and Statistics. Baltimore, Maryland. May 2004.

“Multi-Scale ‘Spatial’ Analysis of Computer Network Traffic Data.” IEEE Workshop on Statistical Signal Processing. St. Louis, Missouri. September 2003.

“Multi-Scale ‘Spatial’ Analysis of Computer Traffic Data on Network Graphs.” Annual Joint Statistical Meetings. San Francisco, California. August 2003.

Comment on “Wavelet-based nonparametric modeling of hierarchical functions in colon carcinogenesis.” Best paper session, Journal of the American Statistical Association – Applications & Case Studies. Annual Joint Statistical Meetings. San Francisco, California. August 2003.

“Multiscale ‘Spatial’ Analysis of Network Data: Putting Wavelets on Graphs.” 35<sup>th</sup> Symposium on the Interface of Computing and Statistics. Salt Lake City, Utah. March 2003.

“Bayesian Multiscale Methods for Poisson Count Data.” Statistical Challenges in Modern Astronomy III. University of Pennsylvania. July 2001.

“A Multiresolution Analysis for Likelihoods: Theory and Methods.” Workshop on Nonlinear Estimation and Classification. Mathematical Sciences Research Institute (MSRI), Berkeley, California. March 2001.

“Likelihood-based Multiscale Models for Spatial Data.” Annual National Radio Science Meeting. Boulder, Colorado. January 2001.

“Multiscale Statistical Modeling of Scale Effects.” First International Conference on Geographic Information Science. Savannah, Georgia. October 2000.

“Segmentation of Astronomical Time Series via a Bayesian Multiscale Framework.” Annual Joint Statistical Meetings. Indianapolis, Indiana. August 2000.

“Bayesian Multiscale Analysis via Recursive Partitioning.” 6<sup>th</sup> World Meeting of the International Society for Bayesian Analysis. Heraklion, Crete. June 2000.

“Multiscale Models for Hierarchical Aggregation of Spatial Data.” International Conference in Honor of Professor C.R. Rao. San Antonio, Texas. March 2000.

“Capturing Complex Scale Relationships Using Hierarchies: Some Problems in Astronomy and Geography.” Annual Meeting of the American Association for the Advancement of Science (AAAS). Washington, DC. February 2000.

“A Bayesian Multi-Scale Approach to Poisson Inverse Problems.” Annual Joint Statistical Meetings. Baltimore, Maryland. August 1999.

“Partition-Based Multi-Scale Models for Poisson Data.” 15<sup>th</sup> Annual New England Statistics Symposium. Storrs, Connecticut. April 1999.

“Bayesian Multi-Scale Models for Poisson Intensity Functions.” Annual Joint Statistical Meetings. Dallas, Texas. August 1998.

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“Methods for Analyzing Certain Poisson Signals and Images in Astronomy.” The 31<sup>st</sup> Asilomar Conference on Signals, Systems, and Computers. November 1997.

“Wavelet Shrinkage Estimation of Poisson Intensities Using Corrected Thresholds, with Applications to Astronomical Signals and Images.” International Workshop on Wavelets in Statistics, Duke University. October 1997.

“Analysis of BATSE Data Using the Haar Transform and Poisson Noise Characteristics.” Converging Computing Methodologies in Astronomy Conference. Sonthofen, Germany. September 1997.

“Wavelet Shrinkage for Tomographic Image Reconstruction.” 40<sup>th</sup> Anniversary Meeting of the Society for Industrial and Applied Mathematics (SIAM). Stanford, California. July 1997.

“Wavelet Methods for Estimating the Intensity Profiles for Astronomical Gamma-Ray Bursts.” Regional Meeting of the American Mathematical Society, Detroit, Michigan. May 1997.

“Adaptive Bayesian Wavelet Shrinkage.” Annual Joint Statistical Meeting. Chicago, Illinois. August 1996.

“Wavelet Shrinkage De-Noising: Variations on a Theme.” Annual SRCOS Meeting. Bismark, Arkansas. June 1996.

“Wavelet Shrinkage in Tomography.” 26th Conference on the Interface of Statistics and Computing. Rayleigh, North Carolina. June 1994.

### **Tutorials and Short Courses**

“Statistical Analysis of Network Data.” Two-day lecture for the Bernoulli Society’s SemStat series. (With accompanying Kolaczyk (2017) Cambridge monograph.) Eindhoven, Netherlands. March, 2017.

“Statistical Analysis of Network Data.” Annual Joint Statistical Meetings. Chicago, IL. August, 2016. [Half-day short course.]

“Statistical Analysis of Network Data.” Summer School 2016, East China Normal University. Shanghai, China. July, 2016. [Three-day short course.]

“Statistical Analysis of Network Data.” Annual Eastern North American Region (ENAR) meeting of the International Biometric Society. Austin, Texas. March, 2016. [One-day short course.]

“Introduction to Statistical Network Analysis.” European Courses in Advanced Statistics (ECAS) Course on Statistical Analysis of Network Data. Herrsching, Germany. October, 2015. [Two-day series of lectures.]



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“Select Topics in Statistics for Complex Networks.” International School and Conference on Network Science (NetSci) 2015. Zaragoza, Spain. June, 2015. [One-day of lectures.]

“Statistical Analysis of Network Data.” Workshop on Statistical and Computational Challenges in Networks and Cybersecurity. Centre de Recherches Mathématiques, Université de Montréal. Montréal, Canada. May, 2015. [Two-day short course.]

“Statistical Analysis of Network Data.” STOR-i Master Class. Lancaster, England. March, 2015. [Three-day short course.]

“A Whirl-wind Tour of Statistical Analysis of Network Data.” Program on Statistical Inference, Learning, and Models for Big Data. Fields Institute, Canada. January, 2015. [One-hour lecture.]

“Statistical Analysis of Network Data.” Winter School on Networks in Economics and Finance. Louvain-La-Neuve, Belgium. December, 2014. [Series of six lectures.]

“Statistics for Complex Networks.” Les Houches School on Complex Networks. Les Houches, France. April, 2014. [Series of four lectures.]

“Statistical Analysis of Network Data.” Stats in Paris Workshop: Statistics and Economics of Networks. Paris, France. November, 2013. [Two-day short course.]

“Statistical Analysis of Network Data”. US Center for Disease Control Symposium on Statistical Methods. May, 2011. [One-day short course.]

“Statistical Analysis of Network Data”. Centre for Complexity Science, University of Warwick, England. May, 2011. [Two-day short-course.]

“Statistical Analysis of Network Data”. Program on Complex Networks, Opening Workshop. Statistical and Applied Mathematical Sciences Institute (SAMSI). RTP, North Carolina. August, 2010. [Overview lecture.]

“Statistical Analysis of Network Data”. Institut de Statistique, l'Université Catholique de Louvain, Belgium. Sept/Oct 2009. [Two-week short-course.]

“Sampling Networks and the Inference of Network Characteristics.” Network Science Workshop. Bloomington, Indiana. May, 2006. [One-hour lecture.]

### **Selected Research Seminars**

“Statistical Analysis of Network Data in the Context of ‘Big Data’: Large Networks and Many Networks.” Department of Mathematics, Northwestern University. May, 2017.

“Estimating Network Degree Distributions Under Sampling: An Inverse Problem, with Application to Monitoring Social Media Networks.” Department of Economics, University of Maryland. March, 2017.

“Network-based Statistical Models and Methods for Identification of Cellular Mechanisms of Action.” Department of Statistics, Oxford University. December, 2016.

“Estimating Network Degree Distributions from Sampled Networks: An Inverse Problem”. Probability & Statistics Seminar, School of Mathematics, Bristol University. December, 2016

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“Statistical Analysis of Network Data in the Context of 'Big Data': Large Networks and Many Networks”. Center for Statistics and Machine Learning, Princeton University. April 2016.

“Estimating Network Degree Distributions from Sampled Networks: An Inverse Problem.” Department of Statistics, North Carolina State University. April, 2016.

“Network-based Statistical Models and Methods for Identification of Cellular Mechanisms of Action.” Theodore L. Badger Lectures in Network Medicine. Channing Division of Network Medicine, Brigham and Women's Hospital. Boston, MA. September, 2015.

“Statistical Analysis of Network Data in the Context of `Big Data': Large Networks and Many Networks.” Big Data Initiative Seminar Series. London School of Economics (LSE), London. March, 2015.

“Statistical Analysis of Network Data: (Re)visiting the Foundations.” Department of Statistics, University of Chicago. October, 2014.

“Statistical Analysis of Network Data: (Re)visiting the Foundations. Laboratory for Information and Decision Sciences (LIDS), MIT. September, 2014.

“A Compressed PCA-subspace Methods for Anomaly Detection in High-Dimensional Data.” Image Processing Seminar, University of Heidelberg. March, 2014.

“Statistical Analysis of Network Data.” Centre for Statistics, Gottingen University. March, 2014.

“Estimating Network Degree Distributions from Sampled Networks: An Inverse Problem. Université des Artes et Metier, Paris. November, 2013.

“Estimating Network Degree Distributions from Sampled Networks: An Inverse Problem. Department of Statistics, University of Georgia. September, 2013.

“Network-based Statistical Models and Methods for Identification of Cellular Mechanisms of Action.” Department of Statistics, University of California-Davis. March, 2013.

“Network-based Statistical Models and Methods for Identification of Cellular Mechanisms of Action.” Advanced Networks Colloquium, University of Maryland. April, 2012.

“Statistical Analysis of Network Data.” DTC Science and Technology Innovators Series, University of Minnesota. February, 2012.

“Network-based Statistical Models and Methods for Identification of Cellular Mechanisms of Action.” Department of Biostatistics & Bioinformatics. Emory University. February, 2012.

“Multi-Attribute Networks and the Impact of Partial Information on Inference and Characterization.” Machine Learning Seminar, l'Universite Catholique Louvain. Louvain-la-Neuve, Belgium. November, 2011.

“Multi-Attribute Networks and the Impact of Partial Information on Inference and Characterization.” AgroParisTech. Paris, France. November, 2011.

“A Compressed PCA-subspace Method for Anomaly Detection in High-Dimensional Data.” Séminaire Parisien de Statistique, l'Universite de Paris VII. Paris, France. November, 2011.

“Some Results on Asymptotics for Inference in Networks.” Seminaire de Statistique, Ecole Nationale de la Statistique et de l'Adminstration Economique (ENSAE). Paris, France. October, 2011.

“Some Results on Asymptotics for Inference in Networks.” Seminaire SSB, l'Universite d'Evry, France. September, 2011.

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“Drug target prediction: finding biological needles in a haystack of networks.” Probability Seminar, Cornell University. May, 2010.

“Drug target prediction: Finding biological needles in a haystack of networks.” Seminar in Computational and Applied Mathematics, Notre Dame University. April, 2010.

“Predicting gene targets of perturbations via network-based filtering of mRNA expression compendia.” Center for Systems Biology, Duke University. March, 2010.

“Network-based auto-probit modeling with application to protein function prediction.” Stern School of Business, New York University. March, 2010.

“Drug target prediction: Finding biological needles in a haystack of networks.” Department of Statistics, Columbia University. March, 2010.

“Network Filtering.” Harvard University School of Public Health, Seminar on High-Dimensional Data Analysis. December, 2009.

“Multiscale Statistical Modeling for Poisson Signal and Image Data.” Royal Observatory of Belgium. Brussels, Belgium. October, 2009.

“Network Filtering.” Center for Statistical Sciences, Brown University. September, 2008.

“Network Kriging.” Department of Statistics, Yale University. April, 2007.

“Network Kriging”. CRM-ISM-GERAD Colloquium in Statistics, University of Montreal, Quebec, CA. November, 2005.

“Efficient Estimation of End-To-End Network Properties.” Seminar Series, Department of Electrical and Computer Engineering, University of Wisconsin-Madison. March, 2005.

“Statistical Methods for Monitoring End-to-End Computer Network Traffic.” Seminar on Complex Networks. Ecole Nationale Supérieure. Paris, France. November, 2004.

“Multiscale, Multigranular Statistical Image Segmentation.” Department of Statistics, Université Joseph Fourier. Grenoble, France. November, 2004.

“Efficient Monitoring of End-to-End Network Traffic.” Network and Performance Group, Université de Paris VI. Paris, France. November, 2004.

“Multiscale, Multigranular Statistical Image Segmentation.” Statistics and Probability Seminar, Université de Paris VII. Paris, France. October, 2004.

“A Multiscale Framework for Disease Mapping.” Department of Biostatistics, Yale University. April, 2004.

“On the Distance Between Network Links and its Relation to Covariance in Network Tomography.” Department of Statistics, Rutgers University. November, 2003.

“Prediction of Traffic on Un-Measured Links: Network Kriging.” Sprint Advanced Technology Laboratory, Burlingame, CA. August, 2003.

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“Multiscale Probability Models -- Blending Wavelets, Recursive Partitioning, and Graphical Models.” Department of Mathematics and Statistics, University of Massachusetts-Amherst. April 2002.

“Multiscale Probability Models -- Blending Wavelets, Recursive Partitioning, and Graphical Models.” Stochastic Systems Group, Laboratory for Information and Decision Sciences, Massachusetts Institute of Technology. February 2002.

“Multiscale Probability Models -- Blending Wavelets, Recursive Partitioning, and Graphical Models.” ARIANA Research Group, INRIA. Sophia-Antipolis, France. June, 2001.

“A Multiresolution Analysis for Likelihoods: Blending Wavelets, Partitioning, and Graphical Models.” L'Institut Henri Poincaré. Paris, France. May, 2001.

“A Multiresolution Analysis for Likelihoods.” Department of Electrical and Computer Engineering, Rice University. February, 2001.

“A Multiresolution Analysis for Likelihoods.” Department of Mathematics and Statistics, University of Montreal. November, 2000.

“A Class of Bayesian Multiscale Models for Spatial Data.” Bayesian Methodology Working Group Seminar, Department of Biostatistics, Harvard School of Public Health. September, 2000.

“A Multiscale Statistical Framework for Deconvolution of Poisson Data.” Harvard-Smithsonian Center for Astrophysics. June 2000.

“Estimation in Poisson inverse problems via a Bayesian multiscale framework.” Department of Biostatistics, Harvard University. December 1999.

“Estimation in Poisson inverse problems via a Bayesian multiscale framework.” Department of Biostatistics, Columbia University. October 1999.

## **RESEARCH ADVISING**

### **Postdoctoral Students (Current employment, when known)**

Daniel Ahelegbey, 2015 – 2017. Visiting faculty, University of Pavia.

Juliane Manitz, 2015 – 2016. Senior Biostatistician, EMD Serono.

Apratim Ganguly, 2014 – 2015, Quantitative Analyst, Google.

Yun Li, 2012-2013. Data Scientist, PubMatic

Cedric Ginestet, 2012 – 2014, Lecturer, Kings College London

Prakash Balachandran, 2012 – 2014, Vice President, Morgan Stanley

Natallia Katenka, 2009 – 2012, Asst. Prof., Dept. of Computer Science & Statistics, URI

David Gold, 2007 – 2008, Asc. Dir., Discovery & Translational Biostatistics, Bristol-Myers Squibb

### **PhD Students, Primary Advisor (Current employment, when known)**

Jun Li, Ph.D. 2018, Statistics. Data Scientist, Google.

Xinyu Kang, Ph.D. 2018, Statistics. Quantitative Analyst, NY Life Insurance Company

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Heather Shappell, Ph.D. 2017, Biostatistics. Postdoc., Dept. of Biostatistics, Johns Hopkins  
Alexsandrina Goeva, Ph.D. 2017, Statistics. Postdoc., Broad Institute, MIT/Harvard  
Paula Griffin, Ph.D. 2015, Biostatistics. Product Manager, Quora  
Yaonan Zhang, Ph.D. 2015, Statistics. Quantitative Researcher, State Street Associates  
Weston Viles, Ph.D. 2013, Statistics. Postdoc., Dept. of Biomedical Data Science, Dartmouth  
Lisa Pham, Ph.D. 2013, Bioinformatics. Director of Data Science, Capella Biosciences  
Qi Ding, Ph.D. 2011, Statistics. Vice President, Risk Manager, JP Morgan Chase  
Shu Yang, Ph.D. 2011, Statistics. Senior Biostatistician, Novartis.  
Elissa Cosgrove, Ph.D. 2010, Biomedical Engineering. Bioinformatics Research Associate, Cornell  
Xiaoyu Jiang, Ph.D. 2009, Statistics. Associate Director, Biostatistics, Biogen  
Jianing Di, Ph.D. 2008, Statistics. Head of Statistics & Decision Sciences (China), Janssen Pharma.  
Yingchun Zhou, Ph.D. 2007, Statistics. Assoc. Prof., School of Statistics, East China Normal Univ.  
David Chua, Ph.D. 2006, Statistics. Vice President, Black Rock Hong Kong  
Mary Louie, Ph.D. 2003, Statistics. Vice President, New York Life Insurance Company  
Carlos Morales, Ph.D. 2002, Statistics. Quantitative Analyst, GMO LLC

### **PhD Students, Secondary Advisor (Current employment, when known)**

Daniel Posner, Current Ph.D. student, Biostatistics  
Adrian Heilbut, Ph.D. 2016, Bioinformatics. Data Scientist, Kallyope, Inc.  
Shile Zhang, Ph.D. 2015, Bioinformatics. Bioinformatics Scientist, Illumina  
Chen Lu, Ph.D. 2013, Biostatistics. Biostatistics Manager, Amgen  
Ming-hui Chen, Ph.D. 2007, Statistics. Research Associate, Neuroscience, Boston University  
Anukool Lakhina, Ph.D. 2006, Computer Science. Founder and CEO, Guavas  
Junchang Ju, Ph.D. 2004, Geography. Remote Sensing Scientist, NASA Goddard  
Weiguo Liu, Ph.D. 2001, Geography. Dir. of Data Science, CVS Health

### **Doctoral Thesis Committees**

Delaram Montamedvaziri, Ph.D. 2014, Electrical and Computer Engineering  
Jing Qian, Ph.D. 2014, Electrical and Computer Engineering  
Lisa Christadore, Ph.D. 2012, Biochemistry.  
Manqi Zhao, Ph.D. 2011, Electrical and Computer Engineering.  
Manway Liu, Ph.D. 2010, Biomedical Engineering.  
Naioki Nariai, Ph.D. 2010, Bioinformatics.  
Boris Hayete, Ph.D. 2007, Bioinformatics.

### **External Examining Committees**

Jean-Benoist Leger, Ph.D. 2014. Agro Paris Tech.  
Antoinne Channarond, Ph.D. 2013. Université Paris Sud  
Clemence Magnien, Habilitation (HDR), 2010.

### **Master Theses**

Vadim Kutsyy, M.S. 1996, Statistics. Head of Data Strategy & Stewardship, PayPal

### **Undergraduate Senior Honors Theses**

Alok Pattani, B.A. / M.A. 2008, Mathematics. Quantitative Analyst, Google.

## **TEACHING**

### **Courses Taught**

#### **Boston University**

##### Lower Undergraduate:

Art and Science of Quantitative Reasoning (Fall '09, '10, '12, '13; Spring '09 – '11, '13, '14)  
Basic Statistics and Probability (Spr '99)  
Elementary Probability (Spr '00)

##### Upper Undergraduate / Masters

Methods of Scientific Computing (Fall '99 – '02)  
Linear Models (Fall '06 – '08, '12, '14, '17)  
Introduction to Probability (Fall '03)  
Introduction to Stochastic Processes (Spring '99 – '04, '06)  
Sampling Design (Fall '98)

##### Masters

Statistics Practicum (Fall/Spring '15 – '18)

##### Doctoral

Theoretical Statistics (Spring '13, '14)  
Statistical Learning (Spring '08, '10)  
Statistical Analysis of Network Data (Fall '05; Spring '11, '13, '15)

#### **ENSAE, Paris**

##### Masters

Statistical Analysis of Network Data with Applications in Marketing. (*Fall '11 – '15; Spring '18*)

#### **Harvard University**

##### Upper Undergraduate / Masters

Regression Analysis and Modeling (Spring '98)

##### Doctoral

Wavelet and Multiscale Methods for Statistical Estimation (Fall '97)  
Statistics for Network Science (*Spring '05*)

#### **The University of Chicago**

##### Lower Undergraduate

Quantitative Reasoning (Winter '95 – '97)  
Statistical Methods and Their Applications (Spring '95)  
Linear Models and Experimental Design (Spring '96, '97)

##### Doctoral

Spectral and Time-Frequency Methods (Fall '94, '95)  
Statistical Consulting (Fall/Winter/Spring '94 – '97)

#### **Stanford University**

##### Lower Undergraduate

Introduction to Statistical Methods for Social Scientists. (*Winter '94*)

## **Innovations in Teaching**

The course “Quantitative Reasoning,” at the University of Chicago, was developed for students concentrating in the liberal arts. Rather than lecturing, classes were run in the traditional roundtable / discussion style common in the humanities and social sciences, based on select readings about mathematics and statistics, covering specific inter-related topics from deterministic systems to stochastic systems to sampling, estimation/testing, and the quantification of uncertainty.

The course “Art and Science of Quantitative Reasoning,” at Boston University, was similarly developed for students concentrating in the liberal arts, but was team-taught with a faculty colleague from each of computer science, mathematics, and systems. The unifying concept in the course was the power of abstraction in quantitative reasoning. Responsible for introducing probability and statistics in the course, I used a combination of traditional and ‘flipped’ classroom techniques to both develop these topics in and of themselves and illustrate their ties to the other components of the course.

The “Statistics Practicum” is a two-semester course that lies at the heart of the new M.S. in Statistical Practice program at Boston University. Half pedagogy and half statistical consulting, the course uses just-in-time principles and a largely ‘flipped’ classroom environment, with a collaborative group-based organizational structure, to guide students towards a holistic understanding – grounded in practice -- of how conceptual, methodological, and computational aspects come together for a statistician to be optimally effective in the modern era of data science.

The courses taught on the statistical analysis of network data at Boston University, ENSAE, and Harvard over the past decade represent some of the earliest and longest running examples of a course with a statistics-centric focus on network science. Continually modified, as a function of both time and audience, these courses facilitated the writing of and, in turn, have been supported by my three books in this area. Both the books and various of the course materials are used by colleagues at universities across the U.S. and Europe.

## **PROFESSIONAL ACTIVITIES**

### **Key Leadership Positions and Outcomes**

*Director, Program in Statistics, Boston University.*

Led all programmatic aspects of the primary academic unit responsible for statistics at Boston University. Housed within the Department of Mathematics & Statistics, we offer minors, major, MA, MS, and PhD degrees in statistics through the Program in Statistics. Key accomplishments include: (i) a complete review and overhaul of the entire curriculum (from minor through PhD) over a ten-year period covering 2002-2012, and ongoing evolution ever since; (ii) roughly 30% growth in recruitment and hiring of faculty, postdocs, and graduate students during this same period; (iii) the development of a new and innovative MS in Statistical Practice (MSSP) degree in 2015; (iv) the simultaneous launch of an integrated statistical consulting service for the Boston University community (MSSP Consulting); and, currently, (iv) an ongoing multi-level cluster hiring initiative in statistics, aimed at recruiting ~5-6 new faculty to our department over 3 years. (Presently 3 of these faculty lines have been filled, one each at assistant, associate, and full professor levels.)

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*Founding Director, M.S. in Statistical Practice program, Boston University.*

This new degree program was launched as a department-level response to the current and emerging needs in data science. Run in a cohort-based style, the goal is to produce holistically trained statisticians in 2-3 semesters. Adaptive learning and collaborative, group-based organization is used heavily throughout the program. Key aspects of my role in this program include the following: (i) led the design, proposal, and development of the program since inception in 2015; (ii) developed and led the Statistics Practicum course sequence central to the program (see Innovations in Teaching above); (iii) simultaneously launched an integrated statistical consulting service for the Boston University community (MSSP Consulting), with a combination of M.S. students, PhD student mentors, and MSSP program faculty providing multi-tiered service to roughly 70 clients/year; and (iv) grew the program from 5 to 40 students in 3 years. (Currently generating ~\$2M/year in new tuition revenue.)

*Leader, Program on Complex Networks, SAMSI.*

Led the development and execution of a year-long program on complex networks at the primary NSF-funded research institute in statistics and applied mathematics. Coordinated with local management and a scientific advisory committee, over the course of the 2010-2011 academic year, to enable (i) six multi-day workshops, (ii) five research working groups, and (iii) one co-taught course, focused particularly on themes in network modeling and inference, dynamics of and on networks, and network flows. Actively integrating participants from statistics, applied mathematics and probability, signal processing, and statistical physics, this program set the record for participation among all SAMSI programs in the Institute's first 10 years.

*Co-chair, Data Science Education Roundtable, U.S. National Academies of Sciences.*

This group of approximately 30 representatives from academic data science programs, funding agencies, professional societies, foundations, and industry is charged with assembling to discuss the community's needs, best practices, and ways to move forward on the task of preparing large numbers of professionals to help realize the potential of data science. Sponsored by a variety of stakeholders, in addition to the U.S. National Academies, including the NIH, ACM, and ASA, the roundtable convenes four times per year. Now starting Year 2 of a three-year commitment, I have to date led this roundtable in the following ways: (i) in planning and convening the regular meetings, each open to the public (in-person or via web-cast) and advertised to the broader data science community; (ii) in conducting outreach to integrate our efforts with parallel efforts in other communities and countries; and (iii) in coordinating the initial stages of a collection of working groups among roundtable members to produce additional products for dissemination (e.g., expository publications, opinion pieces, etc.).

## **Professional Service**

### **Service to Professional Societies**

*Member, 2018 – present.* Data Science Steering Group, Institute of Mathematical Statistics (IMS)

*Member, 2017 – present.* Management Committee, Astrostatistics Special Interest Group, International Statistical Institute (ISI).

*Member, 2017 – present.* Council, New England Statistical Society (NESS).



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*Co-Chair*, 2016 – present. Data Science Education Roundtable, Committee on Applied and Theoretical Statistics, U.S. National Academies of Sciences, Engineering, and Medicine (NAS).

*Member*, 2014 – present. Lingzi Lu Award Committee, American Statistical Association (ASA).

### **Conferences and Workshops**

*Technical Committee, Co-Chair*. 2018 IEEE Data Science Workshop.

*Technical Committee, Member*. NetSci 2018 Conference.

*Co-organizer*. 2018 Workshop on Complex Time Series Modelling and Forecasting: Dynamic Networks, Spatio-temporal Data, and Functional Processes. Tsinghua Sanya International Mathematics Forum (TSIMF), China.

*Co-organizer*. 2014 Workshop on Revising the Foundations of Statistics in the Era of Big Data: Scaling Up to Meet the Challenge. Boston University.

*Program Committee*. 2014 Grace Hopper Celebration of Women in Computing Conference

*Co-Organizer*. 2012 New England Statistics Symposium (NESS)

*Co-Organizer*. 2011 Workshop on Large Graphs: Modeling, Algorithms and Applications. Institute for Mathematics and its Applications (IMA).

*Program Leader*, 2010-11 Program on Complex Networks, Statistical and Applied Mathematical Sciences Institute (SAMSI).

*Program Committee*. IMS Section Co-Chair, 2008 Joint Statistical Meetings (JSM).

*Technical Committee*. 2003 IEEE Workshop on Statistical Signal Processing.

In addition, I have organized various individual research sessions at different conferences and workshops over the years, including for the Annual Meeting of the American Association for the Advancement of Science (AAAS), the Joint Statistical Meetings (JSM), and SIAM.

### **Funding Panels**

*NSF Panelist*, 2017. Mathematical Sciences.

*NIH Panelist*, 2015. Modeling of Social Behavior.

*NSF Panelist*, 2014. National Research Traineeship Program.

*NSF Panelist*, 2010. Mathematical Biology.

*NSF Panelist*, 2004. Mathematical Sciences / Astronomy.

*NIH Panelist*, 2001. NIAAA Biosensor Workshop.

### **External Academic Program Review Committees**

*Member*, 2015. For the Applied and Computational Mathematics and Statistics Department, University of Notre Dame.

*Member*, 2015. For the Department of Mathematical and Statistical Sciences, University of Colorado Denver.

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## **Reviewer**

*Reviewer* for grant proposals submitted to various agencies over the years, including: the Canadian NSERC; the Netherlands NWO; the Swiss NSF; the UK EPSRC; and the US AFOSR, ARO, NIH, NSA, and NSF.

*Reviewer* for manuscripts submitted to various journals and conferences over the years, including:

Within Statistics: *AISTATS, Annals of Applied Statistics, Annals of the Institute of Mathematical Statistics, Annals of Statistics, Bernoulli, Biometrika, Computational Statistics and Data Analysis, Environmental and Ecological Statistics, Journal of the American Statistical Association, Journal of Computational and Graphical Statistics, Journal of Nonparametric Statistics, Journal of the Royal Statistical Society, Journal of Statistical Planning and Inference, Probability Theory and Related Fields, Sankhya, Scandanavian Journal of Statistics, Statistica Sinica, Statistics in Medicine, and Test.*

Outside of Statistics: *Applied Econometrics, Astronomy and Astrophysics, The Astrophysical Journal, Bioinformatics, BMC Bioinformatics, European Physical Journal, Geographical Analysis, IEEE Signal Processing Letters, IEEE Transactions on Geoscience and Remote Sensing, IEEE Transactions on Image Processing, IEEE Transactions on Information Theory, IEEE Transactions on Medical Imaging, IEEE Transactions on Signal Processing, International Journal of Geographical Information Systems, Journal of Econometrics, Journal of Microscopy, Nature, NIPS, PLoS ONE, Proceedings of the National Academy of Sciences, Science, SIAM Journal on Imaging, and Social Networks.*

Note: Please see Editorial Responsibilities for a summary of editorial services provided to date.

## **Statistical Consultant**

*Consultant*, 2016. Stanford Team for NSASAG Mathematical/Statistical Problems Project  
*Statistical Advisor*, 2016. BU Office of the General Counsel  
*External Advisor*, 2015 – present. Riffyn

## **Departmental and University Service**

I have served on a variety of committees at the departmental, college, and university levels throughout my career. Below is a summary list of the most prominent roles in which I have served while at Boston University. Additional details are available upon request.

### **Departmental**

*Founding Director*, MS in Statistical Practice (MSSP) Program, 2015 – present.  
*Director*, Program in Statistics, 2002 – present.

In addition, as director of the Program in Statistics, I have been a regular and central member for well over a decade on the following departmental committees: (i) undergraduate and graduate committees; (ii) faculty search committees in statistics and probability; (iii) departmental planning committees; and (iv) the departmental executive committee.

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## **University**

- Member*, Steering Committee, Hariri Institute for Computing (2018 – present)
- Member*, President's Committee on Transdisciplinary Epidemiology & Genomics (2017 – 2018)
- Member*, Provost's Steering Committee, Data Science Hiring Initiative (2014 – present)
- Member*, Statistics Search Committee, School of Education (2013-14)
- Member*, Provost's Council on Educational Technology & Instruction (2012-13)
- Chair*, Curriculum Committee, Bioinformatics Program (2010-11; 2012-13)
- Member*, Core Curriculum Committee, College of Arts & Sciences (2010-2011)
- Member*, Coordinating Committee for Hiring in Integrative Biology (2009 – 10)
- Member*, Management Committee, Center for Information and Systems Engineering (2008-11)
- Member*, Steering Committee, NSF IGERT for Graduate Training in Bioinformatics (2008 – 10)
- Member*, Provost's Curriculum Committee on Integrative Biology (2008-2009)