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Department of Mathematics
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Education

Ph.D. mathematics	University of Michigan	1995
M.S. mathematics	Michigan State University	1991
B.S. computer science	Michigan State University	1989
B.Mus., violin performance	Michigan State University	1989

Professional Experience

Head of Mathematics	Purdue University	2013-2020
Professor of Mathematics	Purdue University	2010-present
Consultant	Gene Network Sciences	2005-2009
Director of Cardiac Technology	Gene Network Sciences	2004-2005
Associate Professor	Purdue University	2002-2010
H.C. Wang Assistant Professor	Cornell University	1998-2001
Max Zorn Assistant Professor	Indiana University	1995-98

Visiting Positions

Invited visitor	IHES, Bures-sur-Yvette, France	Spring 2013
Invited visitor	Institut Mittag-Leffler	April 2008
Visiting Professor	Université Paul-Sabatier, Toulouse	March 2005
Visiting Professor	Université Paul-Sabatier, Toulouse	May 2004
Invited visitor	IHES, Bures-sur-Yvette, France	summer 1999
Postdoctoral Fellow	Mathematical Sciences Research Institute	spring 1996
Postdoctoral Fellow	Mathematical Sciences Research Institute	spring 1995

Fellowships and Awards

SIAM Imaging Sciences Best Paper Award	2020
Big Ten Academic Leadership Program Fellow	2017-18
Purdue University Seed for Success Award	2010 and 2018
Math Advisors' Choice Award	2015
Purdue University Fellowship for Study in a Second Discipline	2012
Ruth and Joel Spira Teaching Award	2004 and 2009
University of Michigan Research Partnership Award	1994
University of Michigan Regents Fellowship	1991-94
NSF Dissertation Enhancement Award (for residence at IHES)	1994
NSF Graduate Fellowship	1989-91

Research Interests

Algorithms for image processing
Algorithms for uncertainty quantification and reduction
Mathematical and computational biology
Dynamical systems and their applications
Complex analysis and geometry-several complex variables

Publications

Peer-reviewed journal and expository articles

Published/Accepted

68. C. A. Bouman, G. T. Buzzard, and B. Wohlberg, "Plug-and-Play: A General Approach for the Fusion of Sensor and Machine Learning Models," to appear in *SIAM News*, 2021.
67. S. Majee, T. Balke, C. A. J. Kemp, G. T. Buzzard, and C. A. Bouman, "Multi-Slice Fusion for Sparse-View and Limited-Angle 4D CT Reconstruction," to appear in *IEEE Trans. on Comp. Imaging*. Preprint available: <http://arxiv.org/abs/2008.01567>.
66. A. Chakrabarty, D. K. Jha, G. T. Buzzard, Y. Wang, and K. G. Vamvoudakis, "Safe Approximate Dynamic Programming via Kernelized Lipschitz Estimation," *IEEE Transactions on Neural Networks and Learning Systems*, pp. 1–15, 2020, doi: 10.1109/TNNLS.2020.2978805.
65. J. Ulcickas, Z. Cao, J. Rong, C.A. Bouman, L. Slipchenko, G.T. Buzzard, and G.J. Simpson, "Multiagent Consensus Equilibrium in Molecular Structure Determination," *J. Phys. Chem. A*, vol. 124, no. 43, pp. 9105–9112, 2020, doi: 10.1021/acs.jpca.0c07282.
64. V. Sridhar, X. Wang, G. Buzzard, and C. Bouman, "Distributed Iterative CT Reconstruction using Multi-Agent Consensus Equilibrium," *IEEE Transactions on Computational Imaging*, pp. 1–1, 2020, doi: 10.1109/TCI.2020.3008782.
63. R. Ahmad, CA Bouman, GT Buzzard, S Chan, S Liu, ET Reehorst, P Schniter, "Plug-and-Play Methods for Magnetic Resonance Imaging: Using Denoisers for Image Recovery," in *IEEE Signal Processing Magazine*, vol. 37, no. 1, pp. 105-116, Jan. 2020, doi: 10.1109/MSP.2019.2949470.
62. A. Raha, A. Chakrabarty, V. Raghunathan, and G. Buzzard, "Embedding Approximate Nonlinear Model Predictive Control at Ultrahigh Speed and Extremely Low Power," *IEEE Transactions on Control Systems Technology*, vol. PP, pp. 1–8, Mar. 2019, doi: 10.1109/TCST.2019.2898835.
61. Chakrabarty, A., Rundell, A.E., Zak, S.H., Zhu, F., Buzzard, G.T., Unknown Input Estimation for Nonlinear Systems Using Sliding Mode Observers and Smooth Window Functions, *SIAM J. Control Optim.*, 56(5):3619–3641, 2018. DOI:10.1137/16M1078793
60. Zhang, S., Song, Z., Godaliyadda, G.M.D.P., Hye Ye, D., Chowdhury, A.U., Sengupta, A., Buzzard, G.T., Bouman, C.A., and Simpson, G.J., Dynamic Sparse Sampling for Confocal Raman Microscopy, *Anal Chem.*, 90(7):4461-4469, 2018. DOI: 10.1021/acs.analchem.7b04749.
59. Buzzard, G.T., Chan, S.H., Sreehari, S., and Bouman, C.A., Plug-and-Play Unplugged: Optimization Free Reconstruction Using Consensus Equilibrium, *SIAM J. Imag. Sci.*, 11(3):2001-2020, 2018. DOI:10.1137/17M1122451
58. Buzzard, G.T., McGee, R.L., Maximally Informative Next Experiments for Nonlinear Models, *Mathematical Biosciences*, 302:1-8, 2018, DOI:10.1016/j.mbs.2018.04.007, 2018.
57. Buzzard, G.T., Chambolle, A., Cohen, J.D., Levine, S.E., Lucier, B.J., Pointwise Besov Space Smoothing of Images, *J Math Imaging Vis*, 20 pages, 2018. DOI:10.1007/s10851-018-0821-1
56. Chakrabarty, A., Fridman, E., Zak, S.H., Buzzard, G.T., State and Unknown Input Observers for Nonlinear Systems with Delayed Measurements, *Automatica*, 95:246-253, 2018. DOI: 10.1016/j.automatica.2018.05.036
55. Borgonovo, E., Buzzard, G.T., Wendell, R., A Global Tolerance Approach to Sensitivity Analysis in Linear Programming, *Eur. J. Oper. Res.*, 267(1):321-337, 2018. DOI: 10.1016/j.ejor.2017.11.034
54. Godaliyadda, G.M., Hye Ye, D., Uchic, M.D., Groeber, M.A., Buzzard, G.T., and Bouman, C.A. A Framework for Dynamic Image Sampling Based on Supervised Learning (SLADS), *IEEE Trans. Computational Imaging*, 4(1):1-16, 2018. DOI: 10.1109/TCI.2017.2777482.
53. Rehrauer, O., Dinh, V.C., Mankani, B.R., Buzzard, G.T., Lucier, B.J., Ben-Amotz, D., Binary Complementary Filters for Compressive Raman Spectroscopy, *Appl. Spectrosc*, 72(1):69-78, 2018. DOI: 10.1177/0003702817732324.
52. Chakrabarty, A., Corless, M., Buzzard, G.T., Zak, S.H., Rundell, A.E., State and Unknown Input Observers for Nonlinear Systems with Bounded Exogenous Inputs, *IEEE Trans. Autom. Control.*, 62(11): 5497-5510, 2017. DOI: [10.1109/TAC.2017.2681520](https://doi.org/10.1109/TAC.2017.2681520)

51. Sreehari, S., Venkatakrishnan, S.V., Wohlberg, B., Buzzard, G.T., Drummy, L.F., Simmons, J.P., Bouman, C.A., Plug-and-Play Priors for Bright Field Electron Tomography and Sparse Interpolation, *IEEE Trans. Comput. Imaging*, 2(4), 408-423, 2016. DOI: [10.1109/TCL.2016.2599778](https://doi.org/10.1109/TCL.2016.2599778)
50. Scarborough, N.M., Godaliyadda, D.H.Y., Kissick, D.J., Zhang, S., Newman, J.A., Sheedlo, M.J., Chowdhury, A., Fischetti, R.F., Das, C., Buzzard, G.T., Bouman, C.A., Simpson, G.J., Dynamic X-ray Diffraction Sampling for Protein Crystal Positioning, *J. Synchrontron Radiat.*, 24, 188-195, 2017. DOI: [10.1107/S160057751601612X](https://doi.org/10.1107/S160057751601612X)
49. Chakrabarty, A., Buzzard, G.T., Zak, S.H., Output-Tracking Quantized Explicit Nonlinear Model Predictive Control Using Multi-Class Support Vector Machines, *IEEE Trans. Ind. Electron.*, 64(5), 4130 – 4138, 2017. DOI: [10.1109/TIE.2016.2638401](https://doi.org/10.1109/TIE.2016.2638401)
48. Dinh, V., Rundell, A.E., and Buzzard, G.T., Convergence of the Griddy-Gibbs sampling method, *J. Statist. Comput. Simulation*, 87(7), 1379-1400, 2017. DOI: [10.1080/00949655.2016.1264399](https://doi.org/10.1080/00949655.2016.1264399)
47. Chakrabarty, A., Dinh, V., Corless, M., Rundell, A.E., Zak, S.H., Buzzard, G.T., Support Vector Machine Informed Explicit Nonlinear Model Predictive Control Using Low-Discrepancy Sequences, *IEEE Transactions on Automatic Control*, 62(1): 135-148, 2016.
46. Rehrauer, O., Mankani, B.R., Buzzard, G.T., Lucier, B.J., Ben-Amotz, D., Fluorescence modeling for optimized-binary compressive detection Raman spectroscopy, *Optics Express*, 23(18): 23935-51. doi: [10.1364/OE.23.023935](https://doi.org/10.1364/OE.23.023935), 2015.
45. Mdluli, T., Buzzard, G.T., Rundell, A.E., Efficient Optimization of Stimuli for Model-based Design of Experiments to Resolve Dynamical Uncertainty, *PLOS Computational Biology*, 11(9): e1004488, doi: [10.1371/journal.pcbi.1004488](https://doi.org/10.1371/journal.pcbi.1004488), 2015.
44. Beccacece, F., Borgonovo, E., Buzzard, G., Cillo, A., Zions, A., Elicitation of multiattribute value functions through high dimensional model representations: Monotonicity and interactions, *Eur. J. Op. Res.*, 246(2), 517-527, DOI: [10.1016/j.ejor.2015.04.042](https://doi.org/10.1016/j.ejor.2015.04.042), 2015.
43. McGee, R.L., Krisenko, M.O., Geahlen, R.L., Rundell, A.E., Buzzard, G.T., A Computational Study of the Effects of Syk Activity on B Cell Receptor Signaling Dynamics. *Processes*, 3(1):75-97, 2015.
42. Perley, J.P., Mikolajczak, J., Buzzard, G.T., Harrison, M.L., Rundell, A.E., Resolving Early Signaling Events in T-Cell Activation Leading to IL-2 and FOXP3 Transcription. *Processes*, 2(4):867-900, 2014.
41. Dinh, V., Rundell, A.E., and Buzzard, G.T., Effective Sampling Schemes for Behavior Discrimination in Nonlinear Systems, *Int. J. Uncertainty Quantification*, 4(6); 535-554, 2014.
40. Pargett, M., Rundell, A.E., Buzzard, G.T., Umulis, D.M., Model-based analysis for qualitative data: An application in *Drosophila* germline stem cell regulation, *PLoS Comput Biol*, 10(3): e1003498. doi:[10.1371/journal.pcbi.1003498](https://doi.org/10.1371/journal.pcbi.1003498), 2014.
39. Perley, J., Mikolajczak, J., Harrison, M., Buzzard, G.T., Rundell, A.E., Multiple Model-Informed Open-Loop Control of Uncertain Intracellular Signaling Dynamics, *PLoS Comput Biol*, 10(4): e1003546. doi:[10.1371/journal.pcbi.1003546](https://doi.org/10.1371/journal.pcbi.1003546), 2014.
38. Dinh, V., Rundell, A.E., and Buzzard, G.T., Experimental design for dynamics identification of cellular processes, *Bull. Mathematical Biology*, 76; 597-626, 2014.
37. Wilcox, D.S., Buzzard, G.T., Lucier, B.J., Rehrauer, O.G, Wang, P., and Ben-Amotz, D., Digital Compressive Chemical Quantitation and Hyperspectral Imaging, *Royal Society Chem, Analyst*, 138(17); 4982-4990, 2013. doi: [10.1039/C3AN00309D](https://doi.org/10.1039/C3AN00309D)
36. Buzzard, G.T., Efficient basis change for sparse-grid interpolating polynomials with application to T-cell sensitivity analysis, *Computational Biology Journal*, Article ID 562767, 10 pages, 2013. doi: [10.1155/2013/562767](https://doi.org/10.1155/2013/562767)
35. Wilcox, D.S., Buzzard, G.T., Lucier, B.J., Wang, P., and Ben-Amotz, D., Photon Level Chemical Classification using Digital Compressive Detection, *Analytica Chimica Acta*, (755); 17-27, 2012. doi: [10.1016/j.aca.2012.10.005](https://doi.org/10.1016/j.aca.2012.10.005).

34. Lee, R.S., Buzzard, G.T., and Meckl, P., Optimal parameter estimation for long-term prediction in the presence of model mismatch, *ASME J. Dyn. Sys. Meas. Control*, 134(4), 041010 (16 pages), 2012. <http://dx.doi.org/10.1115/1.4005497>
33. Noble, S.L., Wendel, L.E., Donahue, M.M., Buzzard, G.T., and Rundell, A. E., Sparse-grid-based adaptive model predictive control of HL60 cellular differentiation, *IEEE Trans. Biomedical Eng.*, 59(2); 456-463, 2012. <http://dx.doi.org/10.1109/TBME.2011.2174361>
32. Karim, M.S., Buzzard, G.T., Umulis, D.M., Secreted, receptor-associated BMP regulators reduce stochastic noise intrinsic to many extracellular morphogen distributions, *J. Royal Soc. Interface*, 9(70); 1073-83, 2012. <http://dx.doi.org/10.1098/rsif.2011.0547>
31. Bazil, J.N., Buzzard, G.T., Rundell, A.E., A global, parallel, model-based design of experiments method to minimize model output uncertainty, *Bull. Math. Biol.*, 74(3); 688-716, 2011.
30. Buzzard, G.T., Global sensitivity analysis using sparse grid interpolation and polynomial chaos, *Reliability Eng. and Sys. Safety*, 107 (SAMO 2010); 82-89, 2012. <http://dx.doi.org/10.1016/j.res.2011.07.011>
29. Donahue, M.M., Buzzard, G.T., and Rundell, A.E., Experiment design through dynamical characterization of systems biology models utilizing sparse grids, *IET Systems Biology*, 4(4); 249-262, 2010.
28. Bazil, J.N., Buzzard, G.T., and Rundell, A.E., A bioenergetic model of the mitochondrial population undergoing permeability transition, *J. Theor. Biol.*, 265(4); 672-690, 2010.
27. Buzzard, G.T. and Xiu, D., Variance-based global sensitivity analysis using sparse-grid interpolation and cubature, *Comm. Comp. Phys.*, 9(3); 542-567, 2011.
26. Bazil, J.N., Buzzard, G.T., and Rundell, A.E., Modeling mitochondrial bioenergetics with integrated volume dynamics, *PLoS Comput. Biol.*, 6(1): e1000632, 2010.
25. Donahue, M.M., Buzzard, G.T., and Rundell, A.E., Parameter Identification with Adaptive Sparse Grid-based Optimization for Models of Cellular Processes, in *Methods in Bioengineering: Systems Analysis of Biological Networks*, A. Jayaraman and J. Hahn, Eds. Boston/London: Artech House, 211-232, 2009.
24. Zhou, Q., Zygmunt, A.C., Cordeiro, J.M., Siso-Nadal, F., Miller, R.E., Buzzard G.T., and Fox, J.J., Identification of I_{Kr} Kinetics and Drug Binding in Native Myocytes, *Annals of Biomedical Engineering*, 37(7); 1294-1309, 2009. DOI: 10.1007/s10439-009-9690-5
23. Fox, J.J., Buzzard, G.T., Miller, R., and Siso-Nadal, F., Massively parallel simulation of cardiac electrical wave propagation on Blue Gene, *Parallel Computing: Architectures, Algorithms and Applications*, C. Bischof, M. Bücker, P. Gibbon, G.R. Joubert, T. Lippert, B. Mohr, F. Peters (Eds.), John von Neumann Institute for Computing, Jülich, NIC Series, Vol. 38, pp. 609-616, 2007. Reprinted in: *Advances in Parallel Computing*, Volume 15, (IOS Press), 2008.
22. Buzzard, G.T., and Jenkins, A., Holomorphic motions and structural stability for polynomial automorphisms of C^2 , *Indiana U. Math. J.*, 57(1); 277-308, 2008.
21. Buzzard, G.T., Fox, J.J., and Siso, F., Sharp interface and voltage conservation in the phase field method: Application to cardiac electrophysiology, *SIAM J. Sci. Comp.*, 30(2); 837-854, 2008.
20. Rand, D.G., Zhou, Q., Buzzard, G.T., and Fox, J.J., Computationally efficient strategy for modeling the effect of ion current modifiers, *IEEE Trans. BME*, 55(1); 3-13, 2008.
19. Buzzard, G.T., Hruska, S., and Ilyashenko, Y., Kupka-Smale Theorem for polynomial automorphisms of C^2 and persistence of heteroclinic intersections, *Invent. Math.*, 161(1); 45-89, 2005.
18. Zheng, Y., Balakrishnan, V., Buzzard, G.T., Geahlen, R., Harrison, M., and Rundell, A., Modeling and analysis of early events in T-lymphocyte antigen-activated intracellular-signaling pathways, *J. Comp. Appl. Math.*, 184(1); 320-341, 2005.
17. Buzzard, G.T., and Merenkov, S., Maps conjugating holomorphic maps in C^n , *Indiana U. Math J.*, 52; 1135-1146, 2003.
16. Buzzard, G.T., Tame sets, dominating maps, and complex tori, *Trans. AMS*, 355(6); 2557-2568, 2003.

15. Buzzard, G.T., and Verma, K., Hyperbolic automorphisms and holomorphic motions in C^2 , *Michigan Math. J.*, 49(3); 541-565, 2001.
14. Buzzard, G.T., and Lu, S.Y., Double sections, dominating maps, and the Jacobian fibration, *Amer. J. Math.*, 122(5); 1061-1084, 2000.
13. Buzzard, G.T., Extensions of Hénon maps to the closed 4-ball, *Ergodic Theory Dynam. Systems*, 20(5); 1319-1334, 2000.
12. Buzzard, G.T., and Hubbard, J.H., A Fatou-Bieberbach domain avoiding a neighborhood of a variety of codimension 2, *Math. Ann.*, 316(4); 699-702, 2000.
11. Buzzard, G.T., and Forstneric, F., An interpolation theorem for holomorphic automorphisms of C^n , *J. Geom. Anal.*, 10(1); 101-108, 2000.
10. Buzzard, G.T., and Lu, S.Y., Algebraic surfaces holomorphically dominable by C^2 , *Invent. Math.*, 139(3); 617-659, 2000.
9. Buzzard, G.T., Nondensity of stability for polynomial automorphisms of C^2 , *Indiana Univ. Math. J.*, 48(3); 857-865, 1999.
8. Buzzard, G.T., Kupka-Smale theorem for automorphisms of C^n , *Duke Math. J.*, 93(3); 487-503, 1998.
7. Buzzard, G.T., and Smillie, J., Complex dynamics in several variables, (expository paper), in *Flavors of Geometry*, Cambridge Univ. Press, Cambridge, 1997.
6. Buzzard, G.T., and Forstneric, F., A Carleman type theorem for proper holomorphic embeddings, *Ark. Mat.*, 35(1); 157-169, 1997.
5. Buzzard, G.T., Infinitely many periodic attractors for holomorphic maps of 2 variables, *Annals of Math.*, 145(2); 389-417, 1997.
4. Buzzard, G.T., and Fornæss, J.E., Compositional roots of Hénon maps, in *Geometric Complex Analysis*, ed. by J. Noguchi, et al., World Scientific Publ. Co., Singapore, pp. 67-73, 1996.
3. Buzzard, G.T., and Fornæss, J.E., An embedding of C in C^2 with hyperbolic complement, *Math. Ann.*, 306(3); 539-546, 1996.
2. Buzzard, G.T., and Fornæss, J.E., Complete holomorphic vector fields and time-1 maps, *Indiana U. Math. J.*, 44(4); 1175-1182, 1995.
1. Buzzard, G.T., Stably intersecting Julia sets of polynomials, *C R. Acad. Sci. Paris, Ser. I Math.*, 317(11); 1013-1018, 1993.

Conference proceedings and expository articles (refereed)

27. S. Majee, T. Balke, C. A. J. Kemp, G. T. Buzzard, and C. A. Bouman, "4D X-Ray CT Reconstruction using Multi-Slice Fusion," in 2019 IEEE International Conference on Computational Photography (ICCP), May 2019, pp. 1–8, doi: 10.1109/ICCPHOT.2019.8747328.
26. X.Wang, V. Sridhar, Z. Ronaghi, R. Thomas, J. Deslippe, D. Parkinson, G. Buzzard, S. Midkiff, C. Bouman, and S. Warfield. 2019. Consensus Equilibrium Framework for Super-Resolution and Extreme-Scale CT Reconstruction. In Proceedings of The International Conference for High Performance Computing, Networking, Storage, and Analysis, Denver, CO, USA, November 17–22, 2019 (SC '19), 13 pages. <https://doi.org/10.1145/3295500.3356142>
25. Balke, T.; Majee, S.; Buzzard, G.T.; Poveromo, S.; Howard, P.; Groeber, M.A.; McClure, J.; Bouman, C.A., Separable Models for cone-beam MBIR Reconstruction, *Electronic Imaging, Computational Imaging XVI*, pp. 181-1-1817, 2019. DOI: 10.2352/ISSN.2470-1173.2018.15.COIMG-181
24. Sridhar, V., Buzzard, G. T. and Bouman, C. A., Distributed Framework for Fast Iterative CT reconstruction from View-subsets, *Proc. of Conference on Computational Imaging, IS&T Electronic Imaging*, 2018. DOI: 10.2352/ISSN.2470-1173.2018.15.COIMG-102
23. Almansouri, H., Venkatakrishnan, S.V., Buzzard, G.T., Bouman, C.A., Santos-Villalobos, H., Deep Neural Networks for Non-Linear Model-Based Ultrasound Reconstruction, *GlobalSIP*, 2018.

22. Hye Ye, D., Buzzard, G.T., Ruby, M., Bouman, C.A., Deep Back Projection for Sparse-View CT Reconstruction, GlobalSIP, 2018.
21. Scarborough, N.M., Godaliyadda, D.H.Y., Ye, D., Kissick, D.J., Zhang, S., Newman, J.A., Sheedlo, M.J., Chowdhury, A., Fischetti, R.F., Das, C., Buzzard, G.T., Bouman, C.A., Simpson, G.J., Synchrotron x-ray diffraction dynamic sampling for protein crystal centering, Computational Imaging Conference, IS&T Electronic Imaging 2017.
20. Raha, A., Chakrabarty, A., Raghunathan, V., Buzzard, G.T., Ultrafast Embedded Explicit Model Predictive Control for Nonlinear Systems, American Control Conference (ACC), 2017. DOI: 10.23919/ACC.2017.7963632
19. Zak, S.H., Chakrabarty, A., Buzzard, G.T., Robust state and unknown input estimation for nonlinear systems characterized by incremental multiplier matrices, American Control Conference (ACC), 2017. DOI: 10.23919/ACC.2017.7963451
18. Majee, S., Ye, D.H., Buzzard, G.T., Bouman, C.A., A Model Based Neuron Detection Approach Using Sparse Location Priors, Computational Imaging Conference, IS&T Electronic Imaging 2017.
17. Zhang, H., Chakrabarty, A., Ayoub, R., Buzzard, G.T., Sundaram, S., Sampling-based Explicit Nonlinear Model Predictive Control for Output Tracking, 55th IEEE Conference on Decision and Control, Las Vegas, 2016.
16. Chakrabarty, A., Buzzard, G.T., Fridman, E., Zak, S.H., Unknown Input Estimation via Observers for Nonlinear Systems with Measurement Delays, 55th IEEE Conference on Decision and Control, Las Vegas, 2016.
15. Chakrabarty, A., Sundaram, S., Corless, M., Buzzard, G.T., Zak, S.H., Rundell, A.E., Distributed Unknown Input Observers for Interconnected Nonlinear Systems: Application to Gene Regulatory Networks, ACC 2016, Boston, MA.
14. Chakrabarty, A., Corless, M., Buzzard, G.T., Zak, S.H., Rundell, A.E., Sufficient Conditions for Exogenous Input Estimation in Nonlinear Systems, ACC 2016, Boston, MA.
13. Sai, A., Mdluli, T., Rundell, A.E., Buzzard, G.T., Nexperiment: User Friendly Model-based Design of Experiments Software, BMES 2015, Tampa FL.
12. Mdluli, T.; Pargett, M.; Buzzard, G.T.; Rundell, A.E., Specifying informative experiment stimulation conditions for resolving dynamical uncertainty in biological systems, Engineering in Medicine and Biology Society (EMBC), 2014 36th Annual International Conference of the IEEE , pp. 298-301, Aug. 2014 doi: 10.1109/EMBC.2014.6943588
11. Chakrabarty, A., Buzzard, G.T., Corless, M.J., Zak, S.H., and Rundell, A.E., Correcting Hypothalamic-Pituitary-Adrenal Axis Dysfunction Using Observer-based Explicit Model Predictive Control, International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC'14) Chicago, IL, August 2014; 2014:3426-9. DOI: 10.1109/EMBC.2014.6944359
10. Dilshan Godaliyadda, G.M.; Buzzard, G.T.; Bouman, C.A., A model-based framework for fast dynamic image sampling, Acoustics, Speech and Signal Processing (ICASSP), 2014 IEEE International Conference on, pp.1822-1826, 4-9 May 2014. doi: 10.1109/ICASSP.2014.6853913
9. Chakrabarty, A.; Dinh, V.; Buzzard, G.T.; Zak, S.H.; Rundell, A.E., Robust explicit nonlinear model predictive control with integral sliding mode, American Control Conference (ACC), 2014, pp.2851-2856, June 2014. doi: 10.1109/ACC.2014.6859143.
8. Chakrabarty, A., Buzzard, G.T. and Rundell, A.E., Model-based design of experiments for cellular processes, Wiley Interdiscip Rev Syst Biol Med., 2013 Jan 4. doi: 10.1002/wsbm.1204.
7. Buzzard, G.T. and Lucier, B.J., Optimal filters for high-speed compressive detection in spectroscopy Proc. SPIE 8657, Computational Imaging XI, 865707 (February 14, 2013); doi:10.1117/12.2012700.
6. J.P. Perley, J. Mikolajczak, V.C. Dinh, M.L. Harrison, G.T. Buzzard, and A.E. Rundell, Systematically Manipulating T-Cell Signaling Pathway Dynamics via Multiple Model Informed Open-Loop Controller Design, 2012 IEEE 51st Annual Conference on Decision and Control (CDC), pp.380—385, Dec. 2012. doi: 10.1109/CDC.2012.6426023

5. Buzzard, G.T., Model-based experiment design, initiation. In Springer Encyclopedia of Systems Biology, <http://www.springerreference.com/docs/html/chapterdbid/313051.html>
4. Karim, M.S., Umulis, D.M, and Buzzard, G.T., Steady state probability approximation applied to stochastic model of a biological network, 2011 IEEE International Workshop on Genomic Signal Processing and Statistics (GENSIPS'11).
3. Noble, S.L., Buzzard, G.T., and Rundell, A.E., Feasible parameter space characterization with adaptive sparse grids for nonlinear systems biology models, American Control Conference Proceeding, O'Farrell Street, San Francisco, CA, 2011.
2. Buzzard, G.T., Changkuon, D., Donahue, M.M., and Rundell, A.E., Applications of sparse grid interpolation: sensitivity analysis and experiment design, Procedia - Social and Behavioral Sciences, 2(6), 2010, 7623-7624, <http://dx.doi.org/10.1016/j.sbspro.2010.05.148.1>.
1. Donahue, M.M., Buzzard, G.T., and Rundell, A.E., Robust parameter identification with adaptive sparse grid-based optimization for nonlinear systems biology models, in 2009 American Control Conference Proceedings, Hyatt Regency Riverfront, St. Louis, MO, USA, 2009.

Patent

1. Ben-Amotz, D., Lucier, B.J., Buzzard, G.T., Wilcox, D., Wang, P., Mankani, B., Optical Chemical Classification, U.S. Patent No. 9,476,824 B2, 2016.

Selected Lectures

33. Penn State Workshop on Deep Neural Networks (SLOWDNN), 2020 (online).
32. SIAM Conference on Imaging Science, Toronto, Canada, 2020 (online).
31. Purdue President's Council, Back to Class presentation, Naples, FL, 2020.
30. SIAM Conference on Imaging Science, Bologna, Italy, 2018.
29. Electronic Imaging 2017, San Francisco, CA, 2017.
28. Electronic Imaging 2016, San Francisco, CA, 2016.
27. FOSBE (Foundations of Systems Biology in Engineering), Cambridge, MA, 2015.
26. National Science (Vijyoshi) Camp, Bangalore and Kolkata, India, 2014.
25. SIAM Conference on Uncertainty Quantification, Savannah, GA, 2014.
24. SIAM Control Theory Workshop, San Diego, 2013.
23. Università di Milano-Bicocca, Milan, Italy, 2013.
22. Università Bocconi, Milan, Italy, 2013.
21. Institut des Hautes Etudes Scientifiques, Bures-sur-Yvette, France, 2013.
20. INFORMS 2011 Annual Meeting, Charlotte, NC, 2011.
19. 6th International Conference on Sensitivity Analysis of Model Output, Milan, Italy, 2010.
18. SIAM Conference on Computational Science and Engineering, Miami, 2009.
17. NORDAN conference, Aland, Finland, 2008.
16. Spring Topology and Dynamics Conference, Milwaukee, Wisconsin, 2008.
15. Banach Center Conference: Complex Function Theory, Warsaw, Poland, 2007.
14. AMS Winter Central Section Meeting, Oxford, OH, 2007.
13. Midwest Several Complex Variables Conference, Ann Arbor, MI, 2007.
12. AMS Spring Central Section Meeting, Notre Dame, IN, 2006.
11. Analysis seminar, Université Paul-Sabatier, Toulouse, 2005.
10. Analysis seminar, Université Paul-Sabatier, Toulouse, 2004.
9. Workshop on Complex Dynamics, IHP, Paris, France, 2004.
8. Midwest Several Complex Variables Conference, London, Ontario, Canada, 2004.
7. Analysis seminar, University of Illinois, 2003.

6. Midwest Workshop on Dynamics in SCV, Bloomington, IN, 2002.
5. Conference on Complex Dynamics and Pluripotential Theory, Luminy, France, 2001.
4. Ph.D. Euroconference on Complex Analysis and Holomorphic Dynamics, Platja d'Aro, Spain, 2000.
3. Special Semester on Complex Dynamics in Several Variables, Sc. Norm. Sup., Pisa, Italy, 1999.
2. Hayama Symposium on Several Complex Variables, Hayama, Japan, 1998.
1. 4th Quadriennial Intl. Conference on Dynamical Systems, IMPA, Rio de Janeiro, Brazil, 1997.

Seminar talks have been given at the following institutions: Michigan State, Univ. of Michigan, MSRI (Mathematical Sciences Research Institute), Indiana Univ., Cornell Univ., Purdue Univ., Univ. of Wisconsin-Madison, Univ. of Wisconsin-Milwaukee, Univ. of Chicago, Univ. de Paris-Sud(Orsay), Univ. Paul-Sabatier (Toulouse), SUNY Stony Brook, SUNY Albany, Univ. of Illinois, Wabash College, Toyama Univ. (Japan), IMPA (Rio de Janeiro), Univ. of Wuppertal (Germany), Univ. of Washington, Georgia Institute of Technology, Mt. Holyoke, Univ. of Arizona, Univ. of Nebraska, Sup'Biotech, Paris, University of Georgia, IUPUI, Valparaiso University.

Conferences Organized

11. Computational Imaging XX, 2021 (online).
10. Computational Imaging XIX, Burlingame, CA, 2021.
9. Computational Imaging XVIII, Burlingame, CA, 2020.
8. Computational Imaging XVII, Burlingame, CA, 2019.
7. Approximation Theory and Machine Learning, West Lafayette, Indiana, 2018.
6. Model-based analysis and control of cellular processes, West Lafayette, Indiana, 2012.
5. Midwest Several Complex Variables Conference, West Lafayette, Indiana, 2009 (IMA supported).
4. Dynamical systems in physiological modeling, West Lafayette, Indiana, 2008 (IMA supported).
3. Midwest Several Complex Variables Conference, Bloomington, Indiana, 1997.
2. Midwest Complex Dynamics Workshop, Bloomington, Indiana, 1997.
1. Midwest Several Complex Variables Conference, Ann Arbor, Michigan, 1996.

Research Funding

Agency: DoE Office of Science, subcontracted through Oak Ridge National Laboratory
 Grant title: Intelligent Acquisition and Reconstruction for Hyperspectral Tomography
 Total award: \$293,286
 Duration: 2/1/2021 - 8/31/2023
 PI: Charles Bouman; co-PI: G. Buzzard

Agency: Air Force Research Laboratory (AFRL) subcontracted through Defense Engineering Corporation (DEC)
 Grant title: Model Based 3D Surface Reconstructions
 Total award: \$85,574
 Duration: 4/1/2020 - 3/31/2020
 PI: Charles Bouman; co-PIs: G. Buzzard

Agency: UES Inc., (Air Force Research Labs)
 Grant title: Algorithms for Multi-modal and Multi-resolution Data Fusion, prime contract FA8650-15-D-5405, order FA8650-18-F-5400
 Total award: \$225,000
 Duration: 06/01/18-05/31/22
 PI: Charles Bouman; co-PIs: G. Buzzard

Agency: National Science Foundation
Grant title: CIF: Medium: Multi-Agent Consensus Equilibrium: Modular Methods for Integrating Disparate Sources of Expertise, NSF CCF-1763896
Total award: \$1,264,000
Duration: 06/01/18-05/31/22
PI: Charles Bouman; co-PIs: G. Buzzard, S. Chan, G. Simpson

Agency: National Science Foundation
Grant title: Robust reconstruction techniques for nonuniformly sampled data, NSF DMS-1318894
Total award: \$155,968
Duration: 08/01/13-07/31/17
PI: Ben Adcock, Gregory T. Buzzard (substitute PI)

Agency: Schlumberger Technology Corporation
Grant title: Contamination Monitoring Algorithm, Mathematical Modeling and Algorithms
Duration: 02/01/14-06/30/14
Total award: \$18,913
PI: Gregory T. Buzzard

Agency: Office of Naval Research
Grant title: Digital Compressive Detection Spectroscopy: Theoretical Optimization and Experimental Implementation, N00014-13-1-0394
Duration: 04/01/13-08/31/16
Total award: \$397,609
PI: Bradley J. Lucier; co-PIs: G. Buzzard, D. Ben-Amotz

Agency: National Science Foundation
Grant title: Quantitative Design of Experiments to Predictably Alter Intercellular Signaling Dynamics, DMS-0900277
Duration: 09/01/09-08/31/13
Total award: \$1,216,337
PI: Ann Rundell; co-PIs: G. Buzzard, M. Harrison

Agency: Purdue University Ralph W. and Grace M. Showalter Research Trust
Grant title: Live Imaging and Computational Analysis of Bone Morphogenetic Proteins in Drosophila Embryos
Duration: 07/01/09 – 07/30/10
Total award: \$75,000
PI: David Umulis; co-PI: G. Buzzard

Agency: National Science Foundation
Grant title: Purdue Scholarship Program in Quantitative Physiology, DUE-0728668
Duration: 01/01/08 – 12/31/10
Total award: \$600,000
PI: Edward Bartlett; (multiple co-PIs)

Agency: National Institutes of Health (National Heart, Lung, and Blood Institute)
Grant title: Data Collection & Integration in Cardiac Risk Assessment, 1 R43 HL081687-01
Duration: 08/01/05 – 01/31/07
Total award: \$137,800

PI: Gregory Buzzard

Agency: National Science Foundation

Grant title: Computational Modeling of Cardiac Electrical Response, DMS-0408293

Duration: 09/01/04 – 01/31/07

Total award: \$100,000

PI: Gregory Buzzard

Agency: National Science Foundation

Grant title: Mathematical Sciences Postdoctoral Research Fellowship

Duration: 09/01/98 – 08/31/02

Total award: \$90,000

PI: Gregory Buzzard

Agency: National Science Foundation

Grant title: Complex Dynamics and Classification of Algebraic Surfaces

Duration: 06/01/97 – 05/31/99

Total award: \$40,000

PI: Gregory Buzzard

Ph.D. Students (all at Purdue University)

Philip Mummert, Ph.D. Mathematics, 2007.

Lisa Driskell, Ph.D. Mathematics, 2010.

Jason Bazil, Ph.D. Biomedical Engineering (joint with Ann Rundell), 2010.

Ryan Sang Jun Lee, Ph.D. Mechanical Engineering (joint with Peter Meckl), 2011.

Vu Dinh, Ph.D. Mathematics, 2014.

Reginald McGee, Ph.D. Mathematics, 2015.

Thembi Mdluli, Ph.D. Biomedical Engineering (joint with David Umulis), 2017.

G.M. Dilshan P. Godaliyadda, Ph.D., Elec. and Computer Eng. (joint with Charles Bouman), 2017.

Venkatesh Sridhar, Ph.D. candidate, Elec. and Computer Eng. (joint with Charles Bouman), 2020.

Soumendu Majee, Ph.D. candidate, Elec. and Computer Eng. (joint with Charles Bouman).

Emma Reid, Ph.D. candidate, Mathematics (joint with Charles Bouman).

Tony Allen, Ph.D. candidate, Mathematics (joint with Charles Bouman).

M.S. Students (all at Purdue University)

Max Ruby, M.S., Mathematics, 2020.

REU Students (all at Purdue University)

Trevor Crupi, REU student, spring 2020.

Fernando Davis, REU student, summer 2019.

Grant Bowman, REU student, summer 2019.

Truman Bennet, REU student, summer 2019.

Vanda Johnson, REU student, summer 2014.

Service

Purdue Mathematics Department

Organizer, Geometric Analysis Seminar

Interdisciplinary course development

2002-04
Spring 2006

Advanced Services Committee	2007-08
Undergraduate Committee	2003-11
Scholarship Committee	2005-12
Scholarship Committee Chair	2006-12
Computer Committee	2006-12
Teaching load committee	2007-09
Founder and organizer, applied math lunch seminar	2007-12
Graduate committee	2008-12
Calculus, promotions, and head search committees	2010-11
CCAM director search committee	2011
Head of Department	2013-present
Purdue College of Science (CoS)	
College of Science Cluster Hire Committee	2002-03
Research presentation to President Cordova	2009
Research presentation to CoS Alumni	2010, 2011
MLK Day activities organization: Diversity Forum and Colloquium	2014-15
Purdue University	
University Residence Hall Faculty Fellow	2002-3, 2014-15
ADVANCE-Purdue Council of Department Heads	2013-15
ADVANCE-Purdue Diversity Steering Committee	2015-present
ADVANCE-Purdue Hiring Workshop Facilitator	2017-present
Faculty advisor, Purdue Aikido Club	2012-present
Data Science Research Working Group Member	2017
President's Council Back-to-Class Research Presentation	2018, 2020
Mathematics Profession	
Editorial Board Member, MDPI Processes	2016-present
Associate Editor, IEEE Transactions on Computational Imaging	2020-present
F-GAP mentor for the National Alliance for Doctoral Studies in Mathematics	2015-present
External Review Committee, University of Cincinnati Mathematics	2016
External Review Committee, University of Nebraska Mathematics	2014

Brief Research Description

Professor Buzzard's current research focuses on measurement and reconstruction algorithms in imaging. Other recent work includes topics in cellular signaling networks and Raman spectroscopy, with earlier work on dynamics in several complex variables. The underlying unifying ideas are methods and algorithms for uncertainty quantification and reduction of uncertainty through appropriate measurement schemes. In conjunction with a number of collaborators, his work in these areas has led to theoretical advances in the construction of surrogate functions and the use of such functions for sensitivity analysis and experiment design, to extensions of the classical theory of optimal design of experiment, and to new algorithms for supervised classification. These theoretical advances have fueled a wide variety of applications, including novel experiment design and control methods for cellular-level control of immune cell response, a Raman spectroscopy system that significantly outperforms previous methods in the high-speed regime, and an adaptive approach for sampling images that forms the basis for algorithms for electron microscopy and other imaging modalities.

Selected Accomplishments as Department Head (2013-2020)

Faculty Development:

Oversaw the successful nomination of 4 new AMS Fellows, 2 Sloan Fellows, the Purdue Dreamer Award, and many other faculty awards.

Hired 25+ tenured/tenure track faculty members in 7 years, including 1 named, distinguished professor.

Reduced the standard teaching assignment for full professors from 4 to 3 courses per year.

Oversaw successful promotion cases for 11 faculty members.

Educational mission:

Oversaw the conversion of 4 foundational math courses to use an open-source, online platform for text and homework.

Coordinated the introduction and development of a Quantitative Reasoning course.

Coordinated and funded the renovation of the Math Help Rooms.

Increased summer enrollment by offering and promoting appropriate courses.

Managed the transition to online education in spring 2020.

Diversity:

Coordinated the relocation of the National Math Alliance to Purdue: <https://mathalliance.org/>, 2016.

Achieved inclusion in the AMS Mathematics Programs that Make a Difference (effective May 2017).

Coordinated the forum and lecture by Margot Lee Shetterly, author of Hidden Figures, 2017.

Coordinated the College of Science MLK Diversity Forum and Colloquium, 2015.

Served on the ADVANCE Purdue Steering Committee and as hiring workshop facilitator and on interview teams, 2014-2020.