Busra Tegin, Ph.D.

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Employment History

2025 – ····	🔖 **Assistant Professor (Maître de conférences),** CentraleSupélec Rennes Campus, Cesson-Sevigne, France.
	Member of IETR-UMR CNRS 6164, SIGNAL Research Team.
	Research Interest: My research interests include wireless communications, information theory, and distributed learning, with an emphasis on federated learning, distributed computing and inference, DNA storage systems, and semantic communications.
2023 – 2025	🔖 **Postdoctoral Researcher,** Bilkent Univerity, Ankara, Turkey.
	I worked on the ERC Advanced Grant TRANCIDS: Transmission over Channels with Insertions and Deletions, specifically on the capacity approximation of the insertion channel with applications in DNA storage.
2020 – 2023	🔖 **Research Engineer,** Huawei Turkey Research and Development Center (HTRDC).
	Future generation semantic communication systems.
2017 – 2023	🔖 **Teaching Assistant,** Bilkent Univerity, Ankara, Turkey.
	- Signals and Systems (6 semesters)
	Explanation: I have been awarded for Exceptional Teaching Assistant Performance four times (2018/19 Spring, 2019/20 Fall, 2020/21 Fall, 2020/21 Spring). I was the head teaching assistant for the course, responsible for quiz/project preparations, grading, laboratory tutorials, recitations, distribution of work among other assistants, and course project/laboratory scheduling.
	- Advanced Topics in Machine Learning and Signal Processing (1 semester)
	- Digital Communications (3 semesters)
	- Advanced Digital Communications (2 semesters)
	- Analog Electronics (1 semesters)
	- Applied Electromagnetics (1 semester)

Education

2020 – 2023	🔖 **Ph.D., Bilkent University,** Electrical and Electronics Engineering, GPA: 4.00/4.00
	Thesis advisor: *Prof. Tolga M Duman,*
	Thesis title: *Federated learning and distributed inference over wireless channels.*
2017 – 2020	🔖 **M.Sc., Bilkent University,** Electrical and Electronics Engineering, GPA: 4.00/4.00
	Thesis advisor: *Prof. Tolga M Duman,*
	Thesis title: *Distributed caching and learning over wireless channels.*
2012 – 2017	🔖 **B.S., Bilkent University,** Electrical and Electronics Engineering, GPA: 3.75/4.00.

Research Publications

Journal Articles

1. **B. Tegin**, M. A. Ali, and T. M. Duman, "Over-the-air multi-sensor inference with neural networks using memristor-based analog computing," *Physical Communication*, vol. 69, p. 102 582, 2025, ISSN: 1874-4907. 🔗 URL: https://www.sciencedirect.com/science/article/pii/S1874490724003008.

2. **B. Tegin** and T. M. Duman, "On the capacity of insertion channels for small insertion probabilities," *arXiv preprint arXiv:2504.14035, Accepted for Publication on IEEE Transactions on Information Theory*, 2025.

3. **B. Tegin** and T. M. Duman, "Federated learning with over-the-air aggregation over time-varying channels," *IEEE Transactions on Wireless Communications*, vol. 22, no. 8, pp. 5671–5684, Aug. 2023.

4. **B. Tegin**, E. E. Hernandez, S. Rini, and T. M. Duman, "Straggler mitigation through unequal error protection for distributed approximate matrix multiplication," *IEEE Journal on Selected Areas in Communications*, vol. 40, no. 2, pp. 468–483, Feb. 2022.

5. M. Kalfa, M. Gok, A. Atalik, **B. Tegin**, T. M. Duman, and O. Arikan, "Towards goal-oriented semantic signal processing: Applications and future challenges," *Digital Signal Proc.*, vol. 119, p. 103 134, Dec. 2021.

6   **B. Tegin** and T. M. Duman, "Blind federated learning at the wireless edge with low-resolution ADC and DAC," *IEEE Transactions on Wireless Communications*, vol. 20, no. 12, pp. 7786–7798, Dec. 2021.

7   **B. Tegin** and T. M. Duman, "Coded caching with user grouping over wireless channels," *IEEE Wireless Communications Letters*, vol. 9, no. 6, pp. 920–923, Jun. 2020.

Conference Proceedings

1   **B. Tegin** and T. M. Duman, "Robust composite DNA storage under sampling randomness, substitution, and insertion–deletion errors," in *Accepted for presentation, IEEE International Conference on Communications (ICC)*, 2026.

2   F. Bagci, **B. Tegin**, M. Kazemi, and T. M. Duman, "Update estimation and scheduling for over-the-air federated learning with energy harvesting devices," in *IEEE International Conference on Communications Workshops (ICC Workshops)*, Montreal, QC, Canada, Jun. 2025, pp. 1574–1579.

3   **B. Tegin** and T. M. Duman, "On the capacity of insertion channels for small insertion probabilities," in *IEEE International Symposium on Information Theory (ISIT)*, Ann Arbor, MI, USA, Jun. 2025, pp. 1–6.

4   **B. Tegin** and T. M. Duman, "Transformation-invariant over-the-air combining for multi-sensor wireless inference," in *IEEE Global Communications Conference (GLOBECOM)*, Kuala Lumpur, Malaysia, Dec. 2023, pp. 2937–2942.

5   **B. Tegin** and T. M. Duman, "Blind federated learning with low-cost analog-to-digital converters," in *IEEE Global Communications Conference (GLOBECOM)*, Madrid, Spain, Dec. 2021, pp. 01–06.

6   **B. Tegin** and T. M. Duman, "Federated learning over time-varying channels," in *IEEE Global Communications Conference (GLOBECOM)*, Madrid, Spain, Dec. 2021, pp. 01–06.

7   **B. Tegin**, E. E. Hernandez, S. Rini, and T. M. Duman, "Straggler mitigation through unequal error protection for distributed matrix multiplication," in *IEEE International Conference on Communications (ICC)*, Montreal, QC, Canada, Jun. 2021, pp. 1–6.

Review for Journals

- IEEE Transactions on Wireless Communications
- IEEE Transactions on Communications
- IEEE Journal on Selected Areas in Communications
- IEEE Transactions on Cognitive Communications and Networking
- IEEE Transactions on Green Communications and Networking
- IEEE Transactions on Vehicular Technology

Invited Talks and Posters

08.07.2024   **Recent Results Session,** IEEE International Symposium on Information Theory 2024, Athens, Greece.
Title: Capacity Approximation for the Insertion Channel with Small Insertion Probability.

14.03.2024   **Invited Presentation,** Prof. Ayse Melda Yuksel Turgut's Research Group, Middle East Technical University (METU), Ankara, Turkey.
Title: FL over Time Varying Channels and Wireless Inference.

21.02.2024   **Graduation Day - Poster Session,** Information Theory and Applications Workshop (ITA), San Diego, USA.
Title: Federated Learning and Distributed Inference over Wireless Channels.

Cosupervising Activities

2023 – 2024   **Muhammad Atif Ali,** Bilkent University (MSc)
Thesis Title: Learning and Inference for Wireless Communications Applications using In-Memory Analog Computing
Main supervisor: Prof. Tolga M Duman

2024 – 2025   **Furkan Bagci,** Bilkent University (MSc)
Thesis Title: On Over-The-Air Federated Learning Over Wireless Channels With Energy Harvesting and Heterogeneous Data Distribution
Main supervisor: Prof. Tolga M Duman

Cosupervising Activities (continued)

2024 – Present   **Omer Faruk Keskin,** Bilkent University (MSc)

Skills

Languages	English (Full Professional Proficiency), French (Beginner), Turkish (Native Language)
Coding	Matlab, Python
Teaching	Teaching Assistantships on Digital Communications, Advanced Digital Communications, Advanced Topics in Machine Learning and Signal Processing, Signals and Systems, Analog Electronics, Applied Electromagnetics

Awards and Achievements

2021   **Student Grant**, 2021 IEEE International Conference on Communications (ICC).

2019–2020   **Graduate Research Fellowship Program**, Huawei.

2018–2020   **Exceptional Teaching Assistant Award**, Bilkent University.

2013–2017   **High Honor Student**, Bilkent University.

2012–2017   **Bachelor Scholarship**, Bilkent University.

2012   **Ranked 28th out of 2 million applicants National University Entrance Exam**, Turkey.