

RICARDO GUTIERREZ-OSUNA

Department of Computer Science and Engineering
Texas A&M University
520A H.R. Bright Building
College Station, TX 77843-3112

Voice: (979) 845-2942
Fax: (979) 845-1420
Email: rgutier@cse.tamu.edu
URL: <http://faculty.cse.tamu.edu/rgutier/>

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: 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: Ren C. Luo
- B.S.** Industrial Engineering, Polytechnic University of Madrid (Spain) 1986-1992
Minor in Electronics and Control Systems (Electrical Engineering)

RESEARCH INTERESTS

Intelligent sensors, machine olfaction, speech processing, wearable sensors, machine learning, biologically-inspired computation, multimodal interfaces, mobile robotics.

ACADEMIC EXPERIENCE

- Texas A&M University, College Station, TX**
Professor, Computer Science and Engineering Department 09/12-present
Associate Professor, Computer Science and Engineering Department 09/06-08/12
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. Dean of Engineering Excellence Award, TAMU College of Engineering 2017
2. Barbara and Ralph Cox '53 Faculty Fellow, TAMU College of Engineering 2014
3. Association of Former Students College-Level Teaching Award, TAMU COE 2009
4. Barbara and Ralph Cox '53 Faculty Fellow, TAMU College of Engineering 2009

5. Tenneco Meritorious Teaching Award, TAMU College of Engineering 2009
6. Graduate Faculty Teaching Excellence Award, TAMU Computer Science 2007
7. Ramon y Cajal Award, Spain's Ministry of Education and Science 2005-2010
8. NSF Faculty Early Career Development (CAREER) Award 2000-2004
9. Preparing the Professoriate Fellow, North Carolina State University 1996-1997
10. "La Caixa" Scholarship for Post-graduate Study Abroad (Spain) 1993-1995

RESEARCH GRANTS AND CONTRACTS

1. Principal Investigator, with J. Levis, "Developing golden speakers for second-language pronunciation training," National Science Foundation, \$300,000, August 2016-June 2018.
2. Principal Investigator, with J. Levis and E. Chukharev-Khudilaynen, "Perception and production in second language: the roles of voice variability and familiarity," National Science Foundation, \$565,000, August 2016-June 2019.
3. Principal Investigator, with Pao-Tai Lin, "Chip-scale wearable chemical sensors based on tunable mid-infrared devices," CrucialTec, \$300,000, June 2016-May 2017.
4. Principal Investigator (on subcontract), "Passive Vital Sign Monitoring," Phase I SBIR, NASA, \$26,800, June-December 2016.
5. Co-Investigator, with B. Ahmed (PI) and K. Ballard, "Apraxia World: An interactive, technology-based comprehensive tool for remote speech therapy of CAS," Qatar National Research Fund, \$809,694, January 2016-December 2018.
6. Co-Investigator with R. Arroyave (PI) and R. Aramayo, "Development of Big Data Scientific Management Tools for the Materials Genome Initiative; Materials Galaxy," TAMU Big Data Initiative, \$50,000, February 2016-January 2017.
7. Principal Investigator (on subcontract), "Mobile Footprint Detection," Phase II SBIR, Department of Homeland Security, \$120,000, March 2015-September 2016.
8. Principal Investigator (on subcontract), "Mobile Footprint Detection," Phase I SBIR, Department of Homeland Security, \$30,000, May 2014-August 2014.
9. Principal Investigator, with E. Shipp and B. Ahmed (co-PI), "Promoting stress self-regulation with physiological training games," Qatar National Research Fund, \$1,035,534, December 2012-December 2015.
10. Co-Investigator, with L. Mandell (PI) and R. Furuta (co-PI), "OCR'ing Early Modern Text," Mellon Foundation, \$733,794, January 2013-December 2014.
11. Co-Investigator, with B. Ahmed (PI) and K. Ballard, "Mobile infrastructure and automated tools for the monitoring and treatment of childhood apraxia of speech," Qatar National Research Fund, \$1,043,499, November 2011-October 2014.
12. Co-Investigator with H. T. Nagle (PI) and S. S. Schiffman, "Replacing human odor assessments of cabin air quality by instrumental measurements," Hyundai-Kia America, \$69,000, September 2011, December 2011.
13. Principal Investigator with co-PIs Isaac Rudomin and Benjamin Hernandez, "Persuasive health games with wearable sensors," TAMU-Conacyt Collaborative Research Grant Program, \$24,000, September 2011-August 2012 (no-cost extended through August 2014).
14. Principal Investigator, "Integrated Sensing and Acting with Tunable Chemical Sensors," National Science Foundation, \$299,930, September 2010-August 2013.

15. Co-Investigator with F. Shipman (PI) and S. Smith, "EAGER: Creativity in the Wild: Insight and Discovery with Wearable Sensors," National Science Foundation, \$125,000, September 2010, August 2011.
16. Principal Investigator, with co-PI B. 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.
17. Principal Investigator (on subcontract), "Miniature and Reliable Chemical Sensors for Cell Phones," Department of Homeland Security, \$142,787, September 2009-September 2011.
18. 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.
19. 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.
20. 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.
21. Principal Investigator with co-PIs 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.
22. Principal Investigator, "MSK parameter analysis tool," \$28,036, United Space Alliance, June 2005-December 2005.
23. Principal Investigator with co-PI 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.
24. Principal Investigator, "MSK parameter analysis tool," \$17,419, United Space Alliance, September 2004 – May 2005.
25. Principal Investigator, "Computational Models for Sensor-based Machine Olfaction," NSF CAREER, \$299,713, July 2000-June 2004 (no cost extension through August 2008).
26. Co-Investigator with O. N. Garcia (P.I.) and A. Goshtasby, "Speech Driven Facial Animation," NSF CISE, \$209,287, September 1999-August 2001.
27. 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.
28. Principal Investigator, "Portable Electronic Drug Detection and Identification Device," UES, Inc., Dayton (OH), \$20,000, August 1999-July 2000.
29. 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.
30. 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

* denotes students under my supervision

JOURNAL ARTICLES

1. A. Parnandi* and R. Gutierrez-Osuna, "Visual Biofeedback and Game Adaptation in Relaxation Skill Transfer," *IEEE Transactions on Affective Computing*, in press.
2. M. Christy, A. Gupta*, E. Grumbach, L. Mandel, R. Furuta, and R. Gutierrez-Osuna, "Mass Digitization of Early Modern Texts with Optical Character Recognition," in *ACM Journal on Computing and Cultural Heritage*, in press.
3. Z. Wang*, A. Parnandi* and R. Gutierrez-Osuna, "BioPad: Leveraging off-the-Shelf Video Games for Stress Self-Regulation," in *Journal of Biomedical and Health Informatics*, in press.
4. A. Parnandi* and R. Gutierrez-Osuna, "Physiological modalities for relaxation skill transfer in biofeedback games," in *Journal of Biomedical and Health Informatics*, in press.
5. J. Huang* and R. Gutierrez-Osuna, "Active wavelength selection for mixture identification with tunable mid-infrared detectors," *Analytica Chimica Acta*, 937: 11-20, 2016.
6. J. Li, R. Gutierrez-Osuna, R. D. Hodges, G. Luckey, J. Crowell, S. S. Schiffman, and H. T. Nagle, "Using Field Asymmetric Ion Mobility Spectrometry for Odor Assessment of Automobile Interior Components," *IEEE Sensors Journal*, 16(14): 5747-5756, 2016.
7. B. Ahmed, H. Ali, J. Choi* and R. Gutierrez-Osuna, "ReBreathe: A calibration protocol that improves stress/relax classification by relabeling deep breathing relaxation exercises," *IEEE Transactions on Affective Computing*, 7(2): 150-161, 2016.
8. S. Aryal* and R. Gutierrez-Osuna, "Data driven articulatory synthesis with deep neural networks," *Computer Speech and Language*, 36: 260-273, 2016.
9. J. Li, R. D. Hodges, R. Gutierrez-Osuna, G. Luckey, J. Crowell, S. S. Schiffman, and H. T. Nagle, "Odor Assessment of Automobile Cabin Air With Field Asymmetric Ion Mobility Spectrometry and Photoionization Detection," *IEEE Sensors Journal*, 16(2), 409-417, 2016.
10. A. Parnandi*, V. Karappa*, T. Lan*, M. Shahin, J. McKechnie, K. Ballard, B. Ahmed and R. Gutierrez-Osuna, "Development of a remote therapy tool for childhood apraxia of speech," *ACM Transactions on Accessible Computing*, 67(3), 10:1-10:23, 2015.
11. M. Shahin, B. Ahmed, A. Parnandi*, V. Karappa*, J. McKechnie, K. Ballard and R. Gutierrez-Osuna, "Tabby Talks: an automated tool for the assessment of childhood apraxia of speech," *Speech Communication*, 70, 49-64, 2015
12. S. Aryal* and R. Gutierrez-Osuna, "Reduction of non-native accents through statistical parametric articulatory synthesis," *Journal of the Acoustical Society of America*, 137(1), 433-446, 2015.
13. J. Huang* and R. Gutierrez-Osuna, "Active wavelength selection for mixture analysis with tunable infrared detectors," *Sensors and Actuators B: Chemical*, 208. 245-257, 2015.
14. A. Parnandi* and R. Gutierrez-Osuna, "A Comparative Study of Game Mechanics and Control Laws for an Adaptive Physiological Game," *Journal on Multimodal User Interfaces*, 9(1), 31-42, 2014.
15. A. Perera-Lluna, K. Manivannan, P. Xu, R. Gutierrez-Osuna, C. Benner, B. D. Russell, "Automatic Capacitor Bank Identification in Power Distribution Systems," *Electric Power Systems Research*, 111, 96-102, 2014.

16. F. M. Shipman, R. Gutierrez-Osuna, and C. D. D. Monteiro, "Identifying sign language videos in video sharing sites," *ACM Transactions on Accessible Computing*, 5(4): 9.1-9.14, 2014
17. R. Gosangi* and R. Gutierrez-Osuna, "Active classification with arrays of tunable chemical sensors," *Chemometrics and Intelligent Laboratory Systems*, 132, 91-102, 2014.
18. Y. Yu, Y. Choe and R. Gutierrez-Osuna, "Context-sensitive Intra-class Clustering," *Pattern Recognition Letters*, 37, 85-93, 2014.
19. R. Gosangi* and R. Gutierrez-Osuna, "Active temperature modulation of metal-oxide sensors for quantitative analysis of gas mixtures," *Sensors and Actuators B: Chemical*, 185, 201-210, 2013.
20. J. Huang*, R. Gosangi, and R. Gutierrez-Osuna, "Active Concentration-Independent Chemical Identification with a Tunable Infrared Sensor," *IEEE Sensors Journal* 12(11), 3135-3142, 2012.
21. D. Felps*, C. Geng, and R. Gutierrez-Osuna, "Foreign accent conversion through concatenative synthesis in the articulatory domain," *IEEE Transactions on Audio, Speech and Language Processing*, 20(8), 2301-2312, 2012.
22. J. Choi*, B. Ahmed, and R. Gutierrez-Osuna, "Development and evaluation of an ambulatory stress monitor based on wearable sensors," *IEEE Transactions on Information Technology in BioMedicine*, 16(2), 279-286, 2012.
23. J. Choi* and R. Gutierrez-Osuna, "Removal of respiratory influences from heart rate variability in stress monitoring," *IEEE Sensors Journal*, 11(11), 2649-2656, 2011.
24. MNK Boulos, B. J. Blanchard*, C. Walker*, J. Montero*, A. Tripathy* and R. Gutierrez-Osuna, "Web GIS in practice X: a Microsoft Kinect natural user interface for Google Earth navigation," *International Journal of Health Geographics*, 10, 45, 2011.
25. J. Rodriguez* and R. Gutierrez-Osuna, "Reverse caricatures effects on three-dimensional facial reconstructions," *Image and Vision Computing*, 29, 329-334, 2011.
26. N.-Y. Yu, T. Yamauchi, H.-F. Yang; Y.-L. Chen and R. Gutierrez-Osuna, "Feature selection for inductive generalization," *Cognitive Science*, 34, 1574-1593, 2010.
27. R. Gosangi* and R. Gutierrez-Osuna, "Active temperature programming for metal-oxide chemoresistors," *IEEE Sensors Journal*, 10(6), 1075-1082, 2010.
28. R. Gutierrez-Osuna and A. Hierlemann, "Adaptive microsensor systems," *Annual Review of Analytical Chemistry*, 3, 255-276, 2010.
29. D. Felps* and R. Gutierrez-Osuna. "Developing objective measures of foreign-accent conversion," *IEEE Transactions on Audio, Speech and Language Processing*, 18(5), 1030-1040, 2010.
30. D. Felps*, H. Bortfeld and R. Gutierrez-Osuna. "Foreign-accent conversion in computer assisted pronunciation training," *Speech Communication*, 51, 920-932, 2009.
31. 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.
32. A. Hierlemann and R. Gutierrez-Osuna, "Higher-order chemical sensing," *ACS Chemical Reviews*, 108, 563-613, 2008.
33. F. Nogueira*, D. Felps* and R. Gutierrez-Osuna, "Development of an infrared absorption spectroscope based on linear variable filters," *IEEE Sensors Journal*, 7(8), 1183-1190, 2007.

34. 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.
35. 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.
36. 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.
37. 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.
38. 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.
39. 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.
40. 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.
41. 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.
42. 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.
43. 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.
44. 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.
45. 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.
46. 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.
47. A. Gutierrez-Galvez* and R. Gutierrez-Osuna, "Pattern Completion through Phase Coding in Population Neurodynamics," *Neural Networks* 16, pp. 649-656, 2003.
48. 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.
49. 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.

50. 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.
51. 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.
52. R. Gutierrez-Osuna, "Pattern Analysis for Machine Olfaction: A Review," *IEEE Sensors Journal*, 2(3), 189-202, 2002.
53. 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.
54. 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.
55. 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.
56. 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.
57. 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, 2010.
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. S. Duggina, C. Monteiro, R. Gutierrez-Osuna, F. Shipman, “Speed-Accuracy Tradeoffs for Detecting Sign Language Content in Video Sharing Sites,” in *Proc. 19th International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS)*, 2017, in press.
2. Khuong N. Nguyen, Xi Liu, O. V. Komogortsev, R. Gutierrez-Osuna, and Yoonsuck Choe. "Explanation of the Perceptual Oblique Effect Based on the Fidelity of Oculomotor Control During Saccades." In *Proceedings of the 2017 Joint IEEE International Conferences on Development and Learning and Epigenetic Robotics (ICDL-Epirob)*, in press.
3. P. Karkamkar* and R. Gutierrez-Osuna, “Optical Computation of Chemometrics Projections using a Digital Micromirror Device,” in *Proc. International Symposium on Olfaction and Electronic Nose (ISOEN)*, 2017.
4. Z. Wang* and R. Gutierrez-Osuna, “Mixture quantification in the presence of unknown interferences,” in *Proc. International Symposium on Olfaction and Electronic Nose (ISOEN)*, 2017.
5. G. Zhao* and R. Gutierrez-Osuna, “Exemplar Selection Methods in Voice Conversion,” in *Proc. International Conference on Acoustics, Speech, and Signal Processing (ICASSP)*, 2017.
6. C. D. D. Monteiro, C. Maria Mathew, F. Shipman and R. Gutierrez-Osuna, “Detecting and Identifying Sign Languages through Visual Features,” in *Proc. IEEE International Symposium on Multimedia (ISM 2016)*, 2016.
7. S. Aryal and R. Gutierrez-Osuna, “Comparing Articulatory and Acoustic Strategies for Reducing Non-Native Accents,” in *Proc. Interspeech*, San Francisco, CA, 2016.
8. C. Liberatore and Ricardo Gutierrez-Osuna, “Generating Gestural Scores from Acoustics Through a Sparse Anchor-Based Representation of Speech,” in *Proc. Interspeech*, San Francisco, CA, 2016.
9. J. McKechnie, K. J. Ballard, P. McCabe, E. Murray, T. Lan, R. Gutierrez-Osuna, and B. Ahmed, “Influence of type of feedback on effect of tablet-based delivery of intensive speech therapy in children with Childhood Apraxia of Speech,” in *Proc. Motor Speech Conference*, Newport Beach, Ca, 2016.
10. M. Shahin, R. Gutierrez-Osuna and B. Ahmed, “Classification of bisyllabic lexical stress patterns in disordered speech using deep learning,” in *Proc. International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2016)*.
11. R. Bhandari, A. Parnandi, E. Shipp, B. Ahmed, and R. Gutierrez-Osuna, “Music-based respiratory biofeedback in visually-demanding tasks,” in *Proc. International Conference on New Interfaces for Musical Expression (NIME)*, Baton Rouge, LA, 2015
12. J. Li, R. Gutierrez-Osuna, R.D. Hodges, G. Luckey, J. Crowell, S. S. Schiffman, and H. T. Nagle, “Odor Assessment of Automobile Interior Components Using Ion Mobility Spectrometry,” in *Proc. IEEE Sensors Conference*, 2015.
13. C. Liberatore*, S. Aryal*, Z. Wang*, S. Polsley*, R. Gutierrez-Osuna, “SABR: Sparse, Anchor-Based Representation of the Speech Signal,” in *Proc. Interspeech*, 2015.

14. S. Aryal* and R. Gutierrez-Osuna, "Articulatory-based conversion of foreign accents with deep neural networks," in *Proc. Interspeech*, 2015.
15. J. Huang*, R. Gutierrez-Osuna, "Detection of weak chemicals in strong backgrounds with a tunable infrared sensor," in *Proc. International Symposium on Olfaction and Electronic Nose (ISOEN), 2015*.
16. H. T. Nagle, R. Gutierrez-Osuna, K. S. Suslick, K. Persaud, J. Covington, R. D. Hodges, G. Luckey, J. Crowell, S. S. Schiffman, "Augmenting human odor assessments of cabin air quality of automobiles by instrumental measurements," in *Proc. International Symposium on Olfaction and Electronic Nose (ISOEN)*, 2015.
17. F. Shipman, R. Gutierrez-Osuna, T. Shipman, C. Monteiro, and V. Karappa*, "Towards a Distributed Digital Library for Sign Language Content", in *Proc. ACM/IEEE Joint Conference on Digital Libraries*, 2015.
18. A. Gupta*, R. Gutierrez-Osuna, M. Christy, B. Capitanu, L. Auvil, L. Grumbach, R. Furuta, and L. Mandell, "Automatic assessment of OCR quality in historical documents," in *Proc. AAAI*, 2015.
19. T. Lan*, S. Aryal*, B. Ahmed, K. Ballard and R. Gutierrez-Osuna, "Flappy Voice: An Interactive Game for Childhood Apraxia of Speech Therapy," in *Proc. CHI-PLAY*, 2014.
20. R. Al-Rihawi, B. Ahmed, and R. Gutierrez-Osuna, "Dodging Stress With A Personalized Biofeedback Game," in *Proc. CHI-PLAY*, 2014.
21. M. Shahin, B. Ahmed, J. McKechnie, K. Ballard, and R. Gutierrez-Osuna, "A comparison of GMM-HMM and DNN-HMM based pronunciation verification techniques for use in the assessment of childhood apraxia of speech," in *Proc. Interspeech 2014*.
22. J. Li, R. D. Hodges, R. Gutierrez-Osuna, G. Luckey, J. Crowell, S. S. Schiffman, and H. T. Nagle, "Odor Assessment of Automobile Cabin Air by Machine Olfaction," in *Proc. IEEE Sensors Conference, 2014*.
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44. R. Gosangi* and R. Gutierrez-Osuna, "Data-driven modeling of metal-oxide sensors with dynamic Bayesian networks," in *Proc. International Symposium on Olfaction and Electronic Nose (ISOEN)*, 2011.
45. R. Gosangi* and R. Gutierrez-Osuna, "Quantification of gas mixtures with active recursive estimation," in *Proc. ISOEN*, 2011.
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1. Y. Son*, A. Parnandi* and R. Gutierrez-Osuna, "A Control-theoretic Approach to Adaptive Physiological Games," TAMU Technical Report CS-TR- 2012-9-1, 2012.
2. A. Parnandi*, Y. Son*, M. Shahin, B. Ahmed, R. Gutierrez-Osuna, "Architecture of an Automated Therapy Tool for Childhood Apraxia of Speech," TAMU Technical Report CS-TR-2012-8-1, 2012.

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16. S. Fu*, R. Gutierrez-Osuna, A. Esposito and O. Garcia, "Audio/Visual Mapping Based on Hidden Markov Models," WSU Technical Report WSU-CS-03-01, 2003.
17. 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 Technical Report CS-WSU-02-03, 2002.
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PRESENTATIONS/INVITED LECTURES

1. "Stress monitoring with wearable sensors," Department of Electrical and Computer Engineering, University of Texas at Austin, April 7, 2011.

2. "Statistical Pattern Recognition for Chemical Sensor Arrays," *Winter School in Chemical Discrimination and Localization using Biologically Based Olfactory Processing*, University of California at San Diego, January 12, 2010.
3. "Neuromorphic Methods for Machine Olfaction," *Winter School in Chemical Discrimination and Localization using Biologically Based Olfactory Processing*, University of California at San Diego, January 12, 2010.
4. "Foreign accent conversion," University of Glasgow, October 22, 2009.
5. "Neuromorphic signal processing for chemical sensor arrays," *BIO-ICT Convergence Workshop, European Commission*, February 25, 2009, Brussels, Belgium.
6. "Audio-visual mappings for speech-driven facial animation," Univ. of Houston, June 6, 2008.
7. "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.
8. "Processing of chemosensor array signals with neuromorphic models of the olfactory pathway," Mitre Corporation, April 4, 2006, Washington, DC.
9. "Neuromorphic processing for optical microbead arrays," *Conference on Goal-Directed Neural Systems*, University of Texas at Arlington, November 4, 2006.
10. "Sensor-based machine olfaction with neuromorphic models of the olfactory system," Arizona Research Laboratories Division of Neurobiology, University of Arizona, December 1, 2005.
11. "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.
12. "Pattern recognition for chemical sensor arrays with neuromorphic models of the olfactory system," Universitat Pompeu Fabra, Barcelona, Spain, May 30, 2005.
13. "Concentration normalization with a model of gain control in the olfactory bulb," *ISOEN 2005*, Barcelona, Spain, April 13-15, 2005.
14. "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.
15. "Cancellation of chemical backgrounds with generalized Fisher's linear discriminants," *IEEE SENSORS 2004*, Vienna, October 24-27, 2004.
16. "Principal Discriminants Analysis for small-sample-size problems: application to chemical sensing," *IEEE SENSORS 2004*, Vienna, October 24-27, 2004.
17. "Sensor-based machine olfaction with a neurodynamics model of the olfactory bulb," *2004 IEEE/RSJ IROS*, September 28 - October 2, 2004, Sendai, Japan.
18. "Sensor-based machine olfaction with neuromorphic models of the olfactory system," Tokyo Institute of Technology, September 28, 2004.
19. "Pattern recognition for chemosensor arrays with the KIII model," *2004 Symposium on Intentional Dynamic Systems*, Memphis, TN, April 24-26, 2004.
20. "Applications of Cross-selective Chemical Sensors to the Food Industry," Center of Food Processing and Engineering, Texas Science Partnership, April 6, 2004.
21. "Statistical classifiers: Bayesian decision theory and density estimation," *3rd European Short Course of the NOSE II Network, Alpbach (Austria)*, March 21-26, 2004.

22. "Signal processing methods for drift compensation," Swedish Sensor Centre (S-SENCE), Linköping University, Sweden, May 18-21, 2003.
23. "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.
24. "Transient Response Analysis for Temperature Modulated Chemoresistors," *9th Intl. Meeting on Chemical Sensors*, Boston, MA, 7-10 July 2002.
25. "Chemosensory Adaptation in an Electronic Nose," *2nd IEEE Bioinformatics and Bioengineering Symposium (BIBE2001)*, Washington, DC, November 4-6, 2001.
26. "Computational Models for Sensor-Based Machine Olfaction", Illumina, Inc., San Diego, CA, August 23, 2001.
27. "Sensor-based Machine Olfaction," University of Rhode Island, Texas A&M University, University of Kentucky, March-May 2001.
28. "Multi-Frequency Temperature Modulation For Metal-Oxide Gas Sensors," *8th International Symposium on Olfaction and the Electronic Nose*, Washington, DC, March 25-30, 2001.
29. "Statistical Pattern Recognition," Second School, European Community Network of Excellence on Artificial Olfactory Sensing (NOSE), Lloret de Mar, Spain, October 2-5, 2000.
30. "Sensor-Based Machine Olfaction: An Overview," University of Cincinnati, November 19, 1999.
31. "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 (COMPLETED)

1. Jin Huang, Active wavelength selection for chemical identification using tunable spectroscopy, Spring 2016
2. Sandesh Aryal, Statistical parametric methods for articulatory-based foreign accent conversion, Fall 2015
3. Rakesh Gosangi, Active control strategies for chemical sensors and sensor arrays, Spring 2013
4. Jongyoon Choi, Minimally-invasive wearable sensors and data processing methods for mental stress detection, Fall 2011
5. Daniel Felps, Articulatory-based speech processing methods for foreign accent conversion, Spring 2011
6. Jobany Rodriguez, Towards the development of training tools for face recognition, Spring 2011
7. Agustin Gutierrez-Galvez, Coding and learning of chemosensor array patterns in a neurodynamics model of the olfactory system, Fall 2005
8. Barani Raman, Sensor-based Machine Olfaction with Neuromorphic Models of the Olfactory System, Fall 2005

PHD STUDENT CHAIR (IN PROGRESS)

1. Avinash Parnandi
2. Chris Liberatore
3. Zelun Wang

4. Adam Hair
5. Guanlong Zhao
6. Shaojin Ding
7. Dennis Cunha

MASTER'S STUDENT CHAIR (COMPLETED)

1. Tian Lan, Health Ninjas: a personalized biofeedback game to teach children deep breathing and nutrition knowledge, Fall 2015
2. Anshul Gupta, Assessment of OCR quality and font identification in historical documents, Summer 2015
3. Rhushabh Bhandari, Effectiveness of music-based respiratory biofeedback in reducing stress during visually demanding tasks, Spring 2015
4. Virendra Karappa, Detection of sign-language content in video through polar motion profiles, Summer 2014
5. Felipe Nogueira, Development of an Infrared Absorption Spectroscope based on Linear Variable Filters, Summer 2006.
6. Marco Zavala, Visual Prosody in Speech-Driven Facial Animation: Elicitation, prediction, and perceptual evaluation, Spring 2005.
7. Steve Ortiz, Structure from Motion using Omni-directional Vision and Certainty Grids, Spring 2004.
8. Nishant Balan, Analysis and Evaluation of Factors Affecting Speech Driven Facial Animation, Summer 2003.
9. Jason Knapp, Monitoring Patient State through Electrocardiographic features, Fall 2002.
10. Ping Sun, A Biologically Plausible Computational Architecture for Sensor-Based Machine Olfaction, Fall 2002.
11. N. Powar, Temperature Modulation and Transient Analysis for Tin-Oxide Sensor Arrays, Fall 2002.
12. Shengli Fu, Audio/Visual Mapping Based on Hidden Markov Models, Summer 2002, (O. Garcia, co-Chair)
13. Praveen Kakumanu, Audio-Visual Processing for Speech Driven Facial Animation, Summer 2002.
14. Shino Korah, A Study of Modulating Excitation Techniques for Commercial Metal-Oxide Gas Sensors, Fall 2000.
15. Mohammed J. Uddin, Drift Reduction of Gas Sensor Array, Spring 2000.

COURSES TAUGHT

Intelligent Sensor Systems, Design of Computing Systems, Introduction to Pattern Recognition, Microprocessor-based System Design, Analog Control Theory, Computational Intelligence, Senior Design, Neural Networks, Speech and Face Recognition, Speech processing

PROFESSIONAL SERVICE

Editorial Board:

- Steering Committee, International Society for Olfaction and Chemical Sensing (2011-present)
- IEEE Sensors Journal (Associate Editor; 2006-2013)
- Sensor Letters (2003-2005)

Program Committee:

- 2013 AAAI Conference on Artificial Intelligence
- 2013 IEEE Consumer Communications and Networking Conference (CCNC)
- Program Chair: 2011 International Symposium on Olfaction and Electronic Nose (ISOEN)
- 2010 IEEE Conference on Multisensor Fusion and Integration (MFI)
- 2009 IEEE International Conference on Robotics and Automation

- 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)

Workshop/Special Session organization:

- Special Session on “Active sensing and chemosensory optimization,” *IEEE Sensors Conference 2010* (Hawaii). Organizers: R. Gutierrez-Osuna, A. Vergara (UCSD), K. Muezzinoglu (UCSD).
- Workshop on “Neurodynamics and Intentional Dynamic Systems,” *International Joint Conference on Neural Networks 2005* (Montréal, Canada). Organizers: P. Andras (U. Newcastle), R. Gutierrez-Osuna, W. J. Freeman (UC Berkeley), R. Kozma (U. Memphis)

Panel reviewer of research proposals/awards:

- European Union Framework Program (FP7) (2009-2011)
- National Science Foundation (2000, 2002, 2003(2), 2005, 2007, 2008, 2009, 2011)
- National Institutes of Health (2000, 2001(2))

Reviewer of scientific journal publications

- 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
- Neurocomputing
- Sensors and Actuators B, Chemical
- Pattern Analysis and Applications
- Biotechnology Progress
- Electronic Letters
- Sensors and Materials
- IEE Proceedings -Circuits, Devices and Systems
- Sensor Letters
- Analytica Chimica Acta

PROFESSIONAL MEMBERSHIP

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