David M. Higdon

Social Decision Analytics Laboratory
Biocomplexity Institute of Virginia Tech
Virginia Tech, National Capital Region
Arlington VA 22203
phone: (571) 858-3100 email: dhigdon@vt.edu

Professional Preparation

Ph.D.,	August 1994, Statistics, University of Washington
M.A.,	1989, Mathematics, University of California at San Diego
B.A.,	1987, Mathematics, University of California at San Diego

Research Interests

space-time modeling; modeling non-standard dependence structure; inverse problems in hydrology and imaging; inference based on combining deterministic and stochastic models; multiscale models; parallel processing in posterior exploration; statistical modeling in ecology, environmental science, and biology; statistical computing; Monte Carlo and simulation based methods; statistical consulting

Professional Experience

2014-present	Professor, Social Decision Analytics Laboratory Virginia Tech, National Capital Region, Arlington VA.
2010-2014	Scientist, Statistical Sciences Group Los Alamos National Laboratory, Los Alamos NM.
2005-2010	Group Leader, Statistical Sciences Group Los Alamos National Laboratory, Los Alamos, NM.
2001-2005	Technical Staff, Statistical Sciences Group Los Alamos National Laboratory, Los Alamos, NM.
1996-2001	Assistant Professor at the Institute of Statistics and Decision Sciences; Coordinator, Statistical Consulting Center; Director of the Center for Multiscale Modeling and Distritributed Computing. Duke University, Durham NC.
1995-1996 & 1999-2001	Research Associate, National Institute of Statistical Sciences, Research Triangle Park, NC.
1994-1996	Visiting Assistant Professor at the Institute of Statistics and Decision Sciences; Coordinator, Statistical Consulting Center. Duke University in Durham NC.
1992-93	Programmer. StatSci Inc., Seattle WA.
1991	Instructor, University of Washington Extension (summer).
1990-94	Teaching and research assistant. Statistics Department, University of Washington.
1989-90	Mathematician/Analyst for B. K. Dynamics in San Diego. Designed and coded projection and simulation models; designed and maintained large databases on a mainframe and personal computers.
1989-90	Adjunct Professor, Miramar Community College, San Diego.

Recognition

1999 Royal Statistical Society Read Paper
2000 American Statistical Association award for Best Contributed Paper in Statistical Computing at the Joint Statistical Meetings
2004 DOE Defense Programs Award – Verfication and Validation
2005 DOE Defense Programs Award – Lifetime Assessments
2006 DOE Defense Programs Award – Pu Aging
2006 Technometrics Youden Prize
2011 Fellow, American Statistical Association

Service

Editor, SIAM/ASA Journal of Uncertainty Quantification, 2016–
Chair, National Academy of Science Committee on Models of the World for the National Geospatial-Intelligence Agency, 2015 – 2016.
Advisory Panel, CREDIBLE [Consortium on Risk in the Environment], UK, 2013–2016
Advisory Panel, EQUIP [Enabling Quantification of Uncertainty in Inverse Problems], UK, 2013–2016
Associate Editor, SIAM/ASA Journal of Uncertainty Quantification, 2012–2015
Co-chair, National Academy of Science Committee on the Mathematical Foundations of Verification, Validation and Uncertainty Quantification, 2010 – 2012.
Moderator for the arXiv, Statistics, Computation category 2010 – 2015.
Founding member of ASA Interest Group on Uncertainty Quantification for Complex Systems, 2010
Advisory Board, Interdisciplinary Mentoring Program in Analysis, Computation, & Theory, Brigham Young University, 2009-2012
Advisory Panel, Project on Managing Uncertainty in Complex Models, UK, 2006–2012
Associate Editor for *Technometrics* 2003-2006
Board Member, International Society for Bayesian Analysis, 2003–2004
Associate Editor for Valencia 7, 2002
Guest Associate Editor for *Statistical Modeling*, 2000

Manuscripts

Pires, B., Goldstein, G., Higdon, D., Sabin, P., Korkmaz, G., Shipp, S., Keller, S., Ba, S., Hamall, K., Koehler, A., and Reese, S. (2017). A Bayesian simulation approach for supply chain synchronization, in *Proceedings of the 2017 Winter Simulation Conference* (eds. Chan, D'Ambrogio, Zacharewicz, Mustafee, Wainer and Page), 3698-3707.

Lawrence, E., Heitmann, K., Kwan, J., Upadhye, A., Bingham, D., Habib, S., Higdon, D., Pope, A., Finkel, H. and Frontiere, N. (2017). The Mira-Titan Universe. II. Matter Power Spectrum Emulation. *Astrophysical Journal*, 847(1), 50.

D. Osthus, K. Hickman, P. C. Caragea, D. Higdon, and S. Del Valle. (2017). Forecasting Seasonal Influenza with a state-space SIR model. *Annals of Applied Statistics*, DOI 10.1214/16-AOAS1000.

O. Harari, D. Bingham, A. Dean and D. Higdon (2017). Computer Experiments: Prediction Accuracy, Sample Size and Model Complexity Revisited, *Statistica Sinica*.

National Academies of Sciences, Engineering, and Medicine (2016). *From Maps to Models: Augmenting the Nation's Geospatial Intelligence Capabilities*, Washington, DC: The National Academies Press. doi: 10.17226/23650.

K. Heitmann, D. Bingham, E. Lawrence, S. Bergner, S. Habib, D. Higdon, A. Pope, R. Biswas, H. Finkel, N. Frontiere, N. Bhattacharya (2016). The Mira-Titan Universe: Precision Predictions for Dark Energy Surveys, *The Astrophysical Journal*, 820, 108.

P. Chylek, T. J. Vogelsang, J. D. Klett, N. Hengartner, D. Higdon, G. Lesins, and M. K. Dubey (2016). Indirect Aerosol Effect Increases CMIP5 Models' Projected Arctic Warming, *Journal of Climate*, 29, 4.

Gattiker, J.R., Hamada, M.S., Higdon, D.M., Schonlau, M., and Welch, W.J. (2016). Using a Gaussian Process as a Nonparametric Regression Model, *Quality and Reliability Engineering International*, to appear.

L. Bornn, C. R. Farrar, D. Higdon, K. P. Murphy (2016). Modeling and diagnosis of structural systems through sparse dynamic graphical models, *Mechanical Systems and Signal Processing*, 74, 133-143.

Weaver, B. P., Williams, B. J., Anderson-Cook, C.M., and Higdon, D. (2016). Bayesian Design of Experiments Using Gaussian Processes. *Bayesian Analysis*, 191 - 213.

J. Gattiker, K. Myers, D. Higdon and B. Williams (2016). Gaussian Process-based sensitivity analysis and Bayesian model calibration with GPMSA, in *Handbook of Uncertainty Quantification* (Ghanem, Higdon, Owhadi eds.), Springer, New York.

Pratola, M. and Higdon, D.(2016). Bayesian Additive Regression Tree Calibration of Complex High-Dimensional Computer Models. *Technometrics*, 166-179.

McDonnell, J., Schunck, N., Higdon, D., Sarich, J., Wild, S., and Nazarewicz, W. (2015). Uncertainty quantification for nuclear density functional theory and information content of new measurements. *Physical Review Letters*, 114, 122501.

Higdon D. (2015). Discussion of "Computer Experiments with Qualitative and Quantitative Variables: A Review and Reexamination." *Quality Engineering*, 27, 14-16.

Weaver, B. P., Warr, R. L., Anderson-Cook, C.M., and Higdon, D. (2015). Visualizing Discrepancies from Nonlinear Models and Computer Experiments. *Statistics and Modeling*, to appear.

M. S. Hamada, D. M. Higdon, J. Abes, C. Hills, and A. M. Peters. (2015). Illustrating How Science Can Be Incorporated Into a Nonlinear Regression Model. *Quality Engineering*, to appear.

H. O. Funsten, M. Bzowski, D. M. Cai, M. Dayeh, R. DeMajistre, P. C. Frisch, J. Heerikhuisen, D. M. Higdon, P. Janzen, B. A. Larsen, G. Livadiotis, D. J. McComas, E. Möbius, C. S. Reese, E. C. Roelof, D. B. Reisenfeld, N. A. Schwadron, and E. J. Zirnstein. (2015). Symmetry of the IBEX Ribbon of Enhanced Energetic Neutral Atom (ENA) Flux. *The Astrophysical Journal*, 799, 68.

D. Osthus, P. C. Caragea, D. Higdon, S. K. Morley, G. D. Reeves, and B. P. Weaver. (2014). Dynamic linear models for forecasting of radiation belt electrons and limitations on physical interpretation of predictive models. *Space Weather*, 12, 426–446.

Storlie, C. B., Lane, W. A., Ryan, E. M., Gattiker, J. R., and Higdon, D. M. (2014). Calibration of Computational Models with Categorical Parameters and Correlated Outputs via Bayesian Smoothing Spline ANOVA. *Journal of the American Statistical Association*, to appear.

Mehta, P.M., Walker, A., Lawrence, E., Linares, R., Higdon, D. M., and Koller, J. (2014). Modeling satellite drag coefficients with response surfaces. *Advances in Space Research*, to appear.

Higdon, D., McDonnell, J., Schunck, N., Sarich, J., and Wild, S. (2014). A Bayesian Approach for Parameter Estimation and Prediction Using a Computationally Intensive Model. *Journal of Physics G*, 42, 034009.

Schunck, N., McDonnell, J., Sarich, J., Wild, S., and Higdon, D. (2014). Error Analysis in Nuclear Density Functional Theory. *Journal of Physics G*, to appear.

Pratola,M.T., Chipman,H., Gattiker,J., Higdon,D., McCulloch,R. and Rust,W.N. (2014). Parallel Bayesian Additive Regression Trees, *Journal of Computational and Graphical Statistics*, 23, 830-852.

Heitmann, K., Lawrence, E., Kwan, J., Habib, S., and Higdon, D. (2014). The Coyote Universe Extended: Precision Emulation of the Matter Power Spectrum. *The Astrophysical Journal*, 780, 111.

Higdon, D., Pratola, M., Gattiker, J., Lawrence, E., Jackson, C., Tobis, M., Habib, S., Heitmann, K. and Price, S. (2013). Computer Model Calibration Using the Ensemble Kalman Filter, *Technometrics*, 55, 488-500.

Storlie,C. B., Fugate,M. L., Higdon, D., Huzurbazar,A. V., and Francois,E.G. and McHugh,D.C. (2013). Methods for Characterizing and Comparing Populations of Shock Wave Curves, *Technometrics*, 436-449.

Holsclaw, T., Sansó, B., Lee, H., Heitmann, K. and Habib, S., Higdon, D., and Alam, U. (2013). Gaussian process modeling of derivative curves, *Technometrics*, 55, 57–67.

Higdon, D., Geelhood, K., Williams, B., and Unal., C. (2013). Calibration of Tuning Parameters in the FRAPCON Model, *Annals of Nuclear Engineering*, 52, 95–102.

H. O. Funsten, R. DeMajistre, P. C. Frisch, J. Heerikhuisen, D. M. Higdon, P. Janzen, B. A. Larsen, G. Livadiotis, D. J. McComas, E. Möbius,8, C. S. Reese, D. B. Reisenfeld, N. A. Schwadron, and E. J. Zirnstein. (2013). Circularity of the IBEX Ribbon of Enhanced Energetic Neutral Atom (ENA) Flux. *The Astrophysical Journal*, 776, 30.

Nakhleh, C., Higdon, D., Allen, C. and Ryne, R. (2013). Bayesian reconstruction of particle beam phase space. In *Bayesian Theory and Applications* (P. Damien, P. Dellaportas, N. Polson, D. Stephens, eds). Oxford, 673-686.

National Research Council (2012). *Assessing the Reliability of Complex Models: Mathematical and Statistical Foundations of Verification, Validation, and Uncertainty Quantification*, National Academies Press, Washington D.C.

T. Bui-Thanh, O. Ghattas, and D. Higdon (2012). Adaptive Hessian-based non-stationary Gaussian process response surface method for probability density approximation with application to Bayesian solution of large-scale inverse problems, *SIAM Journal on Scientific Computing*, 34, A2837-A2871.

Higdon, D., Lawrence, E., Heitmann, K. and Habib, S. (2012). Simulation-aided inference in Cosmology. In *Statistical Challenges in Modern Astronomy V* (E. Feigelson, G.J. Babu, eds). Springer.

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Holsclaw, T., Alam, U., Sanso, B., Lee, H., Heitmann, K., Habib, S., and Higdon, D. (2010) Nonparametric Dark Energy Reconstruction from Supernova Data, *Physcial Review Letters*, 105, 241302.

Holsclaw, T., Alam, U., Sanso, B., Lee, H., Heitmann, K., Habib, S., and Higdon, D. (2010) Nonparametric Reconstruction of the Dark Energy Equation of State, *Physical Review D* 82, 103502.

Lawrence, E. and Higdon, D.. (2010) Comment on: Galaxy Formation: a Bayesian Uncertainty Analysis, *Bayesian Analysis*, 5, 683–690.

Higdon, D. (2010). Comments on: A general science-based framework for dynamical spatio-temporal models. *Test*, 19, 462–465.

Lawrence, E., Heitmann, K., White, M., Higdon, D., Wagner, C., Habib, S. and Williams, B. J. (2010). The Coyote Universe III: Simulation Suite and Precision Emulator for the Nonlinear Matter Power Spectrum. *Astrophysical Journal*, to appear.

Higdon, D., Reese, C.S., Moulton, J.D., Vrugt, J.A. and Fox, C. (2010). Posterior exploration for computationally intensive form models. In *Handbook of Markov Chain Monte Carlo* (A. Gelman, X. Meng, S. Brooks, G. Jones, eds). Chapman & Hall/CRC.

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Short, M., Higdon, D., Guadagnini, L., Guadagnini, A. and Tartakovsky, D. M. (2010). Predicting vertical connectivity within an aquifer system. *Bayesian Analysis*, 5, 557–582.

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Vrugt, J. A., Ter Braak, C. J. F., Diks, C. G. H., Robinson, B. A., Hyman, J. M., and Higdon, D. (2009). Accelerating Markov chain Monte Carlo simulation by differential evolution with self-adaptive randomized subspace sampling. *International Journal of Nonlinear Sciences and Numerical Simulation*, 10, 273-290.

Hamada, M. D. and Higdon, D. (2009) Illustrating the future prediction of performance based on computer code, physical experiments, and critical performance parameter samples. *Quality Engineering*, 21, 405-415.

Heitmann, K., Higdon, D., White, M., Habib, S., Williams, B. J., Lawrence, E. and Wagner, C. (2009). The Coyote Universe II. *Astrophysical Journal*, 705, 156–174.

Morris, M. D. and Higdon, D. (2009) Comments on Goldstein and Rougier, *Journal of Statistical Planning and Inference*, 139, 1249–1250.

Schneider, M. D., Knox, L., Habib, S., Heitmann, K., Higdon, D. and Nakhleh, C (2008). Simulations and cosmological inference: A statistical model for power spectra means and covariances. *Physical Review Letters D*, 78,063529.

Higdon, D., Nakhleh, C. and Williams, B. (2008). A Bayesian Calibration Approach to the Thermal Problem, *Computer Methods in Applied Mechanics and Engineering* 197, 2431–2441.

Sansó, B., Lee, H. K., Zhou, W. and Higdon, D., (2008). Inference for a Proton Accelerator Using Convolution Models, *Journal of the American Statistical Association*, 103, 604–613.

Higdon, D., Gattiker, J., Williams, B. and Rightley, M. (2008). Computer model calibration using high dimensional output, *Journal of the American Statistical Association*, 103, 570–583.

Higdon, D. and Gattiker, J. (2008) Comment on Sansó et al., *Bayesian Analysis*, 3, 39–44.

Kronberg, P. P., Bernet, M. L., Miniati, F., Lilly, S. J., Short, M. B. and Higdon, D. (2008) A global probe of cosmic magnetic fields to high redshifts. *Astrophysical Journal*, 676, 70–79.

Habib, S., Heitmann, K., Higdon, D., Nakhleh, C. and Williams, B. (2007). Cosmic Calibration: Constraints from the Matter Power Spectrum and the Cosmic Microwave Background. *Physical Review Letters D*, 76, 083503.

Short, M., Higdon, D., Kronberg, P. (2007). Estimation of Faraday Rotation Measures of the Near Galactic Sky Using Gaussian Process Models, *Bayesian Analysis*, 2, 665-680.

Unal, C., Williams, B., Higdon, D. and Nelson, R. (2007) Towards standardizing uncertainty estimations in reactor safety. *Transactions of the American Nuclear Society*, 96, 430–1.

Pasqualini, D., Heitmann, K., TenCate, J. A., Habib, S. and Higdon, D. (2007) Nonequilibrium and nonlinear dynamics in Berea and Fontainebleau sandstones: low-strain regime. *Journal of Geophysical Research-Solid Earth*, 112, B01204.

Gattiker, J. R., Lawrence, E. and Higdon, D. (2006) Analysis of multi-domain complex simulation studies. *Lecture Notes in Computer Science*, 3982, 1153–1162.

Heitmann, K., Higdon, D., Nakhleh, C. and Habib, S. (2006). Cosmic Calibration. *Astrophysical Journal Letters*, 646, L1.

Holloman, C. H., Lee, H. K. H. and Higdon D. M. (2006). Multiresolution Genetic Algorithms and Markov Chain Monte Carlo *Journal of Computational & Graphical Statistics*, 15, 861–879

Williams, B., Higdon, D., Moore, L., McKay, M. and Keller-McNulty S. (2006). Combining Experimental Data and Computer Simulations, with an Application to Flyer Plate Experiments, *Bayesian Analysis*, 1, 765–792.

Linkletter, C., Bingham, D., Hengartner, N., Higdon, D., and Ye, K. (2006). Variable selection for Gaussian process models in computer experiments. *Technometrics*, 48, 478–490.

Higdon, D. (2006). A Primer on space-time modelling from a Bayesian perspective. In *Statistics of Spatio-Temporal Systems* (B. Finkenstadt, L. Held, V. Isham, eds), 217–279. Chapman & Hall/CRC.

Christie, M. A., Glimm, J., Grove, J., Higdon, D., Sharp, D. H. and Wood-Schultz, M. M. (2005). Error Analysis and Simulations of Complex Phenomena. *Los Alamos Science*, 29, 6–25.

Lee, H., Higdon, D., Calder, K. and Holloman, C. (2005). Spatial Models via Convolutions of Intrinsic Processes. *Statistical Modelling*, 5, 1–21.

Lee, H., Sanso, B, Zhou, W and Higdon, D. (2005). Inferring Particle Distribution in a Proton Accelerator Experiment. *Bayesian Analysis*

Higdon, D., Kennedy, M., Cavendish, J., Cafeo, J. and Ryne R. D. (2004) Combining field observations and simulations for calibration and prediction. *SIAM Journal of Scientific Computing*, 26, 448–466.

Higdon, D., Williams, B., Moore, L., McKay, M. and Keller-McNulty S. (2004). Uncertainty Quantification for Combining Experimental Data and Computer Simulations, in *Society for Modeling and Simulation International*, D. Pace and S. Stevenson eds.

Nakhleh, C. and Higdon, D. (2004). Discussion of: When Can Finite Testing Ensure Infinite Trustworthiness? *Journal of the Iranian Statistical Society*, 3, 30–34.

J.A. TenCate, D. Psqualini, S. Habib, K. Heitmann, D. Higdon and P. Johnson (2004). Nonlinear and Nonequilibrium Dynamics in Geomaterials *Physical Review Letters*, 93, 6.

Lu, Z. M.,Higdon, D. and Zhang, D. X. (2004) A Markov chain Monte Carlo method for the groundwater inverse problem. *Developments in Water Science*, 55, 1273–1283. (also Spatial Modeling)

Higdon, D. (2004). Discussion of: Nonstationary Multivariate Process Modeling through Spatially Varying coregionalization. *Test*, 13, 298–303.

Higdon D., Lee, H. and Holloman, C. (2003). Markov chain Monte Carlo-based approaches for inference in computationally intensive inverse problems (with discussion) *Bayesian Statistics 7. Proceedings of the Seventh Valencia International Meeting*, 181–197.

Ferreira, M., West, M., Lee, H. K., Higdon D. and Bi, Z. (2003). Multi-scale Modelling of 1-D Permeability Fields *Bayesian Statistics 7. Proceedings of the Seventh Valencia International Meeting*, 181–197.

Bayarri, M.J., Berger, J.O., Higdon, D., Kennedy, M.C., Kottas, A., Paulo, R., Sacks, J., Cafeo, J.A., Cavendish, J., and Tu, J. (2002). A framework for the validation of computer models. *Society for Modeling and Simulation International*, D. Pace and S. Stevenson eds.

Higdon D. (2002). Space and space-time modeling using process convolutions, in *Quantitative Methods for Current Environmental Issues* (C. Anderson, et al. eds), 37–54, Springer, London. [102]

C. A. Calder, C. Holloman, D. Higdon (2002) Exploring Space-Time Structure in Ozone Concentration Using a Dynamic Process Convolution Model. *Bayesian Case Studies VI* (Kass et al. eds.). 165–176. Springer, New York.

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Lee, H., Higdon, D., Bi, Z., Ferreira, M., and West, M. (2002). Markov random field models for high-dimensional parameters in simulations of fluid flow in porous media. *Technometrics* **44**, 230–241.

Lee, Malallah, Datta-Gupta and Higdon (2002). Multiscale Data Integration using Markov random fields. To appear in *Society of Petroleum Engineers Journal.*

Higdon, D. M. and Yamamoto, S. Y. (2001), Bayesian Image Analysis in Scanning Magnetoresistance Microscopy, *Journal of the American Statistical Association* **96**, 785–793.

Higdon, D. (2001), Discussion of: The art of data augmentation, by D. vanDyk and X. L. Meng. *Journal of Computational and Graphical Statistics.*

Higdon, D. (2000), Discussion of: A Bayesian time-course model for functional magnetic resonance imaging data, by C. R. Genovese, *Journal of the American Statistical Association*, **95**, 705–706.

Borsuk, M., Higdon, D., and Stow C. (2000). A Bayesian hierarchical model to predict benthic oxygen demand from organic matter loading in estuaries and coastal zones. *Ecological Modelling.*

Baron, P. W., Sindram, D., Higdon, D., Howell, D. N. and Gottfried, M. R. (2000) Prolonged rewarming time during allograft implantation predisposes to recurrent hepatitis C infection after liver transplantation. *Liver Transplantation*, 6, 407–412.

Higdon, D. M. and Bowsher, J. E. (2000), Bayesian inference and Markov chain Monte Carlo in imaging. *Image Processing, Proceedings of SPIE*, vol 3661, 1–13.

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Higdon, D. M., Swall, J. and Kern, J. (1999), Non-Stationary Spatial Modeling, *Bayesian Statistics 6. Proceedings of the Sixth Valencia International Meeting*, 761–768.

Besag, J. E. and Higdon, D. M. (1999), Bayesian analysis of agricultural field experiments. (with Discussion) *J. R. Statis. Soc. B*, **61**, 691–746.

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Higdon, D. M. (1998), Estimation of Genetic Effects in the Presence of Spatial Trend and Censoring, *Proceedings of the 13th International Workshop on Statistical Modeling*, ed. B. Marx.

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Higdon, D. M. (1998), Auxiliary variable methods for Markov chain Monte Carlo with applications, *Journal of the American Statistical Association*, **93**, 585-595.

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Higdon, D., Lavine, M., Liu, J., Perreault, S. and Slott, V. (1997) Interpretation of CASA data using distribution based and multivariate statistical methods. *Journal of Andrology*, Supplement, 55–55.

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Besag, J. E., Higdon, D. M. and Mengersen K. (1995), Meta-analysis via Markov chain Monte Carlo: combining information through Bayesian random effects logistic regression, Discussion paper, ISDS, Duke University.

Besag, J., P. J. Green, D. Higdon, and K. Mengersen (1995), Bayesian computation and stochastic systems (with Discussion), *Statistical Science*, **10**, 3-66.

Higdon, D. M. (1993), Contribution: Spatial statistics and Bayesian computation (with Discussion), by J. Besag and P. J. Green. *Journal of the Royal Statistical Society, Series B,* **55,** 25-37.

Besag, J. E. and Higdon, D. M. (1993), Bayesian inference for agricultural field experiments. *Bull. Int. Statist. Inst.,* **55,** no.1, 121-136.

Other Activities

- Invited Speaker, CANSSI-SAMSI Summer School on Mathematical and Statistical Model Uncertainty, Vanouver BC, 2018
- Invited Panelist, National Academy of Sciences Data Science Workshop, Washington DC, 2018
- Invited Speaker, Symposium on Data Science & Statistics, Reston VA, 2018
- Invited Speaker, Joint Statistical Meetings, Baltimore MD, 2017
- Invited Speaker, National Academy of Sciences Data Driven Decision Making Symposium, Washington DC, 2017
- Plenary Speaker, SIAM Annual Meeting, Pittsburgh PA, 2017
- Invited Speaker, Joint Statistical Meetings, Chicago IL, 2016
- Conference Organizer, Workshop on Bayesian Statistics and Nuclear Theory hosted by the Institute for Nuclear Theory, University of Washington, Seattle WA, 2016
- Invited Speaker, Computational and Data Science and Engineering Days at the University at Buffalo, 2016

- Invited Speaker, From Industrial Statistics to Data Science, Ann Arbor MI, 2015
- Invited Speaker, Eastern North America Region, Biometrics Society, Miami FL, 2014
- Workshop Organizer, Workshop on Extrapolation, Las Vegas NV, 2013.
- Invited Speaker, International Symposium on Nonlinear Theory and its Applications, Santa Fe, 2013.
- Invited Speaker, Information and Statistics in Nuclear Experiment and Theory, Glasgow 2013.
- Invited Speaker, Spring Research Conference, Los Angeles 2013.
- Invited Speaker, ASA Meeting on Environmental Statistics, Raleigh NC, 2012.
- Short Course Presenter, UQ Summer School, USC 2012.
- Invited Speaker, Joint Statistical Meetings, San Diego 2012.
- Conference Organizer, ASA-SIAM Conference on UQ, Raleigh NC 2012.
- Invited Speaker, Conference on Data Analysis, Santa Fe NM 2012.
- Invited Speaker, Newton Institute, Cambridge UK 2011.
- Invited Speaker, Workshop on Statistics in Astronomy and Astrophysics, State College PA 2011.
- Invited Speaker, Verification, Validation, and Uncertainty Quantification Across Disciplines, Park City UT 2011.
- Organizing Committee, Fourth International IMS/ISBA Joint Meeting, 2011.
- Conference Organizer, Future Directions for Uncertainty Quantification in National Security Science, Santa Fe NM, 2010.
- Conference Organizer, Measurement Data and Uncertainty Quantification for a Greenhouse Gas Information System, Boulder CO, 2010.
- Instructor, Explorations in Statistics Research: An undergraduate summer program, Boulder CO, 2010.
- Invited Speaker, SAMSI Organizational Meeting on Uncertainty Quantification, RTP NC, 2010.
- Scientific Program Committee, Uncertainty in Complex Models Workshop, Sheffield UK, 2010.
- Invited Speaker, Foro Nacional de Estadistica, Texcoco, Mexico, 2009.
- Invited Speaker, Joint Statistical Meetings, Washington DC, 2009.
- Invited Speaker, Joint Statistical Meetings, Denver CO, 2008.
- Invited Speaker, Workshop on Computer Model Evaluation, Sydney, Australia, 2008.
- Invited Speaker, ISBA World Meeting 8, Hamilton Island, Australia, 2008.
- Invited Speaker, University of British Columbia Summer School on Monte Carlo Methods, Vancouver, Canada, 2008
- Invited Speaker, BIRS Workshop on Climate Change Impacts on Ecology and the Environment, Banff, Canada, 2008
- Invited Speaker, International Environmetrics Society, Kelowna, Canada, 2008
- Invited Speaker, Spring Researcher's Conference, Atlanta GA, 2008
- Invited Speaker, IMAC, Orlando FL, 2008
- Invited Speaker, Workshop on Data-driven and Physically-based Models for Characterization of Processes in Hydrology, Hydraulics, Oceanography and Climate Change, Singapore, 2008
- Invited Speaker, Workshop on Bayesian Case Studies, Pittsburgh PA, 2007
- Invited Speaker, SAMSI Workshop on Computer Models, RTP NC, 2007
- Invited Speaker, Eastern North America Region, Biometrics Society, Atlanta GA, 2007.
- Speaker, Predictive Science Panel, Los Alamos NM, 2006
- Invited Speaker, LACSI Symposium, Santa Fe NM, 2006
- Invited Speaker, SAMSI Kickoff Workshop on Computer Models, RTP NC, 2006
- Invited Speaker, Joint Statistical Meetings, Seattle WA, 2006.
- Invited Speaker, Valencia 8, Benidorm, Spain, 2006.
- IMS Program Chair (contributed talks), Joint Statistical Meetings 2005.
- Invited Speaker, COBAL 2, San Juan de Los Cabos, Mexico, 2005.
- Invited Presenter at SEMSTAT '04, Munich Germany, 2004.
- The Invited Presenter at the Summer Institute in Statistics, Brigham Young University, Provo UT, 2004.
- Program Chair, WNAR 04, Albuquerque NM, 2004.
- Invited Speaker, Workshop on Statistical Computer Model Evaluation, Banf, Canada, 2004.
- Invited Speaker, ISBA World Meeting 7, Viña del Mar, Chile, 2004.

- Short Course in Spatial Modeling at RAND, Santa Monica, CA, 2003.
- Invited Speaker, SAMSI Workshop on Multiscale Modeling, RTP, NC, 2003.
- Invited Speaker, IPAM Inverse Problem Workshop, Lake Arrowhead, CA, 2003.
- Invited Speaker, Statistical Society of Canada Meeting, Halifax, NS, 2003.
- Invited Speaker, IMS/WNAR Regional Meeting, Golden, CO, 2003.
- Invited Speaker, Joint Statistical Meetings, San Francisco, CA, 2003.
- Invited Speaker, Workshop on Bayesian Analysis, Santa Cruz, CA, 2003.
- Conference Organizer; Seventh Workshop on Case Studies in Bayesian Statistics Pittsburgh, Pennsylvania, September, 2003
- Invited Speaker, 1st Latin American Meeting on Bayesain Statistics (COBOL I) Ubatuba, Brazil February, 2002
- Guest Associate Editor for Statistical Modelling.
- Invited Speaker; IMS/ENAR Spring Regional Meeting Washington D.C., 2002.
- Invited Speaker; 7th Valencia International Meeting on Bayesian Statistics, Tenerife, Spain, 2002.
- Invited Speaker; IMS/WNAR Regional Meeting, Los Angeles, CA, 2002.
- Invited Speaker; IMS/ENAR Spring Regional Meeting Charlotte, North Carolina March, 2001
- Conference Organizer: Second Workshop on Bayesian Inference In Stochastic Processes Villa Monastero, Varenna (LC), Italy May-June, 2001
- Workshop Organizer and Invited Speaker, Workshop on spatial moving average models, Seattle WA, July 2001
- Conference Organizer; Sixth Workshop on Case Studies in Bayesian Statistics Pittsburgh, Pennsylvania, September, 2001
- Invited Speaker, TIES 2001 Conference Portland, Oregon August, 2001
- Invited talk at TIES/SPRUCE (The International Environmetrics Society and Statistics in Public Resources and Utilities, and in Care of the Environment) International Conference. Sheffield UK, September 2000.
- Invited discussant of the JASA case study session, Joint Statistical Meetings, Indianapolis IN, Aug 2000.
- Invited speaker at the Workshop on Statistics for Large Datasets, NCAR, Boulder CO, July 2000.
- Invited Speaker, Workshop on Hierarchical Modeling in Environmental Statistics Ohio State University, Columbus, OH May 2000
- Invited speaker at Biometrics Society Meeting, Eastern North America Region, Chicago IL, March 2000.
- Invited talk at the Joint Statistical Meetings, Baltimore MD, August 1999
- Invited speaker at Lukac's Symposium on the Environment, Bowling Green OH, April 1999
- Keynote Address at the SPIE (International Society for Optical Engineering) meeting on Medical Imaging, San Diego Winter 1999.
- Read Paper before the Royal Statistical Society, London, Fall 1998.
- Invited talk at the Meeting on Stochastic Processes, Madrid, Spain, Spring 1998.
- Invited paper at Interface 97, Houston TX, Spring 1997.

Grant Awards

Robustness and scale in spatial applications of Markov chain Monte Carlo for Bayesian inference. PI. National Science Foundation Grant DMS-9505114 ($40,000).

Non-stationary models for spatial statistics and Bayesian image analysis. PI. National Science Foundation Grant DMS-9704425 ($141,000).

Multiscale Modeling and Simulation in Scientific Inference: Hierarchical Methods for Parameter Estimation in Porous Flow. Co-PI with John Trangenstein (Math) and Zibigniew Kabala (Civil and Environmental Engineering) National Science Foundation Grant DMS-9873275 ($2,300,000).

Framework for Statistical Evaluation of Complex Computer Models. Co-PI with Alan Karr (National Institute of Statistical Sciences), Jim Berger and Jerry Sacks (ISDS, Duke University), and Susie Bayarri (Universitat de Valencia), National Science Foundation Grant DMS-0073952 ($900,000).

Spatial-Temporal Models for Health Effects. Co-PI with Merlise Clyde (ISDS, Duke University) and Robert Wolpert (ISDS, Duke University). Environmental Protection Agency Grant, 2000–2003 ($558,000).

Statistical Methodology for Spatial Modeling and Interpolation of Air and Deposition Pollutants. Co-PI with Montserrat Fuentes (Statistics, North Carolina State University). Environmental Protection Agency Statistical COOP 2000–2003 ($500,000).

Multiscale Modeling and Parameter Estimation. PI. Los Alamos National Laboratory LDRD-ER 2001–2003.

Distributed Markov Chain Monte Carlo for Inverse Problems. PI. Los Alamos National Laboratory LDRD-ER 2002–2005.

Carbon Sequestration. Co-PI with Don Zhang. Los Alamos National Laboratory LDRD-DR 2003–2006.

Multilevel Adaptive Sampling for Multiscale Inverse Problems. Co-PI with David Moulton. Los Alamos National Laboratory LDRD-ER 2006–2009.

Uncertainty Quantification for Large-Scale Ice Sheet Models. Co-PI with Omar Ghattas. Dept. of Energy, Advanced Scientific Computing Research, 2009-2011.

Quantification of Uncertainty in Extreme Scale Computations. Co-PI. Dept. of Energy, Scientific Discovery through Advanced Computing, 2011-2015.

Uncertainty Quantification in the Nuclear Computational Low Energy Initiative. Dept. of Energy, Scientific Discovery through Advanced Computing, 2012-2015.

Uncertainty Quantification in Plasma-Surface Interactions. Dept. of Energy, Scientific Discovery through Advanced Computing, 2012-2015.

Uncertainty Quantification in Computation-Driven Discovery for the Dark Universe. Dept. of Energy, Scientific Discovery through Advanced Computing, 2012-2014.

End to End Digitization and Supply Chain Modeling Framework. Co-PI with Sallie Keller. Proctor & Gamble, 2015-2017.

Feasibility and Efficacy of Matching Public Records with Sample Surveys. Co-PI with Sallie Keller. Census Bureau (United States Department of Housing and Urban Development), 2015-2016.

Initiative Launch Inventory Analysis. PI with Gizem Korkmaz. Proctor & Gamble, 2015.

Accelerating HEP Science: Inference and Machine Learning at Extreme Scales. PI. Dept. of Energy, Scientific Discovery through Advanced Computing, 2017-2022.

Addressing the Office of Emergency Operations (OEM) Questions Through Data and a Review of the Literature. PI. Fairfax County, Office of Emergency Management, 2016-2017.

Leveraging Local Data Sources to Build a Comprehensive Community-Based Understanding of Complex National Health Problems. PI. MITRE Corporation, 120081, 2018.

Towards an Integrated Data Framework for Understanding the Context of Military Environments. co-PI. Army Research Institute, 2015-2018.

Dissertations Supervised

Jenise Swall (1999) *Non-stationary spatial modeling using a process convolution approach.*
John Kern (2000) *Bayesian Process-Convolution Approaches to Specifying Spatial Dependence Structure.*
Chris Holloman (2002) *Parameter Estimation Algorithms for Computationally Intensive Spatial Problems*
Catherine Calder (2003) *Exploring Latent Structure in Spatial Temporal Processes Using Process Convolutions*