YIHENG LI

Stanford University, School of Medicine
Division of Computational Medicine, Research Staff

li.terry710@gmail.com I +1(650)-665-3654 I linkedin.com/in/yiheng-li I 3180 Porter Drive, Palo Alto, 94304, CA

PROFESSIONAL EXPERIENCE

Stanford University *Research Staff - Gevaert Lab* Stanford, CA 09/2023-present

- **3D β-VAE for Lung Nodule Analysis.** Engineered a novel 3D β-Variational Autoencoder for lung CT images, enabling self-supervised learning of tumor morphology without manual labels. The model efficiently reconstructed 3D lung nodule volumes with high fidelity (SSIM 0.774, PSNR 26.1), outperforming conventional radiomics in capturing fine-grained structural details while compressing images into a compact latent representation.
    - **Discovered clinically meaningful latent features:** Demonstrated that the β-VAE's latent space encodes important tumor characteristics – for example, latent dimensions strongly correlated with nodule size (after UMAP visualization). By manipulating these latent vectors, the model can synthesize new realistic lung lesions of varying sizes, showcasing an ability to simulate disease progression scenarios for data augmentation and hypothesis generation.
    - **Advanced predictive modeling of cancer outcomes:** Leveraged the learned 3D embeddings to predict critical clinical endpoints on an independent radiogenomic dataset. Our β-VAE achieved accurate predictions of pathological nodal metastasis stage and KRAS mutation status, performing on par with fully supervised models. This work established the β-VAE as a pretrained foundational model for medical imaging, capable of transferring to downstream tasks and ultimately guiding personalized treatment strategies.
- **AI-Based Multi-Modal COVID-19 Triage Model.** Developed an AI-driven triage system integrating multi-modal data – chest CT radiomics (9,943 features) combined with patient clinical and lab records – to predict critical outcomes (ICU admission, need for mechanical ventilation, mortality) in COVID-19 patients. This model was trained on a large multi-hospital cohort (n=1,662) and externally validated on independent cohorts (n=1,362), achieving high predictive accuracy (AUROC ~0.85–0.94 across tasks).

Subtle Medical Inc. *Deep Learning Research Scientist* Menlo Park, CA 08/2021-08/2023

- **Quality Control in 3D MRI Co-Registration.** Developed a self-supervised model that integrates innovative augmentation strategies and custom loss formulations to enhance multi-contrast MRI registration, resulting in significant improvements in image fidelity and registration accuracy on benchmark datasets.
- **Self-Supervised Coverage Detection for Medical Imaging.** Pioneered a framework for robust coverage detection by incorporating novel key point detection algorithms and tailored loss adaptations. This strategic approach, developed in collaboration with junior researchers, led to substantial performance gains on proprietary datasets.

Stanford University *Research Assistant* Stanford, CA 07/2020-07/2021

- **Carmorilo Lab.** Conducted research in traumatic brain injury biomechanics, biomedical statistics, and machine learning, contributing to 5 co-authored publications on head-impact subtyping, brain-strain prediction, and sensor-based injury modeling.
    - **Machine-learning-based head impact subtyping**. Developed ML methods based on the spectral densities of head kinematics to identify distinct impact subtypes and improve traumatic brain injury prediction across heterogeneous head-impact scenarios.
    - **Subtype-specific brain strain modeling**. Showed that the relationship between head kinematics and cumulative strain damage measure (CSDM) is piecewise multivariate linear across impact subtypes, supporting more accurate subtype-aware prediction models.
    - **Wearable-sensor measurement window design**. Helped determine the optimal time window of head kinematics measurement needed to reliably estimate brain strain and strain rate from American football impacts.
    - **Interpretable statistical analysis of kinematic predictors**. Applied rigorous statistical modeling to identify the most predictive head-motion features for traumatic brain injury, clarifying how measurable kinematics relate to brain strain outcomes.
    - **Cross-domain evaluation of brain injury criteria**. Demonstrated that the relationship between standard brain injury criteria and simulated brain strain differs across impact types, highlighting the need for more context-specific injury assessment models.
- **Gevaert Lab.** Integrated multi-modal pre-training (SimCLR, BYOL, DINO) across pathology, CT, and EHR data to predict post–PD-L1 treatment outcomes; published findings in peer-reviewed journals.
- **Chaudhari Lab.** Participated in the Opportunistic CT initiative by designing, training, and rigorously evaluating a U-Net based segmentation pipeline (U-Net based) to automatically delineate vertebral structures in sagittal CT slices.

Publications

Huang, J., Yagmurlu, B., Polletti, P., Lee, R., VanderPloeg, A., Noor, H. et al. Brain tumor segmentation using deep learning: high performance with minimized MRI data. Front. Radiol. 5, 1616293 (2025). https://doi.org/10.3389/fradi.2025.1616293

Li, Y., Sadée, C. Y., Carrillo-Perez, F., Selby, H. M., Thieme, A. H. & Gevaert, O. A 3D lung lesion variational autoencoder. Cell Rep. Methods 4, 100695 (2024). https://doi.org/10.1016/j.crmeth.2024.100695

Zhan, X., Li, Y., Liu, Y., Cecchi, N. J., Raymond, S. J., Zhou, Z. et al. Machine-learning-based head impact subtyping based on the spectral densities of the measurable head kinematics. J. Sport Health Sci. 12, 619–629 (2023). https://doi.org/10.1016/j.jshs.2023.03.003

Zhan, X., Li, Y., Liu, Y., Cecchi, N. J., Gevaert, O., Zeineh, M. M. et al. Piecewise multivariate linearity between kinematic features and cumulative strain damage measure (CSDM) across different types of head impacts. Ann. Biomed. Eng. 50, 1596–1607 (2022). https://doi.org/10.1007/s10439-022-03020-0

Zhan, X., Li, Y., Liu, Y., Domel, A. G., Alizadeh, H. V., Raymond, S. J. et al. The relationship between brain injury criteria and brain strain across different types of head impacts can be different. J. R. Soc. Interface 18, 20210260 (2021). https://doi.org/10.1098/rsif.2021.0260

Liu, Y., Domel, A. G., Cecchi, N. J., Rice, E., Callan, A. A., Raymond, S. J. et al. Time window of head impact kinematics measurement for calculation of brain strain and strain rate in American football. Ann. Biomed. Eng. 49, 2791–2804 (2021). https://doi.org/10.1007/s10439-021-02821-z

Xu, Q., Zhan, X., Zhou, Z., Li, Y., Xie, P., Zhang, S. et al. AI-based analysis of CT images for rapid triage of COVID-19 patients. NPJ Digit. Med. 4, 75 (2021). https://doi.org/10.1038/s41746-021-00446-z

Zhan, X., Li, Y., Liu, Y., Domel, A. G., Alizadeh, H. V., Zhou, Z. et al. Predictive factors of kinematics in traumatic brain injury from head impacts based on statistical interpretation. Ann. Biomed. Eng. 49, 2901–2913 (2021). https://doi.org/10.1007/s10439-021-02813-z

Lyu, J., Xiong, F., Sun, N., Li, Y., Liu, C. & Yin, S. Photosynthesis and related physiological parameters differences affected the isoprene emission rate among 10 typical tree species in subtropical metropolises. Int. J. Environ. Res. Public Health 18, 954 (2021). https://doi.org/10.3390/ijerph18030954

EDUCATION

M.Sc. in Biomedical Informatics	Stanford University	09/2019-06/2021
B.Sc. in Resource and Environmental Science	Shanghai Jiao Tong University	09/2015-06/2019
International Exchange	University of California, Berkeley	01/2018-05/2018