Jianyi **Yang**

Master Student · Beijing University of Posts and Telecommunications

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Education

Beijing University of Posts and Telecommunications (BUPT)

Beijing, China

M.S. in Information and Communication Engineering

Sept. 2015 - Present

- Advisor: Prof. Lin Sang
- Dissertation title: "The Application of Compressed Sensing in Millimeter Wave Channel Estimation."
- Overall GPA: 83.42/100 Major GPA: 86.29/100

Xidian University

Xi'an, Shaanxi, China

B.S. in Information Engineering

Sept. 2011 - Jun. 2015

- Overall GPA: 86.75/100 Major GPA: 88.76/100 ***Ranking: 1/153***
- Some Major Courses: Advanced Mathematics: 96 Linear Algebra: 100 Random Signal Analysis: 92 Principles of Communication: 91 Information Theory Foundation and Coding Theory: 91 Signal Detection and Estimation: 93

Publications

J. Yang, Z. Wei, N. Li, L. Sang and P. Li, "Correlation Based Adaptive Compressed Sensing for Millimeter Wave Channel Estimation," *IEEE Wireless Communications and Networking Conference (WCNC)*, Mar. 2017.

J. Yang, Z. Wei, X. Zhang, N. Li and L. Sang, "Enhanced Multi-Resolution Hierarchical Codebook Design for Adaptive Compressed Sensing Based Millimeter Wave Channel Estimation," *IEEE/CIC International Conference on Communications in China (ICCC)*, Jul. 2016.

J. Yang, L. Yin, L. Sang, X. Zhang, S.You and H. Liu, "A Practical Implementation of TD-LTE and GSM signals identification via Compressed Sensing," accepted by *International Conference on Signal and Information Processing, Networking and Computers (ICSINC)*, Sept. 2017.

Research Experience

Master Research, Wireless Theory and Technical Lab(WT&T), BUPT

Beijing, China

Research on Millimeter Wave Channel Estimation

Jul. 2015 - Present

- Studied Robert W. Heath's compressed sensing based millimeter wave channel estimation algorithm; proposed an iterative algorithm for the hierarchical codebook design which resolved the inaccurate training beam coverage problem in the original codebook. Proved the convergence of the proposed algorithm. ***A paper on this research has been published in IEEE/CIC ICCC (The 2nd paper in Publications)***.
- Applied the Genetic Algorithm to decompose the theoretic training codes into analog precoder/combiner and digital precoder/combiner. This method can realize more accurate decomposition than Orthogonal Matching Pursuit (OMP) algorithm.
- Proposed a novel correlation based compressed sensing method for millimeter wave channel estimation; devised the cosine training beam pattern which meets the requirements of the proposed algorithm; developed the two-step method to generate the hybrid training precoder/combiner. The proposed algorithm can realize a more precise channel estimation under hardware (radio frequency (RF) chains and phase shifters) constraints without increasing the training overhead. ***A paper on this research has been published in IEEE WCNC (The 1st paper in Publications)***.
- Completed a detailed derivation of Generalized Approximated Message Passing (GAMP) based on S. Rangan's work; derived the output function of GAMP in the case of 1-bit sampling of GAMP output; applied GAMP in millimeter wave channel estimation with 1-bit ADC; verified that GAMP has higher estimation performance than Binary Iterative Hard Thresholding (BIHT) algorithm by simulation. Related work is summarized in GAMP: A Complete Derivation and its Application to 1-bit Measuring of AWGN Output.

Master Research, Wireless Theory and Technical Lab (WT&T), BUPT

Beijing, China

Institution Cooperation Project on Aeronautical Channel Modeling

Mar. 2017-Jul. 2017

- Investigated the characteristics of aeronautical channel within different scenes.
- Developed a simulation platform (Matlab) of wideband aeronautical channel models which can be utilized to output channel impulse respond of time domain and frequency domain.
- Verified the validity of the platform by calculating the delay power profile (PDP) and Doppler power spectral density (DPSD). The simulated PDP and DPSD coincide with the theoretical value approximately.

Internship, Beijing Advanced Innovation Center for Future Internet Technology *Beijing, China*

Researcher on Signal Identification *Oct. 2016-Mar. 2017*

- Acquired the common on-the-air signals (LTE, GSM, etc.) using a real-time spectrum analyzer (Tektronix 306B).
- Verified second order cyclostationarity of the acquired signals using Matlab.
- Proposed a low-rate compressed sampling structure for TD-LTE and GSM signals identification; derived a closed expression of false alarm probability; verified the proposed signal identification method using measured data. ***A paper on this research has been accepted by ICSINC (The 3rd paper in Publications)***.
- Collaborated with a colleague of WT&T on the research on signal classification based on Artificial Neural Networks (ANNs).

Undergraduate Graduation Project, Xidian University *Xi'an, China*

Researcher on Multi-user Beamforming *Dec. 2014-Jun. 2015*

- Evaluated the performance of traditional beamforming schemes using real channel data, including the coarse and precise beam searching and digital beamforming schemes (Zero Forcing (ZF) and Block Diagonal (BD)).
- Designed beamforming codebook for the 3D MIMO scene. Simulation results show that 3D MIMO beamforming has better interference cancellation performance than 2D MIMO with the same number of antennas.
- ***Outstanding Undergraduate Graduation Thesis(1%).***

Honors & Awards

National Post-Graduate Scholarship (Top 1% of 754), Ministry of Education of P.R. China 2017

Outstanding Post-graduate Student Award (Top 5% of 754), BUPT 2016

2nd Prize in Post-Graduate Mathematical Contest in Modeling (Top 20% of 26616), Ministry of Edu. of P.R. China 2016

Outstanding Graduate Award (Top 5% of 800), Xidian University 2015

Outstanding Undergraduate Graduation Thesis Award (Top 1% of 800), Xidian University 2015

2nd Prize Goodix Scholarship (Top 1% of 800), Goodix & Xidian University 2015

2nd Prize in Electronic Design Contest of Texas Instruments Cup (Top 25% of 576), Edu. Department of Shaanxi 2014

Outstanding Undergraduate Student (Top 5% of 800), Xidian University 2014 & 2013 & 2012

National Scholarship(Top 1% of 800), Ministry of Education of P.R. China 2013 & 2012

2nd Prize in Shaanxi Undergraduate Mathematical Contest (Top 4% of 15000), Shaanxi Mathematical Society 2012

Mentoring Experience

Mentoring Assistant, School of Info. and Comm. Eng. (Dr. Zaixue Wei), BUPT *Beijing, China*

Undergraduate Graduation Project– Beamforming for Multi-user Massive MIMO Systems with low-cost hardware *Dec. 2016 - Jun. 2017*

- Assisted an undergraduate student in understanding the principles of hybrid beamforming, block diagonal algorithm, orthogonal matching pursuit algorithm.
- Helped in debugging; proofread the graduation thesis.

Teaching Assistant, School of Info. and Comm. Eng. (Prof. Lin Sang), BUPT *Beijing, China*

Undergraduate Course– Principles of Communication *Sept. 2015 - Jun. 2016*

- Assisted Prof. Sang in preparing teaching materials.
- Assisted Prof. Sang in checking students' answers to assignments.