Song Noh

website: www.songnoh.com (Email: songnoh@inu.ac.kr, Phone: +82 32-835-8284)

EXPERIENCE

Incheon National University Incheon, South Korea
Assistant Professor Sep. 2018 - Present

- Signal processing algorithm for human-type and machine-type communications
- Design of intelligent wireless communiation systems

Intel Corporation Oregon, USA
Wireless Standards Research Engineer Dec. 2015 - Jul. 2018

- Investigation of the dynamic blockage effects on performance in mmWave
- Development of PHY and MAC algorithm for self-contained and flexible duplex transmission
- Performance analysis of wireless backhaul solution in sub-6GHz and mmWave bands
- Technical contribution to Integrated Access and Backhaul for NR study item

Purdue University Indiana, USA
Research Assistant Jan. 2012 - Dec. 2015

- Multi-resolution codebook and beamforming sequence design in millimeter wave systems
- Pilot beam pattern and hybrid beamforming design in massive MIMO systems
- Precoder design for blind separation and estimation in MIMO-OFDM systems
- Development of a link level simulator based on Digital Video Broadcasting (DVB-T2)

EDUCATION

Purdue University Indiana, USA
Ph.D. in Electrical and Computer Engineering Aug. 2011 – Dec. 2015
Advisors: Professors Michael Zoltowski and David Love

Korea Advanced Institute of Science and Technology (KAIST) Daejeon, South Korea
Master of Science in Electrical Engineering Feb. 2010
Advisor: Professor Youngchul Sung

Soongsil University Seoul, South Korea
Bachelor of Engineering in Electrical Engineering Feb. 2008

PUBLICATIONS

Journal Articles

Song Noh, Jiho Song, Youngchul Sung, and Heejung Yu, "Fast high-resolution AoA estimation for millimeter-wave hybrid array of subarrays," In preparation for submission to *IEEE Trans. Wireless Commun.*, 2020.

Song Noh, Jaekoo Lee, Heejung Yu, Jiho Song, "Channel estimation with beam squint in hybrid beamforming massive MIMO systems," In preparation for submission, 2020.

Waqas Khalid, Heejung Yu, and **Song Noh**, "Residual energy analysis in cognitive radios with energy harvesting UAV under reliability and secrecy constraints," Submitted to *Sensors*, Apr. 2020.

Jiho Song, Byungju Lee, **Song Noh**, and Jong-Ho Lee, "Adaptive multiuser transmission using millimeter wave beam alignment with user selection," Submitted to *IEEE Trans. Veh. Technol.*, Mar. 2020.

Byounghak Kim, Heejung Yu, **Song Noh**, "Cognitive interference cancellation with digital channelizer for satellite communication," *Sensors*, vol. 20, no. 2, Jan. 2020.

Song Noh, Jiho Song, and Youngchul Sung, "Fast beam search and refinement for millimeter-wave massive MIMO based on two-level phased arrays," Submitted to *IEEE Trans. Wireless Commun.*, Jul. 2019.

Jiho Song, Byungju Lee, **Song Noh**, and Jong-Ho Lee, "Limited feedback designs for machine-type communications exploiting user cooperation," *IEEE Access*, vol. 7, pp 95154 - 95169, Sep. 2019.

Song Noh, Michael Zoltowski, and David Love, "Multi-resolution codebook and adaptive beamforming sequence design for millimeter wave beam alignment," *IEEE Trans. Wireless Commun.,* vol. 16, no. 9, pp 5689 – 5701, Sep. 2017.

Il Y. Chun, **Song Noh**, David Love, Thomas M. Talavage, Stephen Beckley, and Sherman J. Kisner, "Mean square error (MSE)-based excitation pattern design for parallel transmit and receive SENSE MRI image reconstruction," *IEEE Trans. Comput. Imag.,* vol. 2, no. 4, pp. 424 – 439, Dec. 2016.

Song Noh, Michael Zoltowski, and David Love, "Training sequence design for feedback assisted hybrid beamforming in massive MIMO systems," *IEEE Trans. Commun.,* vol. 61, no. 1, pp 187 – 200, Jan. 2016.

Song Noh, Michael Zoltowski, Youngchul Sung, and David Love, "Pilot beam pattern design for channel estimation in massive MIMO systems," *IEEE J. Sel. Topics Signal Process.,* vol. 8, no. 5, pp. 787 – 801, Oct. 2014.

Song Noh, Youngchul Sung, and Michael Zoltowski, "A new precoder design for blind channel estimation in MIMO-OFDM systems," *IEEE Trans. Wireless Commun.,* vol. 13, no. 12, pp. 7011 – 7024, Dec. 2014.

Conference Papers

Kyungsik Seo and **Song Noh**, "Performance analysis of beam search techniques in millimeter wave systems," in *Proc. KICS,* Yongpyong, Korea, Feb. 2020.

Song Noh, Kyungsik Seo, Mirae Kim, and Junghwan Im, "Beam misalignment-aware beamforming system design," in *Proc. KICS,* Seoul, Korea, Nov. 2019.

Song Noh, Junghwan Im, Mirae Kim, and Kyungsik Seo, "Beamformed signal classification based on multiple hypothetical testing," in *Proc. KICS,* Jeju, Korea, Jun. 2019.

Song Noh, Dawei Ying, Qian (Clara) Li, Hassan Ghozlan, Apostolos (Tolis) Papathanassiou, and Geng Wu, "System evaluation for millimeter-wave radio access network," in *Proc. IEEE ICC,* Kansas City, MO, May 2018.

Song Noh, Michael Zoltowski, and David Love, "Multi-resolution codebook based beamforming sequence design in millimeter-wave systems," in *Proc. IEEE Globecom,* San Diego, CA, Dec. 2015.

Song Noh, Michael Zoltowski, and David Love, "Downlink training codebook design and hybrid precoding in FDD massive MIMO systems," in *Proc. IEEE Globecom,* Austin, TX, Dec. 2014. (**Best Paper Award**)

Song Noh, Michael Zoltowski, Youngchul Sung, and David Love, "Training signal design for channel estimation in massive MIMO systems," in *Proc. IEEE ICASSP,* Florence, Italy, May 2014.

Song Noh and Michael Zoltowski, "A new precoder design for precoding-based blind channel estimation for MIMO-OFDM systems," in *Proc. IEEE Globecom,* Atlanta, GA, Dec. 2013.

Song Noh and Michael Zoltowski, "Blind separation for precoding-based blind channel estimation for MIMO-OFDM systems," in *Proc. Asilomar,* Pacific Grove, CA, Nov. 2013.

Song Noh, Michael Zoltowski, Youngchul Sung, and David Love, "Optimal pilot beam pattern design for massive MIMO systems," in *Proc. Asilomar,* Pacific Grove, CA, Nov. 2013.

EXTERNAL ACTIVITIES

Technical Committee Activities

- Member, Wireless World Research Form (WWRF), Steering Board — Oct. 2017 - Jul. 2018

Reviewer of Journal and Conference Papers

- IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Vehicular Technology
- IEEE Communications Letters, IEEE Wireless Communications Letters, IEEE Signal Processing Letters
- IEEE Globecom, IEEE ICC, IEEE WCNC

AWARDS AND HONORS

- Next Generation and Standards (NGS) Division Recognition Award, Intel — Q3 2017

- Wireless Communication Research (WCR) Division Recognition Award, Intel Q1 2017
- IEEE Transactions on Communications Exemplary Reviewer Apr. 2015
- Silver Prize in the 21st HumanTech Paper Contest sponsored by Samsung Feb. 2015
- IEEE Global Communications Conference (Globecom) Best Paper Award Dec. 2014