Junjik Bae

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EDUCATION

Northwestern University, Evanston, IL *2002 – Present*
Ph.D. in Electrical Engineering and Computer Science (Expected 2008)

Ohio State University, Columbus, OH *1999 – 2001*
M.S. in Physics

Seoul National University, Seoul, Korea *1993 – 1999*
B.S. in Physics

SKILLS

Languages & Software: C/C++, Matlab, and Mathematica
Computer Skills: Windows, Mac OS X, Unix Operating Systems
Wireless technology: WiMAX, CDMA, OFDM, random access

PATENTS

Filed three patents with US patent office.

- Method for Resource Allocation with Rectangular Bursts (U.S. Serial No: 11/830,979)
- Relay-Assisted Channel Condition Measurements for Connection Setup and Maintenance (U.S. Serial No: 11/835,470)
- Route Maintenance and Update Based on Connection Identifier in Multi-hop Relay Systems (U.S. Serial No: 11/835,604)

RELATED EXPERIENCE

Research Assistance June 2004 – Current
EECS, Northwestern University, Evanston, IL

- Advisers: Prof. Michael L. Honig and Randall Berry.
- Research interest: ad-hoc and relay networks, cooperative networks, cognitive radio and dynamic spectrum sharing, game theory and auctions for resource allocation.
- Proposed a novel Fallback auction for power allocation in an interference channel model and showed that the proposed scheme achieves a full information equilibrium with VCG outcome.
- Applied well-known sequential second price auction for resource allocation in a wireless ad hoc network and found the efficiency lower bound of the auction.
- Derived the upper bound of throughput in a relay-enhanced cellular system with FDMA / TDMA assumption and provided theoretical background for Motorola project.

Summer Internship May 2007 – Aug. 2007
WSR, **Motorola**, Schaumburg, IL

- Investigated various cooperative relay schemes to determine the feasibility for business decision.
- Developed an uplink system simulator to estimate the performance of a relay-enhanced WiMAX system including cooperative relay schemes.

Summer Internship June 2006 – Sep. 2006
Wireless Communication and Audio Signal Processing Group, **Siemens**, Princeton, NJ

- Proposed a novel burst allocation method to improve the efficiency of WiMAX scheduler (US patent filed).

- Developed a downlink system simulator to assess the performance of WiMAX.
- Investigated various technical concepts in a relay-enhanced WiMAX system to improve the performance (Two US patents filed).

PUBLICATIONS

Journal Papers

- **Junjik Bae**, Randall Berry, Michael L. Honig, "Resource allocation for Relay-Assisted Downlink Data Transmission," working paper.
- **Junjik Bae**, Eyal Beigman, Randall Berry, Michael L. Honig, and Rakesh Vohra, "An Ascending Auction for Non Concave Valuation," working paper.
- **Junjik Bae**, Eyal Beigman, Randall Berry, Michael L. Honig, and Rakesh Vohra, "Sequential Bandwidth and Power Auctions for Distributed Spectrum Sharing," appear to be in JSAC Special Issue on "Game Theory in Communication Systems".

Conference Papers

- **Junjik Bae**, Eyal Beigman, Randall Berry, Michael L. Honig, and Rakesh Vohra, "Interference Mitigation in Dynamic Spectrum Sharing ," working paper.
- Eugene Visotsky, **Junjik Bae**, Roger Peterson, Randall Berry, and Michael L. Honig, "On the Uplink Capacity of an 802.16j System," *Proceedings of IEEE Wireless Communications & Netwroking Conference (WCNC)*, Las Vegas, NV, USA, 2008.
- **Junjik Bae**, Eyal Beigman, Randall Berry, Michael L. Honig, and Rakesh Vohra, "Efficiency Bounds for Sequential Resource Allocation Auctions," *Proceedings of IEEE Conference on Decision and Control (CDC)*, New Orleans, LA, USA, 2007 (invited paper).
- **Junjik Bae**, Eyal Beigman, Randall Berry, Michael L. Honig, and Rakesh Vohra, "An Efficient Ascending Auction for Non-Concave Valuation," Annual Allerton Conference on Communication, Network games and algorithms, Monticello, IL, USA, September, 2007 (invited paper).
- **Junjik Bae**, Eyal Beigman, Randall Berry, Michael L. Honig, and Rakesh Vohra, "Efficiency of Sequential Bandwidth and Power Auctions with Rate Utilities," *Proceedings of 2nd International Conference on Cognitive Radio Oriented Wireless Networks and Communications (CrownCom)*, Orlando, FL, USA, 2007.
- **Junjik Bae**, Randall Berry, and Michael L. Honig, "Power Allocation and Coverage for a Relay-Assisted Downlink with Voice Users," *Proceedings of IEEE Global Communications Conference (GLOBECOM)*, San Francisco, CA, USA, 2006.
- **Junjik Bae**, Randall Berry, and Michael L. Honig, "Power Allocation, Rate, and Coverage for Relay-Assisted Downlink Data Transmission," *Proceedings of IEEE International Conference on Communications (ICC)*, Istanbul, Turkey, 2006.

HONORS and AWARDS

Graduated with Honors - Seoul National University (1999)
Scholarship for Outstanding Students - Seoul National University (1996-1999)

COMMUNITY SERVICES

- Founder and Organizer of Commnet Talk, lunch time talks within Communications and Networking Group at EECS Department, Northwestern University.
- Member of *IEEE* (since 2004)
- Reviewer for IEEE Journal on Selected Areas in Communications (JSAC), IEEE Transactions on Networking (ToN), IEEE Transactions on Wireless Communications (TWC), IEEE International Conferences on Communication (ICC), IEEE Wireless communications and Networking Conference (WCNC), IEEE

International Symposium on Information Theory (ISIT), and IEEE Signal Processing Advances in Wireless Communications (SPAWC).