

# Dr. Soyi Jung

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## Research Interests

- **Big-Data Processing Platforms:** Computation Outsourcing for Distributed Big-Data Processing
- **Trust Computing:** Optimal Auction through Deep Learning
- **Distributed Systems Design and Analysis:** Lyapunov Optimization, Queuing Theory

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## Educational Backgrounds

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

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## R&D Positions

- **Korea University – School of Electrical Engineering**, Seoul, Republic of Korea, and *Jointly with* **University of California at Irvine – Donald Bren School of Information and Computer Sciences**, Irvine, CA, USA
  - Research Professor at Korea Univ. (03/2021–Present), Artificial Intelligence and Mobility Lab (Advisor: Prof. Joongheon Kim)
  - Visiting Scholar at UC-Irvine (03/2021–Present), Advisor: Prof. Marco Levorato
- **Korea Testing and Research (KTR) Institute**, Gwacheon, Republic of Korea
  - Researcher (03/2015–02/2016)

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## 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, KIIE** (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**, WISSET (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.

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## R&D Projects

- **End-Edge-Cloud Big-Data Processing for Augmented Reality Applications** 03/2021–Present
  - Funded by Samsung Advanced Institute of Technology
- **5G/Unmanned Vehicle Research Center (5G/UV-RC) – University IT Research Center (ITRC)** 06/2020–12/2020
  - Funded by Institute for Information and Communications Technology Promotion (IITP), PI: Hanyang University

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## International Publications

- Correspondence mark: †

### 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.15.review] K Kim, **S. Jung**, and J.-H. Kim<sup>†</sup>, "Adaptive Speckle Filtering for Real-time Computing in Low Earth Orbit Satellite Synthetic Aperture Radar," *ICT Express* (Under Review)., (Special Issue on Mobile and Edge Computing Systems)

- [J.14.review] **S. Jung**, D. Mohaisen, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Truthful and Performance-Optimal Outsourcing Computing for Surveillance Analytics Platforms via Learning-based Auction," *IEEE Internet of Things Journal* (Under Review)., (Special Issue on Secure Data Analytics for Emerging Internet of Things)
- [J.13.review] M. Shin, W. J. Yun, **S. Jung**<sup>†</sup>, S. Park, D. Mohaisen, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Cooperative Multi-Agent Deep Reinforcement Learning for Autonomous Surveillance Drones," *IEEE Transactions on Vehicular Technology* (Under Review).
- [J.12.review] W. J. Yun, Y. J. Ha, **S. Jung**<sup>†</sup>, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Multi-Agent Deep Reinforcement Autonomous Drone Mobility Learning for Smart City Services," *IEEE Vehicular Technology Magazine* (Under Review).
- [J.11.revision] **S. Jung**, J. Kim<sup>†</sup>, M. Levorato, C. Cordeiro, and J.-H. Kim<sup>†</sup>, "Infrastructure-Assisted On-Driving Experience Sharing for Millimeter-Wave Connected Vehicles," *IEEE Transactions on Vehicular Technology* (Under Major Revision).
- [J.10.revision] D. Kim, S. Park, J. Kim, J. y. Bang, and **S. Jung**<sup>†</sup>, "Stabilized Adaptive Sampling Control for Reliable Real-Time Learning-based Surveillance Systems," *IEEE/KICS Journal of Communications and Networks* (Under Major Revision).
- [J.09.revision] M. Shin, **S. Jung**<sup>†</sup>, J. Kim, and W. Lee<sup>†</sup>, "Millimeter-Wave Beam Trading for Smart Ocean IoT Networks via Learning-Assisted Auction," *IEEE/KICS Journal of Communications and Networks* (Under Major Revision).
- [J.08.revision] **S. Jung**, M. Levorato, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Self-Adaptive Learning Outsourcing Decision Making for Edge-Assisted UAV Networks," *IEEE Systems Journal* (Under Major Revision).
- [J.07.revision] S. Park, **S. Jung**, H. Lee, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Large-Scale Water Quality Prediction using Federated Sensing and Learning: A Case Study with Green Tide Big-Data," *Sensors* (Under Major Revision)., (Special Issue on Emerging Sensors Techniques and Technologies for Intelligent Environments)
- [J.06.revision] **S. Jung**, W. J. Yun, M. Shin, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Orchestrated Scheduling and Multi-Agent Deep Reinforcement Learning for Cloud-Assisted Multi-UAV Charging Systems," *IEEE Transactions on Vehicular Technology* (Major Revision Completed)., (Special Section on Vehicular Networks in the era of 6G: End-Edge-Cloud Orchestrated Intelligence)
- [J.05.revision] W. J. Yun, **S. Jung**, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Distributed Deep Reinforcement Learning for Autonomous Aerial eVTOL Mobility in Drone Taxi Applications," *ICT Express* (Major Revision Completed).
- [J.04] **S. Jung**, J. Kim, and J.-H. Kim<sup>†</sup>, "Intelligent Active Queue Management for Stabilized QoS Guarantees in 5G Mobile Networks," *IEEE Systems Journal*, v(n):ppp-ppp, June 2021 (Online Published)., DOI: 10.1109/JSYST.2020.3014231
- [J.03] **S. Jung**, J. Kim, and J.-H. Kim<sup>†</sup>, "Joint Message-Passing and Convex Optimization Framework for Energy-Efficient Surveillance UAV Scheduling," *Electronics*, 9(9):1475, September 2020., DOI: 10.3390/electronics9091475
- [J.02] **S. Jung**, S.-H. Lee, and J.-H. Kim<sup>†</sup>, "Reliability Control Framework for Random Access of Massive IoT Devices," *IEEE Access*, 7:49928–49937, April 2019., DOI: 10.1109/ACCESS.2019.2911089
- [J.01] S.-H. Lee, **S. Jung**, and J.-H. Kim<sup>†</sup>, "Dynamic Resource Allocation of the Random Access for MTC Devices," *ETRI Journal*, 39(4):546-557, August 2017., DOI: 10.4218/etrij.17.0116.0825

## Conferences

- [C.07.review] G. Lee, W. J. Yun, **S. Jung**<sup>†</sup>, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Visualization of Deep Reinforcement Autonomous Aerial Mobility Learning Simulations," in *Proc. IEEE International Conference on Computer Communications (INFOCOM)*, Virtual, May 2021. (Demo Abstract)
- [C.06] **S. Jung**, W. J. Yun, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Infrastructure-Assisted Cooperative Multi-UAV Deep Reinforcement Energy Trading Learning for Big-Data Processing," in *Proc. 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," in *Proc. 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," in *Proc. IEEE Vehicular Technology Conference (VTC-Fall)*, 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," in *Proc. 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," in *Proc. 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," in *Proc. International Conference on Electronics, Information, and Communication (ICEIC)*, Bali, Indonesia, January 2013.

## Teaching Experience

**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 Algorithm* (Fall 2020), *Digital Forensics* (Fall 2020)

## 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)
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- **Prof. Joongheon Kim**, *Postdoctoral Research Supervisor*
  - Professor at the School of Electrical Engineering, Korea University (Seoul, Republic of Korea)
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  - E-mail: [joongheon@korea.ac.kr](mailto:joongheon@korea.ac.kr)
- **Prof. Marco Levorato**, *Postdoctoral Research Supervisor*
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