Ying-Chia Lin

Curriculum Vitae

PERSONAL DETAILS

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EDUCATION

Department of Computer Science, University of Verona, Italy 2010 - 2013
PhD Candidate

Department of Mathematics, Section of Mathematical Statistics, Tamkang University, Taiwan 2003 - 2005
MSc

Department of Mathematics, Section of Mathematical Statistics, Tamkang University, Taiwan 1999 - 2003
BSc

WORK EXPERIENCE

Department of Computer Science, University of Verona, Italy 2014
Post-doc

STI / IEL / LTS5, Ecole Polytechnique Fdrale de Lausanne (EPFL), Lausanne, Switzerland 2010, 2012
Internship

The period of stay at EPFL mainly working on tract-based quantitative analysis of myelin and axonal remodeling of the uninjured motor network after stroke. Another is working on tumor segmentation with 3T- MRI and combined different contrast MRI in multiple sclerosis.

Integrated Brain Research Unit, Taipei Veterans General Hospital, Department of Medical Research and Education, Taiwan 2005 - 2008
Research Assistant

To continue my zeal for research, I accepted a position as a research assistant at the Laboratory of Integrated Brain Research Unit (IBRU) at Taipei Veterans General Hospital, IBRU offers the possibility of participating in front-line research with access to the most advanced hardware facilities including 3T-MRI and 306-sensor magnetoencephalographic

(MEG), where my initial challenge was seeking an objective answer to the choice of statistical modality for functional brain image study. In 2005, with Dr. Jen-Chuen Hsieh, Prof. Li-Fen Chen and Prof. Yong-Sheng Chen, I began approaches for extracting significant information from brain signals to understand the function and structure of the human brain. My first project was to process MRI and to perform statistic analysis of the difference between MRI volumes of patients with bipolar disorders and normal controls. My second project was engaged in conducting a MEG experiment and in charge of analyzing MEG data and performing group comparison. We applied the sLORETA method to reconstruct spatiotemporal current density distribution on the cortical surface from MEG signals and also applied statistical modeling and correlation method to map and elucidate the difference of emotional processing in the brains of bipolar affective disorder. While reading a lot, I was also trained to reason and conceptualize my readings systematically and present my own perspectives clearly. I have done some work close with Dr. Tzu-Chen Yeh on fMRI experiment acquisition in laboratory. I am interested in brain imaging and modeling by using a combined modalities (MRI/fMRI and MEG/EEG) and solved imaging inverse problem approaches to enhance spatiotemporal resolution of signal.

RESEARCH TOPICS

Topic Highlights

1. Tract-based quantitative analysis of myelin and axonal remodeling in the uninjured motor network after stroke
2. A multi-resolution approach based on 3D stationary wavelet transform (3D-SWT) to do denoising on the diffusion propagator and reconstruct the ODF with diffusion spectrum imaging (DSI).
3. Medical imaging perception going to processing functional near-infrared spectroscopy (fNIRS) data using the multiresolution approach to cortical signals for robotic surgery environment
4. Voxel-based morphometry (VBM) methods for structural brain imaging analysis in spinocerebellar atrophy patients by MRI scan.
5. Cortical-based group analysis of emotion processing using MEG, MRI and fMRI
6. Impaired frontal synchronization of spontaneous research topics.
7. TFEID: Taiwanese facial expression image database
(http://bml.ym.edu.tw/ download/html/)
8. Dynamic and distributed MEG source mapping of emotion-evoked responses
9. Reconstruct MEG source mapping in different head positions with face perception
10. MEG evidence for right frontal impairment of negative emotion processing in bipolar disorder using sLORETA method

Background

I am a PhD candidate under supervisor Prof. Gloria Menegaz and join the Vision Image Processing and Sound (VIPS) Lab at Department of Computer Science, University of Verona. My current work is going to improve the orientation diffusion function (ODF) reconstruction in noisy condition, reproducibility and robustness to noise based on diffusion MRI (dMRI) and diffusion spectrum imaging (DSI). Another topic is using tract-based quantitative analysis of myelin and axonal remodeling in the uninjured motor network after stroke. The aim is to understand structure and functional connectivity between cortical regions and characterize by white matter integrity. To pursuit my long-term research interest in computational neuroscience, my short-term goal is to further strengthen and solidate my foundation in computer science in the research with focus on:

A. Medical Imaging and Medical Imaging Reconstruction, which guide co-registration for intra- or inter-modality multidimensional data;
B. Machine Learning and Pattern Classification, which offer me theoretical techniques to do further mathematical modeling in neuronal activity and neural system;
C. Image Processing, Computer Graphics and Computer Vision, which provides me essential methods to visualize and analyze signals.

SKILLS

Languages Chinese (mother tongue)
English (fluent)
Software MATLAB, JAVA, C/C++, FSL, Freesurfer, SPM, 4D TOOL, BESA, CURRY, SAS, SPSS+AMOS, R, PACS, Python, dipy, sLORETA, MRIcron, Mango, dtk, TrackVis, CMTK, Cytoscape, ITK, ITK-SNAP

PUBLICATIONS

Journal Papers

Alessandro Daducci, Erick Jorge Canales-Rodr guez, Maxime Descoteaux, Eleftherios Garyfallidis, Yaniv Gur, **Ying-Chia Lin**, Merry Mani, Sylvain Merlet, Michael Paquette, Alonso Ramirez-Manzanares, Marco Reisert, Paulo Reis Rodrigues, Farshid Sepehrband, Emmanuel Caruyer, Jeiran Choupan, Rachid Deriche, Mathews Jacob, Gloria Menegaz, Vesna Prckovska, Mariano Rivera, Yves Wiaux, Jean-Philippe Thiran,"Quantitative comparison of reconstruction methods for intra-voxel fiber recovery from diffusion MRI", Medical Imaging, IEEE Transactions on Medical Imaging (ISSN: 0278-0062), 2013 (in press).

Ying-Chia Lin, Alessandro Daducci, Djalel Meskaldji, Gloria Menegaz, Jean-Philippe Thiran, Patrik Michel, Reto Meuli, Gunnar Krueger, Cristina Granziera, "Tract-based Quantitative Analysis of the Substrate of Connectivity Remodeling in the Uninjured Motor Network After Stroke", Journal of Brain Connectivity, 2014 (submitted).

David Romascano, Djalel Meskaldji, Guillaume Bonnier, Samanta Simioni, David Rotzinger, **Ying-Chia Lin**, Gloria Menegaz , Alexis Roche , Myriam Schluep, Renaud Du Pasquier, Jonas Richiardi, Dimitri Van De Ville, Alessandro Daducci, Tilman Sumpf, Jens Frahm, Jean-Philippe Thiran, Gunnar Krueger and Cristina Granziera, "Cerebellar connectomics: towards new biomarkers in early multiple sclerosis", PNAS, 2014 (submitted).

Guillaume Bonnier, Alexis Roche, David Romascano, Samanta Simioni, Djalel Meskaldji, David Rotzinger, **Ying-Chia Lin**, Gloria Menegaz, Myriam Schluep, Renaud Du Pasquier, Tilman Sumpf, Jens Frahm, Jean-Philippe Thiran, Gunnar Krueger, Cristina Granziera, "Advanced MRI unravels the nature of tissue alterations in early multiple sclerosis", Annals of Neurology, 2014 (submitted).

Shyan-Shiou Chen, Pei-Chi Tu, **Ying-Chia Lin**, Tung-Ping Tom Su, Jen-Chuen Hsieh, Li-Fen Chen,"Impaired Frontal Synchronization of Spontaneous Magnetoencephalographic Activity in Patients with Bipolar Disorder", Neuroscience letters, 2008.

Conference Papers

Ying-Chia Lin, Alessandro Daducci, Djalel Meskaldji, Jean-Philippe Thiran, Reto Meuli, Gunnar Krueger, Gloria Menegaz, Cristina Granziera, "Tract-based quantitative analysis of myelin and and axonal remodeling in the uninjured motor network after stroke", #4495, Joint Annual Meeting ISMRM-ESMRMB 2014, Milan, Italy, 2014.

Silvia Obertino, **Ying-Chia Lin**, Alessandro Daducci, Jean-Philippe Thiran, Reto Meuli, Gunnar Krueger, Cristina Granziera*, Gloria Menegaz*, "Tract-based assessment of the subcortical motor network plasticity after stroke", #4154, Joint Annual Meeting ISMRM-ESMRMB 2014, Milan, Italy, 2014.

Guillaume Bonnier, Alexis Roche, David Romascano, Samanta Simioni, Djalel Meskaldji, David Rotzinger, **Ying-Chia Lin**, Gloria Menegaz, Myriam Schluep, Renaud Du Pasquier, Tilman Johannes Sumpf, Jens Frahm, Jean-Philippe Thiran, Gunnar Krueger, Cristina Granziera, "Multi-contrast MRI improves the clinical-radiological coorelation in early multiple sclerosis and minimally impaired patients", #3259, Joint Annual Meeting ISMRM-ESMRMB 2014, Milan, Italy, 2014.

Guillaume Bonnier, Alexis Roche, David Romascano, Samanta Simioni, Djalel Meskaldji, David Rotzinger, **Ying-Chia Lin**, Gloria Menegaz, Myriam Schluep, Renaud Du Pasquier, Tilman Johannes Sumpf, Jens Frahm, Jean-Philippe Thiran, Gunnar Krueger, Cristina Granziera, "Multiple Sclerosis lesion fingerprint using multicontrast MRI", #3291, Joint Annual Meeting ISMRM-ESMRMB 2014, Milan, Italy, 2014.

David Romascano, Djalel Meskaldji, Guillaume Bonnier, Samanta Simioni, David Rotzinger, **Ying-Chia Lin**, Gloria Menegaz, A. Roche, Myriam Schluep, Renaud Du Pasquier, J. Richiardi, D. Van De Ville, Alessandro Daducci, Tilman Johannes Sumpf, Jens Frahm, Jean-Philippe Thiran, Gunnar Krueger and Cristina Granziera, "Cerebellar connectomics provide new biomarkers in early multiple sclerosis", #5736, Joint Annual Meeting ISMRM-ESMRMB 2014, Milan, Italy, 2014.

Ying-Chia Lin, Alessandro Daducci, Djalel Meskaldji, Gloria Menegaz, Jean-Philippe Thiran, Reto Meuli, Gunnar Krueger, Cristina Granziera, "Myelin Plasticity Does not Influence Diffusion Remodelling of the Uninjured Motor Network After Stroke Motor Network After Stroke", #2934, Computer #44, ISMRM 21st Annual Meeting, Salt Lake City, Utah, USA, 2013.

Silvia Obertino, **Ying-Chia Lin**, Jean-Philippe Thiran, Reto Meuli, Gunnar Krueger, Alessandro Daducci, Cristina Granziera*, Gloria Menegaz*, "A Diffusion Spectrum Imaging Study of the Cortico-subcortical Motor Connections After Stroke", ISMRM Diffusion Workshop, Diffusion as a Probe of Neural Tissue Microstructure, Podstrana, Croatia, 2013.

Ying-Chia Lin, Gloria Menegaz, "Propagator denoising in sparse domains: is SWT a viable solution?", proceeding of ISBI 2012 HARDI reconstruction workshop, Barcelona, Spain, 2012.

Ying-Chia Lin, Gloria Menegaz, "Multiscale representation for ODF denoising in diffusion spectrum imaging", IEEE International Symposium on Biomedical Imaging (ISBI'12), Barcelona, Spain, 2012.

Ying-Chia Lin, "Towards the integration of diffusion neuroimaging, multiscale representations and cortical functionality", Poster contributions (No. 26), Annual Zurich Center for Imaging Science and Technology (CIMST'11) Meeting, ETH Zurich, 2011.

Giulia Paggetti, **Ying-Chia Lin**, Gloria Menegaz, Daniel Richard Leff, Guang-Zhong Yang, "Does It Exist a Link between Performance and Parietal Cortex Activity in Surgical Tasks, International Conference on Neural Computation (ICNC'10), Valencia, Spain, 2010.

Li-Fen Chen, **Ying-Chia Lin**, Yong-Sheng Chen, Tung-Ping Su, and Jen-Chuen Hsieh, "Magnetoencephalographic evidence of right frontal impairment of negative emotion processing in bipolar disorder", 14th Annual Meeting of the Organization for Human Brain Mapping, 2008.

Shyan-Shiou Chen, Li-Fen Chen, Pei-Chi Tu, Tung-Ping Su, Jen-Chuen Hsieh, **Ying-Chia**

Lin,"Increased Frontal Delta Synchronization of Bipolar Patients: a MEG Study", 14th Annual Meeting of the Organization for Human Brain Mapping, 2008.

Congresses Presentation

"Myelin Plasticity Does Not Significantly Influence Diffusion Remodelling of the Uninjured Motor Network After Stroke Uninjured Motor Network After Stroke", Ying-Chia Lin, Poster presentation in Summer school on Graphical models for the characterisation of information flow in complex networks: Application in neuroimaging, Grenoble, France. July 08, 2013.

"Does Not Significantly Influence Diffusion Remodeling of the Uninjured Motor Network After Stroke", E-poster (No. 2934) presentation in 21st Annual Meeting ISMRM, Salt Lake City, Utah, USA, 2013.

"Multiscale Representations for ODF denoising in Diffusion Spectrum Imaging", Ying-Chia Lin, Poster presentation in 10th IEEE EMBS International Summer School on Biomedical Imaging, Berder Island, France. June 24, 2012.

"Propagator denoising in sparse domains: is SWT a viable solution?", Ying-Chia Lin , Oral presentation in ISBI 2012 HARDI reconstruction workshop, Barcelona, Spain. May 2st, 2012.

"Multiscale Representations for ODF denoising in Diffusion Spectrum Imaging", Ying-Chia Lin, Poster (No. 1627) presentation in IEEE International Symposium on Biomedical Imaging (ISBI12), Barcelona, Spain, 2012.

"Towards the integration of diffusion neuroimaging, multiscale representations and cortical functionality", Poster (No. 26): Ying-Chia Lin, Annual Zurich Center for Imaging Science and Technology (CIMST) Meeting, ETH Zurich. September 5, 2011.

"Intro reconstruction method in diffusion spectrum imaging (DSI)", Signal Processing Lab 5, Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland. July 15, 2010.

"Intel Parallel Programming Workshop at the ACM International Conference on Computing Frontiers 2010", Bertinoro, Italy, May 17 - 19, 2010.

Thesis

Ying-Chia Lin, " Multi-modal investigation of cortical connectivity at multiple scales," 2014, (PhD Thesis).

Ying-Chia Lin, Yue-Cune Chang," Using statistical method to explore the possible risk factors for suicide and its recurrence," 2005, (MSc Thesis).

Schools Attended

Summer school on Graphical models for the characterization of information flow in complex networks: Application in neuroimaging, Grenoble, France. July 08 - 12, 2013.

10th IEEE EMBS International Summer School on Biomedical Imaging, Berder Island, France. June 22 - 30, 2012.

5th CIMST Interdisciplinary Summer School on Bio-medical Imaging, ETH Zurich, Switzerland. September 5 - 16, 2011.

VIPS Advanced School on Numerical Geometry of Non-Rigid Shapes, Lecturers: Dr. Alex Bronstein and Dr. Michael Bronstein, Verona, Italy. April 19 - 23, 2010.

1 ϕ PLUS/VIPS Advanced School on Computer Vision, Pattern Recognition, and Image Processing, Lecturers: Dr. Alessandro Vinciarelli and Dr. Daniel Gatica-Perez, Sestri Levante, Genova, Italy. July 18 - 22, 2010.

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