

# HAOYANG HU

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## EDUCATION

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### ShanghaiTech University

Shanghai, P.R.China

M.S. Candidate in Communication and Information Systems

Sept. 2021 - Jun. 2024 (Expected)

GPA (Overall): 3.94/4.0, GPA (Major): 4.0/4.0, Advisors: Prof. [Youlong Wu](#) and Prof. [Ning Cai](#)

### University of Electronic Science and Technology of China

Chengdu, Sichuan, P.R.China

B.E. in Earth Information Science and Technology

Sept. 2017 - Jun. 2021

GPA: 3.98/4.0 (91.89/100)

## RESEARCH INTERESTS

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Information Theory, Coded Computation, Wireless Communication, Machine Learning

## PUBLICATIONS

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### Journal Articles

[J1] **H. Hu**, Y. Wu, Y. Shi, S. Li, C. Jiang, and W. Zhang, “Communication-Efficient Coded Computing for Distributed Multi-Task Learning”, IEEE Transactions on Communications, vol. 71, no. 7, pp. 3861–3875, 2023. [\[Paper\]](#)

### Conference Papers

[C1] **H. Hu**, S. Li, M. Cheng, and Y. Wu, “Coded Distributed Computing for Hierarchical Multi-Task Learning”, in IEEE Information Theory Workshop (ITW), 2023, pp. 480–485. [\[Paper\]](#)

[C2] H. Tang, **H. Hu**, K. Yuan and Y. Wu, “Communication-Efficient Coded Distributed Multi-Task Learning”, in IEEE Global Communications Conference (GLOBECOM), 2021, pp. 1-6. [\[Paper\]](#)

### Manuscripts

[I1] **H. Hu**, S. Li, M. Cheng, S. Ma, Y. Shi, and Y. Wu, “On Exploiting Network Topology for Hierarchical Coded Multi-task Learning”, submitted to IEEE Transactions on Communications, 2023.

[I2] Y. Wu, C. Li, **H. Hu**, and H. Tu, “Nested Coded Distributed Computing via Joint Cellular and D2D Communications”, in preparation, 2023.

## RESEARCH EXPERIENCE

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### Project: Coded Computation via Joint Cellular and D2D Communications

May 2023 - Oct. 2023

Research Assistant, work with Prof. [Youlong Wu](#)

- Proposed NestedCDC scheme that significantly reduces communication costs by leveraging coding techniques and parallel transmission opportunities in the D2D network.
- Extended NestedCDC to the asymmetric case, where each cluster may contain a different number of users. Designed useful (help compute output functions) and auxiliary (help encode and decode messages) intermediate values to ensure accurate delivery. [\[I2\]](#)

### Project: Coded Computation for Hierarchical Multi-Task Learning Systems

Apr. 2022 - Sep. 2022

Research Assistant, work with Profs. [Youlong Wu](#) and [Songze Li](#) (Southeast University)

- Proposed coded computing techniques to reduce the communication loads for hierarchical multi-task learning systems via jointly exploiting the network topology and relays’ computing capability. [\[C1\]](#)
- Derived information-theoretic lower bounds on the uplink and downlink communication loads. [\[I1\]](#)

## Project: Communication-Efficient Coded Distributed Multi-Task Learning

Mar. 2021 - Dec. 2021

Research Assistant, work with Profs. Youlong Wu and [Songze Li](#) (Southeast University)

- Proposed communication-efficient coded multi-task learning schemes to reduce the uplink and downlink communication loads in the distributed multi-task learning setting. [\[C2\]](#)
- Established a theoretic trade-off between the uplink communication load, downlink communication load, and computation load for flexible and fixed data placements. Provided information-theoretic lower bounds on the uplink and downlink communication. [\[J1\]](#)

## TEACHING EXPERIENCE

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### Teaching Assistant at ShanghaiTech University

- EE142: Fundamentals of Information Theory (Outstanding Teaching Assistant, Top 20%) *Spring, 2022*
- CS282: Machine Learning *Fall, 2022*

## AWARDS AND HONORS

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Merit Student (Top 5%)	<i>ShanghaiTech University, 2022</i>
Outstanding Graduates in Sichuan Province	<i>Ministry of Education in Sichuan Province, 2021</i>
China National Scholarship (Top 0.2 % Nationwide)	<i>Ministry of Education in China, 2020</i>
Gratitude to Chinese Modern Scientists Scholarship	<i>2020</i>
First-class Scholarship	<i>University of Electronic Science and Technology of China, 2018 ~ 2020</i>
First Prize of China Undergraduate Mathematical Contest in Modeling	<i>2019</i>
Shiqiang Scholarship	<i>2019</i>
Wuliangye Scholarship	<i>2018</i>

## TECHNICAL STRENGTHS

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**Programming Languages:** Python, MATLAB, C/C++

**Technical Skills:** CVX, PyTorch, Git, Latex

**English Proficiency:** TOEFL 104 (Reading 29, Listening 29, Speaking 22, Writing 24), GRE 322 (AW: 3.5)

Last updated in October, 2023