

# Wireless Communication & Information System Laboratory



Prof. Wan Choi (최 완)

## Experience:

- Professor, Dept. of ECE, Seoul National University Mar. 2020 –
- Professor, School of EE, KAIST Feb. 2007– Feb. 2020

## Education:

- Ph.D. in ECE, Univ. of Texas at Austin
- M.S. in EE, Seoul National University
- B.S. in EE, Seoul National University

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## Academic activities:

- IEEE Fellow (IEEE Communication Society)
- Member of Fellow Evaluation Committee, IEEE Vehicular Technology Society (2020 -- present)
- Executive Editor Chair, IEEE Trans. on Wireless Communications (July 2019 – present)
- Executive Editor, IEEE Trans. on Wireless Communications (Dec. 2014–June 2019)
- Editor, IEEE Trans. on Wireless Communications (Dec. 2008–May 2014)
- Editor, IEEE Trans. on Vehicular Technology (Apr. 2011– present)
- Editor, IEEE Wireless Communications Letters (Sep. 2012–Sep. 2017)
- Guest Editor, IEEE Journal on Selected Areas in Communications (2014)

## About WCISL

- We carry out advanced research on academic and technological fronts in wireless communications and information systems.
- Our research focuses on building up technical fundamentals of advanced wireless information systems and finds practical applications to wireless distributed learning, wireless computing, 5G/6G, and internet of things (IoT).
- We are recognized as a world-leading research group in wireless communications and information systems.
- Career after graduation: 4 professors, 2 researchers in government funded research institutes, 2 engineers in Samsung Electronics, 1 engineer in oversea company, 3 oversea postdoc scholars (total 12 Ph.D. alumni until 2019)
- Useful courses: probability and random process, communication systems, digital signal processing, information theory, optimization, linear algebra, real analysis, etc.

## Main Research Topics

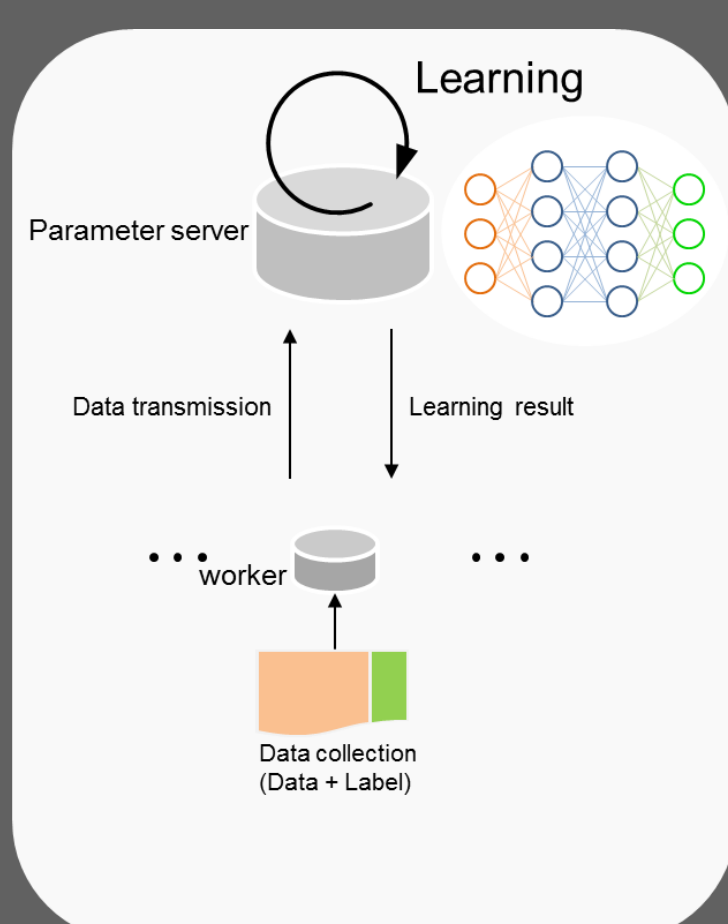
### 5G/6G Communication Systems

- We have developed key techniques enabling 5G/6G, in the areas of massive MIMO, interference management, massive connections, ultra reliability and low latency, and D2D/V2X.
- We authored the most cited (5,017 times, google scholar) 5G paper: “What will 5G be?” IEEE Journal on Selected Areas in Communications, June 2014.

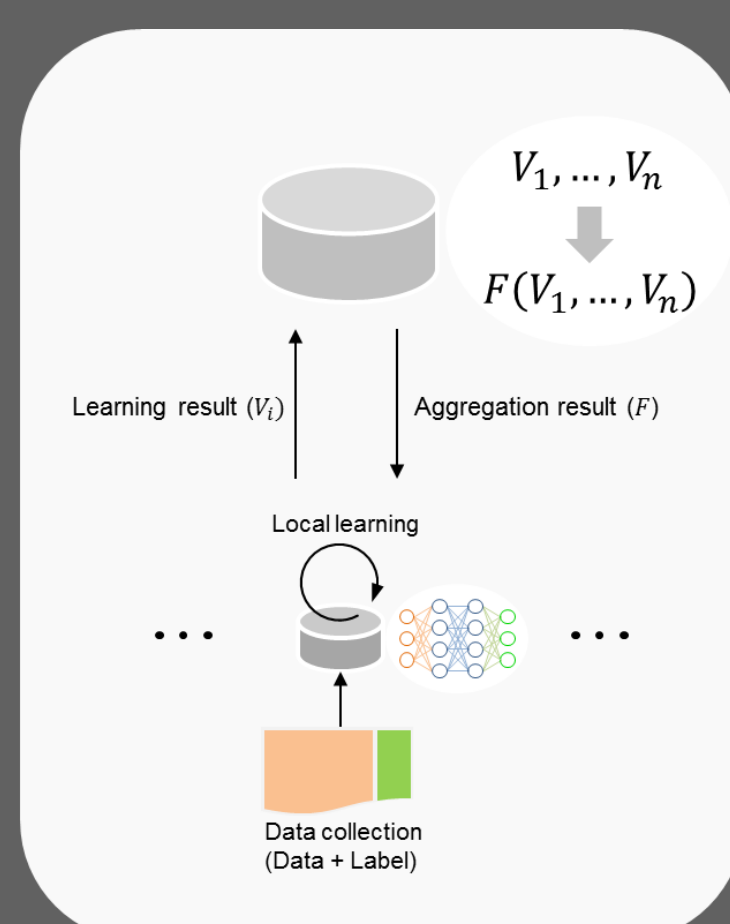


### Wireless Distributed Learning

- Learning is carried out with distributed local servers, where local servers locally update models while a central server aggregates the local models.
- The fundamental question is how to design the aggregation methodologies to achieve reliable and low latency performance in wireless environments?
- We explore many related issues involving wireless information delivery, such as Byzantine fault, straggler, multiple access, communication delay/errors, distributed consensus (distributed ledger/block-chain), etc.



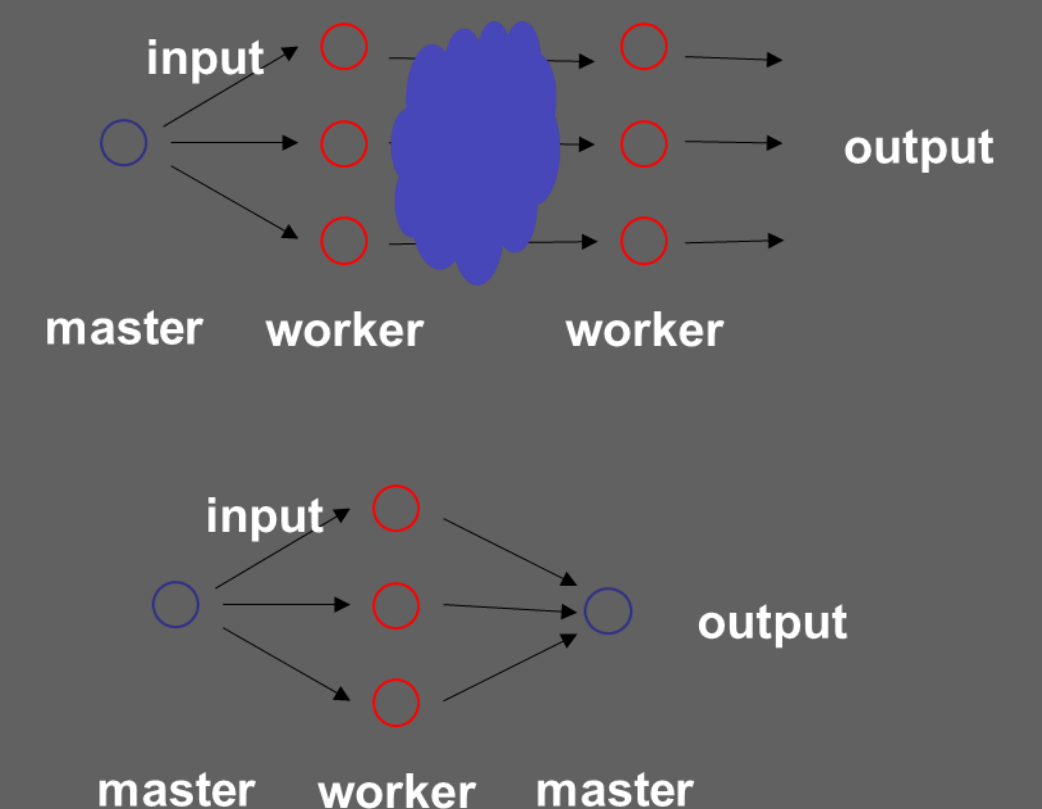
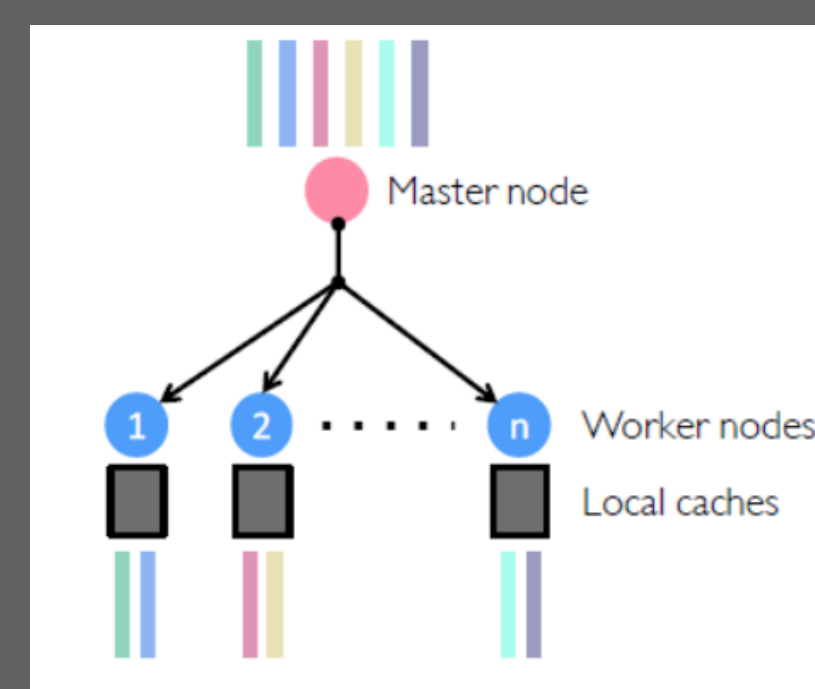
Cost of transmitting data is too high.



Cost of transmitting learning results is low.

### Wireless Edge Computing

- Wireless edge nodes collaboratively carry out specific tasks by computing, caching and exchange data in a distributed way.
- The convergence of 3C (Computing, Caching, Communication) essentially leads a new paradigm of wireless information system design.
- Key issues involve task assignment (or function mapping), straggler effect, data shuffling, data transfer, aggregation (or function reduction)
- We aim at devising break-through techniques and building up a new framework of 3C convergence.



## Academic Achievements

- 90+ IEEE top journal papers ( 40 top journal papers in recent 5 years)
- More than 10,000 citations (Google scholar, <https://scholar.google.com/citations?user=hbji8o3IAAAAJ&hl=en>)
- Irwin Jacobs Award from Qualcomm and KICS, 2015
- Haedong Young Scholar Award from KICS, 2012
- High Impact Research Icon of University of Malaya, 2013 – 2015.
- IEEE Communication Society Asia Pacific Young Researcher Award, 2007
- IEEE Vehicular Technology Society Dan Noble Fellowship Award, 2006
- Best paper award for IEEE Trans. on Vehicular Technology, 2002.