Soyi Jung

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Visiting Scholar, University of California at Irvine – Donald Bren School of Information and Computer Sciences, Irvine, CA, USA
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Research Interests

- **Connected and Autonomous Vehicles:** Unmanned Aerial Vehicles, Autonomous Driving
- **Intelligent and Trust Computing:** Optimal Auction through Deep Learning
- **Distributed Systems Design and Analysis:** Lyapunov Optimization, Queuing Theory

Educational Backgrounds

- **Ajou University**, Suwon, Republic of Korea
  – Ph.D. (03/2016–02/2021) in Electrical and Computer Engineering (Advisor: Prof. Jae-Hyun Kim)
  – M.S. (03/2013–02/2015) in Electrical and Computer Engineering (Advisor: Prof. Jae-Hyun Kim)
  – B.S. (03/2009–02/2013) in Electrical and Computer Engineering

R&D Positions

- **Hallym University – School of Software**, Chuncheon, Republic of Korea
  – *Assistant Professor* (*09/2021–Present*)
- **University of California at Irvine – Donald Bren School of Information and Computer Sciences**, Irvine, CA, USA
  – *Postdoctoral Scholar at UC-Irvine* (*09/2021–Present*), Advisor: Prof. Marco Levorato
- **Korea University – School of Electrical Engineering**, Seoul, Republic of Korea
  – *Research Professor at Korea University* (*03/2021–08/2021*), Advisor: Prof. Joongheon Kim
  – *Co-director at Artificial Intelligence and Mobility* (*AIM*) *Lab* (*03/2021–08/2021*), Advisor: Prof. Joongheon Kim
- **Korea Testing and Research (KTR) Institute**, Gwacheon, Republic of Korea
  – *Researcher* (*03/2015–02/2016*)

Project (Selected: Primary PI)

- **Fundamental Research on LEO Satellite Access Protocols in Non-Territorial Networks** 04/2021–11/2021
  Electronics and Telecommunications Reesarch Institute (*ETRI*) [ETRI (21ZH1100), Grant: $50,000; **Primary PI**]

Awards and Honors

- **Best Paper Award**, *IEEE ICOIN* (*IEEE International Conference on Information Networking*) 01/2021
  – Infrastructure-Assisted Cooperative Multi-UAV Deep Reinforcement Energy Trading Learning for Big-Data Processing.
- **ICT Paper Contest Award by Electronics Times**, *KIISE* (*Korean Institute of Information Scientists and Engineers*) 12/2019
  – Reducing Consecutive Collisions in Sensing Based Semi Persistent Scheduling for Cellular-V2X.
- **Bronze Paper Award**, *IEEE Seoul Section Student Paper Contest* 12/2019
  – Enhanced Resource Selection Algorithm of 3GPP C-V2X Communication.
- **Outstanding Paper Award**, *KICS* (*Korean Institute of Communications and Information Sciences*) 11/2017
  – Wireless Caching Algorithm Based on User's Context in Smallcell Environments.
- **Young Woman Researcher Award**, *WISET* (*Korea Center for Women in Science, Engineering, and Technology*) *and KICS* (*Korean Institute of Communications and Information Sciences*) 11/2015
- **Korea Regional Conference Paper Award**, *KICS* (*Korean Institute of Communications and Information Sciences*) 06/2015
  – Cache Algorithm using User's Context in Smallcell Environments.

International Publications

Ph.D. Dissertation

[PhD.01] **S. Jung**, *Energy-Efficient Scheduling and Optimization for Connected and Autonomous Vehicles*, Ph.D. Dissertation (Electrical and Computer Engineering), Ajou University, Suwon, Korea, February 2021.

Magazines and Journals

[J.16] **S. Jung** and J. Kim*, "Adaptive and Stabilized Real-Time Super-Resolution Control for UAV-Assisted Smart Harbor Surveillance Platforms," ***Journal of Real-Time Iamge Processing*** (Accepted).

[J.15] **S. Jung**, J. Kim, and J.-H. Kim*, "Intelligent Active Queue Management for Stabilized QoS Guarantees in 5G Mobile Networks," ***IEEE Systems Journal***, v(n):ppp–ppp, September 2021 (Online Published).

[J.14] Y.J. Ha, M. Yoo, G. Lee, **S. Jung***, S.W. Choi, J. Kim*, and S. Yoo*, "Spatio-Temporal Split Learning for Privacy-Preserving Medical Platforms: Case Studies with COVID-19 CT, X-Ray, and Cholesterol Data," ***IEEE Access***, v(n):ppp–ppp, September 2021 (Online Published).

[J.13] **S. Jung**, J. Kim*, M. Levorato, C. Cordeiro, and J.-H. Kim*, "Infrastructure-Assisted On-Driving Experience Sharing for Millimeter-Wave Connected Vehicles," ***IEEE Transactions on Vehicular Technology***, 70(8):7307–7321, August 2021.

[J.12] G. Lee, W.J. Yun, Y.J. Ha, **S. Jung***, J. Kim, and Y.K. Lee*, "Measurement Study of Real-Time Virtual Reality Contents Streaming over IEEE 802.11ac Wireless Links," ***Electronics***, 10(16):1967, August 2021.

[J.11] **S. Jung**, W. J. Yun, M. Shin, J. Kim*, and J.-H. Kim*, "Orchestrated Scheduling and Multi-Agent Deep Reinforcement Learning for Cloud-Assisted Multi-UAV Charging Systems," ***IEEE Transactions on Vehicular Technology***, 70(6):5362–5377, June 2021.

[J.10] G. Lee, W. J. Yun, Y.-J. Ha, **S. Jung***, J.-Y. Kim, S. Hong, J. Kim, and Y.-K, Lee*, "Measurement Study of Real-Time Virtual Reality Contents Streaming over IEEE 802.11ac Wireless Links," ***Electronics***, 10(16):1967, August 2021.

[J.09] H. Lee, **S. Jung***, and J. Kim, "Truthful Electric Vehicle Charging via Neural-Architectural Myerson Auction," ***ICT Express***, 7(2):196–199, June 2021.

[J.08] K. Kim, **S. Jung**, and J.-H. Kim*, "Adaptive Speckle Filtering for Real-time Computing in Low Earth Orbit Satellite Synthetic Aperture Radar," ***ICT Express***, 7(2):187–190, June 2021.

[J.07] D. Kim, S. Park, J. Kim, J. y. Bang, and **S. Jung***, "Stabilized Adaptive Sampling Control for Reliable Real-Time Learning-based Surveillance Systems," ***IEEE/KICS Journal of Communications and Networks***, 23(2):128–136, April 2021.

[J.06] W. J. Yun, **S. Jung**, J. Kim*, and J.-H. Kim*, "Distributed Deep Reinforcement Learning for Autonomous Aerial eVTOL Mobility in Drone Taxi Applications," ***ICT Express***, 7(1):1–4, March 2021.

[J.05] **S. Jung**, W. J. Yun, J. Kim*, and J.-H. Kim*, "Coordinated Multi-Agent Deep Reinforcement Learning for Energy-Aware UAV-based Big-Data Platforms," ***Electronics***, 10(5):543, February 2021.

[J.04] S. Park, **S. Jung**, H. Lee, J. Kim*, and J.-H. Kim*, "Large-Scale Water Quality Prediction using Federated Sensing and Learning: A Case Study with Real-World Sensing Big-Data," ***Sensors***, 21(4):1462, February 2021.

[J.03] **S. Jung**, J. Kim, and J.-H. Kim*, "Joint Message-Passing and Convex Optimization Framework for Energy-Efficient Surveillance UAV Scheduling," ***Electronics***, 9(9):1475, September 2020.

[J.02] **S. Jung**, S.-H. Lee, and J.-H. Kim*, "Reliability Control Framework for Random Access of Massive IoT Devices," ***IEEE Access***, 7:49928–49937, April 2019.

[J.01] S.-H. Lee, **S. Jung**, and J.-H. Kim*, "Dynamic Resource Allocation of the Random Access for MTC Devices," ***ETRI Journal***, 39(4):546-557, August 2017.

Conferences

[C.16] W.J. Yun, B. Lim, **S. Jung**, Y.-C. Ko, J. Park*, J. Kim*, and M. Bennis, "Attention-based Reinforcement Learning for Real-Time UAV Semantic Communication," *IEEE International Symposium on Wireless Communication Systems* (*ISWCS*), Berlin, Germany, September 2021.

[C.15] H. Lee, **S. Jung***, and J. Kim*, "Distributed and Autonomous Aerial Data Collection in Smart City Surveillance Applications," *IEEE VTS Asia Pacific Wireless Communications Symposium* (*APWCS*), Virtual, August 2021.

[C.14] J. Kim, Y. Kwak, J. Choi, **S. Jung***, and J. Kim*, "Quantum Scheduling for Millimeter-Wave Observation Satellite Constellation," *IEEE VTS Asia Pacific Wireless Communications Symposium* (*APWCS*), Virtual, August 2021.

[C.13] Y.J. Ha, M. Yoo, S. Park, **S. Jung**, and J. Kim*, "Secure Aerial Surveillance using Split Learning," *IEEE International Conference on Ubiquitous and Future Networks* (*ICUFN*), Jeju Korea, August 2021.

[C.12] H. Baek, W.J. Yun, **S. Jung**, M. Ji, J. Kim*, J. Park*, and M. Bennis, "Communication and Energy Efficient Slimmable Federated Learning via Superposition Coding and Successive Decoding," *International Conference on Machine Learning* (*ICML*) (*Workshop on Federated Learning for User Privacy and Data Confidentiality*), Virtual, July 2021.

[C.11] J. Kim, S. Park, **S. Jung***, and S. Yoo*, "Spatio-Temporal Split Learning," *IEEE/IFIP International Conference on Dependable Systems and Networks* (*DSN*), Virtual, June 2021. (Supplemental Volume)

[C.10] H. Baek, Y.J. Ha, **S. Jung***, and J. Kim*, "Noise Rejection in mmWave Radar Images using Deep Learning Image Processing Methods," *IEEE International Technical Conference on Circuits/Systems, Computers and Communications* (*ITC-CSCC*), Jeju Korea, June 2021.

[C.09] M. Yoo, Y.J. Ha, **S. Jung***, and J. Kim*, "CNN-based Hand Gesture Recognition Using mmWave Radar," *IEEE International Technical Conference on Circuits/Systems, Computers and Communications* (*ITC-CSCC*), Jeju Korea, June 2021.

[C.08] H. Lee **S. Jung***, and J. Kim*, "Deep Learning Auction for Truthful Secure UAV Networking," *IEEE International Technical Conference on Circuits/Systems, Computers and Communications* (*ITC-CSCC*), Jeju Korea, June 2021.

[C.07] G. Lee, W. J. Yun, **S. Jung***, J. Kim*, and J.-H. Kim*, "Visualization of Deep Reinforcement Autonomous Aerial Mobility Learning Simulations," *IEEE International Conference on Computer Communications* (*INFOCOM*), Virtual, May 2021. (Demo Abstract)

[C.06] **S. Jung**, W. J. Yun, J. Kim*, and J.-H. Kim*, "Infrastructure-Assisted Cooperative Multi-UAV Deep Reinforcement Energy Trading Learning for Big-Data Processing," *IEEE International Conference on Information Networking* (*ICOIN*), Jeju, Korea, January 2021.

[C.05] **S. Jung**, P. Yeng, T. Q. S. Quek, and J.-H. Kim*, "Belief Propagation based Scheduling for Energy Efficient Multi-drone Monitoring System," *IEEE International Conference on ICT Convergence* (*ICTC*), Jeju, Korea, October 2020.

[C.04] **S. Jung**, H.-R. Cheon, and J.-H. Kim*, "Reducing Consecutive Collisions in Sensing Based Semi Persistent Scheduling for Cellular-V2X," *IEEE Vehicular Technology Conference* (*VTC*), Hawaii, USA, September 2019.

[C.03] S.-H. Lee, **S. Jung**, and J.-H. Kim*, "Adaptive Resource Allocation and Congestion Control Algorithm for Massive Devices in LTE-A," *IEEE Wireless Communications and Networking Conference* (*WCNC*), Barcelona, Spain, April 2018.

[C.02] S.-S. Yoo, S.-H. Lee, **S. Jung**, and J.-H. Kim*, "Performance Evaluation of Random Access Response Estimation Scheme for IoT Communications," *IEEE International Conference on Communications* (*ICC*), Paris, France, May 2017.

[C.01] J.-K. Kim, **S. Jung**, K.-H. Lee, and J.-H. Kim*, "Frame Aggregation Scheme based on Voice Quality in VoIP System," *International Conference on Electronics, Information, and Communication* (*ICEIC*), Bali, Indonesia, January 2013.

Teaching Experience

Hallym University – School of Software, *Assistant Professor*

- **Undergraduate Courses**: *Computer Architecture* (Fall 2021), *Algorithm* (Fall 2021)

Seoul Women's University – Department of Information Security, *Part-Time Lecturer*

- **Undergraduate Courses**: *Computer Architecture* (Spring 2021), *Introduction to Computer and Information Security* (Spring 2021), *Computer Algorithms* (Fall 2020), *Digital Forensics* (Fall 2020)

Professional Activities

Talks and Presentations

Academic Societies

- *Split Learning Technology Trends: Focusing on Medical AI Applications*; **KICS Workshop** (Seoul, Korea, 08/2021)
- *Research Trends in Connected and Autonomous Vehicle* (*CAV*) *Scheduling and Optimization*; **OSIA Workshop** (Seoul, Korea, 04/2021)

Universities

- *Energy-Efficient Scheduling and Optimization for Connected and Autonomous Vehicles*; **Korea University** (Seoul, Korea, 03/2021)

References

- **Prof. Jae-Hyun Kim**, *Ph.D. Research and Dissertation Advisor*
  – Professor at the Department of Electrical and Computer Engineering, Ajou University (Suwon, Republic of Korea)
  – URL: `http://winner.ajou.ac.kr`
  – E-mail: jkim@ajou.ac.kr
- **Prof. Joongheon Kim**, *Postdoctoral Research Supervisor*
  – Professor at the School of Electrical Engineering, Korea University (Seoul, Republic of Korea)
  – URL: `https://joongheon.github.io`
  – E-mail: joongheon@korea.ac.kr
- **Prof. Marco Levorato**, *Postdoctoral Research Supervisor*
  – Professor at the Donald Bren School of Information and Computer Sciences, University of California at Irvine (Irvine, California, USA)
  – URL: `https://iasl.ics.uci.edu/`
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