Sangwon Hwang

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EDUCATION

Ph.D. Electrical and Computing Engineering — Seoul | Feb 2022
Korea University
Advisor : Inkyu Lee
Thesis : Multi-Agent Deep Reinforcement Learning Based Resource Allocation Methods for Wireless Communication Systems

B.S. Electrical Engineering — Seoul | Feb 2015
Korea University

WORK EXPERIENCE

PUKYONG NATIONAL UNIVERSITY | Assistant Professor — Busan | Mar 2025 – Present
Department of Computer and Artificial Intelligence Engineering
Homepage (PKNU)

SAMSUNG ELECTRONICS | Senior Researcher — Suwon | Dec 2023 – Feb 2025
Mobile Experience Business
Affiliation: Connectivity R&D Group
Homepage (Samsung)

KOREA UNIVERSITY | Postdoctoral fellow — Seoul | Feb 2023 – Nov 2023
Augmented Cognition Meta-Communications Research Center, ERC
Supervisor : Inkyu Lee

KOREA TECHNOLOGY FINANCE CORPORATION | Assistant Manager — Seoul | Dec 2021 – Jan 2023
Central Technology Appraisal Institute
Role: Technology Valuation, Comprehensive Technology Appraisal (Listed market; KOSDAQ)
Homepage (KOTEC)

ACADEMIC EXPERIENCE

QUEEN'S UNIVERSITY | Visiting Student — Kingston, ON | Sep 2019 – Nov 2019
Supervisor : IL-min Kim

KOREA'S UNIVERSITY | Graduate Research Assistant — Seoul | Mar 2018 – Dec 2021
Principal Investigator : Inkyu Lee

low orbit satellite communication — Apr 2021 - Dec 2021
Ministry of Science and ICT, Korea

Research on AI Scheduling for communication systems Learning — Apr 2020 - Apr 2021
Samsung Electronics, Korea

for Next Generation Telecommunication systems based on Machine Learning — Dec 2018 - Dec 2020
Huawei Technologies, China

Communication network design based on Dynamic Mirror Descent technique — Mar 2018 - Feb 2021
National Research Foundation, Korea

PUBLICATIONS

Journal (In Preparation)

[J5] S. Kim, J. Moon, Z. Fu, **S. Hwang** and I. Lee, "Sensing Mode Selection and Beamforming Design for Integrated Dynamic Sensing and Communication Systems," *to be submitted in IEEE Transactions on Wireless Communications.*

[J4] M. Kim, H. Lee and **S. Hwang*** "Deep Reinforcement Learning Approach for Fluid Antenna Systems," *to be submitted in IEEE Publication.*

[J3] **S. Hwang***, B. Lim and H. Lee "Deep Reinforcement Learning Approach for Satellite Mobile Edge Computing Networks," *to be submitted in IEEE Internet of Things Journal*.

[J2] B. Lim, M. Vu and **S. Hwang***, "Graph Attention Network Approach for Decentralized User Association and Beamforming Design in Multi-RIS Assisted Multi-Cell Network," *to be submitted in IEEE Transactions on Wireless Communications*.

[J1] Z. Fu, J. Moon, **S. Hwang**, S. Kim and I. Lee "Deep Reinforcement Learning Approach for Integrated Sensing and Communication Systems," *to be submitted in IEEE Wireless Communication Letters*.

Journal

[J12] J. Moon, Z. Fu, I. Bang, T. Kim and **S. Hwang***, "Joint Optimization of Transmission Probability and Artificial Noise for Covert Communications in an AF Relay System," *submitted in IEEE Transactions on Wireless Communications*.

[J11] S. Kim, Z. Fu, J. Moon, **S. Hwang**, S. Park and I. Lee, "Sensing Mode Selection and Beamforming Design for Integrated Dynamic Sensing and Communication Systems," *under revision in IEEE Transactions on Wireless Communications*.

[J10] Z. Fu, J. Moon, **S. Hwang**, S. Kim, Z. Di and I. Lee, "Covert Communications in Multi-antenna Two-way Relay Systems," *accepted in IEEE Transactions on Vehicular Technology*.

[J9] **S. Hwang***, H. Lee, M. Kim and I. Lee, "Multi-Agent Deep Reinforcement Learning for Decentralized Multi-UAV Mobile Edge Computing Networks," *in IEEE Internet of Things Journal, vol. 12, no. 10, pp. 14484-14497, May. 2024*.

[J8] S. Shin, **S. Hwang**, S. Kim and I. Lee, "Comments on Throughput Maximization for UAV-Enabled Integrated Periodic Sensing and Communication," *in IEEE Transactions on Wireless Communications, vol. 24, no. 2, pp. 1753-1753, Feb. 2025*.

[J7] M. Kim, H. Lee, **S. Hwang**, M. Debbah and I. Lee, "Cooperative Deep Reinforcement Learning Methods for UAV-Aided Mobile Edge Computing Networks," *in IEEE Internet of Things Journal, vol. 11, no. 23, pp. 38040-38053, Dec. 2024*.

[J6] M. Kim, H. Lee, **S. Hwang**, M. Kim and I. Lee, "Decentralized Learning Framework for Hierarchical Wireless Networks: A Tree Neural Network Approach," *in IEEE Internet of Things Journal, vol. 11, no. 10, pp. 17780-17796, May. 2024*.

[J5] J. Park, **S. Hwang**, H. Lee and I. Lee, "Deep Recurrent Q-Network Methods for mmWave Beam Tracking Systems," *in IEEE Transactions on Vehicular Technology, vol. 71, no. 12, pp. 13429-13434, Dec. 2022*.

[J4] Z. Fu, **S. Hwang**, J. Moon, H. Ren and I. Lee, "A Codebook Design for FD-MIMO Systems With Multi-Panel Array," *in IEEE Transactions on Vehicular Technology, vol. 71, no. 12. pp. 13366-13371, Dec. 2022*.

[J3] **S. Hwang***, H. Lee, J. Park and I. Lee, "Decentralized Computation Offloading with Cooperative UAVs: Multi-Agent Deep Reinforcement Learning Perspective," *in IEEE Wireless Communications, vol. 29, no. 4, pp. 24-31, August 2022*.

[J2] **S. Hwang***, H. Kim, H. Lee and I. Lee, "Multi-Agent Deep Reinforcement Learning for Distributed Resource Management in Wirelessly Powered Communication Networks," *in IEEE Transactions on Vehicular Technology, vol. 69, no. 11, pp. 14055-14060, Nov. 2020*.

[J1] J. Jang, H. Lee, **S. Hwang**, H. Ren and I. Lee, "Deep Learning-Based Limited Feedback Designs for MIMO Systems," *in IEEE Wireless Communications Letters, vol. 9, no. 4, pp. 558-561, April 2020*.

Conference

[C4] **S. Hwang***, J. Park, H. Lee, M. Kim and I. Lee, "Deep Reinforcement Learning Approach for UAV-Assisted Mobile Edge Computing Networks," *in Proc. IEEE Global Communications Conference, 2022, pp. 3839-3844*.

[C3] M. Kim, **S. Hwang** and I. Lee, "Deep Reinforcement Learning Approach for Fairness-aware Scheduling in Wireless Networks," *in Proc.International Conference on Information and Communication Technology Convergence (ICTC), 2022, pp. 1229-1232*.

[C2] Z. Fu, B. Ju, J. Moon, **S. Hwang** and I. Lee, "Covert Communications in Two-way Relay Systems with Energy Harvesting," *in Proc. International Conference on Information and Communication Technology Convergence (ICTC), 2022, pp. 985-989*.

[C1] S. Kang, H. Lee, **S. Hwang** and I. Lee, "Time Switching Protocol for Multi-Antenna SWIPT Systems," *in Proc. IEEE Wireless Communications and Networking Conference (WCNC), May 2020, pp. 1-6*.

Patent

[P7] **S. Hwang***, H. Lee, M. Kim, and I. Lee, "Method and Apparatus for Generating Multi-agent Reinforcement Learning Model for Distributed Multi-UAV based Mobile Edge Computing Network," *filled with the Korea Intellectual Property Office, No. KR 10-2025-0077126, Jun. 12, 2025*.

[P6] M. Kim, H. Lee, **S. Hwang**, and I. Lee, "Method and Apparatus for Generating Cooperative Message-based Multi-agent Reinforcement Learning Model for UAV-based Edge Computing Resource Optimization," *filled with the Korea Intellectual Property Office, No. KR 10-2025-0077125, Jun. 12, 2025.*

[P5] **S. Hwang***, C. Yang, J. Yun and J. Choi, "Intelligent Wi-Fi link assessment for Wi-Fi to cellular transition," *filled with the Korea Intellectual Property Office, No. KR 10-2025-0000376, Jan. 02, 2025.*

[P4] J. Yun, J. Choi, **S. Hwang**, G. Kim and C. Yang, "On-device deep reinforcement learning based intelligent Wi-Fi roaming method," *filled with the Korea Intellectual Property Office, No. KR 10-2024-0119514, Sep. 03, 2024.*

[P3] M. Kim, H. Lee, **S. Hwang** and I. Lee, "Method and Apparatus for generating neural network model for each node of network with hierarchical tree structure based on distributed learning framework," *filled with the Korea Intellectual Property Office, No. KR 10-2024-0027642, Feb 27, 2024.*

[P2] Z. Fu, **S. Hwang**, J. Moon and I. Lee, "Method and Apparatus for Transmission and Reception based on Line Panel Codebook In Wireless Communication System," *U.S. Patent, No. US 11,870,518 B2, Jan 9, 2024.*

[P1] Z. Fu, **S. Hwang**, J. Moon and I. Lee, "Method and Apparatus for Transmission and Reception based on Line Panel Codebook In Wireless Communication System," *Korean Patent, No. KR 10-2622249, Jan 3, 2024.*

PROJECTS

HUAWEI PROJECT

Objective (1): Developing 3GPP standard Type-II codebook for multi-panel MIMO system where one-to-many mapping between transceiver unit and antenna elements is available
Objective (2): Designing joint channel estimation and feedback for FDD MIMO to mitigate the huge feedback overhead
Deliverables: ***[J1], [J4], [P1], [P2],*** *Technical Documents, S/W*

SAMSUNG PROJECT

Objective: Developing scheduling algorithm which is adaptive to changes in the environment such as channel and network topology
Deliverables: ***[C3],*** *Patent, Technical Documents, S/W*

NATIONAL RESEARCH FOUNDATION PROJECT

Objective: Designing transceivers based on energy causality of user terminals in wireless-powered communication networks
Deliverables: ***[J2],*** *Technical Documents*

AWARDS AND HONOR

KOREA UNIVERSITY
Seoul | Mar 2015 – Feb 2017

Graduate Scholarship
Full tuition for graduate students

DAELIM CORPORATION
Seoul | Sep 2011 – Feb 2015

Undergraduate Scholarship
Full tuition and living expenses support for undergraduate students

AWARDS
Silver Awards | 2020

IEEE Seoul Section Student Paper Contest

ACADEMIC ACTIVITY

Reviewer

Journal: IEEE JSAC, IEEE Network, IEEE TVT, IEEE TCCN, IEEE TITS, IEEE WCL, IEEE SPL, IEEE Access, Nature Scientific Report
Conference: IEEE ICC (2021), IEEE Globecom (2021), IEEE VTC (2022, 2018)

SKILLS

Programming Languages: Python, Tensorflow, Pytorch, Java, Android, Matlab, C, C++, PHP, Git, LaTeX

REFERENCES

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