Changchang Yin

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EDUCATION

- **Ph.D. The Ohio State University, Columbus, OH, USA**
  Major: Computer Science and Engneering — 2019 - present
  Advisor: Dr. Ping Zhang
- **M.S. Xi'an Jiaotong University, Xi'an, Shaanxi, China**
  Major: Computer Science and Technology — 2016 - 2019
  Advisor: Dr. Buyue Qian
- **B.S. Xi'an Jiaotong University, Xi'an, Shaanxi, China**
  Major: Computer Science and Technology — 2012 - 2016

RESEARCH INTEREST

- My research interests lie in **data mining**, **machine learning** and their application to **trustworthy AI** (e.g., causal inference, model interpretability, data privacy & security, and model uncertainty estimation), and **computational medicine** (e.g., predictive modeling, patient subtyping, dynamic treatment regime learning, and medical imaging).

PROFESSIONAL EXPERIENCE

Artificial Intelligence in Medicine (AIMed) Lab, OSU — **Columbus, OH, USA**
Graduate Research Assistant — *2019 - present*

- Advisor: Dr. Ping Zhang
- Topic: Trustworthy Deep Learning on Electronic Health Records
  - Interpretability: developed interpretable risk prediction models with attention mechanisms and an interactive clinical prediction system to show which clinical records could increase or decrease the disease risks and what if the early intervention (e.g., medication) is assigned (*ICDM 2019* and *JMIR 2020*)
  - Causality: developed a deconfounding actor-critic model to learn optimal personalized treatment strategies from observational EHRs, which incorporated a patient resampling module and a confounding balance module to remove confounding bias (*KDD 2022*)
  - Uncertainty: developed an active sensing model to quantify the clinical risk prediction models' uncertainty caused by the unobserved variables and recommend new observations to reduce the uncertainty (*KDD 2024*)

PUBLICATIONS

The full list of my papers is available at Google Scholar Note that * denotes co-first authors.

1. **Changchang Yin**, Pin-Yu Chen, Bingsheng Yao, Dakuo Wang, Jeffrey Caterino, Ping Zhang. SepsisLab: Early Sepsis Prediction with Uncertainty Quantification and Active Sensing. ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**), 2024 (Acceptance rate: 20%, applied data science track)
2. Jiayuan Chen, **Changchang Yin**, Yuanlong Wang, Ping Zhang. Predictive modeling with temporal graphical representation on electronic health records. International Joint Conference on Artificial Intelligence (**IJCAI**), 2024.

3. Shao Zhang, Jianing Yu, Xuhai Xu, **Changchang Yin**, Yuxuan Lu, Bingsheng Yao, Melanie Tory, Lace M Padilla, Jeffrey Caterino, Ping Zhang, Dakuo Wang. Rethinking human-AI collaboration in complex medical decision making: A case study in sepsis diagnosis. ACM CHI Conference on Human Factors in Computing Systems (**CHI**), 2024 (Acceptance rate: 1060/4028 = 26.3%)

4. Yuanlong Wang, **Changchang Yin**, Ping Zhang. Multimodal risk prediction with physiological signals, medical images and clinical notes. *Heliyon* 10:e26772, 2024 (Impact factor: 4.0)

5. Seungyeon Lee*, **Changchang Yin***, Ping Zhang. Stable clinical risk prediction against distribution shift in electronic health records. *Patterns* 4:100828, 2023 (Impact factor: 6.5)

6. Thai-Hoang Pham, **Changchang Yin**, Laxmi Mehta, Xueru Zhang, Ping Zhang. A fair and interpretable network for clinical risk prediction: A regularized multi-view multi-task learning approach. *Knowledge and Information Systems (KAIS)* 65:1487–1521, 2023

7. **Changchang Yin**, Ruoqi Liu, Jeffrey Caterino, Ping Zhang. Deconfounding actor-critic network with policy adaptation for dynamic treatment regimes. ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**), 2022 (Acceptance rate: 254/1695 = 15.0%, research track)

8. **Changchang Yin**, Sayoko Moroi, Ping Zhang. Predicting age-related macular degeneration progression with contrastive attention and time-aware LSTM. ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**), 2022 (Acceptance rate: 195/753 = 25.9%, applied data science track)

9. Thai-Hoang Pham, **Changchang Yin**, Laxmi Mehta, Xueru Zhang, Ping Zhang Cardiac complication risk profiling for cancer survivors via multi-view multi-task learning. IEEE International Conference on Data Mining (**ICDM**), 2021 (Acceptance rate: 98/990 = 9.9%, regular paper, oral presentation. Selected as one of the best papers and invited to KAIS Journal Special Issue)

10. Zicong Zhang, **Changchang Yin**, Ping Zhang. Temporal clustering with external memory network for disease progression modeling. IEEE International Conference on Data Mining (**ICDM**), 2021 (Acceptance rate: 98/990 = 9.9%, regular paper, oral presentation)

11. Fenglin Liu, **Changchang Yin**, Xian Wu, Shen Ge, Ping Zhang, Xu Sun. Contrastive attention for automatic medical report generation. Findings of Annual Meeting of the Association for Computational Linguistics (Findings of **ACL**), 2021

12. Yuanfang Guan, Hongyang Li, Daiyao Yi, Dongdong Zhang, **Changchang Yin**, Keyu Li, Ping Zhang. A survival model generalized to regression learning algorithms. Nature Computational Science 1:433–440, 2021

13. Zicong Zhang, Kimerly Powell, **Changchang Yin**, Shilei Cao, Dani Gonzalez, Yousef Hannawi, Ping Zhang Brain atlas guided attention U-net for white matter hyperintensity segmentation. American Medical Informatics Association Informatics Summit (AMIA Summit), 2021 (Buckeye AI, one of the top solutions for WMH Segmentation Challenge)

14. Dongdong Zhang*, **Changchang Yin***, Katherine Hunold, Xiaoqian Jiang, Jeffrey Caterino, Ping Zhang. An interpretable deep-learning model for early prediction of sepsis in the emergency department. Patterns 2:100196, 2021 (Buckeye AI, one of the winning teams for 2019 DII National Data Science Challenge)

15. Sundreen Asad Kamal*, **Changchang Yin***, Buyue Qian, Ping Zhang. An interpretable risk prediction model for healthcare with pattern attention. BMC Medical Informatics and Decision Making 20:307, 2020

16. Ruoqi Liu, **Changchang Yin**, Ping Zhang. Estimating individual treatment effects with time-varying confounders.IEEE International Conference on Data Mining (**ICDM**), 2020 (Acceptance rate: 91/930 = 9.8%, regular paper, oral presentation)

17. Dongdong Zhang, **Changchang Yin**, Jucheng Zeng, Xiaohui Yuan, Ping Zhang. Combining structured and unstructured data for predictive models: a deep learning approach. BMC Medical Informatics and Decision Making 20:280, 2020

18. Rui Li*, **Changchang Yin***, Samuel Yang, Buyue Qian, Ping Zhang. Marrying medical domain knowledge with deep learning on electronic health records: a deep visual analytics approach. Journal of Medical Internet Research (**JMIR**) 22(9):e20645, 2020 (Impact factor: 5.034. Featured on AMIA 2021 Year-in-Review)

19. **Changchang Yin**, Ruoqi Liu, Dongdong Zhang, Ping Zhang. Identifying sepsis subphenotypes via time-aware multi-modal auto-encoder. ACM SIGKDD Conference on Knowledge Discovery and Data Mining (**KDD**), 2020 (Acceptance rate: 216/1279 = 16.9%, research track, oral presentation)

20. **Changchang Yin**, Rongjian Zhao, Buyue Qian, Xin Lv, Ping Zhang. Domain knowledge guided deep learning with electronic health records. IEEE International Conference on Data Mining (**ICDM**), 2019 (Acceptance rate: 95/1046 = 9.1%, regular paper, oral presentation)

21. **Changchang Yin**, Buyue Qian, Xianli Zhang, Yang Li, Qinghua Zheng. Automatic generation of medical imaging diagnostic report with hierarchical recurrent neural network. IEEE International Conference on Data Mining (**ICDM**), 2019 (Acceptance rate: 95/1046 = 9.1%, regular paper, oral presentation)

22. Xianli Zhang, Buyue Qian, Yang Li, **Changchang Yin**, Xudong Wang, Qinghua Zheng. KnowRisk: an interpretable knowledge-guided model for disease risk prediction. 2019 IEEE International Conference on Data Mining (**ICDM**), 1492-1497

23. **Changchang Yin**, Buyue Qian, Shilei Cao, Xiaoyu Li, Jishang Wei, Qinghua Zheng, Ian Davidson. Deep similarity-based batch mode active learning with exploration-exploitation. IEEE International Conference on Data Mining (**ICDM**), 2017.

24. Shilei Cao, Buyue Qian, **Changchang Yin**, Xiaoyu Li, Jishang Wei, Qinghua Zheng, Ian Davidson. Knowledge guided short-text classification for healthcare applications. 2017 IEEE International Conference on Data Mining (**ICDM**), 31-40

25. Zihao Zhu, **Changchang Yin**, Buyue Qian, Yu Cheng, Jishang Wei, Fei Wang. Measuring patient similarities via a deep architecture with medical concept embedding. IEEE International Conference on Data Mining (**ICDM**), 2016.

PRESENTATIONS

- **"Deconfounding actor-critic network with policy adaptation for dynamic treatment regimes"**
  Presentation for KDD'2022 Aug 2022
- **"Predicting age-related macular degeneration progression with contrastive attention and time-aware LSTM"**
  Presentation for KDD'2022 Aug 2022
- **"Identifying sepsis subphenotypes via time-aware multi-modal auto-encoder"**
  Presentation for KDD'2020 Aug 2020
- **"Deep similarity-based batch mode active learning with exploration-exploitation"**
  Presentation for ICDM'2017 Dec 2017
- **"Measuring patient similarities via a deep architecture with medical concept embedding"**
  Presentation for ICDM'2016 Dec 2016

SERVICES

- Conference reviewer: KDD, AAAI, IJCAI, ICDM, SDM, AMIA.
- Journal reviewer: JMIR, JBHI, NCAA, BMC Medical Informatics and Decision Making.
- Conference sub reviewer: ICML, NeurIPS, ICLR.
- Journal sub reviewer: Nature Communications, Nature Machine Intelligence, Patterns, BMC Bioinformatics.