

Liberty S. Hamilton

Curriculum Vitae

Current Position

2017-present **Assistant Professor**, *Department of Communication Sciences and Disorders, University of Texas at Austin*, Austin, Texas.

Education

2008–2013 **PhD, Neuroscience**, *University of California, Berkeley*, Laboratory of Dr. Shaowen Bao.
Dissertation title: Modulation and manipulation of sound representation in the auditory cortex.

2002–2006 **BA, Neuroscience**, *Scripps College*, Claremont, California.
Cum laude. Additional concentrations in Spanish and Music (piano performance).

Research Experience

2017-present **Assistant Professor of Communication Sciences and Disorders**, *University of Texas at Austin*, Austin, TX, Studies on human speech perception, auditory plasticity, and developmental changes using intracranial electrocorticography (ECoG).

2014–2017 **Postdoctoral Fellow**, *University of California, San Francisco*, San Francisco, CA. Laboratory of Dr. Edward F. Chang, Studies on human speech perception using ECoG and computational modeling.

2008–2013 **Graduate Student Researcher**, *University of California, Berkeley*, Berkeley, CA. Laboratory of Dr. Shaowen Bao, Studies of network interactions in the auditory cortex using in vivo electrophysiology, optogenetics, and computational models.

2006–2008 **Staff Research Associate**, *Laboratory of Neuro Imaging at UCLA (LONI)*, Los Angeles, CA. Laboratory of Dr. Katherine Narr, Analysis of structural MRI, functional MRI, and DTI data in patients with schizophrenia, bipolar disorder, autism, depression, and diabetes.

Peer-Reviewed Publications

2017 Tang C, **Hamilton LS**, Chang EF (2017). Intonational speech prosody encoding in human auditory cortex. *Science*. 357(6353): 797-801.

Baud MO, Kleen JK, Anumanchipalli GK, **Hamilton LS**, Tan Y-L, Knowlton R, Chang EF (2017). Fully-automated detection and localization of interictal discharges in focal epilepsy. *Neurosurgery* (accepted, in press)

2016 Muller LN, **Hamilton LS**, Edwards E, Bouchard K, Chang EF (2016). Spatial resolution dependence on spectral frequency in human speech cortex electrocorticography. *Journal of Neural Engineering* 13: 056013.

Cheung C*, **Hamilton LS***, Johnson K, Chang EF (2016). Auditory Representation of Speech Sounds in Human Motor Cortex. *eLife* 2016; 5:e12577. *Co-first authors.

Hullett PW, **Hamilton LS**, Mesgarani N, Schreiner CE, Chang EF (2016). Human Superior Temporal Gyrus Organization of Spectrotemporal Modulation Tuning Derived from Speech Stimuli. *Journal of Neuroscience* 36(6):2014-2026.

- 2015 Pirnia T, Woods RP, **Hamilton LS**, Lyden H, Joshi SH, Asarnow RF, Nuechterlein K, Narr KL (2015). Hippocampal dysfunction during declarative memory encoding in schizophrenia and effects of genetic liability. *Schizophrenia Research*. 161(2-3):357-366.
- 2013 **Hamilton LS**, Sohl-Dickstein J, Huth AG, Carels VM, Deisseroth K, Bao S (2013). Optogenetic activation of an inhibitory network enhances feedforward functional connectivity in auditory cortex. *Neuron* 80:4 1066-1076.
- Elliott TM, **Hamilton LS**, Theunissen FE (2013). Acoustic structure of the five perceptual dimensions of timbre in orchestral instrument tones. *Journal of the Acoustical Society of America* 133:1 (389-404).
- 2011 Clark KA, Nuechterlein KH, Asarnow R, **Hamilton LS**, Phillips O, Hageman N, Woods R, Alger JR, Toga A, Narr KL. (2011). Mean diffusivity and fractional anisotropy as indicators of disease and genetic liability to schizophrenia. *Journal of Psychiatric Research*. 2011 Jul; 45(7):980-8.
- 2010 Ajilore O, Narr K, Rosenthal J, Pham D, **Hamilton L**, Watari K, Elderkin-Thompson V, Darwin C, Toga A, Kumar A (2010). Regional cortical gray matter thickness differences associated with type 2 diabetes and major depression. *Psychiatry Research: Neuroimaging*. 2010 Nov 30; 184(2):63-70.
- Yang Y, Nuechterlein KH, Phillips O, **Hamilton LS**, Subotnik KL, Asarnow RF, Toga AW, Narr KL (2010). The contributions of disease and genetic factors towards regional cortical thinning in schizophrenia: the UCLA family study. *Schizophrenia Research*. 2010 Nov;123(2-3):116-25.
- 2009 **Hamilton LS**, Altshuler LL, Townsend J, Bookheimer SY, Phillips OR, Fischer J, Woods RP, Mazziotta JC, Toga AW, Nuechterlein KH, Narr KL (2009). Alterations in Functional Activation in Euthymic Bipolar Disorder and Schizophrenia During a Working Memory Task. *Human Brain Mapping* 2009 Dec;30(12):3958-69.
- Narr KL, Szeszko PR, Lencz T, Woods RP, **Hamilton LS**, Phillips O, Robinson D, Burdick KE, Derosse P, Kucherlapati R, Thompson PM, Toga AW, Malhotra AK, Bilder RM (2009). DTNBP1 is associated with imaging phenotypes in schizophrenia. *Human Brain Mapping* 2009 Nov;30(11):3783-94.
- Luders E, Sánchez FJ, Gaser C, Toga AW, Narr KL, **Hamilton LS**, Vilain E (2009). Regional gray matter variation in male-to-female transsexualism. *NeuroImage* 2009 Jul 15;46(4):904-7.
- Luders E, Narr KL, **Hamilton LS**, Phillips OR, Thompson PM, Valle JS, Del-Homme M, Strickland T, McCracken JT, Toga AW, Levitt JG (2009). Decreased Callosal Thickness in Attention-Deficit/Hyperactivity Disorder. *Biological Psychiatry*. 2009 Jan 1; 65(1): 84-88.
- Narr KL, Hageman N, Woods RP, **Hamilton LS**, Clark K, Phillips O, Shattuck DW, Asarnow RF, Toga AW, Nuechterlein KH (2009). Mean diffusivity: A biomarker for CSF-related disease and genetic liability effects in schizophrenia. *Psychiatry Research: Neuroimaging*. 2009 Jan 30; 171(1): 20-32.
- Phillips OR, Nuechterlein KH, Clark KA, **Hamilton LS**, Asarnow RF, Hageman NS, Toga AW, Narr KL (2009). Fiber Tractography Reveals Disruption of Temporal Lobe White Matter Tracts in Schizophrenia. *Schizophrenia Research*. 107(1):30-8.
- 2008 **Hamilton LS**, Levitt JG, O'Neill J, Alger JR, Luders E, Phillips OR, Caplan R, Toga AW, McCracken J, Narr KL (2008). Reduced white matter integrity in attention-deficit hyperactive disorder. *Neuroreport*. 2008 Nov 19; 19(17):1705-8.
- Coscia DM, Narr KL, Robinson DG, **Hamilton LS**, Sevy S, Burdick KE, Gunduz-Bruce H, McCormack J, Bilder RM, Szeszko PR (2008). Volumetric and shape analysis of the thalamus in first-episode schizophrenia. *Human Brain Mapping* 2008 Jun 20.
- Ballmaier M, Narr KL, **Hamilton L**, Kumar A (2008). Hippocampal Morphology and Distinguishing Late-Onset From Early-Onset Elderly Depression. *American Journal of Psychiatry* 2008 Feb; 165(2): 229-37.
- Luders E, Narr KL, Bilder RM, Szeszko PR, Gurbani MN, **Hamilton L**, Toga AW, Gaser C (2008). Mapping the Relationship between Cortical Convolution and Intelligence: Effects of Gender. *Cerebral Cortex* 2008 Sep;18(9):2019-26.

2007 **Hamilton LS**, Narr KL, Luders E, Szeszko PR, Thompson PM, Bilder RM, Toga AW (2007). Asymmetries of cortical thickness: effects of handedness, sex, and schizophrenia. *Neuroreport* 18(14): 1427-1431.

Luders E, Narr KL, Bilder RM, Thompson PM, Szeszko PR, **Hamilton L**, Toga AW (2007). Positive correlations between corpus callosum thickness and intelligence. *Neuroimage* 37(4): 1457-1464.

Preprint Publications (not peer reviewed)

2016 **Hamilton LS***, Edwards E*, Chang EF (2016). Parallel streams define the temporal dynamics of speech processing across human auditory cortex. *Biorxiv* doi: <https://doi.org/10.1101/097485> *co-first authors.

Publications submitted or in preparation

Hamilton LS*, Edwards E*, Chang EF. Parallel streams define the temporal dynamics of speech processing across human auditory cortex (under review) *co-first authors.

Hamilton LS, Chang DL, Lee M, Chang EF. Semi-automated anatomical labeling and inter-subject warping of high-density intracranial recording electrodes in electrocorticography. (under review)

Hamilton LS, Sohl-Dickstein J, Bao S. Experience-dependent modulation of functional connectivity in the auditory cortex (under review)

Sjerps MJ, Leonard MK, **Hamilton LS**, Chang EF. The neural hierarchy of phonetic features (in prep)

Conference Abstracts

2017 **Hamilton LS***, Edwards E*, Chang EF (2017). Parallel streams define the temporal dynamics of speech processing across human auditory cortex. September 2017, International Conference on Auditory Cortex, Banff, Canada.

Tang C, **Hamilton LS**, Chang EF (2017). Cortical responses in human superior temporal gyrus that differentiate intonation contours in speech are a response to pitch, not fundamental frequency. September 2017, International Conference on Auditory Cortex, Banff, Canada.

2016 Tang C, **Hamilton LS**, Chang EF (2016). Cortical representation of speech intonation on human superior temporal gyrus. Society for Neuroscience 2016, San Diego, CA.

Hamilton LS, Chang EF (2016). Feature extraction in the human primary to parabelt auditory cortex. AREADNE 2016, Research in Encoding and Decoding of Neural Ensembles, Santorini, Greece.

Hamilton LS*, Edwards E*, Chang EF (2016). A new human cortical map for temporal analysis of the natural auditory speech scene. Computational and Systems Neuroscience (Cosyne) 2016, Salt Lake City, UT. (*Co-first authors)

2015 Muller L, Chang E, Edwards E, **Hamilton L**, Bouchard K (2015). Spatial resolution dependence on spectral frequency in human electrocorticography: implications for device neurotechnology. Society for Neuroscience 2015, Chicago, IL.

Hamilton LS*, Edwards E*, Chang EF (2015). Multi-scale functional parcellation of cortex by unsupervised activation clustering. Computational and Systems Neuroscience (Cosyne) 2015, Salt Lake City, UT. (*Co-first authors)

2014 **Hamilton LS**, Chang EF (2014). Functional organization of speech perception in the human superior temporal gyrus. 5th International Conference on Auditory Cortex, Magdeburg, Germany. Sept. 2014.

Hamilton LS, Sohl-Dickstein J, Bao S (2014). Sensitive periods for functional connectivity in auditory cortical circuits. Frontiers in Systems Neuroscience. Conference abstract: Computational and systems neuroscience 2014, Salt Lake City, UT.

- 2012 **Hamilton LS**, Sohl-Dickstein J, Huth AG, Bao S (2012). Optogenetic stimulation of an inhibitory network enhances feedforward connectivity in auditory cortex. Society for Neuroscience 2012, New Orleans, Louisiana. (Selected for SfN Student Travel Award)
- 2011 **Hamilton LS**, Davis M, Oldfield C, Bao S (2011). Representation of conspecific vocalizations in mouse auditory cortex. Society for Neuroscience 2011, Washington, D.C.
- Hamilton LS**, Yang S, and Bao S (2011). The role of perisomatic inhibition in cortical processing of natural sounds. FENS-IBRO SfN-sponsored school: Causal Neuroscience - Manipulating Neural Circuits. Bertinoro, Italy.
- 2010 **Hamilton LS**, Elliott TM, and Theunissen F (2010). The perceptual dimensionality of timbre. Gordon Research Conference: Sensory Coding & the Natural Environment 2010, Lewiston, Maine.
- Hamilton LS** and Bao S (2010). Top-down influences on intensity coding in primary auditory cortex. Frontiers in Systems Neuroscience. Conference Abstract: Computational and Systems Neuroscience 2010, Salt Lake City, UT. doi: 10.3389/conf.fnins.2010.03.00129
- 2009 Elliott T, **Hamilton L**, and Theunissen F (2009). Spectrotemporal Modulations Underlying Timbre Perception. Society for Neuroscience 2009, Chicago, IL.
- Theunissen F, Elliott T and **Hamilton L** (2009). Spectrotemporal Modulations Underlying Speech and Timbre Perception. Frontiers in Systems Neuroscience. Conference Abstract: Computational and systems neuroscience 2009, Salt Lake City, UT. doi: 10.3389/conf.neuro.06.2009.03.234

Invited Talks

- 2018 **Symposium, ARO (Association for Research in Otolaryngology) Meeting**. "Linking theoretical and experimental approaches to understand auditory cortical processing". San Diego, CA.
- 2017 **2017 International Conference on Auditory Cortex**. "Parallel streams define the temporal dynamics of speech processing across human auditory cortex". September 2017, Banff, Canada.
- 2017 **UC San Francisco Postdoctoral Seminar Series**, San Francisco CA.
- 2017 **Seminar, Starkey Research Institute, Berkeley, CA**
- 2016 **Seminar, Department of Communication Sciences and Disorders, University of Texas at Austin, Austin, TX**. "Functional organization of the human speech cortex revealed by direct brain recordings". May 2016, Austin, TX.
- 2015 **UC San Francisco Systems Neuroscience Research in Progress Seminar**. "A new human cortical map for temporal analysis of the natural auditory speech scene". December 2015, San Francisco, CA.
- 2015 **Neuropsychology colloquium, VA Hospital, Martinez**. "Feature representation in human auditory cortex during natural speech perception". October 27, 2015, Martinez, CA.
- 2015 **Swartz Computational Neuroscience Conference**. "Feature representation in human primary and secondary auditory cortex during natural speech perception". August 2015, Janelia Research Campus, Ashburn, VA.
- 2014 **5th International Conference on Auditory Cortex - Towards a Synthesis of Human and Animal Research**. "Speech representation in human speech cortex during perception and production". September 2014, Magdeburg, Germany.

Honors and awards

2017	Travel Award , Sponsored by the National Institutes on Deafness and Other Communication Disorders through the National Institutes of Health. International Conference on Auditory Cortex 2017, Banff, Canada	\$750
	Faculty Travel Grant , University of Texas at Austin, International Conference on Auditory Cortex 2017, Banff, Canada	\$1200
2015	Swartz Fellow representative from UCSF for Swartz Computational Meeting 2015.	
2014	Ruth L. Kirschstein National Research Service Award (F32 – 1F32DC014192-01). “The spatiotemporal dynamics of cortical speech representation”. Impact score: 10.	\$154,662
2014	Cosyne Travel Fellowship . Computational and Systems Neuroscience Conference, Salt Lake City, Utah. February 2014.	\$500
2012	Society for Neuroscience Student Travel Award , Society for Neuroscience Meeting 2012, New Orleans, Louisiana.	\$1,000
2011	Graduate Division Travel Fellowship , University of California, Berkeley for FENS - IBRO SfN-sponsored school in Bertinoro, Italy - “Causal Neural Circuits”.	\$500
2010	Gatsby Travel Fellowship , Gordon Research Conference, Sensory Coding & the Natural Environment	\$500
2009-2012	National Science Foundation Graduate Fellowship	\$91,000
2002-2006	James E. Scripps Scholarship Half tuition merit scholarship.	\$60,000
2002-2006	Scripps College National Merit Scholarship	\$8,000

Software

- 2017 **img_pipe**, a python package for electrode localization, anatomical labeling, and warping, Written by Hamilton LS, Chang DL, Lee MB, Chang EF, Available at https://www.github.com/ChangLabUcsf/img_pipe.

Teaching experience

- 2017 **“Anatomy and Physiology of the Auditory System” – University of Texas at Austin**, Assistant Professor, Graduate level course for Audiology (AuD) students. CSD391P/Q.
- 2011 **“Intro to Neurobiology” - University of California, Berkeley**, Graduate Student Instructor, upper division undergraduate neuroscience course. (Profs. Yang Dan, Ehud Isacoff, and John Ngai).
- 2010 **“Intro to Brain, Mind, and Behavior” - University of California, Berkeley**, Graduate Student Instructor, lower division undergraduate neuroscience course for non-majors. (Prof. David Presti).

Service

- 2017 **Faculty Search Committee**, *Communication Sciences and Disorders*, UT Austin.
- 2016 **Technical Committee Member**, *Workshop on Speech Engineering and the Computational Neuroscience of Speech (SECNS)*, a satellite conference of *INTERSPEECH 2016*.
- 2016-2017 **Abstract Reviewer**, *Society for Neurobiology of Language*.
- 2017-present **Reviewer**, *NeuroImage*.
- 2017-present **Reviewer**, *PLoS Computational Biology*.
- 2015-present **Reviewer**, *Journal of Neuroscience*.
- 2015-present **Reviewer**, *Brain Research*.
- 2014-present **Reviewer**, *Human Brain Mapping*.
- 2012-2013 **Design Team**, *Berkeley Science Review*, University of California, Berkeley.
- Created layouts including photos and infographics for student-run science magazine using Adobe Creative Suite
 - Created accompanying interactive web graphics using JavaScript d3.js.

2011-2012 **Student representative for Neuroscience Admissions Committee**, *Helen Wills Neuroscience Institute, University of California, Berkeley.*

- Read and ranked >300 applications submitted to the graduate program in Neuroscience at UC Berkeley
- Solicited feedback from students during interviews and reported back to faculty committee