# Fa-Hsuan Lin

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Date of Birth: Feb. 15 1972
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## EDUCATION

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| 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

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| Nov. 2007- | Assistant Professor in Radiology, Harvard Medical School, Boston, MA, USA |
| Oct. 2005- | Assistant in Neuroscience, Department of Radiology, Athinoula A. Martinos Center for Biomedical Imaging, Massachusetts General Hospital, Charlestown, MA, USA |
| Oct. 2005-Nov. 2007 | Instructor in Radiology, Harvard Medical School, Boston, MA, USA |
| Mar. 2004-Oct. 2005 | 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 |
| | 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 |
| | Advisor: John W. Belliveau, Ph.D. |
| Jan. 1999-Dec. 2003 | Research assistant, Massachusetts General Hospital-NMR center, Charlestown, MA, USA |
| | Advisors: Lawrence L. Wald, Ph.D., Kenneth K. Kwong Ph.D. |

## HONOR

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| 2006 | Sam Williamson Prize in Biomagnetism Research, 15$^{th}$ International Conference on Biomagnetism, Vancouver, Canada |
| 2006 | I. I. Rabi Young Investigator Award, International Society of Magnetic Resonance in Medicine |

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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 |

**GRANTS**

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| NIH, NIBIB (R21) | "Dynamic Magnetic Resonance Inverse Imaging", Principle Investigator |
| 1R21EB007298 | |
| 09/14/2007 – 08/31/2009 | |

**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*, *Magnetic Resonance in Medicine*, *IEEE Transaction on Medical Imaging*, *MAGMA*

**INVITED TALKS**

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| 17, June, 2008 | Symposium: “Mapping Neuronal Current by Magnetic Resonance Imaging”, The 14$^{th}$ annual meeting of the organization for human brain mapping, Melbourne, Australia |
| 8, January, 2008 | “Highly parallel MRI and MR inverse imaging", Helsinki University of Technology, Helsinki, Finland |
| 15, June, 2006 | Morning workshop: "Directional Influence in Large-Scale Cortical Networks", The 12$^{th}$ annual meeting of the organization for human brain mapping, Florence, Italy |
| 29-30, August, 2005 | Minisymposium "Complex neural systems", Helsinki University of Technology, Helsinki, Finland |
| 15-17, October, 2004 | The second international workshop on parallel MRI, ETH, Zurich, Switzerland |

**PUBLICATIONS**

**US Patents**

1. Suppression of Noise and Reconstruction of Dynamic Magnetic Resonance Imaging Time Series Using Spatial Filters, Fa-Hsuan Lin, (MGH licensing, MGH 3380)
2. Reconstruction of Dynamic Magnetic Resonance Imaging Time Series Using Beamformer, Fa-Hsuan Lin, (MGH licensing)
3. Metabolic T2 Relaxation Times Maps, ,Shang-Yueh Tsai, Stefan Posse, Fa-Hsuan Lin, (MGH licensing, MGH 3337)
4. Prior Regularized GRAPPA Reconstruction of Parallel MRI Data, Fa-Hsuan Lin, (United States Patent 7,394,252)
5. Dynamic magnetic resonance inverse imaging, Fa-Hsuan Lin, (United States Patent 7,394,251)
6. Method for parallel image reconstruction using automatic regularization, Fa-Hsuan Lin, (United States Patent 7,053,613)

**Journal Papers**

*1.* "Linear constraint minimum variance beamformer functional magnetic resonance inverse imaging", *Fa-Hsuan Lin, Thomas Witzel, Thomas A. Zeffiro, John, W. Belliveau, NeuroImage, in press*

*2.* "Stimulus-Induced Rotary Saturation (SIRS): a potential method for the detection of neuronal currents with MRI", Thomas Witzel, Fa-Hsuan Lin, Bruce R. Rosen, Lawrence L. Wald, *NeuroImage, in press*

*3.* "Event-related Single-shot Volumetric Functional Magnetic Resonance Inverse Imaging of Visual Processing", Fa-Hsuan Lin, Thomas Witzel, Joseph B. Mandeville, Jonathan R. Polimeni, Thomas A. Zeffiro, Douglas N. Greve, Graham Wiggins, Lawrence L. Wald, John W. Belliveau, *NeuroImage. (2008), Vol 42 (1), pp. 230-247*

*4.* "Parallel input makes the brain run faster", Tommi Raij, Jari Karhu,b Dubravko Kicic, Pantelis Lioumis, Petro Julkunen, Fa-Hsuan Lin, Jyrki Ahveninen, Risto J. Ilmoniemi, Jyrki P. Mäkelä, Matti Hämäläinen, Bruce R. Rosen, John W. Belliveau, *NeuroImage (2008), Vol 40 (4), pp. 1792-1797*

*5.* "Accelerated Proton-Echo-Planar-Spectroscopic-Imaging (PEPSI) using GRAPPA with a 32-Channel Phased-Array Coil", Shang-Yueh Tsai, Ricardo Otazo, Stefan Posse, Yi-Ru Lin, Hsiao-Wen Chung, Fa-Hsuan Lin, *Mag. Reson. Med (2008), Vol 59 (5), pp. 989-998*

*6.* "Accelerated Short-TE 3D Proton-Echo-Planar-Spectroscopic-Imaging using 2D-SENSE with a 32-Channel Array Coil", Ricardo Otazo, Shang-Yueh Tsai, Fa-Hsuan Lin, Stefan Posse, *Mag. Reson. Med. (2007), Vol 58 (6), pp. 1107-1116*

7. "Parallel MRI Reconstruction Using Variance Partitioning Regularization", Fa-Hsuan Lin, Fu-Nien Wang, Seppo P. Ahlfors, Matti S. Hamalainen, and, John W. Belliveau, *Mag. Reson. Med. (2007), Vol 58 (5), pp. 735-744*

8. "Magnetoencephalographic mapping of interictal spike propagation: A technical and clinical report", Keiko Hara, Fa-Hsuan Lin, Susana Camposano, Deirdre M. Foxe, P. Ellen Grant, Blaise. F. Bourgeois, Seppo P. Ahlfors, Steven M. Stufflebeam, Am *J Neuroradiol, (2007), Vol 28, pp. 1486-1488*

9. "Fast Mapping of T2 Relaxation Time of Cerebral Metabolites using Proton-Echo-Planar-Spectroscopic-Imaging (PEPSI)", Shang-Yueh Tsai, Stefan Posse, Yi- Ru Lin, Cheng-Wen Ko, Ricardo Otazo, Hsiao-Wen Chung, Fa- Hsuan Lin, *Mag. Reson. Med. (2007), Vol 57 (5), pp. 859-865*

10. "MRI Constrained Spectral Imaging of Benzodiazepine Modulation of Spontaneous Neuromagnetic Activity in Human Cortex", Jyrki Ahveninen, Fa-Hsuan Lin, Reetta Kivisaari, Taina Autti, Matti Hamalainen, Steven Stufflebeam, John W Belliveau, Seppo Kahkonen, *NeuroImage* (2007), Vol 35, pp. 577-582

11. "Sensitivity-encoded (SENSE) Proton-Echo-Planar-Spectroscopic-Imaging (PEPSI) in Human Brain", Fa-Hsuan Lin, Shang-Yueh Tsai, Ricardo Otazo, Arvind Caprihan, Lawrence L. Wald, John W. Belliveau, Stefan Posse, *Magn. Reson. Med., (2007), Vol. 57 (2), pp. 249-257.*

12. "PROPELLER-EPI with parallel imaging using a circularly symmetric phase array RF coil at 3.0 T: Application to high resolution diffusion tensor imaging", Tzu-Chao Chuang, Teng-Yi Huang, Fa-Hsuan Lin, Fu-Nien Wang, Chun-Jung Juan, Hsiao-Wen Chung, Cheng-Yu Chen, Kenneth K. Kwong, *Magn. Reson. Med (2006), Vol. 56 (6), pp. 1352-1358.*

13. "Dynamic "what" and "where" pathways in human auditory cortex", Jyrki Ahveninen, Iiro P. Jääskeläinen, Tommi Raij, Giorgio Bonmassar, Sasha Devore, Matti Hämäläinen, Sari Levänen, Fa-Hsuan Lin, Mikko Sams, Barbara G. Shinn-Cunningham, Thomas Witzel, John W. Belliveau, *Proc. Nat. Acad. Sci. (2004) Vol 103 (39), pp. 14608-14613.*

14. "Dynamic Magnetic Resonance Inverse Imaging of Human Brain Function", Fa-Hsuan Lin, Lawrence L. Wald, Seppo P. Ahlfors, Matti S. Hämäläinen, Kenneth K. Kwong, John W. Belliveau, *Magn. Reson. Med. (2006) Vol. 56 (4), pp 787-802*

15. "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. Hämäläinen, *NeuroImage (2006), Vol 31, pp. 160-171*

16. "Distributed Current Estimates with a Cortical Orientation Constraint", Fa-Hsuan Lin, John W. Belliveau, Anders M. Dale, Matti S. Hämäläinen, *Human Brain Mapping (2006), Vol. 27, 1, pp. 1-13*

17. "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) Vol. 54 (5), pp 1232-1240*

18. "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*

19. "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.*

20. "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*

21. “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*

22. “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*

23. “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*.

24. “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*

*25.* "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*

*26.* "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*