

ROBERT BRANDON GRAMACY

CONTACT INFO

Department of Statistics (MC0439)
Hutcheson Hall, Virginia Tech
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RESEARCH INTERESTS

Bayesian modeling methodology, statistical computing, machine learning, Monte Carlo inference, nonparametric regression, sequential design, and optimization under uncertainty. Application areas include spatial data, computer experiments, ecology, epidemiology, finance and public policy.

EDUCATION

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

Ph.D. Applied Mathematics & Statistics, December 2005, advised by Herbert K.H. Lee
Dissertation: *Bayesian treed Gaussian process models*

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

M.Sc. Computer Science, April 2003, advised by Manfred K. Warmuth
Thesis: *Adaptive Caching by Experts*

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

College Honors; 4.00 GPA

B.Sc. (Highest Honors) Computer Science, June 2001

Honors Thesis: *Shortest Paths and Network Flow Algorithms for ESD Analysis*

B.A. (Honors) Mathematics, June 2001

Project: *Combinatorial Optimization by Matchings*

PROFESSIONAL POSITIONS

Professor of Statistics, Department of Statistics, VIRGINIA TECH	2016 – pres
Associate Professor of Statistics, Booth School of Business, UNIV. OF CHICAGO	2014 – 2016
Fellow , COMPUTATION INSTITUTE Argonne/UCicago	2013 – 2016
Assistant Professor of Statistics, Booth School of Business, UNIV. OF CHICAGO	2010 – 2014
Lecturer of Statistical Science, Statistical Laboratory, UNIV. OF CAMBRIDGE, UK	2006 – 2010
Fellow , JESUS COLLEGE Cambridge	2006 – 2010
Visiting Professor , Dept. of Probability and Statistics, UC SANTA BARBARA	2009
Postdoc , Statistical Laboratory under Steve Brooks, UNIV. OF CAMBRIDGE, UK	2006

HONORS & AWARDS

Facebook Faculty Award; 2016
Robert King Steel Faculty Fellow; 2014-2015
Kemper Family Foundation Scholar; 2011-2012
R in Finance best academic paper prize; 2011
INQUIRE UK/Europe best paper prize, 1 of 2 winners; 2008
Savage Award for best Ph.D. thesis in Bayesian applied methodology; 2006
ASA Statistical Computing & Graphics student paper competition, 1 of 4 winners; 2005
UCSC Applied Math & Stats nomination for UC Presidents Dissertation fellowship; 2005
Huffman Prize, given to the top graduating UCSC Engineering student; 2001
Chancellor's Award, UC Santa Cruz; 2001
Dean's Award, UC Santa Cruz Baskin Engineering School; 2001
UCSC Student Employee of the Year; 2000

PEER-
REVIEWED
JOURNAL
ARTICLES

- L.R. Johnson, R.B. Gramacy, J. Cohen, E. Mordecai, C. Murdock, J. Rohr, S.J. Ryan, A.M. Stewart-Ibarra, D. Weikel. *Phenomenological forecasting of disease incidence using heteroskedastic Gaussian processes: a dengue case study* (2017) *Annals of Applied Statistics*, to appear; arXiv:1702.00261
- T. Graves, R.B. Gramacy, C.L.E. Franzke, N.W. Watkins. *A brief history of long memory: Hurst, Mandelbrot and the Road to ARFIMA, 1951-1980*. (2017) *Entropy*, 19(9); arXiv:1406.6018
- C-L. Sung, R.B. Gramacy, B. Haaland. *Potentially Predictive Variance Reducing Subsample Locations in Local Gaussian Process Regression* (2017) *Statistica Sinica*, to appear; arXiv:1604.04980
- T. Graves, C.L.E. Franzke, N.W. Watkins, R.B. Gramacy, E. Tindale. *Systematic inference of the long-range dependence and heavy-tail distribution parameters of ARFIMA models* (2017) *Physica A*, 473, pp. 60–71
- R.B. Gramacy, B. Haaland. *Speeding up neighborhood search in local Gaussian process prediction*. (2016) *Technometrics*, 58(3), pp. 294–303; arXiv:1409.0074
- R.B. Gramacy, `laGP`: *Large-scale spatial modeling via local approximate Gaussian processes in R*. (2016) *Journal of Statistical Software*, 72(1), pp. 1–46; available as a vignette in `laGP` on CRAN
- S.W. Malone, R.B. Gramacy, E. ter Horst. *Timing foreign exchange markets*. (2016) *Econometrics*, 4(1), 15; SSRN:2154035
- R.B. Gramacy, G.A. Gray, S. Le Digabel, H.K.H. Lee, P. Ranjan, G. Wells, S. Wild. *Modeling an augmented Lagrangian for improved blackbox constrained optimization* (2016) *Technometrics* (with discussion), 58(1), pp. 1–11; arXiv:1403:4809
- R.B. Gramacy, D. Bingham, J.P. Holloway, M.J. Grosskopf, C.C. Kuranz, E. Rutter, M. Trantham, R.P. Drake. *Calibrating a large computer experiment simulating radiative shock hydrodynamics*. (2015) *Annals of Applied Statistics*, 9(3); pp. 1141–1168; arXiv:1410.3293
- R.B. Gramacy, M. Ludkovski. *Sequential design for optimal stopping problems*. (2015) *SIAM Journal on Financial Mathematics*, 6(1), pp. 748–775; arXiv:1309.3832
- R.B. Gramacy, and D.W. Apley. *Local Gaussian process approximation for large computer experiments*. (2015) *Journal of Computational and Graphical Statistics*, 24(2), pp. 561–578; arXiv:1303.0383
- T. Graves, R.B. Gramacy, C.L.E. Franzke, N.W. Watkins. *Efficient Bayesian inference for natural time series using ARFIMA processes*. (2015) *Nonlinear Processes in Geophysics*, 22, pp. 679–700; arXiv:1403:2940
- R.B. Gramacy, S. Le Digabel. *The mesh adaptive direct search algorithm with treed Gaussian process surrogates*. (2015) *Pacific Journal of Optimization*, 11(3), pp. 419–447; Les cahiers du GERAD #G-2011-37; OO:2011-07-3090
- R.B. Gramacy, S.W. Malone, E. ter Horst. *Exchange rate fundamentals, forecasting, and speculation: Bayesian models in black markets*. (2014) *Journal of Applied Econometrics*, 29(1), pp. 22–41
- R.B. Gramacy, J. Niemi, R. Weiss. *Massively parallel approximate Gaussian process regression*. (2014) *Journal of Uncertainty Quantification*, 2(1), pp. 564–584; arXiv:1310.5182

- D.D. Creal, R.B. Gramacy, R.S.Tsay. *Market-based credit ratings*. (2014) *Journal of Business and Economic Statistics*, 32(3), 430–444; SSRN:2310260
- C. Anagnostopoulos, R.B. Gramacy. *Information-Theoretic Data Discarding for Dynamic Trees on Data Streams*. (2013) *Entropy*, 15(12), 5510–5535; arXiv:1201.5568
- H. Chipman, E.I. George, R.B. Gramacy, R. McCulloch. *Bayesian treed response surface models*. (2013) *WIREs Data Mining and Knowledge Discovery*, 3(4)
- Y. Hua, R.B. Gramacy, H. Lian. *Bayesian quantile regression for single-index models*. (2013) *Statistics and Computing*, 23(4), 437–454; arXiv:1110.0219
- R.B. Gramacy, M.A. Taddy, S.M. Wild. *Variable selection and sensitivity analysis via dynamic trees with an application to computer code performance tuning*. (2013) *Annals of Applied Statistics*, 7(1), pp. 51–80; arXiv:108.4739
- R.B. Gramacy, S.T. Jensen, M.A. Taddy. *Estimating player contribution in hockey with regularized logistic regression*. (2013) *Journal of Quantitative Analysis in Sports*, 9(1), pp. 97–111; arXiv:1209.5026
- J.D. Lawrence, R.B. Gramacy, L. Thomas, S.T. Buckland. *The importance of prior choice in model selection: a density dependence example*. (2013) *Methods in Ecology and Evolution*, 4(1), pp. 25–33; arXiv:1108.4912
- R.B. Gramacy, N.G. Polson. *Simulation-based regularized logistic regression*. (2012) *Bayesian Analysis*, 7(3), pp. 567–590; arXiv:1005.3430
- R.B. Gramacy, H.K.H. Lee. *Cases for the nugget in modeling computer experiments*. (2012) *Statistics and Computing*, 22(3), pp. 713–722; arXiv:1007.4580
- R.B. Gramacy, H. Lian. *Gaussian process single-index models as emulators for computer experiments*. (2012) *Technometrics*, 54(1), pp. 30–41; arXiv:1009.4241
- C.L.E. Franzke, T. Graves, N.W. Watkins, R.B. Gramacy, C. Hughes. *Robustness of estimators of long-range dependence and self-similarity under non-Gaussianity*. (2012) *Philosophical Transactions of the Royal Society A*, 370(1962), pp. 1250–1267; arXiv:1101.5018
- M.A. Taddy, R.B. Gramacy, N.G. Polson. *Dynamic trees for learning and design*. (2011) *Journal of the American Statistical Association*, 106(493), pp. 109–123; arXiv:0912.1586
- R.B. Gramacy, N.G. Polson. *Particle learning of Gaussian process models for sequential design and optimization*. (2011) *Journal of Computational and Graphical Statistics*, 20(1), pp. 102–118; arXiv:0909.5262
- T. Broderick, R.B. Gramacy. *Classification and categorical inputs with treed Gaussian process models*. (2011) *Journal of Classification*, 28(2), 244–270; arXiv:0904.4891
- H.K.H. Lee, R.B. Gramacy, C. Linkletter, G.A. Gray. *Optimization Subject to Hidden Constraints via Statistical Emulation*. (2011) *Pacific Journal of Optimization*, 7(3), pp. 467–478; UCSC-SOE-10-10
- D. Merl, L.R. Johnson, R.B. Gramacy, M. Mangel. *amei: an R package for the Adaptive Management of Epidemiological Interventions*. (2010) *Journal of Statistical Software*, 36(6)

- R.B. Gramacy, E. Pantaleo. *Shrinkage regression for multivariate inference with missing data, and an application to portfolio balancing*. (2010) *Bayesian Analysis*, 5(2), pp. 1–26; arXiv:0907.2135
- R.B. Gramacy, M.A. Taddy. *Categorical inputs, sensitivity analysis, optimization and importance tempering with `tgp` version 2, an R package for treed Gaussian process models*. (2010) *Journal of Statistical Software*, 33(6)
- R.B. Gramacy, R.J. Samworth, R. King. *Importance tempering*. (2010) *Statistics and Computing*, 20(1), pp. 1–7; arXiv:0707.4242
- D. Merl, L.R. Johnson, R.B. Gramacy, M.S. Mangel. *A statistical framework for the adaptive management of epidemiological interventions*. (2009) *PLoS ONE* 4(6): e5087
- R.B. Gramacy, H.K.H. Lee. *Adaptive design and analysis of supercomputer experiments*. (2009) *Technometrics*, 51(2), pp. 130–145; arXiv:0805.4359
- M.L. Cule, R.B. Gramacy, R.J. Samworth. *LogConcDEAD: an R package for maximum likelihood estimation of a multivariate log-concave density*. (2009) *Journal of Statistical Software*, 29(2)
- R.B. Gramacy, H.K.H. Lee. *Bayesian treed Gaussian process Models with an application to computer modeling*. (2008) *Journal of the American Statistical Association*, 103(483), pp. 1119–1130; arXiv:0710.5837
- R.B. Gramacy, H.K.H. Lee. *Gaussian Processes and Limiting Linear Models*. (2008) *Computational Statistics and Data Analysis*, 53, pp. 123–136; arXiv:0804.4685 (full version of JSM06)
- R.B. Gramacy. *`tgp`: an R package for Bayesian nonstationary, semiparametric nonlinear regression and design by treed Gaussian process models*. (2007) *Journal of Statistical Software*, 19(9)
- V. Picheny, R.B. Gramacy, S.M. Wild, S. Le Digabel. *Bayesian optimization under mixed constraints with a slack-variable augmented Lagrangian*. (2016) *Advances in Neural Information Processing Systems (NIPS)*, 29, pp. 1435–1443; arXiv:1605.09466
- P. Balaprakash, K. Rupp, A. Mametjanov, R.B. Gramacy, P.D. Hovland, S.M. Wild. *Empirical performance modeling of GPU kernels using active learning*. (2014) *ParCo 2013 proceedings in Parallel Computing: Accelerating Computational Science and Engineering (CSE)* vol. 25, pp. 646–655; ANL/MCS-P4097-0713
- P. Balaprakash, R.B. Gramacy, S. Wild. *Active-Learning-Based Surrogate Models for Empirical Performance Tuning*. (2013) in *IEEE Cluster 2013 proceedings*; ANL/MCS-P4073-0513
- R. Silva, R.B. Gramacy. *Gaussian Process Structural Equation Models with Latent Variables*. (2010) in *Proceedings of the 26th Conference on Uncertainty in Artificial Intelligence (UAI 2010)*, Catalina Island, California, 8-11 July. P. Grunwald, P. Spirte, editors
- T. Broderick, R.B. Gramacy. *Treed Gaussian Process Models for Classification*. (2010) Hermann Locarek-Junge, Claus Weihs (Eds.): *Classification as a Tool for Research*. in *Proc. of the International Federation of Classification Societies (IFCS-09)*, University of Dresden, Germany, 13-18 March, 2009. Springer-Verlag, Heidelberg-Berlin, pp. 101–108
- R. Silva, R.B. Gramacy. *MCMC Methods for Bayesian Mixtures of Copulas*. (2009) In D. van Dyk and M. Welling (Eds.), *Proceedings of the Twelfth International Conference on Artificial Intelligence and Statistics (AISTATS)*, Clearwater Beach, Florida, April 16-18. *JMLR: W&CP* 5:512-519

**PEER-
REVIEWED
CONFERENCE
PROCEEDINGS**

G.A. Gray, M. Martinez-Canales, M.A. Taddy, H.K.H. Lee, and R.B. Gramacy, *Enhancing Parallel Pattern Search Optimization with a Gaussian Process Oracle*, SAND2006-7946C. (2006) Proceedings of the 14th NECDC

R.B. Gramacy, H.K.H. Lee, W.G. MacReady. *Parameter Space Exploration with Gaussian Process Trees*. (2004) ICML Proceedings, Banff, AB (Omnipress, pp. 353–360)

R.B. Gramacy, M.K. Warmuth, S.A. Brandt, I. Ari. *Adaptive Caching by Refetching*. (2003) Advances in Neural Information Processing Systems 15, (MIT Press, pp. 1465–1472)

I. Ari, A. Amer, R.B. Gramacy, E.L. Miller, S.A. Brandt, D.D.E. Long. *ACME: Adaptive Caching using Multiple Experts*. WDAS 2002, (Carlton Scientific); 2002

**BOOK
CHAPTERS &
INVITED
PAPERS**

R.B. Gramacy, M. Taddy, S. Tian. “Hockey player performance via regularized logistic regression.” (2016) chapter in *Handbook of Statistical Methods for Design and Analysis in Sports*. J. Albert, M. Glickman, R. Koning, and T. Swartz, editors; CRC Press; arXiv:1510.02172

R.B. Gramacy. “Gibbs sampling for ordinary, robust and logistic regression with Laplace priors.” (2013) chapter in *Bayesian Theory and Applications* honoring Adrian Smith. P. Damien, P. Dellaportas, N.G. Polson and D.A. Stephens, editors; pp. 466-482, Oxford University Press

R.B. Gramacy, H.K.H. Lee. “Optimization under unknown constraints”, with discussion. (2011) in *Bayesian Statistics 9*. J.M. Bernardo, M.J. Bayarri, J.O. Berger, A.P. Dawid, D. Heckerman, A.F.M. Smith, M. West, editors; Oxford University Press

H.K.H. Lee, M.A. Taddy, R.B. Gramacy, G.A. Gray. “Designing and analyzing a circuit device experiment using treed Gaussian processes.” (2010) in *Handbook of Applied Bayesian Analysis*. A. O’Hagan and M. West, editors; Oxford University Press

IN REVIEW

F. Sun, R.B. Gramacy, B. Haaland, E. Lawrence, A. Walker. *Emulating satellite drag from large simulation experiments* (2017); arXiv:1712.0018

M.J. Heaton, A. Datta, A. Finley, R. Furrer, R. Guhaniyogi, F. Gerber, R.B. Gramacy, D. Hammerling, M. Katzfuss, F. Lindgren, D.W. Nychka, F. Sun, A. Zammit–Mangion. *Methods for Analyzing Large Spatial Data: A Review and Comparison* (2017); arXiv:1710.05013

M. Binois, J. Huang, R.B. Gramacy, M. Ludkovski. *Replication or exploration? Sequential design for stochastic simulation experiments* (2017); arXiv:1710.03206

M. Binois, R.B. Gramacy, M. Ludkovski. *Practical heteroskedastic Gaussian process modeling for large simulation experiments* (2016); arXiv:1611.05902

**OTHER
PUBLICATIONS**

I. Crandell, A.J. Millican, R. Vasta, S. Leman, E. Smith, N. Alexander, W. Devenport, R.B. Gramacy, M. Binois. *Anomaly detection in large-scale wind tunnel tests using Gaussian processes* (2017) 33rd AIAA Aerodynamic Measurement Technology and Ground Testing Conference.

R.B. Gramacy, G.A. Gray, S. Le Digabel, H.K.H. Lee, P. Ranjan, G. Wells, S. Wild. *Rejoinder (to Modeling an augmented Lagrangian for improved blackbox constrained optimization)* (2016) *Technometrics*, 58(1), pp. 26–29

G.A. Gray, J-P. Watson, C. Silva, R. Gramacy, *Quantifiably secure power grid operation, management and evolution: a study of uncertainties affecting the grid integration of renewables*. (2013) Technical Report SAND2013-7886

R.B. Gramacy. *Comment: on advances in expected improvement*. An invited discussion of “Quantile-Based Optimization of Noisy Computer Experiments with Tunable Precision” by V. Picheny, D. Ginsbourger and G. Caplin. (2013) *Technometrics*, 55(1), pp. 19–20.

J. Gerakos, R.B. Gramacy. *Regression-based earnings forecasts*. (2012); SSRN:2112137

C. Anagnostopoulos, R.B. Gramacy. *Dynamic trees for online analysis of massive data*. (2011) NIPS workshop on Bayesian Optimization, Experimental Design and Bandits (Granada, Spain)

R.B. Gramacy `tgp`: *an R package for nonlinear regression by treed Gaussian processes*. (2009) ISBA Bulletin, Software Spotlight; September 16(3)

R.B. Gramacy. *A review of “Ecological Models and Data in R” by Benjamin Bolker*. (2009) *The American Statistician*, August, Vol. 63, No. 3, pp. 281–282

R.B. Gramacy, J.H. Lee, R. Silva. *On estimating covariances between many assets with histories of highly variable length*. (2007) arXiv:0710.5837

M.L. Martinez-Canales, L.P. Swiler, P.D. Hough, G.A. Gray, M.L. Chiesa, R. Heaphy, S.W. Thomas, T.G. Trucano, H.K.H. Lee, M. Taddy, R.B. Gramacy. *Penetrator Reliability Investigation and Design Exploration: From Conventional Design Processes to Innovative Uncertainty-Capturing Algorithms*. (2006) Sandia Report SAND2006-7669

R.B. Gramacy, H.K.H. Lee. *Gaussian Processes and Limiting Linear Models*. (2006) Proceedings of the Joint Statistical Meetings of the ASA, Section on Bayesian Statistical Science, Seattle, WA

R.B. Gramacy, H.K.H. Lee, W.G. MacReady. *Adaptive exploration of computer experiment parameter spaces*. (2004) ISBA Bulletin, Applications; December 11(4), pp. 3–6

P. Ngan, D. Oliver, T. Smedes, R. Gramacy, C-K Wong. *Automatic Layout Based Verification of Electrostatic Discharge Paths*. (2001) EOS/ESD Symposium, Portland OR (pp. 96)

THESES

Ph.D. Thesis, Department of Applied Math & Statistics. *Bayesian treed Gaussian process models*. (2005) UC Santa Cruz; UCSC S&E Library: GRAD COMPSCI 2005 G73

Masters Thesis, Department of Computer Science. *Adaptive Caching by Experts*. (2003) UC Santa Cruz; UCSC S&E Library: Q325.5 .G73 2003

Honors Senior Thesis, Department of Computer Science. *Shortest paths and network flow algorithms for Electrostatic Discharge analysis* (2001) UC Santa Cruz

**OPEN SOURCE
SOFTWARE**

laGP: An R-package for local approximate Gaussian process regression.
<http://cran.r-project.org/web/packages/laGP/index.html>

reglogit: An R-package for regularized logistic regression by Gibbs sampling.
<http://cran.r-project.org/web/packages/reglogit/index.html>

dynaTree: An R-package for dynamic tree regression and classification modeling for learning and design; with Matt Taddy. <http://cran.r-project.org/web/packages/dynaTree/index.html>

plgp: An R-package for particle learning of Gaussian process regression and classification models, facilitating sequential design and constrained optimization under uncertainty.
<http://cran.r-project.org/web/packages/plgp/index.html>

BART: An R-package for Bayesian Additive Regression Trees; with Robert McCulloch, Rodney Sparapani, Matthew Pratola, Jean-Sebastien Roy, Makoto Matsumoto, Takuji Nishimura. <http://cran.r-project.org/web/packages/BART/index.html>

tgp: An R-package for Bayesian nonstationary, nonlinear regression and design with treed Gaussian processes; with Matt Taddy. <http://cran.r-project.org/web/packages/tgp/index.html>

LogConcDEAD: An R-package for maximum likelihood estimation of nonparametric log-concave densities in arbitrary dimension; with M. Cule and R.J. Samworth.
<http://cran.r-project.org/web/packages/LogConcDEAD/index.html>

monomvn: An R-package for shrinkage regression and multivariate normal/Student-*t* inference with monotone missingness. <http://cran.r-project.org/web/packages/monomvn/index.html>

amei: An R-package for the Adaptive Management of Epidemiological Interventions; with Dan Merl, Leah Johnson, and Marc Mangel. <http://cran.r-project.org/web/packages/amei/index.html>

geometry: An R-package for mesh generation and surface tessellation; with Raul Grassman.
<http://cran.r-project.org/web/packages/geometry/index.html>

maptree: An R-package for mapping, pruning, and graphing tree models; with Denis White.
<http://cran.r-project.org/web/packages/maptree/index.html>

GRANTS

DOE LAB 17-1697 sub to Argonne National Laboratory for SciDAC/DOE Office of Science ASCR and High Energy Physics: *Accelerating HEP Science: Inference and Machine Learning at Extreme Scales*. [Co-PI] under PI David Higdon (VTBI), awarded in Jan 2018 for 5 years. 41% credit of total award of \$950,000 \$389,500

Socially Determined health analytics project. [Co-PI] Awarded for Summer 2017. 20% credit of total award of \$44,484 \$8,897

Facebook Faculty Award, 2016, unrestricted gift via host institution \$25,000

National Science Foundation (NSF), CDS&E-MSS/Collaborative Research: *Local Approximation for Large Scale Spatial Modeling*. [PI] Awarded in August 2016 for 3 years, collaborative with [PI] Ben Haaland (GA Tech). Total award is \$225,000. \$150,000

National Science Foundation (NSF), CDS&E-MSS/Collaborative Research: *Sequential Design for Stochastic Control: Active Learning of Optimal Policies*. [PI] Awarded in September 2015 for 3 years, collaborative with [PI] Mike Ludkovski (UCSB). Total award is \$449,889. \$228,497

American Institute for Mathematics (AIM) SQuaRE for *Robustness for black-box optimization*. [PI] Funds travel/subsistence for 6 people to visit AIM in Palo Alto: three one week trips in 2011–2013.

INstitute for QUantitative Investment REsearch (INQUIRE) UK 2009/05 for *Fast, robust, and dynamic Bayesian updating of large scale between–asset covariances for balancing portfolios*. [PI] Awarded in October 2009 for 2 years. £8,190

UK Engineering and Physical Sciences Research Council (EPSRC) EP/D065704/1 for *Trans-dimensional Markov Chain Simulation for both Bayesian and Classical Model Determination* [PI] Awarded in October 2006 for 3 years. £286,881

TALKS & SEMINARS

Key: **S** ≡ Seminar < 60m; **IT** ≡ Invited Talk < 35m; **RT** ≡ Refereed Talk < 35m; **K** ≡ Keynote

Replication or exploration? Sequential design for stochastic simulation experiments

IT	Feb 2018	Isaac Newton Institute , Cambridge, UK
IT	Nov 2017	Joint Statistical Meetings , Baltimore, MD, USA
IS	Mar 2017	Virginia Tech Dept. of Industrial & Systems Eng, Blacksburg, VA, USA
IS	Feb 2017	Virginia Commonwealth Univ Dept. of Math & Stat, Richmond, VA, USA

Statistical optimization under blackbox constraints

IT	Dec 2017	UC Santa Barbara Dept. of Probability & Statistics, Santa Barbara, CA, USA
IT	Oct 2016	Virginia Tech Department of Mathematics, Blacksburg, VA, USA
IT	Jan 2016	University of Florida Informatics Institute, Gainesville, FL, USA
IT	Nov 2015	INFORMS Meeting , Philadelphia, PA USA
IT	Oct 2015	Conference on Applied Statistics in Defense , Fairfax, VA, USA
IT	Jun 2015	Quality and Productivity Research Conference , NCSU, Raleigh, NC, USA
S	Apr 2015	University of South Florida IDSC, Tampa, FL, USA
IT	Mar 2015	SIAM Computer Science & Engineering Meeting , Salt Lake City, UT, USA
S	Feb 2015	Arizona State University , Tempe, AZ, USA
IT	Dec 2014	NIPS Workshop on Bayesian Optimization , Montreal, QC, Canada
IT	Oct 2012	Design and Analysis of Experiments Conference , Athens, GA
IT	Jun 2011	Statistical Society of Canada Meeting , Wolfville, NS, Canada
IT	Apr 2011	Optimization Days , Montreal, QC, Canada
IT	Nov 2010	INFORMS Meeting , Austin, TX, USA
IT	Aug 2010	IMS Meeting , Gothenburg, Sweden

Local approximate Gaussian processes for large computer experiments

IS	May 2017	University College London , London, UK
K	Mar 2017	Institute for Statistical Mathematics , Tokyo, Japan
IT	Feb 2017	SIAM Computer Science & Engineering Meeting , Atlanta, GA, USA
IT	Sept 2016	European Network for Business and Industrial Stats , Sheffield, UK
IT	May 2016	Spring Research Conference , IIT, Chicago, IL, USA
S	Jan 2016	Northwestern Univesity , Evanston, IL, USA
S	Jan 2016	Notre Dame University , South Bend, IN, USA
IT	Dec 2015	DEMA Conference , Sydney, NSW, Australia
S	Dec 2015	Virginia Tech , Blacksburg, VA, USA
S	Nov 2015	North Carolina State University , Raleigh, NC, USA
S	Nov 2015	University of Florida , Gainesville, FL, USA
S	Nov 2015	Georgia Tech , Atlanta, GA, USA
IT	Jul 2015	ISI World Meeting , Rio De Janeiro, Brazil
IT	Nov 2014	INFORMS Meeting , San Francisco, CA, USA
IT	Oct 2014	Conference on Applied Statistics in Defense , Washington DC, USA
S	Oct 2014	Arizona State University , Tempe, AZ, USA
IT	Jul 2014	ISBA World Meeting , Cancun, Mexico
S	May 2014	University of Wisconsin , Madison, WI, USA
S	Feb 2014	Harvard University , Cambridge, MA, USA
S	Jan 2014	Los Alamos National Labratory , Los Alamos, NM, USA
IT	Dec 2013	Conference of the Intl. Chinese Statistical Assoc. , Hong Kong
S	Oct 2013	The Ohio State University , Columbus, OH, USA
S	Jul 2013	Computation Institute – Argonne/UChicago , IL, USA
S	Jun 2013	UC Santa Cruz , CA, USA
S	Apr 2013	Rutgers University , Piscataway, NJ, USA
S	Mar 2013	Simon Fraser University , Burnaby, BC, Canada

Simulation-based regularized logistic regression, with application to estimating player performance in hockey

IT	Aug 2014	Joint Statistical Meetings , Boston, MA, USA
S	Sep 2013	Bowling Green State University , OH, USA
IT	Jun 2013	Classification Society Meeting , Milwaukee, WI, USA
IT	Jan 2013	ISBA Regional Meeting , Varanasi, India
IT	Aug 2012	Joint Statistical Meetings , San Diego, CA, USA
S	Apr 2011	Northwestern University , Evanston, IL, USA
S	Apr 2011	University of Pennsylvania (Wharton School) , Philadelphia, PA, USA

Dynamic trees for optimization, variable selection and online learning

S	Jan 2014	Los Alamos National Labratory , Los Alamos, NM, USA
S	Sep 2012	University of Texas , Austin, TX, USA
S	Apr 2012	Illinois Institute of Technology , Chicago, IL, USA
IT	Apr 2012	SIAM Uncertainty Quantification Meeting , Raleigh, NC, USA
S	Mar 2012	Brigham Young University , Provo, UT, USA
IT	Nov 2011	INFORMS Meeting , Charlotte, NC, USA
S	Oct 2011	University of Iowa , Iowa City, IA, USA
S	Aug 2011	Lawrence Livermore National Labs , Livermore, CA, USA
IT	Jun 2011	Classification Society Meeting , Pittsburgh, PA, USA
S	Apr 2011	Argonne National Labs , Argonne, IL, USA

Cases for the nugget in computer experiments

- IT Dec 2012 **Spatial Statistics Conference**, Miami, FL, USA
- IT Jun 2012 **Spring Research Conference**, Cambridge, MA, USA

Sequential Monte Carlo for sequential design and optimization

- S Aug 2011 **University of Texas**, Austin, TX, USA
- S Apr 2010 **University of Lancaster**, UK
- S Apr 2010 **Northwestern**, Evanston, IL, USA
- S Apr 2010 **Virginia Tech**, Blacksburgh, VA, USA
- S Mar 2010 **London School of Economics**, UK
- S Feb 2010 **University of Kent**, Canterbury, UK
- S Dec 2009 **Duke**, Durham, NC, USA
- S Oct 2009 **UC Santa Cruz**, CA, USA
- IT Oct 2009 **Design and Analysis of Experiments Conference**, Columbia, MO, USA
- IT Oct 2009 **INFORMS Conference**, San Diego, CA, USA
- S Oct 2009 **UC Santa Barbara**, CA, USA
- IT Jun 2009 **BISP6**, Brixen, Italy

Adaptive exploration of computer experiment parameter spaces

- RT Aug 2005 *Award talk*, **Joint Statistical Meetings**, Minneapolis, MN, USA
- RT Jul 2004 **Intl. Conf. on Machine Learning**, Banff, AB, Canada
- RT May 2004 **Meeting of the ISBA**, Viña del Mar, Chile

On estimating covariances between many assets with histories of highly variable length

- IT Apr 2011 **R in Finance**, Chicago, IL
- S Apr 2011 **INQUIRE Europe/UK Conference**, Cambridge, UK
- IT Aug 2009 **Joint Statistical Meetings**, Washington DC, USA
- S Mar 2009 **University of Chicago** (Booth School of Business), USA
- S Mar 2009 **University of Cambridge** (Engineering), UK
- S Mar 2009 **University of Bath**, UK
- S Mar 2009 **University College London**, UK
- IT Jun 2008 **Isaac Newton Institute**, Cambridge, UK
- S Apr 2008 **INQUIRE Europe/UK Conference**, Zurich, Switzerland
- S Dec 2007 **European Quantitative Forum**, State Street, London, UK

Importance Tempering

- S Mar 2008 **University of Bristol**, UK
- S Mar 2008 **University of Sheffield**, UK
- S Jan 2008 **University of Warwick**, UK
- IT Jan 2008 **Joint Meeting of IMS & ISBA (MCMSki II)**, Bormio, Italy
- S Dec 2007 **University of Southampton**, UK
- S Mar 2007 **University of Nottingham**, UK
- S Apr 2006 **University of Oxford**, UK
- S Mar 2006 **Queen Mary, University of London**, UK
- IT Oct 2005 **Design and Analysis of Experiments Conference**, Santa Fe, NM
- IT Jun 2005 **Classification (CSNA) & Interface Meeting**, St. Louis, MO

Bayesian treed Gaussian process models

S	May 2009	Tilburg University , The Netherlands
S	Apr 2009	2nd OPUS Workshop, CAE Paris , France
S	Feb 2008	RSS & S3RI joint meeting on computer experiments , Southampton, UK
RT	Aug 2007	SBSS Award talk, Joint Statistical Meetings , Salt Lake City, UT, USA
S	Dec 2006	Fidelity Intl. Bank , London, UK
IT	May 2006	Statistical Society of Canada Meeting , London, ON, Canada
S	May 2006	Acadia University , Wolfville, NS, Canada

Adaptive caching by refetching

RT	Dec 2002	Poster Spotlight, NIPS Conference , Vancouver, BC, Canada
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**MEDIA
COVERAGE
& PRESS
RELEASES**

- UChicago Research Computing Center (RCC) coverage of local approximate Gaussian process (1_{aGP}) application to predicting satellite drag, Spring 2016.
- Long Memory review with Graves, Watkins & Franzke featured in *Capital Ideas*, Winter 2014
- Hockey research with Taddy & Jensen was written up in *Capital Ideas*, 35(2), Summer 2013; *Capital Ideas*, Spring 2014; and Seib & Wessel (Wall Street Journal) April 2, 2013
- Credit rating work with Creal & Tsay was written up in *Capital Ideas*, 35(4), Winter 2013/14
- Earnings forecast work with Gerakos was written up in *Capital Ideas*, 35(3), Fall 2013
- Variable selection and sensitivity analysis paper with Taddy & Wild was featured as a *science highlight* at Argonne National Labs on June 10, 2013

**OTHER
RESEARCH
EXPERIENCE**

FIDELITY INTERNATIONAL BANK. Contractor for Joo Hee Lee, portfolio manager, investment strategies group—Dec 2006 – July 2008. Projects include classification and regression trees (CART), estimating covariances with monotone missing data, and forecasting with the Kalman filter.

STATISTICAL LABORATORY, UNIVERSITY OF CAMBRIDGE. Postdoc under Steve Brooks. Studied approximations and automation of Reversible-Jump MCMC algorithms, with applications to problems in statistical ecology.

RAND CORPORATION. Summer Associate under John Shank. Joint High Speed Vessel Analysis of Alternatives and Logistics Analysis for the Littoral Combat Ship: data collection, analysis, model development, logistics & support, and optimal decisions; 2005

APPLIED MATH & STATISTICS, UC SANTA CRUZ. Graduate Student Researcher (GSR) under Herbie Lee. Developed R code for the text *Multiscale Modeling: A Bayesian Perspective* by Herbert K.H. Lee and Marco A.R. Ferreira; 2004

APPLIED MATH & STATISTICS, UC SANTA CRUZ in collaboration with NASA AMES RESEARCH CENTER. GSR under Herbie Lee. Adaptive exploration of computer experiment parameter spaces. 2003–2006

MACHINE LEARNING GROUP, UC SANTA CRUZ. GSR under Manfred K. Warmuth. On-line learning in the Expert Framework applied to caching and speech recognition. 2002–2003

**OTHER
EMPLOYMENT**

ANTRIM DESIGN SYSTEMS: Contractor. Scripting support for database migration; April 2002

PHILIPS SEMICONDUCTORS: Software & CAD Engineer. Summer internship led to senior thesis and extended position; June 1999 – September 2002

UC SANTA CRUZ: Chancellors Undergraduate Intern: Multicultural Engineering Participation (MEP) Student Coordinator; 1999–2000

LECTURING

CMDA/CS/STAT 4564 INTERMEDIATE DATA ANALYTICS AND MACHINE LEARNING, VIRGINIA TECH: A upper-level undergraduate course covering supervised and unsupervised learning from fundamentals to clustering, trees, and Gaussian process. 30 75-minute lectures in 2017, 2018

STAT 6984 MODERN RESPONSE SURFACE METHODS AND COMPUTER EXPERIMENTS, VIRGINIA TECH: A graduate level course covering a modern approach to the synthesis of computer model and field experiment data. 30 75-minute lectures in 2016; given as a 12-hour short course at the BYU Summer Institute of Applied Statistics in 2017; 7.5-hour version to Lawrence Livermore Labs in 2017 and 2017 Fall Technical Conference; 75-minute webinar on Gaussian Processes for the Section on Physical and Engineering Sciences in 2017.

STAT 3504 NONPARAMETRIC STATISTICS, VIRGINIA TECH: An undergraduate level course on quantile, sign, rank tests., etc. 30 75-minute lectures in 2016, 2017

STATISTICAL FOUNDATIONS: A short course covering statistical inference from the fundamentals to linear and generalized linear models: 5 4-hour lectures at JUMP TRADING in 2016 and 2017

STATISTICAL COMPUTING IN R: A graduate level course covering R fundamentals, plotting, and statistical modeling, and advanced topics like Monte Carlo inference, C-in-R, and parallel programming: 10 2-hour lectures at CITADEL LLC in 2013; Given as STAT 6986 ADVANCED STATISTICAL COMPUTING, VIRGINIA TECH with added Unix training, 30 75-minute lectures in 2017

ADVANCED TOPICS IN STATISTICAL LEARNING: A graduate level course covering nonparemetric regression, missing data, dimension reduction, etc.: 5 3-hour lectures at CITADEL LLC in 2011

BUS41000 APPLIED REGRESSION ANALYSIS, UNIVERSITY OF CHICAGO: An MBA course in regression; 10 3-hour lectures: 2010(2), 2011(3), 2012(2), 2013(3)

BAYESIAN INFERENCE: A graduate introduction to Bayesian methods and MCMC inference; 20 lectures: 2009 (UCSB); 2014, 2015 (Booth). Also taught at CITADEL LLC as 10 3-hour lectures: 2011, 2014; a 2-day short course for the 2015 Conference on Applied Statistics in Defense (CASD); and a 1-day short course for the 2016 Knowledge Exchange Workshop

PART IIC STATISTICAL MODELLING, UNIVERSITY OF CAMBRIDGE: Undergraduate course in generalized linear models; 24 lectures: 2007, 2008, 2009

PART III/MPHIL MONTE CARLO INFERENCE, UNIVERSITY OF CAMBRIDGE: Graduate course in classical and Bayesian inference by simulation; 16 lectures: 2007, 2008, 2009, 2010

PART III/MPHIL TIME SERIES, UNIVERSITY OF CAMBRIDGE: Graduate course in time series theory and inference; 8 lectures: 2007, 2008, 2010

**OTHER
TEACHING
EXPERIENCE**

JESUS COLLEGE DIRECTOR OF STUDIES (DOS) IN PART II MATHEMATICS: 2008, 2009, 2010

CAMBRIDGE MATHEMATICAL TRIPOS TUTORIALS/SUPERVISIONS: Part 1A Probability, 2007, 2008, 2009, 2010; Part 1B Markov chains, 2007, 2008; Part 1B Statistics, 2008, 2009, 2010

APPLIED MATH & STATISTICS 131, UC SANTA CRUZ: Undergraduate introduction to Probability Theory (with calculus). Teaching Assistant under Raquel Prado; Spring 2005

APPLIED MATH & STATISTICS 007, UC SANTA CRUZ: Undergraduate course in biostatistics. Teaching Assistant under Raquel Prado; Winter 2005

COMPUTER SCIENCE 201, UC SANTA CRUZ: Graduate course in analysis of algorithms. Teaching Assistant under Allen van Gelder; Winter 2002

COMPUTER SCIENCE 102, UC SANTA CRUZ: Undergraduate course in analysis of algorithms. Teaching Assistant under Suresh Lodha; Fall 2001, & Course Assistant under David Helmbold; Fall 2000; *Course Assistant is the undergraduate equivalent of a Teaching Assistant.*

TUTOR, UC SANTA CRUZ: courses in Mathematics and Engineering. Founded a tutoring service aimed specifically at students who are ethnically underrepresented in Engineering.

**PROFESSIONAL
MEMBERSHIP**

American Statistical Association (ASA)
International Society for Bayesian Analysis (ISBA)
Institute of Mathematical Statistics (IMS)
Institute for Operations Research and the Management Sciences (INFORMS)
Society for Industrial and Applied Mathematics (SIAM)

**PROFESSIONAL
SERVICE**

Editorial:
Associate Editor, SIAM/ASA Journal on Uncertainty Quantification; 2018–Present
Associate Editor, Bayesian Analysis; 2010–Present
Associate Editor, Technometrics; 2008–Present
Associate Editor, Statistical Analysis and Data Mining special issue for CoDA 2016
Associate Editor, Statistica Sinica special issue on Uncertainty Quantification, 2015–2016
Associate Editor, Technometrics special issue on Big Data, 2014–2015
Associate Editor, ISBA Bulletin Student Corner; January 2005–June 2006

In addition to AE services I referee about 10-12 papers/year for:

Technometrics; Journal of Uncertainty Quantification; Journal of the American Statistical Association; Journal of the Royal Statistical Society; Biometrika; Annals of Statistics; Annals of Applied Statistics; Journal of Statistical Planning and Inference; Statistics and Computing; Journal of Computational and Graphical Statistics; Communications in Statistics; Computational Statistics; Computational Statistics and Data Analysis; Brazilian Journal of Probability and Statistics; Journal of Machine Learning Research; Machine Learning; AISTATS; NIPS; Information and Inference; IEEE Transactions on Knowledge and Data Engineering; IEEE Transactions on Pattern Analysis and Machine Intelligence; SIAM Journal of Scientific Computing; Structural and Multidisciplinary Optimization; ACM Transactions on Modeling and Computer Simulation; Optimization and Engineering; Institute of Industrial Engineers (IIE) Transactions; Bioinformatics; Biostatistics; Ecology; Environmetrics; Weather, Climate, and Society (WCAS); Statistics in Medicine; Artificial Intelligence in Medicine; Statistica Sinica; Journal of Computational Physics; International Journal of Approximate Reasoning; Books/Chapters for Princeton University Press; Cambridge University Press; Springer

I have served on the following paper prize committees.

2017 ASA section on Statistical Computing & Graphics student paper competition.
2017–2018 Classification Society dissertation award.

I organized sessions at the following meetings:

European Network for Business and Industrial Statistics (ENBIS), 2017, Naples, Italy
Spring Research Conference (SRC), 2017, Rutgers, New Brunswick, NJ, USA
Joint Statistical Meetings (JSM) Invited Session, 2016, Chicago, IL, USA
International Conference on Design of Experiments, 2016, University of Memphis, TN, USA
International Society for Bayesian Analysis (ISBA) World Meeting, 2016, Sardinia, Italy
Joint Statistical Meetings (JSM) Invited Session, 2015, Seattle, WA, USA
MCMSki IV, 2014, Chamonix, France
Classification Society Meeting, 2013, UM Milwaukee, WI, USA
Spring Research Conference (SRC), 2011, Northwestern University, Evanston, IL, USA

I held the following offices and/or served on the following committees:

Program Chair (Elect), Section on Bayesian Statistical Science, ASA, 2019 (2018)
Treasurer, International Society for Bayesian Analysis (ISBA), 2017–2019
Program Chair (Elect), Section on Statistics in Defense and National Security, ASA, 2018 (2017)
ISBA Finance Committee, 2015–Present
ISBA Industrial Statistics Section Program Chair, 2016–2018
Spring Research Conference (SRC) Management Committee, 2012–2016
Program Chair (Elect), Intl. Society for Bayesian Analysis (ISBA), JSM, 2016 (2015)
Joint Research Conference (JRC; SRC and QPRC) program committee, 2014
Artificial Intelligence and Statistics (AISTATS) senior program committee, 2013
UseR program committee, 2011
International Statistical Ecology Conference (ISEC) program committee: 2008, 2010
Project management committee member, National Centre for Statistical Ecology, 2007–2010
Secretary, IEEE UCSC Student Branch, elected position, 2000–2001
UCSC Student Leadership, Chancellors Undergrad Internship Program, 1999–2000
Webmaster, Intl. Workshop on Bayesian Data Analysis, UC Santa Cruz, CA; 2003

**INVITED
WORKSHOPS
ATTENDED**

Feb 2018, one week: Isaac Newton Institute (INI) on Surrogate models for UQ in complex systems, Cambridge, UK

Sept 2011 & 2012, and Feb 2014: three one-week (small working group) meetings; American Institute of Mathematics (AIM) on Robustness for black-box optimization, Palo Alto, CA, USA

Sept 2008, one week; AIM on Derivative-Free Hybrid Optimization Methods for Solving Simulation-Based Problems in Hydrology, Palo Alto, CA, USA

MENTORSHIP

	<u>Field</u>	<u>Location</u>	<u>Date(s)</u>
Postdocs			
Mickaël Binois	Stats	U. of Chicago	2016–2018
Ioana Cosma	Stats	U. of Cambridge	2009–2010
Ricardo Silva	Stats	U. of Cambridge	2007–2008
Ph.D. Students			
Boya Zhang	Stats	Virginia Tech	2018–pres
Jiangeng Huang	Stats	Virginia Tech	2017–pres
Furong Sun	Stats	Virginia Tech	2017–pres
Adam Edwards	Stats	Virginia Tech	2017–pres
Anne Sutkoff	Econom/Stats	Chicago Booth	2012–2014
Adam Bull	Stats	U. of Cambridge	2009–2010
Timothy Graves	Stats	U. of Cambridge	2009–2013
James Lawrence	Stats	U. of Cambridge	2008–2012
Masters–level Students			
Timothy Graves	Mphil Stats	U. of Cambridge	2008–2009
Tamara Broderick	Part III Maths	U. of Cambridge	2007–2008
James Keough	Mphil Stats	U. of Cambridge	2007–2008
Donal Moore	Mphil Stats	U. of Cambridge	2006–2007
Ph.D. Viva/Committee			
Ian Crandell	Stats	Virginia Tech	2017
Ning Zhang	IEMS	Northwestern U.	2013
Paul Birrell	Stats	U. of Cambridge	2010
Richard Wilkinson	Comp Bio	U. of Cambridge	2007