

CHENWEI WU

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EDUCATION

Harvard University, Cambridge, MA 09/2021-05/2023
M.S. in Data Science GPA: 4.00/4.00
Focuses: Self-supervised learning (SSL), Computer Vision, Out-of-domain (OOD) Generalization
TF: CS109A Introduction to Data Science
University of Rochester, Rochester, NY 09/2016-05/2020
B.S. in Data Science (highest distinctions), B.A. in Financial Economics (distinctions), Minor in Japanese
Honors: Department Top 3, Phi Beta Kappa, Deans' List 2016-2020 GPA: 3.92/4.00
TF: CS Department Tutor, CSC 265 Intermediate Statistical Methods, CSC 240 Data Mining, ECON 268 Economics of Globalization

PUBLICATIONS & CONFERENCE PRESENTATIONS

[BenchMD: A Benchmark for Modality-Agnostic Learning on Medical Images and Sensors](#)
First Author Submitted to CVPR 2023
A Case Study of the Challenges of Applied Machine Learning in Assisted Reproductive Technology
First Author In preparation for ICML 2023
Sensor-based Gaze and Pose Tracking Analysis of Student Group Behavior in the Makerspace
First Author In preparation for CSCW 2023
[Interpretable Multimodal Deep Learning to Predict Breast Cancer Stage](#)
First Author Submitted to Nightingale Contest & IEEE Transactions on Medical Imaging
De-identification and Obfuscation of Sensitive Attributes From Retinal Scans
First Author In preparation for Nature Communications
[Social affective forecasting and social anhedonia in schizophrenia-spectrum disorders: a daily diary study](#)
Co-Author Nature, Schizophrenia, 2022
[Effective Clustering of Nursing Homes Using Unsupervised Machine Learning Focusing on Dementia and Mental Illness](#)
Co-Author Academy Health ARM 2020
[Using Optical Flow to Quantify Movement Differences in Responses to Emotional Stimuli Among People with Schizophrenia](#)
Co-Author Cognitive Neuroscience Society 2020
[Does functional connectivity within the DMN predict individual differences in social pleasure in schizophrenia?](#)
Co-Author Cognitive Neuroscience Society 2020, Society for Research in Psychopathology 2019

TALKS

Johnson & Johnson Data Science R&D Symposium, New Brunswick, NJ 08/2022
"Self-supervised Learning for Survival Rate Prediction of Histopathology Images"
Harvard Medical AI Talk, Harvard Medical School, Boston, MA 08/2022
"[Remote Working on a Cluster](#)"
Harvard Medical AI Talk, Harvard Medical School, Boston, MA 04/2022
"Model Soup"
Harvard Medical AI Talk, Harvard Medical School, Boston, MA 03/2022
"[Ensemble of Averages: Improving Model Selection](#)"
Harvard Medical AI Talk, Harvard Medical School, Boston, MA 01/2022
"[Docker for ML Practitioners](#)"

RESEARCH EXPERIENCES

Medical AI Lab, Harvard Medical School 11/2021 – Present
Graduate Researcher *Advisor: Dr. Pranav Rajpurkar*

- Viewmakers: Learning Neural Augmentations for Electrocardiograms in Self-supervised Learning
 - Developed generative diversity-viewmaker networks budgeted by stochastic L1 boundaries to adversarially learn SSL augmentations on 12-lead electrocardiogram; Viewmakers eliminate the

manual expert augmentation process and perform spurious feature suppression.

- Developed self-distillation with no labels algorithms to improve performance for the CNN and ViT encoders.
- **BenchMD: A Benchmark for Modality-Agnostic Learning on Medical Images and Sensors**
 - Designed BenchMD, a modality-agnostic benchmark that tests how different architectures and training techniques (SSL & SL) perform on domain-shift medical tasks; This benchmark covers 19 publicly available datasets for 7 diverse medical modalities, ranging from 1D sensor data, 2D images, to 3D volumetric scans.
 - Designed three SSL techniques (Emix, Shed, Agnostic MAE) and evaluated their few-shot and zero-shot performance on OOD medical data; beat SOTA AUROC in EEG and Dermatology.

Learning, Information & Technology Lab, Harvard University

10/2021 – Present

Graduate Researcher

Advisor: Dr. Bertrand Schneider

- **Multimodal Learning Analytics (MMLA) for Makerspaces**
 - Developed computer vision 3D gaze detection and facial segmentation pipelines for student collaborative learning behaviors in the Harvard Makerspace using Pytorch.
 - Performed gaze and pose data re-projections into the 3D simulated lab space to generate better visualizations.
 - Collect and analyze student behavior data in Makerspace by leveraging multimodal pipelines to understand social learning aspects like student collaboration and self-efficacy.

DtaK Lab, Harvard University

02/2022 – Present

Graduate Researcher

Advisor: Dr. Weiwei Pan

- **A Case Study of the Challenges of Applied Machine Learning in Assisted Reproductive Technology**
 - Proposed and implemented two improved methods to overcome the existing limitations of machine learning application in the In Vitro Fertilization domain.
 - Explored limitations in current literature including zero external validation, data leakage, heterogeneity and lack of timeliness.
 - Developed Phase-by-phase model to provide interpretable and progressive assistance for clinicians at different IVF stages, and developed Subgroup model to cope with data heterogeneity.
 - Collaborated with clinicians to outline a standardized data selection, preprocessing and modeling pipeline.
 - Used mixed effects models and mixtures of regressions to interpret predictors contributing to successful pregnancies and live births.

SANA Lab, MIT

09/2022 – Present

Graduate Researcher for Capstone Project

Advisor: Dr. Leo Anthony G. Celi

- **De-identifying Retinal Fundus Images for MIMIC**
 - Develop multi-objective algorithms to de-identify retinal fundus images without hurting down-stream disease classification performance; Integrate a new Brazilian retinal fundus dataset into MIMIC following HIPAA privacy regulations.
 - Successfully decreased the gender identification accuracy from 81% to 64%, while maintaining the diabetic retinopathy classification accuracy at 95%.
- **Interpretable multimodal deep learning to predict breast cancer stage**
 - Develop multi-modal models to combine attention-based multiple-instance learning on biopsy images and self-normalized networks on structured clinical metadata to predict breast cancer staging. Achieved Cohen Kappa of 71% and AUROC of 80% over 5-fold cross validation.

Social Cognition & Psychopathology Lab, University of Rochester

04/2019-04/2022

Undergraduate Researcher

Advisor: Dr. David Dodell-Feder

- **Social Brain Study**
 - Performed sentiment and topic analysis on text behavioral data in a functional neuroimaging study to investigate the relationship between brain functional connectivity and social anhedonia.

- Movement Study
 - Applied semi-supervised CNNs, optical flow and OpenFace on patient videos to analyze group differences in nonverbal social synchrony between schizophrenia patients and controls.
 - Studied the patterns of combinations of facial activation units to evaluate the effect of oxytocin on patients' social abilities.

Geriatric Oncology, University of Rochester Medical Center

05/2019 - 08/2021

Undergraduate Researcher

Advisor: Dr. Huiwen Xu

- Nursing Home Clustering
 - Utilized unsupervised algorithms to cluster nursing homes based on the percentage of residents with dementia, depression, and serious mental illness; Detected previously unknown patterns of resident case-mix and staffing in nursing homes; Predicted deficiency scores of nursing homes on a longitudinal basis using supervised learning algorithms.
- Caregiver Health Forecasting
 - Developed text association and pattern mining algorithms to classify cancer therapies.
 - Combined synthetic minority oversampling Technique (SMOTE) with supervised learning techniques to process imbalanced cancer caregiver EHR datasets; Implemented Local Interpretable Model-Agnostic Explanations (LIME) to help clinicians identify mental and physical health risk factors.

WORK EXPERIENCES

Janssen, Titusville, NJ

06/2022 - 08/2022

CV Research Intern

- Developed self-supervised learning pipeline for prostate cancer histopathology WSI's feature extraction and downstream survival prediction.

Credit Suisse, New York, NY

06/2020 - 06/2021

Full-time Analyst

- Served as an IB analyst and data scientist for the Investment Banking Emerging Markets Division.
- Built Airflow automated trading data ETL pipelines and constructed a centralized Azure cloud data platform for bonds and credit default swaps.
- Served as project manager to create a firm-wide chat platform that leverages NLP to assist sales & trading teams to gain a competitive edge.
- Collected big data streams and performed deep learning time series predictions on stock trends.

OUTREACH

Rochester Data Science Society, University of Rochester

10/2018 - 05/2020

President

- Formed a Data Science Colloquia Series; Invited renowned speakers from various fields of data science to share SOTA topics and methods.
- Connected Data Science students with faculty and alumni to help them gain internship and research opportunities.

The Commonwealth of Massachusetts, Boston, MA

06/2018-08/2018

Data Analyst Intern

- Analyzed certification and accounting data via R and Excel VBA to identify opportunities and make strategies for the recruitment, engagement, and retention processes for vendors of minorities, including women, LGBTQ, physically disadvantaged, and veterans.
- Attended in-person events and made calls to promote government assistance programs and establish connections with disadvantaged vendors.
- Utilized BI reporting tool (Sugar) to collect, analyze, and visualize government vendor business data for state government budgeting.

SKILLS

Computer Languages & Tools: Python, Java, MATLAB, R, SQL, HTML, Airflow, Docker, Excel, Tableau

Machine Learning: PyTorch, Pytorch-lightning, Tensorflow, Keras, Sklearn, OpenCV

Computing Platforms: SLURM, AWS, GCP, Azure Databricks

Languages: Chinese (Native), English (Proficient), Japanese (Intermediate), Hu Dialect (Proficient)

Personal Interests: Rowing (UR Varsity Team), Powerlifting (Bench Press 345 lbs, Deadlift 565 lbs, Squat 535)

lbs), Diving (Open Water Permit), Valorant: First Person Shooter Game (Peak Top 135 North America)