

2026 Titan Award – Methodological Research

Bingyu Zhang, University of Pennsylvania

PhD in Applied Mathematics & Computational Science
Area focus: Biostatistics & Medical Informatics
(2021-present)



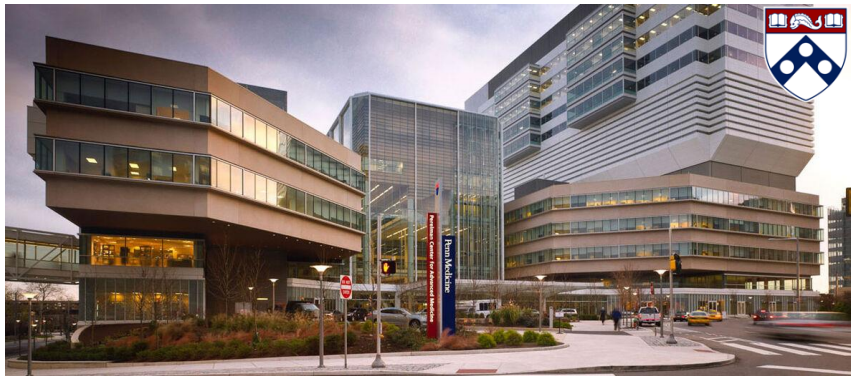
PennCIL lab at OHDSI
(2017-present)



Yong Chen, UPenn

2021







Jessie Tong, JHU

2023



My OHDSI Journey
(2023-present)

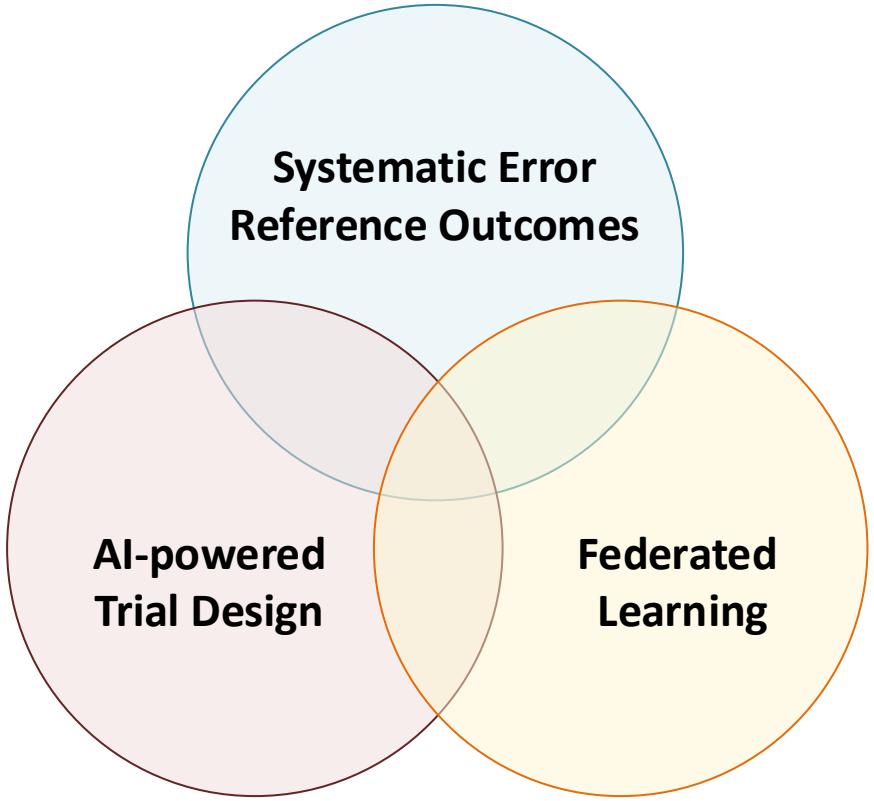
2023



Many OHDSI activities: FL, NCO/SERO, AI, …

2026





FL: Scalable multi-site evidence

- Learn across sites without data sharing
- Improve estimation with sparse data

SERO: Empirical calibration

- Quantify systematic bias
- Calibrate residual bias

AI-powered trial design

- Protocol-EHR alignment for eligibility criteria
- *In silico* trial simulation before trials launch

COLA-GLM-H: lossless one-shot FL algorithm for GLM

Federated Learning

JAMIA
A SCHOLARLY JOURNAL OF INFORMATICS IN HEALTH AND BIOMEDICINE

JOURNAL ARTICLE

A lossless one-shot distributed algorithm for addressing heterogeneity in multi-site generalized linear models

Get access

Bingyu Zhang, MS, Qiong Wu, PhD, Jenna M Reps, PhD, Lu Li, MA, Jiayi Tong, PhD, Yiwen Lu, BS, Dazheng Zhang, PhD, Juan Manuel Ramirez-Anguita, PhD, Jiang Bian, PhD, Milou T Brand, PhD, Thomas Falconer, PhD, Miguel A Mayer, MD, PhD, MPH, Ross D Williams, PhD, Yong Chen, PhD

Journal of the American Medical Informatics Association, Volume 33, Issue 3, March 2026, Pages 700–709, https://doi.org/10.1093/jamia/ocaf198

Published: 19 November 2025 **Article history** ▾

MOSAiC: Multi-Site One-Shot Aggregation of Compressed Risk Functions

Yong Chen, Yiwen Lu, Jing-Mei Qiu, Huiyuan Wang & Yudong Wang

Article | Open access | Published: 15 July 2025

COLA-GLM: collaborative one-shot and lossless algorithms of generalized linear models for decentralized observational healthcare data

Qiong Wu, Jenna M. Reps, Lu Li, Bingyu Zhang, Yiwen Lu, Jiayi Tong, Dazheng Zhang, Thomas Lumley, Milou T. Brand, Mui Van Zandt, Thomas Falconer, Xing He, Yu Huang, Haoyang Li, Chao Yan, Guojun Tang, Andrew E. Williams, Fei Wang, Jiang Bian, Bradley Malin, George Hripcsak, Martijn J. Schuemie, Yun Lu, Steve Drew, Jiayu Zhou, David A. Asch & Yong Chen

Show fewer authors

npj Digital Medicine **8**, Article number: 442 (2025) | Cite this article

Unlocking efficiency in real-world collaborative studies: a multi-site international study with one-shot lossless GLMM algorithm

Jiayi Tong, Jenna M. Reps, Chongliang Luo, Yiwen Lu, Lu Li, Juan Manuel Ramirez-Anguita, Milou T. Brand, Scott L. DuVall, Thomas Falconer, Alex Mayer Fuentes, Xing He, Michael E. Matheny, Miguel A. Mayer, Bhavnisha K. Patel, Katherine R. Simon, Marc A. Suchard, Guojun Tang, Benjamin Viernes, Ross D. Williams, Mui van Zandt, Fei Wang, Jiang Bian, Jiayu Zhou, David A. Asch & Yong Chen

npj Digital Medicine **8**, Article number: 457 (2025) | Cite this article

PDA

https://pdamethods.org/

Article | Open access | Published: 27 October 2026

FLAT-WHITE: from target trial emulation to federated high-throughput causal machine learning using decentralized real-world data

Jiayi Tong, Lu Li, Dazheng Zhang, Kyra S. O'Brien, Yiwen Lu, Qiong Wu, Ting Zhou, Bingyu Zhang, Yuqing Lei, Huilin Tang, Naimin Jing, Haoyang Li, Zhenxing Xu, Yu Huang, Yu Hu, Yujia Zhou, Fongci Lin, Ying Jiang, Haitao Chu, Yong Chen, Fei Wang, Jiang Bian, Hua Xu, David A. Wolk & Yong Chen

npj Health Systems **3**, Article number: 102 (2026) | Cite this article





Alzheimer's disease drug repurposing using decentralised electronic health records: a one-shot lossless algorithm for federated target trial emulation (LATTE) and a multi-site observational study

Lu Li, Qiong Wu, Yiwen Lu, Kyra S O'Brien, Bingyu Zhang, Ting Zhou, Jiayi Tong, Dazheng Zhang, Yuqing Lei, Huilin Tang, Haoyang Li, Zhenxing Xu, Yu Huang, Yu Hu, Yujia Zhou, Fongci Lin, Na Hong, Ying Jiang, Fei Wang, Jiang Bian, Hua Xu, Yong Chen[2], Jeff D Williamson, David A Wolk, Yun Lu, David A Asch, Yong Chen[2]

eBioMedicine
Part of THE LANCET *Discovery Science*

This journal | Journals | Publish | Clinical | Global health | Multimedia | Events | About

ARTICLES · Volume 132, 106466, October 2026 · *Open Access* | Download Full Issue

Discovering repurposable drugs for Alzheimer's disease and related dementias: target trial emulation using decentralised real-world data

Qiong Wu [a,b,c] · Lu Li [b,d] · Yuqing Lei [b,e] · Ting Zhou [b,e] · Huilin Tang [b,d] · Bingyu Zhang [b,d] · Yiwen Lu [b,d] · Maxwell Salvatore [b,e,f,g] · Dazheng Zhang [b,d] · Jiayi Tong [h] · Tingyin Wang [b,d] · Siqi Chen [b,d] · Haoyang Li [i] · Zhenxing Xu [i] · Yu Huang [i] · Yu Hu [k] · Na Hong [l] · Yujia Zhou [l] · Fongci Lin [l] · Kyra S. O'Brien [m,n] · Yong Chen [o,p] · Ruowang Li [q] · Hua Xu [i] · Fei Wang [i] · Jiang Bian [i] · David A. Wolk [m] · Yong Chen [b,d,e,g,n,r] Show less

Foundation of distributional calibration

From Bias Detection to Distributional Calibration: Negative Controls for Shared Systematic Error in Real-world Evidence Pipelines

Huiyuan Wang[a,b], Bingyu Zhang[a,c], Yuqing Lei[a,b], Yiwen Lu[a,c], Dazheng Zhang[a,b], Xinyao Jian[a,b], Yuru Zhu[a,b], Wenjie Hu[a,b], Haitao Chu[d], Yong Chen[d], Marc A. Suchard[e,f,g], Patrick B. Ryan[e,h,i], George Hripcsak[e,h], David A. Asch[j,k,l,m,n], Yun Lu[o], Bin Yu[p,q,r], Martijn J. Schuemie[e,f,i], Yumou Qiu*[s], and Yong Chen*[a,b,c,j,t,u]

Under review at PNAS



Systematic Error Reference Outcomes (SERO)











When some SEROs are invalid

The Fine Art of Tolerance: Robusify p-value Calibration in Observational Studies with Partially Valid Negative Control Outcomes

Bingyu Zhang, PhD[1,2], Dazheng Zhang, PhD[1,3], Huiyuan Wang, PhD[1,3], Wenjie Hu, PhD[1,3], Qiong Wu, PhD[1,3,4], Chongliang Luo, PhD, Lu Li, MA[1,2], Tsai Hor Chan, PhD[1,3], Yudong Wang, PhD[1,3], Yuru Zhu, PhD[1,3], Martijn J. Schuemie, PhD[6,7,8], Patrick B. Ryan, PhD[6,7,9], Marc A. Suchard, PhD[6,8,10], George Hripcsak, MD, MS[6,9], Yong Chen, PhD[1,2,3,11,12,13]

In preparation for JAMIA

Robust Bias Calibration with Potentially Invalid Systematic Error Reference Outcomes: A National Study of Second-line Antihyperglycemic Agents for Cardiovascular Outcomes

Bingyu Zhang, PhD[1,2,3*], Yuru Zhu, PhD[1,3*], Yiwen Lu, PhD[1,2,3], Wenjie Hu, PhD[1,3], Yun Lu, PhD[4], Yumou Qiu, PhD[5], Martijn J. Schuemie, PhD[6,7,8], Patrick B. Ryan, PhD[6,7,9], George Hripcsak, MD, MS[6,9], Marc A. Suchard, PhD[6,8,10], Yong Chen, PhD[1,2,3,11,12,13]

* Co-first authors

In preparation for Nature Communications

BMC Part of Springer Nature

BMC Medicine

Assessing residual bias in real-world vaccine effectiveness studies: validating negative controls to avoid misleading results

Research | Open access | Published: 26 September 2026

Cite this article

You have full access to this open access article

Download PDF | Save article

Bingyu Zhang, Qiong Wu, Ting Zhou, Dazheng Zhang, Jiayi Tong, Yuqing Lei, Haitao Chu, Linbo Wang, Anna Ostropolets, Yumou Qiu, Yun Lu, Patrick B. Ryan, Jeffrey S. Morris, Martijn J. Schuemie, Christopher B. Forrest, George Hripcsak & Yong Chen

Time-at-risk Matters

communications health

Importance of Time-At-Risk for Evaluating Time-Varying Residual Bias in Observational Studies

Bingyu Zhang, PhD[1,2^], Qiong Wu, PhD[1,3,4,5^], Yiwen Lu, PhD[1,2], Dazheng Zhang, PhD[1,3], Ting Zhou, MD, PhD[1,3], Jiayi Tong, PhD[1,3,6], Yuqing Lei, MS[1,3], Haitao Chu, MD, PhD[7], Linbo Wang, PhD[8], Yumou Qiu, PhD[9], Patrick B. Ryan, PhD[10,11,12], Christopher B. Forrest, MD, PhD[13], George Hripcsak, MD, MS[11*], Yong Chen, PhD[1,2,3,14,15,16*]

In press



AI-powered Trial Design

In silico trial simulation using RWD

TrialMap: A Principled End-to-End Framework for Guiding and Optimizing Oncology Trial Eligibility Criteria Pathways Using Real-World Data

Bingyu Zhang, PhD[1,2], Yiwen Lu, PhD[1,2], Vincent Zhang, MS[3], Konghao Zhao, BS[4], Yue Wu, PhD[1,5], Lu Li, PhD[1,2], Huiyuan Wang, PhD[1,5], Jingyue Huang, PhD[1,5], Dazheng Zhang, PhD[1,5], Yuqing Lei, MS[1,5], Xinyao Jian, MS[1,2], Ying Lu, MS[1,5], Bingcao Wu, PhD[6], Yuan Lu, ScD[7,8], Yong Chen, PhD[9], Haitao Chu, MD, PhD[10], Ying Lu, PhD[11], Aloka Chakravarty, PhD[12], Arunava Chakravartty, PhD[12], Bo Huang, PhD[13], Huan He, PhD[3], Yong Lin, PhD[12], Jingyi Liu, PhD[12], Vicki Sallée, PhD, MS, RD[14,15], Ruishan Liu, PhD[4]*, Melina E. Marmarelis, MD, MSCE[14,15]*, Robert H. Vonderheide, MD, DPhil[14,15]*, Hua Xu, PhD[3]*, David A. Asch, MD, MBA[15,16,17,18,19]*, Yong Chen, PhD[1,2,5,17,20,21]*

Under review at JNCI

TrialOptimizer: A Multi-objective Framework for Optimizing Clinical Trial Eligibility using Real-world Data

Author:
Yue Wu[1,2], Bingyu Zhang[1,3], Haoyuan Wang[1,3], Yiwen Lu[1,3], Jingyue Huang[1,2], Huiyuan Wang[1,2], Huilin Tang[1,2], Yong Chen[1-6]

Under revision at Nature Communications

OPTIC: Optimizing Trial Eligibility Criteria with Real-World Data via Conditional Independence Testing

Jingyue Huang, Huiyuan Wang, Bingyu Zhang, Yong Chen*
Department of Biostatistics, Epidemiology and Informatics, University of Pennsylvania

Under revision at JASA



Protocol-EHR alignment

EHRNavigator: A Multi-Agent System for Patient-Level Clinical Question Answering over Heterogeneous Electronic Health Records

Lingfei Qian*, Mauro Giuffre*, Yan Wang, Huan He, Qianqian Xie, Xuguang Ai, Xueqing Peng, Fan Ma, Ruey-Ling Weng, Donald Wright, Adan Wang, Qingyu Chen, Vipina K. Keloth, Hua Xu*



Excited to continue learning, contributing, and growing with the OHDSI community!