Changmin Lee

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(Last update: January 27th, 2026)

RESEARCH INTERESTS

- **Prototyping**
- **IEEE 802.11**
- **Molecular Communications**

SKILLS

- **Languages:** Korean (Native), English (Fluent)
- **Fundamentals:** Communications Theory, Computer Networks, Computer Architecture, Network Simulation (ns-3)
- **Programming:** Python, C/C++, Matlab, Javascript
- **AI & MLOps:** TensorFlow, PyTorch; DRL, XAI; MLflow, Kubeflow
- **Infrastructure & Cloud:** Docker, Kubernetes; Terraform, Ansible, Airflow; AWS, GCP
- **Backend & DB:** Django; MongoDB, PostgreSQL

EXPERIENCES

Mar. 2023 – Now **Newratek**, Senior Engineer
Analyze IEEE 802.11 standards (specifically 802.11be/bn) and design architectural components for next-generation Wi-Fi protocols.

Aug. 2018 – Aug. 2018 **Boğaziçi University**, Visiting Researcher
Provide technical support for a molecular communication testbed.
Co-authored a research paper as a result of successful international collaboration.

EDUCATION

Mar. 2015 – Feb. 2023 **Yonsei University** Seoul, Korea
Ph.D., School of Integrated Technology, College of Engineering
(Advisor: Prof. Chan-Byoung Chae)

Mar. 2012 – Feb. 2015 **Yonsei University** Seoul, Korea
B.S., School of Integrated Technology, College of Engineering

PROJECTS

2026 – **Kubeflow for TinyML**
Upgrading the existing simulation framework to a Kubernetes-based infrastructure using Kubeflow.
Implementing end-to-end MLOps pipelines to develop and deploy optimized TinyML models.

2025 **Deep Learning Framework for System Level Simulator (ns-3)**
Advanced the statistical framework by integrating MLflow to enable Reinforcement Learning experiments.

2025 **Google Cloud AI Study Jam**
Completed advanced tracks in machine learning and data analytics using Google Cloud Platform (GCP).
Implemented hands-on projects involving Vertex AI, BigQuery ML, and scalable AI infrastructure.

2023 – 2024 **Statistical Framework for System Level Simulator (ns-3)**
Containerized ns-3 using Docker for concurrent runs and automated pipelines with Airflow and Django.
Optimized large-scale data management by implementing a processing pipeline with MongoDB.

2023 – 2026 **System Level Simulator (ns-3) for IEEE 802.11be/bn**
Implement features and analyzed its performance on real-time applications with ns-3 simulator.

2022 **Google Machine Learning Bootcamp**
Completed a program focusing on deep learning theory and practical implementation using TensorFlow.

2020 – 2022 **Prototype for In-Vessel Molecular Communication**
Developed a fluidic communication system using pump-based transmitters and pH sensors.
Implemented real-time signal detection and interfacing using Arduino in pipe-flow environments.

2014 – 2020 **Prototype for Free-Space Molecular Communication**
Developed an over-the-air testbed utilizing spray-based transmitters and alcohol sensors.
Implemented real-time signal detection and interfacing using Arduino in free-space environments.

AWARDS AND HONORS

Nov. 2025 **Guest Editor, IEEE TMBMC**
Special issue: Cross-Disciplinary Molecular and Biological Communications: From Nanoscale Mechanisms to Intelligent Multi-Scale Networks

Sept. 2025 **Technical Program Committee, IEEE ICC 2026**
Track: MBMC (Molecular, Biological, and Multi-Scale Communications)

May 2020 **Best Demo Award, IEEE WCNC 2020**
Paper title: In-Vessel Molecular MIMO Communications

Feb. 2020 **Bronze Prize, 26th Samsung Humantech Paper Contest**
Paper title: ISI-Minimizing Channel Codes for Molecular Communication via Diffusion: From Theory to Prototype

May 2019 **Host Data Bakeoff Competition, IEEE CTW 2019**
Competition title: Molecular MIMO Competition

May 2015 **Best Demo Award, IEEE INFOCOM 2015**
Paper title: Molecular MIMO Communication Link

Mar. 2015 **Graduate Fellowship**
ICT Consilience Creative Program, Ministry of Science and ICT, South Korea

Mar. 2012 **Undergraduate Fellowship**
ICT Consilience Creative Program, Ministry of Science and ICT, South Korea

SELECTED PUBLICATIONS

1. S. Lee, **C. Lee**, S.-C. Noh, and J. Lee, "Performance Analysis of IEEE 802.11bn with Coordinated TDMA on Real-Time Applications," to appear in *Proc. IEEE Glob. Commun. Conf. (GLOBECOM)*, 2025.
2. **C. Lee**, B. -H. Koo, C. -B. Chae and R. Schober, "The Internet of Bio-Nano Things in Blood Vessels: System Design and Prototypes," *J. Commun. Netw.*, vol. 25, no. 2, pp. 222-231, Apr. 2023.
3. **C. Lee**, B.-H. Koo, and C.-B. Chae, "Demo: In-Vessel Molecular MIMO Communications," in *Proc. IEEE Wireless Commun. Netw. Conf. Workshops (WCNCW)*, 2020.
4. **C. Lee**, H. B. Yilmaz, C. -B. Chae, N. Farsad and A. Goldsmith, "Machine Learning based Channel Modeling for Molecular MIMO Communications," in *Proc. IEEE Int. Workshop Signal Process. Adv. Wireless Commun. (SPAWC)*, 2017.
5. **C. Lee**, B.-H. Koo, N.-R. Kim, H. B. Yilmaz, N. Farsad, A. W. Eckford, and C.-B. Chae, "Molecular MIMO Communication Link," in *Proc. IEEE Int. Conf. Comput. Commun. Workshops (INFOCOM WKSHPS)*, 2015.

PUBLICATIONS

1. **C. Lee***, S. Lee*, S.-C. Noh, and J. Lee, "Deep Reinforcement Learning Based Coordinated TDMA for IEEE 802.11bn," *Submitted*.
2. S. Lee, **C. Lee**, S.-C. Noh, and J. Lee, "Performance Analysis of IEEE 802.11bn with Coordinated TDMA on Real-Time Applications," to appear in *Proc. IEEE Glob. Commun. Conf. (GLOBECOM)*, 2025. [Online]. Available: https://arxiv.org/abs/2508.18755
3. Y.-F. Lo*, **C. Lee***, and C. -B. Chae, "Three-Dimensional Channel Modeling for Molecular Communications in Tubular Environments with Heterogeneous Boundary Conditions," *Submitted*.
4. P. Hofmann, P. Zhou, **C. Lee**, M. Reisslein, F. H. P. Fitzek and C. -B. Chae, "OpenFOAM Simulation of Microfluidic Molecular Communications: Method and Experimental Validation," *IEEE Access*, vol. 12, pp. 109494-109512, 2024.
5. H. Hyun, **C. Lee**, M. Wen, S. -H. Kim and C. -B. Chae, "ISI-Mitigating Character Encoding for Molecular Communications via Diffusion," *IEEE Wireless Commun. Lett.*, vol. 13, no. 1, pp. 24-28, Jan. 2024.
6. **C. Lee**, B. -H. Koo, C. -B. Chae and R. Schober, "The Internet of Bio-Nano Things in Blood Vessels: System Design and Prototypes," *J. Commun. Netw.*, vol. 25, no. 2, pp. 222-231, Apr. 2023.
7. B. -H. Koo, **C. Lee**, A. E. Pusane, T. Tugcu and C. -B. Chae, "MIMO Operations in Molecular Communications: Theory, Prototypes, and Open Challenges," *IEEE Commun. Mag.*, vol. 59, no. 9, pp. 98-104, Sept. 2021.
8. **C. Lee**, B.-H. Koo, and C.-B. Chae, "Demo: In-Vessel Molecular MIMO Communications," in *Proc. IEEE Wireless Commun. Netw. Conf. Workshops (WCNCW)*, 2020.
9. A. O. Kislal, B. C. Akdeniz, **C. Lee**, A. E. Pusane, T. Tugcu and C. -B. Chae, "ISI-Mitigating Channel Codes for Molecular Communication Via Diffusion," in *IEEE Access*, vol. 8, pp. 24588-24599, 2020.
10. **C. Lee**, B.-H. Koo, and C.-B. Chae, "Molecular MIMO Communications Platform with BTSK for In-Vessel Network Systems," in *Proc. EAI Int. Conf. Bio-insp. Inform. Commun. Technol.*, 2020.
11. Y. Huang, M. Wen, **C. Lee**, C. -B. Chae and F. Ji, "A Two-Way Molecular Communication Assisted by an Impulsive Force," *IEEE Trans. Ind. Informat.*, vol. 15, no. 5, pp. 3048-3057, May 2019.

12. N. -R. Kim, N. Farsad, **C. Lee**, A. W. Eckford and C. -B. Chae, "An Experimentally Validated Channel Model for Molecular Communication Systems," *IEEE Access*, vol. 7, pp. 81849-81858, 2019.
13. **C. Lee**, H. B. Yilmaz, C. -B. Chae, N. Farsad and A. Goldsmith, "Machine Learning based Channel Modeling for Molecular MIMO Communications," in *Proc. IEEE Int. Workshop Signal Process. Adv. Wireless Commun. (SPAWC)*, 2017.
14. H. B. Yilmaz, **C. Lee**, Y. J. Cho and C. -B. Chae, "A Machine Learning Approach to Model the Received Signal in Molecular Communications," in *Proc. IEEE Int. Black Sea Conf. Commun. and Netw. (BlackSeaCom)*, 2017.
15. B.-H. Koo, **C. Lee**, H. B. Yilmaz, N. Farsad, A. Eckford, and C.-B. Chae, "Molecular MIMO: From Theory to Prototype," *IEEE J. Sel. Areas Commun.*, vol. 34, no. 3, pp. 600-614, Mar. 2016.
16. **C. Lee**, B.-H. Koo, N.-R. Kim, H. B. Yilmaz, N. Farsad, A. W. Eckford, and C.-B. Chae, "Demo: Molecular MIMO with Drift," in *Proc. ACM MobiCom*, 2015.
17. **C. Lee**, B.-H. Koo, N.-R. Kim, H. B. Yilmaz, N. Farsad, A. W. Eckford, and C.-B. Chae, "Molecular MIMO Communication Link," in *Proc. IEEE Int. Conf. Comput. Commun. Workshops (INFOCOM WKSHPS)*, 2015.