Yitao **Chen**

SENIOR SYSTEM ENGINEER

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Education

The University of Texas at Austin (UT Austin) *Austin, TX*

PH.D. IN ELECTRICAL AND COMPUTER ENGINEERING *Aug. 2014 - Feb. 2020*

Advisor: Prof. Sriram Vishwanath. GPA: 3.83/4.00

Shanghai Jiao Tong University (SJTU) *Shanghai, China*

BACHELOR OF SCIENCE IN ELECTRONIC SCIENCE AND TECHNOLOGY *Sep. 2010 - Jun. 2014*

Advisor: Prof. Xinbing Wang. GPA: 92.4/100.0

Publications

Compute Partition Functions of Ising Models on Loopy Graphs Using GNN

YITAO CHEN WORK-IN-PROGRESS, *2022*

Convergence of Generalized Belief Propagation Algorithm on Graphs with Motifs

YITAO CHEN, D. VASAL ON ARXIV, *2021*

Multi-Agent Decentralized Belief Propagation on Graphs

YITAO CHEN, D. VASAL ON ARXIV, *2021*

MIMO Full Duplex Radios with Deep Learning

YITAO CHEN, R. MISHRA, D. SCHWARTZ, S. VISHWANATH IEEE ICC'20 WORKSHOP, *2020*

Collision Detection in Dense Wi-Fi Networks using Self-Interference Cancellation

R. MISHRA, YITAO CHEN, W. ROUWET, J. KOTECHA, S. VISHWANATH IEEE ICC'20 WORKSHOP, *2020*

From Centralized to Decentralized Coded Caching

YITAO CHEN, K. SHANMUGAM, A. G. DIMAKIS ITA WORKSHOP, *2020*

On the Key Generation Rate of Physically Unclonable Functions

YITAO CHEN, M. KIM AND S. VISHWANATH ON ARXIV, *2018*

Reconciling Selfish Routing with Social Good

S. BASU, G. YANG, T. LIANEAS, E. NIKOLOVA, AND YITAO CHEN IN PROC. OF SAGT'17, L'AQUILA, ITALY,, *2017*

Approximate Capacity of a Class of Partially Connected Interference Channels

M. KIM, YITAO CHEN, AND S. VISHWANATH IN PROC. OF IEEE ISIT'17, ACHEN, GERMAN, *2017*

Index-coded Retransmission for OFDMA Downlink

M. KIM, YITAO CHEN, AND S. VISHWANATH IN PROC. OF IEEE GLOBECOM'16, WASHINGTON DC, *2016*

Secrecy Capacity Scaling of Large-scale Cognitive Networks

YITAO CHEN, J. ZHANG, X. WANG, X. TIAN, W. WU, F. WU, AND C. TAN IN PROC. OF ACM MOBIHOC'14, PHILADELPHIA, *2014*

Skills

Programming Languages	MATLAB (Expert), Python (Expert), C++(Rusty)
ML Frameworks	Pytorch, PyTorch Geometric
Algorithms	Linear Regression, Logistic Regression, Decision Trees (XGBoost), Random Forest, kNN, SVM, Clustering Algorithms, Kalman Filter, Gradient Descent, Stochastic Gradient Descent, Neural Networks, Reinforcement Learning
NN Models	LSTM, Transformer, GNN, GAN

Work Experience

Qualcomm *San Diego, CA*

SENIOR SYSTEM ENGINEER (WIRELESS RESEARCH & DEVELOPMENT) *Mar. 2020 - Present*

- Work on 5G new radio (5G nR) standardization, **354 patent applications** filed, **12 US patents** granted.
- Research on and build machine learning solutions for all kinds of wireless communication systems.
- Research on improving the reliability of wireless communication systems in 5G nR.

GenXComm Inc.
Austin, TX

Engineer Intern. Project: Full duplex radio. Host: Daniel Schwartz
Jun. 2019 - Aug. 2019

- Analyze the MIMO full-duplex self-interference cancellation problem in theory.
- Implement the deep learning framework for MIMO full-duplex radios in tensorflow.

GenXComm Inc.
Austin, TX

Engineer Intern. Project: Full duplex radio. Host: Daniel Schwartz
Jan. 2019 - May. 2019

- Analyze the capacity and delay of full-duplex wireless mesh networks with CSMA/CA.
- Analyze and simulate the performance of Wi-Fi networks with APs capable of self-interference cancellation.

GenXComm Inc.
Austin, TX

Engineer Intern. Project: Full duplex radio. Host: Hardik B. Jain
Jun. 2016 - Aug. 2016

- Build MAC layer for full-duplex radio on Xilinx FPGA (Zedboard).
- Theoretically model co-channel interference for full-duplex access point (it ensembles multiple full-duplex access points).

Selected Research Experience

Interference Prediction in A Wireless Communication System with Partial Observations
WRD, Qualcomm, San Diego, CA

Senior System Engineer
May. 2022 - Present

- Propose novel LSTM and Transformer structures to resolve the partial observability.
- Show both simulation and system level gains compared to the current 5G nR realizable solution.
- **See our MWC2023 demo**

Compute Partition Functions of Ising Models on Loopy Graphs Using GNN
My Home, San Diego, CA

Individual Researcher
Jan. 2022 - Present

- Propose a new algorithm using GNN to compute the marginal probabilities of nodes for Ising models on a loopy graphs

MIMO Full Duplex Radios with Deep Learning
WNCG, UT Austin, Austin, TX

Research Assistant. Advisor: Prof. Sriram Vishwanath
Mar. 2018 - Jan. 2020

- Propose a novel Deep Neural Network (DNN) structure for solving the MIMO self-interference cancellation problem.
- Show the theoretical convergence of the DNN.
- Show the simulation result of the DNN works better than the state of the art method on the same problem.

Key Generation Rate of Physically Unclonable Functions
WNCG, UT Austin, Austin, TX

Research Assistant. Advisor: Prof. Sriram Vishwanath
Dec. 2016 - Jan. 2018

- Formulate the Physically Unclonable Functions(PUFs) key generation problem into an information-theoretic problem based on the generated-secret (GS) model.
- Show the optimal key generation rate achievable scheme with algebraic binning and polar codes.
- Uncover the connection between Slepian-Wolf distributed source coding problem and PUF key generation problem.
- Design and implement a PUF key generation system with polynomial time encoding and decoding with polar codes.

From Centralized to Decentralized Coded Caching
WNCG, UT Austin, Austin, TX

Research Assistant. Advisor: Prof. Alexandros G. Dimakis
Jan. 2017 - May. 2019

- Design a generic scheme that translates centralized code caching schemes to decentralized counterparts.
- Prove any centralized scheme with constant rate and sub-exponential file size scaling with the number of users can be turned into a decentralized scheme with target coding gain g with file size that is sub-exponential in g.
- Show our decentralized scheme does not require any change in the rest of the system when a new user joins and prove the worst case rate degrades by at most a constant factor when there are not too many adversarial arrivals and departures.
- Show that the centralized scheme with near constant rates and polynomial file size requirements can also be translated into decentralized schemes that provide a polynomial scaling in the target gain g.

Index Coding and the Capacity of Interference Channel with Side Information
WNCG, UT Austin, Austin, TX

Research Assistant. Advisor: Prof. Sriram Vishwanath
Jan. 2016 - Sep. 2016

- Design a randomized Greedy coloring algorithm which beats the state of the art index coding algorithms.
- Prove the $1/2$-bit gap between the up-bound and lower-bound of the capacity of interference channel with side information.

Selected Projects

Kaggle: Santander Customer Satisfaction
UT Austin, Austin, TX

Course Project of Machine Learning: Large-scale Data
Mar. 2016 - Apr. 2016

- Final position top 28%.
- Learn the pre-processing, train-validate-test, post-processing (evaluating the trained model) tricks.
- Build the ensemble model with Logistic Regression, Gradient Boost Machine, Random Forest and Neural Networks.

Honors & Awards

2013	**Shanghai Scholarship**, Top 1% in college	*SJTU, Shanghai*
2013	**Honorable Prize**, Mathematical Contest in Modeling	*Shanghai, China*
2012	**Ricoh Scholarship**, Top 2% in college	*SJTU, Shanghai*
2011	**National Scholarship**, Top 1% in college	*SJTU, Shanghai*
2011	**Academic Excellence Scholarship**, 1st-class, top 1% in college	*SJTU, Shanghai*

Presentation

Information Theory and Applications Workshop *San Diego, CA*
Presenter for <From Centralized to Decentralized Coded Caching> *Feb. 2019*

Teaching Experience

Information Theory *UT Austin, Austin, TX*
Teaching Assistant with Prof. Sriram Vishwanath *Spring 2018*

Probability and Random Process *UT Austin, Austin, TX*
Teaching Assistant with Prof. Sriram Vishwanath *Fall 2017*

Information Theory *UT Austin, Austin, TX*
Teaching Assistant with Prof. Alexandros G. Dimakis *Spring 2017*

Selected Courses

Probability & Stochastic Process I, Markov Chain and Mixing Time, **Large Scale Optimization**, Information Theory, Analysis and Design of Communication Networks, Advanced Algorithms, **Machine Learning: Large-scale Data**, **Estimation Theory**, Sublinear Algorithm.

Reference

Dr. Sriram Vishwanath Professor, Department of Electrical and Computer Engineering, UT Austin
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