

Barbara Ann Bailey

Department of Mathematics and Statistics
San Diego State University
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Education

- B.S. 1981 Mathematics and Physical Education
Springfield College, Springfield, MA
- M.S. 1988 Mathematics
University of Illinois, Champaign-Urbana, IL
- Ph.D. 1996 Biomathematics
Department of Statistics
North Carolina State University, Raleigh, NC

Academic Experience

- 8/12 - present Associate Professor
San Diego State University
Research emphasis is on temporal and spatial modeling of ecological and environmental processes using nonlinear and multivariate statistical analysis.
- 8/06 - 5/12 Assistant Professor
San Diego State University
- 8/05 - 5/06 Visiting Assistant Professor, Department of Mathematics
University of Colorado at Denver and Health Sciences Center
- 8/98 - 8/05 Assistant Professor of Statistics
University of Illinois at Urbana-Champaign
- 3/96 - 7/98 Postdoctoral Research Fellow, National Center for Atmospheric Research
NCAR, Boulder CO
The Geophysical Statistical Project is a project to further development of statistical analysis to the problems faced in the Earth sciences. Research emphasis on modeling the spatial and temporal distribution of cloud cover.

Other Experience

- 9/95 - 2/96 Programming and Documentation Support for FUNFITS
Becton Dickinson Research Center, Research Triangle Park, NC
FUNFITS is a suite of functions and statistical tools for data analysis that enhance the S-PLUS statistical package and facilitate curve and surface fitting.

Publications

- Gude, N.A., Firouzi, F., Broughton, K.M., Ilves, K., Nguyen K.P., Payne, C.R., Sacchi, V., Monsanto, M.M., Casillas, A.R., Khalafalla, F.G., Wang, B.J., Ebeid, D.E., Alvarez, R., Dembitsky, W.P., Bailey, B.A., van Berlo, J., Sussman, M.A. (2018), "Cardiac c-Kit Biology Revealed by Inducible Transgenesis." *Circulation Research*, 123(1):57-72. doi: 10.1161/CIRCRESAHA.117.311828. PubMed PMID: 29636378.
- Conrad, D.J., Bailey, B.A., Hardie, J.A., Bakke, P.S., Eagan, T.M.L., Aarli B.B. (2017), "Median regression spline modeling of longitudinal FEV1 measurements in cystic fibrosis (CF) and chronic obstructive pulmonary disease (COPD) patients". *PLoS One*, 12(12):e0190061. doi: 10.1371/journal.pone.0190061. PubMed PMID: 29261779; PubMed Central PMCID: PMC5738083.
- Akhter, S., Aziz, R.K., Kashef, M.T., Ibrahim, E.S., Bailey, B., Edwards, R.A. (2017), "Kullback-Leibler divergence in complete bacterial and phage genomes." *PeerJ*, doi: 10.7717/peerj.4026. PubMed PMID: 29204318; PubMed Central PMCID: PMC5712468.
- Nguyen, S., Baker, K., Padman, B.S., Patwa, R., Dunstan, R.A., Weston, T.A., Schlosser, K., Bailey, B., Lithgow, T., Lazarou, M., Luque, A., Rohwer, F., Blumberg, R.S., Barr, J.J. (2017) "Bacteriophage Transcytosis Provides a Mechanism To Cross Epithelial Cell Layers." *MBio.*, 8(6). pii: e01874-17. doi: 10.1128/mBio.01874-17. Erratum in: *MBio.* 2018 Jan 2;9(1):. PubMed PMID: 29162715; PubMed Central PMCID: PMC5698557.
- Hartmann, A.C., Petras, D., Quinn, R.A., Protsyuk, I., Archer, F.I., Ransome, E. Williams, G.J., Bailey, B.A., Vermeij, M.J.A, Alexandrov, T., Dorrestein, P.C., and Rohwer, F.L. (2017), "Meta-mass Shift Chemical Profiling of Metabolomes From Coral Reefs." *Proceedings of the National Academy of Sciences*, 114(44), 1168511690, doi: 10.1073/pnas.1710248114.
- Simonis, A.E. , Roch, M.A., Bailey, B.A., Barlow, J., Clemesha, R.E.S., Iacobellis, S., Hildebrand, J.A., and Baumann-Pickering, S. (2017), "Lunar Cycles Affect Common Dolphin *Delphinus delphis* Foraging in the Southern California Bight." *Marine Ecology Progress Series*, 577, 221235, doi.org/10.3354/meps12247.
- Knowles, B., Bailey, B.A., Boling L., Cobián-Güemes, A.G., Felts, B., Grasis J, Haas A.F., Katira P., and others (2017), "Variability and Host Sensitivity Independence in Inductions-based Estimates of Environmental Lysogeny." *Nature Microbiology*, 2,17064, doi: 10.1038/nmicrobiol.2017.64. PubMed PMID: 28452987.
- Quinn, R.A., Phelan, V.V., Whiteson, K.L, Garg, N., Bailey, B.A., Lim, Y.W., Conrad, D.J, Dorrestein, P.C., and Rohwer, F.L. (2016), "Microbial, Host and Xenobiotic Diversity in the Cystic Fibrosis Sputum Metabolome." *The ISME Journal*, 10, 14831498, doi: 10.1038/ismej.2015.207.
- McDole Somera, T., Bailey, B.A., Barott, K., Grasis. J., Hatay, M., Hilton, B.J., Hisakawa, N., Nosrat, B., Nulton, J., Silveira, C.B., Sullivan, C., Brainard, R.E., Rohwer, F. (2016) "Energetic Differences between Bacterioplankton Trophic Groups and Coral Reef Resistance." *Proc Biol Sci.*, 283(1829), pii: 20160467, doi: 10.1098/rspb.2016.0467. PubMed PMID: 27097927; PubMed Central PMCID: PMC4855391.
- Knowles, B., Silveira, C.B., Bailey, B.A., Barott, K, Cantu, V.A., Cobián-Güemes, A.G., Coutinho, F.H., Dinsdale, E.A., Felts, B., Furby, K.A. and others (2016), "Lytic to Temperate Switching of Viral Communities." *Nature*, 531(7595), 466-470, doi: 10.1038/nature17193.
- Ko, G.M., Garg, R., Bailey, B.A., Kumar, S. (2016), "Discovery of Novel HIV-1 Integrase Inhibitors Using QSAR-Based Virtual Screening of the NCI Open Database." *Curr Comput Aided Drug Des.*, 12(2):135-53. PubMed PMID: 27076270.

- Theilmann, R.J., Darquenne, C., Elliott, A.R., Bailey, B.A., and Conrad, D. J.** (2016) “Characterizing Lung Disease in Cystic Fibrosis with Magnetic Resonance Imaging and Airway Physiology.” *PLoS ONE*, 11(6):e0157177, doi: 10.1371/journal.pone.0157177.
- Paluri, S., Kambhatla, K.K.R., Bailey, B.A., Cosman, P.C., Matyjas, J.D., Kumar, S.** (2016), “A Low Complexity Model for Predicting Slice Loss Distortion for Prioritizing H.264/AVC Video.” *Multimedia Tools and Applications*, 75(2), 961-985, doi: 10.1007/s11042-014-2334-2.
- Shen, S.S.P., Wied, O. , Weithmann, A., Regele, T., Bailey, B.A., and Lawrimore, J.H.** (2016), “Six temperature and precipitation regimes of the contiguous United States between 1895 and 2010: a statistical inference study.” *Theoretical and Applied Climatology*, 1-15, doi: 10.1007/s00704-015-1502-2
- Barr, J.J., Auro, R., Sam-Soon, N., Kassegne, S., Peters, G., Bonilla, N., Hatay, M., Mourtada, S., Bailey, B.A., Youle, M. and Felts, B.** (2015), “Subdiffusive Motion of Bacteriophage in Mucosal Surfaces Increases the Frequency of Bacterial Encounters.” *Proceedings of the National Academy of Sciences*, 112(44), 13675-13680, doi: 10.1073/pnas.1508355112.
- Sanchez, S.E., Cuevas, D.A., Rostron, J.E., Liang, T.Y, Pivaroff, C. G., Haynes, M.R., Nulton, J., Felts, B., Bailey, B.A., Salamon, P, Edwards, R.A., Burgin, A.B., Segall, A.M., Rohwer, F.** (2015), “Phage Phenomics: Physiological Approaches to Characterize Novel Viral Proteins.” *Journal of Visualized Experiments*, 100, 52854, doi: 10.3791/52854.
- Chen, C.P., Keown, C.L., Jahedi, A., Naira, A. , Pflieger, M.E., Bailey, B.A., and Miller, R.-A.** (2015), “Diagnostic Classification of intrinsic Functional Connectivity Highlights Somatosensory, Default Mode, and Visual Regions in Autism.” *NeuroImage: Clinical*, 8, 238245, doi: 10.1016/j.nicl.2015.04.002.
- Conrad, D.J., Bailey, B.A.** (2015), “Multidimensional Clinical Phenotyping of an Adult Cystic Fibrosis Patient Population.” (2015), *PLoS One*, 10(3): e0122705, doi: 10.1371/journal.pone.0122705, PMID: PMC4378917.
- Quinn, R.A., Whiteson, K.L, Lim, Y.W., Salamon, P., Bailey, B.A., Mienardi, S., Sanchez, S.E., Blake, D., Conrad, D, and Rohwer, F.** (2014), “A Winogradsky-based Culture System Shows an Association Between Microbial Fermentation and Cystic Fibrosis Exacerbation.” *International Journal of Innovations in Materials Science and Engineering (IMSE) Journal* , 1-15, doi: 10.1038/ismej.2014.234.
- Whiteson, K.L., Bailey, B.A., Bergkessel, M., Conrad, D., Delhaes, L., Felts, B., Harris, J.K., Hunter, R., Lim, Y.W., Maughan, H., Quinn, R., Salamon, P., Sullivan, J., Wagner, B.D., and Rainey, P.B.** (2014), “The Upper Respiratory Tract as a Microbial Source for Pulmonary Infections in Cystic Fibrosis. Parallels from Island Biogeography.” *American Journal of Respiratory and Critical Care Medicine* , 189, 1309-1315, doi: 10.1164/rccm.201312-2129PP.
- Lim, Y.W., Evangelista, J.S. , Schmieder, R., Bailey, B.A., Haynes, M., Furlan, M., Maughan, H., Edwards, R., Rohwer, F., and Conrad, D.** (2013), “Clinical Insights from Metagenomic Analysis of Sputum Samples from Patients with Cystic Fibrosis.” *Journal of Clinical Microbiology*, 52(2), 425-437, doi: 10.1128/JCM.02204-13.
- Bailey, B.A. and Pershing, A.J.** (2013), “A Nonlinear Model for Predicting Interannual Changes in *Calanus finmarchicus* Abundance in the Gulf of Maine.” *Journal of Agricultural, Biological, and Environmental Statistics*, 18(2), 234-249.
- Dinsdale, E.A., Edwards, R.A., Bailey, B.A., Tuba, I., Akhter, S., McNair, K., Schmieder, R., Apkarain, N., Creek, M., Guan, E., Hernandez, M., Isaacs, K., Peterson, C., Reght, T., and Ponomarenko, V.** (2013), “Multivariate Analysis of Functional Metagenomes.” *Frontiers in Statistical Genetics and Methodology*, doi: 10.3389/fgene.2013.00041.

- Akhter, S., Bailey, B.A., Salamon, P., Aziz, R.K., Edwards, R.A.** (2013), "Applying Shannon's Information Theory to Bacterial and Phage Genomes and Metagenomes." *Scientific Reports*, 3(1033), doi: 10.1038/srep01033.
- Ko, G.M., Reddy, A.S., Bailey, B.A., Garg, R., Kumar, S., and Hadaegh, A.R.** (2012), "Differential Evolution-Binary Particle Swarm Optimization Algorithm for the Analysis of Aryl Beta-Diketo Acids for HIV-1 Integrase Inhibition" *IEEE Congress on Evolutionary Computation*, 1-7,
- Paluri, S., Kambhatla, K.K.R, Kumar, S., Bailey, B.A., and Cosman, P.** (2012), "Predicting Slice Loss Distortion In H.264/AVC Video for Low Complexity Data Prioritization." *IEEE International Conference on Image Processing*, 689-692.
- McDole, T., Nulton, J. Barott, K.L, Felts, B., Hand, C., Hatay, M., Lee, H., Nadon, M.O., Nosrat, B., Salamon, P., Bailey, B.A., Sandin, S.A., Vargas-Angel, B., Youle, M., Zgliczynski, B.J., Brainard, R.E., and Rohwer, F.** (2012), "Assessing Coral Reefs on a Pacific-Wide Scale Using the Microbialization Score." *PLOS ONE*, 7(9), 1-10.
- McNair, K., Edwards, R.A., Bailey, B.A.** (2012) "PHACTS, A Computational Approach to Classifying the Lifestyle of Phage." *Bioinformatics*, doi: 10.1093/bioinformatics/bts014.
- Shen, S.P.P., Kramps, B., Sun, S.X, and Bailey, B.A.** (2011), "An Approach to Quantify the Heat Wave Strength and Price a Heat Derivative for Risk Hedging." *Advances in Atmospheric Sciences*, doi:10.1007/s00376-011-1020-9.
- Bailey, B.A** (2012), "Quantifying the Predictability of Noisy Space-Time Dynamical Processes ." *Statistics and Its Interface*, 4(4), 535-549.
- Ko, G.M., Reddy, A.S., Kumar, S., Bailey, B.A., and Garg, R.** (2010), "Computational Analysis of HIV-1 Protease Protein Binding Pockets." *Journal of Chemical Information and Modeling*, 50(10), 1759-1771.
- Rupp, A.J., Bailey, B.A., Shen, S.S.P., Lee, C.K, and Strachan, B.S.** (2009). "An Error Analysis for the Hybrid Gridding of Texas Daily Precipitation Data." *International Journal of Climatology*, 29, doi: 10.1002/joc.1917.
- Xie, H., Eheart, J.W., Chen Y., and Bailey, B.A.** (2009), "An Approach for Improving the Sampling Efficiency in the Bayesian Calibration of Computationally Expensive Simulation Models." *Water Resources Research*, 45, W06419, doi: 10.1029/2007WR006773.
- Demissie, Y.K., Valocchi, A.J., Minsker, B.S., and Bailey, B.A.** (2009), "Integrating a Calibrated Groundwater Flow Model with Error-Correcting Data-Driven Models to Improve Predictions." *Journal of Hydrology*, 364(3-4), 257-271.
- Lee, C., Shen, S.S.P, Bailey, B.A., and North, G.R.** (2008), "Factor Analysis for El Nino Signals in Sea Surface Temperature.," *Theoretical and Applied Climatology*, 97, 195-203, doi: 10.1007/s00704-008-0056-y.
- Kononov, J., Bailey, B.A., and Allery, B.K.** (2008), "Relationships Between Safety and Both Congestion and Safety and Number of Lanes on Urban Freeways." *Transportation Research Record, TRB, National Research Council*, 2083, 26-39.
- Demissie, Y.K., Valocchi, A.J. , Minsker, B.S, and Bailey, B.A.** (2008) , "Bias Corrected Groundwater Model Prediction Uncertainty Analysis." *International Conference ModelCARE 2007, Calibration and Reliability in Groundwater Modeling, Credibility of Modeling*, Copenhagen, Denmark, Sept. 9-13, 2007.

- Demissie, Y.K., Valocchi, A.J., Minsker, B.S., and Bailey, B.A.** (2006), "Data-Driven Modeling Approach to Enhance MODFLOW Head Predictions." *Proceedings of MODFLOW and More 2006: Managing Ground-Water Systems*, v. 1, E. Poeter, M. Hill and C. Zheng (eds.), May 21-24, Colorado School of Mines, Golden, CO., 51-55.
- Frigon, D., Guthrie, R.M, Backman, G.T., Royer, J., Bailey, B.A., and Raskin, L.** (2006), "Long-Term Analysis of a Full Scale Activated Sludge Wastewater Treatment System Exhibiting Seasonal Biological Foaming." *Water Research*, 40(5), 990-1008
- Pershing, A.J., Greene, C.H., Jossi, J.W., O'Brien, L, Brodziak, J.K.T, and Bailey, B.A.** (2005), "Interdecadal Variability in the Gulf of Maine Zooplankton Community with Potential Impacts on Fish Recruitment." *ICES Journal of Marine Science*, 62(7), 1511-1523.
- Bailey, B.A., Doney S.C., and Lima, I.** (2004), "Quantifying the Effects of Dynamical Noise on the Predictability of a Simple Ecosystem Model." *Environmetrics*, 15, 337-355.
- Lin, N., Bailey, B.A., He, X., and Buttlar, W.G.** (2004), "Adjustment of Measuring Devices with Linear Models." *Technometrics*, 46(2), 127-134.
- Kuurman, W.W., Bailey, B.A., Koops, W.J., and Grossman, M.** (2003), "A Model for Failure of a Chicken Embryo to Survive." *Poultry Science*, 82, 214-222.
- Kuurman, W.W., Bailey, B.A., Koops, W.J., and Grossman, M** (2002), "Influence of Storage Days on the Distribution for Time of Embryonic Mortality During Incubation." *Poultry Science*, 81, 1-8.
- Kuurman, W.W., B.A. Bailey, W.J Koops, M. Grossman** (2001), "Effect of Hatch on the Distribution for Failure of an Embryo to Survive Incubation." *Poultry Science*, 80, 710-717.
- Monrad, D., Stout, W.F., Gould, R.L., Roussos, L.A., Bailey, B.A., Fryxell, J. R., He, X., and Plessner, V.R.** (2000), Chapter 11 and 12 in *Statistics: The Craft of Data Collection, Description, and Inference*, Mobius Communications, Ltd., Champaign, IL.
- Bailey, B.A., Berliner, L.M, Collins W., Nychka, D., Kiehl, J.T.** (2000), "Neural Networks: Cloud Parameterizations," Chapter 7 in *Case Studies in Statistics and the Atmospheric Sciences*, Springer-Verlag, New York.
- Davis, J, Nychka, D.W., and Bailey, B.A.** (2000), "A Comparison of Regional Oxidant Model (ROM) Output with Observed Ozone Data. " *Atmospheric Environment*, 34(15), 2413-2423.
- Ellner, S.P., Bailey, B.A., Bobashev, G.V., Gallant, A.R., Grenfell, B.T., and Nychka, D.W.** (1998), "Noise and Nonlinearity in Measles Epidemics: Combining Mechanistic and Statistical Approaches to Population Modeling." *American Naturalist*, 15(5), 425-440.
- Bailey, B.A., Ellner, S., and Nychka, D.W.** (1997), "Chaos with Confidence: Asymptotics and Applications of Local Lyapunov Exponents." *Proceedings of the Fields/CRM Workshop on Nonlinear Dynamics and Time Series: Building a Bridge Between the Natural and Statistical Sciences*, American Mathematical Society, 115-133.
- Bailey, B.A.** (1996), "Local Lyapunov Exponents: predictability depends on where you are." *Nonlinear Dynamics in Economics, Proceedings of the Ninth International Symposium in Economic Theory and Econometrics*, eds. Barnett, W., Kirman, A., and Salmon, M., Cambridge University Press, 345-360.

Conference Proceedings

- Ko, G.M., Reddy, A.S., Kumar, S., Bailey, B.A., Garg, R.** (2010), "A Random Forest Model for the Analysis of Chemical Descriptors for the Elucidation of HIV-1 Protease Protein-Ligand Interactions." *Applied Computational Science and Engineering Student and Computational Science Curriculum Development (ACSESS) 2010*, SDSU.
- Bobashev, G.Y, Ellner, S.P, Bailey, B.A.** (2009), "Improved Forecast with a Combination of Mechanistic and Statistical Predictive Models." 2009 Association for the Advancement of Artificial Intelligence (AAAI) Spring Symposium, Technical Report SS-09-09, The AAAI Press, Menlo Park, California.
- Kononov, J., Bailey, B.A., and Allery, B.K.** (2008), "Exploratory Analysis of Relationship Between Number of Lanes and Safety on Urban Freeways." *Transportation Research Board 87th Annual Meeting Compendium of Papers*, 20p.
- Li, X. and Bailey, B.A.** (2004), "Hierarchical Bayesian Space-time Models for Groundwater Data." *2004 Proceedings of the American Statistical Association*, Statistical Computing Section [CD-ROM], Alexandria, VA: American Statistical Association.
- Bailey, B.A.** (2003), "Diagnostics and Visualization of Nonlinear Statistical Models." *2003 Proceedings of the American Statistical Association*, Statistical Computing Section [CD-ROM], Alexandria, VA: American Statistical Association.
- Bailey, B.A. and Doney, S.C.** (2001), "Quantifying the Effects of Noise on Biogeochemical Models." *Computing Science and Statistics*, 32, 447-453.
- Bailey, B.A., Nychka, D.W., and Ellner, S.** (1998), "A Central Limit Theorem for Local Lyapunov Exponents." Technical Report 76, Department of Statistics, University of Illinois, Champaign, IL.
- Nychka, D.W., Davis, J., and Bailey, B.A.** (1995), "A Comparison of the Regional Oxidant Model with Observational Ozone Data." *National Institute of Statistical Sciences Technical Report*, National Institute of Statistical Sciences, Research Triangle Park, NC.
- Bailey, B.A., Chia-ye, J.L., and Smith, C.E.** (1992), "Conditional Plots for Nonrenewal Neural Spike Train Data." In *Proceedings of the Section on Statistical Education, American Statistical Association*, 224-229.

Grants and Funding

NIH, "Spatial Identification of Lung Abnormalities in CF via a Probabilistic Library of MRI Measurements of Lung Water Density"
 (PI) , Rebecca J. Thielmann, Department of Radiation-Diagnostic, School of Medicine, UCSD; (PI, SDSU) Barbara Bailey
 1R01HL135496-01A1: \$712,175 per year, 08/4/17-5/31/2021, summer month support.

The goal of the research is to establish, evaluate and translate a non-invasive MRI technique to spatially quantify and monitor lung abnormalities in patients with cystic fibrosis (CF). Fast gradient echo magnetic resonance imaging (MRI) techniques are used to quantify the regional distribution of lung water content in adults with cystic fibrosis (CF). The project will establish a probabilistic library of the fractional lung water density (FLD) ratio spatial distribution in healthy subjects aged 18-50, evaluate the probabilistic library in stable CF patients over a wide range of disease severity and correlate with clinical measures, and translate the approach to the clinic by evaluating CF subjects at the onset of a severe exacerbation and post exacerbation after therapy.

NSF, Research Networks in the Mathematical Sciences (RNMS): “Statistical Methods for Atmospheric and Oceanic Science”

(PI) Montserrat Fuentes, N.C. State University, 5M for 5 years, starting 9/2011.

Project funds travel for people to visit other institutions in the network and salaries for extended visits of grad students and postdocs from one institution in the network to another. SDSU is one of the nodes of the network and I am the point of contact.

NIH, “Ecological Approaches to Controlling Cystic Fibrosis”

(PI) Forest Rohwer, Department of Biology, SDSU; (Collaborator) Barbara Bailey

\$1,510,575.00, 12/01/10-11/30/15, 0.6 summer month support.

The goal of the project is to use metagenomes and microscopy to characterize the microbial and viral communities and determine how they change in response to perturbations such as disease severity, antibiotic treatments and chemical treatments. The longitudinal data analysis of the CF registry and patient data can help identify factors that predict changes in lung function over time.

Archer Daniels Midland (ADM) and the University of Illinois at Urbana-Champaign, “Project Catfish I”

(PI) Barbara Minsker, Department of Civil and Environmental Engineering, UIUC; (PI) Barbara Bailey, SDSU

\$8,130, 3/10-3/11, 0.5 summer month support.

The goal of the project is to model the spatial structure of the geographic river area of interest using the geostatistical approach of Bayesian kriging.

SDSU University Grants Program (UGP), “Diagnostics for Nonlinear Statistical Models Applied to Ground-water Flow”

\$4,924, 2009. Student support.

The goal of the project is to develop diagnostics for visualization for fitting nonlinear models to data.

NSF (UMB), “Interdisciplinary Training for Undergraduates in Mathematics and Biology at San Diego State University”

(PI) Anca Segal, Department of Biology, SDSU (Co-PI) Peter Salamon, Department of Mathematics and Statistics, SDSU

\$80K/year for 3 years, 2008-2010. I am one of the participating faculty.

The goal of the SDSU Undergraduates in Mathematical Biology program is to increase the number of undergraduates who pursue a graduate degree in interdisciplinary mathematical biology.

NIH/NIGMS, 1R01GM068946-01, “Models for Gene Expression”

(PI) Sandra Rodriguez-Zas, Department of Animal Sciences, UIUC; (Co-PIs) Barbara Bailey; Gene Robinson, Department of Entomology, UIUC

\$1,000,000, 6/15/03-5/31/07, 1 summer month support and 1 RA for 2 years. Involves dimension reduction and visualization of gene expression data.

Department of Energy, “A New Framework for Adaptive Sampling and Analysis During Long-term Monitoring and Remediation Action Management”

(PI) Barbara Minsker, Department of Civil and Environmental Engineering, UIUC; (Co-PIs) Barbara Bailey, Al Valocchi, Department of Civil and Environmental Engineering, UIUC, Robert Johnson, Argonne National Laboratory

\$540,000, 09/01/02-08/31/05, 0.5 summer month yearly support, 1 RA. Involves space-time modeling of ground water contaminants.

NOAA-Coastal Ocean Program, “Climate-based Forecasts of the Gulf of Maine Ecosystem”

(PI) Andrew Pershing, Department of Earth and Atmospheric Sciences, Cornell University; (Co-PIs) Barbara Bailey; Charles Green, Department of Earth and Atmospheric Sciences, Cornell University;

Jack Jossi, NOAA Fisheries, Narragansett Laboratory.
\$350,546, 09/01/02-08/31/04, 1 summer month yearly support. Involves nonlinear time series modeling and prediction of whale and other marine populations.

NASA/USRA Earth System Science Education for the 21st Century (ESSE 21) Program for the new interdisciplinary LAS major in The Earth System, Environment and Society.

NCSA-UIUC Faculty Fellow, "Visualization and Diagnostics of Nonlinear Statistical Models"
\$10,000, 08/21/02-08/21/03. Involves the development of visualization tools for nonlinear optimization methods.

Professional Activities

The International Biometric Society, Western North American Region (WNAR) Regional Committee Member, 2014-2016

The International Biometric Society, Western North American Region (WNAR) Regional Advisory Board Member, 2013-2015

WNAR Student Paper Competition Committee Review Member, June 16, 2013

Transportation Research Board (TRB) of the National Academies: Committee on Transportation Safety Management Board Member, April 15, 2010-April 14, 2013

American Statistical Association Section on Statistical Computing, Publications Officer, 2008-2011

The International Biometric Society, Eastern North American Region (ENAR) Regional Advisory Board Member, January 1, 2005-December 31, 2007

Invited Session Organizer: Visualization of Data, Spring Research Conference, Gaithersburg, MD, May, 2004

Invited Participant: Workshop on Multiscale Modeling of Environmental Systems at Statistical and Applied Mathematical Sciences Institute, RTP, NC, February 2-7, 2003

Invited Session Chair: Statistics, Psychiatry and Neuroscience: Working together, at the Joint Statistical Meetings, New York City, August, 2002

Invited participant: Institute for Mathematics and its Applications Workshop on Frontiers of Mathematics in Geoscience, University of Minnesota, Twin Cities Campus, March 5-7, 2001

Invited Session Organizer: Statistical Issues in Modeling and Dynamical Systems, ENAR, ASA, Atlanta, GA, 2001

Contributed Session Chair: Computational and Estimation Issues in Modeling, Interface 2000, New Orleans, LA, 2000

Invited Session Chair: Mining Genes and Compounds, Interface 1999, Schaumburg, IL, 1999

Contributed Session Chair: Section on Physical Sciences and Engineering (SPES), ASA annual meetings, Anaheim, 1997

Vice President Statistics/Biomathematics Graduate Student Association, NCSU, 1992-1994

Biomathematics Admissions Committee, NCSU, 1993-1995

Reviewed papers and proposals for:

Nicotine & Tobacco Research, 2017-2018
 PLOS ONE, 2013-2015
 NSF- OCI Software Institutes, 2010
 NSF-Research Training Group, Workforce in the Mathematical Sciences, 2009
 Journal of Hydraulic Engineering, 2007
 Mathematics and Computers in Simulation, 2007
 NSF-International Polar Year, 2006
 NSF-Collaborations in Mathematical Geosciences (CMG), 2004
 Journal of Agriculture, Biological, and Environmental Statistics, 2006
 Journal of North American Actuarial Journal, 2003
 Chemometrics and Intelligent Laboratory Systems, 2002
 Ecological Modelling, 2006
 Journal of Geophysical Research, 2001-2003
 Journal of Climate, 2000,2005
 NSF-Environmental Statistics Panel, June 1-2, 2000
 NSF-Statistics, 1999
 IEEE Transactions on Information Theory, 1998
 Technometrics, 1997
 Journal of Econometrics, 1997
 Journal of the Atmospheric Sciences, 1996
 ASCE Journal of Hydrologic Engineering, 1996
 IEEE Transactions on Circuits and Systems, 1995
 Journal of Nonlinear Dynamics, 1994, 2001

Departmental and University Activities

Statistics Undergraduate Advisor (SDSU), Spring 2007-present

Society for Statisticians and Actuaries (SSA) , Faculty Advisor, 2012-present

M.S. Statistics Advisor (SDSU), Fall 2012-2016, Summer 2017.

College of Science Research Committee, 2014-2015

Director of JDP in Computational Science with Concentration in Statistics, 2011-2012

M.S. Comprehensive Exam Coordinator (SDSU): Data Analysis Exam, 2008, 2010; Theory Exam, 2008

Faculty co-advisor, REUT Mathematics Program (SDSU), Summer 2009

Statistics Search Committee (SDSU), Spring 2007, 2008, 2014

Computation Sciences Statistics Ph.D. Program Admissions Committee (SDSU), 2007-2011

Mathematics Department (UCDHSC) Undergraduate Committee member, Fall 2005

Co-Participant on development team for new interdisciplinary LAS major, "The Earth System, Environment and Society." This is a joint effort with Atmospheric Sciences, Entomology, Geography, Geology, History, Plant Biology, Sociology, and Statistics (UIUC), January 2003 - August 2005

Statistics Department Executive Committee (UIUC), 2001-2005

Statistics Department Director of Undergraduate Studies (UIUC), 2000-2005

Statistics Department Colloquium Chair (UIUC), 1998-2001

Statistics Departmental Qualifying Exam Committee (UIUC):

STAT 326-329, Jan. and Aug. 2000, Aug. 2001, Aug. 2002, Jan. 2003

STAT 410-411, Jan. 2001, Aug. 2003

Graduate Student Supervision:

Colette Smirniotis, Ph.D. Computational Sciences Statistics (SDSU), 2018

Kameryn Denaro, Ph.D. Computational Sciences Statistics (SDSU), 2017.

Mariangel Garcia, Ph.D. Computational Sciences (SDSU), 2016 (co-advised with Jose Castillo)

Guy Cafri, M.S. Statistics (SDSU), 2013

David Armstrong, M.S. Statistics (SDSU), 2012

Colette Smirniotis, M.S. Statistics (SDSU), 2012

Christine Anderson, M.S. Statistics (SDSU), 2013 (expected)

Keith Hettinger, M.S. Statistics (SDSU), 2013 (expected)

Jochen Wieland, M.S. Applied Mathematics (SDSU), 2010

Fabian Bosler, M.S. Applied Mathematics (SDSU), 2010

Scott Nelson, M.S. Statistics (SDSU), 2009

Jing Zheng, M.S. Statistics (SDSU), 2008

Doug Noe, Statistics (UIUC), 2005-2006, Research Assistant

Xiaodong Li, Statistics (UIUC), 2004, Research Assistant

Xueying Li, M.S., Statistics (UIUC), 2003, Research Assistant, (Jointly supervised with Professor Sandra Rodriguez-Zas)

Darren Glosemeyer, M.S. Statistics (UIUC), 2003, Research Assistant

Pim Kuurman, Ph.D., Animal Science (UIUC), 2002

Committee Member:

Lixia Zhu, Ph.D. Computational Sciences (SDSU), 2018

Julien Pierret, Ph.D. Computational Statistics (SDSU), 2018

John Bellettiere, Ph.D. Public Health (SDSU), 2017

Karen Cambell, Ph.D. Computational Sciences Statistics (SDSU), 2017

Jane Xu, Ph.D. Computational Sciences (SDSU), 2017

Seethal Paluri, Ph.D. Computational Sciences (SDSU), 2016)

Kimberly, Leung, Ph.D. Computational Sciences (SDSU), 2016

Rong Zablocki, Ph.D. Computational Sciences Statistics (SDSU), 2016

Gene Ko, Ph.D. Computational Sciences (SDSU), 2015

Peng Zhao, Ph.D. Computational Sciences Statistics (SDSU), 2015

Jeff Ledah, Ph.D. Computational Sciences Statistics (SDSU), 2015

Victor Seguritan, Ph.D. Computational Sciences (SDSU), 2013

Robert Schmeider, Ph.D. Computational Sciences (SDSU), 2013

Sajia Akhter, Ph.D. Computational Sciences (SDSU), 2013

Jonathan Wilson, Ph.D. Computational Sciences Statistics (SDSU, 2013)

Lucie Nguyen, Ph.D. Computational Sciences Statistics (SDSU), 2013

Michael Doane, M.S. Biology (SDSU)

Han Suh Kang, M.S. Cell and Molecular Biology (SDSU), 2016

Kevin Walsh, M.S. Biology (SDSU)

Leeza Anderson, M.A. Psychology (SDSU)

Lauren Paul, M.S. Biology (SDSU)

Colleen Chen, M.S. Computational Sciences (SDSU), 2014

Kirtiraj Mohanty, M.S. Statistics (SDSU), 2014

Xiobin Zhang, M.S. Computer Science (SDSU), 2014

Christian Junginger, M.S. Statistics (SDSU), 2014

Tiffany Liang, M.S. Bioinformatics and Medical Informatics (SDSU), 2014
 Carina Muller, M.S. Statistics (SDSU), 2013
 Daniel Michaelis, M.S. Statistics (SDSU), 2013
 Max Velado, M.S. Statistics (SDSU), 2013
 Jazlynn Ngo, M.S. Applied Mathematics (SDSU), 2013
 Julien Pierret, M.S. Statistics (SDSU), 2013
 Nancy Tafolla, M.S. Applied Mathematics (SDSU), 2013
 Sarah Kienle, M.S. Biology (SDSU), 2013
 Joseph Horton, M.S. Applied Mathematics (SDSU) 2013
 Clark Austin, M.S. Biology (SDSU), 2013
 Olaf Wied, M.S. Applied Mathematics, 2012
 Martin Lehmann, M.S. Applied Mathematics, 2012
 David New, M.S. Applied Mathematics, 2012
 Sara Zarei, Ph.D. Computational Sciences (SDSU), 2012
 Ryan Driscoll, M.S. Biology (SDSU), 2012
 Julia Busch, M.S. Biology (SDSU), 2012
 Katelyn McNair, M.S. Computer Science (SDSU), 2011
 Matthew Barbour, M.S. Biology (SDSU), 2011
 Paula Chapman, M.S. Statistics (SDSU), 2011
 Celia Barroso, M.S. Biology (SDSU), 2010
 Jason Rudy, M.S. Bioinformatics and Medical Informatics (SDSU), 2010
 Aaron Donahue, M.S. Applied Mathematics (SDSU), 2009
 Stefan Kolb, M.S., Applied Mathematics (SDSU), 2009
 Patrick Dussler, M.S. Applied Mathematics (SDSU), 2009
 Scott Strachan, M.S. Applied Mathematics (SDSU), 2009
 Markus Bantle, M.S. Applied Mathematics (SDSU), 2009
 Benedict Kramps, M.S. Applied Mathematics (SDSU), 2009
 Terressa Whitaker, M.S. Geography (SDSU), 2009
 Katja Sauler, M.S. Applied Mathematics (SDSU), 2007
 Andreas Rupp, M.S. Applied Mathematics (SDSU), 2007
 Michael Qingling Fan, M.S. Economics (SDSU), 2007
 William Kilpatrick, M.S. Statistics (SDSU), 2012 (expected)
 Yonas Demissi, Ph. D. Civil and Environmental Engineering (UIUC), 2007
 Hua Xie, Ph.D. Civil and Environmental Engineering (UIUC), 2007
 Sang-Ock Kim, Ph.D., Civil Engineering (UIUC), 2006
 Tereza Neocleous, Ph.D., Statistics (UIUC) , 2005
 Jianhui Zhou, Ph.D., Statistics (UIUC), Research Assistant, 2005
 Dominic Frigon, Ph.D. Civil and Environmental Engineering (UIUC), 2005
 Hairong Huang, M.S., Statistics, 2003, Research Assistant
 Nan Lin, Ph.D. Statistics (UIUC), 2003
 Masha Kocherginsky, Ph.D. Statistics (UIUC), 2002
 Luyang Fu, Ph.D, Agricultural and Consumer Economics (UIUC), 2002
 Xiangyun Xiao, M.S. Natural Resources and Environmental Sciences (UIUC), 2001
 Hedi Idris, Ph.D., Agricultural and Consumer Economics (UIUC), 2001
 Sarah Hartz, Ph.D., Statistics (UIUC), 2000
 Li Liu, Ph.D., Statistics (UIUC), 2000
 Hanga Galfalvy, Ph.D. (UIUC), Statistics, 1999

Women in Mathematics, Science and Engineering (WIMSE) Living/Learning Communities at the University of Illinois, 1999-2002, activities include:

Attending dinner with students

Participating in faculty panel discussions
Volunteered for students to visit lab and conduct informational interview

Honors

Most Influential Faculty in Mathematics and Statistics 2015, Nominated by Wesley Brian Raphael

Incomplete Lists of Teachers Ranked as Excellent (UIUC): STAT 428, Spring 2005; STAT 309, Fall 2002, Fall 2003, and Fall 2004.

Sigma Xi Honor Society

Section on Physical Sciences and Engineering (SPES) Special Contributed Paper Honorable Mention, ASA annual meetings, Anaheim (1997)

Distinguished Service Award, Biomathematics Graduate Program (1996)

Outstanding Graduate Teaching Assistant, Mathematics Department, NCSU (1990)

Invited and Selected Presentations

- “Statistical Blending of Biogeochemical Argo Float Data”
Ocean Sciences Meetings, AGU, Portland, OR, Feb. 16, 2018. (invited poster)
WNAR Annual Meeting, University of Alberta, Edmonton, Canada, June 27, 2018.
- “Clustering Adult Cystic Fibrosis and Chronic Obstructive Pulmonary Disease Patients Based on Longitudinal Lung Function Measurements”
WNAR Annual Meeting, Santa Fe, NM, June 27, 2017.
American Statistical Association annual meetings, (JSM 2017), Baltimore, MD, July 30, 2017.
- “Characterizing and Clustering an Adult Cystic Fibrosis Patient Population using Longitudinal Lung Function Measurements”
International Biometric Conference (IBC2016), Victoria, Canada, July 10, 2016. (invited speaker)
American Statistical Association annual meetings, (JSM 2016), Chicago, IL, July 21, 2016.
- “Visualization of the Ensemble Kalman Filter for Data Assimilation”
American Statistical Association annual meetings, Seattle, WA, August 2015. (invited poster)
- “Random Forests and Clustering Clinical Phenotypes in an Adult Cystic Fibrosis Population”
Department of Statistics Seminar, UC Riverside, June 2, 2015. (invited speaker)
WNAR/IMS Conference Boise State University, Boise, Idaho, June 15, 2015.
- “Visualization of Data Assimilation”
American Statistical Association annual meetings, Boston, MA, August 2014. (invited poster)
- “Nonlinear Models and Prediction Intervals for Plankton Ecosystem Dynamics”
San Diego ASA Chapter Annual Meeting, April 23, 2015 (guest speaker)
WNAR Annual Meeting, University of Hawaii - Manoa, June 20, 2014.
- “Nonlinear Models for Predicting Plankton Ecosystem Dynamics”
WNAR Annual Meeting, University of California - Los Angeles, June 17, 2013.
Interface Symposium, Chapman University, April 13, 2013. (invited speaker)
- “A Nonlinear Model for Prediction Interannual Changes in Zooplankton Abundance in the Gulf of Maine”
American Statistical Association annual meetings, San Diego, CA, August 2012. (invited speaker)
- “Multivariate Statistical Learning Using Random Forests”
Presentation and Lab for SDSU Bridges to the Baccalaureate, July 16, 2010, July 1, 2011, July 11, 2014. (invited speaker)
- “A Nonlinear Model for Prediction of the Gulf of Maine Zooplankton Ecosystem”
Department of Statistics, San Diego State University, April 6, 2011. (invited speaker)
- “A Statistical Approach to Modeling Noisy Nonlinear Systems”
Department of Mathematics, CSU San Marcos, November 15, 2010. (invited speaker)
- “Neural Networks: A Flexible Nonlinear Model”
American Statistical Association annual meetings, Washington DC, August 2009. (invited speaker)
- “Nonlinear Forecasts for the the Gulf of Maine Zooplankton Ecosystem”
Conservation and Research of Endangered Species (CRES), Zoological Society of San Diego, CA, April, 2008. (invited speaker)
American Statistical Association annual meetings, Salt Lake City, UT, August 2007.
International Biometric Society (WNAR), University of California, Irvine, June 27, 2007.

- “A Statistical Approach to Modelling Nonlinear Systems” (invited speaker)
U.S. Geological Survey, San Diego, CA, August, 2008.
Division of Biostatistics and Bioinformatics, University of California, San Diego, May 16, 2007.
Department of Mathematics and Statistics, California State University, Long Beach, March 16, 2007.
Department of Statistics, University of California, Riverside, October 19, 2006.
- “Dimension Reduction of Large Datasets in the Atmospheric Sciences”
American Statistical Association annual meetings, Seattle, August 2006. (invited speaker)
- “Quantifying the Predictability of Noisy Nonlinear Biogeochemical Systems”
Computational Science Research Center (CSRC) Colloquium, SDSU, November 7, 2008. (invited speaker)
Canadian Meteorological and Oceanographical Society, Vancouver, B.C., Canada, May 31, 2005. (invited speaker)
- “A Statistical Approach to Modeling Nonlinear Systems”
Department of Mathematics and Statistics, Portland State University, March 18, 2005. (invited speaker)
- “A Statistical Approach to Modeling Nonlinear Systems” Department of Earth and Atmospheric Science, Cornell University, November 23, 2004. (invited speaker)
- “Visualization of Nonlinear Statistical Models”
Spring Research Conference (SRC) on Statistics in Industry and Technology, NIST, Gaithersburg, MD, May 19-21, 2004. (invited speaker)
- “Developing Ecological Forecasts from Time Series Data”
Ocean Research Conference, Honolulu, Hawaii, Feb. 15-20, 2004.
- “Visualization and Diagnostics of Nonlinear Statistical Models”
American Statistical Association annual meetings, San Francisco, August 2003.
- “Visualization and Diagnostics of Nonlinear Statistical Models” Los Alamos National Laboratory, Los Alamos, NM, July 2, 2003. (invited speaker)
- “Statistics and Modeling: Nonlinear Time Series Analysis”
Climate-based Assessment and Forecasting for Ecosystems in the Gulf of Maine, Woods Hole, MA, June 6, 2003. (invited speaker)
- “Visualization and Diagnostics of Nonlinear Statistical Models”
NCSA FY03 Faculty Fellows Presentation, March 19, 2003. (invited speaker)
- “Quantifying the Predictability of Nonlinear Space-Time Processes”
American Statistical Association annual meetings, New York City, August 2002.
- “A Comparison of the Regional Oxidant Model with Observational Ozone Data”
Environmental Hydrology and Hydraulic Engineering, University of Illinois at Urbana-Champaign, April 24, 2002. (invited speaker)
- “A Comparison of the Regional Oxidant Model with Observational Ozone Data”
Environmental and Resource Economics, University of Illinois at Urbana-Champaign, September 19, 2001. (invited speaker)
- “Quantifying the Predictability of Noisy Nonlinear Biogeochemical Systems”
Department of Statistics Colloquium, University of Illinois at Urbana-Champaign, September 4, 2001. (invited speaker)

- “Quantifying the Predictability of Noisy Nonlinear Systems”
American Statistical Association annual meetings, Atlanta, August 2001.
- “Modeling Cloud Cover as a Dynamical System”
The 3rd Japan-US Joint Seminar on Statistical Time Series Analysis, Kyoto, Japan, June 18-22, 2001.
(invited speaker)
- “A Statistical Approach to Quantifying the Predictability of Noisy Nonlinear Systems”
, Mathematical Sciences Research Institute: Workshop on Nonlinear Estimation and Classification,
Berkeley, CA, March 19-29, 2001.
- “Quantifying the Predictability of Noisy Nonlinear Systems”
Los Alamos National Laboratory, Los Alamos, NM, August 22, 2000. (invited speaker)
- “Quantifying the Predictability of Noisy Nonlinear Systems: A Statistical Approach”
Climate and Global Dynamics Seminar, NCAR, Boulder, CO May 2, 2000. (invited speaker)
- “Quantifying the Effects of Noise on Biogeochemical Models”
Interface 2000, New Orleans, LA, April 5-8, 2000.
- “Statistical Issues in Data Mining and Neural Network Models”
Meeting of Central Illinois Chapter of the American Statistical Association, Illinois State University,
Normal, IL, November 20, 1999. (invited speaker)
- “Statistics and Modeling Dynamical Systems”
Department of Mathematics, Division of Statistics, Northern Illinois University, Dekalb, IL, November
5, 1999. (invited speaker)
- “A Short Short-course in Data Mining”
Psychology Department Quantitative Seminar, October, 1999. (invited speaker)
- “A Short Short-course in Data Mining”
Department of Statistics Colloquium, University of Illinois at Urbana-Champaign, September 7, 1999.
- “Computational Aspects of Modeling the Spatial and Temporal Distribution of Cloud Cover”
Interface 1999, Schaumburg, IL, June 9-12, 1999 (invited speaker)
- “Modeling the Spatial and Temporal Distribution of Cloud Cover”
Department of Atmospheric Science, University of Illinois at Urbana-Champaign, April, 1999. (invited
speaker)
- “Modeling Clouds as a Dynamical System”
Joint Purdue-Illinois Colloquium, Department of Statistics, Purdue University, October 15, 1998.
- “Statistics and Dynamical Systems, Beyond Chaos”
Statistics Department Seminar, Colorado State University, Fort Collins, CO. April, 1998. (invited
speaker)
- “Modeling the Spatial and Temporal Distribution of Cloud Cover”
American Meteorological Society, 14th Conference on Probability and Statistics, Phoenix, AZ, January
1998.
- “Modeling the Spatial and Temporal Distribution of Cloud Cover”
American Statistical Association annual meetings, Anaheim, August 1997.

- “Local Lyapunov Exponents: A Closer Look at Chaos, with Confidence”
Third North American Conference of New Researchers’ in Statistics and Probability, Laramie, WY,
July 1997
- “Issues in Modeling the Distribution of Cloud Cover”
A Symposium by Faculty and Postdoctoral Fellows of the Geophysical Statistics Project of NCAR,
Colorado State University, Fort Collins, February 1997.
- “A Comparison of the Regional Oxidant Model with Observational Ozone Data”
4th World Congress of the Bernoulli Society, Vienna, Austria, August 1996. (invited speaker)
- “Local Lyapunov Exponents: A Closer Look at Chaos, with Confidence”
Society for Industrial and Applied Mathematics annual meeting, Kansas City, July 1996 (invited
speaker)
- “On Asymptotics and Applications of Local Lyapunov Exponents” (joint with Stephen Ellner)
Workshop on: Nonlinear Dynamics and Time Series: Building a Bridge Between the Natural and
Statistical Sciences, Montreal, July 1995.
- “Local Lyapunov Exponent: predictability depends on where you are”
American Institute of Biological Sciences annual meetings, Knoxville, TN, August 1994.
Southeast Regional Mathematical and Statistical Ecology Conference, April 1994
American Statistical Association annual meetings, San Francisco, August 1993. (invited speaker)
- “Neural Networks for Function Estimation” (joint with Douglas Nychka)
Interface 1994, Research Triangle Park, June 1994.