Chiao-Yi (Charlene) Wang

• cyiwang@umd.edu • 240-764-9439 • College Park, MD
• Website: https://chiaoyiwang0424.github.io/ • in/chiao-yi-wang-685416149

Summary

Ph.D. Candidate in Bioengineering specializing in **machine learning and computer vision for biomedical imaging and signal processing**. Experienced in developing deep learning frameworks for multimodal datasets spanning 1D-3D modalities, including optical, hyperspectral imaging, and physiological data. Skilled in multimodal image registration, feature extraction, segmentation, and human pose estimation with proficiency in Python, PyTorch, and OpenCV. Strong publication record in leading venues such as IEEE TNSRE, Biomedical Optics Express, ICCV, ICASSP, and EMBC.

Education

Ph.D. in Bioengineering, University of Maryland, College Park 08/2020 – 05/2026 (Expected)
M.S. in Biomedical Electronics and Bioinformatics, National Taiwan University 09/2016 – 06/2018
B.S. in Electrical Engineering, National Taiwan University 09/2012 – 06/2016

Technical Skills

Programming: Python, PyTorch, OpenCV, C/C++, MATLAB, JavaScript, SQL, LaTex, CUDA, DB2, Verilog
Expertise: Computer Vision, Deep Learning, Multimodal Image Registration, Vessel Segmentation, Cell Detection and Tracking, Human Pose Estimation, Medical Imaging, Hyperspectral Imaging, Signal Processing

Professional Experience

Graduate Research Assistant
Bio-Imaging and Machine Vision lab, University of Maryland (PI: Prof. Yang Tao)
08/2020 – Present | College Park, MD, USA

- Established a deep learning–based computer vision framework integrating vessel segmentation, multimodal image registration and cell tracking to quantify 4D erythrocyte flow rates in the retina (**BOEx'24**).
- Developed deep learning models incorporating human pose estimation and motion analysis for privacy-preserving fall risk assessment using on body cameras (**IEEE TNSRE'25, ICASSP'24**).
- Designed and implemented a human pose retrieval framework utilizing multimodal large language models (MLLMs) (**ICCV'25**).
- Devised hyperspectral imaging pipeline for glucose monitoring with deep regression models (**EMBC'21**).
- Created a data collection path planning framework for smart precision shellfish harvesting (IEEE Access'24).

Application Developer (IT Specialist)
IBM
09/2018 – 06/2020 | Hsinchu, Taiwan

- Developed real-time dispatcher (IBM SiView RTD) and data migration tool.
- Supported MES system maintenance projects for TSMC.

Graduate Research Assistant
Biomedical Optical Spectroscopy and Imaging lab, National Taiwan University (PI: Prof. Kung-Bin Sung)
09/2016 – 08/2018 | Taipei, Taiwan

- Developed a noninvasive bio-optical method to detect oxygen saturation in deep veins (EMBC'17, SPIE Photonics West'18).
- Established a multi-wavelength optical system for real-time detection of dermal collagen concentration changes (Photonics'19, SPIE Photonics West'18).
- Analyzed bio-optical imaging data to quantify skin melanin concentration using noninvasive optical technique (BOEx'20).

Undergraduate Research Assistant

Cellular Mechanism and Biophysics lab, National Taiwan University (PI: Prof. Po-Ling Kuo)

07/2014 – 02/2016 | Taipei, Taiwan

- Developed a tumor interstitium-mimicking platform for evaluation of cytotoxic T lymphocyte-mediated killing of tumor cells. (Scientific Report'20)

Research and Development Intern

Mediatek

07/2015 – 08/2015 | Taipei, Taiwan

- Conducted IC design environment testing and compiler integration.

Publications

Journal

1. **Wang, C.Y.**, Sadrieh, F.K., Shen, Y.T., Oppizzi, G., Zhang, L.Q. and Tao, Y., (2025). EgoFall: Real-time Privacy-Preserving Fall Risk Assessment with a Single On-Body Tracking Camera. *IEEE Transactions on Neural Systems and Rehabilitation Engineering (IEEE TNSRE)*.
2. **Wang, C. Y.**, Nandhan, A. G., Shen, Y. T., Chen, W. Y., Kumar, S. S. S., Long, A., ... & Tao, Y. (2024). ShellCollect: A Framework for Smart Precision Shellfish Harvesting Using Data Collection Path Planning. *IEEE Access*.
3. **Wang, C.Y.**, Sadrieh, F.K., Shen, Y.T., Chen, S.E., Kim, S., Chen, V., Raghavendra, A., Wang, D., Saeedi, O. and Tao, Y., 2024. MEMO: dataset and methods for robust multimodal retinal image registration with large or small vessel density differences. *Biomedical Optics Express*, *15*(5), pp.3457-3479.
4. Chen, S. C., Wu, P. C., **Wang, C. Y.**, & Kuo, P. L. (2020). Evaluation of cytotoxic T lymphocyte-mediated anticancer response against tumor interstitium-simulating physical barriers. Scientific reports, 10(1), 1-13.
5. Sun, C. K., Wu, P. J., Chen, S. T., Su, Y. H., Wei, M. L., **Wang, C. Y.**, ... & Liao, Y. H. (2020). Slide-free clinical imaging of melanin with absolute quantities using label-free third-harmonic-generation enhancement-ratio microscopy. *Biomedical Optics Express*, 11(6), 3009-3024.
6. **Wang, C.Y.**, Kao, T.C., Chen, Y.F., Su, W.W., Shen, H.J. and Sung, K.B., 2019, May. Validation of an inverse fitting method of diffuse reflectance spectroscopy to quantify multi-layered skin optical properties. In *Photonics* (Vol. 6, No. 2, p. 61). MDPI.
7. Tsui, S.Y., **Wang, C.Y.**, Huang, T.H. and Sung, K.B., 2018. Modelling spatially-resolved diffuse reflectance spectra of a multi-layered skin model by artificial neural networks trained with Monte Carlo simulations. *Biomedical optics express*, 9(4), pp.1531-1544.

Conference Proceeding (All peer-reviewed)

8. Shen, Y. T.*, Eum, S.*, Lee, D., Shete, R., **Wang, C. Y.**, Kwon, H., & Bhattacharyya, S. S. (2025). AutoComPose: Automatic Generation of Pose Transition Descriptions for Composed Pose Retrieval Using Multimodal LLMs. *The IEEE/CVF International Conference on Computer Vision (**ICCV**),* 2025
9. **Wang, C.Y.**, Sadrieh, F.K., Shen, Y.T., Oppizzi, G., Zhang, L.Q. and Tao, Y., 2024, April. Real-Time Privacy-Preserving Fall Risk Assessment with a Single Body-Worn Tracking Camera. *The ICASSP 2024-2024 IEEE International Conference on Acoustics, Speech and Signal Processing* (**ICASSP**) (pp. 1866-1870). IEEE.
10. **Wang, C.Y.**, Hevaganinge, A., Wang, D., Ali, M., Cattaneo, M. and Tao, Y., 2021, November. Prediction of aqueous glucose concentration using hyperspectral imaging. *The 2021 43rd Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC) (pp. 3237-3240). IEEE*.

11. **Wang, C.Y.**, Lin, T.X. and Sung, K.B., 2018, September. Improved Inverse Two-Layered Monte Carlo Fitting of In-vivo Skin Diffuse Reflectance Spectra. In Laser Science (pp. JW3A-121). Optica Publishing Group.
12. **Wang, C.Y.**, Yu, T.W. and Sung, K.B., 2018, February. In vivo measurements of optical properties of human muscles with visible and near infrared reflectance spectroscopy. In Optical Biopsy XVI: Toward Real-Time Spectroscopic Imaging and Diagnosis (Vol. 10489, pp. 58-63). SPIE.
13. **Wang, C.Y.**, Liao, A.Y.C. and Sung, K.B., 2018, February. Developing visible and near-infrared reflectance spectroscopy to detect changes of the dermal collagen concentration. In Optical Biopsy XVI: Toward Real-Time Spectroscopic Imaging and Diagnosis (Vol. 10489, pp. 124-131). SPIE.
14. **Wang, C.Y.**, Yu, T.W., Sung, K.B., "Sensitivity Analysis for Detecting Oxygen Saturation of Deep Veins with Non-invasive Near Infrared Spectroscopy," IEEE EMBC 2017

Awards & Honors

- Fall 2020 International GA Tuition Fellowship 08/2020
- Chang Kuan Liang Scholarship, Taiwanese Society of Biomedical Engineering 03/2018
- College Student Research Scholarship, Ministry of Science and Technology, R.O.C. 07/2015

Mentorship Experience

- Mentored M.S. students (Sandip Sharan Senthil Kumar, Guru Nandhan ADP, Wei-Yu (William) Chen, Vijay Dev Reddy Chevireddi) and undergraduate students (Alex Long, Faranguisse Kakhi Sadrieh, Ravidu Hevaganinge)