

## WEI-HUNG WENG

50 Staniford St., Suite 750, Boston MA 02114  
(857) 400-4997 | ckbjimmy@gmail.com | ckbjimmy.github.io

### Summary

- A medical doctor, and a self-taught data science lover
- Exploring clinical and -omic data to assist clinical decision making and personalized medicine

### Education

- Sep 2015- **Harvard Medical School (HMS), Boston, MA**  
*Candidate of Master of Medical Science in Biomedical Informatics (current GPA 4.0/4.0)*
- Clinical informatics, machine learning, natural language processing, bioinformatics, computational biology
  - Managing 4 collaborative works with HMS, MIT and Massachusetts General Hospital
  - Lab director of HMS BMI701: Introduction of biomedical informatics
  - Mentor in MIT-TMU hackathon
  - Student representative of curriculum committee in the program
  - Scholarship of Harvard University Alumni Association in Taiwan (2015)
  - Wang Yuan-Chun Memorial Medical Contribution Scholarship, Taiwan (2015)
- Sep 2004 **Chang Gung University, Taoyuan, Taiwan** (first tier medical school in Taiwan)  
- Jun 2011 *Doctor of Medicine (M.D.) (GPA: 3.99/4.0, Rank: 5/106)*
- Presidential Award 5 times (for top 5% students)
  - 2 teaching assistant/recitation experiences in the 105 students class, 1 year class leadership
  - Board Certificate of Medical Doctor in Taiwan, Certificate of Advanced Cardiovascular Life Support
  - Harvard Medical School, Exchange Student (Massachusetts Eye and Ear Infirmary) (Jun 2011)

### Professional Experience | Research

- Sep 2015 - **Laboratory of Computer Science, Massachusetts General Hospital (MGH), MA** (top-ranked hospital in USA)  
*Research Fellow (Advisor: Dr. Henry Chueh [Director of LCS in MGH])*
- Designing and developing clinical expert recommendation system
    - Developing R/python NLP and machine learning pipeline for processing unstructured clinical data
    - Improving the performance of existed projects 'Expertaj' by implementing the machine learning-based algorithms and ontology-based database
  - Medical concept extraction and matching of undiagnosed disease patients by natural language processing and medical ontology (collaborate with HMS DBMI)
  - Investigating relative hypoglycemia using MIMIC database (collaborate with MIT)
  - Improving the outcome of kidney transplantation patients by using mobile-based educational modules and data analysis (collaborate with Brigham and Women's Hospital (BWH), semi-finalist of BWH startup program)
- Sep 2016 **Department of Neurology, Massachusetts General Hospital (MGH), MA** (top-ranked hospital in USA)  
- May 2017 *Research Assistant (Advisor: Dr. Michael B. Westover)*
- Predicting potential refractory epilepsy using clinical notes by word embedding and deep neural network
  - Analyzing cost-effectiveness decision of using continuous EEG on post resuscitation patients
- Jun 2016 **Division of Clinical Informatics Solutions and Services, Philips Research North America, MA**  
- Aug 2016 *Research Internship (Advisor: Dr. Sandeep Dalal)*
- Designing and implementing the anatomy extraction module for radiology or clinical reports using NLP, ontology, neural word embedding and deep learning methods (python module, delivered product)
- May 2014 **Molecular Imaging Center, National Taiwan University, Taiwan** (rank #1 in Taiwan)  
- Apr 2015 *Research Associate (Advisor: Prof. Chi-Kuang Sun [Director of Center. SPIE, IEEE, OSA Fellow])*
- Developed a method to identify skin melanocytes in noninvasive microscopic imaging modality
  - Managed collaborative image deep learning projects with two academic institutes
  - Assisted strategic planning of commercializing virtual biopsy microscopy, which meets the unmet need that can reach more than three million population with the risk of skin cancer
  - First Prize Award. HIT Biomedical Innovation Hackathon
- Jun 2008 **Kidney Research Center / Cancer Molecular Diagnostics Lab / Department of Psychology,**  
- May 2011 **Chang Gung Memorial Hospital, Taiwan**  
*Undergraduate Research Assistant (Advisor: Prof. Ya-Chung Tian, Prof. Lee-Yung Shih, Prof. Chin-Yen Chen)*
- 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
- Great Honor. Taiwan Medical Development Awards for Outstanding Writings. Taiwan (grant award)
- Research Funding. Medical Foundation in Memory of Dr. Deh-Ling Cheng. Taiwan (grant award)

Jul 2009      **Cancer Immunology and Gene Therapy Lab, Johns Hopkins Medical Institute, MD**  
 - Aug 2009      *Summer Research Assistant (Advisor: Prof. Tzyy-Chou Wu [Director of Laboratory])*  
 • Journal article writing and literature reviews, immunology/molecular cell biology techniques training

### Professional Experience | Clinical

Aug 2012      **Chang Gung Memorial Hospital, Linkou, Taiwan** (the largest medical center in Taiwan)  
 - Apr 2014      *Resident Physician in Pathology and General Medicine / Rotating Internship*  
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                     • Supervised more than 10 medical clerks, interns and residents  
 Jun 2010      • Selected as visiting scholar to Department of Pathology, University of Tokyo Hospital, Tokyo, Japan  
 - May 2011      • Won OSCE Award. Taiwan Association of Medical Education  
                     • Won 2nd Prize in Medical Record Writing Competition

Jul 2012      **Mbanane Government Hospital, Mbabane, Hhohho, Swaziland** (the largest hospital in Swaziland)  
*Resident Physician (Medical volunteer of Taiwan Medical Mission in Swaziland)*  
 • Two rural and suburban outreaches, and critical ward care

Aug 2011      **Republic of China Army, Chungli, Taiwan**  
 - Jul 2012      *Medical Officer of Health, Secondary Lieutenant*  
 • Managed a medical clinic, and a shelter for soldiers with psychiatric diseases

### Publications [2 first-authored and 3 co-authored, all SCI journals]

1. Weng, W.-H., Liao, Y.-H., Tsai, M.-R., Huang, H.-Y., Sun, C.-K. (2016). 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)
2. Liu, C.-H., Tang, W.-R., Weng, W.-H., Lin, Y.-H., & Chen, C.-Y. (2016). The process of coping with stress by Taiwanese medical interns: a qualitative study. *BMC Med Educ*, 16(1). (IF 1.218, citation: 2)
3. 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)
4. 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)
5. 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 [7 first authored and 5 co-authored]

1. Weng, W.-H., Khatiri, A., Waghlikar, 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.

12. Weng, W.-H., Tian, Y.-C. (2009, September). IL-1 has suppressive effect on BKV replication. Summer Student Study for Infectious Disease. Kaohsiung, Taiwan.

### Verified Certifications and Professional Development

- Introduction to Computer Science and Programming Using Python. **MITx (edX)**. Python, data structure, algorithm
- Genomics Data Analysis. **HarvardX (edX)**. (3 courses). Bioconductor, genomics computing, functional genomics
- Data Science Specialization (10 courses) / Mathematical Biostatistics. **Johns Hopkins University (Coursera)**.
  - R programming, data science, statistical inference, regression, machine learning, reproducible research, NLP
- Machine Learning. **Stanford University / National Taiwan University (Coursera)**.
- Natural Language Processing. **Stanford University / Columbia University (Coursera)**, ...

### Language / Skills / Other

- English (fluent), Chinese (native), Taiwanese (native), Japanese (basic)
- Expertise in R, Python, SQL, Linux, bioconductor, cTAKES, MetaMap, medical ontology and database (UMLS, SNOMED-CT, HPO, FMA, MIMIC, ...), LaTeX, Tableau, Matlab, ImageJ, Fiji
- Developed iOS App 'LabBuddy' (more than 10,000 downloads)
- Yearbook designer (medical school), teaching fellow in medical camps and Biology Club, photography, cycling, swimming
- Core member of Investigator Biosciences Society Taiwan (web, design)