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EDUCATION

- Ph.D.** Computer Engineering, North Carolina State University 1995-1998
Minor in Artificial Intelligence
PhD dissertation: Signal Processing and Pattern Recognition for an Electronic Nose
Dissertation advisor: Professor H. Troy Nagle
- M.S.** Computer Engineering, North Carolina State University 1993-1995
MS thesis: Modeling of Ultrasonic Sensors for Self-localization of Mobile Robots
Thesis advisor: Professor Ren C. Luo
- B.S.** Industrial Engineering, Polytechnic University of Madrid (Spain) 1986-1992
Minor in Electronics and Control Systems (Electrical Engineering)

RESEARCH INTERESTS

Biologically-inspired computation, speech processing, machine learning, wearable sensors, intelligent sensors, machine olfaction, multimodal interfaces, face recognition, mobile robotics.

ACADEMIC EXPERIENCE

Texas A&M University, College Station, TX

Associate Professor, Computer Science Department 09/06-present
Assistant Professor, Computer Science Department 07/02-08/06

University of Edinburgh, Scotland, UK

Research Fellow (sabbatical leave) 07/09-12/09

Wright State University, Dayton, OH

Assistant Professor, Computer Science and Engineering Department 09/98-06/02

North Carolina State University, Raleigh, NC

Instructor, Electrical and Computer Engineering Department 06/98-08/98
Research Assistant, Biomedical Instrumentation Laboratory 09/96-05/98
Lecturer, The Graduate School, NCSU 01/97-05/97
Teaching Assistant, Electrical and Computer Engineering Department 01/96-05/96
Research Assistant, Center for Robotics and Intelligent Machines 01/94-12/95

Nomadic Technologies, Inc., Mountain View, CA

Research Assistant, Mobile Robotics Group 06/96-08/96

HONORS AND AWARDS

1. Association of Former Students College-Level Teaching Award, TAMU COE 2009
2. Barbara and Ralph Cox '53 Faculty Fellow, TAMU College of Engineering 2009
3. Tenneco Meritorious Teaching Award, TAMU College of Engineering 2009
4. Graduate Faculty Teaching Excellence Award, TAMU Computer Science 2007
5. Ramon y Cajal Award, Spain's Ministry of Education and Science 2005-2010
6. NSF Faculty Early Career Development (CAREER) Award 2000-2004

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| 7. Preparing the Professoriate Fellow, North Carolina State University | 1996-1997 |
| 8. "La Caixa" Scholarship for Post-graduate Study Abroad (Spain) | 1993-1995 |

RESEARCH GRANTS AND CONTRACTS

1. Principal Investigator, with co-PI Beena Ahmed (TAMU Qatar). "Stress monitoring with non-linear dynamical models and wearable sensors," National Priorities Research Program, Qatar National Research Fund, \$1,049,125, June 2009-May 2012.
2. Principal Investigator (on subcontract), "Miniature and Reliable Chemical Sensors for Cell Phones," Department of Homeland Security, \$142,787, September 2009-September 2011.
3. Co-Investigator with A. Ames, R. Murphy (PI), D. Song, and R. Stoleru, "MRI: Acquisition of Mobile, Distributed Instrumentation for Response Research (RESPOND-R)," NSF MRI, \$1,400,000, August 2009-July 2012.
4. Principal Investigator, with co-PI M. Carreira-Perpinan (UC Merced). "RI: Collaborative Research: Foreign accent conversion through articulatory inversion of the vocal-tract frontal cavity," National Science Foundation, \$450,000, September 2008-August 2011.
5. Principal Investigator, with co-PI S. Semancik (NIST), "Hypothesis generation for chemical threats through active perception with microsensor arrays," Department of Defense, National Geospatial Intelligence Agency, \$240,000, September 2006-August 2008.
6. Co-Investigator with Isaac Rudomin and Heather Bortfeld, "Facial Caricaturing as a Training Tool for Security," TAMU-Conacyt Collaborative Research Grant Program, \$24,000, September 2005-August 2006.
7. Principal Investigator, "MSK parameter analysis tool," \$28,036, United Space Alliance, June 2005-December 2005.
8. Co-Investigator with Ismael Lopez-Juarez, "Design of an Electronic Nose for Hydrogen Measurement in Liquid Aluminum Alloys for the Casting Industry," TAMU-Conacyt Collaborative Research Grant Program, \$24,000, September 2004-August 2005.
9. Principal Investigator, "MSK parameter analysis tool," \$17,419, United Space Alliance, September 2004 – May 2005.
10. Principal Investigator, "Computational Models for Sensor-based Machine Olfaction," NSF CAREER, \$299,713, July 2000-June 2004 (no cost extension through August 2008).
11. Co-Investigator with O. N. Garcia (P.I.) and A. Goshtasby, "Speech Driven Facial Animation," NSF CISE, \$209,287, September 1999-August 2001.
12. Co-Investigator with R. Bhatnagar (U. Cincinnati), R. Machiraju and S. C. Zhu (Ohio State U.), "Generalized Metrics for Image Assessment and Synthesis," \$90,000, OBR Collaborative Grant, September 2000-August 2002.
13. Principal Investigator, "Portable Electronic Drug Detection and Identification Device," UES, Inc., Dayton (OH), \$20,000, August 1999-July 2000.
14. Principal Investigator, "Development of an Electronic Olfactory System for Autonomous Mobile Robots," Research Initiation Grant, Office of Research and Sponsored Programs, Wright State University, \$8,000, June 1999-May 2000.
15. Principal Investigator, "Pattern Recognition of Odors with an Array of Chemical Gas Sensors," Research Challenge Grant, Office of Research and Sponsored Programs, Wright State University, \$25,000, June 1999-May 2000.

PUBLICATIONS

JOURNAL ARTICLES

1. D. Felps and R. Gutierrez-Osuna. "Developing objective measures of foreign-accent conversion," *IEEE Transactions on Audio, Speech and Language Processing*, in press.
2. D. Felps, H. Bortfeld and R. Gutierrez-Osuna. "Foreign-accent conversion in computer assisted pronunciation training," *Speech Communication*, 51, 920-932, 2009.
3. J. Rodriguez, H. Bortfeld, I. Rudomin, B. Hernandez, and R. Gutierrez-Osuna, "The Reverse-caricature Effect Revisited: Familiarization with Frontal Facial Caricatures Improves Veridical Face Recognition," *Applied Cognitive Psychology*, 23(5). 733-742, 2008.
4. A. Hierlemann and R. Gutierrez-Osuna, "Higher-order chemical sensing," *ACS Chemical Reviews*, 108, 563-613, 2008.
5. F. Nogueira, D. Felps and R. Gutierrez-Osuna, "Development of an infrared absorption spectroscopy based on linear variable filters," *IEEE Sensors Journal*, 7(8), 1183-1190, 2007.
6. B. Raman, T. Kotseroglou, L. Clark, M. Lebl and R. Gutierrez-Osuna, "Neuromorphic processing for optical microbead arrays: dimensionality reduction and contrast enhancement," *IEEE Sensors Journal*, 7(4), 506-514, 2007.
7. B. Raman, T. Yamanaka and R. Gutierrez-Osuna, "Contrast Enhancement of Gas Sensor Array patterns with a Neurodynamics Model of the Olfactory Bulb," *Sensors and Actuators B*, 119(2), pp. 547-555, 2006.
8. B. Raman, P. Sun, A. Gutierrez-Galvez and R. Gutierrez-Osuna, "Processing of Chemical Sensor Arrays with a Biologically-Inspired Model of Olfactory Coding," *IEEE Transactions on Neural Networks*, 17(4), pp. 1015-1024, 2006.
9. A. Gutierrez-Galvez and R. Gutierrez-Osuna, "Contrast Enhancement and Background Suppression of Chemosensor Array Patterns with the KIII Model," *International Journal of Intelligent Systems* 21(9), pp. 937-953, 2006.
10. B. Raman and R. Gutierrez-Osuna, "Concentration Normalization with a Model of Gain Control in the Olfactory Bulb," *Sensors and Actuators B: Chemical*, 116(1-2), pp. 36-42, 2006.
11. A. Perera, T. Yamanaka, A. Gutierrez-Galvez, B. Raman and R. Gutierrez-Osuna, "A dimensionality-reduction technique inspired by receptor convergence in the olfactory system," *Sensors and Actuators B: Chemical*, 116 (1-2), pp. 17-22, 2006.
12. A. Gutierrez-Galvez and R. Gutierrez-Osuna, "Increasing the separability of chemosensor array patterns with Hebbian/anti-Hebbian learning," *Sensors and Actuators B: Chemical*, 116(1-2), pp. 29-35, 2006.
13. P. Kakumanu, A. Esposito, O. N. Garcia and R. Gutierrez-Osuna, "A Comparison of Acoustic Coding Models for Speech-Driven Facial Animation," *Speech Communication*, 48(6), pp. 598-615, 2006.
14. S. Fu, R. Gutierrez-Osuna, A. Esposito, P. K. Kakumanu and O. N. Garcia, "Audio/Visual Mapping with Cross-Modal Hidden Markov Models," *IEEE Transactions on Multimedia*, 7(2), pp. 243- 252, 2005.
15. R. Gutierrez-Osuna, P. K. Kakumanu, A. Esposito, O. N. Garcia, A. Bojorquez, J. L. Castillo and I. J. Rudomin, "Speech-driven Facial Animation with Realistic Dynamics," *IEEE Transactions on Multimedia*, 7(1), pp. 33-42, 2005.

16. M. L. Rodríguez-Méndez, A. Arrieta, V. Parra, A. Bernal, A. Vegas, S. Villanueva, R. Gutierrez-Osuna and J. A. de Saja, "Fusion of Three Sensory Modalities for the Multimodal Characterization of Red Wines," *IEEE Sensors Journal*, 4(3), pp. 348-354, 2004.
17. P. Pasini, N. Powar, R. Gutierrez-Osuna, S. Daunert and A. Roda, "Use of a Gas Sensor Array for Detecting Volatile Organic Compounds (VOCs) in Chemically Induced Cells," *Journal of Analytical and Bioanalytical Chemistry*, 378, pp. 76–83, 2004.
18. R. Gutierrez-Osuna and A. Gutierrez-Galvez, "Habituation in the KIII Olfactory Model with Chemical Sensor Arrays," *IEEE Transactions on Neural Networks*, 14(6), pp. 1565-1568, 2003.
19. A. Gutierrez-Galvez and R. Gutierrez-Osuna, "Pattern Completion through Phase Coding in Population Neurodynamics," *Neural Networks* 16, pp. 649-656, 2003.
20. R. Gutierrez-Osuna, A. Gutierrez-Galvez and N. Powar, "Transient Response Analysis for Temperature Modulated Chemoresistors," *Sensors and Actuators B: Chemical* 93(1-3), pp. 57-66, 2003.
21. R. Gutierrez-Osuna and N. Powar, "Odor Mixtures and Chemosensory Adaptation in Gas Sensor Arrays," *International Journal on Artificial Intelligence Tools* 12(1), pp. 1-16, 2003.
22. D. E. Courte, M. A. Rizki, L. A. Tamburino and R. Gutierrez-Osuna, "Evolutionary Optimization of Gaussian Windowing Functions for Data Preprocessing," *International Journal on Artificial Intelligence Tools* 12(1), 17-35, 2003.
23. R. Bryll, R. Gutierrez-Osuna and F. Quek. "Attribute Bagging: Improving Accuracy of Classifier Ensembles by Using Random Feature Subsets," *Pattern Recognition* 36(6), 1291-1302, 2003.
24. R. Gutierrez-Osuna, "Pattern Analysis for Machine Olfaction: A Review," *IEEE Sensors Journal*, 2(3), 189-202, 2002.
25. A. Perera, T. Sundic, A. Pardo, R. Gutierrez-Osuna and S. Marco, "A Portable Electronic Nose Based on Embedded PC Technology and GNU/Linux: Hardware, Software and Applications," *IEEE Sensors Journal*, 2(3), 235-246, 2002.
26. R. Gutierrez-Osuna, H. T. Nagle and S. S. Schiffman, "Transient response analysis of an electronic nose using multi-exponential models," *Sensors and Actuators B, Chemical*, 61(1-3) 170-182, 1999.
27. R. Gutierrez-Osuna and H. T. Nagle, "A Method for Evaluating Data-Preprocessing Techniques for Odor Classification with an Array of Gas Sensors," *IEEE Transactions on Systems, Man, and Cybernetics B*, 29(5), 626-632, 1999.
28. R. Gutierrez-Osuna, J. A. Janet and R. C. Luo, "Modeling of Ultrasonic Range Sensors for Localization of Autonomous Mobile Robots," *IEEE Transactions on Industrial Electronics*, 45(4), pp. 654-662, 1998.
29. J. A. Janet, R. Gutierrez-Osuna, T. A. Chase, M. White and J. C. Sutton, III, "Autonomous Mobile Robot Global Self-localization using Kohonen and Region-Feature Neural Networks," *Journal of Robotic Systems*, 14(4), pp. 263-282, 1997.

CHAPTERS IN BOOKS AND MONOGRAPHS

1. R. Gutierrez-Osuna, "Electronic Nose", in E. B. Goldstein (Ed.), *SAGE Encyclopedia of Perception*, Sage Publications, *in press*.
2. B. Raman and R. Gutierrez-Osuna, "Relating sensor/instrumental response of odorants to their organoleptic properties by means of a biologically-inspired model of receptor neuron

convergence onto olfactory bulb,” in S. Marco and A. Gutierrez-Galvez (Eds.), *Studies in Computational Intelligence*, vol. 188, Springer, 2009, pp. 93-108.

3. R. Gutierrez-Osuna, “Olfactory Interaction,” in W. S. Bainbridge (Ed.), *Encyclopedia of Human-Computer Interaction*, Berkshire Publishing Group, 2004, pp. 507-511.
4. R. Gutierrez-Osuna, H. T. Nagle, B. Kermani and S. S. Schiffman, “Signal Conditioning and Pre-processing”, in T. C. Pearce, S. S. Schiffman, H. T. Nagle and J. W. Gardner (Eds.), *Handbook of Machine Olfaction: Electronic Nose Technology*, Wiley-VCH, 2003, pp. 105-132.
5. H. T. Nagle, R. Gutierrez-Osuna, B. G. Kermani and S. S. Schiffman, “Environmental Monitoring”, in T. C. Pearce, S. S. Schiffman, H. T. Nagle and J. W. Gardner (Eds.), *Handbook of Machine Olfaction: Electronic Nose Technology*, Wiley-VCH, 2003, pp. 419-444.
6. O. N. Garcia and R. Gutierrez-Osuna, “An Updated Approach to Complexity from an Agent-Centered Artificial Intelligence Perspective,” in *Encyclopedia of Library and Information Science (ELIS)*, vol. 68, pp. 346-366, 2001.
7. H. T. Nagle, S. S. Schiffman and R. Gutierrez-Osuna, “The how and why of electronic noses,” in *IEEE Spectrum*, September 1998, pp. 22-34.
8. R. Gutierrez-Osuna and R. C. Luo, “Lola, Probabilistic Navigation for Topological Maps,” in *AI Magazine*, 17(1), pp. 55-62, 1996.

PATENTS

1. A. Perera, T. Sundic, A. Pardo, S. Marco and R. Gutierrez, “Instrument and method for analysis, identification and quantification of gases and liquids. No. PCT/ES02/00134, Priority Nat: International, Priority date: 03.26.02, Owner: eSense Systems S. L.

CONFERENCE PROCEEDINGS

1. N. Y. Yu, T. Yamauchi, and R. Gutierrez-Osuna “Similarity perception of visual objects: A machine-learning approach,” in Proceedings of International Conference on Asia Pacific Psychology (pp.224-226), Seoul, Korea: Korean Psychological Association & Japanese Psychological Association, 2009.
2. N. Y. Yu, T. Yamauchi and R. Gutierrez-Osuna, “Similarity perception of visual objects: A machine-learning approach,” in Armadillo: The Southwest cognition Conference, Houston, USA.
3. A. Pazarloglou, M. George, R. Stoleru, R. Gutierrez-Osuna, “Demo Abstract: Signal Reconstruction with Sub-Nyquist Sampling using Wireless Sensor Networks,” in Proc. ACM/IEEE Information Processing in Sensor Networks (IPSN), 2009.
4. J. Choi and R. Gutierrez-Osuna, “Using heart rate monitors to detect mental stress,” in *Proc. Sixth International Workshop on Body Sensor Networks (BSN 2009)*, 219-223, 2009.
5. R. Gosangi and R. Gutierrez-Osuna, “Active chemical sensing with Partially Observable Markov Decision Processes,” in *Proc. International Symposium on Olfaction and Electronic Noses (ISOEN 2009)*, AIP Conf. Proc. Vol. 1137, 562-565, 2009.
6. A. Pazarloglou, R. Stoleru and R. Gutierrez-Osuna, “High-resolution speech signal reconstruction in wireless sensor networks,” in *Proc. IEEE Workshop on Information Retrieval in Sensor Networks*, Las Vegas, NV, January 10-13, 2009, in press.
7. N. Y. Yu, T. Yamauchi, H. -F. Yang, Y. -L. Chen and R. Gutierrez-Osuna, “A computational method to find salient features,” in *Proc. 6th International Conference of Cognitive Science (ICCS 2008)*, Seoul, Korea, July 27-29, 2008.

8. B. Paulson, P. Rajan, P. Davalos, R. Gutierrez-Osuna, and T. Hammond, "What!?! No Rubine Features?: Using Geometric-based Features to Produce Normalized Confidence Values for Sketch Recognition", in *Proc. VL/HCC (Visual Languages and Human Centric Computing) Workshop on Sketch Tools for Diagramming*, Boston, MA, September 5, 2008.
9. J. Rodriguez, H. Bortfeld, and R. Gutierrez-Osuna, "Reducing the Other-Race Effect through Caricatures," in 8th *IEEE International Conference on Automatic Face and Gesture Recognition (FG 2008)*, Amsterdam, The Netherlands, September 17-19, 2008.
10. H. Choi, R. Gutierrez-Osuna, S. Choi and Y. Choe, "Kernel Oriented Discriminant Analysis for Speaker-Independent Phoneme Spaces," in *Proc. 19th International Conference on Pattern Recognition (ICPR 2008)*, Tampa, FL, December 8-11, 2008.
11. E. Koh, D. Caruso, A. Kerne, and R. Gutierrez-Osuna, "Elimination of junk document surrogate candidates through pattern recognition," in *Proc. 2007 ACM symposium on Document Engineering*, Winnipeg, Manitoba, Canada, August 28 - 31, 2007, pp. 187-195.
12. B. Raman, T. Kotseroglou, M. Lebl, L. Clark, and R. Gutierrez-Osuna, "Pattern recognition for optical microbead arrays with a neuromorphic model of the olfactory bulb," in *28th Annual Meeting of the Association for Chemoreception Sciences*.
13. T. Yamanaka and R. Gutierrez-Osuna, "Estimating the number of modules in rat olfactory bulb by prediction of odorant descriptors," in *28th Annual Meeting of the Association for Chemoreception Sciences*.
14. B. Raman and R. Gutierrez-Osuna, "Mixture segmentation and background suppression in chemosensor arrays with a model of olfactory bulb-cortex interaction," in *2005 IEEE International Joint Conference on Neural Networks*, (pp. 131-136), Montreal, Canada, July 31-August 4, 2005.
15. B. Raman and R. Gutierrez-Osuna, "Concentration normalization with a model of gain control in the olfactory bulb," in *Proc. 11th International Symposium on Olfaction and the Electronic Nose (ISOEN 2005)*, Barcelona, Spain, April 13-15, 2005.
16. A. Perera, T. Yamanaka, A. Gutierrez-Gálvez, B. Raman and R. Gutierrez-Osuna, "A dimensionality-reduction technique inspired by receptor convergence in the olfactory system," in *ISOEN 2005*.
17. A. Gutierrez-Galvez and R. Gutierrez-Osuna, "Contrast enhancement of sensor-array patterns through anti-hebbian learning," in *ISOEN 2005*.
18. B. Raman and R. Gutierrez-Osuna, "Chemosensory processing in a spiking model of the olfactory bulb: chemotopic convergence and center surround inhibition," in *NIPS 2004*, pp. 1105-1112, Vancouver, BC, December 13-16, 2004.
19. R. Gutierrez-Osuna and B. Raman, "Cancellation of chemical backgrounds with generalized Fisher's linear discriminants," in *Proc. IEEE SENSORS 2004*, Vienna, October 24-27, 2004.
20. M. Wang, A. Perera-Lluna and R. Gutierrez-Osuna, "Principal Discriminants Analysis for small-sample-size problems: application to chemical sensing," in *Proc. IEEE SENSORS 2004*, Vienna, October 24-27, 2004.
21. R. Sharifi, D. Shahmirzadi, R. Langari and R. Gutierrez-Osuna, "Combinatorial Utilization of Artificial Neural Network and PCA Dimension Reduction Technique to Data Fault Detection and Correction," in *2nd Annual TAMUS Pathways Research Symposium*, October 15-16, 2004, Corpus Christi, TX. (Poster presentation)

22. B. Raman, A. Gutierrez-Galvez, A. Perera-Lluna and R. Gutierrez-Osuna, "Sensor-based machine olfaction with a neurodynamics model of the olfactory bulb," in *Proc. 2004 IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Sendai, Japan, September 28 – October 2, 2004, pp. 319-324.
23. A. Gutierrez-Galvez, R. Gutierrez-Osuna and B. Raman, "Pattern recognition for chemosensor arrays with the KIII model," in *Proc. 2004 Symposium on Intentional Dynamic Systems*, Memphis, TN, April 24-26, 2004.
24. B. H. McCormick, D. M. Mayerich, L. C. Abbott, R. Gutierrez-Osuna, J. Keyser, Y. Choe, W. Koh, and B. L. Busse. "Whole mouse brain mapped at submicron resolution using Knife-Edge Scanning Microscope," in *Society for Neuroscience Abstracts*. Washington, DC: Society for Neuroscience, 2004. Program No. 1033.4. (Poster presentation)
25. L. Florkey, R. Gutierrez-Osuna and J. D. Bullock, "Computer-Aided Pattern Recognition in the Classification of Superficial Corneal Injuries," in *Proc. Annual Meeting of the American Academy of Optometry*, Dallas, TX, December 4-8, 2003. (Poster presentation)
26. K. S. Gudmundsson, A. A. S. Awwal and R. Gutierrez-Osuna, "Application of phase only filters on e-nose data," in *SPIE Conference (Photonic Devices and Algorithms for Computing V)*, 2003.
27. P. Pasini, N. Powar, R. Gutierrez-Osuna, S. Daunert and A. Roda, "Use of an electronic nose for the identification of genetically modified organisms," in *Proc. 21st National Congress of the Italian Chemical Society*, Torino, Italy, June 22–27, 2003.
28. M. J. Mousavi, K. L. Butler-Purry, R. Gutierrez-Osuna and M. Najafi, "Classification of Load Change Transients and Incipient Abnormalities in Underground Cable Using Pattern Analysis Techniques," in *Proc. 2003 IEEE/PES Transmission and Distribution Conference*, Dallas, TX, September 7-12, 2003.
29. A. Gutierrez-Galvez and R. Gutierrez-Osuna, "Coherent oscillations as a neural code in a model of the olfactory system," in *2003 IEEE/INNS International Joint Conference on Neural Networks*, Portland, OR, July 20-24, 2003, pp. 341-346.
30. R. Gutierrez-Osuna and P. Sun, "A biologically-plausible computational architecture for sensor-based machine olfaction," in *Proc. 9th International Symposium on Olfaction and Electronic Nose (ISOEN 02)*, Rome, Italy, Sept 29 - Oct 2, 2002, pp. 126-128.
31. R. Gutierrez-Osuna and A. Gutierrez-Galvez, "Habituation in the KIII olfactory model using gas sensor arrays," in *ISOEN 02*, pp. 186-187.
32. M. L. Rodríguez-Méndez , A. Arrieta, V. Parra, A. Vegas, S. Villanueva, R. Gutierrez-Osuna and J. A. de Saja, "Sensor system for the complete organoleptic characterisation (smell, taste and colour) of wines," in *ISOEN 02*, pp. 180-185.
33. S. S. Schiffman, R. Gutierrez-Osuna and H. T. Nagle, "Measuring Odor Intensity with E-Noses and Other Sensor Types", in *ISOEN 02*, pp. 68-72.
34. R. Gutierrez-Osuna, "A Self-organizing Model of Chemotopic Convergence for Olfactory Coding", in *Proc. 2nd Joint IEEE Engineering in Medicine and Biology Society-Biomedical Engineering Society Conference*, Houston, TX, 23-26 October 2002, Vol.1, pp. 236-237.
35. R. Gutierrez-Osuna, A. Gutierrez-Galvez and N. Powar, "Transient Response Analysis for Temperature Modulated Chemoresistors," in *Proc. 9th Intl. Meeting on Chemical Sensors*, Boston, MA, 7-10 July 2002.

36. P. Kakumanu, R. Gutierrez-Osuna, A. Esposito, R. Bryll, A. Goshtasby and O. N. Garcia, "Speech Driven Facial Animation", in *Proc. Workshop on Perceptive User Interfaces*, Disney's BoardWalk Inn Resort, November 15-16, 2001.
37. R. Gutierrez-Osuna, N. Powar and P. Sun, "Chemosensory Adaptation in an Electronic Nose," in *Proc. 2nd IEEE Bioinformatics and Bioengineering Symposium (BIBE2001)*, Washington, DC, November 4-6, 2001, pp. 223-229.
38. R. Gutierrez-Osuna, S. S. Schiffman and H. T. Nagle, "Correlation of Sensory Analysis with Electronic Nose Data for Swine Odor Remediation Assessment," in *Proc. 3rd European Congress on Odours, Metrology and Electronic Noses*, Paris, France, June 19-21, 2001.
39. A. Perera, T. Pardo, T. Sundic, S. Marco and R. Gutierrez-Osuna, "IpNose: Electronic nose for distributed air quality monitoring system," in *Proc. 3rd European Congress on Odours, Metrology and Electronic Noses*, Paris, France, June 19-21, 2001.
40. R. Gutierrez-Osuna, S. Korah and A. Perera, "Multi-Frequency Temperature Modulation For Metal-Oxide Gas Sensors," in *Proc. 8th International Symposium on Olfaction and the Electronic Nose (ISOEN 01)*, pp. 212-218.
41. A. Perera, R. Gutierrez-Osuna and S. Marco, "ipNOSE: A portable volatile analyzer based on embedded technology for intensive computation and time dependent signal processing," in *Proc. ISOEN 01*, pp. 31-36.
42. S. S. Schiffman, R. Gutierrez-Osuna and T. Nagle, "Use of an Electronic Nose to Evaluate Odors from Swine Operations," in *Proc. ISOEN 01*, pp. 200-205.
43. R. Gutierrez-Osuna, "Drift Reduction For Metal-Oxide Sensor Arrays Using Canonical Correlation Regression And Partial Least Squares," in *Proc. 7th International Symposium On Olfaction & Electronic Nose (ISOEN 00)*, Brighton, UK, July 20-24, 2000, pp. 147-152.
44. S. S. Schiffman, D. W. Wyrick, R. Gutierrez-Osuna and H. T. Nagle, "Effectiveness of an Electronic Nose for Monitoring Bacterial and Fungal Growth," in *Proc. ISOEN 00*, pp. 173-180.
45. R. Gutierrez-Osuna and O. N. Garcia, "An application of Rissanen's Complexity Measure to Optimizing Abstraction Level," in *Proc. Fifth Annual Conference on Human Interaction with Complex Systems*, UIUC, Illinois, April 30 - May 2, 2000.
46. H. T. Nagle, S. S. Schiffman, R. Gutierrez-Osuna and D. Wyrick, "Development of the electronic nose for monitoring odors," in *Proc. Animal Waste Management Symposium*. Raleigh: NCSU. 1999. pp 119-127.
47. J. J. Classen, S. S. Schiffman, H. T. Nagle and R. Gutierrez-Osuna, "Electronic nose evaluation of synthetic hog farm odor," in Voermans, J. A. M.; Monteny, G. J., eds. *Ammonia and odour emissions from animal production facilities*. International Symposium, Vinkeloord, The Netherlands. NVTL:Rosmalen, The Netherlands. 1997: pp. 72-82.
48. R. Gutierrez-Osuna, D. S. Schudel, J. A. Janét and R. C. Luo, "Lola, the Mobile Robot from NC State," in *AAAI Robot Competition and Exhibition Abstracts*, Vol. 2, p. 1354, 1996.
49. J. A. Janet, R. Gutierrez-Osuna, M. G. Kay and R. C. Luo, "Autonomous Mobile Robot Self-Referencing with Sensor Windows and Neural Networks," in *Proc. IEEE 21st Intl. Conference on Industrial Electronics, Control and Instrumentation*, Orlando, FL, pp. 1124-1129, 1995.
50. J. A. Janet, R. Gutierrez-Osuna, T. A. Chase, M. White and R. C. Luo, "Global Self-localization for Autonomous Mobile Robots using Region- and Feature-based Neural Networks," in *Proc. IEEE 21st Intl. Conference on Industrial Electronics, Control and Instrumentation*, Orlando, FL, pp. 1142-1147, 1995.

51. J. A. Janet, R. Gutierrez-Osuna, T. A. Chase, M. White and R. C. Luo, "Global Self-localization for Autonomous Mobile Robots using Self-organizing Kohonen Neural Networks," in *Proc. IEEE Intl. Conference on Intelligent Robots and Systems*, Pittsburgh, PA, pp. 504-509, 1995.

TECHNICAL REPORTS

1. D. Felps and R. Gutierrez-Osuna, "Developing Objective Measures of Foreign-accent Conversion," TAMU Tech Report CS-TR-2009-9-1, 2009.
2. R. Gosangi and R. Gutierrez-Osuna, "Active Chemical Sensing with Partially Observable Markov Decision Processes," TAMU Tech Report CS-TR-2008-12-2, 2008.
3. T. Yamanaka and R. Gutierrez-Osuna, "Extracting functional clusters of glomeruli in rat olfactory bulb by non-negative matrix factorization," TAMU Tech Report CS-TR-2008-11-2, 2008.
4. T. Yamanaka, A. Perera, B. Raman, A Gutierrez-Galvez and R. Gutierrez-Osuna, "Learning Sparse Basis Vectors in Small-Sample Datasets through Regularized Non-Negative Matrix Factorization," TAMU Tech Report CS-TR-2008-9-1, 2008.
5. J. Choi and R. Gutierrez-Osuna, "Estimating the principal dynamic modes of autonomic state with wearable sensors," TAMU Tech Report CS-TR-2008-7-2, 2008.
6. D. Felps, H. Bortfeld, and R. Gutierrez-Osuna, "Prosodic and segmental factors in foreign-accent conversion," TAMU Tech Report CS-TR-2008-7-1, 2008.
7. Y. Yu, R. Gutierrez-Osuna, and Y. Choe, "Preserving Class Discriminatory Information by Context-sensitive Intra-class Clustering Algorithm," TAMU Tech Report CS-TR-2005-2-3, 2005.
8. S. Fu, R. Gutierrez-Osuna, A. Esposito and O. Garcia, "Audio/Visual Mapping Based on Hidden Markov Models," WSU Tech Report WSU-CS-03-01, 2003.
9. R. Gutierrez-Osuna, P. Kakumanu, A. Esposito, O.N. Garcia, A. Bojorquez, J. Castillo and I. Rudomin, "Speech-driven Facial Animation with Realistic Dynamics," WSU Tech Report CS-WSU-02-03, 2002.
10. A. Esposito, R. Gutierrez-Osuna, P. Kakumanu and O.Garcia, "Optimal Data-Encoding for Speech-Driven Facial Animation", WSU Tech Report WSU-CS-02-04, 2002.
11. O. N. Garcia, R. Giles et al., "Research Foundations on Successful Participation of Underrepresented Minorities in Information Technology", Cyberconference Final Report, NSF 9910768, May 2000, Available at <http://www.cise.nsf.gov/itminorities.html>

PRESENTATIONS/INVITED LECTURES

1. "Foreign accent conversion," University of Glasgow, October 22, 2009.
2. "Neuromorphic signal processing for chemical sensor arrays," BIO-ICT Convergence Workshop, European Commission, February 25, 2009, Brussels. Belgium.
3. "Audio-visual mappings for speech-driven facial animation," Univ. of Houston, June 6, 2008.
4. "Processing of chemosensor array signals with neuromorphic models of the olfactory pathway," BioTechno Workshop 2008: From Biological Olfaction to Sensor Technology, European Network of Excellence in Artificial Olfaction, Feb 25-26, 2008, Skokloster Wårdshus, Sweden.
5. "Processing of chemosensor array signals with neuromorphic models of the olfactory pathway," Mitre Corporation, April 4, 2006, Washington, DC.
6. "Neuromorphic processing for optical microbead arrays," Conference on Goal-Directed Neural Systems, University of Texas at Arlington, November 4, 2006.

7. "Sensor-based machine olfaction with neuromorphic models of the olfactory system," Arizona Research Laboratories Division of Neurobiology, University of Arizona, December 1, 2005.
8. "Pattern recognition for chemical sensor arrays with neuromorphic models of the olfactory system," Bio-Techno Workshop, GOSPEL Network of Excellence (NoE), Tuebingen, Germany, June 14-15, 2005.
9. "Pattern recognition for chemical sensor arrays with neuromorphic models of the olfactory system," Universitat Pompeu Fabra, Barcelona, Spain, May 30, 2005.
10. "Concentration normalization with a model of gain control in the olfactory bulb," *ISOEN 2005*, Barcelona, Spain, April 13-15, 2005.
11. "Pattern recognition for chemical sensor arrays with neuromorphic models of the olfactory system," Center for Perceptual Systems, University of Texas at Austin, February 7, 2005.
12. "Cancellation of chemical backgrounds with generalized Fisher's linear discriminants," *IEEE SENSORS 2004*, Vienna, October 24-27, 2004.
13. "Principal Discriminants Analysis for small-sample-size problems: application to chemical sensing," *IEEE SENSORS 2004*, Vienna, October 24-27, 2004.
14. "Sensor-based machine olfaction with a neurodynamics model of the olfactory bulb," *2004 IEEE/RSJ IROS*, September 28 - October 2, 2004, Sendai, Japan.
15. "Sensor-based machine olfaction with neuromorphic models of the olfactory system," Tokyo Institute of Technology, September 28, 2004.
16. "Pattern recognition for chemosensor arrays with the KIII model," *2004 Symposium on Intentional Dynamic Systems*, Memphis, TN, April 24-26, 2004.
17. "Applications of Cross-selective Chemical Sensors to the Food Industry," Center of Food Processing and Engineering, Texas Science Partnership, April 6, 2004.
18. "Statistical classifiers: Bayesian decision theory and density estimation," *3rd European Short Course of the NOSE II Network*, Alpbach (Austria), March 21-26, 2004.
19. "Signal processing methods for drift compensation," Swedish Sensor Centre (S-SENCE), Linköping University, Sweden, May 18-21, 2003.
20. "A biologically-plausible computational architecture for sensor-based machine olfaction," in *9th International Symposium on Olfaction and Electronic Nose (ISOEN 02)*, Rome, Italy, Sept 29 - Oct 2, 2002.
21. "Transient Response Analysis for Temperature Modulated Chemoresistors," *9th Intl. Meeting on Chemical Sensors*, Boston, MA, 7-10 July 2002.
22. "Chemosensory Adaptation in an Electronic Nose," *2nd IEEE Bioinformatics and Bioengineering Symposium (BIBE2001)*, Washington, DC, November 4-6, 2001.
23. "Computational Models for Sensor-Based Machine Olfaction", Illumina, Inc., San Diego, CA, August 23, 2001.
24. "Sensor-based Machine Olfaction," University of Rhode Island, Texas A&M University, University of Kentucky, March-May 2001.
25. "Multi-Frequency Temperature Modulation For Metal-Oxide Gas Sensors," *8th International Symposium on Olfaction and the Electronic Nose*, Washington, DC, March 25-30, 2001.
26. "Statistical Pattern Recognition," Second School, European Community Network of Excellence on Artificial Olfactory Sensing (NOSE), Lloret de Mar, Spain, October 2-5, 2000.

27. "Sensor-Based Machine Olfaction: An Overview," University of Cincinnati, November 19, 1999.
28. "Pattern Recognition Techniques for KDDM," ITRI Workshop on Knowledge Discovery and Data Mining, Wright State University, September 9, 1999.

RESEARCH SUPERVISION

POST-DOCTORAL ADVISOR

1. T. Yamanaka, Neuromorphic signal processing for machine olfaction, 04/2004-03/2006.
2. A. Perera-Lluna, Signal processing in power distribution systems, 07/2003-12/2004.

PHD STUDENT CHAIR

1. L. Zhang, in progress
2. J. Lee, in progress
3. R. Gosangi, in progress
4. J. Choi, "Minimally-invasive Wearable Sensors and Analysis Tools for the Discovery of Lifestyle Patterns," in progress
5. D. Felps, "Articulatory-based Speech Processing Methods for Foreign Accent Conversion," in progress
6. J. Rodriguez, "Enhancing Facial Distinctiveness for Human and Machine Recognition," in progress.
7. A. Gutierrez-Galvez, "Coding and Learning of Chemosensor Array Patterns in a Neurodynamics Model of the Olfactory System," Fall 2005.
8. B. Raman, "Sensor-based Machine Olfaction with Neuromorphic Models of the Olfactory System," Fall 2005.

MASTER'S STUDENT CHAIR

1. F. Nogueira, "Development of an Infrared Absorption Spectroscope based on Linear Variable Filters," Summer 2006.
2. M. Zavala, "Visual Prosody in Speech-Driven Facial Animation: Elicitation, prediction, and perceptual evaluation", Spring 2005.
3. S. Ortiz, "Structure from Motion using Omni-directional Vision and Certainty Grids," Spring 2004.
4. N. Balan, "Analysis and Evaluation of Factors Affecting Speech Driven Facial Animation," Summer 2003.
5. J. Knapp, "Monitoring Patient State through Electrocardiographic features," Fall 2002.
6. P. Sun, "A Biologically Plausible Computational Architecture for Sensor-Based Machine Olfaction," Fall 2002.
7. N. Powar, "Temperature Modulation and Transient Analysis for Tin-Oxide Sensor Arrays," Fall 2002.
8. S. Fu, "Audio/Visual Mapping Based on Hidden Markov Models", Summer 2002, (O. Garcia, co-Chair)
9. P. Kakumanu, "Audio-Visual Processing for Speech Driven Facial Animation", Summer 2002.
10. S. Korah, "A Study of Modulating Excitation Techniques for Commercial Metal-Oxide Gas Sensors," Fall 2000.
11. M. J. Uddin, "Drift Reduction of Gas Sensor Array," Spring 2000.

COURSES TAUGHT

Computer System Design (Senior/Capstone Design), Pattern Recognition, Neural Networks, Speech and Face Recognition, Intelligent Sensor Systems, Microprocessor-based System Design, Analog Control Theory, Computational Intelligence.

PROFESSIONAL SERVICE

Reviewer of scientific journal publications for

- Proceedings of the National Academy of Sciences
- IEEE Transactions on Computers
- IEEE Transactions on Neural Networks
- IEEE Sensors Journal
- IEEE Transactions on Systems, Man and Cybernetics
- IEEE Transactions on Biomedical Circuits and Systems
- Analytica Chimica Acta
- Sensors and Actuators B, Chemical
- Neurocomputing
- Pattern Analysis and Applications
- Biotechnology Progress
- Electronic Letters
- Sensors and Materials
- IEE Proceedings -Circuits, Devices and Systems
- Sensor Letters

Panel reviewer of research proposals/awards

- European Union Framework Program (FP7)
- National Science Foundation (NSF)
- National Institutes of Health (NIH)

Program Committee:

- 2010 IEEE Conference on Multisensor Fusion and Integration (MFI2010)
- 2009 IEEE Symp Computational Intelligence for Multimedia Signal and Vision Processing
- 2008, 2009 International Joint Conference on Neural Networks
- 2007, 2008, 2009 IEEE Sensors Conference
- 2006 International Symposium on Artificial Brain with Emotion and Learning (ISABEL)
- 2006 Robotics: Systems and Science (RSS).
- 2005, 2006 IEEE International Conference on Autonomic and Autonomous Systems (ICAS)
- 2005 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- 2005 International Symposium on Olfaction and Electronic Nose (ISOEN)
- 2003, 2004 IEEE International Conference on Tools with Artificial Intelligence (ICTAI)
- 2001, 2003 IEEE International Symp. Bio-Informatics and Biomedical Engineering (BIBE)

Editorial Board:

- IEEE Sensors Journal (Associate Editor; 2006-present)
- IEEE International Conference on Robotics and Automation (2009)
- Sensor Letters (2003-2005)

PROFESSIONAL MEMBERSHIP

Senior Member, Institute of Electrical and Electronics Engineers (IEEE)