

Dr. Beate G. Zimmer

Texas A&M University-Corpus Christi
Science & Engineering, Mathematics & Statistics

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Education

PhD, University of Illinois, 1994.

Diplom, Universitaet Konstanz, 1988.

Licensures and Certifications

Higher Education Teaching Certificate, University of Hull (England). (1995 - Present).

Professional Employment

Associate Professor of Mathematics, Texas A&M University -Corpus Christi. (August 2005 - Present).

Guest Scientist in CCS-3 (Information Sciences Group), Los Alamos National Laboratory. (January 2018 - January 2020).

Work on research and publications with Dr. Reid Porter

Guest Scientist, ISR-3 (Space Data Systems), Los Alamos National Laboratory. (May 2011 - January 2018).

Work on projects, help with publications

Laboratory Affiliate, Los Alamos National Laboratory. (May 2010 - August 2010).

Work in the ISR-2 Division (Space and Remote Sensing Sciences) with Reid Porter on publications.

Laboratory Affiliate, Los Alamos National Laboratory. (May 2009 - August 2009).

Work in the ISR-2 (Space and Remote Sensing Sciences) Division with Reid Porter on classification algorithms.

Laboratory Affiliate, Los Alamos National Laboratory. (May 2008 - August 2008).

Work in the ISR-2 (Space and Remote Sensing Sciences) Division with Reid Porter on classification algorithms.

Laboratory Affiliate, Los Alamos National Laboratory. (May 2007 - August 2007).

Work in the ISR-2 (Space and Remote Sensing Sciences) Division with Reid Porter on classification algorithms.

Laboratory Affiliate, Los Alamos National Laboratory. (May 2006 - August 2006).

Work in the ISR-2 (Space and Remote Sensing Sciences) Division with Simon Perkins on classification algorithms.

Visiting Associate Professor of Mathematics, Texas A&M University -Corpus Christi. (August 2003 - August 2005).

Associate Professor of Mathematics, Mississippi University for Women. (August 2002 - August 2003).

Assistant Professor of Mathematics, Mississippi University for Women. (August 1997 - August 2002).

Visiting Assistant Professor of Mathematics, College of William and Mary. (August 1996 - August 1997).

Visiting Lecturer, University of Illinois at Urbana-Champaign. (August 1995 - August 1996).

Leverhulme Postdoctoral Fellow, University of Hull. (August 1994 - August 1995).

Professional Memberships

American Mathematical Society

TEACHING

Teaching Experience

MATH 1342, STATISTICS FOR SOCIAL SCIENCE
MATH 2312, PRECALCULUS
MATH 2413, CALCULUS I
MATH 2414, CALCULUS II
MATH 2415, CALCULUS III
MATH 3311, LINEAR ALGEBRA
MATH 3470, CALCULUS III
MATH 5310, TOPICS IN MATHEMATICS
MATH 5333, NUMERICAL LINEAR ALGEBRA
MATH 5339, NUMERICAL ANALYSIS
MATH 5351, REAL ANALYSIS
MATH 5393, LITERATURE REVIEW AND RESEARCH
MATH 5394, RESEARCH METHODS IN MATH
MATH 5396, DIRECTED INDEPENDENT STUDY
MATH 5994, PROPOSAL RESEARCH
MATH 5995, THESIS
MATH 5997, DIRECTED RESEARCH

Teaching Awards and Honors

A&M System Student Recognition Award for Teaching Excellence, A&M System. (2012).

SCHOLARLY AND CREATIVE ACTIVITIES

Publications

Refereed

Book Chapters

Porter, R., Zimmer, B. G., Hush, D. (2009). In Michael H.F. Wilkinson and Jos B.T.M. Roerdink (Ed.), *Stack Filter Classifiers* (vol. 5720, pp. 282-294). Lecture Notes in Computer Science, Springer Verlag, Mathematical Morphology and Its Application to Signal and Image Processing.

Zimmer, B. G. (2007). A Radon-Nikodym theorem for a vector-valued reference measure. In Imme van den Berg, Vitor Neves (Ed.), *The Strength of Nonstandard Analysis* (pp. pp 227-237). Vienna: Springer Verlag.

Zimmer, B. G. (1995). Nonstandard hulls of Lebesgue-Bochner spaces. In S. Albeverio, W. A. J. Luxemburg, M. Wolff (Ed.), *Advances in Analysis, Probability, and Mathematical Physics - Contributions of Nonstandard Analysis* (1994th ed., pp. p.132-139). Dordrecht: Kluwer.

Conference Proceedings

Theiler, J., Zimmer, B. G., Ziemann, A. (2018). *Closed-Form Detector For Solid Sub-Pixel Targets In Multivariate t-Distributed Background Clutter* (pp. 4 pages). IEEE Explore: International Geoscience And Remote Sensing Symposium.

Porter, R. B., Zimmer, B. G. (2016). *Deep Segmentation Networks using "Simple" Multi-Layered Graphical Models* (pp. 4). Santa Fe, New Mexico: IEEE 2016 Southwest Symposium on Image Analysis and Interpretation.
<http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=7459154&isnumber=7459153>

Porter, R. B., Oyen, D., Zimmer, B. G. (2015). In Hugues Talbot, Laurent Najman & Jocelyn Chanussot (Ed.), *Learning Watershed Cuts Energy Functions* (pp. 13 pages). Springer Lecture Notes in Computer Science, 12th International Symposium on Mathematical Morphology.

Zimmer, B. G., Porter, R. B. (2015). *Links Between Binary Classification and the Assignment Problem in Ordered Hypothesis Machines* (pp. 6 pages). San Francisco: SPIE Electronic Imaging, Image Processing: Algorithms and Systems XIII Conference.
http://www.pooka.lanl.gov/Publications_files/OhmAssignment.pdf

Zimmer, B. G., Sadovski, A. L., Tissot, P., Sterba-Boatwright, B. D. (2008). In C. H. Dagli et. Al. (Ed.), *Monte Carlo Simulations and Factor Analysis to Optimize Neural Network Input Selections and Architectures* (vol. 18, pp. 501-508). New York, NY: Engineering Systems through Artificial Neural Networks / ASME Press.

Sadovski, A. L., Steidley, C., Tissot, P., Zimmer, B. G. (2005). *Real Time Web Availability of Statistical Models for Water Levels along the Texas Coastline* (2005th ed., vol. Vol. 4 – Signal Processing, systems modeling and control, pp. p. 218-223). ICINCO 2005, Proceedings of the Second International Conference on Informatics in Control, Automation and Robotics, Barcelona, Spain, September 14-17, 2005.

Zimmer, B. G., Tissot, P., Flores, J. S., Bowles, Z., Sadovski, A. L., Steidley, C. (2005). *Water Level Forecasting along the Texas Coast: Interdisciplinary Research with Undergraduates*. Portland, Oregon: Proceedings of the 2005 American Society for Engineering Education Annual Conference & Exposition.

Zimmer, B. G., Flores, J. S., Tissot, P., Sadovski, A. L. (2005). *Research with an Undergraduate Student: Using Entropy to Assess the Training of a Neural Network* (2005th ed., pp. 8 pages). Proceedings of the American Society for Engineering Education- Gulf-Southwest Section 2005 Annual Conference.

Journal Articles

Theiler, J., Zimmer, B. G. (2017). Selecting the Selector: Comparison of Update Rules for Discrete Global Optimization. *Statistical Analysis and Data Mining*, 10(3), 211-229.
onlinelibrary.wiley.com/doi/10.1002/sam.11343/full

Zimmer, B. G., Hush, D., Porter, R. (2012). Ordered Hypothesis Machines. *Journal of Mathematical Imaging and Vision*, 43(2), 121-134.
<http://www.springerlink.com/content/a184582626242811/fulltext.pdf>

Porter, R. B., Hush, D., Zimmer, B. G. (2011). Error Minimizing Algorithms for Nearest Neighbor Classifiers. *Proceedings of SPIE Volume: 7870, Image Processing: Algorithms and Systems IX (Proceedings Volume)*, 7870(10 March 2011), 10.
spie.org/app/program/index.cfm?fuseaction=conferencedetail&conference=7870

Garcia-Pineda, O., MacDonald, I., Zimmer, B. G., Shedd, B., Roberts, H. (2010). Remote-sensing evaluation of geophysical anomaly sites in the outer continental slope, northern Gulf of Mexico. *Deep Sea Research Part II: Topical Studies in Oceanography*, 57, 1859-1869.

Garcia-Pineda, O., Zimmer, B. G., Howard, M., Pichel, W., Li, X., MacDonald, I. R. (2009). Using SAR images to delineate ocean oil slicks with a texture classifying neural network algorithm. *Canadian Journal of Remote Sensing*, 35(5), 1-11.

Zimmer, B. G., Sadvovski, A. L., Tissot, P., Sterba-Boatwright, B. D. (2007). Monte Carlo Simulations and Factor Analysis to Optimize Neural Network Input Selections and Architectures. *Intelligent Engineering Systems through Artificial Neural Networks*, 18, 501-508.

Sadvovski, A. L., Zimmer, B. G., Sterba-Boatwright, B. D., Tissot, P., Bachnak, R. (2006). Analysis of the Gulf of Mexico Coastal and Estuarine Water Levels as Random Signals. *WSEAS Transactions on Mathematics*, 5(11), pp.1234-1241.

Sadvovski, A. L., Zimmer, B. G., Sterba-Boatwright, B. D., Tissot, P., Bachnak, R. (2006). Analysis of the Gulf of Mexico Water Levels as random Signals. *WSEAS Transactions on Mathematics*, 5(11), 1234-1241.

Zimmer, B. G. (2005). A Unifying Radon-Nikodym Theorem Through Nonstandard Hulls. *Illinois Journal of Mathematics*, 49(3), pp. 873-883.

Zimmer, B. G., Cutland, N. (2005). Small-Norm Isomorphisms of $C(K)$ -spaces. *Proceedings of the Edinburgh Mathematical Society*, 48, pp. 585-594.

Zimmer, B. G. (1998). An extension of the Bochner integral generalizing the Loeb-Osswald integral. *Mathematical Proceedings of the Cambridge Philosophical Society*, 123, pp. 119-131.

Non-Refereed

Conference Proceedings

Ball, R., Zimmer, B. G., Adams, J., Sterba-Boatwright, B. D. (2007). *ANN predictive water temperature modeling of cold water events in a shallow lagoon* (pp. 7 pages). Proceedings of 87th American Meteorological Society Annual Meeting, Fifth Conference on Artificial Intelligence Applications to Environmental Science.

Presentations

Theiler, J. (Author), Zimmer, B. G. (Author), Ziemann, A. (Author & Presenter), "Closed-Form Detector For Solid Sub-Pixel Targets in multivariate t-distributed Background Clutter," IGARSS

2018, International Geoscience and Remote Sensing Symposium, Valencia, Spain. (July 24, 2018).

Zimmer, B. G., "Matrix Factorizations," ISTI/CSES Applied Machine Learning Summer School 2018, Los Alamos National Laboratory, Los Alamos, NM. (June 27, 2018).

Zimmer, B. G., "Three models for subpixel anomalies in hyperspectral images," Mathematics Seminar, Texas A&M University - Corpus Christi, Corpus Christi, TX. (March 7, 2018).

Theiler, J. (Author & Presenter), Ziemann, A. (Author), Zimmer, B. G. (Author), "Segmented Regression for Spatiospectral Background Estimation," IGARSS 2017, IEEE, Fort Worth, TX. (July 27, 2017).

Theiler, J. (Author & Presenter), Zimmer, B. G. (Author), "Cheaper by the Dozen: Optimization with B measurements between each model update," Materials Informatics Team Meeting, T-Division, Los Alamos National Lab, Los Alamos, NM. (July 14, 2016).

Porter, R. B. (Author & Presenter), Zimmer, B. G. (Author), "Deep Segmentation Networks using "simple" multi-layered Graphical Models," IEEE Southwest Symposium on Image Analysis and Interpretation, IEEE, Santa Fe, NM. (March 7, 2016).

Theiler, J. P. (Author & Presenter), Zimmer, B. G. (Author), Balachandran, P. V. (Author), Lookman, T. (Author), Hogden, J. E. (Author), Barros, K. M. (Author), "Selecting the Selector: using statistics to discover new materials," Conference on Data Analysis, CNLS Los Alamos National Laboratory, Santa Fe, NM. (March 2, 2016).

Theiler, J. (Author & Presenter), Zimmer, B. G. (Author), Balachandran, P., Hogden, J., Barros, K., Lookman, T., "Selecting the selector: some thoughts on the knowledge gradient," Materials Informatics Team Meeting, Material Informatics Team, Los Alamos National Laboratory, NM. (March 1, 2016).

Porter, R. B. (Author & Presenter), Oyen, D. (Author), Zimmer, B. G. (Author), "Learning Watershed Cuts Energy Functions," 12th International Symposium On Mathematical Morphology, Reykjavik, Iceland. (May 29, 2015).

Porter, R. B. (Author & Presenter), Zimmer, B. G. (Author), "Links between binary classification and the assignment problem in ordered hypothesis machines," IS&T/SPIE Electronic Imaging 2015, Image Processing: Algorithms and Systems XIII, SPIE, San Francisco. (February 10, 2015).

Zimmer, B. G., "Putting EMhemi to the Test," LANL Iterative Intelligence group meeting, ISR-3 Division, Los Alamos National Laboratory, Los Alamos, NM. (July 22, 2014).

Zimmer, B. G., "Hemisupervised Expectation Maximization for rare category detection," LANL ISR- DR research group seminar, ISR-3, Los Alamos National Laboratory, Los Alamos National Laboratory. (August 13, 2013).

Zimmer, B. G., "The skinny fish," LANL ISR- DR research group, ISR-3, Los Alamos National Laboratory, Los Alamos National Laboratory. (June 25, 2013).

Zimmer, B. G. (Author & Presenter), "Relatively True – combining first order logic and statistical models," South Texas Math Consortium, TAMUCC, Corpus Christi. (March 24, 2012).

Porter, R. (Author & Presenter), Zimmer, B. G. (Author), Hush, D. (Author), "New loss functions for ordered hypothesis machines," IS&T/SPIE Electronic Imaging 2011, Image Processing: Algorithms and Systems IX, SPIE, San Francisco. (January 24, 2011).

Garcia-Pineda, O. (Author & Presenter), MacDonald, I. (Author), Pichel, W. (Author), Li, X. (Author), Zimmer, B. G. (Author), Lapham, L. (Author), "USING SAR TO ESTIMATE SPATIAL AND TEMPORAL VARIABILITY OF OIL OUTPUT FROM NATURAL HYDROCARBON SEEP FORMATIONS," International Geoscience and Remote Sensing Symposium (IGARSS) 2010, IEEE, Honolulu, Hawaii. (July 30, 2010).

Zimmer, B. G. (Author & Presenter), Porter, R. (Author), Hush, D. (Author), "Stack Filter classifiers with an application to change detection in images.," Joint Math Meetings, AMS Special Session on Interactions of Inverse Problems, Signal Processing and Imaging, American Mathematical Society, San Francisco, CA. (January 12, 2010).

Zimmer, B. G., "Stack Filter Classifiers," Mathematics Seminar, Texas A&M University - Corpus Christi, Corpus Christi. (November 20, 2009).

Garcia, O. (Author), MacDonald, I. R. (Author & Presenter), Zimmer, B. G. (Author), Shedd, W. (Author), Frye, M. (Author), "Satellite SAR inventory of Gulf of Mexico oil seeps and shallow gas hydrates," European Geosciences Union 2009, European Geosciences Union, Vienna, Austria. (April 21, 2009).

Ball, R. (Author & Presenter), Tissot, P., Zimmer, B. G., Sterba-Boatwright, B. D., "Comparison of random forest, artificial neural network, and multi-linear regression: a water temperature prediction case," Seventh Conference on Artificial Intelligence and its Applications to the Environmental Sciences, American Meteorological Society, Phoenix, Arizona. (January 2009).

Zimmer, B. G., Tissot, P., "Texas Coastal Observation Network: what to do with the wealth of data," SAMSI workshop on Environmental Sensor Networks, SAMSI, Raleigh, NC. (January 24, 2008).

Ball, R. (Author & Presenter), Tissot, P., Zimmer, B. G., Adams, J., Sterba-Boatwright, B. D., "ANN predictive water temperature modeling of cold water events in a shallow lagoon.," Fifth Conference on Artificial Intelligence Applications to Environmental Science, American Meteorological Society. (January 2007).

Zimmer, B. G., "12.The Influence of the Choice of a Performance Function on Forecasts Made by Artificial Neural Networks," ICCMM 2005, East China Normal University, Shanghai, China. (October 25, 2005).

Zimmer, B. G., "Differentiating one Vector Measure with respect to another Vector Measure," Conference on Non Standard Mathematics – NSM 2004, Aveiro, Portugal. (July 8, 2004).

Zimmer, B. G., "Isometries between C^* -algebras," Congress Pisa 2002, Non standard methods and applications, University of Pisa, Pisa, Italy. (June 13, 2002).

Zimmer, B. G., "Small-norm isomorphisms of $C(K)$ -spaces," Mathematisches Forschungsinstitut Oberwolfach, Deutsche Forschungsgemeinschaft, Oberwolfach, Germany. (February 25, 1999).

Zimmer, B. G., "Peak functions and the Banach-Stone theorem," International Symposium on Nonstandard Analysis and its Applications, NATO, Edinburgh, Scotland. (August 13, 1996).

Zimmer, B. G., "Calculus & Mathematica," University of Hull Mathematics Seminar, University of Hull, Kingston-upon-Hull, England. (June 25, 1996).

Zimmer, B. G., "Neometric spaces," Mathematics Colloquium, University of Puerto Rico, Mayaguez, Puerto Rico. (March 12, 1996).

Zimmer, B. G., "Nonstandard Vector Integration," Oxford Logic Seminar, Oxford University, Oxford, England. (May 12, 1995).

Zimmer, B. G., "Applications of Nonstandard Analysis to Functional Analysis," Yorkshire Functional Analysis Colloquium, University of Leeds, Leeds, England. (April 9, 1995).

Zimmer, B. G., "Verallgemeinerte Radon-Nikodým Ableitungen," Seminar ueber Funtionalanalysis, Funktionalanalysis Seminar Konstanz-Zuerich, Zuerich, Switzerland. (February 9, 1994).

Zimmer, B. G., "Generalized Radon-Nikodým derivatives," Konferenz über Nichtstandardanalysis und Anwendungen, Deutsche Forschungsgemeinschaft. (February 3, 1994).

Zimmer, B. G., "Properties of the Loeb-Osswald integral," International Conference on Applications of Nonstandard Analysis to Analysis, Functional Analysis and Probability, Blaubeuren, Germany. (July 21, 1992).

Contracts, Grants and Sponsored Research

Grant

Zimmer, Beate G. (Co-Principal), Macdonald, Ian R (Principal), Naehr, Thomas H., "Remote sensing and sea-truth measurements of methane flux to the atmosphere from near-surface gas hydrates in continental margins," Sponsored by Department of Energy, Funding Opportunity Notice # DEPS2608NT43260-04, (Hydrate in the Global Environment), Federal, \$1,300,000.00. (January 2009 - December 2010).

Sponsored Research

Zimmer, Beate G., "Enhanced Harmonics for water level predictions," Sponsored by University Research Council, Texas A&M University-Corpus Christi, \$7,055.00. (September 2006 - September 2007).

Zimmer, Beate G., "Analysis and Design of Environmental ANN Models," Sponsored by Texas Research Development Fund, Texas A&M University-Corpus Christi, \$30,000.00. (December 2005 - August 2006).

Zimmer, Beate G., "Isometries between C^* -algebras," Sponsored by Faculty Research Grant, Mississippi University for Women, Other, \$2,000.00. (May 2001 - August 2001).

SERVICE

Department

Committee Member, Graduate Committee. (October 2018 - Present).
Committee Chair, Assessment. (August 2018 - Present).
Committee Chair, Tenure and Promotion Committee. (August 2018 - Present).
Committee Chair, Computing Committee. (September 2017 - Present).
Committee Member, Faculty Hiring Committee. (September 2017 - Present).
Committee Member, Tenure and Promotion Committee. (September 2008 - Present).
Committee Member, Department Chair Search Committee. (August 2018 - November 2018).
Committee Member, Steering Committee. (October 2017 - March 2018).
Committee Member, Ethics Committee. (September 2017 - October 2017).
Committee Chair, Math Department Awards Committee. (August 2010 - September 2017).

Graduate Program Coordinator. (August 2016 - August 2017).
Committee Member, Distance Education Committee. (September 2014 - August 2017).
Committee Member, Chair Search Committee. (February 2017 - May 2017).
Committee Chair, Instructor Search Committee. (December 2016 - May 2017).
Acting Department Chair. (December 2016).
Maintain online homework/quizzes course, MyMathLab Precalculus course. (August 2010 - August 2015).
Competition organizer, Problem of the Month. (August 2007 - August 2015).
Committee Chair, Calculus Textbook Selection Committee. (February 2015 - March 2015).
Committee Chair, Math Education Search Committee. (September 2013 - January 2014).
Committee Member, Undergraduate program review. (October 2012 - June 2013).
Faculty Mentor, Islander Math Circles. (September 2012).
Attendee, Meeting, Assess-a-thon. (October 2010).
Committee Chair, Instructor Search Committee. (February 2010 - August 2010).
Committee Chair, Upper Division Undergraduate Oversight Committee. (September 2008 - May 2010).

College

Committee Member, College Research Enhancement Committee. (August 2017 - Present).
Committee Member, College Research Enhancement/Research-Release Committee. (September 2012 - September 2013).
Committee Chair, College Research Enhancement/Research Release Committee. (September 2010 - September 2012).
Committee Member, College Research Enhancement/Research-Release Committee. (September 2009 - September 2010).
Committee Member, S&T Curriculum Committee. (September 2008 - May 2010).

University

Committee Member, The Center for Faculty Excellence Committee. (August 2012 - September 2014).
Committee Member, Committee on Committees. (May 2012 - May 2014).
Committee Member, Faculty Senate. (April 2012 - April 2014).
Committee Member, Undergraduate Council. (September 2009 - May 2013).
Committee Member, Research and Scholarly Activity Council. (August 2007 - May 2013).
Committee Member, Research Enhancement Committee. (September 2009 - April 2013).

Professional

Interaction with Industry, ISR-3 Division, Los Alamos National Laboratory. (May 2006 - Present).
Reviewer, Journal Article, Journal of Logic and Analysis. (April 2016 - June 2016).

Public

Purchase, plant and irrigate over 800 seedling trees, Reforestation of Medio Dia Canyon after the Las Conchas Wildfire. (August 2011 - Present).
Volunteer, Glenoak Therapeutic Riding. (January 2010 - December 2011).