

# ZESEN ZHANG

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## EDUCATION

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**Shanghai Jiao Tong University**

*Sep 2015 - Present*

Zhiyuan Honors Program of Engineering (Highly Seletive: **Top 5%**), School of Cyber Security

B.S in Information Security

1st Year GPA: **86.8/100**; 2nd Year GPA: **89.2/100**; 3rd Year GPA: **90.4/100**; Total GPA:**89/100**

## AREAS OF INTERESTS

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Network Security, System Security and Reliability, Mobile Security

Blockchain Network, Probability Theory

## PUBLICATIONS

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[1] Fu, Luoyi; Fu, Xinzhe; **Zhang, Zesen**; Xu, Zhiying; Wu, Xudong; Wang, Xinbing; Lu, Songwu, “Joint Optimization of Multicast Energy in Delay-constrained Mobile Wireless Networks” accepted by the *IEEE/ACM Transactions on Networking*.

[2] **Zesen Zhang**, Dongrui Lu, YinYou Li, Luoyi Fu, Guihai Chen “Evolving Information Cascading: Late Bird Matters” submitted to *IEEE INFOCOM 2019*

[3] Xiaoying Gan, **Zesen Zhang**, Luoyi Fu, Xinbing Wang “Unraveling Impact of Critical Sensing Range on Mobile Camera Sensor Networks” submitted to *the Transactions on Mobile Computing*.

## RESEARCH EXPERIENCES

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*Intelligent Internet of Things*

**Core Member**

Supervisors: **Prof. Xingbin Wang, Prof. Luoyi Fu**

**Asymptotic Analysis and Privacy Protection in Social Networks**

*Aug 2018 - Present*

- Description: This study shows how to de-anonymize the identity of a person in an anonymized network using the mapping between two networks.
- Implemented the preferential attachment(PA) model to show the evolving character of social networks and discover the degree character.
- Showed the relationship between the subgraphs and the super-graph (a great index in the “seedless” method) via MAP index (made by Maximum Posterior Probability).
- Trying to use the single-arm bandit method to form the modified function contributed by the evolving characteristic of the network.

**The Percolation of Rumor In the Evolving Social Network**

*Jan 2018 - Jul 2018*

- Description: This study shows the critical scale of “seed” that we need to percolate the influence to the whole network that is evloving.
- Used the reduction method to prove that finding the critical scale of “seed” to diffuse to the whole network in the general evolving network is an N-P hard problem.
- Applied the Markov process to portray the evolving process under the preferential attachment (PA) model and the Erdos-Renyi (ER) model which can form each step recursively. Then, applied the Taylor formula, the Stirling formula and the Azuma’s inequality to prove that  $\ln n$  (n is the number of vertexes in the network) seed is the only influence to the whole network.
- Verified the results of theoretical deduction in large-scale academic network.
- Submitted to IEEE INFOCOM 2019.

**Unraveling Impact of Critical Sensing Range on Mobile CSNs**

*Aug 2017 - Dec 2017*

- Description: This study uses equivalent sensing radius (ESR) to unravel the critical requirement for asymptotic full view coverage in both static and mobile heterogeneous Camera Sensor Networks (CSNs).
- Derived the critical sensing range for full view coverage under static model, 2-dimensional random walk mobility, 1-dimensional random walk and random rotating model.
- Analyzed the numerical results to validate the theoretical results on critical ESR to achieve full view coverage and investigated the relationship between ESR and the percentage of full view coverage.
- Submitted to Transactions on Mobile Computing.

#### **Optimizing Multicast Energy in Mobile Wireless Networks**

*Mar 2017 - July 2017*

- Description: This study proposes ConMap, a novel and general framework for efficient transmission scheme design that jointly optimizes both the transmitting and receiving energy.
- Helped develop the algorithm which especially focus on optimize the energy on both spread and receive sides. It makes a step to first add the energy of receive side into consideration and use Steiner tree to get the optimization result of designing minimum energy transmission scheme (DeMEM) problem.
- Evaluated the performance and flexibility of ConMap framework based on three real datasets through SPT heuristic, MST heuristic and approximation algorithm.
- Accepted by IEEE/ACM Transaction on Networking.

### **SELECTED PROJECTS**

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#### **Intelligent Mobile Gray Software Detection and Analysis System**

*Mar 2018-May 2018*

- Developed and implemented the detection and analysis system for different users.
- Applied 3 progressive methods to predict the possibility of gray apps and obtained 92% accuracy.
  - Decompiled the APK, analyzed user permission, intent action and category, then applied KNN for classification training.
  - Transformed the binary code into the gray graph and used Neural Network to learn the graph.
  - Installed the app in virtual machine for dynamic analysis based on Xposed.

#### **Encrypted Communication System Based on netfilter**

*Sep 2017 - Jan 2018*

- Designed a Firewall encryption system for data encryption and transfer in Linux.
- Used DH, AES and RSA to encrypt and decrypt the information transfer between the client and server.
- Established the visualization system for users to choose different encryption algorithms and encrypt the words based on a specific network protocol (Like TCP or UDP).

### **SERVICES**

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**Reviewer** of: China Communications, Wireless Network, Transaction on Sensor Network

**Secretary** of Cultural and Sports Center, Student Union, SJTU

**Secretary** of the Ministry of Coach, Table Tennis Association, SJTU

### **HONORS & AWARDS**

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Chuntsung Programme Scholarship	<i>2018</i>
First prize, National Mathematical Contest in Modeling (Country level) ( <b>Top 1%</b> )	<i>2017</i>
Zhiyuan Honours Programme Scholarship	<i>2015-2017</i>
Zhiyuan ABC scholarship	<i>2015-2017</i>
Merit Student in Shanghai Jiao Tong University	<i>2017</i>
Third prize, National Physics Competition	<i>2016</i>
Third prize, National Table Tennis Competition for College Students	<i>2016</i>

### **TECHNICAL STRENGTHS**

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<b>Computer Languages</b>	C/C++, Java, Python, html;
<b>Language for Hardware</b>	C, Verilog VHDL
<b>Other Tools</b>	MATLAB, L <sup>A</sup> T <sub>E</sub> X, Multisim