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

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 and Reinforcement learning for clinical decision makings with multimodal data
- Learning glycemic control strategy for critically ill patients using large critical care database mining

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
- 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, WH**, Wagholikar, KB, McCray, AT, Szolovits, P, Chueh, HC. Medical subdomain classification of clinical notes using machine learning-based natural language processing approach. BMC Medical Informatics and Decision Making. [under review]

2. Lin, CK, Lin, RT, Chen, T, Wei, Y, **Weng, WH**, Zigler, C, Christiani, DC. A Global Perspective on Coal-fired Power Plants and Lung Cancer Mortality. New Engl J Med. [under review]

3. Dalal, S, Hombal V, **Weng, WH**, Mankovich, G, Mabotuwana, T, Hall, CS, Fuller, J, Lehnert, BE, Gunn, ML. Determining Follow-Up Imaging Study Using Radiology Reports. J Am Med Informatics Assoc. [under review]

4. **Weng, WH**, Raffa, JD, Pollard, TJ, Bellomo, R, Celi, LA. Relative hypoglycemia and mortality in non-diabetic critical care patients. Crit Care Med. [in preperation]

5. **Weng, WH**, Liao, YH, Tsai, MR, Huang, HY, Sun, CK. (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.

6. Liu, CH, Tang, WR, **Weng, WH**, Lin, YH, Chen, CY. (2016, January). The process of coping with stress by Taiwanese medical interns: a qualitative study. BMC Med Educ, 16(1).

7. Lin, YH, Chen, CY, Lin, SH, Liu, CH, **Weng, WH**, Kuo, TBJ., Yang, CCH. (2013). Gender differences in cardiac autonomic modulation during medical internship. Psychophysiology, 50(6), 521–527.

8. **Weng, WH**, Shih, LY. (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, CF, Monie A, **Weng, WH**, Wu, TC. (2010). DNA vaccines for cervical cancer. Am J Transl Res, 2(1), 75-87.

CONFERENCES

1. Chung, YA, **Weng, WH** (co-first and corresponding author). Learning Image Representations using Deep Siamese CNNs for Content-Based Medical Image Retrieval. Medical Imaging meets NIPS workshop. 2017. Long Beach, CA.

2. **Weng, WH**, Wagholikar, KB, Chueh, HC. (2017, Nov). Computing Performance Analysis on Clinical Document-level Classification. AMIA 2017 Annual Symposium, Washington, DC.

3. **Weng, WH**, Wagholikar, KB, Chueh, HC. (2017, March). Classifiers for Identifying the Medical Specialty of Clinical Documents. 2017 AMIA Joint Summits on Translational Science, San Francisco, CA.

4. Sun, CK, Wei, ML, Su, YH, **Weng, WH**, Liao, YH. 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.

5. **Weng, WH** (2016, December). Predictive Analytics Pipeline for Clinical Narrative Document Classification. Artificial Intelligence in Medicine, Laguna Niguel, CA.

6. **Weng, WH** (2016, December). Medical Domain Classification with Sequential Label-Embedded Neural Concept Embedding Model. Artificial Intelligence in Medicine, Laguna Niguel, CA.

7. **Weng, WH**, Khatri, A, Wagholikar, KB, Cohen, AB, Chueh, HC. (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.

8. **Weng, WH**, Wagholikar, KB (2016, November). Supervised Clinical Document Classification Pipeline. AMIA 2016 NLP WG Pre-Symposium, Chicago, IL.

9. **Weng, WH**, Wagholikar, KB (2016, November). Classifying Clinical Documents into Medical Domains. AMIA 2016 NLP WG Pre-Symposium, Chicago, IL.

10. **Weng, WH**, Liao, YH, Tsai, MR, Huang, HY, Sun, CK. (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.

11. Huang, HF, **Weng, WH**, Hsu, WH, Sun, CK., (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.

12. Chou, YH, Hung, SY, Lee, GG, **Weng, WH**, Liao, YH, Sun, CK., et al. (2015 July). Nuclei location enhancement based on improved efficient ellipse hough transform for third harmonic generation microscopy imaging. IEEE ChinaSIP 2015, Chendu, China.

13. Liao, YH, **Weng, WH**, Sun, CK. (2015, June). Characterization of dendritic cells in pigmented skin tumors by harmonic generation microscopy. 23rd World Congress of Dermatology, Vancouver, Canada.

14. Lee, GG, Cai, CS, Liao, YH, **Weng, WH**, Sun, CK., Tsai, MR, et al. (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.

15. Lee, SY, **Weng, WH**, Sun, CK. (2015, February). Super resolution brain imaging by using a two-photon fluorescence microscopy with harmonic modulation. SPIE Photonics West 2015, San Francisco, CA.

16. **Weng, WH**, Tsai, MR, Liao, YH, Sun, CK. (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.

17. **Weng, WH**, Tsai, MR, Liao, YH, Sun, CK. (2014, November). Identifying melanocyte in pigmented skin lesions based on in vivo third harmonic generation microscopy. Biomedical Molecular Imaging 2014. Taipei, Taiwan.

18. **Weng, WH**, Liu, WM, Tsai, MR, Liao, YH, Sun, CK. (2014, November). In vivo quantification of melanin mass density in human by using third harmonic generation microscopy. Biomedical Molecular Imaging 2014. Taipei, Taiwan.

19. **Weng, WH**, Tian, YC. (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.

20. **Weng, WH**, Tian, YC. (2009, September). IL-1 has suppressive effect on BKV replication. Summer Student Study for Infectious Disease. Kaohsiung, Taiwan.

Scholarly Addresses

Invited Presentations

2017/11	**Invited clinical and data science mentor**, Chinese PLA General Hospital-MIT Health Data Conference and Workshop	*Beijing, China PRC*
2017/07	**Invited talk: Artificial Intelligence in Medicine**, in UP-MIT-Stanford-AeHIN Big Data for Health Conference and Workshops for Asia-Pacific	*Cebu, Philippines*
2017/06	**Invited talk: 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*

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 / REVIEWER

2017	**Reviewer**, NIPS 2017 Machine Learning for Health	*Long Beach, CA*
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)