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Current Position

Research Associate, Parra Lab, Department of Biomedical Engineering, City College of New York

Scientist, Soterix Medical Inc.

Education

Ph.D. in Biomedical Engineering (2010–2016), City College of New York (CCNY)
Research Area: computational models of current flow in transcranial electrical stimulation (TES)

M.S. in Biomedical Engineering (2007–2010), University of Electronic Science and Technology of China (UESTC), Chengdu, China
Research Area: brain-computer interface (BCI) and biomedical signal processing

B.S. in Biomedical Engineering (2003–2007), UESTC, Chengdu, China

Research Experience

Neural Engineering Lab, Department of Biomedical Engineering, CCNY, 2010–2016

Oct 2014–Dec 2016, Validation of TES models using intracranial *in vivo* recordings

- Built high resolution computational models for 14 epilepsy patients under TES
- Compared the model output with the intracranial recordings
- First solid validation in history of TES models by *in vivo* intracranial data

Apr 2014–Dec 2014, Construction of a high resolution standard head model for the community of neuroimaging

- Segmentation of a standard head (ICBM-152) and built the model based on it
- Evaluated the standard model using individualized models in terms of electroencephalogram (EEG) source imaging and targeted TES
- Showed that the standard model can replace the individualized models that are usually expensive to get

Oct 2012–Mar 2014, Study of automated segmentation of magnetic resonance images (MRI) of human heads

- Theoretical development of the algorithm based on statistical physics
- Implemented the algorithm in Matlab and C

- Evaluated the algorithm using online MRI database
- Showed that the algorithm can significantly improve smoothness of the segmentation

Feb 2011–Sep 2012, Development of automated modeling techniques for individualized high-definition transcranial direct current stimulation (HD-tDCS)

- Developed a Matlab script for automated clean-up of MRI segmentation and automated HD virtual electrode placement on human heads
- Evaluated the automated modeling techniques using manually obtained models
- Showed that manual labor can be greatly reduced without affecting the modeling accuracy

Key Laboratory for NeuroInformation of Ministry of Education, UESTC, Chengdu, China, 2007–2010

Jan 2009–Jun 2010, Development of EEG-based voluntary BCI system

- Studied algorithm on real-time detection of voluntary motor imagery
- Collected EEG data on human subjects to train the parameters of the algorithm
- Implemented the algorithm, developed the user interface for real-time EEG control and tested the system

Sep 2008–Dec 2008, Principal contributor, BCI Competition IV

Oct 2008–Nov 2008, Signal analyst, Study of human-computer interface using electromyography (EMG)

Jan 2007–Jun 2007, Senior design: classification of EEG signal when the brain is doing math

Teaching Experience

Teaching Assistant in the following courses:

- BME 50500–Image and Signal Processing in Biomedicine (undergraduate), Fall 2015, Fall 2014
- BME I5000–Medical Imaging and Image Processing (graduate), Fall 2013
- BME I5100–Biomedical Signal Processing (graduate), Spring 2016

Tasks accomplished as in Teaching Assistant:

- Tutored students on basic/advanced Matlab programming
- Graded all homework assignments, quizzes and exams
- Gave two lectures on image segmentation

Research Advising

Master students

Kofi Agyeman, Oct 2015–May 2017

Bhoomika Joyappa, Mar 2015–Jul 2015, now SAS programmer consultant at Janssen Pharmaceuticals

René Kempe, Sep 2012–Jul 2013, now project manager in medical devices department at Sanofi

Undergraduate students

Chris Thomas, Feb 2015–present, now software engineer at Soterix Medical Inc.

Jakov Kendes, Aug 2016, now undergraduate student at Boston University

Hetince Zhao, May 2015–Aug 2015, now undergraduate student at University of Rochester

Ahmed Kayal, Jun 2014–Nov 2014, now master student at Boston University and intern at Boston Children's Hospital

Publications

Journal Articles

*†: authors contributed equally

Huang, Y., Datta, A., Bikson, M., Parra, L.C., 2017. Realistic vOlumetric-Approach to Simulate Transcranial Electric Stimulation – ROAST – a fully automated open-source pipeline. *bioRxiv 217331*

Lafon*, B., Henin*, S., **Huang, Y.**, Friedman, D., Melloni, L., Thesen, T., Doyle, W., Buzsáki, G., Devinsky, O., Parra†, L.C., Liu†, A.A., 2017. Low frequency transcranial electrical stimulation does not entrain sleep rhythms measured by human intracranial recordings. *Nature Communications*, 8:1199

Huang*, Y., Liu*, A.A., Lafon, B., Friedman, D., Dayan, M., Wang, X., Bikson, M., Doyle, W.K., Devinsky, O., Parra, L.C., 2017. Measurements and models of electric fields in the *in vivo* human brain during transcranial electric stimulation. *eLife*, 6, e18834

Santos, M.D., Cavenaghi, V.B., Mac-Kay, A.P.M.G., Serafim, V., Venturi, A., Truong, D.Q., **Huang, Y.**, Boggio, P.S., Fregni, F., Simis, M., Bikson, M., Gagliardi, R.J., 2017. Non-invasive brain stimulation and computational models in post-stroke aphasic patients: single session of transcranial magnetic stimulation and transcranial direct current stimulation. A randomized clinical trial. *Sao Paulo Medical Journal*, 135(5), 475-480

Huang, Y., Parra, L.C., Haufe, S., 2016. The New York Head–A precise standardized volume conductor model for EEG source localization and tES targeting. *NeuroImage*, 140, 150-162

Huang, Y., Parra, L.C., 2015. Fully Automated Whole-Head Segmentation with Improved Smoothness and Continuity, with Theory Reviewed. *PLOS ONE*, 10, e0125477

Senço, N.M., **Huang, Y.**, D'Urso, G., Parra, L.C., Bikson, M., Mantovani, A., Shavitt, R.G., Hoexter, M.Q., Miguel, E.C., Brunoni, A.R., 2015. Transcranial direct current stimulation in obsessive-compulsive disorder: emerging clinical evidence and considerations for optimal montage of electrodes. *Expert Review of Medical Devices*, 12, 381-391

Seibt, O., Brunoni, A.R., **Huang, Y.**, Bikson, M., 2015. The Pursuit of DLPFC: Non-neuronavigated Methods to Target the Left Dorsolateral Pre-frontal Cortex With Symmetric Bicephalic Transcranial Direct Current Stimulation (tDCS). *Brain Stimulation*, 8, 590-602

Lacey, E.H., Jiang, X., Friedman, R.B., Snider, S.F., Parra, L.C., **Huang, Y.**, Turkeltaub, P.E., 2015. Transcranial Direct Current Stimulation for Pure Alexia: Effects on Brain and Behavior. *Brain Stimulation*, 8, 305-307

Kempe, R., **Huang, Y.**, Parra, L.C., 2014. Simulating pad-electrodes with high-definition arrays in transcranial electric stimulation. *Journal of Neural Engineering*, 11, 026003

Huang, Y., Dmochowski, J.P., Su, Y., Datta, A., Rorden, C., Parra, L.C., 2013. Automated MRI segmentation for individualized modeling of current flow in the human head. *Journal of Neural Engineering*, 10, 066004

Dmochowski, J.P., Datta, A., **Huang, Y.**, Richardson, J.D., Bikson, M., Fridriksson, J., Parra, L.C., 2013. Targeted transcranial direct current stimulation for rehabilitation after stroke. *NeuroImage*, 75, 12-19

Huang, Y., Wu, Q., Lei, X., Yang, P., Xu, P., Yao, DZ., 2009. An algorithm for idle-state detection and continuous classifier design in motor-imagery-based BCI. *Journal of Electronic Science and Technology*, 7 (1), 27-33

Ren, JR., Liu, TJ., **Huang, Y.**, Yao, DZ., 2009. A study of Electromyogram based on human-computer interface. *Journal of Electronic Science and Technology*, 7 (1), 69-73

Proceedings

Lafon, B., Liu, A., **Huang, Y.**, Minhas, P., Kar, K., Bikson, M., Friedman, D., Krekelberg, B., Parra, L.C., 2017. Direct Experimental Validation of Computational Current Flow Models with Intra-Cranial Recordings in Human and Non-Human Primates. *Brain Stimulation*, 10, e15

Haufe, S., **Huang, Y.**, Parra, L.C., 2015. A highly detailed FEM volume conductor model based on the ICBM152 average head template for EEG source imaging and TCS targeting. *Conf Proc IEEE Eng Med Biol Soc* 2015, 5744-5747

Huang, Y., Su, Y., Rorden, C., Dmochowski, J., Datta, A., Parra, L.C., 2012. An automated method for high-definition transcranial direct current stimulation modeling. *Conf Proc IEEE Eng Med Biol Soc* 2012, 5376-5379

Patents

Kempe, R., **Huang, Y.**, Parra, L.C., 2016. Neurocranial Electrostimulation Models, Systems, Devices and Methods. US20160228702 A1

Conference Posters

*†: authors contributed equally

Huang, Y., Datta, A., Bikson, M., Parra, L.C., ROAST: a free, fully-automated, Realistic, vOlumetric-Approach-based Simulator for Transcranial electrical stimulation, *4th Annual New York Metro Imaging Research Symposium*, New York, NY, November, 2017

Huang*, Y., Liu*, A.A., Lafon, B., Friedman, D., Dayan, M., Wang, X., Bikson, M., Devinsky, O., Parra, L.C., Measurements and models of electric fields in the *in vivo* human brain during TES, *Organization for Human Brain Mapping Annual Meeting 2017*, Vancouver, BC, Canada, June 2017

Huang, Y., Thomas, C., Datta, A., Parra, L.C., Optimized tDCS for targeting multiple brain regions: an integrated implementation, *Noninvasive Brain Stimulation pre-conference at the International Neuromodulation Society's 13th World Congress*, Edinburgh, Scotland, UK, May 2017

Huang*, Y., Liu*, A.A., Lafon, B., Friedman, D., Dayan, M., Wang, X., Bikson, M., Doyle, W.K., Devinsky, O., Parra, L.C., Measurements and models of electric fields in the *in vivo* human brain during TES, *Minnesota Neuromodulation Symposium*, Minneapolis, MN, April 2017

Huang*, Y., Liu*, A.A., Lafon, B., Friedman, D., Dayan, M., Wang, X., Bikson, M., Devinsky, O., Parra, L.C., Measurements and models of electric fields in the *in vivo* human brain during transcranial electric stimulation, *NYC Neuromodulation 2017*, New York, NY, January 2017

Huang*, Y., Liu*, A.A., Lafon, B., Friedman, D., Dayan, M., Wang, X., Devinsky, O., Parra, L.C., Direct experimental validation of transcranial electric stimulation models with intracranial recordings in human, *Society for Neuroscience Annual Meeting 2016*, San Diego, CA, November 2016

Lafon*, B., **Huang*, Y.**, Henin, S., Friedman, D., Melloni, L., Thesen, T., Buzsáki, G., Devinsky, O., Parra†, L.C., Liu†, A.A., Assessment of transcranial electrical stimulation effects on brain rhythms measured by invasive electroencephalography, *Society for Neuroscience Annual Meeting 2016*, San Diego, CA, November 2016

Huang*, Y., Liu*, A.A., Lafon, B., Friedman, D., Dayan, M., Wang, X., Bikson, M., Devinsky, O., Parra, L.C., Measurements and models of electric fields in the *in vivo* human brain during transcranial electric stimulation, *The 3rd Annual Brain Imaging Center (BIC) Symposium*, New York, NY, October 2016

Huang, Y., Parra, L.C., Haufe, S., ICBM-NY: A highly detailed volume conductor model for EEG source localization and TCS targeting, *Society for Neuroscience Annual Meeting 2015*, Chicago, IL, October 2015

Lafon, B., Liu, A.A., **Huang, Y.**, Minhas, P., Kar, K., Bikson, M., Friedman, D., Krekelberg, B., Parra, L.C., Direct experimental validation of computational current-flow models with intracranial recordings in human and non-human primates, *NYC Neuromodulation 2015*, New York, NY, January 2015

Huang, Y., Su, Y., Datta, A., Jiang, Z., Dmochowski, J.P., Rorden, C., Parra, L.C., Automated modeling of targeted non-invasive electrical stimulation of the brain with multiple electrodes, *The 2nd Annual Translational and Molecular Imaging Institute Symposium*, New York, NY, May 2011

Conference Talks

*: authors contributed equally

Huang*, Y., Liu*, A.A., Lafon, B., Friedman, D., Dayan, M., Wang, X., Bikson, M., Doyle, W.K., Devinsky, O., Parra, L.C., Measurements and models of electric fields in the *in vivo* human brain during transcranial electric stimulation, *The 7th Annual Translational and Molecular Imaging Institute Symposium*, New York, NY, April 2017

Invited Seminar Talks

Department of Biomedical Engineering Fall 2016 Seminar Series, Measurements and models of electric fields in the *in vivo* human brain during transcranial electric stimulation, The City College of New York, Oct 26, 2016

Department of Biomedical Engineering Fall 2015 Seminar Series, Computational modeling techniques for transcranial direct current stimulation, and their validations, The City College of New York, Dec 2, 2015

Computer aided design of the body: An overview on using Simpleware to simulate and 3D print organs, The City College of New York, Oct 16, 2015