# June Chul Roh

3480 Granada Ave. Apt. 116, Santa Clara, CA 95051, Phone: (408) 726–1383 junechul@gmail.com, http://dsp.ucsd.edu/~jroh

### SUMMARY OF QUALIFICATIONS

- Strong theoretical and practical knowledge of wireless communication systems including MIMO, OFDM, and CDMA systems with proven track record.
- 7+ years professional experience in wireless communication industry: physical-layer design, MODEM chip development and testing.
- ♦ Author of 27 technical papers including 6 IEEE Journal articles in the area of wireless communication systems, and 10+ patents granted.

#### PROFESSIONAL EXPERIENCE

**Texas Instruments, Inc.** Sunnyvale, CA Wireless PHY Systems Engineer June 2005 – Current

Working on multiband OFDM based UWB (WiMedia) SoC development.

- Modem algorithms development: FFT placement, channel estimation (CE), channel-aware OLA and CE, interference detection and mitigation, noise variance estimation, frequency-domain equalizer, QPSK/DCM demapper, and Rx antenna diversity have been developed, and their system architecture for UWB modem SoC defined.
- Lead the development MATLAB model for end-to-end PER simulation. The owner of the MATLAB model and implemented all the modem algorithms including above. Support SystemC model development and RTL implementation.
- Contributed to WiMedia PHY standardization activity.
- Performed physical-layer simulation for 802.11n WLAN chipset development (in first 3 months with TI).
- Patent Disclosure: "Robust Packet Detection, Symbol Timing, Channel Length Estimation And Channel Response Estimation For Wireless Systems" filed Aug. 2007.

KT (Korea Telecom) R&D Group	Member of Technical Staff
Seoul, Korea	Feb. 1995 – Aug. 2000
Worked on 3G wireless system development.	_

- Worked on system specification for 2.5G cellular network (currently operated by KTF). Initially GSM was considered but finally CDMA air-interface was adopted.
- Designed physical-layer RTT for WCDMA standards and contributed to 3GPP standardization activity.
- Played a key role in WCDMA modem development for KT's 3G trial system: went through the whole modem chip development stages from algorithm development to lab testing.
- Investigated on capacity enhancement techniques including multi-user detection and interference cancelation techniques.
- 10 patents granted.

#### EDUCATION

# University of California, San Diego Ph.D., Electrical Engineering (Communication Theory and Systems)

Dissertation: Multiple-Antenna Communication Systems with Finite Rate Feedback Advisor: Dr. Bhaskar D. Rao

- Closed-loop MIMO systems: Design and analysis of channel feedback quantization for multipleantenna systems with finite-rate feedback. General and near-optimal quantization/feedback methods for MIMO channel state information were proposed.
- New transmission strategy with partial feedback in MIMO multiple-antenna systems.
- Optimal adaptive modulation scheme for MIMO systems.

#### University of Seoul, Korea M.S., Electrical Engineering

Thesis: Research on Multiple Access Schemes for Spread-Spectrum Packet Radio Networks Advisor: Dr. Dong In Kim

• Proposed various new spreading-code assignment strategies for CDMA random-access packet radio networks and carried out their performance analysis.

#### University of Seoul, Korea B.S., Electrical Engineering

### WORK/RESEARCH INTERESTS

Communication Theory, Information Theory, Coding Theory, and Statistical Signal Processing. MIMO, OFDM, OFDMA and CDMA Systems including WLAN, UWB, WiMAX, WCDMA, and LTE/4G. Wireless modem algorithm development and implementation.

HONORS AND AWARDS

- Research Assistantship (full tuition waive and monthly stipend) during the whole Ph.D. study from the UCSD Center for Wireless Communications (CWC) and the Cal-(IT)<sup>2</sup> (California Institute for Telecommunications and Information Technology), 2000–2005.
- Seoul Metropolitan City Mayor's Scholarship, University of Seoul, 1991.
- Scholarship for Excellent Achievement, University of Seoul, 1989–1992.

### **PROFESSIONAL ACTIVITIES**

- Member, Institute of Electrical and Electronics Engineers (IEEE)
- Member in three IEEE Societies: Information Theory, Communications, and Signal Processing
- Reviewer of various technical journals and conferences including IEEE Trans. on Communications, IEEE Trans. on Wireless Communications, IEEE J. on Selected Areas in Communications, IEEE Communication Letters, and IEEE Wireless Communication Letters.

### COMPUTER SKILLS

- Expert in MATLAB and C/C++, Perl familiarity, HDL (Verilog/VHDL) literacy
- Windows, Linux, and Sun OS platforms

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Feb. 1995

Feb. 1993

INTERNATIONAL SKILLS

- *Languages*: English (fluent) and Korean (mother tongue)
- Visa Status: U.S. Permanent Resident with Korean Citizenship

### SELECTED PUBLICATIONS

## **Journal Articles**

- 1. June Chul Roh and Bhaskar D. Rao, "Multiple Antenna Channels with Partial Channel State Information at the Transmitter," *IEEE Transactions on Wireless Communications*, vol. 3, no. 2, pp. 677–688, Mar. 2004.
- 2. June Chul Roh and Bhaskar D. Rao, "Transmit Beamforming in Multiple Antenna Systems with Finite Rate Feedback: A VQ-Based Approach," *IEEE Transactions on Information Theory*, vol. 52, no. 3, pp. 1101–1112, Mar. 2006.
- 3. June Chul Roh and Bhaskar D. Rao, "Design and Analysis of MIMO Spatial Multiplexing Systems with Quantized Feedback," *IEEE Transactions on Signal Processing*, vol. 54, no. 8, pp. 2874–2886, Aug. 2006.
- 4. June Chul Roh and Bhaskar D. Rao, "Efficient Feedback Methods for MIMO Channels Based on Parameterization," *IEEE Transactions on Wireless Communications*, vol. 6, no. 1, pp. 282–292, Jan. 2007.
- Dong In Kim and June Chul Roh, "Performance of Slotted Asynchronous CDMA Using Controlled Time of Arrival," *IEEE Transactions on Communications*, vol. 47, no. 3, pp. 454– 463, Mar. 1999.
- Dong In Kim and June Chul Roh, "Random Assignment/Transmitter-oriented Code Scheme for Centralized DS/SSMA Packet Radio Networks," *IEEE Journal on Selected Areas in Communications*, vol. 14, no. 8, pp. 1560–1568, Oct. 1996.

## **Conference Papers**

- 1. June Chul Roh and Bhaskar D. Rao, "MIMO Spatial Multiplexing Systems with Quantized Feedback," *Proc. of IEEE International Conference on Communications (ICC)* 2005, Seoul, Korea, May 2005.
- 2. June Chul Roh and Bhaskar D. Rao, "Performance Analysis of Multiple Antenna Systems with VQ-Based Feedback," *Proc. of 38th Asilomar Conference on Signals, Systems, and Computers* 2004, Pacific Grove, CA, Nov. 2004.
- 3. June Chul Roh and Bhaskar D. Rao, "Vector Quantization Techniques for Multiple-Antenna Channel Information Feedback," *Proc. of International Conference on Signal Processing and Communications (SPCOM)* 2004, Bangalore, India, Dec. 2004.
- 4. June Chul Roh and Bhaskar D. Rao, "Channel Feedback Quantization Methods for MISO and MIMO Systems," *Proc. of IEEE International symposium on Personal, Indoor and Mobile Radio Communications (PIMRC) 2004*, Barcelona, Spain, Sep. 2004.
- 5. June Chul Roh and Bhaskar D. Rao, "An Efficient Feedback Method for MIMO Systems with Slowly Time-Varying Channels," *Proc. of IEEE Wireless Communications and Networking Conference (WCNC) 2004*, Atlanta, GA, Mar. 2004.

- 6. Chandra Murthy, June Chul Roh and Bhaskar D. Rao, "Optimality of Extended Maximum Ratio Transmission," *Proc. of 6th Baiona Workshop on Signal Processing in Communications*, Baiona, Spain, Sep. 2003.
- June Chul Roh and Bhaskar D. Rao, "Multiple Antenna Channels with Partial Feedback," Proc. of IEEE International Conference on Communications (ICC) 2003, Anchorage, AK, May 2003.
- 8. June Chul Roh and Bhaskar D. Rao, "An Improved Transmission Strategy for Multiple Antenna Channels with Partial Feedback," *Proc. of 36th Asilomar Conference on Signals, Systems, and Computers* 2002, Pacific Grove, CA, Nov. 2002.
- 9. June Chul Roh and Bhaskar D. Rao, "Adaptive Modulation for Multiple Antenna Channels," *Proc. of 36th Asilomar Conference on Signals, Systems, and Computers* 2002, Pacific Grove, CA, Nov. 2002.
- June Chul Roh, Yong Ho Kim, Ki Hwan Ahn, Han Sup Lee, and Hyun Myung Pyo, "Korea Telecom IMT-2000 Testbed Based on Inter-cell Asynchronous Wideband CDMA," Proc. of ACTS Mobile Communication Summit 1999, Sorrento, Italy, June 1999.
- 11. June Chul Roh, Yong Ho Kim, Chan Eui Yun, Hyun Myung Pyo, and Gilsoon Kang, "Wideband CDMA Modem for Korea Telecom IMT-2000 Testbed System," *Proc. of International Conference on Communication Technology (ICCT) 1998*, Beijing, China, Oct. 1998.
- Yong Ho Kim, June Chul Roh, Hyun Myung Pyo, and Myung Sang Yoon, "Korea Telecom IMT-2000 Testbed Based on Wideband CDMA Technologies," *Proc. of ACTS Mobile Communication Summit 1998*, Rhodes, Greece, June 1998.
- 13. June Chul Roh, Yang Ho Choi, Hyun Myung Pyo, "Performance of a CDMA Acquisition Using Double-Dwell Serial Search and Its Implementation," *Proc. of Joint Conference on Communications and Information (JCCI)* 1997, Busan, Korea, May 1997 (in Korean).
- Dong In Kim and June Chul Roh, "RA/T Spreading Code Scheme for Centralized DS/SSMA Packet Radio Networks," Proc. of IEEE International Symposium on Spread Spectrum Techniques and Applications (ISSSTA) 1996, Mainz, Germany, Sep. 1996.
- 15. Dong In Kim and June Chul Roh, "Random Access with Controlled Time of Arrival for Distributed Spread-Spectrum Packet Radio Networks," *Proc. of IEEE International Conference on Communications (ICC) 1995*, Seattle, WA, June 1995.