Wei-Hung **Weng**

Biomedical Informatician · Computer Science Researcher · Pathologist

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Education

Massachusetts Institute of Technology (MIT)

Cambridge, MA, USA

Ph.D. in Computer Science and Artificial Intelligence

Sep. 2017 -

- Received Graduate Fellowship

Harvard Medical School (HMS)

Boston, MA, USA

Master of Medical Science (MMSc) in Biomedical Informatics

Sep. 2015 - May 2017

- Received Graduate Fellowships
- Lab session leader of HMS course (BMI701: Introduction of biomedical informatics)

Chang Gung University

Taoyuan, Taiwan

Doctor of Medicine (M.D.)

Sep. 2004 - Jun. 2011

- Received five Presidential Awards
- Board Certificate of Medical Doctor in Taiwan
- Certificate of Advanced Cardiovascular Life Support
- Two teaching assistant/recitation experiences in the 105 students class, one year of class leadership
- Harvard Medical School, Exchange Student (Massachusetts Eye and Ear Infirmary) (Jun 2011)

Skills

Programming	R, Python, MATLAB, Stan, SQL, Linux, LaTeX
Other Technologies	Git, Tensorflow, Theano, Keras, Scikit-learn, NLTK, UMLS (SNOMED-CT, RxNorm, HPO), MetaMap, cTAKES Bioconductor, ImageJ, Tableau, InDesign, Photoshop
Languages	English, Chinese, Japanese

Research Experience

Computer Science and Artificial Intelligence Laboratory (CSAIL), MIT

Cambridge, MA

Graduate Researach Assistant in Clinical Decision Making Group (Prof. Peter Szolovits)

Sep. 2017 -

- Representation learning in medicine with multimodal data
- Investigating medical intelligent machine

Laboratory of Computer Science, Massachusetts General Hospital

Boston, MA

Postdoctoral Research Fellow in Laboratory of Computer Science and Department of Neurology (Drs. Henry Chueh, Brandon Westover)

Sep. 2015 - May 2017

- Building generalized clinical document classification system using NLP, ontology and machine learning
- Developing adversarial network methods for clinical domain adaptation
- Predicting potential refractory epilepsy using clinical notes by deep neural network
- Redefining glycemic control for critically ill patients using large critical care database mining
- Identifying medical concepts in the unstructured data automatically for undiagnosed disease patients
- Improving the outcome of kidney transplantation patients by data-driven mobile educational modules
- Analyzing cost-effectiveness decision of using continuous EEG on post resuscitation patients

Division of Clinical Informatics Solutions and Services, Philips Research North America

Cambridge, MA

Research Internship (Dr. Sandeep Dalal)

Jun. 2016 - Aug. 2016

- Initiated the anatomy extraction project for radiology reports using ontology and neural word embedding

Molecular Imaging Center, National Taiwan University

Taipei, Taiwan

Research Associate (Prof. Chi-Kuang Sun)

May 2014 - Apr. 2015

- Developed the qualitative and deep learning methods to identify skin melanocytes in microscopic imaging
- Proposed a go-to market strategy of virtual biopsy microscopy for skin cancer detection

Kidney Research Center / Cancer Molecular Diagnostics Lab / Department of Psychology, Chang Gung Memorial Hospital — *Taoyuan, Taiwan*

Undergraduate Research Assistant (Profs. Lee-Yung Shih, Ya-Chung Tian, Chin-Yen Chen) — *Jun. 2008 - May 2011*

- Investigated cytokines effects on polyomavirus BK infection
- Clinical data analysis of concomitance of essential thrombocythemia and chronic myeloid leukemia
- Investigated the relationship between sleepiness scale and heart rate variability in medical students

Cancer Immunology and Gene Therapy Lab, Johns Hopkins Medical Institute — *Baltimore, MD*

Summer Research Assistant (Prof. Tzyy-Choou Wu) — *Jul. 2009 - Aug. 2009*

- Immunology/molecular cell biology techniques training and review writing

Clinical Experience

Chang Gung Memorial Hospital — *Taoyuan, Taiwan*

Resident Physician in Pathology and General Medicine — *Aug. 2012 - Apr. 2014*

- Supervised more than 10 medical clerks, interns and residents
- Selected as visiting scholar to Department of Pathology, University of Tokyo Hospital, Tokyo, Japan

Republic of China Army — *Taoyuan, Taiwan*

Medical Officer of Health, Secondary Lieutenant — *Aug. 2011 - Jul. 2012*

- Managed a medical clinic, and a shelter for soldiers with psychiatric diseases
- Volunteered in Mbanane Government Hospital in Swaziland, for critical ward care and rural outreaches

Honors & Awards

Scholarship

2017	**Rolf G. Locher Graduate Fellowship**, MIT	*Cambridge, MA*
2015	**Scholarship of Harvard University Alumni Association (HAA) in Taiwan**, HAA in Taiwan	*Taipei, Taiwan*
2015	**Wang Yuan-Chun Memorial Medical Contribution Scholarship**, HAA in Taiwan	*Taipei, Taiwan*

Academic

2006-08	**Presidential Award**, CGU Medicine (top 5% students)	*Taoyuan, Taiwan*

Award

2015	**Semifinalist (TxNet - Education app for kidney transplant patients)**, BWH Startup Program	*Boston, MA*
2015	**First Prize Award (Fetal heart beat detector)**, HIT Biomedical Innovation Hackathon	*Taipei, Taiwan*
2011	**Objective Structured Clinical Examination (OSCE) Award**, Taiwan Association of Medical Education	*Kaohsiung, Taiwan*
2011	**Second Prize**, Medical Record Writing Competition	*Kaohsiung, Taiwan*
2011	**Great Honor**, Taiwan Medical Development Awards for Outstanding Writings	*Taipei, Taiwan*
2009	**Research Funding**, Medical Foundation in Memory of Dr. Deh-Ling Cheng	*Kaohsiung, Taiwan*

Publications

Journal Publications

1. **Weng, W.-H.**, Wagholikar, K. B., McCray, A. T., Szolovits, P., Chueh, H. C. (under reviewing). Medical subdomain classification of clinical notes using machine learning-based natural language processing approach. BMC Medical Informatics and Decision Making.
2. **Weng, W.-H.**, Raffa, J. D., Pollard, T. J., Bellomo, R., Celi, L. A. (in preperation). Relative hypoglycemia and mortality in non-diabetic critical care patients. Crit Care Med.
3. **Weng, W.-H.**, Liao, Y.-H., Tsai, M.-R., Huang, H.-Y., Sun, C.-K. (2016, June). Differentiating intratumoral melanocytes from Langerhans cells in non-melanocytic pigmented skin tumors in vivo by using label-free third harmonic generation microscopy. Journal of Biomedical Optics, 21(7), 076009. (IF 2.859)
4. Liu, C.-H., Tang, W.-R., **Weng, W.-H.**, Lin, Y.-H., Chen, C.-Y. (2016, January). The process of coping with stress by Taiwanese medical interns: a qualitative study. BMC Med Educ, 16(1). (IF 1.218, citation: 2)
5. Lin, Y.-H., Chen, C.-Y., Lin, S.-H., Liu, C.-H., **Weng, W.-H.**, Kuo, T. B. J., Yang, C. C. H. (2013). Gender differences in cardiac autonomic modulation during medical internship. Psychophysiology, 50(6), 521–527. (IF 2.986, citation: 13)
6. **Weng, W.-H.**, Shih, L.-Y. (2011). Occurrence of BCR-ABL1-Positive Chronic Myeloid Leukemia following Essential Thrombocythemia. Acta Haematologica, 126(4), 220–223. (IF 1.116, citation: 1)
7. Hung, C.-F., Monie A., **Weng, W.-H.**, Wu, T.-C. (2010). DNA vaccines for cervical cancer. Am J Transl Res, 2(1), 75-87. (IF 3.402, citation:37)

Conferences

1. **Weng, W.-H.** Wagholikar, K. B., Chueh, H. C. (2017, March). Classifiers for Identifying the Medical Specialty of Clinical Documents. 2017 AMIA Joint Summits on Translational Science, San Francisco, CA.
2. **Weng, W.-H.** (2016, December). Predictive Analytics Pipeline for Clinical Narrative Document Classification. Artificial Intelligence in Medicine, Laguna Niguel, CA.
3. **Weng, W.-H.** (2016, December). Medical Domain Classification with Sequential Label-Embedded Neural Concept Embedding Model. Artificial Intelligence in Medicine, Laguna Niguel, CA.
4. **Weng, W.-H.**, Khatri, A., Wagholikar, K. B., Cohen, A. B., Chueh, H. C. (2016, November). Improving the Workflow of Curbside Consultation by Using Unstructured Clinical Notes - a Natural Language and Machine Learning-based Approach. AMIA 2016 Annual Symposium, Chicago, IL.
5. **Weng, W.-H.**, Wagholikar, K. B. (2016, November). Supervised Clinical Document Classification Pipeline. AMIA 2016 NLP WG Pre-Symposium, Chicago, IL.
6. **Weng, W.-H.**, Wagholikar, K. B. (2016, November). Classifying Clinical Documents into Medical Domains. AMIA 2016 NLP WG Pre-Symposium, Chicago, IL.
7. **Weng, W.-H.**, Liao, Y.-H., Tsai, M.-R., Huang, H.-Y., Sun, C.-K. (2016, March). Differentiating intratumoral melanocytes from Langerhans cells in non-melanocytic pigmented skin tumors in vivo by using third harmonic generation microscopy. Focus on Microscopy Conference 2016, Taipei, Taiwan.
8. Huang, H.-F., **Weng, W.-H.**, Hsu, Winston H., Sun, C.-K., (2015, December). Automated Detection of Noninvasive Imaging of Basal Cell Carcinoma by Convolutional Neural Network. NIPS 2015 Workshop on Machine Learning in Healthcare, Montreal, Canada.
9. Chou, Y.-H., Hung, S.-Y., Lee, G.-G., **Weng, W.-H.**, Liao, Y.-H., Sun, C.-K., Shih, H.-T. (2015 July). Nuclei location enhancement based on improved efficient ellipse hough transform for third harmonic generation microscopy imaging. IEEE ChinaSIP 2015, Chendu, China.
10. Liao, Y.-H., **Weng, W.-H.**, Sun, C.-K. (2015, June). Characterization of dendritic cells in pigmented skin tumors by harmonic generation microscopy. 23rd World Congress of Dermatology, Vancouver, Canada.
11. Lee, G.-G., Cai, C.-S., Liao, Y.-H., **Weng, W.-H.**, Sun, C.-K., Tsai, M.-R., Hung, S.-Y., Huang, C.-H., Shih, H.-T., Yu, Z.-H. (2015, May). Quantitative Gabor feature analysis of collagen fibers in harmonically generated microscopy (HGM) imaging. OMICS International Global Summit and Expo on Multimedia and Applications ETMN Pre-conference Workshop 2015, Kaohsiung, Taiwan.
12. Lee, S.-Y., **Weng, W.-H.**, Sun, C.-K. (2015, February). Super resolution brain imaging by using a two-photon fluorescence microscopy with harmonic modulation. SPIE Photonics West 2015, San Francisco, CA.
13. **Weng, W.-H.**, Tsai, M.-R., Liao, Y.-H., Sun, C.-K. (2015, February). Differentiating pigmented skin tumors by the tumor-associated melanocytes based on in vivo third harmonic generation microscopy. SPIE Photonics West 2015, San Francisco, CA.
14. **Weng, W.-H.**, Tsai, M.-R., Liao, Y.-H., Sun, C.-K. (2014, November). Identifying melanocyte in pigmented skin lesions based on in vivo third harmonic generation microscopy. Biomedical Molecular Imaging 2014. Taipei, Taiwan.
15. **Weng, W.-H.**, Liu, W.-M., Tsai, M.-R., Liao, Y.-H., Sun, C.-K. (2014, November). In vivo quantification of melanin mass density in human by using third harmonic generation microscopy. Biomedical Molecular Imaging 2014. Taipei, Taiwan.
16. **Weng, W.-H.**, Tian, Y.-C. (2010, August). Interleukin-1 beta Inhibits BK virus gene expression and replication in human renal proximal tubular epithelial cells. Taiwan Medical Development Awards for Outstanding Writings. Taipei, Taiwan.
17. **Weng, W.-H.**, Tian, Y.-C. (2009, September). IL-1 has suppressive effect on BKV replication. Summer Student Study for Infectious Disease. Kaohsiung, Taiwan.

Invited Talks

2017/07	**Invited speaker, workshop moderator,** UP-MIT-Stanford-AeHIN Big Data for Health Conference and Workshops for Asia-Pacific	*Cebu, Philippines*
2017/06	**Mentor,** NUS-MIT Datathon	*Singapore, Singapore*
2016/10	**Invited panelist,** Deconstructing the Hype around Big Data and Precision Medicine	*Taipei, Taiwan*
2016/09	**Invited panelist, mentor and judge,** MIT-TMU Internet of Things Hackathon	*Taipei, Taiwan*

Professional Activities

Program Committee

2017	**Scientific Program Committee,** AMIA 2017 Annual Symposium	*Washington, DC*
2017	**TBI Year-in-Review Workgroup Member,** AMIA 2017 Joint Summits on Translational Science	*San Francisco, CA*

Extracurricular Activity

- Deep learning study group
- Developed iOS App ‘LabBuddy’ (more than 10,000 downloads)
- Core member of Investigator Biosciences Society Taiwan (website development and design)
- Teaching fellow in medical camps and Biology Club, Yearbook design (medical school)