

# CURRICULUM VITAE

Zheng Li

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Associate Research Scientist

State Key Laboratory of Cognitive Neuroscience and Learning & IDG/McGovern Institute for Brain Research,  
Center for Collaboration and Innovation in Brain and Learning Sciences, Beijing Normal University  
[lz@bnu.edu.cn](mailto:lz@bnu.edu.cn)

## Education

**Doctor of Philosophy**, Duke University, May 16, 2010.

Department of Computer Science

Dissertation Title: *Non-Linear Adaptive Bayesian Filtering for Brain Machine Interfaces*

**Bachelor of Science**, Purdue University, May 8, 2004.

Highest Distinction, GPA 4.0 of 4.0

Major: Computer Science Honors and Mathematics

Minor: Psychology

## Publications

### Journal Articles

Li J & Li Z. (2017) **Sums of Spike Waveform Features for Motor Decoding**. *Frontiers in Neuroscience*. 11:406. doi: 10.3389/fnins.2017.00406

Li Z, Jiang Y-H, Duan L, & Zhu C-Z. (2017) **A Gaussian mixture model based adaptive classifier for fNIRS brain-computer interfaces and its testing via simulation**. *Journal of Neural Engineering*. 14:4. doi:10.1088/1741-2552/aa71c0

Xiao X, Zhu H, Liu W-J, Yu X-T, Duan L, Li Z, & Zhu C-Z. (2017) **Semi-automatic 10/20 Identification Method for MRI-Free Probe Placement in Transcranial Brain Mapping Techniques**. *Frontiers in Neuroscience*. 11:4. doi:10.3389/fnins.2017.00004

Li S, Li J, & Li Z. (2016) **An Improved Unscented Kalman Filter Based Decoder for Cortical Brain-Machine Interfaces**. *Frontiers in Neuroscience*. 10:587. doi: 10.3389/fnins.2016.00587

Bian Z, Ouyang G, Li Z, Li Q, Wang L, & Li X. (2016) **Weighted-Permutation Entropy Analysis of Resting State EEG from Diabetics with Amnesic Mild Cognitive Impairment**. *Entropy*. 18(8), 307. doi:10.3390/e18080307

Gu Y, Han J, Liang Z, Yan J, Li Z, & Li X. (2016) **Empirical mode decomposition-based motion artifact correction method for functional near-infrared spectroscopy**. *Journal of Biomedical Optics*. 21(1). doi: 10.1117/1.JBO.21.1.015002

Duan L, Dai R-N, Xiao X, Sun P-P, Li Z, & Zhu C-Z. (2015) **Cluster imaging of multi-brain networks (CIMBN): a general framework for hyperscanning and modeling a group of interacting brains**. *Frontiers in Neuroscience*. 9:267. doi: 10.3389/fnins.2015.00267

Yan JQ, Wei Y, Wang YH, Xu G, Li Z, & Li XL. (2015) **Use of functional near-infrared spectroscopy to evaluate the effects of anodal transcranial direct current stimulation on brain connectivity in motor related cortex**. *Journal of Biomedical Optics*. 20(4), 046007. doi:10.1117/1.JBO.20.4.046007

Li Z. (2014) **Decoding methods for neural prostheses: where have we reached?** *Frontiers in Systems Neuroscience*. 8:129. doi: 10.3389/fnsys.2014.00129

Schwarz DA, Lebedev MA, Hanson TL, Dimitrov DF, Lehew G, Meloy J, Rajangam S, Subramanian V, Ifft PJ, Li Z, Ramakrishnan A, Tate A, Zhuang KZ, & Nicolelis MAL. (2014) **Chronic, wireless recordings of large-scale brain activity in freely moving rhesus monkeys.** *Nature Methods*. 11(6):670-6. doi:10.1038/nMeth.2936

Ifft PJ, Shokur S, Li Z, Lebedev MA, & Nicolelis MAL. (2013) **A Brain-Machine Interface Enables Bimanual Arm Movements in Monkeys.** *Science Translational Medicine*. 5, 210ra154. doi:10.1126/scitranslmed.3006159

O'Doherty JE, Lebedev MA, Li Z, & Nicolelis MAL. (2012) **Virtual active touch using randomly patterned intracortical microstimulation.** *IEEE Transactions on Neural Systems and Rehabilitation Engineering*. 20(1), 85-93. doi:10.1109/TNSRE.2011.2166807

Li Z, O'Doherty JE, Lebedev MA, & Nicolelis MAL. (2011) **Adaptive Decoding for Brain-Machine Interfaces Through Bayesian Parameter Updates.** *Neural Computation*. 23(12), 3162-3204. doi:10.1162/NECO\_a\_00207

Lebedev MA, Tate AJ, Hanson TL, Li Z, O'Doherty JE, Winans JA, Ifft PJ, Zhuang KZ, Fitzsimmons NA, Schwarz DA, Fuller AM, An JH, & Nicolelis MAL. (2011) **Future developments in brain-machine interface research.** *Clinics (Sao Paulo)* 66(S1): 25-32. doi:10.1590/S1807-59322011001300004

Chu Y, Li Z, Su Y, & Pizlo Z. (2010) **Heuristics in Problem Solving: The Role of Direction in Controlling Search Space.** *Journal of Problem Solving*. 3 (1), 27-51. doi:10.7771/1932-6246.1078

Li Z, O'Doherty JE, Hanson TL, Lebedev MA, Henriquez CS, & Nicolelis MAL. (2009) **Unscented Kalman filter for brain-machine interfaces.** *PLoS ONE*. 4(7): e6243. doi:10.1371/journal.pone.0006243

Pizlo Z, Stefanov E, Saalweachter J, Li Z, Haxhimusa Y, & Kropatsch WG. (2006) **Traveling salesman problem: a foveating pyramid model.** *Journal of Problem Solving*. 1 (1), 83-101. doi:10.7771/1932-6246.1009

Pizlo Z & Li Z. (2005) **Solving combinatorial problems: 15-puzzle.** *Memory & Cognition*. 33 (6), 1069-1084. doi:10.3758/BF03193214

### Conference Papers

Li J & Li Z. (2017, May) **A Fair Comparison of Sorted versus Unsorted Spikes for Decoding.** *Proceedings of the 8th International IEEE EMBS Conference on Neural Engineering (NER)*.

Pizlo Z & Li Z. (2004, January) **Graph pyramids as models of human problem solving.** *Proceedings of the SPIE-IS&T Conference on Electronic Imaging, Computational Imaging*. 5299, 205-215. doi:10.1117/12.543423

Pizlo Z & Li, Z. (2003, January) **Pyramid algorithms as models of human cognition.** *Proceedings of the SPIE-IS&T Conference on Electronic Imaging, Computational Imaging*. 5016, 1-12. doi:10.1117/12.479704

### Book Chapters

Li, Z. (2016) **Adaptive Spike Sorting with a Gaussian Mixture Model.** In: *Signal Processing in Neuroscience*, Li, X. ed., Springer Science, 11-38, doi:10.1007/978-981-10-1822-0, ISBN: 978-981-10-1821-3

### Conference Abstracts

- Ramakrishnan A, Li Z, Shokur S, Lebedev MA, Nicolelis MAL. (2015, October) **Keeping up with a virtual monkey: Representation of self-generated actions vis-a-vis observed actions of a competitor by monkey cortical ensembles during an arm reaching task.** (Poster presentation) Society for Neuroscience 2015 Annual Meeting, Chicago, USA.
- Ramakrishnan A, Ifft PJ, Li Z, Shokur S, Lebedev MA, Nicolelis MAL. (2013, November) **Brain-machine interface featuring cooperation and social interaction.** (Poster presentation) Society for Neuroscience 2013 Annual Meeting, San Diego, USA.
- Ifft P, Lebedev MA, Li Z, & Nicolelis MAL. (2012, October) **Bimanual brain-machine interface.** (Poster presentation) Society for Neuroscience 2012 Annual Meeting, New Orleans, USA.
- Li Z, Tate AJ, Lebedev MA, & Nicolelis MAL. (2011, November) **Software-based scalable multichannel spike acquisition.** (Poster presentation) Society for Neuroscience 2011 Annual Meeting, Washington D.C., USA.
- O'Doherty JE, Lebedev MA, Li Z, & Nicolelis MAL. (2011, November) **Towards a brain-machine-brain interface with virtual active touch using randomly patterned intracortical microstimulation.** (Poster presentation) Society for Neuroscience 2011 Annual Meeting, Washington D.C., USA.
- Li Z, O'Doherty JE, Lebedev MA, & Nicolelis MAL. (2010, November) **Closed-loop adaptive decoding using Bayesian regression self-training.** (Poster presentation) Society for Neuroscience 2010 Annual Meeting, San Diego, USA.
- Han Z, Li Z, O'Doherty JE, Lebedev MA, & Nicolelis MAL. (2010, November) **Decoding self-timed motor behavior with hidden Markov models.** (Poster presentation) Society for Neuroscience 2010 Annual Meeting, San Diego, USA.
- Li Z, O'Doherty JE, Lebedev MA, & Nicolelis MAL. (2009, October) **Simultaneous BMI decoding and tuning model update using Bayesian regression.** (Poster presentation) Society for Neuroscience 2009 Annual Meeting, Chicago, USA.
- Li Z, O'Doherty JE, Hanson TL, Lebedev MA, Henriquez CS, & Nicolelis MAL. (2008, November) **Unscented Kalman filter for brain-machine interfaces.** (Poster presentation) Society for Neuroscience 2008 Annual Meeting, Washington D.C., USA.
- Grant BD, Li Z, Hanson TL, O'Doherty JE, Lebedev MA, & Nicolelis MAL. (2008, November) **Multipurpose, expandable suite for brain-machine interfaces.** (Poster presentation) Society for Neuroscience 2008 Annual Meeting, Washington D.C., USA.
- Li Z, O'Doherty JE, Hanson TL, Lebedev MA, Henriquez CS, & Nicolelis MAL. (2007, November) **N-th order Kalman filter improves the performance of a brain machine interface for reaching.** (Poster presentation) Society for Neuroscience 2007 Annual Meeting, San Diego, USA.
- Grant BD, Li Z, Hanson TL, O'Doherty JE, Lebedev MA, & Nicolelis MAL. (2007, November) **Automated spike sorting of multiunit data for brain-machine interface applications.** (Poster presentation) Society for Neuroscience 2007 Annual Meeting, San Diego, USA.
- Pizlo Z & Li Z. (2004, January) **Graph pyramids as models of human problem solving.** (Slide presentation) IS&T/SPIE 16th Annual Symposium, San Jose, USA.
- Li Z & Pizlo Z. (2003, November) **The role of mental representation in problem solving.** (Poster presentation) 44th Annual Meeting of the Psychonomic Society, Vancouver, Canada.
- Li Z & Pizlo Z. (2003, July) **Pyramid model of human problem solving.** (Slide presentation) 36th Annual Meeting of the Society for Mathematical Psychology, Weber State University, Ogden, Utah, USA.

Li Z & Pizlo Z. (2003, March) **Effect of problem presentation on mental representation and performance in the m+m puzzle.** (Slide presentation) Hoosier Mental Life 2003, Purdue University, West Lafayette, Indiana, USA.

Pizlo Z & Li Z. (2003, February) **Human problem solving: a new direction.** (Slide presentation) Annual Interdisciplinary Conference, Jackson, Wyoming, USA.

Pizlo Z & Li Z. (2003, January) **Pyramid algorithms as models of human cognition.** (Slide presentation) IS&T/SPIE 15th Annual Symposium, Santa Clara, USA.

Pizlo Z & Li Z. (2002, November) **Direction and distance in human problem solving.** (Slide presentation) 43rd Annual Meeting of the Psychonomic Society, Kansas City, USA.

Pizlo Z & Li Z. (2002, July) **Problem solving without search.** (Slide presentation) 35th Annual Meeting of the Society for Mathematical Psychology, Miami University, Oxford, Ohio, USA.

## Employment History

### Postdoctoral Associate

Department of Neurobiology, Duke University

March 2011 to December 2012 (Research scholar, June 2010 to March 2011)

Research in decoding models and algorithms for brain-machine interfaces; development of scalable acquisition software which use off-the-shelf hardware for large-scale neural recording.

### Summer Undergraduate Research Intern

NASA Institute of Nanoelectronics and Computing and NSF Network for Computational Nanotechnology, Purdue University

June 2003 to August 2003

Research in scientific visualization at the Purdue University Rendering and Perceptualization Laboratory on simultaneous visualization of multiple volumetric datasets.

## Honors and Awards

Clinical Faculty Arts and Sciences Endowed Fellowship, Duke University Graduate School, May 2004.

Lynn Fellowship, Purdue University Graduate School, March 2004 (declined).

Charles C. Chappelle Fellowship, Purdue University Graduate School, March 2004 (declined).

James B. Duke Fellowship, Duke University Graduate School, February 2004.

## Teaching

Neural Interfaces, Beijing Normal University, Fall 2014, Spring 2015

Teaching Assistant, CPS 102,170,270, Duke University, Fall 2005, Spring 2006, Fall 2006