BIOGRAPHICAL SKETCH

NAME Brian Litt	POSITION TITLE Associate Professor of Neurology and Biomedical Engineering; Director EEG Laboratory, University of Pennsylvania
eRA COMMONS USER NAME LITTBR	

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	MM/YY	FIELD OF STUDY
Harvard University, Cambridge MA	A.B.	05/82	Engineering & Appl. Sci.
Johns Hopkins Univ. School of Medicine	M.D.	05/86	Medicine
Johns Hopkins Hospital, Baltimore, MD	Intern	06/87	Intern, Internal Medicine
Johns Hopkins Univ. Applied Physics Lab	Fellow	06/88	Dana Research Fellow
Johns Hopkins Hospital, Baltimore, MD		06/91	Neurology Residency
Johns Hopkins Hospital, Baltimore, MD	Residency	07/90-06/91	Chief Neurology Resident
Johns Hopkins Hospital, Baltimore, MD		06/93	Fellowship, Epilepsy & Clin. Neurophys.

A. Personal Statement

The Litt lab focuses on applying engineering technology to mapping and modulating functional networks in brain to understand and treat human disease, particularly epilepsy. The lab innovates in the areas of hardware design, machine learning, brain-computer interfaces, and translating this work into implantable devices. Our collaborative group is composed of clinical and experimental scientists and engineers. The lab emphasizes training in research, hosting 15 doctoral candidates 10 post-doctoral researchers the past five years.

B. Positions and Honors

Positions and Employment

6/79-8/79 Non-Newtonian Fluid Mechanics, U.S. Government Aberdeen Proving Grounds, Aberdeen MD
6/80-8/80 Systems Applications Programmer, Johns Hopkins University Applied Physics Laboratory
6/81-8/81 Systems Design, Programming, Signal Processing, Cardiovascular Physiology
Department of Biomedical Engineering, Johns Hopkins University School of Medicine, Balt., MD
5/82-8/82 Systems Analysis Engineer, U.S. Government Aberdeen Proving Grounds, Aberdeen MD
1987-1988 Dana Foundation Fellow, Research in Magnetoencephalography, Johns Hopkins University
Applied Physics Laboratory, Johns Hopkins University School of Medicine
1990-1991 Chief Resident in Neurology, Johns Hopkins Hospital
1991-1996 Attending Neurologist, Sinai Hospital of Baltimore
1993-1994 Instructor in Neurology, Johns Hopkins University School of Medicine
1993-1996 Attending Neurologist, Johns Hopkins Hospital
1994-1996 Assistant Professor, Neurology and Medicine, Johns Hopkins University School of Medicine
1994-1996 Co-Director, EEG Lab, Division of Neurology, Sinai Hospital, Baltimore, MD
1996-1999 Director, EEG Laboratory, Asst. Professor of Neurology, Emory University School of Medicine
1999-2004 Assistant Professor of Neurology and Bioengineering, University of Pennsylvania
1999-2002 Director, Epilepsy Surgery Program, Co-Dir. EEG Laboratory Department of Neurology, UPenn
7/01-7/02 Acting Director, Intraoperative Monitoring, Hospital of the University of Pennsylvania
6/1999- Director, EEG Lab, Hospital of the University of Pennsylvania,
7/2004- Associate Professor of Neurology and Bioengineering, University of Pennsylvania
2008- Director, Epilepsy Surgery Program, Hospital of the University of Pennsylvania
7/2009- Associate Professor with Tenure, Bioengineering, University of Pennsylvania
7/2009- Associate Professor with Tenure, Neurology, University of Pennsylvania

Honors and Awards

1982-6 March of Dimes Scholarship Award for Medical Training
1986 Dana Foundation Research Fellowship Award: Magnetoencephalography
1991 Johns Hopkins Hospital "Resident Teacher of the Year" Award
1991 Merritt-Putnam Fellowship Grant
1992 William Gowers Fellowship Grant
2000 Whitaker Foundation Bioengineering Research Fellowship
2003 American Academy of Neurology Penry-Dreifus Award
2004 Klingenstein Fellowship Award in the Neurosciences
2004 Presidential Symposium Lecturer, American Epilepsy Society National Meeting
2005 Elected to the American Neurological Association
2006 Presidential Symposium Speaker, American Neurological Association National Mtg, San Diego, CA

C. 15 Selected relevant peer-reviewed publications (Selected from over 50 peer-reviewed publications

1. Stead S, Bower M, Brinkmann B, Lee K, Marsh R, Myer F, Litt B, VanGompel J, Worrell G. Microseizures and the Spatiotemporal Scales of Human Partial Epilepsy. **Brain**, *2010, Aug*. 4.

2. Viventi J, Kim DH, Moss J, Kim Y-S, Blanco J, Anetta N, Hicks A, Xiao J, Huang Y, Callans DJ, Rogers JA, Litt B. A Conformal, Bio-interfaced Class of Silicon Electronics for Mapping Cardiac Electrophysiology. Science Translational Medicine**.** (cover) 2010; 2(24):24ra22. NIHMSID:NIHMS209374.

3. Kim DH, Viventi J, Amsden J, Xiao J, Vigeland L, Kim Y-S, Blanco J, Frechette E, Contreras D, Kaplan D, Omenetto F, Huang Y, Hwang K-C, Zakin M, Litt B, Rogers JA. Dissolvable Films of Silk Fibroin for Ultrathin, Conformal Bio-Integrated Electronics. Nature Materials (cover) 2010 Jun;9(6):511-7. Epub 2010 Apr 18.

4. Stacey WC, Lazarewicz MT, Litt B. Synaptic noise and physiological coupling generate high-frequency oscillations in a hippocampal computational model. J Neurophysiol. 2009;102(4):2342-57. PMCID:PMC2775383

5. Worrell GA, Gardner AB, Stead SM, Hu S, Goerss S, Cascino GJ, Meyer F B, Marsh R, Litt B. High-frequency oscillations in human temporal lobe: simultaneous microwire and clinical macroelectrode recordings. Brain. 2008;131(4):928-37. PMCID: PMC2760070.

6. Stacey WC, Litt B. Technology insight: neuroengineering and epilepsy-designing devices for seizure control. Nat Clin Pract Neurol. 2008;4(4):190-201. PMCID: PMC 2904395.

7. Wong S, Gardner AB, Krieger AM, Litt B. A stochastic framework for evaluating seizure prediction algorithms using hidden Markov models. J Neurophysiol. 2007;97(3):2525-32. PMCID: PMC2230664.

8. Firpi H, Smart O, Worrell G, Marsh E, Dlugos D, Litt B. High-frequency oscillations detected in epileptic networks using swarmed neural-network features. Ann Biomed Eng. 2007;35(9):1573-84.

9. Gardner AB, Krieger A, Vachtsevanos G, Litt B. One-Class Novelty Detection for Seizure Analysis from Intracranial EEG. Journal of Machine Learning Research. 2006;7:1025-44.

10. D'Alessandro M, Vachtsevanos G, Esteller R, Echauz J, Cranstoun S, Worrell G, Parish L, Litt B. A multi-feature and multi-channel univariate selection process for seizure prediction. Clin Neurophysiol. 2005;116(3):506-16.

11. Worrell GA, Parish L, Cranstoun SD, Jonas R, Baltuch G, Litt B. High-frequency oscillations and seizure generation in neocortical epilepsy. Brain. 2004;127(Pt 7):1496-506.

12. Parish LM, Worrell GA, Cranstoun SD, Stead SM, Pennell P, Litt B. Long-range temporal correlations in epileptogenic and non-epileptogenic human hippocampus. Neuroscience. 2004;125(4):1069-76.

13. Kerrigan JF, Litt B, Fisher RS, Cranstoun S, French JA, Blum DE, Dichter M, Shetter A, Baltuch G, Jaggi J, Krone S, Brodie M, Rise M, Graves N. Electrical stimulation of the anterior nucleus of the thalamus for the treatment of intractable epilepsy. Epilepsia. 2004;45(4):346-54.

14. D'Alessandro M, Esteller R, Vachtsevanos G, Hinson A, Echauz J, Litt B. Epileptic seizure prediction using hybrid feature selection over multiple intracranial EEG electrode contacts: a report of four patients. IEEE Trans Biomed Eng. 2003;50(5):603-15.

15. Litt B, Esteller R, Echauz J, D'Alessandro M, Shor R, Henry T, Pennell P, Epstein C, Bakay R, Dichter M, Vachtsevanos G. Epileptic seizures may begin hours in advance of clinical onset: a report of five patients. Neuron. 2001;30(1):51-64.

Patents, Editorials, Reviews, and Book Chapters: on request

D. Research Support It is supposed to begin with most relevant to research proposed. Note- need to include your responsibilities (ie please check for accuracy where highlighted)

1U24NS063930-01A1 Litt (PI) 02/15/2010 – 01/31/2015
The International Epilepsy Electrophysiology Database
This project focuses on collecting complete, high resolution, high quality electrophysiology from humans and animal models of epilepsy implanted with intracranial electrodes. These data, and supporting metadata, will be collected from top centers in the North America, and linked with a related database in Europe. Data and tools for viewing and manipulating data will be posted for sharing/ international use.
Role: PI

R01 NS 48598-04 Litt (PI) 09/23/2008 – 07/31/2011 (no cost extension)
Evolution of Seizure Precursors in Epilepsy
The major goals of this project are to gather intracranial data from a wide variety of adults and children with refractory epilepsy implanted with intracranial electrodes and use statistical methods to understand how epileptic seizures are generated in these patients through quantitative analysis of intracranial EEG.
Role: PI

RO1 NS 48598-04 Litt (PI) 08/01/05 – 07/31/2011
Evolution of Seizure Precursors in Epilepsy
The major goal of this project is to collect, annotate, and post for download a "gold standard" data set of scalp EEG recordings for investigators to use in the training and testing of portable EEG systems.
Role: PI

RO1 NS 041811-01 Dichter (PI) 01/01/2007-12/31/2012
An Implantable Device to Predict and Prevent Seizures, Bioengineering Research Partnership
The major goals of this project are to develop methods to predict and arrest seizures using electrical stimulation and to understand mechanisms underlying seizure generation in animal models of epilepsy.
Role: Co-investigator

RO1 MH 061975-07A2 Kahana (PI) 07/01/2007-06/30/2012
Electrophysiology in Human Spatial Cognition
The major goal of this grant is to show that brain oscillations are generated in almost every part of the brain and that they play a wide range of functions in both human and animal cognition.
Role: Co-investigator

1R21 NS 067316-01 Kahana (PI) 09/30/2009-8/31/2011
Intracranial EEG for Neuronal Oscillatory Contingency during Cognitive Tasks
The major goals of this project are to map cognitive networks in patients implanted with intracranial electrodes during evaluation for epilepsy surgery.
Role: Co-investigator

Dana Foundation Kahana (PI) 02/01/08-01/31/11
Intracranial EEG for Theta Rhythm Contingency During Cognitive Tasks
The major goal of this grant is to understand the nature of theta oscillations in patients implanted with intracranial electrodes during evaluation for epilepsy surgery during cognitive tasks that that decompose memory encoding and decoding.
Role: Co-investigator

RO1 NS 630391 A1 Worrell(PI) 04/05/09-3/31/2011
Microseizure, Ultra-slow & High Frequency Oscillations: Biomarkers of Epilepsy
The major goal of this grant is to map the spatial distribution of high frequency oscillations in human epileptic networks and determine their relationship to outcome after epilepsy surgery. The grant focuses on simultaneous macro and microelectrode recordings in patients undergoing epilepsy surgery at the Mayo Clinic and the University of Pennsylvania.
Role: Co-investigator