Wei-Hung **Weng**

Biomedical Informatician · Computer Science Researcher · Pathologist

32 Vassar Street, Cambridge MA 02138, USA

(+1) 857-400-4997 | ckbjimmy@gmail.com | ckbjimmy.github.io | ckbjimmy | ckbjimmy

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

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 Research 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.. Medical subdomain classification of clinical notes using machine learning-based natural language processing approach. BMC Medical Informatics and Decision Making. [under review]
2. Lin, C.-K., Lin, R.-T., Chen, T., Wei, Y., **Weng, W.-H.**, Zigler, C., Christiani, D. C.. A Global Perspective on Coal-fired Power Plants and Lung Cancer Mortality. New Engl J Med. [under review]
3. Dalal, S., Hombal V., **Weng, W.-H.**, Mankovich, G., Mabotuwana, T., Hall, C. S., Fuller, J., Lehnert, B. E., Gunn, M. L.. Determining Follow-Up Imaging Study Using Radiology Reports. J Am Med Informatics Assoc. [in preperation]
4. **Weng, W.-H.**, Raffa, J. D., Pollard, T. J., Bellomo, R., Celi, L. A.. Relative hypoglycemia and mortality in non-diabetic critical care patients. Crit Care Med. [in preperation]
5. **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)
6. 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)
7. 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)
8. **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)
9. 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, Nov). Computing Performance Analysis on Clinical Document-level Classification. AMIA 2017 Annual Symposium, Washington, DC.
2. **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.
3. Chi-Kuang Sun, Ming-Liang Wei, Yu-Hsiang Su, **Wei-Hung Weng**, Yi-Hua Liao. Molecular imaging of melanin distribution in vivo and quantitative differential diagnosis of human pigmented lesions using label-free harmonic generation biopsy (Conference Presentation). SPIE Photonics West 2017, San Francisco, CA.
4. **Weng, W.-H.** (2016, December). Predictive Analytics Pipeline for Clinical Narrative Document Classification. Artificial Intelligence in Medicine, Laguna Niguel, CA.
5. **Weng, W.-H.** (2016, December). Medical Domain Classification with Sequential Label-Embedded Neural Concept Embedding Model. Artificial Intelligence in Medicine, Laguna Niguel, CA.
6. **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.
7. **Weng, W.-H.**, Wagholikar, K. B. (2016, November). Supervised Clinical Document Classification Pipeline. AMIA 2016 NLP WG Pre-Symposium, Chicago, IL.
8. **Weng, W.-H.**, Wagholikar, K. B. (2016, November). Classifying Clinical Documents into Medical Domains. AMIA 2016 NLP WG Pre-Symposium, Chicago, IL.
9. **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.
10. 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.
11. 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.
12. 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.
13. 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.
14. 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.
15. **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.
16. **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.
17. **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.
18. **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.
19. **Weng, W.-H.**, Tian, Y.-C. (2009, September). IL-1 has suppressive effect on BKV replication. Summer Student Study for Infectious Disease. Kaohsiung, Taiwan.

Scholarly Addresses

Invited Presentations

2017/07	**Artificial Intelligence in Medicine,** in UP-MIT-Stanford-AeHIN Big Data for Health Conference and Workshops for Asia-Pacific	*Cebu, Philippines*
2017/06	**Artificial Intelligence in Healthcare Analytics,** in NUS-MIT Healthcare Analytics 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*

Conference Tutorials

2017/07 **Biomedical Text Mining and Natural Language Processing Workshop**, in UP-MIT-Stanford-AeHIN Big Data for Health Conference and Workshops for Asia-Pacific *Cebu, Philippines*

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*

Academic Lectures

Fall, 2016 **Lab of Introduction of Biomedical Informatics**, BMI701, Harvard Medical School *Boston, MA*

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)