# Fa-Hsuan Lin

1498 Beacon Street #2
Brookline, MA 02446, USA
Tel: +1-617-2324928
E-mail: fhlin@nmr.mgh.harvard.edu

Date of Birth: Feb. 15 1972
Citizenship: Taiwan
http://www.nmr.mgh.harvard.edu/~fhlin

## EDUCATION

Feb. 2004 — *Doctor of Philosophy* in Electrical and Medical Engineering
**Harvard University-Massachusetts Institute of Technology,** Cambridge, MA, USA
Harvard-MIT Division of Health Science and Technology
Department of Electrical Engineering/Computer Science, MIT

June 1996 — *Master of Science* in Electrical Engineering (Biomedical Engineering)

June 1994 — *Bachelor of Science* in Electrical Engineering
**National Taiwan University,** Taipei, Taiwan
Department of Electrical Engineering

## RESEARCH EXPERIENCE

Jan. 2004- — Research fellow in Radiology, Harvard Medical School, Boston, MA, USA
Research fellow, Department of Radiology, Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown, MA, USA

"Spatiotemporal Brain Imaging and Modeling"
Structural and functional multi-modal neuroimaging using fMRI/MEG/EEG for studies of sensorimotor and cognitive systems of human brain in both control and patient populations

Advisors: John W. Belliveau, Ph.D, Matti S. Hämäläinen, Ph.D., Steven M. Stufflebeam, M.D.

Jan. 1999-Dec. 2003 — Research assistant, Massachusetts General Hospital-NMR center, Charlestown, MA, USA

"Functional Cerebral Network Analysis"
Detection and estimation of the distributed functional cerebral network in by fMRI/MEG/EEG

Advisor: John W. Belliveau, Ph. D.

Jan. 1999-Dec. 2003 — Research assistant, Massachusetts General Hospital-NMR center, Charlestown, MA, USA

"Parallel imaging and optimization of Radio-frequency Coils in MRI"
Optimizing RF coils at 1.5 T and 3 T scanners and the associated parallel imaging techniques, such as SENSE/SMASH imaging

Advisors: Lawrence L. Wald, Ph. D, Kenneth K. Kwong Ph. D.

Sep. 1995 - Sep. 1996 Research assistant, National Yang-Ming University, Veteran General Hospital, Taipei, Taiwan

"Optimization of Head Phased Array Coil"
Analysis, design and implementation of head phased array RF coil in 1.5 T MRI scanner

Advisor: Wei-Peng Kuan, Ph. D.

**HONOR**

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| 1999-2004 | Athinoula A. Martinos Scholar Fellowship, Harvard-MIT Divisions of Health Sciences and Technology, MIT, Cambridge, MA, USA |
| 2003 | Travel Grant Program, Cambridge Science Foundation Inc., Cambridge, MA, USA |
| 2003 | Junior Scientist Program, 14th Conference of the International Society for Brain Electromagnetic Topography, November 19-23, 2003, Santa Fe, New Mexico, USA |
| 2000-2001, 2003-2004 | Travel award, Organization for Human Brain Mapping annual conference, Minneapolis, MN, USA |
| 1996, 2001-2002, 2004 | Student stipend, International Society of Magnetic Resonance in Medicine annual conference, Berkeley CA, USA |
| 1998-2001 | Fellowship of the Ministry of Education in biomedical engineering, Taiwan |

**PROFESSIONAL ACTIIVTIES**

International Society of Magnetic Resonance in Medicine (ISMRM): membership since 1995

The Organization of Human Brain Mapping (OHBM): membership since 1998

Ad-hoc reviewer: *NeuroImage*, *IEEE Transaction on Medical Imaging*, *MAGMA*

**INVITED TALKS**

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| 15-17, October, 2004 | The second international workshop on parallel MRI, Zurich, Switzerland |

**PUBLICATIONS**
**Journal Papers**

"Assessing and improving the spatial accuracy in MEG source localization by depth-weighted minimum-norm estimates ", Fa-Hsuan Lin, Thomas Witzel, Seppo P. Ahlfors, Steven M. Stufflebeam, John W. Belliveau, Matti S. Hamaleinen, *NeuroImage (2005), in revision*

“Cancellation of MEG and EEG signals generated by simultaneous sources”, Seppo P. Ahlfors, Fa-Hsuan Lin, Suresh Narayanan, Thomas Witzel, Eric Halgren, *Human Brain Mapping (2005) in revision*

“Propeller EPI: an MR imaging technique suitable for diffusion tensor imaging at high field strength with reduced geometric distortions”, Fu-Nien Wang, Teng-Yi Huang, Fa-Hsuan Lin, Tzu-Chao Chuang, Nan-Kuei Chen, Hsiao-Wen Chung, Cheng-Yu Chen, Kenneth K Kwong, *Mag. Reson. Med. (2005) in press*

"Distributed Current Estimates with a Cortical Orientation Constraint”, Fa-Hsuan Lin, John W. Belliveau, Anders M. Dale, Matti S. Hämäläinen, *Human Brain Mapping (2005) in press*

"Functional MRI Using Regularized Parallel Imaging Acquisition", Fa-Hsuan Lin, Teng-Yi Huang, Nan-Kuei Chen, Fu-Nien Wang, Steven M. Stufflebeam, John W. Belliveau, Lawrence L. Wald, Kenneth K. Kwong, *Mag. Reson. Med. (2005) Vol. 54 (2), pp 343-353*

"Wavelet-based Spectral Spatiotemporal Mapping in the Human Brain", Fa-Hsuan Lin, Thomas Witzel, Matti S. Hämäläinen, Anders M. Dale, John W. Belliveau, Steven M. Stufflebeam, *NeuroImage (2004) Vol. 23(2) pp 582-595*.

"Human Posterior Auditory Cortex Gates Novel Sounds to Consciousness", Iiro P. Jaaskelainen, Jyrki Ahveninen, Giorgio Bonmassar, Anders M. Dale, Risto J. Ilmoniemi, Sari Levanen, Fa-Hsuan Lin, Patrick May, Jennifer Melcher, Steven Stufflebeam, Hannu Tiitinen, John W. Belliveau, *Proc. Nat. Acad. Sci. (2004) Vol 101 (17), pp. 6809-6814*

"Parallel Imaging Reconstruction Using Automatic Regularization", Fa-Hsuan Lin, Kenneth K Kwong, John W. Belliveau, Lawrence L. Wald, *Mag. Reson. Med.* (2004) *Vol. 51 (3), pp 559-567*

"A Degenerate Mode Birdcage Volume Coil for Sensitivity Encoded Imaging", Fa-Hsuan Lin, Kenneth K Kwong, Ing-Jye Huang, John W. Belliveau, Lawrence L. Wald, *Mag. Reson. Med.* (2003) *Vol. 50 (5), pp 1107-1111*

"Multivariate Analysis of Neuronal Interactions in the Generalized Partial Least Squares Framework: Simulations and Empirical Studies", Fa-Hsuan Lin, Anthony R. McIntosh, John Agnew, Guinevere F. Eden, Thomas A. Zeffiro, John W. Belliveau, *NeuroImage (2003) Vol. 20(2) pp 625-642*.

"A wavelet-based approximation of surface coil sensitivity profiles for correction of image intensity inhomogeneity and parallel imaging reconstruction", Fa-Hsuan Lin, Ying-Jui Chen, John W. Belliveau, Lawrence L. Wald, *Human Brain Mapping (2003), Vol. 19, 2, pp. 96-111*

"Quantitative spatial/spectral analysis of phased array coil", Fa-Hsuan Lin, Wei-peng Kuan, Shyh-kang Jeng, Jyh-horng Chen, *IEEE Transaction on Medical Imaging, Vol. 18, No. 12, December, 1999, pp. 1129-1137*

"Quantitative spatial/spectral analysis of radio-frequency coil based on method of moment", Fa-Hsuan Lin, Shyh-kang Jeng, Wei-peng Kuan, Jyh-horng Chen, *IEEE Transactions on Magnetics, Vol. 354, July 1999, pp. 2118 –2127*

**Conference Abstracts**

"Static and Dynamic Granger Causality in Epileptic spike propagation", Fa-Hsuan Lin, Keiko Hara, John W. Belliveau, Steven M. Stufflebeam, *11th International Conference on Functional Mapping of the Human Brain, Toronto, Canada, (2005); s38*

"Spectral Spatiotemporal and Causality Analysis of Human Somatomotor Neural Network", Fa-Hsuan Lin, Tommi Raij, Jyrki Ahveninen, Sari Levanen, Steven M. Stufflebeam, John W. Belliveau, Bruce R. Rosen, Matti S. Hamalainen, *11th International Conference on Functional Mapping of the Human Brain, Toronto, Canada, (2005); s38*

"Comparison of SENSE and GRAPPA Reconstruction for Proton-Echo-Planar-Spectroscopic-Imaging (PEPSI)", Shang-Yueh Tsai, Arvind Caprihan, Stefan Posse, Fa-Hsuan Lin, 1*1th International Conference on Functional Mapping of the Human Brain, Toronto, Canada, (2005); s43*

"Can dSPM show Hemispheric Language Dominance?", Keiko Hara , Fa-Hsuan Lin , Deirdre Foxe , Steven Stufflebeam, *11th International Conference on Functional Mapping of the Human Brain, Toronto, Canada, (2005); s52*

“Sensitivity Encoded Proton Echo Planar Spectroscopic Imaging (PEPSI) on Human Brain", Fa-Hsuan Lin, Arvind Caprihan, Lawrence L. Wald, John W. Belliveau, Stefan Posse, *Proc. Intl. Soc. Mag. Reson. Med. (2005); 489*

“Variable-Density Sensitivity Encoded Functional MRI", Fa-Hsuan Lin, Nan-Kuei Chen, Lawrence L. Wald, John W. Belliveau, *Proc. Intl. Soc. Mag. Reson. Med. (2005); 2666*

“PROPELLER EPI with Parallel Imaging on High Resolution DTI at 3T",T-C. Chuang, T-Y. Huang, F-H. Lin, F-N. Wang, C-W. Ko, K. Kwong, H-W. Chung, Proc. *Intl. Soc. Mag. Reson. Med. (2005); 9*

"Human brain areas involved in perception of symmetrical and asymmetrical optic flow speeds across visual fields: An fMRI study", Y-H. Chou, F-H. Lin, L. P. Panych, N-K. Chen, *Proc. Intl. Soc. Mag. Reson. Med. (2005); 565*

“A 96-channel MRI System with 23- and 90-channel Phase Array Head Coils at 1.5 Tesla", G. C. Wiggins, A. Potthast, C. Triantafyllou, F. Lin, T. Benner, C. J. Wiggins, L. Wald, *Proc. Intl. Soc. Mag. Reson. Med. (2005); 671*

“Impact of regularization on the point-spread function of the MEG minimum-norm estimates”, Fa-Hsuan Lin, Thomas Witzel, Seppo P. Ahlfors, Steven M. Stufflebeam, John W. Belliveau, Matti S. Hämäläinen, *14th International Conference on Biomagnetism, Boston, MA, USA (2004); 485.*

“Wavelet-based Spectral Spatiotemporal Map Predicts Propagation of Epileptic Spikes”, Fa-Hsuan Lin, Keiko Hara, John W. Belliveau, Eric Halgren, Steven M. Stufflebeam, *14th International Conference on Biomagnetism, Boston, MA, USA (2004); 750*

“Functional MRI Using Regularized Sensitivity Encoded Echo-Planar Imaging”, Fa-Hsuan Lin, Teng-Yi Huang, Nan-Kuei Chen, Fu-Nien Wang, Christina Triantafyllou, Lawrence L. Wald, John W. Belliveau, Kenneth K. Kwong, *10th International Conference on Functional Mapping of the Human Brain, Budapest, Hungary, (2004); s58*

“Assessment and improvement on the spatial accuracy in MEG source localization by depth weighting corrected minimum-norm estimate”, Fa-Hsuan Lin, Thomas Witzel, Seppo P. Alfhor, Steven M. Stufflebeam, John W. Belliveau, Matti S. Hämäläinen, *10th International Conference on Functional Mapping of the Human Brain, Budapest, Hungary, (2004); s46*

“Sensitivity Encoded Image Reconstruction Using Direct Regularization”, Fa-Hsuan Lin, Fu-Nien Wang, Teng-Yi, Huang, Matti S. Hamalainen, Kenneth K. Kwong, John W. Belliveau, Lawrence L. Wald, *Proc. Intl. Soc. Mag. Reson. Med. (2004); 2412*

“Propeller EPI with SENSE parallel imaging using a circularly symmetric phase array RF coil”, Tzu-Chao Chuang, Teng-Yi Huang, Fa-Hsuan Lin, Fu-Nien Wang, Hsiao-Wen Chung, Cheng-Yu Chen, Kenneth K. Kwong, *Proc. Intl. Soc. Mag. Reson. Med. (2004); 535*

"Propeller EPI: application to diffusion tensor imaging", Fu-Nien Wang, Teng-Yi Huang, Fa-Hsuan Lin, Hsiao-Wen Chung, David S. Tuch, Ming-Chung Chou, Cheng-Yu Chen, Kenneth K. Kwong, *Proc. Intl. Soc. Mag. Reson. Med. (2004); 2462*

"Minimum-current estimates with a cortical orientation constraint", Fa-Hsuan Lin, John W. Belliveau, Anders M. Dale, and Matti S. Hämäläinen *9th International Conference on Functional Mapping of the Human Brain, New York City, USA, (2003): 2,877*

"Working memory processing of visual location and color", Fa-Hsuan Lin, Leonardo Angelone, Giorgio Bonmassar, John W. Belliveau, Synnöve Carlson, *9th International Conference on Functional Mapping of the Human Brain, New York City, USA, (2003): 2,464*

"Characterization of MEG/EEG signals generated by simultaneous sources", Seppo P. Ahlfors, Fa-Hsuan Lin, Thomas Witzel, Anders M. Dale, John W. Belliveau, Eric Halgren, 13th international conference in Biomagnetism, Jena, Germany (2002)

"Spatiotemporal Mapping of Cortical Oscillations", Thomas Witzel, Steven M. Stufflebeam, Fa-Hsuan Lin, Matti S. Hämäläinen, Eric Halgren, Anders M. Dale, 13th international conference in Biomagnetism, Jena, Germany (2002)

"Localization of cortical activity using parsimonious linear estimates", Fa-Hsuan Lin, Seppo P. Ahlfors, Matti S. Hämäläinen, John W. Belliveau, Anders M. Dale, *8th International Conference on Functional Mapping of the Human Brain, Sendai, Japan, (2002); 466*

**"**Multivariate modeling of voluntary movements and behavior using Partial Least Squares", Fa-Hsuan Lin, David S. Tuch , John Agnew , Thomas A. Zeffiro , John W. Belliveau, *8th International Conference on Functional Mapping of the Human Brain, Sendai, Japan (2002); 467*

"Dissociation of auditory N1m into anterior and posterior components using fMRI-constrained MEG", Fa-Hsuan Lin, Iiro P. Jääskeläinen, Jyrki Ahveninen, Giorgio Bonmassar, Risto J. Ilmoniemi, Steven Stufflebeam, Lawrence Wald, Jennifer Melcher, Anders M. Dale, John W. Belliveau, *8th International Conference on Functional Mapping of the Human Brain, Sendai, Japan (2002); 664*

"Differential Post-Stimulus Inhibition of N1 Activity Underlies Mismatch Response Generation at the Human Auditory Cortex", Iiro P. Jaaskelainen ,Jyrki Ahveninen , Giorgio Bonmassar , Patrick May , Risto Ilmoniemi , Sari Levanen , Fa-Hsuan Lin , Steven Stufflebeam, Jennifer Melcher , Anders Dale , Hannu Tiitinen , John Belliveau. *Proc. Intl. Soc. Mag. Reson. Med. (2002); 1471*

"Reconstruction of sensitivity encoded images using regularization and discrete time wavelet transform estimates of the coil maps ", Fa-Hsuan Lin**,** Kenneth K Kwong, Ying-Jui Chen, John W. Belliveau, Lawrence L. Wald. *Proc. Intl. Soc. Mag. Reson. Med. (2002); 2389*

"Sensitivity encoded imaging from multiple mode birdcage volume coil", Fa-Hsuan Lin**,** Kenneth K Kwong, John W. Belliveau, Lawrence L. Wald, *Proc. Intl. Soc. Mag. Reson. Med. (2002); 853*

"Removing signal intensity inhomogeneity from surface coil MRI using discrete wavelet transform and wavelet packet", Fa-Hsuan Lin, Ying-Jui Chen, John W. Belliveau, Lawrence L. Wald, *Engineering in Medicine and Biology Society, 2001. Proceedings of the 23rd Annual International Conference of the IEEE, Volume: 3 , (2001):* 2793 -2796

“Cancellation of MEG and EEG signals with distributed source activation on realistic cortical surface”, Fa-Hsuan Lin, Seppo P. Ahlfors, Thomas Witzel, Anders M. Dale, Bruce R. Fischl, Arthur K. Liu, John W. Belliveau, Eric Halgren, *Neuroimage (2001) 13:6 part 2 of 2,186*

“Multiple subject effective connectivity analysis of voluntary movement”, Fa-Hsuan Lin, Anthony R. McIntosh, John Agnew, Thomas A. Zeffiro, John W. Belliveau, *Neuroimage (2001) 13:6 part 2 of 2,1211*

“Estimation of coil sensitivity map and correction of surface coil magnetic resonance images using wavelet decomposition”, Fa-Hsuan Lin, Lawrence L. Wald, Ying-Jui Chen, John W. Belliveau *Proc. Intl. Soc. Mag. Reson. Med. (2001); 801*

“Comparison of orthogonal and independent component analysis on dimension-reduced fMRI data in Patial Least Squares framework”, Fa-Hsuan Lin, Anthony R. McIntosh, Thomas A. Zeffiro, John Agnew, John Belliveau, *Proc. Intl. Soc. Mag. Reson. Med. (2001); 1730*

“Movement rate modulation of cortical motor systems investigated with Partial Least Square analysis “, Fa-Hsuan Lin, John Agnew, Thomas A. Zeffiro, Guinevere F. Eden, Anthony R. McIntosh, John W. Belliveau, *Neuroimage (2000) 11: part 2 of 2, 837*

“Detection of visual attention using Partial Least Squares (PLS) Analysis of fMRI data”, Fa-Hsuan Lin, Anthony R McIntosh, Gary Strangman, Giorgio Bonmassar, Gregory V. Simpson and John W. Belliveau, *Proc. Intl. Soc. Mag. Reson. Med. (2000); 851*

“SENSE Imaging using a transmission line volume phased array”, Fa-Hsuan Lin, Patrick J. Ledden, Kenneth K. Kwong, John W. Belliveau, Lawrence L. Wald, *Proc. Intl. Soc. Mag. Reson. Med. (2000); 931*

"A generalized time-harmonic algorithm for simulation of radio-frequency coils in magnetic resonance", Kai-hsiang Chuang, Fa-Hsuan Lin, Shyh-Kang Jeng, *ESMRMB annual metting, Geneva, Switzerland, 1998*

"Quantitative optimization of birdcage coil for homogeneity in high field magnetic resonance", Fa-Hsuan Lin, *Magnetic Resonance Materials in Physics, Biology, and Medicine, p. 186; vol V; number II, 1997.*

"Quantitative spatial/spectral analysis of phased array coil", Fa-Hsuan Lin, Syh-kang Jeng, Wei-peng kuan, Jyh-horng Chen, *Engineering in Medicine and Biology Society, 18th Annual International Conference of the IEEE, Vol. 5, 1997, pp. 2281 -2282*

"Optimization of head phased array coil in MRI", Fa-Hsuan Lin, Wei-peng Kuan, Shyh-kang Jeng, Jyh-horng Chen, *ISMRM Fourth Meeting, New York, U. S. A., 1996*

"Quantitative spatial/spectral analysis of birdcage coil", Fa-Hsuan Lin, Wei-peng Kuan, Shyh-kang Jeng, Jyh-horng Chen, *ESMRMB annual meeting, Prague, Czech Rep., 1996*