Zhibin Zou

✉ zzou2@albany.edu | 🏠 www.zhibinzou.com | in zhibin-zou-8665851a4 | 📍 Albany, NY, USA

Education

University at Albany, State University at New York   *Albany, NY, USA*
PhD in Electrical and Computer Engineering   Sep. 2019 - Present

- Advised by Weifu Wang from Sep. 2019 - Dec. 2020
- Advised by Aveek Dutta from Jan. 2021 - Present
- GPA: 4.0/4.0
- Selected Courses: Advanced Digital Communication, Modern Wireless Network, Machine Learning and Information Theory, Probability and Random Process, Digital Signal Processing, Statistical Signal Processing, Engineering Optimization, Parameter Estimation and Signal Detection Theory, Discrete Mathematics with Applications, Cyber-Physical Systems, Linear Control Theory, Robotics.

Xidian University   *Xi'An, China*
MS in Electrical and Computer Engineering   Sep. 2016 - Jun. 2019

Xidian University   *Xi'An,, China*
BS in Electrical and Computer Engineering   Sep. 2012 - Jun. 2016

Publications

Journals

[1] **Z Zou**, M Careem, A Dutta, N Thawdar. "Joint Spatio-Temporal Precoding for Non-Stationary Channels, " *IEEE Transactions on Communications (TCOM)* (Under Review) [pdf]

[2] **Z Zou**, L Song, X Cheng. "Labeled box-particle CPHD filter for multiple extended targets tracking," *Journal of Systems Engineering and Electronics* [pdf]

[3] X Cheng, L Song, H Ji, **Z Zou**. "Group target tracking algorithm based on labeled box particle probability hypothesis density ," *Systems Engineering and Electronics* (in Chinese) [pdf]

Conferences

[1] **Z Zou**, A Dutta. "Multidimensional Eigenwave Multiplexing Modulation for Non-stationary Channels," *IEEE International Conference on Communications (ICC), 2022* (Under Review)

[2] **Z Zou**, X Wei, D Saha, A Dutta, G Hellbourg. "SCISRS: Signal Cancellation using Intelligent Surfaces for Radio Astronomy Services," *IEEE Global Communications Conference (GLOBECOM), 2022* [pdf]

[3] **Z Zou**, M Careem, A Dutta, N Thawdar. "Unified Characterization and Precoding for Non-Stationary Channels," *IEEE International Conference on Communications (ICC), 2022* [**Best Paper Award**] [pdf]

[4] X Cheng, L Song, **Z Zou**. "Multiple group target tracking with evolving networks and labeled box particle PHD filter," *Chinese Control And Decision Conference (CCDC), 2018* [pdf]

[5] **Z Zou**, L Song, X Cheng. "Labeled box-particle PHD filter for multi-target tracking," *IEEE International Conference on Computer and Communications (ICCC), 2017* [pdf]

Patents

[1] L Song, Y Pan, **Z Zou**, et al. "Passive Box-particle PHD multi-target tracking based on TDOA," *CN Patent*, Application Number 201810825869.8, Patent Number CN108981707B (Issued) [Link]

[2] L Song, H Cent, Y Pan, P Yang, **Z Zou**, et al. "A evaluation for the multple group and extended target ellipse shape estimation," *CN Patent*, Application Number 201811640647.5, Patent Number CN109683150A (Filed) [Link]

[3] L Song, P Yang, H Ceng, Y Pan, **Z Zou**, et al. "Front vehicles distance measuring based on deep learning," *CN Patent*, Application Number 201811322870.5, Patent Number CN109509223A (Filed) [Link]

Preprints

[1] **Z Zou**. "Optimizing towards the best insertion-based error-tolerating joints," arXiv:2209.15147 [pdf] | [video]

Qualifications

- PhD Scholar in Electrical and Computer Engineering
- 5+ years of research experience on Signal Processing and Communications
- 10+ technique publications on wireless communications, signal processing and target tracking
- Best paper award at prestigious IEEE conference, full Scholarship awards, two Chinese national scholarship awards, a granted CN patent
- GPA 4.0/4.0 and strong knowledge of MIMO, OFDM, wireless communications, DSP, signal processing, probability, and optimization.
- Programming Skills on Matlab, Julia, Python, experimental skills on software defined radio (SDR), single chip processors (Raspberry pi) and micro-controllers (Arduino)

Research Projects

NSF CAREER: "Generalizing Deep Learning for Wireless Communication"
MESA Lab, SUNY Albany

This project aims to generalizes the architecture of a Deep Learning (DL) based wireless transceiver that will consistently operate with low error rate in all types of wireless channels, but especially outperform the state of the art in future xG channels. My contributions of this work is summarized as:

June. 2021 - Present

- Derived a High-order Generalized Mercer's Theorem (HOGMT) for non-stationary channels decomposition
- Proposed a unified characterization method for non-stationary channels
- Proposed a HOGMT based spatio-temporal precoding to cancel spatial, temporal and jointly spatio-temporal interference

NSF SWIFT: "Collaborative RFI Cancellation for Radio Astronomy"
MESA Lab, SUNY Albany

This project focuses on active interference cancellation at the telescope supported by active bidirectional collaboration between the telescope and neighboring cellular networks. Currently, I am working on

June. 2022 - Present

- Ongoing work on modeling the autoencoder for RFI cancellation at telescope with shared RFI from the base station
- Ongoing work on the nonlinear expression for the RFI sharing by Bussgang theorem

NSF SWIFT: "SCISRS: Signal Cancellation using Intelligent Surfaces for Radio Astronomy Services"
MESA Lab, SUNY Albany

The objectives of this project are to accurately estimate the RFI incident at the telescope and to configure the RIS so the reflected signal arriving at the telescope receiver precisely cancels the incident RFI. My contributions are:

Apr. 2022 - Present

- Assisted in preparing the project proposal
- Proposed a phase and energy solution for RIS elements to cancel RFI
- Proposed a error bound for the given location error

NSF Collaborative Research: RI: Medium: " Robust Assembly of Compliant Modular Robots"
Weifu Wang's Lab, SUNY Albany

This project explores how flexible robots can be designed to move and join together to form larger structures, such as temporary antennas, tent supports, bridges, or tunnel reinforcements. My contributions are:

Apr. 2019 - Dec. 2020

- Defined the point-edge contact model for peg-in-hole problem
- Proposed an optimization for error-tolerating peg and socket joints with respect to insertion and stability

Random Finite Sets based Multi-target Tracking
Liping Song's Lab, SUNY Albany

The objective of this project is to design Random Finite Sets (RFS) based filters for multi-target tracking, multiple extended targets tracking, and multiple group targets tracking. My contributions summarized as:

Sep. 2016 - May. 2019

- Proposed a labeled box-particle Probability Hypothesis Density (PHD) filter for multi-target tracking
- Implement a Cardinalized Probability Hypothesis Density (CPHD) filter for multiple extended/group target tracking

Highlights

- Invited to presenting my work at the Special Technical Session in IEEE ICC 2022
- Assisted in preparing the funded project NSF SWIFT No. 2229497
- Reviewer of IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- Reviewer of International Conference on Computer Science and Application Engineering (CSAE)

Experience

Research Assistant

MESA Lab, University at Albany, SUNY   2021-Present

Research focuses on Precoding, Non-stationary Channel, Channel Decomposition, RFI Cancellation, RIS, Autoencoder

Research Assistant

Weifu Wang's Lab, University at Albany, SUNY   2019-2020

Research focuses on Robotics, Block Optimization

Research Assistant

Liping Song's Lab, Xidian University   2016-2019

Research focuses on Target Tracking, Random Finite Sets Theory, Box-Particle Filter

Awards and Honors

Jun. 2022	**Young Gladiator**: "Funded by Institute for the Wireless Internet of Things at Northeastern University"
May. 2022	**Best Paper Award, IEEE ICC**: "IEEE ICC is the flagship conference of IEEE ComSoc"
Sep. 2020	**Granted Chinese Patent**: "Patent (CN 108981707B) filed at Jul. 2018 is granted at Sep. 2020"
Nov. 2018	**National Scholarship, China**: "Highest level scholarship for students in China"
Dec. 2017	**Excellent Graduate Student, Xidian University**
Nov. 2017	**National Scholarship, China**: "Highest level scholarship for students in China"

Skills

Expertise	MIMO, OFDM, Precoding, Signal Processing, Spectrum Analysis, Machine Learning, Target Tracking, Bayesian Filter
Instrument Skills	Raspberry Pi, Software Defined Radios (SDR), Blender
Programming	Matlab, Julia, Python
Languages	English, Chinese (Native)

References

- Prof. Aveek Dutta
  Ph. D, Assistant Professor, University at Albany SUNY, Albany, NY, USA
  📞 +1(518)442-5083   ✉ adutta@albany.edu
- Prof. Dola Saha
  Ph. D, Assistant Professor, University at Albany SUNY, Albany, NY, USA
  📞 +1(303)638-3752   ✉ dsaha@albany.edu