

# Juan Zhao

Postdoctoral fellow  
Center for Precision Medicine, Dept. of Biomedical informatics,  
Vanderbilt University Medical Center  
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## Education

- Ph.D. in Computer Science, 08/2006- 07/2012  
University of Chinese Academy of Sciences, Beijing, China
  - Successive Postgraduate and Doctoral Program
- B.S. in Computer Science and Technology,  
Shandong University, China
  - GPA3.7/4(Top 3% in the college, rank 9/330)

## Research interests

My research interests lie in machine learning and data mining theories and applications in biomedical informatics, healthcare, and security. My current research focus is to leverage deep learning/machine learning and a huge health care data at Vanderbilt University Medical Center to enhance disease prediction. I have developed prediction models on predicting 10-years cardiovascular risk disease. I was also interested in the Blockchain in healthcare and Internet-of-Things (IoT).

## Positions and Employment

- 2017/9 - present Postdoctoral Fellow, Vanderbilt University Medical Center (VUMC)  
2015/9 – 2017/9 Research Scientist, Adjunct Faculty, Department of Electrical and Computer Engineering, Tennessee State University (TSU)  
2012/7 – 2015/8 Senior Engineer, Program manager, Research assistant professor. Chinese Computer Network Information Center (CNIC), Chinese Academy of Sciences (CAS)

## Selected Publications (2018.1-present)

- **Zhao J**, Feng Q, Wu P, Lupu R, Wilke RA, Wells QS, et al. Learning from Longitudinal Data in Electronic Health Record and Genetic Data to Improve Cardiovascular Event Prediction. *Scientific Reports*. **2019**;9(1):717.
- **Zhao J**, Feng Q, Wu P, Warner JL, Denny JC, Wei W-Q. Using topic modeling via non-negative matrix factorization to identify relationships between genetic variants and disease phenotypes: A case study of Lipoprotein (a)(LPA). *PloS one*. **2019**;14(2):e0212112.
- **Zhao J**, Shetty S, Pan JW, Kamhoua C, Kwiat K. Transfer learning for detecting unknown network attacks. *EURASIP Journal on Information Security*. **2019** Feb 21;2019(1):1.
- Shetty S, Liang X, Bowden D, **Zhao J**, Zhang L. BLOCKCHAIN BASED DECENTRALIZED ACCOUNTABILITY AND SELF SOVEREIGNTY IN HEALTHCARE SYSTEMS. In: *Business Transformation through Blockchain*. Palgrave Macmillan, part of Springer (Nature); **2019**. p. 119–149.
- Wu P, Gifford A, Meng X, Li X, Campbell H, Varley T, **J Zhao**, et al. Developing and Evaluating Mappings of ICD-10 and ICD-10-CM codes to Phecodes. *BioRxiv*. **2018**;462077.

- Liang X, Shetty S, Tosh DK, **Zhao J**, Li D, Liu J. A Reliable Data Provenance and Privacy Preservation Architecture for Business-Driven Cyber-Physical Systems Using Blockchain. *International Journal of Information Security and Privacy (IJISP)*. **2018**;12(4):68–81.

## Presentations

- Detecting time-evolving phenotypes topics via tensor-factorization. Department of Biomedical Informatics Seminar. Nashville. March, 2019
- Learning from Longitudinal Electronic Health Record and Genetic Data to Improve Cardiovascular Event Prediction, (*Science Presentations*), eMERGE Steering Committee, Washington D.C, Jan. 2019.
- Using Topic Modeling to Identify Relationship between LPA Variant and Disease Phenotypes, Poster presented American Medical Informatics Association (AMIA), (*Poster*) 2018 Annual Symposium, San Francisco, CA, Nov. 3-7, 2018
- Learning from Longitudinal Electronic Health Record and Genetic Data to Improve Cardiovascular Event Prediction, (*Poster*), Advances in Genome Biology and Technology (AGBT), LA JOLLA, CA, Sep. 2018.
- Learning from Longitudinal Electronic Health Record and Genetic Data to Improve Cardiovascular Event Prediction. (*Seminar*) Department of Biomedical Informatics Seminar, Dec.12, 2018, Vanderbilt University Medical Center.
- Using Topic Modeling to Identify Relationship between LPA Variant and Disease Phenotypes (*Poster*) presented at Vanderbilt Genetic Institute 2017 Fall Symposium, Nashville, Nov. 2017.

## Research projects

- Developed machine learning/deep learning models on longitudinal EHR and genetic data to predicting 10-years cardiovascular risk disease (VUMC, 2018-Present).
- Stroke phenotyping in projects with Deepmind (VUMC, 2018. Aug - Present)
- Led research efforts research on machine learning and data mining for cyber security. (TSU, 2015-2017)
- Blockchain applications in healthcare and IoT. (TSU, 2017)
- Led science efforts on data mining on social media (CNIC,2012-2015).
- Led development efforts on building a cloud-based collaborative working platform, the national biggest academic collaboration system (CNIC,2012-2015).

## Award

- **PI**, “Leveraging machine learning and deep learning with longitudinal EHR and genetic data to better predict 10-year stroke” (18AMTG34280063), American Heart Association Training Grants, \$100,000, 2018-07-01 to 2020-06-30
- **Co-PI**, “Distributed machine learning for anomaly detection in massive datasets”, Boeing Contract, \$450,000, 1/1/2016 - 12/31/2018.
- **Co-PI**, “Transgenerational adaptation of plants to acidic pH and toxic metals in soil” (2018-38821-27737), National Institute of Food and Agriculture, \$500,000, 01/04/2018 – 03/31/2021

## Honors

|           |   |
|-----------|---|
| 2003-2005 | Scholarship, Shandong University                                      |
| 2008      | 2nd Prize at National Graduates Mathematics Modeling Competition      |
| 2008      | Champion at BEA Systems, Inc. Innovation Contest                      |
| 2009      | Outstanding Students Award, University of Chinese Academy of Sciences |
| 2010      | Outstanding Students Award, University of Chinese Academy of Sciences |

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| 2011      | Outstanding Students Award, University of Chinese Academy of Sciences         |
| 2011      | Dean Scholarship, University of Chinese Academy of Sciences                   |
| 2012      | Outstanding Graduate Student Award, University of Chinese Academy of Sciences |
| 2014,2015 | Outstanding Staff Award, CNIC Chinese Academy of Sciences                     |

## Teaching

Instructor Spring 2017

Department of Electrical and Computer Engineering, Tennessee State University

- ENGR 2230 Engineering programming with C++

Mentor Fall 2015 to Fall 2016

Department of Electrical and Computer Engineering, Tennessee State University

- Mentor of one Ph.D. student in the Boeing project focusing on distributed machine learning
- Mentor of five undergraduate students in Senior Design.
- Mentor Fall 2010 - Spring 2015

Computer Network Information Center, Chinese Academy of Sciences.

- Mentor of two Ph.D. students in the project of social network analysis focusing on social networks extraction and prediction. Fall 2012 - Spring 2015
- Mentor of two master students in the development of mobile apps. 2012 - 2014

## Software Copyrights

- Deep Web Crawler for Literature Software (2014SR208139)
- Duckling Document Library Software for Team Collaboration (2014SR116988)
- Content Recommending Platform for Library Research (2012SR102523)
- Knowledge-based Scholar Social Networking Platform (2012SR089695)

## Publications (2013-Present)

<https://scholar.google.com/citations?user=7wKBycMAAAAJ&hl=en#>

- **Zhao J**, Feng Q, Wu P, Lupu R, Wilke RA, Wells QS, et al. Learning from Longitudinal Data in Electronic Health Record and Genetic Data to Improve Cardiovascular Event Prediction. *Scientific Reports*. **2019**;9(1):717.
- **Zhao J**, Feng Q, Wu P, Warner JL, Denny JC, Wei W-Q. Using topic modeling via non-negative matrix factorization to identify relationships between genetic variants and disease phenotypes: A case study of Lipoprotein (a)(LPA). *PloS one*. **2019**;14(2):e0212112.
- **Zhao J**, Shetty S, Pan JW, Kamhoua C, Kwiat K. Transfer learning for detecting unknown network attacks. *EURASIP Journal on Information Security*. **2019** Feb 21;2019(1):1.
- Shetty S, Liang X, Bowden D, **Zhao J**, Zhang L. BLOCKCHAIN BASED DECENTRALIZED ACCOUNTABILITY AND SELF SOVEREIGNTY IN HEALTHCARE SYSTEMS. In: *Business Transformation through Blockchain*. Palgrave Macmillan, part of Springer (Nature); **2019**. p. 119–149.
- Wu P, Gifford A, Meng X, Li X, Campbell H, Varley T, **J Zhao**, et al. Developing and Evaluating Mappings of ICD-10 and ICD-10-CM codes to Phecodes. *BioRxiv*. **2018**;462077.
- **Zhao J**, Shetty S, Pan JW. Feature-based transfer learning for network security. In: *MILCOM 2017-2017 IEEE Military Communications Conference (MILCOM)*. IEEE; 2017. p. 17–22.
- Muallem A, Shetty S, Pan JW, **Zhao J**, Biswal B. Hoeffding Tree Algorithms for Anomaly Detection in Streaming Datasets: A Survey. *Journal of Information Security*. 2017;8(04):339.

- Liang X, **Zhao J**, Shetty S, Li D. Towards data assurance and resilience in iot using blockchain. In: MILCOM 2017-2017 IEEE Military Communications Conference (MILCOM). IEEE; 2017. p. 261–266.
- Liang X, **Zhao J**, Shetty S, Liu J, Li D. Integrating blockchain for data sharing and collaboration in mobile healthcare applications. In: 2017 IEEE 28th Annual International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC). IEEE; 2017. p. 1–5.
- Liang X, Shetty S, **Zhao J**, Bowden D, Li D, Liu J. Towards Decentralized Accountability and Self-sovereignty in Healthcare Systems. In: International Conference on Information and Communications Security. Springer; 2017. p. 387–398.
- Shen Y, Yu J, Dong K, **Zhao J**, Nan K. An Influence Field Perspective on Predicting User’s Retweeting Behavior. In: International Conference on Web-Age Information Management. Springer; 2015. p. 3–16.
- **Zhao J**, Dong K, Yu J. Recommending funding collaborators with scholar social networks. In: 2014 International Conference on Data Science and Advanced Analytics (DSAA). IEEE; 2014. p. 122–127.
- **Zhao J**, Dong K, Yu J, Nan K. DSN: A Knowledge -based Scholar Networking Practice Towards Research Community, in: 2013 IEEE 9th International Conference on e-Science (e-Science). 2013. pp 238-244
- **Zhao J**, Dong K, Yu J, Nan K, Yan B. Social Network Analysis Technologies in e-Science, e-Science Technology Application, vol 4(3):3-15, 2013.