

## Qi (Rose) Yu

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- RESEARCH      Spatiotemporal Machine 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, Halicioğlu Data Science Institute*      July 2020 - Present
- PREVIOUS APPOINTMENT      **Northeastern University**, Boston, Massachusetts  
*Assistant Professor, Khoury College of Computer Sciences Network Science Institute, College of Engineering, Physics (By Courtesy)*      Aug 2018 - June 2020
- California Institute of Technology**, Pasadena, California  
*Postdoctoral Scholar, Computing + Mathematical Sciences*      Aug 2017 - Aug 2018  
                                 • Advisors: Anima Anandkumar, Yisong Yue
- Stanford University**, Palo Alto, California  
*Visiting Researcher, Computer Science Department*      Aug 2016 - Oct 2016  
                                 • Host: Christopher Ré
- IBM Research**, Yorktown Heights, New York  
*Research Intern*      June 2015 - Aug 2015
- Yahoo! Labs**, Sunnyvale, California  
*Research Intern*      June 2014 - Aug 2014
- Intel Lab**, Santa Clara, California  
*Research Intern*      May 2013 - Aug 2013
- Microsoft R&D**, Minghang, Shanghai  
*Program Manager Intern*      June 2011 - June 2012
- 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*  
                                 • Advisors: Yan Liu, Cyrus Shahabi
- Zhejiang University**, Hangzhou, Zhejiang, PRC  
*B.S in Computer Science, Chu Kochen Honors College*      Aug 2008 - June 2012  
                                 • Advisor: Zhihua Zhang
- SELECTED AWARDS AND HONORS      **Outstanding Faculty Researcher Award**, JPMorgan, July 2021
- Facebook Data Science Research Awards**, Facebook Research, June 2021
- Google Cloud Research Innovators**, Google Cloud, March 2021
- AWS Machine Learning Research Awards**, Amazon Science, Feb 2021

**Best Paper Award**, NeurIPS Machine Learning for Public Health, Dec 2020

**Adobe Data Science Research Awards**, Adobe Research, March 2020

**Google Faculty Research Award**, Google Research, Feb 2020

**Best Dissertation Award**, University of Southern California, 2018

**Best Paper Award**, NIPS Time Series Workshop, 2017

**SIGKDD Scholarship**, ACM 50th Celebration of the Turing Award, San Francisco, 2017

**Rising Stars in EECS**, 40 Awardees in North America, MIT, 2015

**Annenberg Graduate Fellowship**, University of Southern California, 2012

**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

**First prize in Undergraduate Research and Innovation**, Zhejiang University, 2010

CONFERENCE  
PUBLICATIONS

- [C1] Nima Dehmamy, Robin Walters, Yanchen Liu, Dashun Wang, Rose Yu. "Automatic Symmetry Discovery with Lie Algebra Convolutional Network" To Appear at *Advances in Neural Information Processing Systems* (NeurIPS), 2021
- [C2] Dongxia Wu, Liyao Gao, Xinyue Xiong, Matteo Chinazzi, Alessandro Vespignani, Yi-An Ma, Rose Yu. "Quantifying Uncertainty in Deep Spatiotemporal Forecasting" In Proceedings of *ACM SIGKDD Conference on Knowledge Discovery and Data Mining* (KDD), 2021
- [C3] 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
- [C4] Steven Wong, Lejun Jiang, Robin Walters, Tamás G. Molnár, Gábor Orosz, Rose Yu. "Physics-Guided Deep Learning for Traffic Forecasting using Vehicle-to-Vehicle Communication" In Proceeding of *Annual Conference on Learning for Dynamics and Control* (L4DC), 2021
- [C5] Robin Walters, Jinxi (Leo) Li, Rose Yu. "Trajectory Prediction using Equivariant Continuous Convolution", In Proceeding of *International Conference on Learning Representations* (ICLR), 2021
- [C6] Rui Wang, Robin Walters, Rose Yu. "Incorporating Symmetry into Deep Dynamics Models for Improved Generalization", In Proceeding of *International Conference on Learning Representations* (ICLR), 2021
- [C7] 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
- [C8] 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
- [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] 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.
- [C11] Csaba Both, Nima Dehmamy, Albert-László Barabási, Rose Yu. "Network Layout using Graph Neural Networks" In *International Conference on Network Science (NetSci)*, 2020.
- [C12] 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
- [C13] Eliza Huang, Rui Wang, Uma Chandrasekaran, Rose Yu. "Aortic Pressure Forecasting with Deep Sequence Learning", In Proceeding of *Computing in Cardiology (CinC)*, 2020
- [C14] 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
- [C15] 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
- [C16] 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
- [C17] 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
- [C18] Rose Yu, Guangyu Li, Yan Liu. "Tensor regression meets Gaussian Processes." In Proceedings of *International Conference on Artificial Intelligence and Statistics (AISTATS)*, 2018
- [C19] 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
- [C20] Rose Yu, Yan Liu. "Learning from Multiway Data: Simple and Efficient Tensor Regression." In Proceedings of *International Conference on Machine Learning (ICML)*, 2016
- [C21] 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
- [C22] 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
- [C23] 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
- [C24] 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**
- [C25] 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 (KDD)*, 2014
- [C26] Cuixia Gao, Naiyan Wang, Qi Yu, Zhihua Zhang. "A Feasible Nonconvex Relaxation Approach to Feature Selection." In *Proceeding of 24th AAAI Conference on Artificial Intelligence (AAAI)*, 2011

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, Yan Liu. "Spatio-Temporal Analysis of Social Media Data" In *Encyclopedia of GIS*, 2016
- [J4] Rose Yu, Huida Qiu, Zhen Wen, Ching-Yung Liu, Yan Liu. "A Survey on Social Media Analysis Anomaly Detection" In *ACM KDD Exploration*, 2016
- [J5] 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

SELECTED  
WORKSHOP PAPERS  
(UNREFEREED)

- [W1] Xingyu Su, Robin Walters, Denis Aslangil, Rose Yu. "Forecasting Variable-Density 3D Turbulent Flow. Poster Contact". In *ICLR Deep Learning for Simulation workshop, 2021*
- [W2] Rui Wang, Danielle Maddix, Christos Faloutsos, Yuyang Wang, Rose Yu. "Physics-based vs. Data-driven: A Benchmark Study on COVID-19 Forecasting", **Best Paper Award** in *Advances in Neural Information Processing Systems (NeurIPS)*, Machine Learning for Public Health workshop, 2020
- [W3] Rui Wang, Adrian Albert, Karthik Kashinath, Mustafa Mustafa, Rose Yu. "Towards physics informed deep learning for spatiotemporal modeling of turbulence flow". **Oral Presentation** at *Advances in Neural Information Processing Systems (NeurIPS)*, Machine Learning for Physical Sciences workshop, 2019
- [W4] Clara De Paolis, Saeed Amizadeh, Rose Yu. "A Neural Framework for Learning DAG to DAG Translation". In *Advances in Neural Information Processing Systems (NeurIPS)*, relational representation learning workshop, 2018
- [W5] Rose Yu, Stephan Zheng, Anima Anandkumar, Yisong Yue. "Long-term forecasting using Tensor-Train RNN". **Best Paper Award** in *Advances in Neural Information Processing Systems (NIPS)*, time series workshop, 2017
- [W6] Yaguang Li, Rose Yu, Cyrus Shahabi, Yan Liu. "Diffusion Convolutional Recurrent Neural Network: Data-Driven Traffic Forecasting". **Oral Presentation** at *Advances in Neural Information Processing Systems (NIPS)*, time series workshop, 2017
- [W7] Rose Yu, Stephan Zheng. "Learning Chaotic Dynamics with Tensor RNN". In *International Conference on Machine Learning (ICML)*, Deep structured prediction workshop, 2017
- [W8] Rose Yu, Paroma Varma, Dan Iter, Chris De Sa, Christopher Re, "Socratic Learning". In *Advances in Neural Information Processing Systems (NIPS)* future of interactive machine learning workshop, 2016

AWARDED GRANTS

- [G1] Lead PI, DOE ASCR, *2493: Discovering Physically Meaningful Structures from Climate Extreme Data* \$ 3,560,504, Sep 2021 - Aug 2024
- [G2] Co-PI, NSF DMS, *2134274: SCALE MoDL: Representation Theoretic Foundations of Deep Learning*, \$300,000, Jan 2022 - Dec 2024
- [G3] Co-PI, NSF CNS, *2100237-CCRI: ABR: Cognitive Hardware and Software Ecosystem Community Infrastructure (CHASE-CI)*, \$999,971, June 2021 - May 2024
- [G4] Co-PI, NSF CNS, *2120019-CCRI: ENS: Cognitive Hardware and Software Ecosystem Community Infrastructure (CHASE-CI)*, \$1,800,000, Oct 2021 - Sep 2024

- [G5] PI, Facebook Data Science Research Award, *Sample-efficient sequential Bayesian decision making*, \$50,000, June 2021
- [G6] PI, AWS ML Research Awards, *Deep Relational Forecasting for Dynamic Graphs*, \$30,000, with \$50,000 AWS Credits, Feb, 2021
- [G7] 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.
- [G8] PI, Abiomed Research Grant, *Automated Patient Care Assistant via Machine Learning*, \$299,480, Nov 2020 - Oct 2023.
- [G9] PI, Army Research Office, *W911NF-20-1-0334: Physics-Guided Learning for Sample Efficient Spatiotemporal Decision Making*, \$370,704, Sep 2020 - Aug 2023.
- [G10] PI, Adobe Data Science Research Award, *Context-Aware Customer Journey Optimization in Spatiotemporal Environment*, \$50,000, June 2020
- [G11] PI, Google Faculty Award, *Physics Guided Deep Learning for Realistic and Efficient Traffic Simulation*, \$67,694, Feb 2020
- [G12] PI, ALCF Director's Discretionary (DD) Program Allocation Award *Accelerating Traffic Simulation with Graph Neural Networks*, 2 million core hours, June 2020 - Jan 2021.
- [G13] PI, NERSC AY 2020 Exploratory Allocation Award *Physics Informed Deep Learning for Predicting Turbulence Flow*, 45,000 (NERSC MPP Hours) , Jan 2020 - Jan, 2021.
- [G14] PI, NSF CRII, *IIS-1850349/2037745: Multiresolution Tensor Learning for Scalable and Interpretable Spatiotemporal Analysis*, \$174,998, Aug, 2019 - July, 2022
- [G15] PI, Abiomed Research Grant, *Anticipating Patient Outcome via Machine Learning*, \$50,000, July, 2019 - Sep, 2020
- [G16] PI, ONR STTR, *N68335-19-C-0310: Subcontract: Predictive Graph Convolutional Networks*, \$71,784, June, 2019 - Dec, 2019
- [G17] Co-PI, Mathworks Microgrant, *Battery State of Health Machine Learning Prognostics*, \$17,400, Sep, 2019 - Dec, 2019
- [G18] Co-PI, ONR ECP, *Subcontract: Learning and Prediction of Dynamic Processes on Evolving Networks*, \$28,840, March, 2019 - Oct, 2019
- [G19] PI, Northeastern Tier 1, *Physics-Informed Deep Learning for High-Resolution Climate Extremes Modeling*, \$50,000, July, 2019 - Sep, 2020
- [G20] PI, Northeastern Khory Seed Grant, *Learning Bimanual Robotic Manipulation Via Deep Graph Sequence* , \$50,000, Aug, 2019 - Aug, 2020
- [G21] NVIDIA GPU Grant Oct 2018, 1 Titan Xp, Amazon AWS Research Credits, Oct 2018, \$20,000 Cloud Credits, Google Cloud Research Credits, Oct, 2018, \$10,000 Cloud Credits

## ADVISING

### Postdocs Supervised

- Robin Walters, 2020, active

### Ph.D. Students Advised

- Dongxia (Allen) Wu, 2020, active
- Rui (Ray) Wang, 2019, active
- Jung Yeon (John) Park, 2019 - 2020, advised at Northeastern
- Clara De Paolis, 2018 -2020, advised at Northeastern

TEACHING	<b>Deep Reinforcement Learning (CSE 291 )</b>	Fall 2021
	<b>Deep Learning (CSE 151B )</b>	Spring 2021
	<b>Deep Generative Models (CSE 291(G00) )</b>	Fall 2020
	<b>Advanced Machine Learning (CS 7140)</b>	Spring 2020
	<b>Machine Learning Seminar (CS 4950)</b>	Fall 2019
	<b>Introduction to Computer Science Research (CS 3950)</b>	Fall 2019
	<b>Special Topics in AI: Deep Learning (CS 7180)</b>	Spring 2019
	<b>Machine Learning (CS 6140)</b>	Fall 2018
INVITED TALK	<b>Year 2021</b>	
	CMU AI in Physics seminar	Sep 2021
	Georgia Tech Applied & Computational Math	Sep 2021
	KDD Lecture Style Tutorial	August 2021
	NASA Glenn Research Center	July 2021
	One World MINDS Seminar	July 2021
	RIKEN AIP Seminar, Japan	June 2021
	Institute for Pure & Applied Mathematics (IPAM), UCLA	May 2021
	AI Seminar, USC/ISI	May 2021
	CRUNCH Applied Math Group, Brown University	April 2021
	Featured Talk at NVIDIA GTC 2021	March 2021
	Applied Math Department Colloquium, University of Arizona	Feb 2021
	Duke University, Deep Learning Reading Group	Feb 2021
	Oak Ridge National Laboratory Workshop on AI for Robust Engineering & Science	Jan 2021
	<b>Year 2020</b> Machine Learning in Science and Engineering virtual conference	Dec 2020
	NeurIPS 2020 Workshop on Quantum Tensor Networks	Dec 2020
	NeurIPS 2020 Workshop on AI for Earth	Dec 2020
	NeurIPS 2020 Workshop on Interpretable Inductive Biases	Dec 2020
AGU Fall Meeting Invited Talks	Dec 2020	

Caltech Climate Modeling Alliance (CliMA) group	Nov 2020
AAAI 2020 Symposium on Physics-Guided AI for Accelerating Scientific Discovery	Nov 2020
LA Life Science Summit	Oct 2020
COVID-19 Forecast Hub	Sep 2020
International School and Conference on Network Science	Sep 2020
ODSC Europe 2020 Virtual Conference	Sep 2020
Mathematics of Data Science Virtual Lecture Series, Tufts, MA	June 2020
Facebook Artificial Intelligence Research, Menlo Park, CA	April 2020
Functional Data over Multidimensional Domain, EPFL, Switzerland,	April 2020
AI for Robust Engineering and Science workshop, Oak Ridge National Lab	Jan 2020
Physics Informed Machine Learning workshop, Los Alamos National Lab	Jan 2020
<b>Year 2019</b>	
Mitsubishi Electric Research Laboratories (MERL), Cambridge	Oct 2019
<b>Plenary Speaker</b> , European Research Network on System Identification	Sep, 2019
Hazy Research Group Seminar, Stanford University	August 2019
KDD 2019 Tensor Methods Workshop, Anchorage	August 2019
University of Connecticut, Connecticut	July 2019
Google Research, Mountain View	July 2019
Machine Learning Theory Workshop, Peking University, China	June 2019
Auto Lab, University of Michigan, Ann Arbor	May 2019
ICLR 2019 Workshop on Deep Generative Models, New Orleans	May 2019
Tensor Working Group on Simons Foundation, New York	May 2019
Workshop Low-rank Optimization and Applications, Leipzig, Germany	April 2019
Young European Probabilists XV workshop, Eindhoven, Netherland	March 2019
Lawrence Berkeley National Laboratory (LBNL)	March 2019
<b>Year 2018</b>	
Amazon Research, Palo Alto	Dec 2018

Salesforce Research, Palo Alto,	Dec 2018
Machine Learning Group Seminar, Harvard,	Nov 28 2018
Clinical Machine Learning Group Seminar, MIT,	Nov 13 2018
<b>Keynote Speaker</b> , Climate Informatics 2018 (CI 2018),	Sep 2018
Henry L. Pierce Laboratory Seminar Series, MIT,	Sep 12, 2018
Japan RIKEN Center for Advanced Intelligence Project (AIP), Tokyo,	July 3, 2018
Disney Research, Burbank,	May 22, 2018
<b>Year 2017</b>	
Department of Management Science, University of Miami	Nov 18, 2017
Department of Computing and Mathematical Sciences, Caltech	Oct 6, 2017
Center of Data Science, New York University	March 30, 2017
Department of Computer Science, Brown University	March 13, 2017
School of Industrial and Systems Engineering, Georgia Institute of Technology	March 6, 2017
College of Computer and Information Science, Northeastern University	March 3, 2017
AI with The Best, Online Conference	Sep 17, 2016
Computer Science Department, Stanford University	May 23, 2016

#### ACADEMIC SERVICE **Conference Organizing Committee**

Poster Chair, KDD (2020)  
 Proceedings Chair, ACM SIGSPATIAL (2020)  
 KITP: At the Crossroad of Physics and Machine Learning, 2019  
 Proceedings Chair, WSDM (2018)  
 Short Paper Chair, CIKM (2017)

#### **Workshop Co-organizer**

ICML Time Series Workshop, (2021, 2019, 2017)  
 ICCV Simulation Technology for Embodied AI, 2021  
 ICLR Workshop on Deep Learning for Simulation (2021)  
 NeurIPS Workshop on Machine Learning for Engineering (2020)  
 NIPS Woman in Machine Learning Workshop (2016)  
 NIPS workshop on Learning with Tensors: Why Now and How? (2016)

#### **Grant Reviewer/Panelist**

Department of Energy (DOE) Review Panel (2020, 2019)  
 National Science Foundation (NSF) Review Panel (2021, 2019, 2018)



**Senior Program Committee (or Area Chair)**

ICML(2021, 2020), ICLR (2022, 2021), NeurIPS (2021, 2020), AAAI (2021), IJCAI (2020), SDM (2020)

**Program Committee**

ICML (2020, 2019, 2018), NeurIPS (2019, 2018), ICLR (2020, 2019), KDD (2019), AISTATS (2020, 2019), SDM (2019), AAAI (2018), IJCAI (2018), CIKM (2017), NIPS Time Series Workshop (2016), ICML Time Series Workshop (2016)

**Reviewer** AAAI 2021 Spring Symposium on Combining Machine Learning with Physical Sciences, Proceedings of IEEE (2019), Journal of Machine Learning Research (JMLR), Journal of Artificial Intelligence Research (JAIR), Transactions on Knowledge Discovery from Data (TKDD), IEEE Transactions on Knowledge and Data Engineering (TKDE), IEEE Intelligent Transportation Systems Transaction (ITS)