BIOGRAPHICAL SKETCH

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NAME: Hsu, Yu-Chun

eRA COMMONS USER NAME (credential, e.g., agency login): YUCHHSU

POSITION TITLE: Faculty Associate

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
Chun-Yuan Christian University	B.S.	09/2002	09/2006	Biotechnology
National Yang-Ming University	Ph.D.	09/2006	02/2020	Neuroscience
UT Health Houston	Postdoc	06/2021	09/2024	Biomedical informatics

A. Personal Statement

My background in neuroscience and medical informatics has equipped me with the skills and knowledge to develop integrated solutions for biomedical informatics. I am a Faculty Associate at the McWilliams School of Biomedical Informatics (SBMI) at The University of Texas Health Science Center at Houston (UTHealth). Prior to this position, I was a postdoctoral research fellow at SBMI UTHealth, where I received mentorship from Dr. Xiaoqian Jiang and advanced my expertise in biomedical informatics. I also have experience as a data scientist at Chang-Gung Memorial Hospital, Taoyuan, Taiwan, and as a chief technical officer at Beyond ECG (startup), Taoyuan, Taiwan. I obtained my Ph.D. from the Institute of Neuroscience, National Yang-Ming University, Taiwan, under the supervision of Dr. Chou Po Hung. These experiences have enabled me to apply machine learning techniques to address clinical problems in the medical field.

My research interests include physiological signals, brain-related disease diagnosis, treatment planning, and prognosis using machine learning methods. I have been recognized with the 2020 and 2021 National Innovation Award, Taiwan, and the 2021 Futuretech Award, Taiwan. My interdisciplinary background and insights will allow me to contribute significantly to biomedical informatics.

Publications:

1. Yulin Dai†, **Yu-Chun Hsu**†, Brisa S Fernandes, Kai Zhang, Xiaoyang Li, Nitesh Enduru, Andi Liu, Astrid M Manuel, Xiaoqian Jiang, Zhongming Zhao. “Disentangling Accelerated Cognitive Decline from the Normal Aging Process and Unraveling Its Genetic Components: A Neuroimaging-Based Deep Learning Approach.” *Journal of Alzheimer’s Disease* 97, no. 4 (2024): 1807-1827.
2. Yu-Chang Huang†, **Yu-Chun Hsu**†, Zhi-Yong Liu, Ching-Heng Lin, Richard Tsai, Jung-Sheng Chen, Po-Cheng Chang, Hao-Tien Liu, Wen-Chen Lee, Hung-Ta Wo, Chung-Chuan Chou, Chun-Chieh Wang, Ming-Shien Wen, Chang-Fu Kuo. “Artificial intelligence-enabled electrocardiographic screening for left ventricular systolic dysfunction and mortality risk prediction.” Frontiers in Cardiovascular Medicine 10, 298, 2023.
3. Chu, Yan, Kaichen Tang, **Yu-Chun Hsu**, Tongtong Huang, Dulin Wang, Wentao Li, Sean I. Savitz, Xiaoqian Jiang, and Shayan Shams. "Non-invasive arterial blood pressure measurement and SpO2 estimation using PPG signal: a deep learning framework." *BMC Medical Informatics and Decision Making* 23, no. 1 (2023): 131.

† Equal contribution

B. Positions, Scientific Appointments, and Honors

Positions and Employment

2024 – Faculty Associate, McWilliams School of Biomedical Informatics, UTHealth, Houston, TX
2021 – 2024 Postdoctoral Research Fellow, McWilliams School of Biomedical Informatics, UTHealth, Houston, TX
2019 – 2021 Data Scientist, AI core lab, Chang-Gung Memorial Hospital, Taoyuan, Taiwan
2020 – 2021. Chief Technical Officer, Beyond ECG (startup), Taoyuan, Taiwan

Honors

2021 Futuretech Award, Taiwan
2021 National Innovation Award, Taiwan
2020 National Innovation Award, Taiwan

C. Contributions to Science

1. **Deep learning with physiological signals (ECG, PPG)** My research leverages deep learning to enhance the analysis of physiological signals like Electrocardiogram (ECG) and photoplethysmogram (PPG) for improved cardiovascular diagnostics. By applying advanced models to 12-lead ECG data, we can detect subtle features that aid in the early detection of heart diseases, such as left ventricular systolic dysfunction, and in predicting patient mortality. Similarly, by using deep learning with PPG signals, we have developed methods to estimate arterial blood pressure and SpO2 levels accurately. This non-invasive, cost-effective approach supports continuous cardiovascular monitoring and early detection of critical health conditions, reducing the need for invasive procedures.

    a. Yu-Chang Huang†, **Yu-Chun Hsu**†, Zhi-Yong Liu, Ching-Heng Lin, Richard Tsai, Jung-Sheng Chen, Po-Cheng Chang, Hao-Tien Liu, Wen-Chen Lee, Hung-Ta Wo, Chung-Chuan Chou, Chun-Chieh Wang, Ming-Shien Wen, Chang-Fu Kuo. “Artificial intelligence-enabled electrocardiographic screening for left ventricular systolic dysfunction and mortality risk prediction.” Frontiers in Cardiovascular Medicine 10, 298, 2023.
    b. Po-Cheng Chang, Zhi-Yong Liu, Yu-Chang Huang, **Yu-Chun Hsu**, Jung-Sheng Chen, Ching-Heng Lin, Richard Tsai, Chung-Chuan Chou, Ming-Shien Wen, Hung-Ta Wo, Wen-Chen Lee, Hao-Tien Liu, Chun-Chieh Wang, Chang-Fu Kuo. "Machine learning-based prediction of acute mortality in emergency department patients using twelve-lead electrocardiogram." *Frontiers in Cardiovascular Medicine* 10 (2023): 1245614.
    c. Chu, Yan, Kaichen Tang, **Yu-Chun Hsu**, Tongtong Huang, Dulin Wang, Wentao Li, Sean I. Savitz, Xiaoqian Jiang, and Shayan Shams. "Non-invasive arterial blood pressure measurement and SpO2 estimation using PPG signal: a deep learning framework." *BMC Medical Informatics and Decision Making* 23, no. 1 (2023): 131.
    d. Yu-Chang Huang, Chang-Fu Kuo, **Yu-Chun Hsu**, Yueh Peng Chen, Jung-Sheng Chen, Ming Shien Wen. “Prediction of Left Ventricular Systolic Dysfunction Using Standard 12-lead Electrocardiogram With Deep Neural Network” American Heart Association, online, 2020.

2. **Deep learning with Alzheimer’s disease:** I began studying Alzheimer’s disease using MRI (magnetic resonance imaging) modalities, cognitive scoring, and deep learning models for disease status evaluation. Collaborating closely with partners, we developed models to address specific challenges in various tasks, including comparing slow versus rapid progressors, link imaging data, cognitive scores, and Genome-Wide Association Studies (GWAS) studies.

    a. Yulin Dai†, Yu-Chun Hsu†, Brisa S Fernandes, Kai Zhang, Xiaoyang Li, Nitesh Enduru, Andi Liu, Astrid M Manuel, Xiaoqian Jiang, Zhongming Zhao. “Disentangling Accelerated Cognitive Decline from the Normal Aging Process and Unraveling Its Genetic Components: A Neuroimaging-Based Deep Learning Approach.” *Journal of Alzheimer’s Disease* 97, no. 4 (2024): 1807-1827.
    b. Xiaotian Ma, Madison Shyer, Kristofer Harris, Dulin Wang, **Yu-Chun Hsu**, Christine Farrell, Nathan Goodwin, Sahar Anjum, Avram S Bukhbinder, Sarah Dean, Tanveer Khan, David Hunter, Paul E

Schulz, Xiaoqian Jiang, Yejin Kim. “Deep learning to predict rapid progression of Alzheimer’s disease from pooled clinical trials: A retrospective study” *PLOS Digital Health* 3, no. 4 (2024): e0000479.