# Xinyu Wu

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## EDUCATION

**Department of Electronic Engineering, Shanghai Jiao Tong University (SJTU), China** Sept 2014-Present

**B.E. in Electronic Engineering, Overall GPA: 4.04/4.3 (92.6/100), Major GPA: 4.05/4.3 (93.0/100), Ranked 1/168**

**Zhiyuan Honor Track (85 students selected from around 2400 students for advanced course and research trainings)**

**Core Courses:** Wireless Communication Principles and Mobile Networks (99) / Data Structure and Algorithms (95) / Principles of Communications (97) / Linear Algebra (96) / Probability and Statistics (98) / Mathematical Methods in Physics (100)

**Double Major, B.S. In Mathematics, GPA: 4.20/4.3 (96.7/100), Ranked 1/26** Feb 2016-Present

**Core Courses:** Mathematical Analysis I (100) / Mathematical Analysis II (99) / Ordinary Differential Equation (99) / Advanced Algebra (98) / Complex Analysis (100) / Numerical Analysis (93, No.2 in class) / Real Analysis (96)

**GRE:** Verbal - 155 Quantitative - 170 Analytical Writing - 3.5 **TOEFL:** 111 (Reading 30, Listening 26, Speaking 26, Writing 29)

## RESEARCH EXPERIENCES

**Social Network De-anonymization with Overlapping Communities: Analysis, Algorithm and Experiments | SJTU | Research Assistant** Mar 2017-Jul 2017

Advisor: Xinbing Wang, Distinguished Professor and Vice President of Electronic Engineering, Shanghai Jiao Tong University

- Used the Overlapping Stochastic Block Model to solve the social network de-anonymization problem without seeded nodes, and derived the cost function based on the Minimum Mean Square Error criterion.
- Proved that solving the cost function is NP-hard, and transformed the original problem into a simpler weighted-edge mapping problem (WEMP), and proved the validity of this transformation.
- Found a way to make the node mapping error negligible compared with the size of network by minimizing WEMP, and proposed the Convex-concave Based De-anonymization Algorithm (CBDA) to obtain the optimal value of WEMP.
- Evaluated the performance of CBDA, the Genetic Algorithm (GA) and Convex Optimization Based Algorithm (COBA) by utilizing three datasets: synthetic networks, sampled real social networks and cross-domain co-author networks.
- Demonstrated that our CBDA is suitable for large networks with dense overlapping communities, and showed the algorithm accuracy reaches 90% in real networks, superior to GA and CBDA.

**Large-scale Wireless Fingerprints Prediction for Cellular Network Positioning | SJTU | Research Assistant**

Sept 2016-Mar 2017

Advisor: Xiaohua Tian, Associated Professor of Electronic Engineering, Shanghai Jiao Tong University

- Proposed a wireless fingerprints predication mechanism based on subspace identification method in matrix completion, specifically germane to Stiefel manifolds.
- Designed an algorithm based on Streamlined Stiefel-manifold Optimization Algorithm (SSOA), analyzed its convergence and proved that its superior efficiency in time than the algorithm based on Grassmann manifold.
- Designed a sliding-window mechanism based on bootstrapping percolation to overcome the difficulty, mainly caused by sample sparsity, in directly applying SSOA to outdoor fingerprints prediction.
- Utilized a 2.2 $km^2$ suburb region to verify the low predicting error of SSOA in fingerprinting reconstruction compared with a series of matrix reconstruction algorithms.
- Applied SSOA to reconstruct the fingerprint database in a 67.4$km^2$ region in Ningbo, China, and used this database to conduct fingerprinting localization.
- Showed that 70% and 97% users can be localized within an error of 100m and 300m respectively based on the database constructed by SSOA, exceeding the requirement of E911 regulated by FCC: “within 100m for 67% and 300m for 90%”.

**Online Pricing Crowdsensed Fingerprints for Accurate Indoor Localization | SJTU | Research Assistant**

Mar 2016-Jul 2016

Advisor: Xiaohua Tian, Associated Professor of Electronic Engineering, Shanghai Jiao Tong University

- Proposed a quality-assessment probabilistic model dedicated to evaluate the quality of RSS fingerprints for accurate indoor localization.
- Designed an online pricing scheme for RSS fingerprints based on online learning technique and convex optimization.

- Provided the optimal solution for two scenarios: I. Maximizing the amount of high-quality data the buyer can purchase with constrained budget; II. Minimizing the budget the buyer needs for achieving a certain quality level.
- Conducted simulation by measuring RSS values in the school library, and demonstrated that our online pricing scheme reached the required quality level with nearly 70% less budget than the state-of-art online mechanism we had known.

**Optimizing Calibration Scheme for a Non-Linear Circuit System | SJTU | Research Assistant**

Sept 2015-Dec 2015

Advisor: Yan Yuan, Senior Engineer of Electronic Engineering, Shanghai Jiao Tong University

- Applied several heuristic algorithms to provide the best calibration scheme for a non-linear circuit system, including simulated annealing, genetic algorithm and particle swarm optimization.
- Utilized numerical methods to conduct the calibration, including polynomial fitting, cubic spline interpolation.
- Drew the conclusion that particle swarm optimization worked best in diminishing the error of calibration, while genetic algorithm performed the worst.

## PUBLICATION

**Xinyu Wu**, Zhongzhao Hu, Luoyi Fu, Xinbing Wang, "Social Network De-anonymization with Overlapping Communities: Analysis, Algorithm and Experiments", submitted to *IEEE International Conference on Computer Communications,* Jul 2017.

**Xinyu Wu**, Xiaohua Tian, Xinbing Wang, "Large-scale Wireless Fingerprints Prediction for Cellular Network Positioning'', submitted to *IEEE International Conference on Computer Communications,* Jul 2017.

Xiaohua Tian, Wencan Zhang, Jingchao Wang, Wenxin Li, Shitao Li, **Xinyu Wu**, Yucheng Yang, ''Online Pricing Crowdsensed Fingerprints for Accurate Indoor Localization'', accepted by Vehicular Technology Conference 2017-Fall, **the Best Paper Award**.

## AWARD

- Meritorious Winner in the 2017 Mathematical Contest in Modeling (top 7% in all contestants) 2017
- National Scholarship, Ministry of Education of China (**highest scholarship for Chinese undergraduates**, top 3%) 2017, 2016
- 'Han Ying Ju Hua' Scholarship, Shanghai Jiao Tong University (one of the only two students in the School of Electronic and Electrical Engineering, overall 14 in the whole university) 2017
- National 2nd Prize at the 25th Contemporary Undergraduate Mathematical Contest in Modeling, in China. (top 1%-6% in all contestants) 2016
- Zhiyuan Honor Scholarship (twice, only students in Zhiyuan College are available) 2016, 2015
- The 'Annual Excellent Student' (twice, approximately top 5%) 2016, 2015
- 'United Water' Scholarship, Shanghai Jiao Tong University (the only one in the School of Electronic and Electrical Engineering, overall 14 in the whole university) 2015
- 2nd Prize at the 7th Chinese Mathematics Competition. (top 5%-7.5% in Shanghai) 2015

## LEADERSHIP AND ACTIVITIES

**Student Life Center**, Shanghai Jiao Tong University | Leader of Academic Department Oct 2015-Present

- Responsible for helping students with academic problems, including daily courses, final exams, learning English and so on.
- Invited several excellent students to present their experiences in learning and researching in the seminar.

## SKILLS

Programming : C/C++, Matlab, Python, VHDL, Labview, Latex

Language: English

Proficient in English reading, writing and listening, rich experience in scientific English writing