



# Shengjun(Daniel) Zhang

RESEARCH ASSISTANT · CONTROL · OPTIMIZATION · STATISTICAL LEARNING

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| 🎓 Shengjun(Daniel) Zhang

*"There is nothing more practical than a good theory."*

## Education

### UNT (University of North Texas)

PH.D. MAJOR IN ELECTRICAL ENGINEERING

- Minor in Business Management

*Denton, Texas, U.S.A*

*Jan. 2018 - May 2022*

### NYU (New York University)

M.S. IN ELECTRICAL ENGINEERING

- Robotic Control

*New York, New York, U.S.A*

*Jan. 2015 - Jan. 2017*

### CAU (China Agricultural University)

B.S. IN AUTOMATION OF HONORS PROGRAM WITH *Cum Laude*

- Control Theory

*Beijing, China*

*Sep. 2010 - Jul. 2014*

## Research Interests

#### Learning

Statistical Learning, Machine Learning, Reinforcement Learning

#### Control & Optimization

Control System, Convex Optimization, Non-convex Optimization, Distributed Optimization

#### Power System

DERs with Transactive Approaches

## Skills

#### Programming

Julia, Python, MATLAB

#### Languages

Mandarin, English

## Work Experience

### Huazhong University of Science and Technology

POSTDOCTORAL RESEARCHER

- School of Artificial Intelligence and Automation
- Supervisor: Dr. Ye Yuan

*Wuhan, China*

*May 2022 - Sep. 2022*

### Pacific Northwest National Laboratory

RESEARCH SCIENTIST INTERN

- Optimization and Control Group
- Supervisor: Dr. Ke Ma

*Remote*

*Jun. 2021 - Aug. 2021*

## Professional Experience

### University of North Texas

RESEARCH/TEACHING ASSISTANT

- Optimization, Signal, Control, and Algorithms Research (OSCAR) Laboratory, Department of Electrical Engineering
- Supervisor: Dr. Colleen Bailey & Dr. Tao Yang (Former advisor)

*Denton, Texas, U.S.A*

*Jan. 2018 - present*

### Huazhong University of Science and Technology

VISITING RESEARCHER

- Key Laboratory of Image Processing and Intelligent Control of Education Ministry, School of Artificial Intelligence and Automation
- Supervisor: Dr. Ye Yuan

*Wuhan, China*

*May 2018 - Jul. 2018*

## Zhejiang University

VISITING RESEARCHER

- Group of Networked Sensing and Control, College of Control Science and Engineering
- Supervisor: Dr. Junfeng Wu

Hangzhou, China

Jul. 2018 - Jul. 2018

## New York University

RESEARCH ASSISTANT

- Control/Robotics Research Laboratory, Tandon School of Engineering
- Supervisor: Dr. Farshad Khorrami

New York, New York, U.S.A

Jan. 2016 - Jul. 2016

## Publications

### JOURNAL ARTICLES [9]

Communication Compression for Distributed Nonconvex Optimization

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson  
*IEEE Transactions on Automatic Control* (Under Review). 

Under Review

Zeroth-Order Stochastic Coordinate Methods for Decentralized Non-convex Optimization

Shengjun Zhang, Tan Shen, Yunlong Dong, Heng Zhang  
*IEEE Signal Processing Letters* (Under Review). 

Under Review

A Primal-Dual SGD Algorithm for Distributed Nonconvex Optimization

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson  
*IEEE/CAA Journal of Automatica Sinica* 9.5 (2022) pp. 812–833. 

DOI: 10.1109/JAS.2022.105554

2022

Sublinear and Linear Convergence of ADMM for Distributed Nonconvex Optimization

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson  
*IEEE Transactions on Control of Network Systems* (2022). 

DOI: 10.1109/TCNS.2022.3186653

2022

Zeroth-order Algorithms for Distributed Stochastic Nonconvex Optimization

Xinlei Yi, Shengjun Zhang, Tao Yang, Karl H Johansson  
*IFAC Automatica* 142 (2022) p. 110353. 

DOI: 10.1016/j.automatica.2022.110353

2022

Variance aware reward smoothing for deep reinforcement learning

Yunlong Dong, Shengjun Zhang, Xing Liu, Yu Zhang, Tan Shen  
*Neurocomputing* 458 (2021) pp. 327–335. 

DOI: 10.1016/j.neucom.2021.06.014

2021

Event-triggered Distributed Optimization Algorithms (in Chinese)

Tao Yang, Lei Xu, Xinlei Yi, Shengjun Zhang, Ruijuan Chen, Yuzhe Li  
*ACTA Automatica Sinica* 47.x (2021) pp. 1–11. 

DOI: 10.16383/j.aas.c200838

2021

Linear Convergence of First- and Zeroth-Order Primal-Dual Algorithms for Distributed Nonconvex Optimization

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H. Johansson  
*IEEE Transactions on Automatic Control* (2021) pp. 1–8. 

DOI: 10.1109/TAC.2021.3108501

2021

A Magnetic Nanoparticle Based Nucleic Acid Isolation And Purification Instrument for DNA Extraction of Escherichia coli O157: H7

Yahui Chen, Jianhan Lin, Qin Jiang, Qi Chen, Shengjun Zhang, Li Li  
*Journal of nanoscience and nanotechnology* 16.3 (2016) pp. 2296–2300. 

DOI: 10.1166/jnn.2016.10933

2016

### CONFERENCE PROCEEDINGS [11]

Accelerated Zeroth-order Algorithm for Stochastic Distributed Nonconvex Optimization

Shengjun Zhang, Colleen P. Bailey  
*2022 American Control Conference (ACC)* 

DOI: 10.23919/ACC53348.2022.9867306

Atlanta, GA, United States

2022

Event-Triggered Proportional-Integral Algorithms for Distributed Optimization (Invited Session Extended Abstract)

Tao Yang, Lei Xu, Xinlei Yi, Shengjun Zhang, Yuzhe Li  
*40th Chinese Control Conference (CCC)*

Shanghai, China

2021

A Primal-Dual Algorithm for Distributed Sparse Principal Component Analysis

Shengjun Zhang, Colleen P. Bailey  
*2021 IEEE International Conference on Data Science and Computer Application* 

DOI: 10.1109/ICDSCA53499.2021.9650142

Dalian, China

2021

## Accelerated Primal-Dual Algorithm for Distributed Nonconvex Optimization

Shengjun Zhang, Colleen P. Bailey

2021 IEEE Symposium Series on Computational Intelligence (SSCI) 

DOI: 10.1109/SSCI50451.2021.9660023

Orlando, FL, United States

2021

## Convergence Analysis of Nonconvex Distributed Stochastic Zeroth-order Coordinate Method

Shengjun Zhang, Yunlong Dong, Dong Xie, Lisha Yao, Colleen P. Bailey, Shengli Fu

60th IEEE Conference on Decision and Control (CDC) 

DOI: 10.1109/CDC45484.2021.9683475

Austin, TX, United States

2021

## Exponential Convergence for Distributed Smooth Optimization Under the Restricted Secant Inequality Condition

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson

21st IFAC World Congress 

DOI: 10.1016/j.ifacol.2020.12.383

Berlin, Germany

2020

## Linear Convergence for Distributed Optimization Without Strong Convexity

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson

59th IEEE Conference on Decision and Control (CDC) 

DOI: 10.1109/CDC42340.2020.9304381

Jeju Island, Republic of Korea

2020

## Obstacle Avoidance and Navigation Utilizing Reinforcement Learning with Reward Shaping

Shengjun Zhang, Colleen P. Bailey

SPIE Artificial Intelligence and Machine Learning for Multi-Domain Operations Applications II 

DOI: 10.1117/12.2558212

California, United States

2020

## Optimal Control Under Communication Constraints for Multi-agent Unmanned Vehicles

Shengjun Zhang, Colleen P. Bailey

SPIE Artificial Intelligence and Machine Learning in Defense Applications II 

DOI: 10.1117/12.2574176

Edinburgh, United Kingdom

2020

## Event-Triggered Control for Consensus of Multi-Agent Systems with Nonlinear Output and Directed Topologies

Xinlei Yi, Shengjun Zhang, Tao Yang, Junfeng Wu, Karl Henrik Johansson

38th Chinese Control Conference (CCC) 

DOI: 10.23919/ChiCC.2019.8865399

Guangzhou, China

2019

## Computational Convergence Analysis of Distributed Optimization Algorithms for Directed Graphs

Shengjun Zhang, Xinlei Yi, Jemin George, Tao Yang

15th IEEE International Conference on Control and Automation (ICCA)  (Best Student Paper Shorten List)

DOI: 10.1109/ICCA.2019.8899565

Edinburgh, Scotland

2019

## Honors & Awards

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2021 **Student Travel Award**, The 60<sup>th</sup> IEEE Conference on Decision and Control (CDC)

Austin, Texas, U.S.A

2020 **Third Place Graduate Student Poster Competition**, IEEE North Tech SAS

Denton, Texas, U.S.A

2019 **IEEE Outstanding Graduate Student**, IEEE local event

Denton, Texas, U.S.A

2019 **College of Engineering Dean Tuition Scholarship**, UNT

Denton, Texas, U.S.A

2019 **Toulouse Graduate School Scholarship**, UNT

Denton, Texas, U.S.A

2018 **College of Engineering Dean Tuition Scholarship**, UNT

Denton, Texas, U.S.A

2018 **Toulouse Graduate School Scholarship**, UNT

Denton, Texas, U.S.A

2012 **2<sup>nd</sup> prize**, National Physics Experiment Competition of Colleges

Beijing, China

## Certifications

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2016 **Machine Learning**, Instructor: Andrew Ng, license: NNBCAXYFA2HK.

Stanford University

on Coursera

## Teaching Experiences

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Spring '22 **EENG 5810 Digital Communications**, Teaching Assistant

Spring '22 **EENG 3920 Modern Communication System Design Project**, Teaching Assistant

Spring '22 **EENG 3510 Electronics I**, Teaching Assistant

Fall '21 **EENG 3510 Electronics I**, Teaching Assistant

Fall '21 **EENG 3520 Electronics II**, Teaching Assistant

Fall '21 **EENG 3920 Modern Communication System Design Project**, Teaching Assistant

Fall '20 **EENG 5940 Optimization Theory**, Teaching Assistant

Spring '19 **EENG 2620 Signals and Systems**, Teaching Assistant

Fall '18 **EENG 2620 Signals and Systems**, Teaching Assistant

Fall '18 **EENG 5940 Control and Optimization for Power Systems**, Teaching Assistant

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## Professional Activities

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|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Member</b>              | IEEE HKN, IEEE Studnet Member, IEEE Young Professionals                                                                                                                                                                                                                                                                               |
| <b>Journal Reviewer</b>    | IEEE Transactions on Automatic Control<br>IEEE Transactions on Control of Network Systems<br>IEEE Transactions on Industrial Electronics<br>IEEE Transactions on Neural Networks and Learning Systems<br>IET Control Theory and Applications<br>Neurocomputing<br>Automatica<br>International Journal of Robust and Nonlinear Control |
| <b>Conference Reviewer</b> | Advances in Neural Information Processing Systems (NeurIPS)<br>IEEE Conference on Decision and Control (CDC)<br>American Control Conference (ACC)<br>IEEE International Conference on Control and Automation (ICCA)<br>Chinese Control Conference (CCC)                                                                               |
| <b>Conference Chair</b>    | Co-Chair (Substitute Dr. Tao Yang) of Distributed Optimization and Learning for Networked Systems II at CDC 2021                                                                                                                                                                                                                      |

## Mentoring

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### Kelvin Darden

M.S. STUDENT

- Project on load shedding in Smart Grid.
- First placement: engineer, Oncor Electric Delivery.

UNT

2018