

# 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

- **University of California at Irvine – Donald Bren School of Information and Computer Sciences**, Irvine, CA, USA
  - **Korea University – School of Electrical Engineering**, Seoul, Republic of Korea (Joint Appointment)
  - Postdoctoral Scholar at UC-Irvine (05/2021–Present), Advisor: Prof. Marco Levorato
  - Research Professor at Korea University Artificial Intelligence and Mobility Lab (03/2021–Present), Advisor: Prof. Joongheon Kim
- **Korea Testing and Research (KTR) Institute**, Gwacheon, Republic of Korea
  - Researcher (03/2015–02/2016)

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## Project (Selected: Primary PI)

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

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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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## 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.

### Book Chapters

- [BC.02] **S. Jung** and J. Kim<sup>†</sup>, "Deep Learning Recipes for Connected and Autonomous Vehicles (CAV) Coordination and Control," *Deep Learning and Its Applications for Vehicle Networks*, CRC Press Taylor and Francis Group, Month Year., (Editor: F. Hu)
- [BC.01] **S. Jung** and J. Kim<sup>†</sup>, "Stochastic Decision Making under Uncertainty using Deep Learning," *Decision Making*, IntechOpen, Month Year., (Editor: F.P.G. Márquez)

## Magazines and Journals

- [J.18.review] **S. Jung**, M. Shin, J. Kim<sup>†</sup>, and W. Lee<sup>†</sup>, "Millimeter-Wave Beam Trading for Smart Ocean IoT Networks via Learning-Assisted Auction," *IEEE Access* (Under Review).
- [J.17.review] **S. Jung** and J. Kim<sup>†</sup>, "Adaptive and Stabilized Real-Time Super-Resolution Control for UAV-Assisted Smart Harbor Surveillance Platforms," *Journal of Real-Time Image Processing* (Under Review)., (Special Issue on Real-Time Intelligent Image Processing for Security Applications)
- [J.16.review] W. J. Yun, S. Park, J. Kim<sup>†</sup>, M. Shin, **S. Jung**<sup>†</sup>, D. Mohaisen<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Double Blind Review," *IEEE Transactions on Industrial Informatics* (Under Review)., (Special Session on Reliability and Security for Intelligent Wireless Sensing and Control Systems)
- [J.15.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.14.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 Internet Computing* (Under Review).
- [J.13.major] **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* (With Associate Editor)., (Connected Vehicles Series: Annual Special Issue/Special Section on Connected Vehicles)
- [J.12.major] **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 Transactions on Services Computing* (Under Major Revision).
- [J.11] H. Lee, **S. Jung**<sup>†</sup>, and J. Kim, "Truthful Electric Vehicle Charging via Neural-Architectural Myerson Auction," *ICT Express* (Accepted).
- [J.10] 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* (Accepted).
- [J.09] **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](https://doi.org/10.1109/JSYST.2020.3014231)
- [J.08] **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* (Accepted)., (Special Section on Vehicular Networks in the era of 6G: End-Edge-Cloud Orchestrated Intelligence), DOI: [10.1109/TVT.2021.3062418](https://doi.org/10.1109/TVT.2021.3062418)
- [J.07] 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* (Accepted)., (Special Issue on Mobile and Edge Computing Systems), DOI: [10.1016/j.icte.2021.02.003](https://doi.org/10.1016/j.icte.2021.02.003)
- [J.06] 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*, 7(1):1-4, March 2021., DOI: [10.1016/j.icte.2021.01.005](https://doi.org/10.1016/j.icte.2021.01.005)
- [J.05] **S. Jung**, W. J. Yun, J. Kim<sup>†</sup>, and J.-H. Kim<sup>†</sup>, "Coordinated Multi-Agent Deep Reinforcement Learning for Energy-Aware UAV-based Big-Data Platforms," *Electronics*, 10(5):543, February 2021., (Special Issue on Ultra-Intelligent Computing and Communication for B5G and 6G Networks), DOI: [10.3390/electronics10050543](https://doi.org/10.3390/electronics10050543)
- [J.04] 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 Real-World Sensing Big-Data," *Sensors*, 21(4):1462, February 2021., (Special Issue on Emerging Sensors Techniques and Technologies for Intelligent Environments), DOI: [10.3390/s21041462](https://doi.org/10.3390/s21041462)
- [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., (Special Issue on Energy-Aware and Efficient Computing and Communications), DOI: [10.3390/electronics9091475](https://doi.org/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](https://doi.org/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](https://doi.org/10.4218/etrij.17.0116.0825)

## Conferences

- [C.07] 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.
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## 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)
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## Professional Activities

Talks and Presentations

**Universities**

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

**Academic Societies**

- *Research Trends in Connected and Autonomous Vehicle (CAV) Scheduling and Optimization*; **OSIA Workshop** (Seoul, Korea, 04/2021)
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## 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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- **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)
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