# Yunxiang LIU

## Personal Information


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## Education

2013 – present **Nanyang Technological University, Singapore**.
2nd-year MEng student in wireless communications, School of EEE

Supervisor: Prof. Yong Liang Guan & Prof. Dmitriy Garmatyuk
Thesis: *Narrowband Radar System for Indoor Doorway Detection.* **Submitted; in review**

CGPA: **4.67**/5.00

2009 – 2013 **University of Electronic Science and Technology of China, Chengdu, P.R.China**.
B.Eng. in wireless communications, Yingcai Experimental School

Supervisor: Prof. Gang Wu & Prof. Yong Liang Guan
Thesis: *SC-FDMA Frequency Domain Oversampling MMSE Equalizer.*

GPA: **3.79**/4.00 or **88.5**/100 Ranking: **16**/110

## Education - Self Study

May 2014 - Present **Machine Learning and Pattern Recognition** .
By Christopher M. Bishop

Status: **Ongoing.**

Mar 2014 **Unsupervised Feature Learning and Deep Learning** .
Offered by Stanford University

Materials Contributed by: Andrew Ng, Jiquan Ngiam, etc;

Status: **Completed**.

Feb 2014 **CS229 Machine Learning**.
Offered by Stanford Engineering Everywhere

Instructor: Prof. Andrew Ng;

Status: **Completed**.

Nov 2013 – Jan 2014 **Machine Learning**.
Offered by Coursera

Instructor: Prof. Andrew Ng;

Grade Achieved: 99.9%;

Status: **Completed**.

## Exchange Experience

July 2012 – May 2013 **Research Assistant**,
*supervised by Prof. Yong Liang Guan & Prof. Dmitriy Garmatyuk*.
Nanyang Technological University

July 2011 – Aug 2011 **American Language Center Intensive English Communication Program**.
University of California, Los Angeles

## Research Experience

Mar 2014 – present **Distributed MIMO Relaying for Range Extension and Diversity Enhancement**,
*supervised by Prof. Yong Liang Guan*.
INFINITUS Lab, School of EEE, NTU

In the battlefield, the communications between two users (soldiers or vehicles) may fail due to the low received signal power (long distance signal attenuation or severe fading). In these cases, the relaying technique may help by decreasing the transmission distance (hence signal attenuation) and extracting multi-path diversity, in which other users in-between are chosen to be the relays. Therefore, we develop a real-time USRP-based relaying system.

◇ Compared the BER performance between CPM (GMSK) and SC-FDE by simulation. (collaborated with Dr. ZiLong LIU)
◇ Built up an USRP-based full-duplex relaying system using GMSK modulation in one path Rayleigh fading channel. (collaborated with Dr. NGUYEN Thanh Hieu)
◇ Built up an USRP-based transmission system based on SC-FDE in non-ideal wireless channel.

Oct 2012 – Jan 2015 **Narrowband Radar System for Indoor Doorway Detection**,
*supervised by Prof. Yong Liang Guan & Prof. Dmitriy Garmatyuk*.
INFINITUS Lab, School of EEE, NTU & Department of Electrical and Computer Engineering, Miami University

Radar is an object-detection system that uses radio waves to determine the range and direction of objects. It could be employed on an Unmanned Ground Vehicle (UGV) for autonomous navigation. We propose a low-cost narrowband radar system based on USRP (Universal Software Radio Peripheral) hardware and C++/MATLAB programming to enable UGV autonomous indoor navigation. The main purpose is to investigate open doorway detection in an indoor environment utilizing a narrowband radar.

◇ Implemented, calibrated and verified the proposed USRP-based radar system.
◇ Collected the open doorway detection data in realistic indoor environment.
◇ Developed effective radar processing algorithms.
◇ Demonstrated the open doorway detection of radar-guided UGV.

July 2012 – June 2013 **SC-FDMA Oversampling MMSE Equalizer**,
*supervised by Prof. Yong Liang Guan & Prof. Gang Wu*.
INFINITUS, School of EEE, NTU & National Key Laboratory of Science and Technology on Communications, UESTC

Single Carrier Frequency Division Multiple Access (SC-FDMA) is an alternative technique comparing with Orthogonal Frequency Division Multiple Access (OFDMA). However, it also suffers greatly from carrier frequency offset (CFO) due to the reason that CFO destroys the orthogonality among subcarriers. In order to improve the BER performance, we propose a novel frequency domain oversampling MMSE equalization receiver for SC-FDMA system.

◇ Designed an oversampling MMSE equalizer for SC-FDMA
◇ Compared the BER performance with the conventional MMSE equalizer.

## Social Experience

Dec 2014 – present **Committee Member**.
Intelligent Transport Society (ITS) Singapore Student Branch

June 2014 – present **Committee Member**.
Graduate Student Council, NTU

## Teaching

Spring 2012 TA, Introduction to Information Theory

## Honors and Awards

2013 – 2014 **Master of Engineering Award**.
School of EEE, Nanyang Technological University

2009 – 2012 **Second-class People's Scholarship**.
University of Electronic Science and Technology of China

## Skills

Programming C/C++, MATLAB, Python
Typesetting LaTeX
Language English, Chinese (native)

## Publications

### Publications

[1] **Yunxiang, Liu**, YongLiang Guan, Dmitriy Garmatyuk, and Jade Morton. USRP-based OFDM Radar Systems for Doorway Detection. In *Radar Conference*, pages 0875–0880. IEEE, 2014.

[2] **Yunxiang, Liu**, YongLiang Guan, Dmitriy Garmatyuk, and Francois Quitin. Improved Exit Path Identification with Indoor USRP-based Radar System. In *ION PNT 2015, Pacific Positioning, Navigation and Timing Meeting*, **to appear in 2015 ION PNT**.

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