

## Education

August 2015 **Northwestern Polytechnical University**, Xi'an, China.

– July 2019 B.Eng. in Information Engineering

**GPA:** 89/100, **Rank:** 1/50

August 2019 **University of Michigan**, Ann Arbor, MI.

– April 2021 M.Eng.(Expected) in Electrical and Computer Engineering

**GPA:** 4.0/4.0

## Publications and/or Manuscripts

April 2020 **Modelling learning in C. elegans chemosensory and locomotive circuitry for T-maze navigation**

Sakelaris B., **Sun J.\***, Li Z.\*, Banerjee S., Booth V. and Gourgou E. \*co-second author

## Research Experiences

Sep 2019 **Image Processing to decipher C. elegans locomotion in mazes**,

– Present Advisor: Research Scientist [Eleni Gourgou](#).

Working on finding the motion trails of the elegans

- Use the Chan-Vese active contour method and SVD to extract contours of the maze
- By the Procrustes Transformation method, a T-shape polygon is rotated and shifted to have maximal overlap with the extracted contour
- Apply the Frame Difference method to find motion trails of the elegans
- Use the K-Nearest Neighbor (KNN) algorithm to smooth the motion trails

Jan 2020 **Deep Neural Network for Spectrum Unfolding**,

– Present Advisor: Professor [Alfred Hero](#).

Working on Recurrent Neural Network (RNN) algorithm

- Propose the RNN architecture that mimics project gradient descent method from optimization theory
- Complete the Recurrent Neural Network code by Pytorch

March 2018 **Differential Microphones Arrays based on Differential Equation**,

– June 2018 Advisor: Professor [Jie Chen](#) and Professor [Lijun Zhang](#).

Worked on Differential Microphones Arrays based on Differential Equation

- Proved that the polynomial of sinusoidal function is the solution of a differential equation and the differential equation corresponding to LDMA and CDMA are same

May 2017 – **Distributed PCA by the Primal-Dual Method of Multipliers (PDMM)**,

October 2017 Advisor: Professor [Jie Chen](#).

Worked on Distributed Optimization Algorithm

- Distributed PCA method can be obtained by simply approximating the global correlation matrix via the Average Consensus Algorithm subroutine, so matrices are divided in columns
- Eigenvalue decomposition of the correlation matrix and reduced its dimension to p-dim by PDMM algorithm
- Programmed in Matlab to accomplish Distributed PCA

## Selected Awards and Honors

- November 2018 **Honorable Mention of the International Mathematical Contest in Modeling.**
- November 2017 **First Prize Scholarship,** Northwestern Polytechnical University.  
Top 15% in 200 students
- November 2016 **National Scholarship,** Northwestern Polytechnical University.  
0.2% national wide)

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## Selected Course Projects

- March 2018 **Development of Microphone Orientation System.**  
Achieved communication between two computers. Achieved source coding by ASIC code and adopted 2FSK modulation based on MATLAB.
- January 2018 **Communication System Design.**  
Accomplished acoustic localization by Conventional Beamforming method and Direction of Arrival (DOA) location method

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## Skills

**Programming Languages:** Matlab, Julia, Python, Bash, HTML, Latex, Pytorch