



# 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)

*Denton, Texas, U.S.A*

PH.D. MAJOR IN ELECTRICAL ENGINEERING

*Jan. 2018 - present*

- Minor in Business Management

### NYU (New York University)

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

M.S. IN ELECTRICAL ENGINEERING

*Jan. 2015 - Jan. 2017*

- Robotic Control

### CAU (China Agricultural University)

*Beijing, China*

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

*Sep. 2010 - Jul. 2014*

- Control Theory

## 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

### Pacific Northwest National Laboratory

*Remote*

RESEARCH SCIENTIST INTERN

*Jun. 2021 - Aug. 2021*

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

## Professional Experience

### University of North Texas

*Denton, Texas, U.S.A*

RESEARCH/TEACHING ASSISTANT

*Jan. 2018 - present*

- Cyber-Physical Energy System Laboratory, Department of Electrical Engineering
- Supervisor: Dr. Colleen Bailey & Dr. Tao Yang

### Huazhong University of Science and Technology

*Wuhan, China*

VISITING RESEARCHER

*May 2018 - Jul. 2018*

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

## 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 Khorrarni

New York, New York, U.S.A

Jan. 2016 - Jul. 2016

## Publications


### JOURNAL ARTICLES [8]

#### A Primal-Dual SGD Algorithm for Distributed Nonconvex Optimization

Xinlei Yi, Shengjun Zhang, Tao Yang, Tianyou Chai, Karl H Johansson  
*SIAM Journal on Optimization* (Under Review). 

Under Review

#### Zeroth-order Algorithms for Distributed Stochastic Nonconvex Optimization

Xinlei Yi, Shengjun Zhang, Tao Yang, Karl H Johansson  
*IFAC Automatica* (Under Review). 

Under Review

#### Distributed Zeroth-order Stochastic Coordinate Methods

Shengjun Zhang, Yunlong Dong, Dong Xie, Lisha Yao, Colleen P. Bailey, Shengli Fu  
*IEEE Transactions on Signal Processing* (In Submission)

. In Submission

#### 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* (Conditionally Accepted)


. Conditionally Accepted

#### Variance aware reward smoothing for deep reinforcement learning

Yunlong Dong, Shengjun Zhang, Xing Liu, Yu Zhang, Tan Shen  
*Neurocomputing* 458 (2021) pp. 327–335. Elsevier.   
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. Science Press.   
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. American Scientific Publishers.   
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)* 

Atlanta, GA, United States

Under Review

#### 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*

Dalian, China


2021

#### Accelerated Primal-Dual Algorithm for Distributed Nonconvex Optimization

Shengjun Zhang, Colleen P. Bailey

**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) 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

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

2016 **Machine Learning**, Instructor: Andrew Ng, license: NNBCAXYFA2HK.Stanford University  
on Coursera

## Teaching Experiences

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

UNT

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

UNT

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

UNT

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

UNT

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

UNT

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

UNT

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

UNT

## Professional Activities

<b>Member</b>	IEEE HKN, IEEE Studnet Member, IEEE Young Professionals
<b>Journal Reviewer</b>	IEEE Transactions on Automatic Control IEEE Transactions on Control of Network Systems IEEE Transactions on Industrial Electronics IET Control Theory and Applications Neurocomputing Automatica International Journal of Robust and Nonlinear Control
<b>Conference Reviewer</b>	Advances in Neural Information Processing Systems (NeurIPS) IEEE Conference on Decision and Control (CDC) American Control Conference (ACC) IEEE International Conference on Control and Automation (ICCA) 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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<b>Kelvin Darden</b>	UNT
M.S. STUDENT	2018
<ul style="list-style-type: none"> <li>Project on load shedding in Smart Grid.</li> <li>First placement: engineer, Oncor Electric Delivery.</li> </ul>	