# Yao Liu

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## Objective

Internship in mm-wave and RF integrated circuit design

## Education

**Bachelor of Engineering in Electrical Engineering** **2007-2011**
University of Electronic Science and Technology of China (UESTC), Chengdu, China
Major: Electromagnetic and Radio Technology

**Master Program, School of EECS** **2011-2013**
Oregon State University, Corvallis, OR, USA
Major advisor: Dr. Huaping Liu

**Doctoral Program, School of EECS** **2013-Present**
Oregon State University, Corvallis, OR, USA
Major advisor: Dr. Arun Natarajan

## Professional Experience

***Research Assistant in High-Speed Integrated Circuits Lab, Oregon State University:***

- **Design and tapeout 60 GHz IC with on-chip antenna integration in 0.18um SiGe BICMOS. (Nov. 2013)**
- Performed design, layout and packaging of aperture-coupled patch antenna. Radiation pattern measurement in anechoic chamber has been conducted. Design achieves more than 40% efficiency, 0 dBi gain and more than 10% bandwidth. Design simplifies packaging and test and is wafer-scale compatible. Design is extended to dual-polarization on-chip antenna and Tx/Rx system.
- **Design and tapeout of 77GHz digitally controlled oscillators in 65nm CMOS. (Feb. 2015)**
- Performed design and layout of a novel high-resolution digitally-controlled oscillator with > 8.5GHz tuning range from 74.6GHz to 83.6GHz. Design required extensive EM simulations of custom inductor and capacitor structures in IE3D. Design achieves state-of-the-art <400 kHz frequency resolution and -180.9dB VCO FoM in 65nm CMOS.
- **Design and tapeout of 77GHz Class-A power amplifier in 65nm CMOS. (Feb. 2015)**
- DCO described in earlier work drives a ~2dBm output power 3-stage PA in 65nm CMOS. Design required load-pull analysis and creation of custom transmission-line based matching network.
- **Design and tapeout 60GHz LNA, vector modulator and quadrature hybrid coupler in 0.18um SiGe BICMOS. (May 2016)**
- Performed design and layout of a 3 stage common-emitter and cascode LNA with 24 dB power gain and 6dB noise figure. Custom transmission-line based matching network was used. Vector modulator along with coupler achieves 360° phase shift of original signal.

***Teaching Assistant in School of EECS, Oregon State University:***
Electric and Magnetic Field (ECE 390), Signal and Systems (ECE 351/352), Probability and Random Signals (ECE 353), Network Theory (ECE 580)

## Related Courses

CMOS Integrated Circuit Design (ECE522, ECE523, ECE520), Phase Lock Loop (ECE599)
Radio Frequency IC Design (ECE621), RF and Microwave Circuit Design (ECE593)
Antenna and Propagation (ECE584)
Digital Communication System Design (ECE669), VLSI System Design (ECE574)

## EDA Expertise

Circuit Design: Cadence (Virtuoso, Spectre, Goldengate), Agilent ADS, Hspice
EM Simulators: Ansys HFSS, Agilent ADS Momentum, Mentor Graphics IE3D
Programming Languages: Linux, Verilog, MATLAB, C

## Publications

**Yao Liu**, Abhishek Agrawal and Arun Natarajan, "Millimeter-wave IC Antenna co-integration for integrated transmitters and receivers" – Workshop on "Antenna and Packaging Technologies for mm-Wave Frond-end Integration" at IEEE RFIC/International Microwave Symposium, May 2015

Yunqi Wang, **Yao Liu**, Abhishek Agrawal, and Arun Natarajan, "A 74.6GHz - 83.6GHz Digitally Controlled Oscillator with 370kHz Frequency Resolution in 65nm CMOS", accepted by IEEE Topical Meetings on Silicon Monolithic Integrated Circuits in RF Systems, Jan. 2016

**Yao Liu**, Abhishek Agrawal and Arun Natarajan, "Millimeter-wave IC-Antenna Cointegration for Integrated Transmitters and Receivers", accepted by IEEE Antennas and Wireless Propagation Letters, Mar. 2016.

## Professional Activities and Interests

Student Member, IEEE, Swimming, Hiking, Cycling

## Awards Received

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| Oregon State University International Student Scholarship | 2012-2013 |
| Oregon State University Graduate Laurels Scholarship | 2013 |
| Wei Family Private Foundation Scholarship | 2012-2013 |

## Volunteer Experience

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| Oregon State University International Student Orientation Mentor | 2012 |