

Mei Liu, PhD

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POSITION AND APPOINTMENTS

2022 – Present	Associate Professor with Tenure	Division of Biomedical Informatics Department of Health Outcomes and Biomedical Informatics (HOBBI) University of Florida Gainesville, FL
2020 – 2022	Interim Director	Division of Medical Informatics Department of Internal Medicine University of Kansas Medical Center Kansas City, KS
2020 – 2022	Associate Professor with Tenure	Division of Medical Informatics Department of Internal Medicine University of Kansas Medical Center Kansas City, KS
2014 – 2020	Assistant Professor (tenure track)	Division of Medical Informatics Department of Internal Medicine University of Kansas Medical Center Kansas City, KS
2012 – 2014	Assistant Professor (tenure track)	Department of Computer Science New Jersey Institute of Technology Newark, NJ

EDUCATION / TRAINING

09/2009 – 06/2012	Postdoctoral Fellow	Department of Biomedical Informatics Vanderbilt University Medical Center Nashville, TN
09/2004 – 07/2009	PhD	Computer Science University of Kansas Lawrence, KS
09/2002 – 05/2004	MS	Computer Science University of Kansas Lawrence, KS
09/1998 – 05/2002	BS	Computer Science University of Kansas Lawrence, KS

RESEARCH SUMMARY

My research focus is **Artificial Intelligence and Machine Learning for P4 Medicine** (Predictive, Preventive, Personalized, and Participatory)

- Disease prediction and prevention via EHR data analysis: e.g., Acute Kidney Injury (AKI), Diabetic Kidney Disease (DKD), Diabetic Retinopathy, Sepsis
- Drug discovery and safety: drug design, drug repurposing, adverse drug reaction detection

Following highlight my work and selected publications in medical AI within the most recent 3 years:

- 1) Liu K, Zhang X, Chen W, Yu ASL, Kellum JA, Matheny ME, Simpson SQ, Hu Y, Liu M. Development and Validation of a Personalized Model With Transfer Learning for Acute Kidney Injury Risk Estimation Using Electronic Health Records. **JAMA Netw Open**. 2022;5(7):e2219776. (IF 13.37)
- 2) Bisarya R, Song X, Salle J, Liu M, Patel A, Simpson SQ. Antibiotic timing and progression to septic shock among emergency department patients with suspected infection. **Chest**, 2021 Jun 26: S0012-3692(21)01256-3. doi: 10.1016/j.chest.2021.06.029. Epub ahead of print. [PMID: 34186038] (IF 10.262)
- 3) Wang J, Abu-El-Rub N, Gray J, Pham HA, Zhou Y, Manion FJ, Liu M, Song X, Xu H, Rouhizadeh M, Zhang Y. COVID-19 SignSym: a fast adaptation of a general clinical NLP tool to identify and normalize COVID-19 signs and symptoms to OMOP common data model. **JAMIA**, 2021 Mar 1; ocab015. (IF 7.942)
- 4) Song X, Yu ASL, Kellum JA, Waitman LR, Matheny ME, Simpson SQ, Hu Y, Liu M. Cross-site transportability of an explainable artificial intelligence model for acute kidney injury prediction. **Nat Commun.**, 2020 Nov 9;11(1):5668. [PMCID: PMC7653032] (IF 17.69)
- 5) Song X, Waitman LR, Hu Y, Yu ASL, Robbins DC, Liu M. (2019) Robust clinical marker identification for diabetic kidney disease with ensemble feature selection. **JAMIA**, 26(3), 242-253. [PMID: 30602020] (IF 7.942)

PROFESSIONAL ACTIVITIES

Editorial & Scientific Program Committees

2022 – Present	Frontiers Nephrology, Guest Editor for Rising Star in Critical Care Nephrology
2022 – Present	Scientific Reports, Associate Editor
2014 – Present	Associate Editor, Decision Support Systems (DSS)
2016 – Present	International Journal of Computational Intelligence in Bioinformatics and Systems Biology, Editorial Board
2019 – Present	AAAI Conference on Artificial Intelligence, Program Committee
2018 – Present	FLAIRS International Conference of the Florida Artificial Intelligence Research Society, Program Committee
2022	11 th IEEE International Conference on Health Informatics (ICHI) Poster and Demonstration Chair
2019, 2020	AMIA Annual Symposium Scientific Program Committee, Data Science track

- 2019, 2021 AMIA Informatics Summit Scientific Program Committee, Data Science track
- 2012 Guest Editor, The Scientific World Journal special issue on Sequence-Based Prediction of Structure and Function of Protein

Grant Proposal Reviewer

- 2020 – Present National Institutes of Health (NIH) Review Panel
- 2018 – Present National Science Foundation (NSF) Review Panel
- 2017 Greater Plains Collaborative (GPC) Clinical Data Research Network Inter-Institutional Pilot Grant Program
- 2016 KUMC Research Institute Internal Clinical Pilot Research Grant and Lied Basic Science Grant Programs

Conference Reviewer

- 2011 – Present AMIA – American Medical Informatics Association Annual Symposium
- 2011 – Present AMIA Joint Summits on Translational Science
- 2013, 2017 MedInfo – World Congress on Medical and Health Informatics
- 2015, 2016 ICHI – IEEE International Conference on Healthcare Informatics
- 2014 PAKDD – Workshop on Scalable Data Analytics: Theory and Applications
- 2013 ICMLA – International Conference on Machine Learning and Applications
- 2013 IEEE International Workshop on Big Data in Bioinformatics and Health Informatics
- 2011 BIOKDD – International Workshop on Data Mining in Bioinformatics
- 2011 ICIC – International Conference on Intelligent Computing
- 2011 HISB – IEEE Conference on Healthcare Informatics, Imaging, and System Biology

Journal Reviewer

- 2022 Kidney International
- 2020 Journal of the American Society of Nephrology (JASN)
- 2020 BMC Nephrology
- 2016 – Present Applied Clinical Informatics (ACI)
- 2014 – Present Data Mining and Knowledge Discovery (DMKD)
- 2017 Knowledge Based Systems (KBS)
- 2016 Artificial Intelligence in Medicine (AIM)
- 2013 – 2015 International Journal of Data Mining and Bioinformatics (IJDMB)
- 2013 IEEE Transactions on Knowledge and Data Engineering (TKDE)
- 2012, 2015 Journal of Web Engineering (JWE)

2015	Neural Networks
2014	Expert Systems With Applications (ESWA)
2013	Journal of the American Medical Informatics Association (JAMIA)
2013	PLoS ONE
2012, 2013	BMC Bioinformatics

HONORS & AWARDS

2017	Distinguished Paper, "Predicting inpatient acute kidney injury over different time horizons: how early and accurate?", American Medical Informatics Association (AMIA)
2017	AMIA Clinical Research Informatics Award nominee, Joint Summits on Translational Science (AMIA-CRI)
2013	Distinguished Paper, "Identifying Inconsistencies in SNOMED-CT Problem Lists using Structural Indicators", American Medical Informatics Association (AMIA)
2012	Distinguished Paper, "Large-scale Prediction of Adverse Drug Reactions by Integrating Chemical, Biological, and Phenotypic Properties of Drugs", American Medical Informatics Association (AMIA) Joint Summit on Translational Science
2009 – 2011	National Library of Medicine Postdoctoral Training Fellowship
2010	2 nd Best system in Concept Extraction task, i2b2 NLP challenge
2009	Honor Dissertation – Department of Electrical Engineering and Computer Science, University of Kansas
2007	Paul F. Huebner Memorial Award – Excellence in teaching, University of Kansas
2002	Outstanding Senior in Computer Science – Based on overall outstanding academic achievement. The award is presented to only one graduating senior in each of the three majors (i.e. Computer Science, Computer Engineering, Electrical Engineering) in the Department of Electrical Engineering and Computer Science, University of Kansas
1998 – 2002	Endowment Merit Scholar, University of Kansas

TEACHING ACTIVITIES

Fall, 2018 – 2021	PRVM868 – Biomedical Informatics Driven Clinical Research	Graduate
Spring, 2014	CS639 – Electronic Medical Records	Graduate
Fall, 2013	CS115 – Introduction to Computer Science, C++	Undergraduate
Spring, 2013	CS639 – Electronic Medical Records	Graduate
Fall, 2012	CS639 – Electronic Medical Records	Graduate

STUDENT SUPERVISION

Advisor

2021 – Present	Ho Yin Chan, Postdoctoral Fellow, Medical Informatics, University of Kansas Medical Center (KUMC)
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- 2017 – 2019 Xing Song, Postdoctoral Fellow, Medical Informatics, University of Kansas Medical Center (KUMC)
- 2016 – 2017 Peng Cheng, Postdoctoral Fellow, Medical Informatics, University of Kansas Medical Center (KUMC)
- 2012 – 2013 Ankur Agrawal, PhD, Computer Science, New Jersey Institute of Technology (NJIT)

PhD Committee

- 2021 – 2026 Liangqin Ren, Computer Science, University of Kansas (KU)
- 2020 – 2026 Pramil Paudel, Computer Science, University of Kansas (KU)
- 2020 – 2026 Sumit Bhattarai, Computer Science, University of Kansas (KU)
- 2019 – 2025 Zeyan Liu, Computer Science, University of Kansas (KU)
- 2017 – 2022 Sana Awan, Computer Science, University of Kansas (KU)
- 2019 Hao Xue, Computer Science, University of Kansas (KU)
- 2017 – 2018 Ala'a Jaber, Occupational Therapy, University of Kansas Medical Center (KUMC)
- 2017 – 2018 Ling Zheng, Computer Science, New Jersey Institute of Technology (NJIT)
- 2015 Xiang Ji, Computer Science, New Jersey Institute of Technology (NJIT)
- 2013 Zhe He, Computer Science, New Jersey Institute of Technology (NJIT)

Master Committee

- 2014 Mengnan Gu, New Jersey Institute of Technology (NJIT)
- 2013 Meghanasamir Vasavada, New Jersey Institute of Technology (NJIT)

GRANT

Ongoing Research Support

NSF/Smart & Connected Health Liu (PI) 10/2020 – 09/2024

SCH: INT: Collaborative Research: Privacy-Preserving Federated Transfer Learning for Early Acute Kidney Injury Risk Prediction

Major Goals: The project is to address the computational and security challenges for building a global machine learning model to predict acute kidney injury (AKI) in hospitalized patients using EMR data located at different hospitals. The prediction model will be developed and developed using data from 12 health systems in the PCORnet Greater Plains Collaborative.

Role: Lead-PI

R01DK116986 Liu (PI) 09/2019 – 06/2023
NIH/NIDDK

Identifying Personalized Risk of Acute Kidney Injury with Machine Learning

Major Goals: This project aims to develop novel machine learning algorithms to identify risk factors of acute kidney injury in hospitalized patients using data from two PCORnet clinical data research networks (CDRNs).

Role: PI

Completed Research Support

RD-2020C2-20329 O'Rorke (PI) 07/2021 – 06/2025
Patient Centered Outcomes Research Institute (PCORI)

Comparative Effectiveness Research for Neuroendocrine Tumors (CER-NET)

Major Goals: Partner with patients on comparative effectiveness research (CER) to achieve the goal of mitigating toxicity and optimizing effectiveness and sequencing of therapy for patients with neuroendocrine tumors (NETs).

Role: Site-PI

UL1 TR002366 Castro (PI) 07/2022 – 06/2027
NIH/NCATS, Institutional Clinical and Translational Science Award (U54)

Frontiers: The Heartland Institute for Clinical and Translational Research

Major Goals: Create a new academic home with training programs for clinical and translational investigators, provide an enhanced coordinated translational research infrastructure and actively engage the community in developing, testing and disseminating translational research.

Role: Informatics Core Co-Lead

RI-CRN-2020-003-IC Waitman (PI) 01/2022 – 12/2024
Patient Centered Outcomes Research Institute (PCORI)

Advancement of PCORnet Infrastructure: Clinical Research Network

Major Goals: Advance the informatics capacity of the PCORnet Greater Plains Collaborative research network that captures complete and comprehensive data from patients at twelve medical centers.

Role: Co-I; GPC representative in the PCORnet CDM Data Workgroup

U54DK126126-01 Calvet (PI) 07/2020 – 06/2025
NIH/NIDDK

Kansas PKD Research and Translation Core Center

Major Goals: Part of a national PKD Research Consortium, to develop and share research resources, with overall goal of improving our understanding of the pathogenesis, progression, prevention and clinical management of polycystic kidney disease (PKD) through enhanced sharing of research resources, core services and expertise to ensure establishment of a robust research community.

Role: Key Personnel

U18-DP006120-01 Black & Kho (PI) 09/2015 – 09/2021
Centers for Disease Control and Prevention (CDC)

Effect of ACA Medicaid Expansion on Diabetes: Diagnosis, Treatment, Patient Compliance and Health Outcomes

Major Goals: Study the effect of the Patient Protection and Affordable Care Act of 2010 (ACA) Medicaid expansion on diabetes diagnosis, treatment, and outcomes in adults, using data from two PCORnet clinical data research networks (CDRNs).

Role: Site-PI

PCORI (#PaCR-2017C2-8153) O'Brien (PI) 10/2019 – 07/2020
Duke University/Duke Clinical Research

Using PCORnet to Compare Blood Pressure Control Strategies

Major Goals: In collaboration with the American Heart Association (AHA) and the American Medical Association (AMA), the Health eHeart Alliance and PCORnet Cardiovascular Health Collaborative Research Network propose to establish the National Blood Pressure Control Laboratory to enhance cardiovascular health and blood pressure control in the United States. The BP Control Lab will enable blood pressure control surveillance, provide feedback to healthcare systems and clinicians, and conduct efficient pragmatic comparative effectiveness research on interventions designed to enhance blood pressure control.
Role: Subaward PI-KUMC site

Kidney Health CRG Pilot Liu (PI) 08/2018 – 03/2019
Patient Centered Outcomes Research Institute (PCORI)
Building and Validating Predictive Models for Acute Kidney Injury using PCORnet CDM
Major Goals: Develop and validate predictive models for acute kidney injury in general hospitalized patients using electronic medical record data across PCORnet.
Role: PI

BLUE KC Outcomes Research Grants Simpson (PI) 08/2017 – 09/2018
KCALSI, Kansas City Area Life Sciences Institute
Sepsis Predictive Risk Modeling Learned from Information Security
Major Goals: Develop predictive models for patients with sepsis, assessing what clinical factors would make physicians move faster in treating patients with suspected sepsis.
Role: Co-Investigator (machine learning expert)

CDRN-1306-04631 Waitman (PI) 09/2015 – 09/2018
Patient Centered Outcomes Research Institute (PCORI)
The Greater Plains Collaborative – a PCORnet Clinical Data Research Network Phase II
Major Goals: Extend the capacity of the research network that captures complete and comprehensive data from patients at twelve medical centers. Continue governance, regulatory processes, technical infrastructure, and patient engagement strategies to enable a learning health care system by integrating Comparative Effectiveness Research with clinical workflows. Develop sustainable model for this digital infrastructure.
Role: Co-Investigator

CDRN-1306-04631 Modification 003 Waitman (PI) 10/2015 – 01/2017
Patient Centered Outcomes Research Institute
The Greater Plains Collaborative Phase I Supplement – CMS Enclave Project
Major Goals: The objective of this project is to test and evaluate the process of using Medicare claims data to supplement PCORnet Clinical Data Research Network (CDRN) data.
Role: Co-Investigator

CDRN-1306-04631 Waitman (PI) 03/2014 – 09/2015
Patient Centered Outcomes Research Institute
The Greater Plains Collaborative; a PCORnet Clinical Data Research Network – Phase I
Major Goals: create a research network that captures complete and comprehensive data from patients at ten medical centers. Develop the governance, regulatory processes, technical infrastructure, and patient engagement strategies to enable a learning health care system by integrating Comparative Effectiveness Research with clinical workflows.
Role: Co-Investigator

RESEARCH ACTIVITIES

Publications (in reverse chronological order)

Peer-reviewed Journal Articles

1. X. Zhang, K. Liu, B. Yuan, H. Wang, S. Chen, Y. Xue, W. Chen, **M. Liu**, Y. Hu. A hybrid adaptive approach for instance transfer learning with dynamic and imbalanced data. *International Journal of Intelligent Systems (IJIS)*, First published 02 September 2022; <https://doi.org/10.1002/int.23055>.
2. K. Liu, X. Zhang, W. Chen, ASL. Yu, JA. Kellum, ME. Matheny, SQ. Simpson, Y. Hu, **M. Liu**. Development and Validation of a Personalized Model With Transfer Learning for Acute Kidney Injury Risk Estimation Using Electronic Health Records. *JAMA Netw Open*. 2022;5(7):e2219776.
3. K. Liu, B. Yuan, X. Zhang, W. Chen, LP. Patel, Y. Hu, **M. Liu**. Characterizing the temporal changes in association between modifiable risk factors and acute kidney injury with multi-view analysis. *Int J Med Inform*. 2022 July;163:104785.
4. L. Wu, Y. Hu, **M. Liu**, B. Yuan, X. Zhang, WQ. Chen, K. Liu. Temporal dynamics of clinical risk predictors for hospital-acquired acute kidney injury under different forecast time windows. *Knowledge-Based Systems*. 2022 June;245:108655.
5. LR. Waitman, X. Song, DL. Walpitage, DC. Connolly, LP. Patel, **M. Liu**, MC. Schroeder, JJ. VanWormer, AS. Mosa, ET. Anye, AM. Davis. Enhancing PCORnet Clinical Research Network data completeness by integrating multistate insurance claims with electronic health records in a cloud environment aligned with CMS security and privacy requirements. *J Am Med Inform Assoc.*, 2022 Mar 15;29(4):660-670. doi: 10.1093/jamia/ocab269. PMID: 34897506; PMCID: PMC8922172.
6. L. Wu, Y. Hu, X. Zhang, J. Zhang, **M. Liu**. Development of a knowledge mining approach to uncover heterogeneous risk predictors of acute kidney injury across age groups. *Int J Med Inform*. 2021 Dec;158:104661. doi: 10.1016/j.ijmedinf.2021.104661.
7. Q. Luo, S. Mo, Y. Xue, X. Zhang, Y. Gu, L. Wu, J. Zhang, L. Sun, **M. Liu**, Y. Hu. Novel deep learning-based transcriptome data analysis for drug-drug interaction prediction with an application in diabetes. *BMC Bioinformatics*, 2021, 22:318. Doi:10.1186/s12859-021-04241-1.
8. A. Furmanchuk, **M. Liu**, X. Song, L.R. Waitman, J.R. Meurer, K. Osinski, A. Stoddard, E. Chrischilles, J.C. McClay, L.G. Cowell, U. Tachinardi, P.J. Embi, A.S.M. Mosa, V. Mandhadi, R.C. Shah, D. Garcia, F. Angulo, A. Patino, W.E. Trick, T.W. Markossian, L.J. Rasmussen-Torvik, A.N. Kho, B.S. Black. Effect of the affordable care act on diabetes care at major health centers: newly detected diabetes and diabetes medication management. *BMJ Open Diab Res Care*, 2021, 9:e002205. Doi:10.1136/bmjdr-2021-002205.
9. R. Bisarya, X. Song, J. Salle, **M. Liu**, A. Patel, S.Q. Simpson. Antibiotic timing and progression to septic shock among emergency department patients with suspected infection. *Chest*, 2021, Jun 26:S0012-3692(21)01256-3. doi: 10.1016/j.chest.2021.06.029. Epub ahead of print. PMID: 34186038.
10. X. Song, **M. Liu**, L.R. Waitman, A. Patel, S.Q. Simpson. Clinical factors associated with rapid treatment of sepsis. *PLoS ONE*, 2021, 16(5):e0250923.
11. R. Wang, Z. Miao, T. Liu, **M. Liu**, K. Grdinovac, X. Song, Y. Liang, D. Delen, W. Paiva. Derivation and validation of essential predictors and risk index for early detection of diabetic retinopathy using electronic health records. *J. Clin. Med.*, 2021, 10, 1473.

12. J. Wang, N. Abu-El-Rub, J. Gray, H.A. Pham, Y. Zhou, F.J. Manion, **M. Liu**, X. Song, H. Xu, M. Rouhizadeh, Y. Zhang. COVID-19 SignSym: a fast adaptation of a general clinical NLP tool to identify and normalize COVID-19 signs and symptoms to OMOP common data model. *JAMIA*, 2021 Mar 1;ocab015.
13. X. Song, A.S.L. Yu, J.A. Kellum, L.R. Waitman, M.E. Matheny, S.Q. Simpson, Y. Hu, **M. Liu**. Cross-site transportability of an explainable artificial intelligence model for acute kidney injury prediction. *Nat Commun.*, 2020 Nov 9;11(1):5668.
14. L. Wu, Y. Hu, B. Yuan, X. Zhang, W. Chen, K. Liu, **M. Liu**. Which risk predictors are more likely to indicate severe AKI in hospitalized patients? *Int J Med Inform.*, 2020 Nov;143:104270.
15. L. Wu, Y. Hu, X. Zhang, W. Chen, A.S.L. Yu, J.A. Kellum, L.R. Waitman, **M. Liu**. Changing relative risk of clinical factors for hospital-acquired acute kidney injury across age groups: a retrospective cohort study. *BMC Nephrology*, 2020 Aug 2;21(1):321.
16. M.T. Beauchamp, B. Regier, A. Nzuki, R.W. Romine, B. Sweeney, **M. Liu**, A.M. Davis. Weight change before and after adenotonsillectomy in children: an analysis based upon pre-surgery body mass category. *Clinical Otolaryngology*, 2020;00:1-7. DOI: 10.1111/coa.13568.
17. X. Song, L.R. Waitman, A.S.L. Yu, D.C. Robbins, Y. Hu, **M. Liu**. Longitudinal risk prediction of chronic kidney disease in diabetic patients using a temporal-enhanced gradient boosting machine: retrospective cohort study. *JMIR Med Inform*, 2020;8(1):e15510. DOI: 10.2196/15510.
18. X. Song, L.R. Waitman, Y. Hu, A.S.L. Yu, D.C. Robbins, **M. Liu**. Robust clinical marker identification for diabetic kidney disease with ensemble feature selection. *JAMIA*, 26(3): 242-253, January 2019. DOI: 10.1093/jamia/ocy165.
19. J. He, Y. Hu, X. Zhang, L. Wu, L.R. Waitman, **M. Liu**. Multi-perspective predictive modeling for acute kidney injury in general hospital populations using electronic medical records. *JAMIA Open*, 00(0)1-8, November 2018. DOI: 10.1093/jamiaopen/ooy043.
20. L. Wu, Y. Hu, X. Liu, X. Zhang, W. Chen, A.S.L. Yu, J.A. Kellum, L.R. Waitman, **M. Liu**. Feature ranking in predictive models for hospital-acquired acute kidney injury. *Scientific Reports*, (2018)8:17298, November 2018. DOI:10.1038/s41598-018-35487-0.
21. X. Zhang, Y. Hu, **M. Liu**, T. Lang. Optimization of assembly pipeline may improve the sequence of the Chloroplast genome in *Quercus spinose*. *Scientific Report*, (2018)8:8906, June 2018. DOI:10.1038/s41598-018-27298-0.
22. W. Chen, Y. Hu, L. Wu, X. Zhang, K. Liu, J. He, Z. Tang, X. Song, L.R. Waitman, **M. Liu**. Causal risk factor discovery for severe acute kidney injury using electronic health records. *BMC Medical Informatics and Decision Making*, 18(Suppl 1):13, March 2018.
23. R. Cai, **M. Liu**, Y. Hu, B.L. Melton, M.E. Matheny, H. Xu, L. Duan, L.R. Waitman. Identification of adverse drug-drug interactions through causal association rule discovery from spontaneous adverse event reports. *Artificial Intelligence in Medicine*. 76:7-15, January 2017.
24. A. Culbertson, S.Goel, M.B. Madden, N. Safaeinili, K.L. Jackson, T. Carton, L.R. Waitman, **M. Liu**, A. Krishnamurthy, L. Hall, N. Cappella, S. Visweswaran, M.J. Becich, R. Applegate, E. Bernstam, R. Rothman, M. Matheny, G. Lipori, J. Bian, W. Hogan, D. Bell, S. Grannis, A. Martin, J. Klann, R. Sutphen, A.B. Ohara, A. Kho. The building blocks of interoperability: a multisite analysis of patient demographic attributes available for matching. *Applied Clinical Informatics*. 8:322-336, 2017.

25. A.G. Sreih, N. Annapureddy, J. Springer, G. Casey, K. Byram, A. Cruz, M. Estephan, V. Frangiosa, M.D. George, **M. Liu**, A. Parker, S. Sangani, R. Sharim, P.A. Merkel. Development and validation of case-finding algorithms for the identification of patients with ANCA-Associated Vasculitis in Large Healthcare Administrative Databases. *Pharmacoepidemiology and Drug Safety*. 25(12):1368-1374, December 2016.
26. Y. Tan, Y. Hu, X. Liu, Z. Yin, X-W. Chen, **M. Liu**. Improving drug safety: From adverse drug reaction knowledge discovery to clinical implementation. *Methods*. 110:14-25, November 1, 2016.
27. W. Chen, Z. Hao, R. Cai, X. Zhang, Y. Hu, **M. Liu**. Multiple-cause discovery combined with structure learning for high-dimensional discrete data and application to stock prediction. *Soft Computing*. 20(11):4575-4588, November 2016.
28. Y. Hu, K. Liu, X. Zhang, L. Su, E.W.T. Ngai, **M. Liu**. Application of evolutionary computation for rule discovery in stock algorithmic trading: a literature review. *Applied Soft Computing*. 36:534-551, November 2015.
29. Y. Hu, K. Liu, X. Zhang, K. Xie, W. Chen, Y. Zeng, **M. Liu**. Concept drift mining of portfolio selection factors in stock market. *Electronic Commerce Research and Applications (ECRA)*. 14(6):444-455, October-November 2015.
30. X. Zhang, Y. Hu, K. Xie, W. Zhang, L. Su, **M. Liu**. An Evolutionary Trend Reversion Model for Stock Trading Rule Discovery. *Knowledge-Based Systems*. 79:27-35, May 2015.
31. Y. Hu, B. Feng, X. Mo, X. Zhang, E.W.T. Ngai, **M. Liu**. Cost-sensitive and Ensemble-based Prediction Model for Outsourced Software Project Risk Prediction. *Decision Support Systems (DSS)*. 72:11-23, April 2015.
32. Y. Hu, B. Feng, X. Zhang, E.W.T. Ngai, **M. Liu**. Stock Trading Rule Discovery with an Evolutionary Trend Following Model. *Expert Systems with Applications*. 42(1):212-222, January 2015.
33. Y. Hu, X. Zhang, B. Feng, K. Xie, **M. Liu**. iTrade: A Mobile Data-Driven Stock Trading System with Concept Drift Adaptation. *International Journal of Data Warehousing and Mining*. 11(1): 66-83, January 2015.
34. X. Zhang, Y. Hu, K. Xie, S. Wang, E.W.T. Ngai, **M. Liu**. A Causal Feature Selection Algorithm for Stock Prediction Modeling. *Neurocomputing*, 142(0):48-59, October 2014.
35. **M. Liu**, R. Cai, Y. Hu, M.E. Matheny, J. Sun, J. Hu, H. Xu. Determining Molecular Predictors of Adverse Drug Reactions with Causality Analysis based on Structure Learning. *Journal of the American Medical Informatics Association (JAMIA)*, 21(2):245-51, Mar-April 2014.
36. Y. Hu, X. Zhang, E.W.T. Ngai, R. Cai, **M. Liu**. Software Project Risk Analysis using Bayesian Networks with Causality Constraints. *Decision Support Systems (DSS)*. 56:439-49, December 2013.
37. Y. Hu, J. Du, X. Zhang, X. Hao, E.W.T. Ngai, M. Fan, **M. Liu**. An Integrative Framework for Intelligent Software Project Risk Planning. *Decision Support Systems (DSS)*. 55(4):927-37, November 2013.
38. **M. Liu**, E.R. McPeck Hinz, M.E. Matheny, J.C. Denny, J.S. Schildcrout, R.A. Miller, H. Xu. Comparative Analysis of Pharmacovigilance Methods in Detection of Adverse Drug Reactions from Electronic Medical Records. *Journal of the American Medical Informatics Association (JAMIA)*. 20:420-6, May 2013.

39. L. Duan, M. Khoshneshin, W. Street, **M. Liu**. Adverse Drug Effect Detection. *IEEE Journal of Biomedical and Health Informatics*, 17(2):305-311, March 2013.
40. **M. Liu**, Y. Wu, Y. Chen, J. Sun, Z. Zhao, X-W. Chen, M.E. Matheny, H. Xu. Large-scale Prediction of Adverse Drug Reactions Using Chemical, Biological, and Phenotypic Properties of Drugs. *Journal of the American Medical Informatics Association (JAMIA)*. 19(e1):e28-e35, June 2012.
41. Y. Lu, H. Xu, N.B. Peterson, Q. Dai, M. Jiang, J.C. Denny, **M. Liu**. Extracting Epidemiologic Exposure and Outcome Terms from Literature using Machine Learning Approaches. *International Journal of Data Mining and Bioinformatics (IJDMB)*. 6(4):447-59, 2012.
42. M. Jiang, Y. Chen, **M. Liu**, S.T. Rosenbloom, S. Mani, J.C. Denny, H. Xu. A study of Machine Learning Based Approaches to Extract Clinical Entities and their Assertions from Discharge Summaries. *Journal of the American Medical Informatics Association (JAMIA)*. 18(5):601-6, 2011.
43. Y. Hu, C. Guo, E.W.T. Ngai, **M. Liu**, S. Chen. A Scalable Intelligent Non-content-based Spam-filtering Framework. *Expert Systems with Applications*. 37(2010):8557-65, 2010.
44. **M. Liu**, X. Chen, R. Jothi. Knowledge-Guided Inference of Domain-Domain Interactions from Incomplete Protein-Protein Interaction Networks. *Bioinformatics*. 25(19):2492-2499, 2009.
45. X. Lin, **M. Liu**, X-W. Chen. Assessing Quality of Protein-Protein Interactions by Integrative Analysis of Data in Model Organisms. *BMC Bioinformatics*. 10(Suppl 4):S5 2009.
46. X-W. Chen, **M. Liu**, R. Ward. Protein Function Assignment through Mining Cross-Species Protein-Protein Interactions. *PLoS ONE*. 3(2): e1562, 2008.
47. X-W. Chen, **M. Liu**. Domain Based Predictive Models for Protein-Protein Interaction Prediction. *EURASIP Journal on Advances in Signal Processing*. 2006(1):55, 2006.
48. X-W. Chen, **M. Liu**. Prediction of Protein-protein Interactions Using Random Decision Forest Framework. *Bioinformatics*. 21(24):4394-4400, 2005.

Peer-reviewed Conference Articles

49. HY. Chan and **M. Liu**. Interpretable sub-phenotype identification in acute kidney injury. *American Medical Informatics Association Annual Symposium (AMIA 2022)*, Accepted, November 2022.
50. K. Liu, X. Zhang, WQ. Chen, B. Yuan, Y. Hu, **M. Liu**. A patient complexity measure for subgroup prediction modeling of acute kidney injury. *The China Conference on Health Information Processing (CHIP 2021)*. December 4-5, 2021.
51. X. Zhang, Y. Xue, X. Shu, S. Chen, K. Liu, WQ. Chen, **M. Liu**, Y. Hu. A transfer learning approach to correct temporal performance drift of clinical prediction on models. *The China Conference on Health Information Processing (CHIP 2021)*. December 4-5, 2021, recommended for journal publication in JMIR Medical Informatics.
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