

# DONGXIN LIU

(+86) 138-1766-6057 ◇ dxliu.sjtu@gmail.com ◇ <http://dxliu.me>

Shanghai Jiao Tong University

## EDUCATION

---

### Shanghai Jiao Tong University

- M.S. in Computer Science: advisor Prof. Fan Wu. Sep. 2014 - Present  
Overall GPA: 2.75/3.3 Major GPA: 2.84/3.3 Rank: 2/102
- B.S. in Computer Science Sep. 2010 - Jun. 2014  
Overall GPA: 87.56/100 Rank: 12/130 Major GPA: 90.87/100 Rank: 6/130

## RESEARCH INTERESTS

---

My research interests are in the areas of wireless network, matrix completion, and optimization theory. A central theme is building a system to efficiently identify unoccupied TV spectrums in the indoor environment. I am proficient in the techniques of compressive sensing and Gaussian process.

## PUBLICATIONS

---

- **Dongxin Liu**, Zhihao Wu, Fan Wu, Yuan Zhang, and Guihai Chen, “FIWEX: Compressive Sensing Based Cost-Efficient Indoor White Space Exploration”, Proceedings of the *16th ACM International Symposium on Mobile Ad Hoc Networking and Computing (MobiHoc)*, Hangzhou, China, June, 2015. [Acceptance rate: **14.8%**] [PDF]
- **Dongxin Liu**, Fan Wu, Linghe Kong, Shaojie Tang, Yuan Luo, and Guihai Chen, “Training-Free Indoor White Space Exploration”, *IEEE Journal on Selected Areas in Communications (JSAC)*, vol. 34, no. 10, 2016. [Acceptance rate: **11.5%**] [PDF]
- **Dongxin Liu**, Zhihao Wu, Fan Wu, Yuan Zhang, and Guihai Chen, “Cost-Efficient Indoor White Space Exploration through Compressive Sensing”, *IEEE/ACM Transactions on Networking (ToN)* (Under Review, Miner Revision). [PDF]
- **Dongxin Liu**, Tianshu Liu, Xiaofeng Gao, Fan Wu, and Shaojie Tang, “Towards Fine-Grained Indoor White Space Estimation”, Proceedings of the *ACM Special Interest Group for the computer systems performance evaluation community (SIGMETRICS)*, Urbana-Champaign, IL, June, 2017 (To be submitted).

## RESEARCH EXPERIENCES

---

### Indoor White Space Measurement at Different Cities

Apr. 2014 - Nov. 2015

- Implemented an energy detector based on GNU Radio platform and USRP N210 devices.
- Deployed more than 22 USRP's to measure the RSSIs of TV spectrums in different buildings of Shanghai and Nanjing for more than one month.
- Characterized the spatial-temporal-spectral correlations among indoor TV spectrums based on roughly 3400000 samples collected during the measurement.

### Compressive Sensing Based Indoor White Space Exploration System

Apr. 2014 - Dec. 2014

- Reconstructed the indoor white space availability map by solving a compressive sensing based non-convex optimization problem and designed a *k-medoids* clustering based sensor deployment algorithm.
- Identified 47.8% more indoor white spaces with 38.4% less false alarms compared with WISER (*MobiCom'13*).
- Published in *MobiHoc* 2015, corresponding journal version is under review in *IEEE/ACM Transactions on Networking (ToN)*.

### Training-free Indoor White Space Exploration System

Jan. 2015 - Jul. 2015

- Designed a training-free indoor white space exploration system based on Relevance Vector Machine (RVM) and Bayesian compressive sensing, and implemented training-free spectrum detector deployment by maximizing the differential entropy.

- Achieved competitive performance against the existing training-based systems.
- Published in *IEEE Journal on Selected Areas in Communications (JSAC)*, vol. 34, no. 10, 2016.

### **Gaussian Process Based Fine-grained Indoor White Space Estimation** *Aug. 2015 - Apr. 2016*

- Characterized the spatial-temporal-spectral correlations of indoor white space by multiplying a Gaussian kernel, a period kernel, and a semi-positive matrix, and utilized multitask Gaussian process model to accurately estimate the white space availability at arbitrary indoor locations.
- Designed a sensor candidate locations selection mechanism by maximizing the mutual information.
- To be submitted to *SIGMETRICS* 2017.

### **Mobile Sensor Based Indoor White Space Exploration System** *May 2016 - Present*

- Designed and implemented a mobile spectrum sensing platform which contains an USRP, an omni antenna, an Arduino-WiFi based mobile device and an Intel NUC.
- Devised a multi-task Gaussian process based mobile device dispatching mechanism to explore indoor white space with only one mobile sensor.
- In preparation for *MobiCom* 2017.

## **SCHOLARSHIPS & AWARDS**

---

National Scholarship, China (Top 2%)	<i>2016</i>
National Scholarship, China (Top 2%)	<i>2015</i>
Outstanding Graduates Awards, SJTU	<i>2014</i>
Academic Excellence Scholarship of SJTU (Top 5%)	<i>2013</i>
Academic Excellence Scholarship of SJTU (Top 10%)	<i>2012</i>
Academic Excellence Scholarship of SJTU (Top 5%)	<i>2011</i>

## **SKILLS**

---

<b>Computer Languages</b>	C, C++, MATLAB, Python, Java.
<b>Math Tools</b>	Compressive sensing, Multi-task Gaussian process, Non-convex optimization.
<b>Platforms</b>	USRP, GNU Radio, Gnuplot, iRobot.

## **EXTRACURRICULAR ACTIVITIES**

---

- Quality Development Association, *Vice President* *2011 - 2012*
- Volunteer at Shanghai International Marathon *2012, 2013, 2014, 2015*