Qi (Rose) Yu

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Research

Large-Scale Spatiotemporal Learning, Deep Learning, Tensor Methods, and their applications.

Current Appointment

University of California, San Diego, La Jolla, California
Assistant Professor, Department of Computer Science and Engineering, July 2020 - Present
Halıcıoğlu Data Science Institute

Previous Appointment

Northeastern University, Boston, Massachusetts
Assistant Professor, Khoury College of Computer Sciences Aug 2018 - June 2020
Network Science Institute, College of Engineering, Physics (By Courtesy)

California Institute of Technology, Pasadena, California
Postdoctoral Scholar, Computing + Mathematical Sciences Aug 2017 - Aug 2018
- Advisors: Anima Anandkumar, Yisong Yue

Education

University of Southern California, Los Angeles, California
Ph.D., Computer Science, Computer Science Department Aug 2012 - Aug 2017
Thesis: Tensor Learning for Large-Scale Spatiotemporal Analysis
Finalist in William F. Ballhaus, Jr. Prize for Excellence in Graduate Engineering Research

Zhejiang University, Hangzhou, Zhejiang, PRC
B.S in Computer Science, Chu Kochen Honors College Aug 2008 - June 2012

Selected Awards and Honors

Outstanding Faculty Researcher Award, JPMorgan, July 2021

Facebook Data Science Research Awards, Facebook Research, June 2021

AWS Machine Learning Research Awards, Amazon Science, 2020

Adobe Data Science Research Awards, Adobe Research, 2020

Google Faculty Research Award, Google Research, 2019-2020

Best Paper Award, NeurIPS Machine Learning for Public Health Workshop, 2020

Best Dissertation Award, University of Southern California, 2018

Best Paper Award, NeurIPS Time Series Workshop, 2017

Selected in ACM Heidelberg Laureate Forum , University of Heidelberg, 2013

Microsoft 2011 Young Fellowship, Microsoft Research Asia, 2011

International Forum (iF) Design Hanover Global Concept Award, iF, 2010

Conference Publications

[C1] Dongxia Wu, Liyao Gao, Xinyue Xiong, Matteo Chinazzi, Alessandro Vespignani, Yi-An Ma, Rose Yu. "Quantifying Uncertainty in Deep Spatiotemporal Forecasting" To appear in *ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (KDD), 2021

[C2] Rui Wang, Danielle Maddix, Christos Faloutsos, Yuyang Wang, Rose Yu. "Bridging Physics-based and Data-driven modeling for Learning Dynamical Systems", In Proceeding of *Annual Conference on Learning for Dynamics and Control* (L4DC), 2021

[C3] Robin Walters, Jinxi (Leo) Li, Rose Yu "Trajectory Prediction using Equivariant Continuous Convolution", In *International Conference on Learning Representations* (ICLR), 2021

[C4] Rui Wang, Robin Walters, Rose Yu "Incorporating Symmetry into Deep Dynamics Models for Improved Generalization", In *International Conference on Learning Representations*, 2021

[C5] Fan Xie, Alex Chowdhury, Clara De Paolis, Linfeng Zhao, Lawson Wong, Rose Yu "Deep Imitation Learning for Bimanual Robotic Manipulation" In Proceeding of *Advances in Neural Information Processing Systems* (NeurIPS), 2020

[C6] Armand Comas Massague, Chi Zhang, Zlatan Feric, Octavia Camps, Rose Yu "Learning Disentangled Representations of Video with Missing Data" In Proceeding of *Advances in Neural Information Processing Systems* (NeurIPS), 2020

[C7] Chintan Shah, Nima Dehmamy, Nicola Perra, Matteo Chinazzi, Albert-László Barabási, Alessandro Vespignani, Rose Yu "Finding Patient Zero: Learning Contagion Source with Graph Neural Networks" In *International Conference on Network Science* (NetSci), 2020.

[C8] Csaba Both, Nima Dehmamy, Albert-László Barabási, Rose Yu "Network Layout using Graph Neural Networks" In *International Conference on Network Science* (NetSci), 2020.

[C9] Jung Yeon Park, Kenneth Theo Carr, Stephan Zheng, Yisong Yue, Rose Yu "Multiresolution Tensor Learning for Efficient and Interpretable Spatial Analysis" In Proceedings of *the 32th International Conference on Machine Learning* (ICML), 2020

[C10] Rui Wang, Adrian Albert, Karthik, Kashinath, Mustafa, Mustafa, Rose Yu. "Towards Physics-informed Deep Learning for Spatiotemporal Modeling of Turbulent Flows", In Proceeding of*ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (KDD), 2020

[C11] Eliza Huang, Rui Wang, Uma Chandrasekaran, Rose Yu. "Aortic Pressure Forecasting with Deep Sequence Learning", In Proceeding of *Computing in Cardiology* (CinC), 2020

[C12] Nima Dehmamy, Albert-László Barabási, Rose Yu. "Understanding the Representation Power of Graph Neural Networks in Learning Graph Topology" In Proceeding of *Advances in Neural Information Processing Systems* (NeurIPS), 2019

[C13] Yukai Liu, Rose Yu, Stephan Zheng, Eric Zhan, Yisong Yue. "NAOMI: Non-Autoregressive Multiresolution Sequence Imputation" In Proceeding of *Advances in Neural Information Processing Systems* (NeurIPS), 2019

[C14] Guanya Shi, Xichen Shi, Michael O'Connell, Rose Yu, Kamyar Azizzadenesheli, Anima Anandkumar, Yisong Yue, Soon-Jo Chung. "Neural Lander: Stable Drone Landing Control using Learned Dynamics" In Proceedings of *International Conference on Robotics and Automation* (ICRA), 2019

[C15] Yaguang Li, Rose Yu, Cyrus Shahabi, Yan Liu "Diffusion Convolutional Recurrent Neural Network: Data-Driven Traffic Forecasting" In Proceedings of *International Conference on Learning Representations* (ICLR), 2018

[C16] Rose Yu, Guangyu Li, Yan Liu. "Tensor regression meets Gaussian Processes." In Proceedings of *International Conference on Artificial Intelligence and Statistics* (AISTATS), 2018

[C17] Rose Yu, Yaguang Li, Ugur Demiryurek, Cyrus Shahabi, Yan Liu. "Deep Learning: A Generic Approach for Extreme Condition Traffic Forecasting." In Proceedings of *the Seventeenth SIAM International Conference on Data Mining* (SDM), 2017

[C18] Rose Yu, Yan Liu. "Learning from Multiway Data: Simple and Efficient Tensor Regression." In Proceedings of *International Conference on Machine Learning* (ICML), 2016

[C19] Dingxiong Deng, Cyrus Shahabi, Ugur Demiryurek, Linhong Zhu, Rose Yu, Yan Liu, "Latent Space Model for Road Networks to Predict Time-Varying Traffic", In Proceeding of *ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (KDD), 2016

[C20] Rose Yu, Andrew Gelfand, Suju Rajan, Cyrus Shahabi, Yan Liu. "Geographic Segmentation via Latent Poisson Factor Model." In *ACM International Conference on Web Search and Data Mining* (WSDM), 2016

[C21] Rose Yu, Dehua Cheng, Yan Liu. "Accelerated Online Low Rank Tensor Learning for Multivariate Spatiotemporal Streams." In Proceedings of *International Conference on Machine Learning* (ICML), 2015

[C22] Rose Yu, Mohammad Taha Bahadori, Yan Liu. "Fast Multivariate Spatio-temporal Analysis via Low Rank Tensor Learning." In Proceeding of *Advances in Neural Information Processing Systems* (NIPS), 2014 **Spotlight**

[C23] Rose Yu, Xinran He, Yan Liu. "GLAD: Group Anomaly Detection in Social Media Analysis." In Proceeding of *ACM SIGKDD Conference on Knowledge Discovery and Data Mining*, 2014

Journal Publications

[J1] K. Kashinath, M. Mustafa, A. Albert,J-L. Wu, C. Jiang, S. Esmaeilzadeh ,K. Azizzadenesheli, R. Wang, A.Singh, A. Manepalli, D. Chirila, R.Yu, R. Walters, B. White, H. Xiao, H. A. Tchelepi, P. Marcus, A. Anandkumar, Prabhat. "Physics-informed machine learning: Case studies for weather and climate modelling" In *Journal of Philosophical Transactions of the Royal Society A*, 2020

[J2] Rose Yu, Stephan Zheng, Anima Anandkumar, Yisong Yue. "Long Term Forecasting with Higher Order Tensor RNN". In *Journal of Machine Learning Research* (JMLR), 2018

[J3] Rose Yu, Huida Qiu, Zhen Wen, Ching-Yung Liu, Yan Liu. "A Survey on Social Media Analysis Anomaly Detection" In *ACM KDD Exploration*, 2016

[J4] Rose Yu, Xinran He, Yan Liu. "GLAD: Group Anomaly Detection in Social Media Analysis - Extended Abstract." In ACM Transactions on Knowledge Discovery in Data (TKDD), 2015

Awarded Grants

[G1] Co-PI, NSF DMS, *2134274:SCALE MoDL: Representation Theoretic Foundations of Deep Learning*, $300,000, Jan 2022 - Dec 2024

[G2] Co-PI, NSF CNS, *2120019-CCRI: ENS: Cognitive Hardware and Software Ecosystem Community Infrastructure (CHASE-CI)*, $1,800,000, Oct 2021 - Sep 2024

[G3] Co-PI, DARPA SBIR, *W31P4Q-21-C-0014: Combining Simulated and Real Data for Near-Term Forecasting of Nonstationary Dynamic Processes*, $120,000, Feb 2021 - Sep 2021.

[G4] PI, Abiomed Research Grant, *Automated Patient Care Assistant via Machine Learning*, $299,480, Nov 2020 - Oct 2023.

[G5] PI, Army Research Office, *W911NF-20-1-0334: Physics-Guided Learning for Sample Efficient Spatiotemporal Decision Making*, $370,704, Sep 2020 - Aug 2023.

[G6] PI, NSF CRII, *IIS-1850349/2037745: Multiresolution Tensor Learning for Scalable and Interpretable Spatiotemporal Analysis*, $174,998, Aug, 2019 - July, 2022

References

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