




# Yue Zhao

CONTACT INFORMATION


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 USC Faculty Directory

 Google Scholar

213-821-2369

Powell Hall (PHE) 432

Los Angeles, CA

United States, 90089

Department of Computer Science

University of Southern California

RESEARCH SUMMARY

I build *reproducible*, *automated*, and *scalable* **machine learning (ML)** and **data mining (DM)** benchmarks, algorithms, and systems, with a focus on **anomaly detection**, **graph neural networks**, **ML systems**, and **healthcare AI**.

1. **Benchmark** various learning algorithms for fair evaluation and new insights.

2. **Automate** ML by model selection and hyperparameter optimization.

3. **Design** large-scale ML systems for real-world applications.

4. **Develop** open-source ML tools to support applications in healthcare, finance, security, and more.

### (1) Data Mining and Machine Learning

- ☐ Unsupervised Machine Learning

☐ Outlier & Anomaly Detection
- ☐ Graph Neural Networks

☐ Out-of-distribution (OOD) Detection

### (2) Open Systems

- ☐ Automated Machine Learning

☐ Meta-Learning
- ☐ Machine Learning Systems

☐ Parallel Computing


### (3) Applications

- ☐ Healthcare AI

☐ AI for Science
- ☐ Financial Risk Modeling

☐ Therapeutic for ML

OPEN-SOURCE HIGHLIGHTS

 YZHAO062

**Open-source Contribution:** I have led or contributed as a core developer to more than 10 ML open-source initiatives. Popular ones include PyOD (A Python Toolbox for Scalable Outlier Detection), ADBench (Anomaly Detection Benchmark), and TDC (An ML Data Hub for Drug Discovery).

My works receive  **20,000 GitHub Stars** and 20,000,000 downloads as of April 12, 2024.

FULL-TIME PROFESSIONAL EXPERIENCE

**University of Southern California**  
*Thomas Lord Department of Computer Science*  
Assistant Professor (Tenure-Track)  
Automation, System, and Application (**ASAP**) Lab ([Link](#))

Aug. 2023 - Present

### PwC Canada

*Consulting & Deals*  
Senior Consultant (Data Scientist)  
Consultant (Data Scientist)  
Research Associate (Intern)

Aug. 2017 - Jun. 2019  
Feb. 2017 - Jul. 2017  
May. 2016 - Jan. 2017

EDUCATION

**Carnegie Mellon University**  
*Ph.D. in Information Systems and Management*  
• **Affiliation:** CMU automated learning systems group (Catalyst) and Data Analytics Techniques Algorithms (DATA) Lab  
• **Advisors and Mentors:** CMU: Prof. Leman Akoglu, Prof. Zhihao Jia, and Prof. George Chen. I collaborate with Prof. Jure Leskovec at Stanford, and Prof. Philip S. Yu at UIC.

Pittsburgh, PA  
Sep. 2019 - May. 2023

University of Toronto  
Master of Science in Computer Science

Toronto, ON  
Sep. 2015 - Dec. 2016

University of Cincinnati  
Bachelor of Science in Computer Engineering  
Minor: Computer Science and Mathematics

Cincinnati, OH  
Sep. 2010 - May. 2015

PUBLICATIONS



**Preprints & Under Submission**

38. Lichao Sun, Yue Huang, Haoran Wang, Siyuan Wu, Qihui Zhang, Chujie Gao, Yixin Huang, Wenhan Lyu, Yixuan Zhang, Xiner Li, Zhengliang Liu, Yixin Liu, Yijue Wang, Zhikun Zhang, Bhavya Kailkhura, Caiming Xiong, Chaowei Xiao, Chunyuan Li, Eric Xing, Furong Huang, Hao Liu, Heng Ji, Hongyi Wang, Huan Zhang, Huaxiu Yao, Manolis Kellis, Marinka Zitnik, Meng Jiang, Mohit Bansal, James Zou, Jian Pei, Jian Liu, Jianfeng Gao, Jiawei Han, Jieyu Zhao, Jiliang Tang, Jindong Wang, John Mitchell, Kai Shu, Kaidi Xu, Kai-Wei Chang, Lifang He, Lifu Huang, Michael Backes, Neil Zhenqiang Gong, Philip S. Yu, Pin-Yu Chen, Quanquan Gu, Ran Xu, Rex Ying, Shuiwang Ji, Suman Jana, Tianlong Chen, Tianming Liu, Tianyi Zhou, William Wang, Xiang Li, Xiangliang Zhang, Xiao Wang, Xing Xie, Xun Chen, Xuyu Wang, Yan Liu, Yanfang Ye, Yinzhi Cao, Yong Chen, Yue Zhao  
TrustLLM: Trustworthiness in Large Language Models  
**Under construction**  
**arXiv preprint arXiv:2401.05561**
37. Hao Dong, Gaetan Frusque, Yue Zhao, Eleni Chatzi, Olga Fink  
NNG-Mix: Improving Semi-supervised Anomaly Detection with Pseudo-anomaly Generation  
**Under submission**  
**arXiv preprint arXiv:2311.11961**
36. Xueying Ding, Yue Zhao, Leman Akoglu  
Fast Unsupervised Deep Outlier Model Selection with Hypernetworks  
**Under submission**  
**arXiv preprint arXiv:2307.10529**
35. Minqi Jiang, Chaochuan Hou, Ao Zheng, Xiyang Hu, Songqiao Han, Hailiang Huang, Xiangnan He, Philip S. Yu, Yue Zhao  
Weakly Supervised Anomaly Detection: A Survey  
**Under submission**  
**arXiv preprint arXiv:2302.04549**
34. Yue Zhao, Leman Akoglu  
Hyperparameter Optimization for Unsupervised Outlier Detection  
**Under submission**  
**arXiv preprint arXiv:2208.11727**

**Peer-reviewed Journal Papers**

33. Ling Yang\*, Zhilong Zhang\*, Yang Song, Shenda Hong, Runsheng Xu, Yue Zhao, Wentao Zhang, Bin Cui, Ming-Hsuan Yang  
Diffusion Models: A Comprehensive Survey of Methods and Applications  
*ACM Computing Surveys (CSUR)*, 2023  
(\*equal contribution)
32. Yue Zhao\*, Martin Q. Ma\*, Xiaorong Zhang, Leman Akoglu  
The Need for Unsupervised Outlier Model Selection: A Review and Evaluation of Internal Evaluation Strategies  
*ACM SIGKDD Explorations Newsletter (SIGKDD Explor.)*, 2023  
(\*equal contribution)
31. Kexin Huang\*, Tianfan Fu\*, Wenhao Gao\*, Yue Zhao, Yusuf Roohani, Jure Leskovec, Connor W. Coley, Cao Xiao, Jimeng Sun, Marinka Zitnik

Artificial Intelligence Foundation for Therapeutic Science  
*Nature Chemical Biology (NCHEMB)*, 2022  
(\*equal contribution)

30. Yue Zhao\*, Zheng Li\*, Xiyang Hu, Nicola Botta, Cezar Ionescu, George H. Chen  
ECOD: Unsupervised Outlier Detection Using Empirical Cumulative Distribution Functions  
*IEEE Transactions on Knowledge and Data Engineering (TKDE)*, 2022.  
(\*equal contribution)
29. Yue Zhao, Zain Nasrullah, Zheng Li  
PyOD: A Python Toolbox for Scalable Outlier Detection  
*Journal of Machine Learning Research (JMLR)*, 2019.

**Peer-reviewed Conference & Workshop Papers (with proceedings)**

28. Minqi Jiang\*, Chaochuan Hou\*, Ao Zheng\*, Songqiao Han, Hailiang Huang<sup>†</sup>, Qingsong Wen, Xiyang Hu<sup>†</sup>, Yue Zhao<sup>†</sup>  
ADGym: Design Choices for Deep Anomaly Detection.  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2023  
(<sup>†</sup>Corresponding author)
27. Jaemin Yoo, Yue Zhao, Lingxiao Zhao, Leman Akoglu  
DSV: An Alignment Validation Loss for Self-supervised Outlier Model Selection  
*European Conference on Machine Learning and Principles and Practice of Knowledge Discovery in Databases (ECML/PKDD)*, 2023
26. Peng Xu, Lin Zhang, Xuanzhou Liu, Jiaqi Sun, Yue Zhao, Haiqin Yang, Bei Yu  
Do Not Train It: A Linear Neural Architecture Search of Graph Neural Networks  
*International Conference on Machine Learning (ICML)*, 2023
25. Yue Zhao, Guoqing Zheng, Subhabrata Mukherjee, Robert McCann, Ahmed Awadallah  
ADMoE: Anomaly Detection with Mixture-of-Experts from Noisy Labels  
*Thirty-Seventh AAAI Conference on Artificial Intelligence (AAAI)*, 2023
24. Yue Zhao, George H. Chen, Zhihao Jia  
TOD: GPU-accelerated Outlier Detection via Tensor Operations  
*International Conference on Very Large Data Bases (VLDB)*, 2023
23. Songqiao Han\*, Xiyang Hu\*, Hailiang Huang\*, Minqi Jiang\*, Yue Zhao\*  
ADBench: Anomaly Detection Benchmark  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2022  
(\*equal contribution & the corresponding author)
22. Yue Zhao\*, Kay Liu\*, Yingdong Dou\*, et al.  
Benchmarking Node Outlier Detection on Graphs  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2022  
(\*equal contribution)
21. Yue Zhao, Xiaorong Zhang, Leman Akoglu  
ELECT: Toward Unsupervised Outlier Model Selection  
*IEEE International Conference on Data Mining (ICDM)*, 2022.  
Regular paper. Acceptance rate 9.77% (85/870); overall acceptance 20% (174/870).
20. Zhiming Xu, Xiao Huang, Yue Zhao, Yushun Dong, Jundong Li  
Contrastive Attributed Network Anomaly Detection with Data Augmentation  
*Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD)*, 2022  
Acceptance rate 19%.
19. Yue Zhao, Ryan A. Rossi, Leman Akoglu  
Automatic Unsupervised Outlier Model Selection  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2021  
Acceptance rate 26%.

18. Kwei-Herng Lai, Daochen Zha, Junjie Xu, Yue Zhao, Guanchu Wang, Xia Hu  
Revisiting Time Series Outlier Detection: Definitions and Benchmarks  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2021
17. Kexin Huang\*, Tianfan Fu\*, Wenhao Gao\*, Yue Zhao, Yusuf Roohani, Jure Leskovec, Connor W. Coley, Cao Xiao, Jimeng Sun, Marinka Zitnik  
Therapeutics Data Commons: Machine Learning Datasets and Tasks for Drug Discovery and Development  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2021  
(\*equal contribution)
16. Yue Zhao\*, Xiyang Hu\*, Cheng Cheng, Cong Wang, Changlin Wan, Wen Wang, Jianing Yang, Haoping Bai, Zheng Li, Cao Xiao, Yunlong Wang, Zhi Qiao, Jimeng Sun, Leman Akoglu  
SUOD: Accelerating Large-scale Unsupervised Heterogeneous Outlier Detection  
*Conference on Machine and Learning Systems (MLSys)*, 2021.  
Acceptance rate 23.5% (52/221). (\*equal contribution)
15. Kwei-Herng Lai\*, Daochen Zha\*, Guanchu Wang, Junjie Xu, Yue Zhao, Devesh Kumar, Yile Chen, Purav Zumkhawaka, Minyang Wan, Diego Martinez and Xia Ben Hu  
TODS: An Automated Time Series Outlier Detection System (Demo paper)  
*Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI)*, 2021.  
(\*equal contribution)
14. Meng-Chieh Lee, Yue Zhao, Aluna Wang, Pierre Jinghong Liang, Leman Akoglu, Vincent S. Tseng, Christos Faloutsos  
AutoAudit: Mining Accounting and Time-Evolving Graphs  
*IEEE International Conference on Big Data (Big Data)*, 2020
13. Changlin Wan, Dongya Jia, Yue Zhao, Wennan Chang, Sha Cao, Xiao Wang, and Chi Zhang  
A Data Denoising Approach to Optimize Functional Clustering of Single Cell RNA-sequencing Data  
*IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, 2020
12. Zheng Li, Yue Zhao, Nicola Botta, Cezar Ionescu, Xiyang Hu  
COPOD: Copula-Based Outlier Detection  
*IEEE International Conference on Data Mining (ICDM)*, 2020.
11. Zheng Li, Yue Zhao, Jialin Fu  
SYNC: A Copula based Framework for Generating Synthetic Data from Aggregated Sources  
*IEEE International Conference on Data Mining Workshops (ICDMW)*, 2020.
10. Yiqun Mei, Yue Zhao, Wei Liang  
DSR: An Accurate Single Image Super Resolution Approach for Various Degradations  
*IEEE International Conference on Multimedia and Expo (ICME)*, 2020, London, UK.
9. Yue Zhao, Xuejian Wang\*, Cheng Cheng\*, Xueying Ding\*  
Combining Machine Learning Models and Scores using combo Library (Demo paper)  
*Thirty-Fourth AAAI Conference on Artificial Intelligence (AAAI)*, 2020.  
(\*equal contribution)
8. Zain Nasrullah, Yue Zhao  
Music Artist Classification with Convolutional Recurrent Neural Networks  
*IEEE International Joint Conference on Neural Networks (IJCNN)*, 2019, Hungary.
7. Yue Zhao, Zain Nasrullah, Maciej K. Hryniewicki, Zheng Li  
LSCP: Locally Selective Combination in Parallel Outlier Ensembles  
*SIAM International Conference on Data Mining (SDM)*, 2019, Calgary, Canada.  
Acceptance rate 22.7% (90/397).
6. Yue Zhao, Maciej K. Hryniewicki  
XGBOD: Improving Supervised Outlier Detection with Unsupervised Representation Learning  
*IEEE International Joint Conference on Neural Networks (IJCNN)*, 2018, Rio, Brazil.

5. Yue Zhao, Maciej K. Hryniewicki, Francesca Cheng, Boyang Fu, Xiaoyu Zhu  
Employee Turnover Prediction with Machine Learning: A Reliable Approach  
*Intelligent System Conference (Intellisys)*, 2018, London, UK.  
Acceptance rate 34% (194/568).
4. Yue Zhao\*, Zhongtian Qiu\*, Yiqing Yang\*, Weiwei Li\*, Mingming Fan  
An Empirical Study of Touch-based Authentication Methods on Smartwatches  
*ACM International Symposium on Wearable Computers (ISWC)*, 2017, Maui, USA.  
Acceptance rate 25.6% (23/90). (\*equal contribution)

#### Peer-reviewed Workshop Papers (without proceedings)

3. Yue Zhao, Xueying Ding, Jianing Yang, and Haoping Bai.  
SUOD: Toward Scalable Unsupervised Outlier Detection  
*Workshops at the Thirty-Fourth AAAI Conference on Artificial Intelligence*, 2020.  
**Extended version published in *MLSys 2021*.**
2. Colin Wan, Zheng Li, Alicia Guo, Yue Zhao  
SynC: A Unified Framework for Generating Synthetic Population with Gaussian Copula  
*Workshops at the Thirty-Fourth AAAI Conference on Artificial Intelligence*, 2020.  
**Extended version published in *ICDMW 2020*.**
1. Yue Zhao, Maciej K. Hryniewicki  
DCSO: Dynamic Combination of Detector Scores for Outlier Ensembles  
*ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD Workshop on Outlier Detection De-constructed)*, 2018, London, UK.  
**Extended version published in *SDM 2019*, renamed to LSCP.**

#### AWARDS, GRANTS, AND FUNDING

Google Cloud Research Innovators		Mar. 2024
AAAI New Faculty Highlights		Feb. 2024
Meta 2022 AI4AI Research Award (co-PI)	\$50,000	Oct. 2022
The Norton Labs Graduate Fellowship	\$20,000	Mar. 2022
CMU Presidential Fellowship	\$80,000	2019
Mitacs-Accelerate Research and Development Funding	\$30,000	2016-2017
University Global Award and Scholarship	\$32,000	2010-2015
Mantei/Mae Award & Scholar	\$40,000	2012-2015
Engineer of the Month (University of Cincinnati)		Jun. 2014

#### INTERNSHIP EXPERIENCE

<b>NortonLifeLock Research Group</b>		
Machine Learning Research Intern		2022
• Supervised by Dr. Acar Tamersoy and Dr. Kevin Roundy.		
<b>Microsoft Research</b>		
Machine Learning Research Intern		2022
• Designed weakly supervised anomaly detection algorithms		
• Supervised by Dr. Guoqing Zheng and Dr. Subhabrata (Subho) Mukherjee.		
<b>Stanford University, Computer Science Department</b>		
Visiting Student Researcher		2021
• Designed new GNN systems.		
• Supervised by Prof. Jure Leskovec.		
<b>IQVIA, Analytics Center of Excellence</b>		
Machine Learning Research Intern		2020
• Designed new machine learning models in healthcare.		
• Supervised by Dr. Cao (Danica) Xiao (IQVIA) and Prof. Jimeng Sun (UIUC).		

**Siemens PLM Software USA**

Software Engineer (Intern &amp; Contract)

Mar. 2012 - Dec. 2014

- Managed a Java project to transition the LabManager system to vCloud Director.
- Refactored outdated automation code and added new modules and JUnit test cases.
- Led a C++ Code Coverage project on Teamcenter platform to strengthen its stability.

**TEACHING  
EXPERIENCE*****University of Southern California***

Los Angeles, CA

**Instructor**

Spring 2024

*CSCI 566 Deep Learning and its Applications****Carnegie Mellon University***

Pittsburgh, PA

**Teaching Assistant**

Fall 2022

*Managing Digital Business* (Prof. David Riel)**Teaching Assistant & co-Instructor** (lectures on AutoML and MLSys)

Spring 2022

**Teaching Assistant & co-Instructor** (lectures on AutoML and MLSys)

Fall 2021

**Teaching Assistant & co-Instructor** (lectures on AutoML)

Spring 2021

**Teaching Assistant & co-Instructor** (lectures on AutoML)

Fall 2020

*Intro to Artificial Intelligence* (Prof. David Steier)**Teaching Assistant**

Spring 2022

*Digital Transformation* (Prof. David Riel)**Teaching Assistant** (helping on course topics)

Fall 2021

*Statistics for IT Managers* (Prof. Daniel Nagin)***University of Toronto***

Toronto, ON

**Teaching Assistant & Lab Session Instructor**

Fall 2015

*Embedded Systems* (Prof. Philip Anderson)***University of Cincinnati***

Cincinnati, OH

**Teaching Assistant & Lab Session Instructor**

Fall 2014

*Intro to Programming* (Prof. George Purdy)**PH.D.  
STUDENTS**

- Haoyan Xu (USC, ECE Ph.D., 2024 Spring-)
- Tiankai Yang (USC, CS Ph.D., 2024 Fall-)
- Li Li (USC, CS Ph.D., 2024 Fall-)

**QUALIFICATION  
& THESIS  
COMMITTEE**

- Haonan Wang (USC, ECE Ph.D.)
- Hassan Hamad (USC, ECE Ph.D.)
- Qinyi Luo (USC, CS Ph.D.)
- Yizhou Zhang (USC, CS Ph.D.)
- Haoming Li (USC, CS Ph.D.)
- Arash Hajisafi (USC, CS Ph.D.)
- Yi Chien Lin (USC, ECE Ph.D.)
- Yuke Zhang (USC, ECE Ph.D.)

**SERVICES****Conference Organizing Committee**

- Workflow Co-Chair for KDD 2023

**External Reviewer for Funding Proposals**

- Dutch Research Council (NWO)

**Journal Editor**

- Associate Editor, IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- Action Editor, Journal of Data-centric Machine Learning Research (DMLR)

#### **Program Committee and/or Area Chair for Conferences and Workshops**

- ICML 2024 (Area Chair)
- AISTATS 2024 (Area Chair)
- MLSys 2024
- KDD 2020, 2021, 2022, 2023
- IJCAI 2022, 2023
- NeurIPS 2021, 2022, 2023
- AAAI 2021, 2022, 2023
- AAAI Demonstrations 2021, 2022
- MICCAI 2020, 2021, 2022
- ICDM 2020
- KDD Workshop on Outlier Detection and Description (ODD), 2021
- KDD Workshop on Anomaly and Novelty Detection (ANDEA), 2021, 2022
- IJCAI Workshop on Artificial Intelligence for Anomalies and Novelities (AI4AN), 2020, 2021
- INFORMS Workshop on Data Science 2021

#### **Journal Reviewer**

- Journal of Machine Learning Research (JMLR)
- Machine Learning
- IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)
- IEEE Transactions on Knowledge and Data Engineering (TKDE)
- IEEE Internet of Things Journal (IoT-J)
- IEEE Intelligent Systems
- IEEE Journal on Selected Areas in Communications (J-SAC)
- Data Mining and Knowledge Discovery (DMAI)
- ACM Transactions on Management Information Systems (TMIS)
- Knowledge and Information Systems (KAIS)
- INFORMS Journal on Computing (IJOC)
- Big Data
- Artificial Intelligence Review (AIRE)
- Neurocomputing
- IEEE Transactions on Systems, Man, and Cybernetics: Systems
- IEEE/ACM Transactions on Computational Biology and Bioinformatics (TCBB)
- IEEE Network Magazine
- IEEE Computational Intelligence Magazine (CIM)
- BioData Mining
- European Journal of Management and Business Economics (EJMBE)
- The Journal of Open Source Software (JOSS)

TALKS AND LECTURES	USC Retreat on AI and Engineering Safety	<i>Safety Measures for LLMs</i>	Apr. 2024
	Visa Research	<i>Towards Reproducible, Automated, and Scalable AD</i>	Apr. 2024
	USC Symposium on Frontiers of Generative AI	<i>Generative AI for Anomaly Detection</i>	Mar. 2024
	AAAI New Faculty Highlights (invited)	<i>Towards Reproducible, Automated, and Scalable AD</i>	Feb. 2024
	U of Nevada, Las Vegas	<i>Automated and Scalable ML Algorithms and Systems</i>	Oct. 2023
	Samsung Seminar	<i>Automated and Scalable Anomaly Detection Systems</i>	Aug. 2023
	KDD SoCal Day	<i>Enable Applications by ML with Noisy Inputs</i>	Aug. 2023
	CMU Catalyst	<i>How (Not) to Fail Your Academic Job Search</i>	May. 2023
	KAUST	<i>Automated and Scalable ML Algorithms and Systems</i>	Apr. 2023
	Emory University	<i>Automated and Scalable ML Algorithms and Systems</i>	Apr. 2023
	USC	<i>Automated and Scalable ML Algorithms and Systems</i>	Mar. 2023
	UC Davis	<i>Automated and Scalable ML Algorithms and Systems</i>	Mar. 2023
	Stony Brook University	<i>Automated and Scalable ML Algorithms and Systems</i>	Feb. 2023
	University of Chicago	<i>Automated and Scalable ML Algorithms and Systems</i>	Feb. 2023
	UC Merced	<i>Automated and Scalable ML Algorithms and Systems</i>	Feb. 2023
	CMU PDL Meeting	<i>Automated and Scalable ML Algorithms and Systems</i>	Jan. 2023
	CMU Data Science Seminar	<b>Guest Lecture</b> <i>Automated Anomaly Detection</i>	Nov. 2022
	LoG Seminar	<i>Large-scale Graph Anomaly Detection</i>	Oct. 2022
	Intuit	<i>Anomaly Detection for Financial Risk Modeling</i>	Aug. 2022
	Rice University	<i>Large-scale Anomaly Detection with Automation</i>	Sep. 2022
	Microsoft Research	<i>Weakly-supervised Anomaly Detection</i>	Sep. 2022
	Wells Fargo	<i>Anomaly Detection for Financial Risk Modeling</i>	Aug. 2022
	Columbia University	<b>Guest Lecture</b> <i>Anomaly Detection</i>	Jul. 2022
	Morgan Stanley	<i>Automated Outlier Detection</i>	Jun. 2022
	Microsoft Research	<i>Automated Outlier Detection</i>	Jun. 2022
	Morgan Stanley	<i>Large-scale Anomaly Detection Systems</i>	Mar. 2022
	Rutgers Business School	<i>Outlier Model Selection</i>	Mar. 2022
	Tesla	<i>Large-scale Anomaly Detection Systems</i>	Feb. 2022
	Catalyst, CMU	<i>Systems for Data Mining Algorithms</i>	Dec. 2021
	E&Y Canada	<i>ML applications in Data Analytics</i>	Oct. 2021
	University of Nottingham	<i>General Machine Learning Applications</i>	Jan. 2021