

Lucas C. Parra, Ph.D.

Full Professor
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ACADEMIC APPOINTMENTS

City University of New York	Full Professor	Biomed. Engineering	1/2008-present
City University of New York	Associate Professor	Biomed. Engineering	7/2003-12/2007
Columbia University	Adjunct Assistant Professor	Biomed. Engineering	9/2002-6/2003

INDUSTRY APPOINTMENTS

Hyposafe A/S (Denmark)	Scientific Advisory Board	Neuro-engineering	8/2007-present
Neuromatters LLC. (NJ)	Founding Member, VP	Neuro-engineering	3/2007-present
Sarnoff Research Center (NJ)	Technology Leader	Signal Processing	3/2001-6/2003
Sarnoff Research Center (NJ)	Member of Technical Staff	Signal Processing	4/1997-2/2001
Siemens Research (Princeton)	Member of Technical Staff	Medical Imaging	4/1995-3/1997
Siemens Research (Princeton)	Visiting Doctoral Fellow	Machine Learning	4/1994-3/1995
Siemens Research (Munich)	Doctoral Fellow	Neural Networks	4/1992-3/1995

EDUCATION

Ludwig-Maximilians University, Munich, Germany		
Ph.D., Physics (Thesis advisor: Gustavo Deco)		7/1996
M.S., Physics and Computer Science		2/1992
B.S., Physics		7/1987

PROFESIONAL ACTIVITIES**Journal Editor**

Associate Editor for the IEEE Transactions on Biomedical Engineering	1/2005-present
Associate Editor for the IEEE Transactions on Signal Processing	6/2007-5/2009

Nominated/Elected Committee Appointments

IEEE Technical Committee, Signal Processing Society, Machine Learning and SP	6/2005-5/2008
CUNY Intellectual Property Committee	9/2007-present

Affiliations

IEEE (Senior Member since 2007)	since 1999
Society for Neuroscience	since 2004
American Association for the Advancement of Science	since 2000

Conference Program Committees

International Conference on Independent Component Analysis, 2004, 2005, 2006, 2007
International Conference on Acoustic and Speech Signal Processing, 2006, 2007
IEEE Workshop on Machine Learning and Signal Processing, 2005, 2006, 2007
IEEE Workshop on Applications of Signal Processing to Audio, 2005, 2007

Reviewer

Nature Neuroscience Reviews, Brain Research, Journal of Neuroscience Methods, Neuroimaging, Neurocomputing, Neural Computations, Physical Review Letters E, Journal of the Acoustical Society of America, Journal of Machine Learning Research, IEEE Transactions on Signal Processing, IEEE Transactions on Speech and Audio Processing, IEEE Transactions on Biomedical Engineering, Signal Processing Letters, EURASIP Journal of Applied Signal Processing.

GRANTS and CONTRACTS**Current:**

NIH/SCORE, Bikson (PI)/**Parra** (co-PI)* \$507K 2/2007-1/2010
Effects of extracellular fields on spike time coherence: Explore the physiological relevance of extracellular fields.

* Proposal prepared by Parra and Bikson and submitted with alternating order of PI/co-PI.

Tinnitus Research Initiative, **Parra** (PI) \$100K 7/2007-6/2009
Tinnitus as a result of gain adaptation: Test the gain adaptation hypothesis of tinnitus and develop predictive/diagnostic criteria based on audiometry and psycho-acoustics.

DARPA/DSO, **Parra** (PI), subcontract with Columbia University \$506K 10/2007-3/2009
Cortically Coupled Computer Vision Phase 2: real-time analysis of visual processing with EEG.

DARPA/DSO, Parra (PI), Bikson (co-PI) \$100K 6/2009-9/2010
System for Focal Cranial Electrical Stimulation: Development of multi-electrode system to control currents for focal trans-cranial electrical stimulation. To be used to improve human learning performance.

Pending:

DARPA/DSO, **Parra** (PI), subcontract with Columbia University \$350K 1/2010-6/2011
Cortically Coupled Computer Vision Phase 3: real-time analysis of visual processing with EEG.

Past:

PSC CUNY, **Parra** (PI) \$4K 7/2007-6/2008
Multiclass bilinear analysis of EEG.

RNID, **Parra** (PI) \$2K 1/2008
Knowledge transfer grant to initiate experimental collaboration on tinnitus with David McAlpine at the Ear Institute, University College London (UCL).

GN ReSound, **Parra** (PI) \$10K 12/2006-11/07
Tinnitus research pilot project.

DARPA/DSO, **Parra** (PI, subcontract HM1582-05-C-0043) \$315K 10/2005-6/2007
Cortically Coupled Computer Vision: real-time analysis of visual processing with EEG.

NCI,U56 **Parra** (PI, pilot within U56CA96299) \$105K 5/2004-12/2006
MRSI analysis for brain tumor detection: pilot study to explore analysis of MRSI for brain tumor detection, in collaboration with neuro-radiology at Memorial Sloan-Kettering Cancer Center (MSKCC).

PSC CUNY, **Parra** (PI) \$4K 7/2005-6/2006
Network model of the effect of extracellular fields on spike time coherence in the hippocampus

DARPA/DSO, **Parra** (PI, subcontract to Honeywell) \$165K 7/2003-12/2004

Real-time electro-encephalography analysis: measuring attention in real-time and single-trial detection of evoked responses.

DARPA/IPTO, **Parra** (PI, subcontract to UNM) \$60K 9/2003-12/2003
Single trial EEG analysis in collaboration with Tang (PI) at the University of New Mexico (UNM).

DARPA/IPTO, **Parra** (PI) \$2,400K 2002-2004
Adaptive Brain-Computer Interfaces for augmented cognition and action: detecting cognitive events in real-time in collaboration with Columbia and Princeton University.

DARPA/ATO, Fancourt (PI), **Parra** (Co-PI) \$750K 2003
Advanced Speech Encoding Program: explore utility of glottal signal to improve low bit-rate speech encoding.

DARPA/IPTO, **Parra** (PI) \$150K 2001
Real-time neuro-feedback for Augmented Cognition – pilot project.

NIMA, Sajda (PI), **Parra** (Co-PI) \$300K 2000
Magneto-encephalography (MEG) for Brain-Computer Interface as part of NIMA project on pyramid processing for medical imaging.

Biofield Corp., Sajda (PI), **Parra** (Co-PI) \$200K 2000-2001
Statistical analysis of breast cancer detection system based on skin surface potential.

Thomson Multimedia, **Parra** (PI) \$1,500K 1999-2000
Acoustic array processing for distant talking speech control.

TEACHING**Current Academic Appointments**

Director of the Masters Program in Biomedical Engineering at CCNY	9/2005-present
Member of Doctoral Faculty in Biology, Neuroscience Subprogram	2/2005-present
Member of Doctoral Faculty in Psychology, Cognitive Neuroscience Subprogram	11/2004-present

Graduate Courses

BME I5100: Biomedical signal processing and modeling, 3credit (developed and taught)
 BME I5000: Medical imaging, 3credit (developed and taught)

Undergraduate Courses

BME 22000: Biostatistics and research methods, 3credit (developed and taught)
 BME 31000: Experimental Methods in BME, 3credit (co-taught)
 BME 50500: Image and signal processing in biomedicine, 3credit (developed and taught)

Teaching Evaluations

Scores between 5 (best) and 1 (worst) reported wherever available:

Term	Course Number	Faculty peer evaluation	Student survey rating the course	Student survey rating the instructor	Student survey response rate
SP09	BME I5100				
FA08	BME 50500		3.3		25%
FA08	BME I5000		4.0		33%
SP08	BME I5100				
FA07	BME 50500		2.9	2.8	34%
SP07	BME I5000	4.8	3.1	3.3	44%
FA06	BME I5100		4.5	4.5	40%
FA06	BME 50500	5.0	4.0	4.1	100%
SP06	BME 22000	5.0	3.5	3.6	30%
FA05	BME 50500	4.5	3.3	3.2	33%
FA05	BME I5000				
SP05	BME I5100				
SP05	BME 2200	5.0	4.2	4.1	60%
SP04	BME I5000				
SP04	BME 3100				
FA03	BME I5100		4.2	4.3	85%

Teaching Awards:

Recognition in advisement from the BMES student committee, Spring 2005

Current Ph.D. Students (with full financial support from grants of LCParra)

Xiang Zhou, Ph.D. candidate, Biomedical Engineering
 Yuzhuo Su, Ph.D. candidate, Biomedical Engineering
 Joao Dias, Ph.D. candidate, Computational Biology, Gulbenkian Fellowship recipient
 Davide Reato, Ph.D. candidate, Physics (Marom Bikson as co-advisor)

Past Ph.D. Students

Christoforou Christoforos, CUNY, Computer Science, Robert Haralick as co-advisor, graduated 12/2008

Current Ph.D. Students (co-mentored and supported by other faculty)

Thomas Radman, Ph.D. candidate, Neuroscience (co-advisor with Marom Bikson, graduated 8/2009)

Kristen Maul, Ph.D. candidate, Speech and Hearing (co-advisor with Ofer Tchernichovski, graduated 6/2009)

Ph.D. Thesis Committees (student, university, department, mentor, graduation year)

Amadu Toure, CCNY, BME, Candido Baco

Sidong Zeng, CCNY, EE, Thao Nguyen

Tony Schultz, CCNY, Physics, M. J. Potasek

James Herman, CCNY, Biology, Josh Wallman

Hans von Gizycki, CCNY, Psychology, Art Spielman

Shuyan Du, Columbia University, BME, Paul Sajda, graduate in 2005

Adam Gerson, Columbia University, BME, Paul Sajda, graduated in 2005

Andre Lehovich, Arizona University, Radiology, Harrison Barrett, graduated in 2004

PUBLICATIONS

(All papers available on-line at <http://bme.engr.cuny.cuny.edu/faculty/lparra>)

Refereed Full Length Journal Articles

1. **Lucas C. Parra**, Jeffrey M. Beck, Anthony J. Bell, "On the maximization of information flow between spiking neurons," *Neural Computations*, in press, 2009.
2. Wei Ji Ma*, Xiang Zhou*, Lars A. Ross, John J. Foxe, **Lucas C. Parra**, "Lip-reading aids word recognition most in moderate noise: a Bayesian explanation using high-dimensional feature space," *PLoS ONE*, 4 (3) e4639, March 4, 2009. (* both authors contributed equally to this work)
3. Yuzhuo Su, Thomas Radman, Jake Vaynshteyn, **Lucas C. Parra**, Marom Bikson, "Effects of high-frequency stimulation on epileptiform activity in vitro: ON/OFF control paradigm," *Epilepsia*, 49(9), 1586 - 1593, April 2008.
4. Yuzhuo Su, Sunitha Thakur, Karimi Sasan, Shuyan Du, Paul Sajda, Wei Huang, **Lucas C. Parra**, "Spectrum Separation Resolves Partial Volume Effect of MRSI as Demonstrated on Brain Tumor Scans", *NMR in Biomedicine*, 21(1), 1030-1042, November 2008.
5. **Lucas C. Parra**, Christoforos Christoforou, Adam D. Gerson, Mads Dyrholm, An Luo, Mark Wagner, Marios G. Philiastides, Paul Sajda, "Spatio-temporal linear decoding of brain state: Application to performance augmentation in high-throughput tasks", *IEEE Signal Processing Magazine*, 25(1), 95-115, January 2008.
6. Thomas Radman, Yuzhuo Su, Je Hi An, **Lucas C. Parra***, Marom Bikson*, "Spike timing amplifies the effect of electric fields on neurons: implications for endogenous field-effects" *Journal of Neuroscience*, (*) Both senior authors contributed equally to this work; 27(11), 3030-3036, March 2007.
7. Mads Dyrholm, Christoforos Christoforou, **Lucas C. Parra**, "Bilinear Discriminant Factor Analysis", *Journal of Machine Learning Research*, 8, 1097-1111, May 2007.
8. **Lucas C. Parra**, Barak A. Pearlmutter, "Illusory percepts from auditory adaptation", *Journal of the Acoustical Society of America*, 212(3), 1632-1641, 2007.
9. Adam D. Gerson, **Lucas C. Parra**, Paul Sajda, "Cortically-coupled Computer Vision for Rapid Image Search", *IEEE Transactions on Neural Systems & Rehabilitation Engineering*, 14 (2), 174-179, June 2006.
10. **Lucas C. Parra**, "Steerable Frequency-Invariant Beamforming for Arbitrary Arrays", *Journal of the Acoustical Society of America*, 119 (6), 3839-3847, June 2006.
11. Clay D. Spence, **Lucas C. Parra**, Paul Sajda, "Varying Complexity in Tree-Structured Image Distribution Models", *IEEE Transactions on Image Processing*, 5 (2), 319-330, February 2006.
12. **Lucas C. Parra**, Clay D. Spence, Adam D. Gerson, Paul Sajda, "Recipes for the Linear Analysis of EEG", *Neuroimage*, 28 (2), 326-341, November 2005.
13. Adam D. Gerson, **Lucas C. Parra**, Paul Sajda, "Cortical Origins of Response Time Variability During Rapid Discrimination of Visual Objects", *Neuroimage*, 28 (2), 342-353, November 2005.
14. Paul Sajda, Shuyan Du, Truman R. Brown, Radka Stoyanova, Dikoma C. Shungu, Xiangling Mao, **Lucas C. Parra**, "Nonnegative Matrix Factorization for Rapid Recovery of Constituent Spectra in Magnetic Resonance Chemical Shift Imaging of the Brain", *IEEE Transaction on Medical Imaging*, 23(12), December 2004.
15. **Lucas Parra**, Clay Spence, Adam Gerson and Paul Sajda, "Response Error Correction - A Demonstration of Improved Human-Machine Performance Using Real-Time EEG Monitoring", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 11(2), 173 -177, June 2003.
16. Paul Sajda, Clay Spence, **Lucas Parra**, "A multi-scale probabilistic network model for detection, synthesis and compression in mammographic image analysis", *Medical Image Analysis*, 7(2), 187-204, June 2003.

17. Paul Sajda, Adam Gerson, Klaus-Robert Muller, Benjamin Blankertz, **Lucas Parra**, "A data analysis competition to evaluate machine learning algorithms for use in brain-computer interfaces", *IEEE Transactions on Neural Systems and Rehabilitation Engineering*, 11(2), pp. 184-185, June 2003.
18. **Lucas Parra**, Paul Sajda, "Blind Source Separation via Generalized Eigenvalue Decomposition", *Journal of Machine Learning Research*, 4, 1261-1269, 2003.
19. **Lucas Parra**, Chris Alvino, Akaysha Tang, Barak Pearlmutter, Nick Yeung, Allen Osman, Paul Sajda, "Single-Trial Detection in EEG and MEG: Keeping it Linear", *Neurocomputing*, vol. 52-54, 177-183, June 2003.
20. **Lucas Parra**, Christopher Alvino, "Geometric Source Separation: Merging convolutive source separation with geometric beamforming", *IEEE Transaction on Speech and Audio Processing*, 10(6), 352-362, Sept. 2002.
21. **Lucas Parra**, Chris Alvino, Akaysha Tang, Barak Pearlmutter, Nick Yeung, Allen Osman, Paul Sajda, "Linear Spatial Integration for Single-Trial Detection in Encephalography", *Neuroimage*, 17(1), 223-230, 2002
22. **Lucas Parra**, "Reconstruction of cone-beam projections from Compton scattered data", *IEEE Transactions on Nuclear Science*, 47(4), part II, 1543 -1550, August 2000.
23. **Lucas Parra**, Clay Spence, "On-line convolutive source separation of non-stationary signals", *Journal of VLSI Signal Processing*, 26(1/2), 39-46, August 2000.
24. **Lucas Parra**, Clay Spence, "Convolutive blind source separation of non-stationary sources", *IEEE Transactions on Speech and Audio Processing*, 8(3), 320-327, May 2000.
25. **Lucas Parra**, Harrison Barrett, "List-Mode Likelihood: EM Algorithm and Image Quality Estimation Demonstrated on 2-D PET", *IEEE Transactions in Medical Imaging*, 17(2), 228-235, April 1998.
26. Harrison Barrett, Timothy White, **Lucas Parra**, "List-Mode Likelihood", *Journal of the Optical Society of America*, 14 (11) 2914-2923, 1997.
27. Gustavo Deco, **Lucas Parra**, "Nonlinear Features Extraction by Unsupervised Redundancy Reduction with Stochastic Neural Networks", *Neural Networks*, 10, 683-691, 1997.
28. **Lucas Parra**, Gustavo Deco, Sebastian Miesbach, "Statistical independence and Novelty Detection with Information Preserving Nonlinear Maps", *Neural Computation*, 8, 260-269, 1996.
29. **Lucas Parra**, Gustavo Deco, "Continuous Boltzmann Machine with Rotor Neurons", *Neural Networks*, 8(3), 375-385, 1995.
30. **Lucas Parra**, Gustavo Deco, Sebastian Miesbach, "Redundancy Reduction with Information Preserving Nonlinear Maps", *Network*, 1(1), 61-72, 1995.
31. Gustavo Deco, **Lucas Parra**, "Unsupervised Learning for Boltzmann Machines", *Network*, 6, 437-448, 1995.

Current Journal Manuscripts Under Review

1. **Lucas C. Parra**, Jeffrey M. Beck, Anthony J. Bell, "On the maximization of information flow between spiking neurons", revision submitted to *Neural Computation*.
2. Christoforos Christofou, Robert Haralik, Paul Sajda, **Lucas C. Parra**, "Second Order Bilinear Discriminant Analysis", revised manuscript under review at *Journal of Machine Learning*.
3. Kristen K. Maul*, Henning U. Voss*, **Lucas C. Parra**, Delanthi Salgado-Commissariat, Douglas Ballon, Ofer Tchernichovski & Santosh A. Helekar, "Males, but not females, require early song exposure to shape auditory responses", under review at *Nature Neuroscience* (* The first two authors contributed equally to this study)

Book Chapters

1. Michael S. Pedersen, Jan Larsen, Ulrik Kjems, **Lucas C. Parra**, "A survey of Convolutional Blind Source Separation Methods", *Multichannel Speech Processing Handbook*, Eds. Jacob Benesty and Arden Huang, chapter 52, Springer 2008.
2. Paul Sajda, Adam D. Gerson, Marios G. Philiastides and **Lucas C. Parra**, "Single-trial analysis of EEG during rapid visual discrimination: Enabling cortically-coupled computer vision", book chapter in *Brain-Computer Interface*, Eds. Guido Dornhege, Jose Del R Millan, Thilo Hinterberger, Dennis J. McFarlan, Klaus-Robert Mueller, MIT press, ch. 25, pp. 423-440, September 2007.
3. Adam Gerson, **Lucas Parra**, Paul Sajda, "Single-trial analysis of EEG for Enabling Cognitive User Interfaces", *IEEE Neural-Engineering Handbook*, Ed. Metin Akay, Wiley-IEEE, March 2007.
4. **Lucas Parra**, Craig Fancourt, "An Adaptive Beamforming Perspective on Convolutional Blind Source Separation", book chapter in *Noise Reduction in Speech Applications*, Eds. Gillian Davis, CRC Press LLC, 2002.
5. **Lucas Parra**, Clay Spence, "Separation of non-stationary natural signals", book chapter in *Independent Components Analysis, Principles and Practice*, Eds. Stephen Roberts, Richard Everson, Cambridge University Press, pp. 135-157, 2001.
6. **Lucas Parra**, "Temporal Models in Blind Source Separation", chapter in "Adaptive Processing of Sequences and Data Structures" - International Summer School on Neural Networks, "E.R. Caianiello", Vietri sul Mare, Salerno, Italy, September 6-13, 1997, Tutorial Lectures. Edited by Lee Giles and Marco Gori. Part of the series *Lecture Notes in Computer Science*, Springer, pp. 229-247, 1998.

Peer-Reviewed Conference Proceedings

* 8 papers published at the NIPS Conference which has an acceptance rate of 25% or less.

1. Jonathan Le Roux, Alain de Cheveigne, **Lucas C. Parra**, "Adaptive Template Matching with Shift-Invariant Semi-NMF", *Advances in Neural Information Processing Systems 21*, MIT Press, 2009.
2. Christoforos Christoforou, Paul Sajda, **Lucas C. Parra**, "Second Order Bilinear Discriminant Analysis for single trial EEG analysis", *Advances in Neural Information Processing Systems 20*, MIT Press, 2008.*
3. Mads Dyrholm, **Lucas C. Parra**, "Smooth bilinear classification of EEG", The 28th Annual International Conference of the *IEEE Engineering in Medicine and Biology Society*, New York, August 2006.
4. Thomas Radman, **Lucas C. Parra**, Marom Bikson, "Amplification of small electric fields by neurons; implications for spike timing", The 28th Annual International Conference of the *IEEE Engineering in Medicine and Biology Society*, New York, August 2006.
5. **Lucas C. Parra**, "Least squares frequency invariant beamforming", *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, October 2005.
6. Anthony J. Bell, **Lucas C. Parra**: "Maximizing Sensitivity in a Spiking Network", *Advances in Neural Information Processing Systems 17*, Lawrence K. Saul and Yair Weiss and Leon Bottou, MIT Press, Cambridge, MA. 2005.*
7. **Lucas Parra**, Marom Bikson, "Model of the effect of extracellular fields on spike time coherence", 26th Annual International Conference of the *IEEE Engineering in Medicine and Biology Society* 1-4, September 2004, invited talk.

8. Paul Sajda, Shuyan Du, Truman Brown, **Lucas Parra**, Radka Stoyanova, "Recovery of Constituent Spectra in 3D Chemical Shift Imaging using Non-negative Matrix Factorization", *International Conference on Independent Component Analysis*, pp. 71-76, April 2003.
9. **Lucas Parra**, Paul Sajda, "Converging Evidence of Linear Independent Components in EEG", *First International IEEE EMBS Conference on Neural Engineering*, pp. 525-528, March 2003.
10. Paul Sajda, Adam Gerson, **Lucas Parra**, "High-throughput Image Search via Single-trial Event Detection in a Rapid Serial Visual Presentation Task", *First International IEEE EMBS Conference on Neural Engineering*, pp. 7-10, March 2003.
11. Paul Sajda, Clay Spence, **Lucas Parra** "Capturing Contextual Dependencies In Medical Imagery Using Hierarchical Multi-Scale Models", *IEEE International Symposium on Biomedical Imaging*, pp. 165-168, July 2002.
12. Craig Fancourt, **Lucas Parra**, "A comparison of decorrelation criteria for the blind source separation of non-stationary signals", *IEEE Sensor Array and Multichannel Signal Processing Workshop*, pp. 165-168, August 2002.
13. **Lucas Parra**, Christopher Alvino, "Geometric Source Separation: Merging convolutive source separation with geometric beamforming", *IEEE International Workshop on Neural Networks and Signal Processing*, pp. 273-282, 2001.
14. Craig Fancourt, **Lucas Parra**, "The coherence function in blind source separation of convolutive mixtures of non-stationary signals", *IEEE International Workshop on Neural Networks and Signal Processing*, 2001.
15. Craig Fancourt, **Lucas Parra**, "The Generalized Sidelobe Decorrelator", *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, pp. 167-170, October 2001.
16. **Lucas Parra**, Uday Jain, "Approximate Kalman filtering for the harmonic plus noise model", *IEEE Workshop on Applications of Signal Processing to Audio and Acoustics*, pp. 75-78, 2001.
17. Clay Spence, **Lucas Parra**, Paul Sajda, "Detection, Synthesis and Compression in Mammographic Image Analysis with a Hierarchical Image Probability Model", *IEEE Workshop on Mathematical Methods in Biomedical Image Analysis*, pp. 3-10, December, 2001.
18. **Lucas Parra**, Clay Spence and Paul Sajda, "Higher-order Statistical Properties Arising from the Non-stationarity of Natural Signals," *Advances in Neural Information Processing Systems 13*, pp. 782-792, 2001.*
19. Clay Spence, **Lucas Parra**, "Hierarchical Image Probability (HIP) Models", *Advances in Neural Information Processing Systems 12*, MIT Press, pp. 848-854, 2000.*
20. **Lucas Parra**, Klaus-Robert Mueller, Clay Spence, Andreas Ziehe, Paul Sajda, "Unmixing Hyperspectral Data", *Advances in Neural Information Processing Systems 12*, MIT Press, pp. 942-948, 2000.*
21. Spence, C.D., L. Parra and P. Sajda, "Mammographic mass detection with a hierarchical image probability (HIP) model," Ed. Kenneth M. Hanson, *Proceedings of SPIE "Medical Imaging"*, vol. 3979, pp. 990-997, 2000.
22. Clay D. Spence, **Lucas Parra**, Paul Sajda, "Hierarchical image probability (HIP) models", *Proceedings of International Conference on Image Processing*, September 2000.
23. **Lucas Parra**, "Reconstruction of cone-beam projections from Compton scattered data", *Nuclear Science Symposium*, vol. 2, pp. 1082-1086, 1999.
24. **Lucas Parra**, Clay Spence, "Convolutive Blind Source Separation based on Multiple Decorrelation", presented at "Machines that Learn", *Snowbird Workshop on Neural Networks for Computing, and IEEE Neural Networks and Signal Processing Workshop*, Cambridge, UK, September 1998.
25. Barak Pearlmutter, **Lucas Parra**, "Maximum Likelihood Blind Source Separation: A context-sensitive generalization of ICA", *Advances in Neural Information Processing Systems 9*, MIT Press, pp. 613-619, 1997.*

26. **Lucas Parra**, "Symplectic Nonlinear Independent Component Analysis", *Advances in Neural Information Processing Systems* 8, D. S. Touretzky, M. C. Mozer, M. E. Hasselmo, eds., MIT Press, pp. 437-443, 1996.*
27. Barak Pearlmutter, **Lucas Parra**, "A context-sensitive generalization of Independent Component Analysis", *International Conference on Neural Information Processing*, Hong Kong, September 1996.
28. Gustavo Deco and **Lucas Parra**, "Redundancy Reduction by Unsupervised Boltzmann Machines", *World Conference on Neural Networks*, San Diego, vol. IV, pp. 229-233, 1994.
29. G. Hausler, T. Neumahr, L. Parra, H. Schvnfeld, B. Spellenberg: "Chaos, order and associative memory in video-feedback", *Proc. SPIE Conference 2039 "Chaos in Optics"*, San Diego 1993.
30. **Lucas Parra**, Gustavo Deco, "A Stochastic Network with Rotor Neurons", *Proceedings of the International Joint Conference on Neural Networks*, vol. II, pp. 1397-1400. 1993.
31. Deco G., Parra L.: "Self-Organization in stochastic Neural Networks", *Proceedings of the International Joint Conference on Neural Networks*, vol. I, pp. 479-482, 1993.

Abstracts and Others

1. Xiang Zhou, Simon Henin, Glenis Long, **Lucas C. Parra**, "Spectral profile of tinnitus can be predicted from high-resolution audiogram and DPOAE for a subset of subjects", 3rd Tinnitus Research Initiative Meeting, Stresa, Italy, June 2009. (talk)
2. Xiang Zhou, Suzanne Thompson, Glenis Long, **Lucas C. Parra**, "Perception thresholds of pure tone in notched noise correlate with generator component of distortion product oto-acoustic emissions", 3rd Tinnitus Research Initiative Meeting, Stresa, Italy, June 2009. (poster)
3. Michael Chrostowski, Suzanna Becker, **Lucas C. Parra**, "Oscillatory activity and tinnitus: a computational model", 3rd Tinnitus Research Initiative Meeting, Stresa, Italy, June 2009. (poster)
4. Davide Reato, Marom Bikson, **Lucas C. Parra**, "Modulation of carbachol-evoked gamma activity in vitro with low-amplitude AC electric fields", Society for Neuroscience Meeting, Washington, DC, Program number 41.19/06, November 2008. (poster)
5. Wei Ji Ma, Xiang Zhou, **Lucas C. Parra**, "Auditory-Visual Speech Recognition is Consistent with Bayes-Optimal Cue Combination", Computational and Systems Neuroscience 2008, Salt Lake City, February 2008. (poster)
6. Yuzhuo Su, Thomas Radman, Marom Bikson, **Lucas C. Parra**, "Small fields change spike timing: A functional role of local-field potentials?" Computational and Systems Neuroscience 2007 Salt Lake City, February 2007. (talk)
7. **Lucas C. Parra**, Barak A. Pearlmutter, "illusory Percepts from Auditory Adaptation: a link between Tinnitus and Zwicker tone", Neural Information Processing Systems 2006 - Workshops, Models for Acoustic Processing, Whistler, December 2006 (talk).
8. S. A. Helekar, D. Salgado-Commissariat, P. Diep, R. Langot, K. K. Maul, O. Tchernichovski, L. Parra, "Preservation of the shape of auditory evoked responses to birdsong stimuli despite degradation of their spectrotemporal structure in zebra finches", Society for Neuroscience 2006 (poster).
9. Thomas Radman, **Lucas C. Parra**, Marom Bikson, "Amplification of small electric fields by neurons: implications for endogenous field-effects", Society for Neuroscience Meeting, Atlanta, GA, Program number 539.6, 2006 (poster).
10. Xiang Zhou, Lars Ross, Tue Lehn-Schioler, John J. Foxe, **Lucas C. Parra**, "Temporal visual cues aid speech recognition", 7th Annual Meeting of the International Multisensory Research Forum, Dublin, Ireland, June 18 - 21, 2006 (poster).
11. S. Thakur, Y. Su, S. Karimi, S. Du, P. Sajda, W. Huang, L. Parra, "Spectral Separation Analyses of Proton MRSI Data: Validation with Tumor Grade of Brain Glioma", International Society for

- Magnetic Resonance in Medicine 14th Scientific Meeting & Exhibition, Seattle, Washington, USA, May 6-12, 2006. (talk).
12. **Lucas C. Parra**, Barak A. Pearlmutter, "Illusory Percepts from Auditory Adaptation". Computational and Systems Neuroscience 2006, March 5-8, 2006, Salt Lake City, Utah, (poster).
 13. **Lucas C. Parra**, "Acoustic Source Separation with Microphone Arrays", Audio Engineering Society annual Meeting, New York, October 2005 (talk).
 14. **Lucas C. Parra**, Anthony J. Bell, "Spike Timing-Dependent Learning in Networks", Computational and Systems Neuroscience, Salt Lake City, March 2005 (talk).
 15. Yuzhuo Su, Sunitha Thakur, Wei Huang, Shuyan Du, Paul Sajda, **Lucas C. Parra**, "Spectral separation resolves partial volume effect in MRSI", Annual Fall Meeting of the BME Society, September 2005, (poster).
 16. **Lucas C. Parra**, "Real-time EEG: Applications and Methods", Human Computer Interaction International Conference 2005, Las Vegas, July 22, Augmented Cognition Tutorial. (invited talk).
 17. **Lucas Parra**, Adam Gerson, Paul Sajda, "Origins of Response Time Variability in a Rapid Serial Visual Presentation Task", Cold Spring Harbor meeting Computational and Systems Neuroscience, March 2004 (poster).
 18. **Lucas Parra**, Marom Bikson, "Model of the effect of extracellular fields on spike time coherence", The Society for Neuroscience's 34th Annual Meeting, October 2004 (poster).
 19. **Lucas Parra**, Chris Alvino, Akaysha Tang, Bark Pearlmutter, Nick Yeung, Allen Osman and Paul Sajda, "Linear spatial weighting for single trial detection in encephalography", Computational Neuroscience Meeting, Chicago, July 2002 (talk).
 20. **Lucas Parra**, Akaysha Tang, Zuohua Zhang, Barak Pearlmutter, Paul Sajda, "Predicting motor commands using magneto-encephalography (MEG)" Cognitive Neuroscience Annual Meeting, New York, March 2001 (poster).
 21. **Lucas Parra**, Clay Spence, Bert De Vries, "Convolutional Source Separation and Signal Modeling with ML", International Symposium on Intelligent Systems, Reggio Calabria, Italy, July 1997 (talk).
 22. **Lucas Parra**, Harrison Barrett, "Maximum Likelihood Image Reconstruction from List-Mode Data", Society of Nuclear Medicine 43rd Annual Meeting, Denver, June 1996 (abstract).
 23. Harrison Barrett, Timothy White, **Lucas Parra**, "List-Mode Likelihood", Society of Nuclear Medicine 43rd Annual Meeting, Denver, June 1996 (abstract).
 24. **Lucas Parra**: "Unsupervised Training in Connectionist Models with Information Theoretic Principles", Dissertation (German), Ludwig-Maximilians University, Munich, 1996 (Ph.D. thesis).
 25. Barak Pearlmutter, **Lucas Parra**, "Maximal information transfer in spiking neurons", Society for Neuroscience Annual Meeting, 21(480.7) 1995 (abstract).
 26. **Lucas C. Parra** and Barak A. Pearlmutter, "Maximal information transfer in a spiking neuron. Snowbird Workshop on Neural Networks for Computing, April 1995 (poster).
 27. **L. Parra**: "Optical neural nets with sparse connectivity", Diploma thesis, Medical Optics Lab in the Department of Physic, Ludwig Maximilian University Munich, 1992 (MS thesis).

Invited Talks

1. "Lip reading: A Bayesian Theory of Audio-Visual Integration", Psychology Department, Queens College CUNY, February 2009
2. "Brain-Computer Interface: Reading the brain in real-time", Department of Electrical and Computer Engineering, Polytechnic Institute of NYU, December 2009
3. "Reading the brain", Psychology Department, Hunter College CUNY, October 2008
4. "Tinnitus as a result of gain adaptation", Ear Institute, University College London, November, 2007.

5. "Single trial analysis of EEG", Workshop on the Development and Analysis of Neural Systems Supporting Language, Graduate Center CUNY, October 2007.
6. "Small fields change spike timing: A functional role for endogenous electrical activity?", Rutgers University, September 2007.
7. "On Reading and writing the Brain", Redwood Institute for Theoretical Neuroscience, UC Berkeley September 2007.
8. "Using electric field potentials to read the timing of neuronal activity", Wadsworth Center, Albany, August 2007.
9. "Tinnitus as a result of gain adaptation", Workshop of the Tinnitus Research Initiative, Monaco, July 2007.
10. "Using electric field potentials to read and modulate the timing of neuronal activity", Bernstein Center, Berlin, May 2007.
11. "The timing of visual object recognition as measured with EEG", Danish TU, May 2007.
12. "Cortically coupled computer vision: Enhancing human performance with a EEG brain-computer interface", SUNY Albany, January 2007.
13. "Tinnitus as a Result of Auditory Gain Adaptation", NIPS Workshop, Advances In Acoustic Models, December 2006.
14. "Tinnitus as a Result of Auditory Gain Adaptation", Rockefeller University, Spring 2006.
15. "Acoustic Source Separation with Microphone Arrays", Audio Engineering Society annual Meeting, New York, October 2005.
16. "Real-time EEG: Applications and Methods", Human Computer Interaction International Conference, Las Vegas, Augmented Cognition Tutorial. July 2005.
17. "Single Trial EEG", CCNY/Graduate Center, Workshop on Hearing Neurophysiology, Fall 2004.
18. "Recipes for linear analysis of EEG", Cognitive Neuro-psychology Laboratory, NKI, Spring 2005,
19. "Microphone array perspective on acoustic blind source separation", Workshop on Speech Separation and Comprehension, Montreal, November 2004.
20. "Model of the effect of extracellular fields on spike time coherence", 26th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, September 2004.
21. "Origins of response time variability in a rapid serial visual presentation task", MSSM, Imaging/radiology Department Seminar, Spring 2004.
22. "Effects if Extracellular Potentials on Spike Time Coherence", Redwood Neuroscience Institute Seminar, Palo Alto, CA, Spring 2004.
23. "Brain Computer Interfaces", CCNY Biology Department Seminar, October 2003.
24. "Geometric Source Separation: Merging convolutive source separation with geometric beamforming", Boston University, hearing Research Seminar, December, 2002.
25. "Noninvasive Brain Computer Interfaces for Rehabilitation and Augmentation", IEEE International Conference on Multimodal Interfaces, keynote speech, Pittsburgh, October 2002.
26. "Realistic applications of acoustic blind source separation", Annual meeting of the Acoustic Society of America, Newport Beach, December 2000.
27. "An Introduction to Independent Component Analysis and Blind Source Separation", Lectures in a course on Neural Network in the EE department in Princeton Univ., November 1998.

In the News

The study on audiovisual speech recognition (Ma et al. 2009) was featured in at least 16 publications around the world, most notably, it was featured in:

- [American Morning, CNN](#) (March 4, 2009)

Our work on brain-reading technology has generated some interest in the popular media:

- [Documentary: The Brain](#), History Channel (November 10, 2008)
- ["Tapping the Computing Power of the Unconscious Brain"](#) IEEE Spectrum Video (August 2008)
- ["A Brainy Approach to Image Sorting"](#), IEEE Spectrum (April 2008).
- ["When the brain is a component of the computer"](#), Politiken (Danish newspaper, July 2007).
- ["Brain-Computer Interfaces: Where Human and Machine Meet"](#), IEEE Computer Magazine (January 2007)
- ["Subliminal Search"](#), MIT Technology Review (July 2006)
- ["Man and machine vision in perfect harmony"](#), New Scientist, (July 2006)
- ["This Is a Computer on Your Brain"](#), Wired News (July 2006)

Patents

1. US patent pending (filed 9/26/2007): System for in vivo imaging of the arterial wall to predict the risk of cap rupture.
2. US patent pending 35205-PCT-USA-A (070050.2653): Single trial analysis of EEG.
3. US 6691087: Method and apparatus for adaptive speech detection by applying a probabilistic description to the classification and tracking of signal components
4. US 6208983: Method and apparatus for training and operating a neural network for detecting breast cancer
5. EP 1371058: Geometric source separation signal processing technique.
6. US 6167417: Convolutional blind source separation using a multiple decorrelation method.
7. US 6704454: Method and apparatus for image processing by generating probability distribution of images.
8. US 6898612: Method and System for On-Line Blind Source Separation.
9. US 6691087: Method and apparatus for adaptive speech detection by applying a probabilistic description to the classification and tracking of signal components.

CITATION RECORD**Google Scholar Citations**

Journal and conference papers with 18 or more citation according to Google Scholar as of March 17 2008.

h-index: 18

1. Convolutional blind separation of non-stationary sources

L **Parra**, C Spence - Speech and Audio Processing, IEEE Transactions on, 2000

Cited by 327

2. A context-sensitive generalization of ICA

BA Pearlmutter, LC **Parra** - International Conference on Neural Information Processing, 1996

Cited by 264

3. Geometric source separation: merging convolutional source separation with geometric beamforming LC

Parra, CV Alvino - Speech and Audio Processing, IEEE Transactions on, 2002

Cited by 87

4. List-mode likelihood: EM algorithm and image quality estimation demonstrated on 2-D PET

L **Parra**, HH Barrett - Medical Imaging, IEEE Transactions on, 1998

Cited by 78

5. Convolutional blind source separation based on multiple decorrelation

L **Parra**, C Spence, B De Vries - Neural Networks for Signal Processing VIII, 1998. ...

Cited by 67

6. List-mode likelihood

HH Barrett, T White, LC **Parra** - J. Opt. Soc. Am. A, 1997 - OSA

Cited by 64

7. Statistical independence and novelty detection with information preserving nonlinear maps

L **Parra**, G Deco, S Miesbach - Neural Computation, 1996

Cited by 56

8. Unmixing hyperspectral data

L **Parra**, C Spence, P Sajda, A Ziehe, KR Muller - Advances in Neural Information Processing Systems, 2000

Cited by 57

9. Linear spatial integration for single trial detection in encephalography

L **Parra**, C Alvino, A Tang, B Pearlmutter, N Yeung, ... - NeuroImage, 2002

Cited by 48

10. Blind Source Separation via Generalized Eigenvalue Decomposition

L **Parra**, P Sajda - Journal of Machine Learning Research, 2003 - MIT Press

Cited by 38

11. A data analysis competition to evaluate machine learning algorithms for use in brain-computer ...
P Sajda, A Gerson, KR Muller, B Blankertz, L **Parra** - Neural Systems and Rehabilitation Engineering, IEEE ..., 2003
Cited by 31
12. Response error correction-a demonstration of improved human-machine performance using real-time EEG
LC **Parra**, CD Spence, AD Gerson, P Sajda - Neural Systems and Rehabilitation Engineering, IEEE ..., 2003 - Cited by 30
13. Recovery of constituent spectra in 3D chemical shift imaging using non-negative matrix factorization
P Sajda, S Du, T Brown, L **Parra**, R Stoyanova - 4th International Symposium on Independent Component ..., 2003
Cited by 30
14. Reconstruction of cone-beam projections from Compton scattered data
LC **Parra** - Nuclear Science, IEEE Transactions on, 2000
Cited by 28
15. Recipes for the linear analysis of EEG
LC **Parra** CD Spence, AD Gerson, P Sajda - Neuroimage, 2005
Cited by 23
16. Nonnegative Matrix Factorization for Rapid Recovery of Constituent Spectra in Magnetic Resonance
TR Brown, R Stoyanova, DC Shungu, X Mao, LC **Parra** - IEEE TRANSACTIONS ON MEDICAL IMAGING, 2004
Cited by 22
17. The coherence function in blind source separation of convolutive mixtures of non-stationary signals
CL Fancourt, L **Parra** - Neural Networks for Signal Processing XI, 2001. Proceedings ..., 2001
Cited by 20
18. Symplectic nonlinear component analysis
LC **Parra** - Advances in Neural Information Processing Systems, 1996
Cited by 18
19. Higher-order statistical properties arising from the non-stationarity of natural signals
L **Parra**, C Spence, P Sajda - Advances in Neural Information Processing Systems, 2001
Cited by 18