Dr. Soyi Jung

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Postdoctoral 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), 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

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*)

Project (Selected)

- **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**]
- **Research on Inteligent Agent-based CPS Security and Reliability** 05/2021–11/2021
  Funded by *Telecommunications Technology Association* (*TTA*) [Grant: $50,000]
- **Development of Quantum Deep Reinforcement Learning Algorithm using QAOA** 10/2019–04/2022
  Funded by *Ministry of Science and ICT* [2019M3E4A1080391, Grant: $258,500]
- **mmWave Radar and Deep Reinforcement Learning based Optimal Policy Autonomous Driving** 06/2019–02/2022
  Funded by *National Research Foundation of Korea* [2019R1A2C4070663, Grant: $275,000]

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

- 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.19.review] K. Kim, **S. Jung**, J. Kim†, and J.-H. Kim†, "Stabilized Target Recognition Performance Maximization using Adaptive LEO Spaceborne SAR Image Processing," ***IEEE Transactions on Aerospace and Electronic Systems*** (Under Review).

[J.18.review] **S. Jung**, M. Shin, J. Kim†, and W. Lee†, "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†, "Adaptive and Stabilized Real-Time Super-Resolution Control for UAV-Assisted Smart Harbor Surveillance Platforms," ***Journal of Real-Time Iamge Processing*** (Under Review)., (Special Issue on Real-Time Intelligent Image Processing for Security Applications)

[J.16.review] W. J. Yun, S. Park, J. Kim†, M. Shin, **S. Jung**†, D. Mohaisen†, and J.-H. Kim†, "Cooperative Multi-Agent Deep Reinforcement Learning for Reliable Surveillance via Autonomous Multi-UAV Control," ***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†, and J.-H. Kim†, "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**†, J. Kim†, and J.-H. Kim†, "Multi-Agent Deep Reinforcement Autonomous Drone Mobility Learning for Smart City Services," ***IEEE Internet Computing*** (Under Review).

[J.13.review] **S. Jung**, M. Levorato, J. Kim†, and J.-H. Kim†, "Self-Adaptive Learning Outsourcing Decision Making for Edge-Assisted UAV Networks," ***IEEE Transactions on Services Computing*** (Under Review).

[J.12.major] **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*** (With Associate Editor)., (Connected Vehicles Series: Annual Special Issue/Special Section on Connected Vehicles)

[J.11] H. Lee, **S. Jung**†, and J. Kim, "Truthful Electric Vehicle Charging via Neural-Architectural Myerson Auction," ***ICT Express*** (Online Published).,
DOI: 10.1016/j.icte.2021.03.009

[J.10] 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*** (Online Published).,
DOI: 10.23919/JCN.2021.000009, IEEExplore: https://ieeexplore.ieee.org/document/9406452

[J.09] **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, June 2021 (Online Published).,
DOI: 10.1109/JSYST.2020.3014231

[J.08] **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*** (Accepted)., (Special Section on Vehicular Networks in the era of 6G: End-Edge-Cloud Orchestrated Intelligence),
DOI: 10.1109/TVT.2021.3062418

[J.07] 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*** (Accepted)., (Special Issue on Mobile and Edge Computing Systems),
DOI: 10.1016/j.icte.2021.02.003

[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.,
DOI: 10.1016/j.icte.2021.01.005

[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., (Special Issue on Ultra-Intelligent Computing and Communication for B5G and 6G Networks),
DOI: 10.3390/electronics10050543

[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., (Special Issue on Emerging Sensors Techniques and Technologies for Intelligent Environments),
DOI: 10.3390/s21041462

[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., (Special Issue on Energy-Aware and Efficient Computing and Communications),
DOI: 10.3390/electronics9091475

[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.,
DOI: 10.1109/ACCESS.2019.2911089

[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.,
DOI: 10.4218/etrij.17.0116.0825

Conferences

[C.08] J. Kim, S. Park, **S. Jung**†, and S. Yoo†, "Spatio-Temporal Split Learning," To appear in *Proc. IEEE/IFIP International Conference on Dependable Systems and Networks* (*DSN*), Virtual, June 2021. (Supplemental Volume)

[C.07] G. Lee, W. J. Yun, **S. Jung**†, J. Kim†, and J.-H. Kim†, "Visualization of Deep Reinforcement Autonomous Aerial Mobility Learning Simulations," To appear in *Proc. 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," 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)

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)

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)
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