

Yaohui Guo

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Research Interest

Human-AI/Robot Interaction, Sequential Decision Making, Linear Bandits.

Education

University of Michigan (UM)	Ann Arbor, MI
<i>Ph.D. in Industrial and Operations Engineering</i>	08/2019 – Present
Thesis advisors: Professor Xi Jessie Yang and Professor Cong Shi	
<i>M.S. in Mathematics</i>	09/2020 – 12/2021
<i>M.S. in Robotics</i>	09/2016 – 04/2018
Xi'an Jiaotong University (XJTU)	Xi'an, China
<i>B.S. in Mechanical Engineering and Automation</i>	09/2011 – 07/2015

Professional Experiences

Honda Research Institute	San Jose, CA
<i>Research Associate Intern</i>	05/2023 – 08/2023
Project: Approximating Nash Policy in Multi-agent Trajectory Planning	
Carnegie Mellon University	Pittsburgh, PA
<i>Research Assistant</i>	06/2018 – 01/2019
Project: Multi-vehicle Interaction Pattern Recognition	

Awards and Honors

Rackham Predoctoral Fellowship, University of Michigan	2022
Rackham Graduate Student Research Grant, University of Michigan	2022
Dean and Engineering Graduate Fellowship, University of Michigan	2019
Outstanding Graduate, Xi'an Jiaotong University	2015
1 st Prize, National Undergraduate Mathematics Competition, Chinese Mathematical Society	2014
National Scholarships, Xi'an Jiaotong University	2013, 2014
SMC Fellowship, Xi'an Jiaotong University	2014
1 st Prize, National Undergraduate Mathematical Contest in Modeling, CSIAM	2014

Peer-Reviewed Publications

Book Chapters

- [B1]. X. J. Yang, **Y. Guo**, C. Schemanske,
 "From Trust to Trust dynamics: Combining Empirical and Computational Approaches to Model and Predict Trust Dynamics in Human-Autonomy Interaction",
Human-Automation Interaction: Transportation, edited by V. G. Duffy, S. J. Landry, J. D. Lee, N. Stanton,
 Springer, New York, NY [[link](#)].

Journal Publications

- [J2]. **Y. Guo**, C. Shi, X. J. Yang,
 "Reverse Psychology in Trust-aware Human-robot Interaction",
IEEE Robotics and Automation Letters, Vol. 6(3), 4851-4858, 2021 (presented at ICRA 2021)[[pdf](#)].

- [J1]. **Y. Guo**, X. J. Yang,
"Modeling and Predicting Trust Dynamics in Human-Robot Teaming: A Bayesian Inference Approach",
International Journal of Social Robotics, Vol. 13(8), 1899-1909, 2021 [[pdf](#)].

Conference Proceedings

- [C6]. **Y. Guo**, X. J. Yang, C. Shi,
"Reward Shaping for Building Trustworthy Robots in Sequential Human-Robot Interaction",
2023 IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2023, Detroit, MI [[pdf](#)].
- [C5]. **Y. Guo**, X. J. Yang, C. Shi,
"Enabling Team of Teams: A Trust Inference and Propagation (TIP) Model in Multi-Human Multi-Robot Teams",
2023 Robotics: Science and Systems, RSS 2023, Daegu, Korea [[pdf](#)].
- [C4]. **Y. Guo**, V. V. Kalidindi, M. Arief, W. Wang, J. Zhu, H. Peng, D. Zhao,
"Modeling Multi-vehicle Interaction Scenarios Using Gaussian Random Field",
2019 IEEE Intelligent Transportation Systems Conference, ITSC 2019, Auckland, New Zealand [[pdf](#)].
- [C3]. X. Gong, **Y. Guo**, Y. Feng, J. Sun, D. Zhao,
"Evaluation of the Energy Efficiency in a Mixed Traffic with Automated Vehicles and Human Controlled Vehicles",
2018 IEEE Intelligent Transportation Systems Conference, ITSC 2018, Maui, HI [[pdf](#)].
- [C2]. Z. Huang, **Y. Guo**, M. Arief, H. Lam, D. Zhao,
"A Versatile Approach to Evaluating and Testing Automated Vehicles based on Kernel Methods",
2018 Annual American Control Conference, ACC 2018, Milwaukee, WI [[pdf](#)].
- [C1]. D. Zhao, **Y. Guo**, Y. J. Jia,
"TrafficNet: An Open Naturalistic Driving Scenario Library",
2017 IEEE Intelligent Transportation Systems Conference, ITSC 2017, Yokohama, Japan [[pdf](#)].

Papers Under Revision and Submitted Papers

- [RS3]. **Y. Guo**, X. J. Yang, C. Shi,
"A Linear Bandit Approach to Multi-Human Multi-Robot Teaming",
Under review.
- [RS2]. **Y. Guo**, J. B. Lyons, C. Shi, X. J. Yang,
"Trust Propagation in Multi-Human Operator Multi-Autonomous Agent (MOMA) Teams",
Under review.
- [RS1]. **Y. Guo**, X. J. Yang, C. Shi,
"Trust Prediction in Multi-Human Multi-Robot Agent Teams via Trust Propagation",
Submitted (invited paper), **Autonomous Robots**.

Short Papers & Abstracts

- [S2]. **Y. Guo**, C. Shi, X. J. Yang,
"TIP: A Trust Inference and Propagation Model in Multi-Human Multi-Robot Teams",
Companion of the 2023 ACM/IEEE International Conference on Human-Robot Interaction, HRI 2023, Stockholm, Sweden [[link](#)].
- [S1]. **Y. Guo**, C. Zhang, X. J. Yang,
"Modeling Trust Dynamics in Human-robot Teaming: A Bayesian Inference Approach",
Extended Abstracts of the 2020 CHI Conference on Human Factors in Computing Systems, CHI 2020, Honolulu, HI [[link](#)].

Teaching

Teaching Experience

University of Michigan*Instructor*

Course: IOE 201, Economic Decision Making.

Ann Arbor, MI

Fall 2023

Carnegie Mellon University*Teaching Assistant*

Course: ME 24677, Linear Control System.

Pittsburgh, PA

Fall 2018

Teaching Interests**Foundational courses:** probability, optimization, statistics, stochastic processes, engineering fundamentals, operations management, and economic decision-making.**Advanced topics:** data analytics, control systems, machine learning, artificial intelligence, and robotics.**New courses/seminars:** human-robot interaction, decision-making under uncertainty.**Contributed Grants**

Contributed significantly to the writing and application processes of the following grants:

DOD-AFOSR, AWD-023413, \$800K	05/2023 – 05/2026
Enabling Re-configurable Multi-Operator Multi-Agent (MOMA) Teams: A Trust Inference and Propagation (TIP) Approach.	
DOD-AFOSR, AWD-016363, \$578K	09/2020 – 09/2023
Trust Building in Human-Autonomy Teaming: A Reinforcement Learning Approach.	
DOD-AFOSR, AWD-014929, \$100K	05/2020 – 04/2021
Trust-Driven Human-Agent Teaming: Modeling and Predicting Trust Dynamics.	

Presentation

Conference Presentation

- [CP4]. **Y. Guo**, X. J. Yang, C. Shi, "Reward Shaping for Building Trustworthy Robots in Sequential Human-Robot Interaction", *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2023*, Detroit, MI.
- [CP3]. **Y. Guo**, X. J. Yang, C. Shi, "Enabling Team of Teams: A Trust Inference and Propagation (TIP) Model in Multi-Human Multi-Robot Teams", *2023 Robotics: Science and Systems, RSS 2023*, Daegu, Korea.
- [CP2]. **Y. Guo**, C. Shi, X. J. Yang, "Reverse Psychology in Trust-aware Human-robot Interaction", *2021 IEEE International Conference on Robotics and Automation, ICRA 2021*, Xi'an, China.
- [CP1]. Z. Huang, **Y. Guo**, M. Arief, H. Lam, D. Zhao, "A Versatile Approach to Evaluating and Testing Automated Vehicles based on Kernel Methods", *2018 Annual American Control Conference, ACC 2018*, Milwaukee, WI.

Poster Presentation

- [PP3]. **Y. Guo**, D. Zhao, "Multi-vehicle Motion Pattern Recognition through Hierarchical Gaussian Process", *2019 3rd Toyota Research Institute Joint University Workshop*, University of Michigan, Ann Arbor, MI.
- [PP2]. Z. Huang, **Y. Guo**, M. Arief, H. Lam, D. Zhao, "A Versatile Approach to Evaluating and Testing Automated Vehicles based on Kernel Methods", *2018 Michigan Student Symposium for Interdisciplinary Statistical Sciences, MSSISS 2018*, University of Michigan, Ann Arbor, MI.
- [PP1]. X. Wang, **Y. Guo**, S. Xu, H. Peng, D. Zhao, "Development of a 'Primary Other Test Vehicle' for the Testing and Evaluation of High-Level Automated Vehicles", *2017 2nd Toyota Research Institute Joint University Workshop*, MIT, Cambridge, MA.

Talks

- [T3]. "Multi-agent Human-robot Interaction", *2022 Center for Ergonomics Research Symposium*, University of Michigan, Ann Arbor, MI.
- [T2]. "Trust-aware Human-robot Interaction", *2022 Center for Ergonomics Research Symposium*, University of Michigan, Ann Arbor, MI.
- [T1]. "Multi-vehicle Motion Pattern Recognition through Hierarchical Gaussian Process", *2018 Safe AI Lab Workshop*, Carnegie Mellon University, Pittsburgh, PA.

Professional Activities and Services

Professional Membership

IEEE Student Member, INFORMS Student Member, HFES Student Member.

University-related Service

Liaison Committee Member, UM Human Factors and Ergonomics Society Student Chapter. 2019 – 2020

Student mentor, IOE Ph.D. mentor program. 2021 – 2024

Journal Reviewer for

ACM Transactions on Human-Robot Interaction,	IEEE Transactions on Intelligent Vehicles,
International Journal of Human-Computer Interaction,	IEEE Transactions on Vehicular Technology,
Management Science,	IET Intelligent Transport Systems,
IEEE Intelligent Transportation Systems Magazine,	Frontiers in Robotics and AI,
IEEE Transactions on Intelligent Transportation Systems,	Frontiers in Neuroergonomics,
IEEE Transactions on Human-Machine Systems,	Journal of Artificial Intelligence,
IEEE Transactions on Industrial Informatics,	Scientific Reports.

Conference Reviewer for

HRI, ICIS, ICRA, IROS, RO-MAN, EXTRAAMAS.

Mentoring

University of Michigan

Chenfei Li, PhD@IOE (IOE Mentorship Program)

Doowon Han, PhD@IOE (IOE Mentorship Program)

Weishi Wang, PhD@IOE (IOE Mentorship Program)

Ruby Kim, MS@IS (project member, Trust-Aware Human-Robot Interaction)

Christine Searle, MS@Robotics (project member, Trust-Aware Human-Robot Interaction)

Carnegie Mellon University

Vinay Varma Kalidindi, MS@ME (project member, Multi-Vehicle Interaction)

Ashish Roongta, MS@ME (project member, Multi-Vehicle Interaction)

Manoj Bhat, MS@ME (project member, Multi-Vehicle Interaction)

Outreach Activities

ErgoNomiCs and Human-Automation iNteracTion (ENCHANT) Summer Camp

Instructor

Providing hands-on experience with robots to 7th- and 8th-grade girls [[website](#)].

IOE Pioneer High School Outreach

Coordinator

Introducing operations and ergonomics research to high school students.

UM

07/2022

UM

01/2020