

FULL CURRICULUM VITA

I. NAME: Barbara Ann Bailey

II. EDUCATION

North Carolina State University

Ph.D. Biomathematics, Department of Statistics, May 1996

Thesis: Asymptotics and Applications of Local Lyapunov Exponents

Advisors: Professors Stephen Ellner and Douglas Nychka

University of Illinois at Urbana-Champaign

M.S. in Mathematics, May 1988

Springfield College

B. S. in Mathematics and Physical Education, May 1981

III. TEACHING AND RESEARCH POSITIONS AND RANKS HELD

Associate Professor, Department of Mathematics and Statistics San Diego State University	2012-present
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Assistant Professor, Department of Mathematics and Statistics San Diego State University	2006-2012
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Visiting Assistant Professor, Department of Mathematics, University of Colorado at Denver and Health Sciences Center	2005-2006
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Assistant Professor, Department of Statistics University of Illinois at Urbana-Champaign	1998-2005
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Postdoctoral Research Fellow, Geophysical Statistics Project National Center for Atmospheric Research	1996-1998
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Affiliate group memberships:

SDSU/Claremont Graduate University Joint Doctoral Program in Computational Science	2006-present
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IV. PROFESSIONAL GROWTH

Articles in Refereed Journals

(underlined names denote graduate students I worked with on the paper)

(*signifies chair of committee)

(+signifies graduate student)

(++signifies undergraduate student)

AFTER TENURE

1. Zona, D., Laffleur, P.M., Hufkens, K., **Bailey, B.A.**, Gioli, B., and others. (2022) “Earlier Snowmelt May Lead to Late Season Declines in Plant Productivity and Carbon Sequestration in Arctic Tundra Ecosystems.” *Scientific Reports*, 12 (1), 1-10. doi: <https://doi.org/10.1038/s41598-022-07561-1>.
2. George, E.E., Mullinix, J.A., Meng, F., **Bailey, B.A.**, Edwards, C.; Felts, B., Haas, A. F., Hartmann, A., Mueller, B., Roach, T. F., Salamon, P.; Silveira, C., Vermeij, M.; Rohwer, F., Luque, A. (2021) “Space-filling and benthic competition on coral reefs.” *PeerJ*, 9:e11213. doi: <https://doi.org/10.7717/peerj.11213>.
3. George, E.E., Mullinix, J.A., Meng, F., **Bailey, B.A.**, Edwards, C.; Felts, B., Haas, A. F., Hartmann, A., Mueller, B., Roach, T. F., Salamon, P.; Silveira, C., Vermeij, M.; Rohwer, F., Luque, A. (2021) “2D and 3D coral models imaged in Curacau.” *PeerJ*. doi: 10.5061/dryad.5x69p8d2x.
4. Conrad, D.J.; Billings, J., Teneback, C., Koff, J., Rosenbluth, D., **Bailey, B.A.**, Jain, R. (2021) “Multi-dimensional Clinical Phenotyping of a National Cohort of Adult Cystic Fibrosis Patients.” *Journal of Cystic Fibrosis*, 20 (1), 91-96. doi: <https://doi.org/10.1016/j.jcf.2020.08.010>. PubMed PMID: 32948498.
5. Valera, M.⁺, Walter, R.K., **Bailey, B.A.**, Castillo, J.E. (2020) “Machine Learning Based Predictions of Dissolved Oxygen in a Small Coastal Embayment.” *Journal of Marine Science and Engineering*, 8 (12), 1007
6. Rojas, M. I.⁺, Cavalcanti, G. S., McNair, K. Benler, S., Alker, A.T., Cobián-Güemes, A. G., Giluso, M., Levi, K., Rohwer, F., **Bailey, B.A.**, Beyhan, S., Edwards, R.A., Shikuma, N.J. (2020) “A Distinct Contractile Injection System Gene Cluster Found in a Majority of Healthy Adult Human Microbiomes.” *Msystems*, 5(4), e00648-20. doi: <https://doi.org/10.1128/mSystems.00648-20>.
7. McGhee, J.J.⁺, Rawson, N.⁺, **Bailey, B.A.**, Fernandez-Guerra, A., Sisk-Hackworth, L. Kelley, S.T. (2020) “Meta-SourceTracker: Application of Bayesian Source Tracking to Shotgun Metagenomics.” *PeerJ*, 8, e8783. doi: 10.7717/peerj.8783. PubMed PMID: 32231882.

8. Silveira, C.B., Luque, A., Roach, T., Villela, H., Barno, A., Green, K., Reyes, B., Rubio-Portillo, E., Le, T., Mead, S., Hatay, M., Vermeij, M., Takeshita, Y., Haas, A., **Bailey, B.A.**, Rohwer, F. (2019) "Biophysical and Physiological Processes Causing Oxygen Loss from Coral Reefs." *eLife*, 8:e49114. doi: 10.7554/eLife.49114. PubMed PMID: 31793432.
9. Eill, A.⁺, Jahedi, A.⁺, Gao, Y., Kohli, J., Fong, C., Solders, S., Carper, R., Valafar, F., **Bailey, B.A.**, and Müller, R.-A. (2019) "Functional Connectivities Are More Informative Than Anatomical Variables in Diagnostic Classification of Autism." *Brain Connectivity*, 9(8):604-612. doi: 10.1089/brain.2019.0689. PubMed PMID: 31328535.
10. Arndt, K. A.⁺, Oechel, W. C., Goodrich, J. P., **Bailey, B.A.**, Kalhori, A., Hashemi, J., Sweeny, C., Zona, D. (2019) "Sensitivity of Methane Emissions to Later Soil Freezing in Arctic Tundra Ecosystems." *Journal of Geophysical Research: Biogeosciences*, 124. doi: 10.1029/2019JG005242.
11. Alvarez, R.⁺, Wang, B.J., Quijada, P.J., Avitabile, D., Ho, T., Shaitrit, M., Chavarria, M., Firouzi, F., Ebeid, D., Monsanto, M.M., Navarrete, N., Moshref, M., Siddiqi, S., Broughton, K.M., **Bailey, B.A.**, Gude, N.A., Sussman, M.A. (2019) "Cardiomyocyte cell cycle dynamics and proliferation revealed through cardiac-specific transgenesis of fluorescent ubiquitinated cell cycle indicator (FUCCI)." *J. Mol. Cell. Cardiol*, 127:154-164. Epub 2018 Dec 18. doi: 10.1016/j.yjmcc.2018.12.007. PubMed PMID: 30571978.
12. Denaro, K.⁺, **Bailey, B.A.**^{*}, and Conrad, D.J. (2019) "Quantifying Disease Severity of Cystic Fibrosis using Quantile Regression Methods." *Journal of Data Science*, 18 (1), doi:10.6339/JDS.202001_18(1).0008.
13. 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.
14. 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.
15. 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.

16. 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.
17. 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), 11685-11690. doi: 10.1073/pnas.1710248114.
18. 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, 221-235. doi.org/10.3354/meps12247.
19. 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.
20. 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, 1483-1498. doi: 10.1038/ismej.2015.207.
21. 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.
22. 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.
23. Cafri, G.⁺, **Bailey, B.A.*** (2016) "Understanding variable effects from black box prediction: Quantifying effects in tree ensembles using partial dependence." *Journal of Data Science*, 14(1), 67-95. doi: 10.6339/JDS.201601_14(1).0005.
24. 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.
25. 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.
 26. 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.
 27. 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
 28. 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.
 29. 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.
 30. Chen, C.P.⁺, Keown, C.L., Jahedi, A., Naira, A. , Pflieger, M.E., **Bailey, B.A.**, and Müller, R.-A. (2015) “Diagnostic Classification of intrinsic Functional Connectivity Highlights Somatosensory, Default Mode, and Visual Regions in Autism.” *NeuroImage: Clinical*, 8, 238-245. doi: 10.1016/j.nicl.2015.04.002.
 31. Conrad, D.J. and **Bailey, B.A.** (2015) “Multidimensional Clinical Phenotyping of an Adult Cystic Fibrosis Patient Population.” *PLoS One*, 10(3): e0122705. doi: 10.1371/journal.pone.0122705, PMCID: PMC4378917.
 32. 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.
 33. 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.
34. 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.
35. **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.
36. 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.
37. 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.
38. 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,
39. 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.
40. 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.
41. **Bailey, B.A.** (2012) “Quantifying the Predictability of Noisy Space-Time Dynamical Processes .” *Statistics and Its Interface*. 4(4), 535-549.

BEFORE TENURE

42. 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.
43. Ko, G.⁺, Reddy, A., 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.
44. Rupp, A.⁺, **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.
45. Lee, C.⁺, Shen, S.S.P., **Bailey, B.A.**, and North, G.R. (2009), “Factor Analysis for El Niño Signals in Sea Surface Temperature.”, *Theoretical and Applied Climatology*, 97, 195-203, DOI:10.1007/s00704-008-0056-y.
46. Xie, H.⁺, Eheart, W. Chen, Y, and **Bailey, B.A.** (2009), “A Novel Strategy for Improving the Posterior Sampling Efficiency in the Bayesian Calibration of Computationally Expensive Models.” *Water Resources Research*, 45, W06419, doi:10.1029/2007WR006773.
47. 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: Journal of the Transportation Research Board*, 2083, 25-39.
48. 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*, 2006, 40(5), 990-1008.
49. 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.” *International Council for the Exploration of the Sea (ICES) Journal of Marine Science*, 62(7), 1511-1523.
50. **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.
51. Lin, N.⁺, **Bailey, B.A.**, He, X., and Buttlar, W.G. (2004), “Adjustment of Measuring Devices with Linear Models.” *Technometrics*, 46(2), 127-134.
52. 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.

53. 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.
54. Kuurman, W.W.⁺, **B.A. Bailey**, W.J Koops, and Grossman, M. (2001), “Effect of Hatch on the Distribution for Failure of an Embryo to Survive Incubation.” *Poultry Science*, 80, 710-717.
55. 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.
56. 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.
57. Nychka, D.W., Ellner, S., and **Bailey, B.A.** (1995), “A Personal Overview of Nonlinear Time-series Analysis from a Chaos Perspective - Discussion and Comments.” *Scandinavian Journal of Statistics*, 22, 433-435.

Chapters in Refereed Books

BEFORE TENURE

1. **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.

Articles in Refereed Proceedings

AFTER TENURE

1. 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.

BEFORE TENURE

2. Kononov, J., **Bailey, B.A.**, and Allery, B.K. (2008), “Exploratory Analysis of Relationship Between the Number of Lanes and Safety on Urban Free-ways.” *Transportation Research Board 87th Annual Meeting Compendium of Papers*, DVD Report Number 08-0622.

3. Kononov, J., **Bailey, B.A.**, and Allery, B.K. (2008), “Exploratory Examination of the Functional Form of Safety Performance Functions of Urban Freeways.” *Transportation Research Board 87th Annual Meeting Compendium of Papers*, DVD Report Number 08-0621.
4. 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.
5. 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., 2006, 51-55.
6. **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.
7. **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.

Nonrefereed Conference Proceedings and Technical Reports

BEFORE TENURE

1. Ko, G.M.⁺, Reddy, A.s., Kumar, S, **Bailey, B.A.**, and 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.
2. 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. (selected for inclusion in proceedings)
3. 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.

4. **Bailey, B.A.** (2004), "Diagnostics and Visualization of Nonlinear Statistical Models." *2003 Proceedings of the American Statistical Association*, Statistical Computing Section [CD-ROM], Alexandria, VA: American Statistical Association.
5. **Bailey, B.A.** and Doney, S.C. (2001), "Quantifying the Effects of Noise on Biogeochemical Models." *Computing Science and Statistics*, 32, 447-453.
6. **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.
7. Nychka, D., Haaland, P., O'Connell, M., **Bailey, B.**, and Ellner S. (1996), "FUNFITS data analysis and statistical tools of estimating functions." *Manual for the FUNFITS package on StatLib, Carnegie Mellon University.*
8. 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.
9. **Bailey, B.A.**, Chia-yee, 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.

Funded Research Grants

AFTER TENURE

1. DoD CDMRP ARP, “Atypical Thalamocortical Connectivity and Its Relationship to Sleep Problems and Sound Processing in Young Children with Autism Spectrum Disorders”
 (PI) Annika Linke, Department of Psychology, SDSU;
 (Co-Investigator) Barbara Bailey
 AR210041 \$762,265, 07/2022 - 06/2025, 0.24 calendar month per year
 The proposed study will be a first step towards identifying a neural mechanism underlying sleep problems in ASD. It will broaden the understanding of the neurobiology of ASD and provide impetus for additional longitudinal, transdisciplinary, and ultimately intervention studies to address the current lack of evidence-based guidelines for the treatment of sleep problems in ASD.
2. NIH, “The Autistic Brain Over 45: The Anatomic, Functional, and Cognitive Phenotype”
 (co-PIs) Ruth Carper and Ralph-Axel Mueller, Department of Psychology, SDSU;
 (Co-Investigator) Barbara Bailey
 2R01 MH103494 \$3,668,528, 07/2021 - 06/2026, 0.8 calendar month per year
 The major goals of this longitudinal project are to fully characterize neuroanatomical and neurocognitive aging in 45-70 year-old adults with autism spectrum disorder, utilizing anatomical, diffusion, and functional connectivity MRI approaches.
3. NIH, “Communities fighting COVID!”
 (MPIs) Susan Kiene, Hala Madanat, & Eyal Oren, School of Public Health, SDSU; (Co-Investigator) Barbara Bailey
 3U54 CA132384-10S1 \$4,999,999, 09/2020-08/2022, 0.24 calendar month per year
 This project aims to create effective COVID-19 testing uptake strategies that focus on Latinx, African- American, Filipino, and immigrant communities who are exposed or at high risk of exposure to COVID-19 but have not accessed testing. The project will contribute to health disparity reductions in COVID-19 morbidity and mortality and produce high impact by engaging community health workers, existing community partnerships, and rapid point-of-care testing.
4. NIH, “Auditory Precursors of Language Delay in Toddlers with Autism Spectrum Disorders”
 (PI) Ralph-Axel Mueller, Department of Psychology, SDSU;

(Co-Investigator) Barbara Bailey

1 R01 DC017736-01 \$3,730,525 total, 04/01/2019-03/31/2024, 0.6 calendar month per year

This grant uses an innovative multi-faceted approach incorporating advanced imaging techniques and machine learning methods to discover underlying causes of language impairments in ASD and to identify targets for early intervention.

5. 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, 08/4/17-5/31/2022, 0.6 calendar month per year

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.

BEFORE TENURE

6. 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.

7. NIH, “Ecological Approaches to Controlling Cystic Fibrosis”

(PI) Forest Rohwer, SDSU; (Collaborator) Barbara Bailey

\$1,034,880.00, 12/01/10-11/30/14, 0.6 summer month support per year.

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.

8. Archer Daniels Midland Company (ADM) and the University of Illinois, “The Catfish Project”
(PI) Barbara Minsker for UIUC; (PI) Barbara Bailey for SDSU
\$8,130, 5/10-6/11, 0.5 summer month support. (in renewal for 2012)
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.
9. NSF (UMB), “Interdisciplinary Training for Undergraduates in Mathematics and Biology at San Diego State University”
(PI) Anca Segall, (Co-PI) Peter Salamon, 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.
10. UGP, SDSU University Grants Program, “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.
11. 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 (Bailey:\$107,734), 6/15/03-5/31/07, 1 summer month support and 1 RA for 2 years.
This grant is a collaborative effort to explain the interplay among factors influencing complex traits like social behavior by the integration of genomic research, statistical analysis, and bioinformatics. My contribution is the development of dimension reduction techniques and visualization for complex and high dimensional gene expression data. I would estimate the percentage of my work in the overall effort including graduate student supervision to be one-tenth.
12. 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 Lab

\$540,000 (Bailey:\$42,305), 09/01/02-08/31/05, 0.5 summer month yearly support, 1 RA.

The objectives of this project were to create an adaptive framework for environmental monitoring that would enable effective interpretation of non-intrusive monitoring data, improve predictions and assessment of remediation performance, and develop decision rules for on-site adaptive sampling analysis. My contribution is the space, time, and space-time modeling of ground water contaminants. There were five Ph.D. (four Engineering, one Statistics) partially or fully supported by this project, all of whom benefited greatly from my statistical input. I would estimate the percentage of my work in the overall effort including graduate student supervision to be one-tenth.

13. 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 (Bailey:\$36,609), 09/01/02-08/31/04, 1 summer month yearly support.

The goals of this research are to develop forecasts of the marine ecosystem and to investigate how to incorporate these forecasts into resource management decisions. My part involves nonlinear time series modeling and prediction of the abundance of the zooplankton *Calanus finmarchicus*, a key prey species of the endangered right whale. I would estimate the percentage of my work in the overall effort to be one-tenth.

14. 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

(PI) D. Weubbles, (Co-PIs) B. Bailey, S. Brechin, D. Crummey, F. Delcomyn, E. Delucia, S. Kieffer, S. Marshak, B. Rhoads.

\$64,712 (Bailey 0.5 mo. release as Statistics Department participant), 01/01-03-12/31/04. I was a faculty participant.

15. NCSA-UIUC Faculty Fellow, “Visualization and Diagnostics of Nonlinear Statistical Models”

\$10,000, 08/21/02-08/21/03.

This research involves the development of visualization tools for nonlinear optimization methods. This fellowship was my award which was used to support a graduate student.

Submitted Research Grant Proposals

AFTER TENURE

1. NSF, “RaMP: Accelerating bioinformatic capabilities and opportunities (ABCO) for diverse post-bacc students in biotech rich San Diego”
(PIs) Arun Sethuraman and Scott Kelley, Department of Biology, SDSU;
(Senior Personnel) Barbara Bailey
\$3,000,000, 09/2022-08/2026, 0.8 calendar month per year.

This project proposes the establishment of a rigorous postbaccalaureate training program to (1) recruit a diverse cohort of graduating baccalaureates, (2) matched with mentors with unparalleled expertise in applied genomics, (3) provide opportunities for hands-on inquiry based research, (4) connect with and be co-mentored by graduate (MS, PhD) students, Postdoctoral scholars across SDSU and industry partners.

Invited and Selected Presentations

1. “Random Forests for Time Series Forecasting”
American Statistical Association annual meetings, Philadelphia, PA, , August 2, 2020, virtual
2. “Time Series Forecasting with Random Forests and Nonparametric Models”
American Statistical Association annual meetings, Denver, CO, , July 31, 2019 (invited speaker)
3. “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.
4. “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.
5. “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.
6. “Visualization of the Ensemble Kalman Filter for Data Assimilation”
American Statistical Association annual meetings, Seattle, WA, August 2015. (invited poster)
7. “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.
8. “Visualization of Data Assimilation”
American Statistical Association annual meetings, Boston, MA, August 2014. (invited poster)
9. “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.

10. “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)
11. “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)

V. AWARDS and HONORS RECEIVED

AFTER TENURE

- Tioga Research Award winner advisor, Co-supervised (jointly with C.D. Lin) an ACSESS competition award winner (N. Mendoza), CSRC, SDSU, 2021
- Most Influential Faculty Member in Mathematics and Statistics 2015, Nominated by Wesley Brian Raphael

TEACHING EFFECTIVENESS

Supervision of Ph.D Students (JDP with Claremont Graduate University) in Computational Statistics

1. Nadia Bernado, Ph.D. (2022, expected) Co-Advisor with Joey Lin
2. Colette Smirniotis, Ph.D. (2018) Dissertation: Transformation and Parameterization in LatticeKrig
3. Kameryn Denaro, Ph.D. (2016) Dissertation: Quantifying Disease Severity of Cystic Fibrosis using Linear Quantile Mixed Effects Models.

Supervision of Masters Students

1. Brian Faires, M.S. Bioinformatics and Medical Informatics (2021) (Co-Chair with Scott Kelley, Biology)
2. Guy Cafri, M.S. Statistics Emphasis Biostatistics (2013)
3. Colette Smirniotis, M.S. Statistics Emphasis Biostatistics (2012)
4. David Armstrong, M.S. Statistics (2012)
5. Fabian Bosler, M.S. Applied Mathematics (2010)
6. Jochen Wieland, M.S. Applied Mathematics (2010)
7. Scott Nelson, M.S. Statistics (2009)
8. Jing Zheng, M.S. Statistics (2008)

VI. SELECTIVE SERVICE

Service to the Department

1. Undergraduate Advisor, Statistics, Department of Mathematics and Statistics, Spring 2007-present, in charge of (125-150) statistics majors and minors course counseling, degree planning, statistics program inquiries, and orientation.
2. M.S. Statistics Advisor (SDSU), Fall 2012-present in charge of 50-60 statistics/biostatistics graduate students including admission, course counseling, degree planning, and statistics program inquiries
3. Society for Statisticians and Actuaries (SSA), SDSU Student Organization, Faculty Advisor, 2012-present. The SSA purpose is to help all students interested in statistics and actuarial science to network, collaborate on projects, create study groups, and prepare for the actuarial exams.
4. Chair, Statistic Data Science Search Committee, Department of Mathematics and Statistics, 2017
5. Member, Statistic Search Committee, Department of Mathematics and Statistics, 2007, 2008, 2014, 2020, 2021
6. Member, Biomathematics Committee, Department of Mathematics and Statistics, Spring 2014, 2016
7. Statistics seminar organizer, every 2-3 years, invite 6-8 speakers each semester
8. M.S. Statistics Comprehensive Exam Coordinator 2020: Data Analysis Exam 2008, 2010, 2014, 2018 and Theory Exam, 2008, Qualifying Exam 2019, 2020
9. Department RTP Committee, 2014, 2015-2016, 2019
10. Member, Executive Committee, Mathematics and Statistics Department, Spring 2014
11. Member, Computation Sciences Statistics Ph.D. Program Admissions Committee, Department of Mathematics and Statistics, 2007-2011
12. Internship, graduate development, undergraduate development, and numerous department committees
13. Commencement Committee, Department of Mathematics and Statistics, 2006-present
14. Internship Coordinator, Department of Mathematics and Statistics, 2007-2011
15. Tutoring Programs, Department of Mathematics and Statistics, 2007-2008
16. Faculty co-advisor, REUT Mathematics Program (SDSU), Summer 2009

SDSU Service

1. College of Sciences Diversity and Inclusion Committee Member, 2019-2020
2. College of Science Research Committee, 2014-2015
3. Judge, Student Research Symposium (SRS), many years
4. Judge, CSRC ACSESS, many years
5. CSRC Data Science Workshop, May 28-30, 2019 (Co-organizer/presenter with Dr. Alfonso Limon)
The workshop included an introduction to data science, statistical and machine learning. The two main methods covered are random forests (Bailey) and neural networks (Limon).
6. "Multivariate Statistical Learning Using Random Forests", July 16, 2010, July 1, 2011, July 11, 2014.
Presentation and Lab for SDSU Bridges to the Baccalaureate

Service to the Profession

1. Member of the Fisher Award and Lectureship Committee (American Statistical Association), 2019-2021
The Lectureship recognizes the importance of statistical methods for scientific investigations, and the list of past lecturers well reflects the prestige that COPSS and its member societies place on this award. The Award Committee selecting the recipient will consist of six members.
2. The International Biometric Society, Western North American Region (WNAR) Regional Committee Member, 2014-2016
3. The International Biometric Society, Western North American Region (WNAR) Regional Advisory Board Member, 2013-2015
4. Guest Speaker for San Diego ASA Chapter Annual Meeting, Title: Non-linear Models and Prediction Intervals for Plankton Ecosystem Dynamics, April 23, 2017
5. WNAR Student Paper Competition Committee Review Member, June 16, 2013
6. Transportation Research Board (TRB) of the National Academies: Committee on Transportation Safety Management Board Member, 4/15/2010-4/14/2013
7. The American Statistical Association Section on Statistical Computing, Publications Officer, 2008-2011.
8. The International Biometric Society, Eastern North American Region (ENAR) Regional Advisory Board Member, January 1, 2005-December 31, 2007

9. Reviewed papers and proposals (selected):

Multidisciplinary Digital Publishing Institute, 2022; Autism Research, 2021; CFRI Grant Review, 2021; Vienna Science and Technology Fund, 2021; Scientific Report, 2020; Nicotine & Tobacco Research, 2017-2018; PLOS One, 2013-2015, 2022; 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

Service to the Community

1. 2008 Greater San Diego Science and Engineering Fair Judge, Balboa Park, April 2, 2008