

# Curriculum Vitae

Seungjin Choi

## 1 Personal Data

- Date of Birth: October 26, 1964
- Birthplace: Seoul, Korea
- Citizenship: Korea

## 2 Address

Department of Computer Science  
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## 3 Research Interests

- Machine Learning Methods and Algorithms
  - Nonnegative matrix/tensor factorization
  - Probabilistic graphical models
  - Manifold learning and embedding
  - Kernel machines and Gaussian processes
  - Spectral clustering and graph partitioning
  - Bayesian learning and approximate inference
  - Independent component analysis
- Machine Learning Applications
  - Learning to rank and personalized search
  - Collaborative filtering and recommendation
  - Social network analysis
  - Intelligent user interface
  - Information retrieval
  - Brain computer interface
  - Computational biology and bioinformatics
  - Computer vision and pattern recognition
  - Audio, speech, and image processing

## 4 Education

- **Doctor of Philosophy in Electrical Engineering**, August 1996  
University of Notre Dame  
Notre Dame, Indiana, USA  
**Dissertation Title:** Adaptive Blind Sources Separation Based on Unsupervised Learning  
**Advisor:** Prof. Ruey-Wen Liu
- **Master of Science in Electrical Engineering**, February 1989  
Seoul National University  
Seoul, Korea  
**Thesis Title:** Fast Sequential Algorithms for Least Squares FIR Filters with Linear Phase  
**Advisor:** Prof. Heung-Suk Yang
- **Bachelor of Science in Electrical Engineering**, February 1987  
Seoul National University  
Seoul, Korea

## 5 Professional Experience

- March 2009 - present: Professor of Computer Science at **POSTECH**, Korea.
- March 2005 - February 2009: Associate Professor of Computer Science at **POSTECH**, Korea.
- February 2001 - February 2005: Assistant Professor of Computer Science at **POSTECH**, Korea.
- August 1997 - February 2001: Assistant Professor of Electrical Engineering at **Chungbuk National University**, Korea.
- January 2007 - February 2007: Invited Senior Research Fellow at **Lab for Advanced Brain Signal Processing, Brain Science Institute, RIKEN**, Japan.
- January 2006 - February 2006: Invited Senior Research Fellow at **Lab for Advanced Brain Signal Processing, Brain Science Institute, RIKEN**, Japan.
- January 2005 - February 2005: Invited Senior Research Fellow at **Lab for Advanced Brain Signal Processing, Brain Science Institute, RIKEN**, Japan.
- January 2003 - February 2003: Invited Senior Research Fellow at **Lab for Advanced Brain Signal Processing, Brain Science Institute, RIKEN**, Japan.
- January 2002 - February 2002: Invited Senior Research Fellow at **Lab for Advanced Brain Signal Processing, Brain Science Institute, RIKEN**, Japan.
- July 2001 - August 2001: Invited Senior Research Fellow at **Lab for Advanced Brain Signal Processing, Brain Science Institute, RIKEN**, Japan.
- December 2000 - February 2001: Invited Senior Research Fellow at **Lab for Advanced Brain Signal Processing, Brain Science Institute, RIKEN**, Japan.
- January 2000 - February 2000: Invited Senior Research Fellow at **Lab for Advanced Brain Signal Processing, Brain Science Institute, RIKEN**, Japan.
- July 1999 - August 1999: Invited Senior Research Fellow at **Lab for Open Information Systems, Brain Science Institute, RIKEN**, Japan.

- January 1999 - February 1999: Invited Senior Research Fellow at **Lab for Open Information Systems, Brain Science Institute, RIKEN**, Japan.
- July 1998 - August 1998: Invited Senior Research Fellow at **Lab for Open Information Systems, Brain Science Institute, RIKEN**, Japan.
- December 1997 - February 1998: Invited Senior Research Fellow at **Lab for Open Information Systems, Brain Science Institute, RIKEN**, Japan.
- February 1997 - August 1997: Frontier Researcher at **Lab for Artificial Brain Systems, The Institute of Physics and Chemical Research (RIKEN)**, Japan.
- August 1996 - January 1997: Visiting Assistant Professor in the **Department of Electrical Engineering at the University of Notre Dame**, USA.
- June 1996 - August 1996: Instructor in the **Department of Electrical Engineering at the University of Notre Dame**, USA.

## 6 Professional Activities

### 6.1 Editorial Board Activity

- January 2006 - present: Associate Editor, *Neurocomputing*.
- January 2007 - present: Associate Editor, *Computational Intelligence and Neuroscience*.
- November 2008 - present: Associate Editor, *Journal of Signal Processing Systems*.
- 2005- present: Editorial Board Member, *Neural Information Processing - Letters and Reviews*.
- January 2008 - present: Editorial Board Member, *European Journal of Pure and Applied Mathematics*.

### 6.2 Technical Committee Activity

- 2004 - present: Advisory Member, *IEEE Machine Learning for Signal Processing Technical Committee*.
- 2006 - present: Technical Committee Member, *IEEE Data Mining Technical Committee*.
- 2002 - present: Technical Committee Member, *IEEE Blind Signal Processing Technical Committee*.
- 2001 - 2003: Technical Committee Member, *IEEE Neural Networks for Signal Processing Technical Committee*.

### 6.3 Program Committee Activity

- **2009**
  - Program Committee Member, Asia Information Retrieval Symposium (AIRS-2009)
  - Program Committee Member, International Conference on Neural Computation (ICNC-2009)

- Program Committee Member, International Conference on Intelligent Data Engineering and Automated Learning (IDEAL-2009)
- Program Committee Member, European Conference on Signal Processing (EUSIPCO-2009)
- Program committee member, International Joint Conference on Neural Networks (IJCNN-2009)
- Program Committee Member, International Conference on Blind Signal Separation and Independent Component Analysis (ICA-2009)
- Review Committee Member, IEEE International Symposium on Circuits and Systems (ISCAS-2009)
- Program Committee Member, IASTED International Conference on Artificial Intelligence and Applications (AIA-2009)

- **2008**

- Program Committee Member, The First IEEE International Workshop on Data Mining and Artificial Intelligence (DMAI-2008)
- Technical Committee Member, International Conference on Neural Information Processing (ICONIP-2008)
- Program Committee Member, International Conference on Intelligent Data Engineering and Automated Learning (IDEAL-2008)
- Program Committee Member, IEEE International Workshop on Machine Learning for Signal Processing (MLSP-2008)
- Technical Program Committee Member, European Conference on Signal Processing (EUSIPCO 2008)
- Program Committee Member, International Conference on Multivariate Statistical Modeling and High Dimensional Data Mining (HDM-2008)
- Review Committee Member, IEEE International Symposium on Circuits and Systems (ISCAS-2008)
- Program committee member, International Joint Conference on Neural Networks (IJCNN-2008)
- Technical Program Committee Member (Neural Networks and Computational Intelligence), International Conference on Communications, Circuits, and Systems (ICCCAS-2008)
- Program Committee Member, IASTED International Conference on Artificial Intelligence and Applications (AIA-2008)

- **2007**

- Program Committee Member, International Conference on Blind Signal Separation and Independent Component Analysis (ICA-2007)
- Program Committee Member, IEEE International Workshop on Machine Learning for Signal Processing (MLSP-2007)
- Program co-chairs, IEEE International Conference on Information Acquisitions (ICIA-2007)
- Program Committee Member, International Conference on Machine Learning (ICML-2007)
- Review Committee Member, IEEE International Symposium on Circuits and Systems (ISCAS-2007)

- Program Committee Member, IEEE Symposium on Computational Intelligence and Data Mining (CIDM-2007)
  - Program Committee Member, International Symposium on Neural Networks (ISNN-2007)
  - Program Committee Member, International Conference on Sciences of Electronic, Technologies of Information and Telecommunications (SETIT-2007)
  - Program Committee Member, IASTED International Conference on Artificial Intelligence and Applications (AIA-2007)
- **2006**
    - Program Committee Member, International Conference on Neural Information Processing (ICONIP-2006)
    - Program Committee Member, IEEE International Workshop on Machine Learning for Signal Processing (MLSP-2006)
    - Program Committee Member, IEEE International Symposium on Intelligent Control (ISIC-2006)
    - Program Committee Member, International Conference on Communications, Circuits and Systems (ICCCAS-2006)
    - Program Committee Member, International Conference on Blind Signal Separation and Independent Component Analysis (ICA-2006)
- **2005**
    - Program Committee Member, IEEE International Workshop on Machine Learning for Signal Processing (MLSP-2005)
- **2004**
    - Program Committee Member, IEEE International Workshop on Machine Learning for Signal Processing (MLSP-2004)
    - Program Committee Member, International Joint Conference on Neural Networks (IJCNN-2004)
- **2003**
    - Program Committee Member, International Conference on Blind Signal Separation and Independent Component Analysis (ICA-2003)
    - Program Committee Member, IEEE International Workshop on Machine Learning for Signal Processing (MLSP-2003)
    - Program Committee Member, IEEE International Symposium on Signal Processing and Its Applications (ISSPA-2003)
- **Before 2002**
    - Program Committee Member, International Conference on Blind Signal Separation and Independent Component Analysis (ICA-2001)
    - Program Committee Member, International Conference on Neural Information Processing (ICONIP-2000)

## 7 List of Publications

### 7.1 International Journal Articles

1. Hyekyoung Lee, Jiho Yoo, and Seungjin Choi (2010), "Semi-supervised nonnegative matrix factorization," *IEEE Signal Processing Letters*, vol. 17, no. 1, pp. 4-7, January 2010.
2. Young Min Oh, Jong Kyoung Kim, Yongwook Choi, Seungjin Choi, and Joo-Yeon Yoo (2009), "Prediction and experimental validation of novel STAT3 target genes in human cancer cells," *PLoS ONE*, vol. 4, no. 9, September 2009.
3. Seunghak Lee and Seungjin Choi (2009), "Landmark MDS ensemble," *Pattern Recognition*, vol. 42, no. 9, pp. 2045-2053, September 2009.
4. Jong Kyoung Kim and Seungjin Choi (2009), "Clustering with r-regular graphs," *Pattern Recognition*, vol. 42, no. 9, pp. 2020-2028, September 2009.
5. Sangki Kim, Gunhyuk Park, Sunghoon Yim, Seungmoon Choi, and Seungjin Choi (2009), "Gesture-recognizing hand-held interface with vibrotactile feedback for 3D interaction," *IEEE Transactions on Consumer Electronics*, vol. 55, no. 3, pp. 1169-1177, August 2009.
6. Hyohyeong Kang, Yunjun Nam, and Seungjin Choi (2009), "Composite common spatial pattern for subject-to-subject transfer," *IEEE Signal Processing Letters*, vol. 16, no. 8, pp. 683-686, August 2009.
7. Hyekyoung Lee, Andrzej Cichocki, and Seungjin Choi (2009), "Kernel nonnegative matrix factorization for spectral EEG feature extraction," *Neurocomputing*, vol. 72, pp. 3182-3190, August 2009.
8. Sunho Park and Seungjin Choi (2008), "A constrained sequential EM algorithm for speech enhancement," *Neural Networks*, vol. 21, no. 9, pp. 1401-1409, November 2008.
9. Andrzej Cichocki, Hyekyoung Lee, Yong-Deok Kim, and Seungjin Choi (2008), "Nonnegative matrix factorization with alpha-divergence," *Pattern Recognition Letters*, vol. 29, no. 9, pp. 1433-1440, July 2008.
10. Dong Wook Lee, Jong Kyoung Kim, Sumin Lee, Seungjin Choi, Sanguk Kim, and Inhwan Hwang (2008), "Arabidopsis nuclear-encoded plastid transit peptides contain multiple sequence subgroups with distinctive chloroplast-targeting sequence motifs," *Plant Cell*, vol. 20, no. 6, pp. 1603-1622, June 2008.
11. Sookjeong Kim, Jong Kyoung Kim, and Seungjin Choi (2008), "Independent arrays or independent time courses for gene expression time series data analysis," *Neurocomputing*, vol. 71, pp. 2377-2387, June 2008.
12. B. I. Lee, J. S. Lee, D. S. Lee, W. J. Kang, J. J. Lee, and S. Choi (2007) "A clinical application of ensemble ICA to the quantification of myocardial blood flow in dynamic PET," *Journal of VLSI Signal Processing*, vol. 49, pp. 233-241, November 2007. (Special Issue: Data Fusion for Medical, Industrial, and Environmental Applications. Guest Editors: Danilo Mandic and Dragan Obradovic)
13. Sun Ho Lee and Seungjin Choi (2007), "Two-dimensional canonical correlation analysis," *IEEE Signal Processing Letters*, vol. 14, no. 10, pp. 735-738, October 2007.
14. Hyekyoung Lee, Yong-Deok Kim, Andrzej Cichocki, and Seungjin Choi (2007), "Nonnegative tensor factorization for continuous EEG classification," *International Journal of Neural Systems*, vol. 17, no. 4, pp. 305-317, August 2007.

15. Heeyoul Choi and Seungjin Choi (2007), "Robust kernel Isomap," *Pattern Recognition*, vol. 40, no. 3, pp. 853–862, March 2007.
16. Heeyoul Choi and Seungjin Choi (2007), "A relative trust-region algorithm for independent component analysis," *Neurocomputing*, vol. 70, pp. 1502-1510, March 2007.
17. Jong-Hoon Ahn, Jong-Hoon Oh, and Seungjin Choi (2007), "Learning principal directions: Integrated-squared-error minimization," *Neurocomputing*, vol. 70, pp. 1372-1381, March 2007.
18. Seungjin Choi (2006), "Differential learning algorithms for decorrelation and independent component analysis," *Neural Networks*, vol. 19, no. 10, pp. 1558-1567, December 2006.
19. Jong Kyoung Kim, Sung-Yang Bang, and Seungjin Choi (2006), "Sequence-driven features for prediction of subcellular localization of proteins," *Pattern Recognition*, vol. 39, no. 12, pp. 2301-2311, December 2006.
20. Jaehwan Kim and Seungjin Choi (2006), "Semidefinite spectral clustering," *Pattern Recognition*, vol. 39, no. 11, pp. 2025-2035, November 2006.
21. B. -I. Yoo, S. Kim, Seungjin Choi, Y. Y. Kim, and J. S. Kwon (2006), "Development of a separation algorithm for peak signals and its application to event-related brain potentials," *Journal of the Korean Physical Society*, vol. 49, no. 4, pp. 1667-1674, October 2006.
22. Seungjin Choi, Jong-Hoon Ahn, and Andrzej Cichocki (2006), "Constrained projection approximation algorithms for principal component analysis," *Neural Processing Letters*, vol. 24, no. 1, pp. 53-65, August 2006.
23. Seungjin Choi (2006), "Coupled Helmholtz machine for PCA," *Electronics Letters*, vol. 42, no. 16, pp. 936-937, August 3, 2006.
24. Jong Kyoung Kim, G. P. S. Raghava, Sung-Yang Bang, and Seungjin Choi (2006), "Prediction of subcellular localization of proteins using pairwise sequence alignment and support vector machine," *Pattern Recognition Letters*, vol. 27, no. 9, pp. 996-1001, July 2006.
25. Jaemo Sung, Sung-Yang Bang, and Seungjin Choi (2006), "A Bayesian network classifier and hierarchical Gabor features for handwritten numeral recognition," *Pattern Recognition Letters*, vol. 27, no. 1, pp. 66-75, January 2006.
26. Yongjin Lee and Seungjin Choi (2005), "Maximum within-cluster association," *Pattern Recognition Letters*, vol. 26, no. 10, pp. 1412-1422, July 2005.
27. Yong-Choon Cho and Seungjin Choi (2005), "Nonnegative features of spectro-temporal sounds for classification," *Pattern Recognition Letters*, vol. 26, no. 9, pp. 1327-1336, July 2005.
28. Seungjin Choi, Andrzej Cichocki, H. -M. Park, and S. -Y. Lee (2005), "Blind source separation and independent component analysis: A review," *Neural Information Processing - Letters and Review*, vol. 6, no. 1, pp. 1-57, January 2005.
29. Heeyoul Choi and Seungjin Choi (2004), "Kernel Isomap," *Electronics Letters*, vol. 40, no. 25, pp. 1612-1613, December 2004.
30. Seungjin Choi (2004), "Sequential EM learning for subspace analysis," *Pattern Recognition Letters*, vol. 25, no. 14, pp. 1559-1567, October 2004.
31. Seungjin Choi (2004), "Independence or nonnegativity: constraints for sensory coding," *International Congress Series*, vol. 1269, pp. 38-41, August 2004.
32. Seungjin Choi, Andrzej Cichocki, L. Zhang, and Shun-Ichi Amari (2003), "Approximate maximum likelihood source separation using the natural gradient," *IEICE Trans. Fundamentals*, vol. E86-A, no. 1, pp. 206-214, Jan. 2003.

33. Seungjin Choi, H. Hong, H. Glotin, and F. Berthommier (2002), "Multichannel signal separation for cocktail party speech recognition: A dynamic recurrent network," *Neurocomputing*, vol. 49, no. 1-4, pp. 299-314, Dec. 2002.
34. Seungjin Choi, Andrzej Cichocki, and A. Belouchrani (2002), "Second order nonstationary source separation," *Journal of VLSI Signal Processing*, vol. 32, no. 1-2, pp. 93-104, Aug. 2002.
35. Seungjin Choi, Andrzej Cichocki, and Shun-Ichi Amari (2002), "Equivariant nonstationary source separation," *Neural Networks*, vol. 15, no. 1, pp. 121-130, Jan. 2002.
36. Seungjin Choi and Andrzej Cichocki (2001), "Algebraic differential decorrelation for nonstationary source separation," *Electronics Letters*, vol. 37, no. 23, pp. 1414-1415, Nov. 18, 2001.
37. Seungjin Choi and Andrzej Cichocki (2001), "Blind equalization via approximate maximum likelihood source separation," *Electronics Letters*, vol. 37, no. 1, pp. 61-62, January 27 2001.
38. Seungjin Choi, Shun-Ichi Amari, and Andrzej Cichocki (2000), "Natural gradient learning for spatio-temporal decorrelation: Recurrent network," *IEICE Trans. Fundamentals*, vol. E83-A, no. 12, pp. 2715-2722, Dec. 2000.
39. Seungjin Choi, Andrzej Cichocki, and Shun-Ichi Amari (2000), "Flexible independent component analysis," *Journal of VLSI Signal Processing*, vol. 26, no. 1/2, pp. 25-38, August 2000.
40. Seungjin Choi and Andrzej Cichocki (2000), "Blind separation of nonstationary sources in noisy mixtures," *Electronics Letters*, vol. 36, no. 9, pp. 848-849, April 27 2000.
41. Seungjin Choi and Andrzej Cichocki (1999), "A hybrid learning approach to blind deconvolution of linear MIMO systems," *Electronics Letters*, vol. 35, no. 17, pp. 1429-1430, August 19 1999.
42. Seungjin Choi and Andrzej Cichocki (1999), "An unsupervised hybrid network for blind separation of independent non-Gaussian source signals in multipath environment," *Journal of Communications and Networks*, vol. 1, no. 1, pp. 19-25, March 1999.
43. Seungjin Choi and Andrzej Cichocki (1998), "Cascade neural networks for multichannel blind deconvolution," *Electronics Letters*, vol. 34, no. 12, pp. 1186-1187, June 11 1998.
44. Seungjin Choi (1998), "Differential Hebbian-type learning algorithms for decorrelation and independent component analysis," *Electronics Letters*, vol. 34, no. 9, pp. 900-901, April 30 1998.
45. Seungjin Choi, R. Liu, and Andrzej Cichocki (1998), "A spurious equilibria-free learning algorithm for the blind separation of non-zero skewness signals" *Neural Processing Letters*, vol.7, no. 2, pp. 61-68, 1998.
46. Seungjin Choi, R. R. Schultz, R. L. Stevenson, Y. F. Huang, and R. Liu (1995), "Contrast enhancement of missile video sequences via image stabilization and product correlation," *Optical Engineering*, vol. 34, no. 12, pp. 3495-3507, 1995.

## 7.2 International Conference Papers

1. Heeyoul Choi, Anup Katake, Seungjin Choi, and Yoonsuck Choe (2010), "Alpha-integration of multiple evidence," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2010)*, Dallas, Texas, March 14-19, 2010.

2. Minje Kim, Jiho Yoo, Kyeongok Kang, and Seungjin Choi (2010), "Blind rhythmic source separation: Nonnegativity and repeatability," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2010)*, Dallas, Texas, March 14-19, 2010.
3. Jiho Yoo, Minje Kim, Kyeongok Kang, and Seungjin Choi (2010), "Nonnegative matrix partial co-factorization for drum source separation," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2010)*, Dallas, Texas, March 14-19, 2010.
4. Heeyoul Choi, Seungjin Choi, Anup Katake, and Yoonsuck Choe (2010), "Learning alpha-integration with partially-labeled data," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2010)*, Dallas, Texas, March 14-19, 2010.
5. Jong Kyoung Kim and Seungjin Choi (2009), "Clustering sequence sets for motif discovery," in *Advances in Neural Information Processing Systems 22 (NIPS-2009)*, edited by Y. Bengio, D. Schuurmans, J. Lafferty, C. K. I. Williams and A. Culotta, Vancouver, Canada, December 7-10, 2009.
6. Yoonseop Kang and Seungjin Choi (2009), "Common neighborhood sub-graph density as a similarity measure for community detection," in *Proceedings of the International Conference on Neural Information Processing (ICONIP-2009)*, Bangkok, Thailand, December 1-5, 2009.
7. Heeyoul Choi, Anup Katake, Seungjin Choi, Yoonseop Kang, and Yoonsuck Choe (2009), "Probabilistic combination of multiple evidence," in *Proceedings of the International Conference on Neural Information Processing (ICONIP-2009)*, Bangkok, Thailand, December 1-5, 2009.
8. Jiho Yoo and Seungjin Choi (2009), "Weighted nonnegative matrix co-tri-factorization for collaborative prediction," in *Proceedings of the First Asian Conference on Machine Learning (ACML-2009)*, pp. 396-411, Nanjing, China, November 2-4, 2009.
9. Hyekyoung Lee and Seungjin Choi (2009), "Group nonnegative matrix factorization for EEG classification," in *Proceedings of the Twelfth International Conference on Artificial Intelligence and Statistics (AISTATS-2009)*, Clearwater Beach, Florida, April 16-18, 2009.
10. Jiho Yoo and Seungjin Choi (2009), "Probabilistic matrix tri-factorization," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2009)*, Taipei, Taiwan, April 19-24, 2009.
11. Yong-Deok Kim and Seungjin Choi (2009), "Weighted nonnegative matrix factorization," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2009)*, Taipei, Taiwan, April 19-24, 2009.
12. Seunghak Lee and Seungjin Choi (2009), "Ensembles of landmark multidimensional scalings," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2009)*, Taipei, Taiwan, April 19-24, 2009.
13. Sunho Park, Jiho Yoo, and Seungjin Choi (2009), "Target speech extraction using learned spectral bases," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2009)*, Taipei, Taiwan, April 19-24, 2009.
14. Kye-Hyeon Kim and Seungjin Choi (2009), "Incremental learning to rank with partially labeled data," in *Proceedings of the ACM International Workshop on Web Search Click Data (WSCD-2009)*, Barcelona, Spain, February 9, 2009.
15. Heeyoul Choi, Ricardo Gutierrez-Osuna, Seungjin Choi, and Yoonsuck Choe (2008), "Kernel oriented discriminant analysis for speaker-independent phoneme spaces," in *Proceedings of the International Conference on Pattern Recognition (ICPR-2008)*, Tampa, Florida, December 8-11, 2008.

16. Jiho Yoo and Seungjin Choi (2008), "Orthogonal nonnegative matrix factorization: Multiplicative updates on Stiefel manifolds," in *Proceedings of the 9th International Conference on Intelligent Data Engineering and Automated Learning (IDEAL-2008)*, Daejeon, Korea, November 2-5, 2008.
17. Heeyoul Choi, Seungjin Choi, and Yoonsuck Choe (2008), "Manifold integration with Markov random walks," in *Proceedings of the Twenty-Third AAAI Conference on Artificial Intelligence (AAAI-2008)*, Chicago, Illinois, July 13-17, 2008.
18. Sunho Park and Seungjin Choi (2007), "Gaussian process regression for voice activity detection and speech enhancement," in *Proceedings of the International Joint Conference on Neural Networks (IJCNN-2008)*, Hong Kong, June 1-6, 2008
19. Seungjin Choi (2007), "Algorithms for orthogonal nonnegative matrix factorization," in *Proceedings of the International Joint Conference on Neural Networks (IJCNN-2008)*, Hong Kong, June 1-6, 2008
20. Hyekyoung Lee and Seungjin Choi (2007), "CUR+NMF for learning spectral features from large data matrix," in *Proceedings of the International Joint Conference on Neural Networks (IJCNN-2008)*, Hong Kong, June 1-6, 2008
21. Yong-Deok Kim, Andrzej Cichocki, and Seungjin Choi (2008), "Nonnegative Tucker decomposition with alpha-divergence," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2008)*, Las Vegas, Nevada, March 30 - April 4, 2008.
22. Sunho Park and Seungjin Choi (2008), "Gaussian processes for source separation," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2008)*, Las Vegas, Nevada, March 30 - April 4, 2008.
23. J. Chun, H. Lee, Y. S. Park, W. Park, J. Park, S. H. Han, Seungjin Choi, G. J. Kim (2007), "Real-time classification of fear/panic emotion based on physiological signals," in *Proceedings of the 8th Pan-Pacific Conference on Occupational Ergonomics (PPCOE-2007)*, Bangkok, Thailand, October 17-19, 2007.
24. Sunho Park and Seungjin Choi (2007), "Source separation with Gaussian process models," in *Proceedings of the European Conference on Machine Learning (ECML-2007)*, Warsaw, Poland, September 17-21, 2007.
25. Yong-Deok Kim and Seungjin Choi (2007), "Color face tensor factorization and slicing for illumination-robust recognition," in *Proceedings of the International Conference on Biometrics (ICB-2007)*, Seoul, Korea, August 27-29, 2007.
26. Seungjin Choi (2007) "Wake-sleep PCA," in *Proceedings of the International Joint Conference on Neural Networks (IJCNN-2007)*, Orlando, Florida, August 12-17, 2007.
27. Yong-Deok Kim and Seungjin Choi (2007), "Nonnegative Tucker decomposition," in *Proceedings of the IEEE CVPR-2007 Workshop on Component Analysis Methods*, Minneapolis, Minnesota, June 22, 2007.
28. Kye-Hyeon Kim and Seungjin Choi (2007) "Neighbor search with global geometry: A mini-max message passing algorithm," in *Proceedings of the International Conference on Machine Learning (ICML-2007)*, Corvallis, Oregon, June 20-24, 2007.
29. Andrzej Cichocki, R. Zdunek, Seungjin Choi, R. J. Plemmons, Shun-Ichi Amari (2007), "Nonnegative tensor factorization using alpha and beta divergences," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2007)*, Honolulu, Hawaii, April 15-20, 2007.

30. Yong-Deok Kim and Seungjin Choi (2007), "A method of initialization for nonnegative matrix factorization," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2007)*, Honolulu, Hawaii, April 15-20, 2007.
31. J. Kim, K. -H. Shim, and Seungjin Choi (2007), "Soft geodesic kernel k-means," in *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP-2007)*, Honolulu, Hawaii, April 15-20, 2007.
32. Andrzej Cichocki, R. Zdunek, Seungjin Choi, R. J. Plemmons, Shun-Ichi Amari (2007), "Novel multi-layer non-negative tensor factorization with sparsity constraints," in *Proceedings of the International Conference on Adaptive and Natural Computing Algorithms*, Warsaw, Poland, April 11-14, 2007.
33. S. Lee, I. Jeong, and Seungjin Choi (2007), "Dynamically weighted hidden Markov model for spam deobfuscation," in *Proceedings of the International Joint Conference on Artificial Intelligence (IJCAI-2007)*, Hyderabad, India, January 6-12, 2007.
34. J. K. Kim and Seungjin Choi (2006), "Tree-dependent components of gene expression data for clustering," in *Proc. Int'l Conf. Artificial Neural Networks (LNCS 4132)*, Athens, Greece, September 10-14, 2006.
35. Hyekeyoung Lee, Andrzej Cichocki, and Seungjin Choi (2006), "Nonnegative matrix factorization for motor imagery EEG classification," in *Proc. Int'l Conf. Artificial Neural Networks (LNCS 4132)*, Athens, Greece, September 10-14, 2006.
36. Minje Kim and Seungjin Choi (2006), "ICA-based clustering for resolving permutation ambiguity in frequency-domain convolutive source separation," in *Proc. Int'l Conf. Pattern Recognition (ICPR)*, Hong Kong, August 20-24, 2006.
37. S. Park and Seungjin Choi (2006), "Rao-Blackwellized particle filtering for sequential speech enhancement," in *Proc. Int'l Joint Conf. Neural Networks (IJCNN)*, Vancouver, Canada, July 16-21, 2006.
38. Heeyoul Choi and Seungjin Choi (2006), "Relative gradient learning for independent subspace analysis," in *Proc. Int'l Joint Conf. Neural Networks (IJCNN)*, Vancouver, Canada, July 16-21, 2006.
39. Seungjin Choi, J. H. Ahn, and Andrzej Cichocki (2006), "Iterative projection approximation algorithms for PCA," in *Proc. IEEE Int'l Conf. Acoustics, Speech and Signal Processing (ICASSP)*, Toulouse, France, May 14-19, 2006.
40. Minje Kim and Seungjin Choi (2006) "Monaural music source separation: Nonnegativity, sparseness, and shift-invariance," in *Proc. Int'l Conf. Independent Component Analysis and Blind Signal Separation (LNCS 3889)*, pp. 617-624, Charleston, South Carolina, March 5-8, 2006
41. S. Kim and Seungjin Choi (2006) "Topographic independent component analysis of gene expression time series data," in *Proc. Int'l Conf. Independent Component Analysis and Blind Signal Separation (LNCS 3889)*, pp. 462-469, Charleston, South Carolina, March 5-8, 2006
42. J. Sung, S. -Y. Bang, Seungjin Choi, and Z. Ghahramani (2005) "U-likelihood and U-updating algorithms: Statistical inference in latent variable models," in *Proc. European Conf. Machine Learning (ECML)*, Porto, Portugal, October 3-7, 2005
43. Seungjin Choi (2005) "On variations of power iteration," in *Proc. Int'l Conf. Artificial Neural Networks*, pp. 145-150, Warsaw, Poland, September 11-15, 2005
44. Minje Kim and Seungjin Choi (2005) "On spectral basis selection for single channel polyphonic music separation," in *Proc. Int'l Conf. Artificial Neural Networks*, pp. 157-162, Warsaw, Poland, September 11-15, 2005

45. B. I. Lee, J. S. Lee, D. S. Lee, and Seungjin Choi (2005) "Myocardial blood flow quantification in dynamic PET; An ensemble ICA approach," in *Proc. Int'l Conf. Artificial Neural Networks*, pp. 709-714, Warsaw, Poland, September 11-15, 2005.
46. Heeyoul Choi and Seungjin Choi (2005) "Kernel Isomap on noisy manifold," in *Proc. IEEE Int'l Conf. Development and Learning (ICDL)*, pp. 208-213, Osaka, Japan, July 19-21, 2005.
47. S. Kim and Seungjin Choi (2005) "Independent arrays or independent time courses for gene expression time series," in *Proc. IEEE Int'l Symposium on Circuits and Systems (ISCAS)*, Kobe, Japan, May 23-26, 2005.
48. I. Jang, S. Kim, and Seungjin Choi (2005) "F-SEONS: A second-order frequency-domain algorithm for noisy convolutive source separation," in *Proc. IEEE Int'l Symposium on Circuits and Systems (ISCAS)*, Kobe, Japan, May 23-26, 2005.
49. Heeyoul Choi and Seungjin Choi (2005) "Relative trust-region learning for ICA," in *Proc. IEEE Int'l Conf. Acoustics, Speech and Signal Processing (ICASSP)*, Philadelphia, PA, March 19-23, 2005.
50. H. Kim and Seungjin Choi (2005) "Independent subspaces of gene expression data," in *Proc. IASTED Int'l Conf. Artificial Intelligence and Applications*, Innsbruck, Austria, February 14-16, 2005.
51. Y. -C. Cho and Seungjin Choi (2004), "Learning nonnegative features of spectro-temporal sounds for classification," in *Proc. Int'l Conf. Spoken Language Processing (ICSLP)*, Jeju Island, Korea, October 4-8, 2004.
52. J. -H. Ahn, Seungjin Choi, and J. -H. Oh (2004), "A multiplicative up-propagation algorithm," in *Proc. Int'l Conf. Machine Learning (ICML)*, pp. 17-24, Banff, Canada, July 4-8, 2004.
53. K. Nam, H. Je, and Seungjin Choi (2004), "Fast stochastic neighbor embedding: A trust-region algorithm," in *Proc. Int'l Joint Conf. Neural Networks (IJCNN)*, pp. 123-128, Budapest, Hungary, July 25-29, 2004.
54. Y. Lee and Seungjin Choi (2004), "Minimum entropy, k-means, spectral clustering," in *Proc. Int'l Joint Conf. Neural Networks (IJCNN)*, pp. 117-122, Budapest, Hungary, July 25-29, 2004.
55. Heeyoul Choi, S. Kim, and Seungjin Choi (2004), "Trust-region learning for ICA," in *Proc. Int'l Joint Conf. Neural Networks (IJCNN)*, pp. 41-46, Budapest, Hungary, July 25-29, 2004.
56. J. -H. Ahn, Seungjin Choi, and J. -H. Oh (2004), "A new way of PCA: Integrated-squared-error and EM algorithms," in *Proc. Int'l Conf. Acoustics, Speech and Signal Processing (ICASSP)*, pp. 777-780, Montreal, Canada, May 17-21, 2004.
57. Seungjin Choi (2004), "Independence or nonnegativity: Constraints for sensory coding," in *International Congress Series 1269*, 2004. (presented as an invited talk in BrainIT-2004, Kitakyushu, Japan, March 7-9, 2004)
58. J. -H. Ahn, S. Kim, J. -H. Oh, and Seungjin Choi (2004), "Multiple nonnegative matrix factorization of dynamic PET images," in *Proc. Asian Conf. Computer Vision*, pp. 1009-1013, Jeju Island, Korea, January 27-30, 2004.
59. Y.-C. Cho, Seungjin Choi, S.-Y. Bang (2003), "Non-negative component parts of sound for classification," in *Proc. IEEE Int'l Symp. Signal Processing and Information Technology*, Darmstadt, Germany, December 14-17, 2003.
60. S. Park, Hyekyoung Lee, and Seungjin Choi (2003) "ICA+OPCA for artifact-robust classification of EEG data," in *Proc. IEEE Workshop on Neural Networks for Signal Processing (NNSP)*, pp. 585-594, Toulouse, France, September 17-19, 2003.

61. H. Kim, Seungjin Choi, and S. -Y. Bang (2003) "Membership scoring via independent feature subspace analysis for grouping co-expressed genes," in *Proc. IJCNN 2003*, Portland, Oregon, July 20-24, 2003.
62. Hyekyoung Lee and Seungjin Choi (2003) "PCA+HMM+SVM for EEG pattern classification," in *Proc. IEEE ISSPA*, pp. 541-544, Paris, France, July 1-4, 2003.
63. Seungjin Choi (2003) "Differential ICA," in *Proc. ICANN/ICONIP (Lecture Notes in Computer Science 2714)*, pp. 68-75, Istanbul, Turkey, June 26-29, 2003.
64. Seungjin Choi (2003) "Differential learning and random walk model," in *Proc. ICASSP*, pp. 724-727, Hong Kong, April 6-10, 2003.
65. F. Berthommier and Seungjin Choi (2003) "Several improvements of the Herault-Jutten model for speech segregation," in *Proc. ICA*, pp. 1089-1094, Nara, Japan, April 1-4, 2003.
66. Hyekyoung Lee and Seungjin Choi (2002) "PCA-based linear dynamical systems for multi-channel EEG classification," in *Proc. ICONIP*, pp. 745-749, Singapore, Nov. 19-22, 2002.
67. Seungjin Choi, S. Kim, J. S. Lee, and D. S. Lee (2002) "Rectified subspace analysis of dynamic positron emission tomography," in *Proc. ICONIP*, pp. 2269-2273, Singapore, Nov. 19-22, 2002.
68. F. Berthommier and Seungjin Choi (2002) "Comparative evaluation of CASA and BSS models for subband cocktail party speech segregation," in *Proc. Int'l Conf. Spoken Language Processing*, Denver, Colorado, Sep. 16-20, 2002.
69. Seungjin Choi (2002) "Adaptive differential decorrelation: A natural gradient algorithm," in *Proc. ICANN (Lecture Notes in Computer Science 2415)*, pp. 1168-1173, Madrid, Spain, Aug. 27-30, 2002.
70. H. Kim, Seungjin Choi, and S. Bang (2002) "ISAcycle: Independent subspace analysis of gene expression data," Presented (as a poster) at *Intelligent Systems for Molecular Biology*, Edmonton, Canada, Aug. 3-7, 2002.
71. I. Jang and Seungjin Choi (2002) "Why blind source separation for blind equalization of multiple channels?," in *Proc. IEEE Sensory Array and Multichannel Processing (SAM)*, Rosslyn, VA, Aug. 4-7, 2002.
72. Seungjin Choi (2002) "Sequential EM learning for subspace analysis," in *Proc. ITC-CSCC*, Phuket, Thailand, July 16-19, 2002.
73. Seungjin Choi (2002) "A symmetric-definite pencil approach to source separation," in *Proc. ITC-CSCC*, Phuket, Thailand, July 16-19, 2002.
74. Seungjin Choi, Andrzej Cichocki, and Shun-Ichi Amari (2002) "Natural gradient learning for second-order nonstationary source separation," in *Proc. IJCNN*, pp. 654-658, Honolulu, Hawaii, May 12-17, 2002.
75. Seungjin Choi, Andrzej Cichocki, and Y. Deville (2001) "Differential decorrelation for nonstationary source separation," in *Proc. ICA*, pp. 319-322, San Diego, California, December 9-13, 2001.
76. F. Berthommier and Seungjin Choi (2001) "Evaluation of CASA and BSS models for subband cocktail party speech recognition," in *Proc. ICA*, pp. 301-306, San Diego, California, December 9-13, 2001.
77. J. S. Lee, D. D. Lee, Seungjin Choi, D. S. Lee (2001) "Application of non-negative matrix factorization to dynamic positron emission tomography," in *Proc. ICA*, pp. 629-632, San Diego, California, December 9-13, 2001.

78. I. Jang and Seungjin Choi (2001) "Sequential least squares algorithms for blind co-channel signal separation," in *Proc. ICA*, pp. 601-604, San Diego, California, December 9-13, 2001.
79. P. Wong, Seungjin Choi, and Y. Niu (2001) "A comparison of PCA/ICA for data preprocessing in a geoscience application," in *Proc. ICA*, pp. 278-283, San Diego, California, December 9-13, 2001.
80. J. S. Lee, D. D. Lee, Seungjin Choi, K. S. Park, and D. S. Lee (2001), "Non-negative matrix factorization of dynamic images in nuclear medicine," in *Proc. IEEE Medical Imaging Conference*, San Diego, California, November 4-10, 2001.
81. Seungjin Choi and Andrzej Cichocki (2001), "Correlation matching approach to source separation in the presence of spatially correlated noise," in *Proc. Int'l Symp. Signal Processing and Applications (IEEE ISSPA 2001)*, Kuala-Lumpur, Malaysia, August 13-16, 2001.
82. Seungjin Choi, Andrzej Cichocki, and A. Belouchrani (2001), "Blind separation of second-order nonstationary and temporally colored sources," in *Proc. IEEE Workshop on Statistical Signal Processing (IEEE SSP 2001)*, pp. 444-447, Singapore, August 6-8, 2001.
83. Seungjin Choi, Andrzej Cichocki, L. Zhang, and Shun-Ichi Amari (2001), "Approximate maximum likelihood source separation using the natural gradient," in *Proc. IEEE SPAWC 2001*, pp. 235-238, Taoyuan, Taiwan, March 20-23, 2001.
84. Seungjin Choi and Andrzej Cichocki (2000), "Blind separation of nonstationary and temporally correlated sources from noisy mixtures," in *Proc. IEEE Workshop on Neural Networks for Signal Processing (NNSP 2000)*, pp. 405-414, Sydney, Australia, Dec. 11-13, 2000.
85. Seungjin Choi (2000), "Blind source separation from noisy measurements: Time-delayed correlation matching," in *Proc. ICONIP*, pp. 1359-1362, Taejon, Korea, Nov. 14-18, 2000.
86. Seungjin Choi, H. Hong, H. Glotin, and F. Berthommier (2000), "Multichannel signal separation for cocktail party speech recognition: A dynamic recurrent network," in *Proc. Int'l Conf. Spoken Language Processing (ICSLP 2000)*, Beijing, China, Oct. 16-20, 2000.
87. Seungjin Choi, Andrzej Cichocki, and Shun-Ichi Amari (2000), "Local stability analysis of flexible independent component analysis algorithm," in *Proc. ICASSP*, Istanbul, Turkey, pp. 3426-3429, June 5-9, 2000.
88. Seungjin Choi and O. Lee (1999), "Nonstationary source separation," in *Proc. IEEE Region 10 Conference (TENCON'99)*, September 15-17 1999.
89. Seungjin Choi, Y. Lyu, F. Berthommier, H. Glotin, and Andrzej Cichocki (1999), "Blind separation of delayed and superimposed acoustic sources: Learning algorithm and experimental study," in *Proc. Int'l Conf. Speech Processing (ICSP'99)*, pp. 109-114, August 18-20 1999.
90. Seungjin Choi (1999), "Acoustic source separation: Fundamental issues," in *Proc. Int'l Conf. Speech Processing (ICSP'99)*, pp. 505-510, August 18-20 1999.
91. E. Tessier, F. Berthommier, H. Glotin, and Seungjin Choi (1999), "A CASA front-end using the localization cue for segregation and then cocktail-party speech recognition," in *Proc. Int'l Conf. Speech Processing (ICSP'99)*, pp. 97-102, August 18-20 1999.
92. Seungjin Choi (1999), "Constrained minimum entropy and maximum negentropy for blind deconvolution and equalization," in *Proc. Int'l Conf. Telecommunications (ICT'99)*, pp. 13-17, June 15-18, 1999.
93. Seungjin Choi and Andrzej Cichocki (1999), "A hybrid learning approach to blind deconvolution of MIMO systems," in *Proc. IEEE Signal Processing Workshop on Higher-order Statistics (HOS'99)*, Ceasarea, Israel, pp. 292-295, June 14-16, 1999.

94. Seungjin Choi, Andrzej Cichocki, and Shun-Ichi Amari (1999), "Two spatio-temporal decorrelation learning algorithms and their application to multichannel blind deconvolution," in *Proc. ICASSP*, Phoenix, Arizona, pp. 1085-1088, March 15-19 1999.
95. Andrzej Cichocki, L. Zhang, Seungjin Choi, and Shun-Ichi Amari (1999), "Nonlinear dynamic independent component analysis using state-space and neural network models," in *Proc. International Workshop on Independent Component Analysis and Blind Signal Separation (ICA'99)*, Aussois, France, pp. 99-104, January 11-15 1999.
96. Seungjin Choi, Shun-Ichi Amari, Andrzej Cichocki, and R. Liu (1999), "Natural gradient learning with a nonholonomic constraint for blind deconvolution of multiple channels," in *Proc. International Workshop on Independent Component Analysis and Blind Signal Separation (ICA'99)*, Aussois, France, pp. 371-376, January 11-15 1999.
97. Seungjin Choi, Andrzej Cichocki, and Shun-Ichi Amari (1998), "Blind equalization of SIMO channels via spatio-temporal anti-Hebbian learning rule," in *Proc. IEEE Workshop on Neural Networks for Signal Processing (NNSP'98)*, pp. 93-102, Cambridge, England, 31 August - 3 September 1998.
98. Seungjin Choi, Andrzej Cichocki, and Shun-Ichi Amari (1998), "Flexible independent component analysis," in *Proc. IEEE Workshop on Neural Networks for Signal Processing (NNSP'98)*, pp. 83-92, Cambridge, England, 31 August - 3 September 1998.
99. Seungjin Choi and Andrzej Cichocki (1998), "On-line sequential multichannel blind deconvolution: A deflation approach," in *Proc. IEEE DSP Workshop*, pp. 159-162, Utah, August 9-12 1998.
100. Andrzej Cichocki, I. Sabala, and Seungjin Choi, B. Orsier, and R. Szupiluk (1997), "Self-adaptive independent component analysis for sub-Gaussian and super-Gaussian mixtures with unknown number of source signals," in *Proc. NOLTA'97*, Hawaii, pp. 731-734, November 1997.
101. Seungjin Choi, Shun-Ichi Amari, and Andrzej Cichocki (1997), "Natural gradient learning algorithms for decorrelation," in *Progress in Connectionist-Based Information Systems*, N. Kasabov, R. Kozma, K. Ko, R. O'shea, T. Gedeon, eds., vol. 1, pp. 645-648, 1997.
102. Seungjin Choi, Andrzej Cichocki, and Shun-Ichi Amari (1997), "Adaptive blind deconvolution and equalization with self-adaptive nonlinearities: An information-theoretic approach," in *Progress in Connectionist-Based Information Systems*, N. Kasabov, R. Kozma, K. Ko, R. O'shea, T. Gedeon, eds., vol. 1, pp. 641-644, 1997.
103. Seungjin Choi and Andrzej Cichocki (1997), "Adaptive blind separation of speech signals: Cocktail party problem" in *Proc. Int'l Conf. Speech Processing (ICSP'97)*, pp. 617-622, 26-28 August 1997
104. Seungjin Choi and Andrzej Cichocki (1997), "Blind signal deconvolution by spatio-temporal decorrelation and demixing," in —em *Neural Networks for Signal Processing VII*, J. Principe, L. Gile, N. Morgan, and E. Wilson, eds., pp. 426-435, September 1997.
105. Seungjin Choi and Andrzej Cichocki (1997), "A linear feedforward neural network with lateral feedback connections for blind source separation," in *Proc. IEEE Signal Processing Workshop on Higher-order Statistics (HOS'97)*, Banff, Canada, pp. 349-353, July 21-23 1997.
106. Seungjin Choi, H Luo, and R. Liu (1997), "An adaptive system for direct multi-channel blind equalization," in *Proc. The First Signal Processing Workshop on Signal Processing Advances in Wireless Communications (SPAWC'97)*, Paris, France, pp. 85-88, 16-18 April 1997.
107. Seungjin Choi and R. Liu (1997), "A learning algorithm for the separation of non-zero skewness signals with no spurious equilibria," in *Proc. The Fifth European Symposium on Artificial Neural Networks (ESANN'97)*, Bruges, Belgium, pp. 249-254, 16-18 April 1997.

108. Seungjin Choi and R. Liu (1996), "A direct adaptive blind equalizer for multi-channel transmission," in *1996 Neural Information Processing Systems (NIPS) Workshop on Blind Signal Processing and its Applications*, Snowmass, Colorado, December 1996.
109. Seungjin Choi and R. Liu (1996), "Two-stage neural network for blind sources separation," in *Proc. Midwest Symposium on Circuits and Systems*, Ames, Iowa, pp. 827-830, August 1996.
110. Seungjin Choi, R. R. Schultz, R. L. Stevenson, Y. F. Huang, and R. Liu (1994), "Contrast enhancement of missile data through image sequence stabilization and product correlation," in *Proceedings of the IS&T/SPIE Symposium on Electronic Imaging: Science and Technology*, San Jose, California, Feb. 1994.

### 7.3 International Patents

1. Seungjin Choi *et al.*, "Method and apparatus for convolutive source separation using relative optimization," issued (11/478212), June 29, 2006.

### 7.4 Domestic Patents

1. Seungjin Choi, Sunho Park, "Method for speech enhancement using constrained sequential EM algorithm," Patent no.: 10-0853171, Korea, August 13, 2008.
2. Daijin Kim, Seungjin Choi *et al.*, "Method and apparatus for face feature extraction, hair extraction, and real-time character generation," Patent no.: 10-0839536, June 12, 2008.
3. Seungjin Choi *et al.*, "Method and apparatus for overcoming frequency-domain ambiguity in multichannel source separation," Patent no.: 10-0653173, November 27, 2006.
4. Seungjin Choi *et al.*, "Method and apparatus for multichannel source separation using relative optimization," Patent no.: 10-0636368, October 12, 2006.

## 8 Recent Research Grants

1. National Core Research Center for Systems Bio-Dynamics (Dec. 2004 - Aug. 2008): Funded by KOSEF. Budget = 182,500,000 Korea Won. (participant)
2. Development of motion-based hand-held remote controller for the contents of experiences (Apr. 2008 - Nov. 2008): Funded by Korea Telecom. Budget = 25,000,000 Korea Won. (participant)
3. Development of safe driving assistant system with driver's condition recognition under virtual reality environment (Mar. 2006 - Feb. 2009): Funded by KOSEF. Budget = 110,000,000 Korea Won. (participant)
4. Tensor factorization methods for personalized prediction of relevant advertisements (Mar. 2008 - Feb. 2009): Funded by Microsoft Research Asia. Budget = 25,000 US dollars. (principal investigator)
5. Embedded Software Technology for Network Convergence Mobile Platforms (Oct. 2005 - Dec. 2008): Funded by ITRC program. Budget = 108,000,000 Korea Won. (participant)
6. Development of source separation and restoration based on human auditory models (Jun. 2004 - Mar. 2008): Funded by Korea Ministry of Knowledge and Economy. Budget = 384,500,000 Korea Won. (principal investigator)

7. Gaussian processes for learning users' playing style in computer games (Apr. 2006 - Mar. 2007): Funded by Microsoft Research Asia. Budget = 20,000 US dollars. (principal investigator)
8. Real-time virtual character modeling (Apr. 2006 - Dec. 2006): Funded by Korea Telecom. Budget = 45,000,000 Korea Won. (participant)
9. Design of high density array EEG experiments and development of on-line EEG analysis software for brain computer interface (May 2004 - Apr. 2007): Funded by Korea Ministry of Education, Science and Technology. Budget = 120,000,000 Korea Won. (principal investigator, collaboration with Lab for Brain Signal Processing, Brain Science Institute, RIKEN, Japan)
10. Source separation for interactive audio broadcasting (Apr. 2004 - Nov. 2004): Funded by ETRI. Budget = 25,000,000 Korea Won. (principal investigator)
11. Multichannel brain wave pattern analysis in short time-duration (Mar. 2003 - Nov. 2003): Funded by ETRI. Budget = 20,000,000 Korea Won. (principal investigator)
12. Statistical methods for brain wave pattern analysis (Mar. 2002 - Nov. 2002): Funded by ETRI. Budget = 20,000,000 Korea Won. (principal investigator)
13. Continuous speech recognition with selective attention (Aug. 2001 - May 2004): Funded by Korea Ministry of Science and Technology. Budget = 119,300,000 Korea Won. (participant)
14. Feature extraction methods for EEG classification (Jun. 2001 - Nov. 2001): Funded by ETRI. Budget = 20,000,000 Korea Won. (principal investigator)
15. Comparative study on various models for cocktail party speech separation (Apr. 2001 - Mar. 2003): Funded by KOSEF. Budget = 32,000,000 Korea Won. (principal investigator, collaboration with ICP, INPG, France)
16. Brain engineering-based IT convergence technology (May 2001 - Apr. 2002): Funded by ETRI. Budget = 25,000,000 Korea Won. (participant)
17. Development of methods for the quantification of myocardial blood flow in dynamic PET (Sep. 2000 - Aug. 2005): Funded by KOSEF. Budget = 100,000,000 Korea Won. (participant, collaboration with Seoul National University Hospital)
18. Independent component analysis methods and VLSI implementation for efficient source separation (Aug. 2000 - May 2004): Funded by Korea Ministry of Science and Technology. Budget = 99,000,000 Korea Won. (participant)

## 9 Student Supervision

### 9.1 PhD Thesis

1. Jong Kyoung Kim, "Probabilistic models for motif discovery in biopolymer sequences," February 2010.
2. Sangki Kim, "Dynamic hand gesture recognition with accelerometer," February 2010.
3. Hyekeyoung Lee, "Nonnegative matrix and tensor factorization methods for spectral EEG classification," February 2009.

## 9.2 MS Thesis

1. Shounan An, "Nonnegative matrix factorization regularized by  $k$ -NN graphs," February 2010.
2. Sun Ho Lee, "Two-dimensional canonical correlation analysis for learning correspondence between image," August 2007.
3. Jong Kyoung Kim, "Sequence-driven features for prediction of subcellular localization of proteins," February 2006.
4. Minje Kim, "Monaural music source separation: nonnegativity, sparseness and shift-invariance," February 2006.
5. Sunho Park, "A sequential Rao-Blackwellized particle filter-based speech enhancement algorithm," February 2006.
6. Kejoeng Nam, "Algorithms for approximate joint diagonalization of Hermitian matrices: Relative gradient, relative Newton and relative trust-region," August 2005.
7. Sookjeong Kim, "Spatial pattern and temporal mode analysis of microarray time series data by independent component analysis methods," February 2005.
8. Heeyoul Choi, "Relative trust-region learning for ICA," February 2005.
9. Jaehwan Kim, "Multi-way graph partitioning via semidefinite programming," February 2005.
10. Yongjin Lee, "Minimum entropy clustering through quadratic distance measure," February 2004.
11. Inseon Jang, "A frequency domain approach to convolutive nonstationary source separation in noisy environments," February 2004.
12. Sungcheol Park, "ICA+OPCA for artifact-robust classification of EEG data," February 2004 (co-supervised).
13. Yong-Choon Cho, "NMF feature extraction for general sound classification," February 2004 (co-supervised).
14. Hyekeyoung Lee, "Principal component features for EEG pattern analysis," February 2003.
15. Hyejin Kim, "Analysis of interaction in multiple genes using independent feature subspace analysis," February 2003.
16. Sangki Kim, "Rectified Subspace Analysis," February 2003.