

SONGJIE XIE

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EDUCATION

ShanghaiTech University, Shanghai, China

Sep. 2020 - June 2023 (expected)

M.S. Candidate in Information and Communication Engineering

GPA: 3.59/4.0, Thesis Advisor: Prof. [Youlong Wu](#)

ShanghaiTech University, Shanghai, China

Sep. 2016 - June 2020

B.Eng. in Electronic and Information Engineering

GPA: 3.62/4.0

My research interests lie in **Information Theory** and **Machine Learning** with a focus on Semantic Communication and Trustworthy Machine Learning.

PUBLICATIONS

- [1] **S. Xie**, Y. Wu, S. Ma, M. Ding, Y. Shi, and M. Tang. “Robust Information Bottleneck for Task-Oriented Communication with Digital Modulation.” Accepted with minor revision by *IEEE Journal on Selected Areas of Communication (JSAC)*. [[Paper](#)] [[Code](#)]
- [2] **S. Xie**, Y. Wu, K. Liao, L. Chen, C. Liu, H. Shen, M. Tang, and L. Sun. “Fed-SC: One-Shot Federated Subspace Clustering over High-Dimensional Data.” in Proceedings of the *39th IEEE International Conference on Data Engineering (ICDE 2023)*, 2023, Anaheim, California, USA. [[Code](#)]
- [3] T. Rui, **S. Xie**, and Y. Wu. “On the Achievable Rate Region of the K-Receiver Broadcast Channels via Exhaustive Message Splitting.” *Entropy* 23.11 (2021): 1408. [[Paper](#)]

PREPRINTS AND MANUSCRIPTS

- [a] **S. Xie**, J. Li, M. Ding, and Y. Wu. “Towards Privacy and Fairness: Non-Adversarial Representation Learning with Local Differential Privacy for Information Obfuscation” in preparation.

RESEARCH EXPERIENCE

Network Intelligence Center, ShanghaiTech University, advised by Prof. [Youlong Wu](#) 2020-present

- **Project: Robust Task-oriented Communication with Digital Modulation**

Research Assistant, co-advised by Profs. [Ming Ding](#) (Data61, CSIRO) & [Shuai Ma](#) (Telecom Paris).

- Proposed Robust Information Bottleneck (RIB), a robust framework formulating the informativeness-robustness tradeoff in the encoded representation and a task-oriented communication scheme with digital modulation [[1](#)].

- **Project: Federated Subspace Clustering**

Research Assistant, co-advised by Profs. [Kewen Liao](#) (Australian Catholic University) & [Lu Chen](#) (Swinburne University of Technology)

- Proposed Fed-SC, a one-shot federated subspace clustering scheme for high-dimensional data, with theoretical guarantees on the effectiveness of Fed-SC and verified that a notion of data heterogeneity can benefit the federated subspace clustering [[2](#)].

- **Project: The Achievable Rate Region of the K -Receiver Broadcast Channels**

Research Assistant

- Verified the performance of the exhaustive message splitting scheme by deriving the inner bound on the capacity region of 3-receiver DM-BC, and contributed to theoretical analysis on the achievable rate region of the K -receiver discrete-time memoryless broadcast channels (DM-BCs) [3].

Smart Medical Information Research Center, ShanghaiTech University

2020-2021

- **Project: Data-driven Modeling of Epigenetic Landscape based on Information Theory**

Research Assistant, advised by Profs. [Jie Zheng](#) & [Youlong Wu](#)

- Investigated data-driven frameworks for constructing the epigenetic landscape from single-cell RNA-seq data to recover the pseudotime ordering and find cell clusters of different developmental stages.

Novartis Institutes for BioMedical Research, Shanghai

Jul. 2019 - Sept. 2019

- **Project: Study the Transcriptional Regulation using Single-cell Sequencing Data**

Research Intern, advised by Dr. [Zhengtian Yu](#)

- Analyzed and evaluated more than 20 gene regulatory network reconstruction methods on Novartis's large-scale single-cell RNA seq datasets.

TEACHING AND SERVICE

Teaching Assistant

ShanghaiTech University

Teaching recitations, correcting homework and holding office hours

- EE240: Digital Communication Fall 2022
- EE150: Signals and Systems Spring 2020

Technical Assistant

ShanghaiTech HPC

Managing HPC clusters for scientific applications, and giving technical support and tutorials.

HONORS AND AWARDS

2019 Undergraduate Scholarship in ShanghaiTech University

2019 Merit Student of ShanghaiTech University

2019 First Team Prize in Novartis Young Explorer Program

2018 The Third Prize of The National Undergraduate Electronic Design Contest

TECHNICAL STRENGTHS

Programming Languages

Python, Java, C/C++, MATLAB

Framework & Toolchain

PyTorch, TensorFlow, OpenCV, Git, CVX

Misc

L^AT_EX, SQL