

Desheng Zhang

Personal Information

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Research Interests

- Broadly concentrated on bridging **Cyber-Physical Systems** (also known as **Internet of Things** under some contexts) and **Data Science** by technical integration of communication, computation and control in data-intensive urban systems for **Smart Cities**.
- Focused on the life cycle of **Big-Data-Driven Urban Systems**, from streaming data collection to multi-source data fusion, heterogeneous model integration, visualization, service design and deployment in complex urban setting.

Employment

Assistant Professor Rutgers, The State University of New Jersey, USA	8.2016-Present
Research Associate University of Minnesota, U.S.A	10.2015-8.2016

Education

Ph.D of Computer Science University of Minnesota, U.S.A	9.2011-10.2015 with Government Award
Master of Computer Applied Technology Heilongjiang University, China	9.2008-6.2011 with Excellent Thesis Award
Bachelor of Software Engineering Heilongjiang University, China	9.2004-6.2008 with Excellent Thesis Award

Selected Awards

<i>Best Paper Nominee</i> , ICCPS Committee (Acceptance Rate: 3/91)	3.2015
<i>Best Paper Award</i> , CWSN Committee (Acceptance Rate: 1/200+)	10.2010
<i>Best Paper Runner-up Award</i> , CyberC Committee (Acceptance Rate: 1/297)	10.2010
<i>Best Poster Award</i> , INFOCOM Committee	4.2011
<i>Best Thesis Award in Computer Science</i> , Heilongjiang Dept. of Education (1/46,000)	12.2011
<i>Best Thesis Award</i> , Heilongjiang University	6.2008
<i>Excellent Thesis Research Travel Award</i> , University of Minnesota	11.2013
<i>Excellent Researcher Award</i> , Chinese Academy of Sciences	4.2011
<i>Chinese Government Award for Outstanding Students</i> , (Acceptance Rate: 4/250,000)	9.2014
<i>Doctoral Dissertation Fellowship Award</i> , University of Minnesota	4.2014
<i>ADC Fellowship Award</i> , University of Minnesota	4.2011
<i>National Scholarship</i> , China Ministry of Education (Acceptance Rate: 1/212)	11.2007

Selected Conference Paper Publications

Note: The authors with * are my students.

Cyber-Physical Systems

- [C01] Yu Yang*, X.Xie*, Z.Fang*, F.Zhang, Y.Wang, and **Desheng Zhang**.
VeMo: Enabling Vehicular Mobility Modeling at Individual Levels with Full Penetration
In ACM Conference on Mobile Computing & Networking (**MobiCom'19**). 25/104≈24%
- [C02] Guang Wang*, X.Chen, F.Zhang, Y.Wang, and **Desheng Zhang**.
Experience: Understanding Long-Term Evolving Patterns of Shared Electric Vehicle Fleets
In ACM Conference on Mobile Computing & Networking (**MobiCom'19**). 25/104≈24%
- [C03] Xiaoyang Xie*, G.Wang*, F.Zhang, Y.Liu, and **Desheng Zhang**
coSense: Collaborative Urban-Scale Vehicle Sensing based on Heterogeneous Fleets
In ACM Conference on Pervasive & Ubiquitous Computing (**UbiComp'19**) 9/139≈6%
- [C04] Guang Wang*, X.Xie*, F.Zhang, Y.Liu and **Desheng Zhang**
bCharge: Data-Driven Real-Time Charging Scheduling for Large-Scale Electric Bus Fleets
In IEEE International Real-time Systems Symposium (**RTSS'18**). 27/110≈24%
- [C05] Qin Zhou*, Z.Fang*, Y. Liu, C.Tan, W.Chang and **Desheng Zhang**
EXIMIUS: A Measurement Framework for Explicit and Implicit Urban Traffic Sensing
In ACM Conference on Embedded Networked Sensor Systems (**SenSys'18**). 23/147≈15%
- [C06] Zhihan Fang*, Fan Zhang, Lin Ying, and **Desheng Zhang**
MultiCell: Urban Population Modeling based on Multiple Cellphone Networks
In ACM Conference on Pervasive & Ubiquitous Computing (**UbiComp'18**). 140/501≈27%
- [C07] Yu Yang*, Fan Zhang, and **Desheng Zhang**
SharedEdge: GPS-Free Fine-Grained Travel Time Estimation in State-Level Highway Systems
In ACM Conference on Pervasive & Ubiquitous Computing (**UbiComp'18**). 140/501≈27%
- [C08] Xiaoyang Xie*, Fan Zhang, and **Desheng Zhang**
PrivateHunt: Multi-source Data-driven Dispatching in For-Hire Vehicle Systems
In ACM Conference on Pervasive & Ubiquitous Computing (**UbiComp'18**). 140/501≈27%
- [C09] S.Wang, T.He, **Desheng Zhang**, Y.Shu, Y.Liu, Y.Gu, C.Liu, H.Lee and S.Son
BRAVO: Improving the Rebalancing Operation in Bike Sharing System with Data-Driven Apps
In ACM Conference on Pervasive & Ubiquitous Computing (**UbiComp'18**). 140/501≈27%
- [C10] Y. Yuan, **Desheng Zhang**, Fei Miao, John A. Stankovic, Tian He, George Pappas and Shan Lin.
Dynamic Integration of Heterogeneous Transportation Modes under Disruptive Events
In ACM Conference on Cyber-Physical Systems (**ICCPS'18**), 2018.
- [C11] Ruilin Liu*, Yu Yang*, Daehan Kwak, **Desheng Zhang**, Liviu Iftode, Badri Nath.
Towards Fine-Grained Parking Availability Crowdsourcing Using Parking Decision Models.
In ACM Conference on Pervasive & Ubiquitous Computing (**UbiComp'17**, 1/9 Discussion Papers)
- [C12] **Desheng Zhang**, Juanjuan Zhao, Fan Zhang, Ruobing Jiang and Tian He.
Feeder: Supporting Last-Mile Transit with Extreme-Scale Infrastructure Data.
In ACM Conference on Information Processing in Sensor Networks (**IPSN'15**). 27/110≈24%
- [C13] **Desheng Zhang**, Juanjuan Zhao, Fan Zhang, and Tian He.
UrbanCPS: Cyber-Physical System Based on Multi-Source Data with Model Integration.
In ACM/IEEE International Conference on Cyber-Physical Systems (**ICCPS'15**). 25/91≈27%
- [C14] **Desheng Zhang**, Jun Huang, Ye Li, Fan Zhang, Chengzhong Xu, and Tian He.
Exploring Human Mobility with Multi-Source Data at Extremely Large Metropolitan Scales.
In 20th ACM Conference on Mobile Computing & Networking (**MobiCom'14**). 36/220≈16%
- [C15] **Desheng Zhang**, Ye Li, Fan Zhang, Ming Lu, Yunhuai Liu, and Tian He.
coRide: Carpool Service with a Win-Win Fare Model for Taxicab Networks.
In 11th ACM Conference on Embedded Networked Sensor Systems (**SenSys'13**). 21/123≈17%

- [C16] **Desheng Zhang**, and Tian He.
pCruise: Reducing Cruising Miles for Taxicab Networks.
 In the 33rd IEEE International Real-time Systems Symposium (**RTSS'12**). 35/157≈22%
- Big-Data Analytics
- [C17] **Desheng Zhang**, Fan Zhang, and Tian He.
MultiCalib: National-Scale Traffic Model Calibration with Multi-source Incomplete Data
 In the ACM Conference on Geographic Information Systems (**SIGSPATIAL'16**). 40/217≈18%
- [C18] **Desheng Zhang**, Juanjuan Zhao, Fan Zhang, and Tian He.
coMobile: Real-time Human Mobility Modeling at Urban Scale by Multi-View Learning
 In the ACM Conference on Geographic Information Systems (**SIGSPATIAL'15**). 38/216≈18%
- [C19] **Desheng Zhang**, Ruobing Jiang, Shuai Wang, Yanmin Zhu, Bo Yang, Tian He, and Jian Cao.
Everyone Counts: Fine-Grained Digital Media Advertising in Urban Metro Systems.
 In the IEEE International Conference on Big Data (**BigData'15**). 62/363≈17%
- [C20] **Desheng Zhang**, Tian He, Shan Lin, Sirajum Munir, and John A. Stankovic.
Dmodel: Online Taxicab Passenger Demand Model from Large Roving Sensor Networks.
 In the 3rd IEEE International Congress on Big Data (**BigData'14**). 38/200≈19%
- [C21] **Desheng Zhang**, Tian He, Yunhuai Liu, and John A. Stankovic.
CallCab: a Unified Recommendation System for Carpooling and Regular Taxicab Services.
 In the IEEE International Conference on Big Data (**BigData'13**). 45/259≈17%
- Wireless Networking and Others
- [C22] **Desheng Zhang**, Tian He, Yunhuai Liu, Yu Gu, Fan Ye, Raghu K. Ganti, and Hui Lei.
Acc: Generic On-Demand Accelerations for Neighbor Discovery.
 In 10th ACM Conference on Embedded Networked Sensor Systems (**SenSys'12**). 23/123≈18%
- [C23] **Desheng Zhang**, Tian He, Fan Ye, Raghu K. Ganti, and Hui Lei.
EQS: Neighbor Discovery and Rendezvous Maintenance with Extended Quorum System.
 In 32nd International Conference on Distributed Computing Systems (**ICDCS'12**). 71/515≈13%
- [C24] **Desheng Zhang**, Jinbao Li, and Longjiang Guo.
MCR: a Dynamic and Optimal Duty Cycle Based MAC Protocol for Wireless Sensor Networks.
 In 4th Conference for Wireless Sensor Networks (**CWSN'10**). **Best Paper Award.** 1/212≈0.4%
- [C25] **Desheng Zhang**, and Tian He.
Collaborative Sensing and Control in Large-Scale Transportation Systems.
 In the Conference on Collaboration Technologies and Systems (**CTS'14**). Invited Paper
- [C26] F. Miao, S. Lin, S. Munir, J. A. Stankovic, H. Huang, **Desheng Zhang**, T. He, and G. J. Pappas.
Taxi Dispatch with Real-Time Data in Metropolitan Areas - a Receding Horizon Control Approach.
 In ACM Conference on Cyber-Physical Systems (**ICCPS'15**). **Best Paper Runner-up.** 2/91
- [C27] Jinbao Li, and **Desheng Zhang**.
M&M: A Multi-Channel MAC Protocol with Multiple Channel Reservation for Sensor Networks.
 In the Conference on Cyber-Enabled Computing (CyberC'10). **Best Paper Runner-up.** 1/297

Selected Journal Article Publications

- [J1] **Desheng Zhang**, Tian He, Fan Zhang, and Chengzhong Xu.
Urban-Scale Human Mobility Modeling with Multi-Source Urban Network Data
 In IEEE/ACM Transactions on Networking (**ToN**), 2018
- [J2] **Desheng Zhang**, Tian He, and Fan Zhang.
National-Scale Traffic Model Calibration in Real Time with Multi-source Incomplete Data
 In ACM Transactions on Cyber-Physical Systems (**TCPS**), 2018.
- [J3] F.Miao, S.Han, S.Lin, Q.Wang, J.A.Stankovic, A.Hendawi, **Desheng Zhang**, T.He, G.J. Pappas.
Data-Driven Robust Taxi Dispatch under Demand Uncertainties.
 In IEEE Transactions on Control Systems Technology (**TCST**), 2017.
- [J4] **Desheng Zhang**, Tian He and Fan Zhang.

- Real-time Human Mobility Modeling at Urban Scale by Multi-View Learning*
In ACM Transactions on Intelligent Systems and Technology (**TIST**), 2017
- [J5] **Desheng Zhang**, Ruobing Jiang, Shuai Wang, Yanmin Zhu, Bo Yang, Tian He, and Jian Cao.
Data-Driven Digital Advertising with Uncertain Demand Model in Metro Networks
In IEEE Transactions on Big Data (**TBD**), 2017.
- [J6] F.Miao, S.Han, S.Lin, J.A. Stankovic, H.Huang, **Desheng Zhang**, S.Munir, T.He, G.J. Pappas.
Taxi Dispatch with Real-Time Data in Metropolitan Areas: A Receding Horizon Control Approach.
In IEEE Transactions on Automation Science and Engineering (**TASE**), 2016.
- [J7] **Desheng Zhang**, Tian He, Shan Lin, Sirajum Munir, and John A. Stankovic.
Taxi Passenger Demand Modeling from a Roving Sensor Network.
In IEEE Transactions on Big Data (**TBD**), 2016.
- [J8] **Desheng Zhang**, Tian He, Fan Ye, Raghu K. Ganti and Hui Lei.
Neighbor Discovery and Maintenance with Extended Quorum Systems.
In IEEE Transactions on Mobile Computing (**TMC**), 2016.
- [J9] **Desheng Zhang**, Juanjuan Zhao, Fan Zhang, and Tian He.
Heterogeneous Model Integration for Multi-Source Infrastructure Data.
In ACM Transactions on Cyber-Physical Systems (**TCPS**), 2016.
- [J10] **Desheng Zhang**, Juanjuan Zhao, Fan Zhang, Ruobing Jiang and Tian He.
Last-Mile Transit Service with Urban Infrastructure Data.
In ACM Transactions on Cyber-Physical Systems (**TCPS**), 2016.
- [J11] **Desheng Zhang**, Fan Zhang, Ming Lu, Yunhuai Liu, and Tian He.
Carpool Service for Large-Scale Taxicab Networks.
In ACM Transactions on Sensor Networks (**TOSN**), 2016.
- [J12] **Desheng Zhang**, Tian He, Yunhuai Liu, Yu Gu, Fan Ye, Raghu K. Ganti, and Hui Lei.
Generic Neighbor Discovery in Mobile Applications.
In ACM Transactions on Sensor Networks (**TOSN**), 2015.
- [J13] **Desheng Zhang**, Tian He, Lin Shan, Sirajum Munir, and John A. Stankovic.
Online Cruising Mile Reduction for Large-Scale Taxicab Networks.
In the IEEE Transactions on Parallel and Distributed Systems (**TPDS**), 2015.
- [J14] **Desheng Zhang**, Tian He, Yunhuai Liu, and John A. Stankovic.
A Unified Recommendation System for Carpooling and Regular Taxicab Services.
In the IEEE Transactions on Emerging Topics in Computing (**TETC**), 2014.

Conference Poster Publications

- [P1] Zhihan Fang and **Desheng Zhang**.
Human Mobility Modeling on Metropolitan Scale Based on Multiple Cellphone Networks
In ACM/IEEE Conference on Internet-of-Things Design and Implementation (**IoTDI'17**).
- [P2] **Desheng Zhang**, and Tian He.
USN: an Extremely Large Sensor Network based on Urban Infrastructures for Smart Cities
In the 14th ACM Conference on Embedded Networked Sensor Systems (**SenSys'16**).
- [P3] F.Miao, S.Han, S.Lin, J.Stankovic, Q.Wang, **Desheng Zhang**, T.He and George Pappas
Data-Driven Robust Taxi Dispatch Approaches
In ACM/IEEE International Conference on Cyber-Physical Systems (**ICCPS'16**).
- [P4] **Desheng Zhang**, and Tian He.
Improving Efficiency of Metropolitan-Scale Transit Systems with Multi-Mode Data Feeds.
In the 12th ACM Conference on Mobile Systems, Applications, and Services (**MobiSys'14**).
- [P5] **Desheng Zhang**, Tian He, Yunhuai Liu, Yu Gu, Fan Ye, and Raghu K. Ganti.
Neighbor Discovery with Distributed Quorum System.
In the 9th ACM Conference on Embedded Networked Sensor Systems (**SenSys'11**).
- [P6] **Desheng Zhang**, Tian He, Fan Ye, Raghu K. Ganti and Hui Lei.
Where Is the Crowd?: Crowdedness Detection Scheme for Mobile Crowdsensing Applications.
In the IEEE Conference on Computer Communication (**INFOCOM'11**). **Best Poster Award**.

Professional Activities

Invited Research Talk

Urban Cyber-Physical Systems: Nanyang Technological University	10.2018
Urban Cyber-Physical Systems: University of Virginia	8.2018
Urban Cyber-Physical Systems: Northeastern University	8.2018
Urban Cyber-Physical Systems: Columbia University	12.2017
Urban Cyber-Physical Systems: Peking University: Data Science Center	8.2017
Urban Cyber-Physical Systems: DIMACS	4.2017
Urban Cyber-Physical Systems: University of Maryland	5.2016
Urban Cyber-Physical Systems: University of Oregon	5.2016
Urban Cyber-Physical Systems: University of Illinois	4.2016
Urban Cyber-Physical Systems: Indiana University	4.2016
Urban Cyber-Physical Systems: Carnegie Mellon University (Computer Science)	3.2016
Urban Cyber-Physical Systems: University of Texas	3.2016
Urban Cyber-Physical Systems: Rutgers University	3.2016
Urban Cyber-Physical Systems: Case Western Reserve University	3.2016
Urban Cyber-Physical Systems: Vanderbilt University	3.2016
Urban Cyber-Physical Systems: Georgia Tech	2.2016
Urban Cyber-Physical Systems: Florida State University, University of Mississippi	2.2016
Urban Cyber-Physical Systems: University of California	2.2016
Urban Cyber-Physical Systems: Carnegie Mellon University (Heinz College)	2.2016
Urban Cyber-Physical Systems: Virginia Tech	2.2016
Urban Cyber-Physical Systems: University of Georgia, University of Alabama	2.2016
Urban Cyber-Physical Systems: Case Western Reserve University	1.2016
Urban Cyber-Physical Systems: Georgia State University, University of Memphis	1.2016
Urban Cyber-Physical Systems: City University of New York	12.2015
Mobile Cyber-Physical Systems: University at Buffalo	9.2015
Mobile Cyber-Physical Systems: Hong Kong Polytechnic University	9.2015
Mobile Cyber-Physical Systems: Tsinghua University	8.2015
Mobile Cyber-Physical Systems: Peking University	8.2015
Mobile Cyber-Physical Systems: Chinese Academy of Sciences	8.2015
Mobile Cyber-Physical Systems: New York University	6.2015
Mobile Cyber-Physical Systems: IBM Research	6.2015
Mobile Cyber-Physical Systems: MIT	5.2015
Mobile Cyber-Physical Systems: Northeastern University	5.2015
Mobile Cyber-Physical Systems: Boston University	5.2015
Mobile Cyber-Physical Systems: Microsoft Research	4.2015
International Conference on Collaboration Technologies and Systems	5.2014

PC Chairs

IEEE Workshop on Mission-Oriented Wireless Sensor & Cyber-Physical System Networking	8.2017
27th Conference on Computer Communications and Networks - Bigdata Track (ICCCN)	9.2018

Paper Reviews

Scientific Reports, Nature	6.2017
ACM Proceedings on Interactive, Mobile, Wearable & Ubiquitous Technologies (IMWUT)	5.2017
ACM Transactions on Cyber Physical Systems (ACM TCPS)	9.2016
IEEE/ACM Transactions on Networking (IEEE ToN)	9.2016
IEEE Transactions on Mobile Computing (IEEE TMC)	9.2015
IEEE Transactions on Parallel and Distributed Systems (IEEE TPDS)	1.2014
IEEE Transactions on Intelligent Transportation Systems (IEEE ITS)	9.2016
IEEE Transactions on Services Computing (IEEE TSC)	5.2016
IEEE Transactions on Emerging Topics in Computing (IEEE TETC)	2.2016
IEEE Internet of Things Journal (IEEE IoT)	11.2014
IEEE Conference on Computer Communications (INFOCOM 15,16,17)	8./9.16
COMNET, IJSNet, ICDCS 11&14	6.2014

Program Committee

ACM/IEEE International Conference on Embedded Networked Sensor Systems (SenSys)	2.2018
ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS)	8.2017
IEEE Conference on Sensing, Communication & Networking (SECON)	3.2017
International Conference on Computer Communications & Networks (ICCCN)	3.2017
ACM Symposium on Applied Computing (SAC)	8.2016
International Conference on Embedded Wireless Systems and Networks (EWSN)	5.16/17
IEEE Workshop on Smart Service Systems (SmartSys)	12.15/16
International Conference on Computational and Network Technologies (ICCNT)	2.2014
International Wireless Sensor Networks Workshop (IWSN)	8.2012

Conference Presentation

38 Professional Research Presentations in 7 Years	09-16
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Proposal Review Services

2 NSF Panelist for NSF Proposal Review	2018
Research Proposal Review for Israel Science Foundation	2018

Rutgers Services

Co-Chair for PhD Admission Committee	9.2018
Committee Members for Master Admission	9.2017
Committee Members for PhD Admission	9.2017
Committee Members for Infrastructure	1.2018
Committee Members for Faculty Hiring	1.2018

Teaching Experiences

● Rutgers CS352: Internet Technology	9.2017
● Rutgers CS671: Data-Driven Cyber Physical Systems for Smart Cities	1.2017/2.2018
● Rutgers CS671: Data Science for Smart Cities	10/2018