

# JIACHENG ZHU

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## EDUCATION

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- M.S. in Machine Learning**, *Machine Learning Department* Dec 2019 - Jan 2022  
School of Computer Science, Carnegie Mellon University, PA, USA
- Ph.D. Candidate**, *Mechanical Engineering* Sept 2018 - Present  
College of Engineering, Carnegie Mellon University, PA, USA
- Minor in Data Science**, Sept 2015 - June 2017  
School of Computer Science, Fudan University, Shanghai, China
- B.Eng. in Aerospace design and Engineering**, Sept 2013 - June 2017  
School of Aeronautics and Astronautics, Fudan University, Shanghai, China

## CURRENT RESEARCH

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Jiacheng Zhu's research target is to develop interpretable machine learning techniques that transport and utilize knowledge across different domains. To achieve this goal, he leverages probabilistic theory, Bayesian inference, and optimal transport. He tackles machine learning problems on heterogeneous real-world datasets in robotics, autonomous driving, and healthcare.

## SELECTED PUBLICATIONS & PREPRINTS

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- Functional Optimal Transport: map estimation and domain adaptation for functional data**,  
**Jiacheng Zhu\***, Aritra Guha\*, Dat Do\*, Mengdi Xu, XuanLong Nguyen, Ding Zhao, *submitted to Journal of Machine Learning Research, under review.*
- Data Augmentation for Adversarial Robustness: Interpolation along Wasserstein Geodesic**,  
**Jiacheng Zhu**, Jieliu Qiu, Zhuolin Yang, Aritra Guha, Xuanlong Nguyen, Bo Li, Ding Zhao *Under review.*
- Semantics-Consistent Cross-domain Summarization via Optimal Transport Alignment**,  
Jieliu Qiu, **Jiacheng Zhu**, Mengdi Xu, Frank Dernoncourt, Trung Bui, Zhaowen Wang, Bo Li, Ding Zhao, Hailin Jin, *Under review.*
- Curriculum Reinforcement Learning using Optimal Transport via Gradual Domain Adaptation**,  
Peide Huang, Mengdi Xu, **Jiacheng Zhu**, Laixi Shi, Fei Fang, Ding Zhao, *Conference on Neural Information Processing Systems (NeurIPS 2022).*
- Robustness Certification of Visual Perception Models via Camera Motion Smoothing**,  
Hanjiang Hu, Zuxin Liu, Linyi Li, **Jiacheng Zhu** Ding Zhao, *PMLR Conference on Robot Learning (CoRL) 2022.*
- GeoECG: Data Augmentation via Wasserstein Geodesic Perturbation for Robust Electrocardiogram Prediction**,  
**Jiacheng Zhu\***, Jieliu Qiu\*, Zhuolin Yang, Douglas Weber, Michael Rosenberg, Emerson Liu, Bo Li, Ding Zhao, *PMLR Machine Learning for Healthcare (MLHC) 2022.*
- PhysioMTL: Personalizing Physiological Patterns using Optimal Transport Multi-Task Regression**,

**Jiacheng Zhu**, Gregory Darnell, Agni Kumar, Ding Zhao, Bo Li, XuanLong Nguyen, Shirley You Ren, *PMLR Conference on Health, Inference, and Learning (CHIL) 2022*.

8. **Context-Aware Safe Reinforcement Learning for Non-Stationary Environments**  
Baiming Chen, Zuxin Liu, **Jiacheng Zhu**, Mengdi Xu, Wenhao Ding, Liang Li, Ding Zhao  
*The 2021 International Conference on Robotics and Automation (ICRA 2021)*.
9. **Spatiotemporal learning of multivehicle interaction patterns in lane-change scenarios**  
Chengyuan Zhang, **Jiacheng Zhu**, Wenshuo Wang, Junqiang Xi, *IEEE Transactions on Intelligent Transportation Systems, 2021*.
10. **Task-Agnostic Online Reinforcement Learning with an Infinite Mixture of Gaussian Processes**  
Mengdi Xu, Wenhao Ding, **Jiacheng Zhu**, Zuxin Liu, Baiming Chen, Ding Zhao, *Conference on Neural Information Processing Systems (NeurIPS 2020)*.
11. **Recurrent Attentive Neural Process for Sequential Data**  
Shenghao Qin\*, **Jiacheng Zhu**\*, Jimmy Qin, Wenshuo Wang, Ding Zhao, *Conference on Neural Information Processing Systems (NeurIPS 2019) Workshop*.
12. **Probabilistic Trajectory Prediction for Autonomous Vehicles with Recurrent Attentive Neural Process**  
**Jiacheng Zhu**\*, Shenghao Qin\*, Wenshuo Wang, Ding Zhao, *preprint*.
13. **A Tempt to Unify Heterogeneous Driving Databases using Traffic Primitives**  
**Jiacheng Zhu**, Wenshuo Wang, Ding Zhao, *The 21st IEEE International Conference on Intelligent Transportation Systems (ITSC) 2018*.
14. **A theoretical model for delayed hydride cracking velocity considering the temperature history and temperature gradients**  
Jingyu Zhang, **Jiacheng Zhu**, Shurong Ding, etc., *Nuclear Materials and Energy* 16 (2018): 95-107.
15. **Evaluation of the Effect of Temperature Gradient and Irradiation on Threshold Stress Intensity Factor in Delayed Hydride Cracking and Simulation on DHC Velocity for Zirconium Alloy Cladding Tubes**  
**Jiacheng Zhu**, Jingyu Zhang, Shurong Ding, etc. oral report, proceedings with the 19th Conference on Structural Mechanics in Reactor Technology, Beijing, China, Oct 16-18, 2016

## WORK EXPERIENCE

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### AT & T Labs

June 2022-Aug 2022

*Research Scientist Intern - Statistics Research*

*New York, NY*

- Develop machine learning techniques that eliminate distribution shift and promote fairness

### Apple AI/ML

May 2021-Oct 2021

*Research Scientist Intern - Health AI*

*Seattle, WA*

- Developed Physiology-informed machine learning methodologies
- Proposed PhysiOMTL - a multi-task learning framework with Optimal Transport methods that provides personalized physiological assessment from Heart Rate Variability (HRV)

### Isuzu Technical Center of America

May 2020-Sep 2020

*Research Enginner Intern - Decision Making for Autonomous Driving*

*Ann Arbor, MI*

- Developed a Decision-Making Module based on online trajectory prediction with deep generative models.
- Conducted the domain adaptation from public dataset to testing domain for real-world deployment

**Etiger Capital Partners LLC***Quantitative Analyst - Data Mining & Analysis*

Jun 2017-Aug 2017

*Shanghai, China*

- Independently built a Business-News-NLP Arbitrage on China's A-share stock market based on Hidden Markov Model (HMM), and Naive Bayes Classifier for identifying profitable opportunities

**SELECTED PROFESSIONAL SERVICES**

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**Reviewer** ICML (2021, 2022), NeurIPS (2021, 2022), ICLR (2022, 2023), AAAI 2023, MLHC 2022, CHIL 2022, TITS, ITSC 2018

**TALKS & ACTIVITIES**

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**Generalizing AI for Autonomous Driving under distribution shift** Oct 2022

*Long talk* Hosted by Vijay Badrinarayanan, Wayve AI, London (remote)

**Robustify ECG Automatic diagnosis via distribution interpolation** Sep 2022

*Long talk* Allegheny Health Network, Pittsburgh

**GeoECG: Data augmentation for robust cardiovascular prediction** Aug 2022

*Spotlight presentation* Machine Learning for Healthcare, 2022, Durham, North Carolina

**PhysioMTL: Physiology-informed multi-task Learning** April 2022

*Spotlight presentation* Conference on Health, Inference, and Learning, 2022

**Functional Optimal Transport** February 2022

*Spotlight presentation* AAAI Workshop on Optimal Transport and Structured Data Modeling

**Demographic aware multitask learning for Heart Rate Variability** August 2021

*Intern presentation* Apple AI/ML, Remote

**Oxford Machine Learning Summer School** July 2020

*Attendee* OxML 2020, Oxford University (Online)

**Recurrent Attentive Neural Process for Sequential Data** Dec 2019

*Lightning talks* NeurIPS 2019, Learning with Rich Experience (LIRE) Workshop, Vancouver

**Artificial Intelligence for Data Discovery and Reuse (AIDR) 2019** May 2019

*Long talk* Carnegie Mellon University, Pittsburgh

**HONORS**

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- 2022 Qualcomm Innovation Fellowship, North American, 2022
- Apple Scholars in AI/ML PhD fellowship nomination, 1 out of 3 at CMU College of Engineering, 2021
- Certification, Oxford Machine Learning Summer School, 2020 (Online)
- NeurIPS Student Travel Award, NeurIPS, 2019
- Rackham Travel Grant Fellowship, University of Michigan, Ann Arbor, 2018
- Junyuan Scholarship for Undergraduate Student, Fudan University, 2017
- Outstanding Undergraduate Thesis, Fudan University, 2016
- Xiexin Excellent Student Scholarship, Fudan University, 2016
- Junyuan Scholarship for Undergraduate Student, Fudan University, 2016
- 'GuangHua Innovation Prize' of Fudan University, Fudan University, 2015
- China Graduate Future Flight Vehicle Innovation Competition, First Prize, 2014

## SELECTED COURSES

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Statistical Machine Learning, Probabilistic Graphical Models, Convex Optimization, Reinforcement Learning, Advanced Deep Learning, Intro to Machine Learning, Computer Vision, Machine Learning with Large Datasets, Mobile Robotics: SLAM, Robot Kinematics & Dynamics, Database Management Systems, Data Structures and Algorithms

## TECHNICAL AND PERSONAL SKILLS

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<b>Computer Languages</b>	Python, JavaScript, C/C++, MATLAB
<b>Softwares &amp; Tools</b>	TensorFlow, Pytorch, ROS, OpenRAVE, MySQL, OpenCV, CUDA, Solidworks, L <sup>A</sup> T <sub>E</sub> X
<b>Languages</b>	English, Mandarin, Shanghai Dialect