# Ezgi Özyılkan

pronouns she/they

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## Education

**2021–present Ph.D.,** Electrical and Computer Engineering, NYU Tandon School of Engineering, USA.
Current GPA: 4.0.
Area: Neural lossy data compression.
Advisor: Prof. Elza Erkip.

**2017–2021 Integrated M.Eng.,** Electrical Electronics Engineering, Imperial College London, **first class honors**.
M.Eng. Thesis: *"Deep Stereo Image Compression with Decoder Side Information using Wyner Common Information"*.
Advisor: Prof. Deniz Gündüz.

## Interests and Skills

**data compression** (image, 3D/point cloud, task-aware/semantic features), **information theory** (source coding, multi-terminal), **quantization** (lossy, entropy-constrained), **signal processing** (data analysis, density modeling), **telecommmunications** (distributed, cooperative), **deep learning** (explainable AI, interpretability), **programming** (mostly Python, JAX, PyTorch).

* denotes equal contribution.

## Profile

I am a collaborative researcher and enjoy working with people from diverse backgrounds, which is reflected in my experiences. My current research is driven by a passion for **connecting theory and practice** in compression and telecommunication problems, particularly in distributed scenarios. I leverage tools from deep learning, signal processing, data compression and information theory, yielding interpretable results. Recent collaborators include Jona Ballé and Aaron B. Wagner and Deniz Gündüz.

## Industry Experience

**PhD R&I Intern at InterDigital Video Lab** Manhattan, NY, USA **6/2024–8/2024**
Worked on learning-based lossy 3D/point cloud compression and generative models, focusing on geometry. Hosts: Jiahao Pang, Dong Tian. *Patent application in preparation.*

**PhD R&I Intern at InterDigital AI Lab** Los Altos, CA, USA **6/2022–8/2022**
Worked on learning-based image compression for humans and machines, focusing on scalability. Hosts: Hyomin Choi, Fabien Racapé. *Co-developed a patent and submitted a conference paper, which appeared in IEEE Data Compression Conference (DCC) 2023.*

**Business and Data (Summer) Analyst at Morgan Stanley** London, UK **6/2019–8/2019**

## Patents

H. Choi, F. Racapé, **E. Özyılkan**, and S. M. Ulhaq, "Method or apparatus rescaling a tensor of feature data using interpolation filters," Int. Patent App. No. PCT/US2023/034255, pending.

## Teaching Experience

**Head Course Assistant at NYU Tandon** Brooklyn, NY, USA **1/2022–present**
Probability and Stochastic Processes (Fall 2024, Fall 2022) and Deep Learning (Spring 2022).

## Journal Papers

**E. Özyılkan***, F. Carpi*, S. Garg, and E. Erkip, "Learning-based compress-and-forward schemes for the relay channel," *IEEE Journal on Selected Areas in Communications*, accepted with revisions, expected to appear in 2025.

**E. Özyılkan**, J. Ballé, and E. Erkip, "Neural distributed compressor discovers binning," *IEEE Journal on Selected Areas in Information Theory*, 2024. DOI: 10.1109/JSAIT.2024.3393429.

## Conference Papers

**E. Özyılkan***, F. Carpi*, S. Garg, and E. Erkip, "Neural compress-and-forward for the relay channel," in *2024 IEEE 25th International Workshop on Signal Processing Advances in Wireless Communications (SPAWC)*, 2024. DOI: 10.1109/SPAWC60668.2024.10694419.

**E. Özyılkan** and E. Erkip, "Distributed compression in the era of machine learning: A review of recent advances," in *2024 58th Annual Conf. on Information Sciences and Systems (CISS)*, 2024. DOI: 10.1109/CISS59072.2024.10480175.

S. F. Yilmaz, **E. Özyılkan**, D. Gündüz, and E. Erkip, "Distributed deep joint source-channel coding with decoder-only side information," in *2024 IEEE Int. Conf. on Machine Learning for Communication and Networking (ICMLCN)*, 2024. DOI: 10.1109/ICMLCN59089.2024.10625214.

N. Mital*, **E. Özyılkan***, A. Garjani*, and D. Gündüz, "Neural distributed image compression with cross-attention feature alignment," in *2023 IEEE/CVF Winter Conf. on Applications of Computer Vision (WACV)*, 2023. DOI: 10.1109/WACV56688.2023.00253.

**E. Özyılkan**, J. Ballé, and E. Erkip, "Learned Wyner–Ziv compressors recover binning," in *2023 IEEE Int. Symp. on Information Theory (ISIT)*, 2023. DOI: 10.1109/ISIT54713.2023.10206542.

**E. Özyılkan***, M. Ulhaq*, H. Choi, and F. Racapé, "Learned disentangled latent representations for scalable image coding for humans and machines," in *2023 Data Compression Conf. (DCC)*, 2023. DOI: 10.1109/DCC55655.2023.00012.

N. Mital*, **E. Özyılkan***, A. Garjani*, and D. Gündüz, "Neural distributed image compression using common information," in *2022 Data Compression Conf. (DCC)*, 2022. DOI: 10.1109/DCC52660.2022.00026.

### Workshop Papers

**E. Özyılkan**, J. Ballé, S. Bhadane, A. B. Wagner, and E. Erkip, "Breaking smoothness: The struggles of neural compressors with discontinuous mappings," in *NeurIPS 2024 Machine Learning and Compression Workshop*, accepted, 2024.

E. Taşçı, **E. Özyılkan**, O. K. Ülger, and E. Erkip, "Robust distributed compression with learned Heegard–Berger scheme," in *2024 IEEE Int. Symp. on Information Theory Workshops (ISIT-W)*, 2024. DOI: 10.1109/ISIT-W61686.2024.10591775.

**E. Özyılkan**, J. Ballé, and E. Erkip, "Neural distributed compressor does binning," in *ICML 2023 Workshop on Neural Compression*, **selected for 1 of 4 contributed/spotlight talks**, 2023. OpenReview: 3Dq4FZJSga.

### Selected Honors and Awards

**IEEE Signal Processing Society Scholarship** (2024–2026).

**Best Reviewer Award** at the Neural Compression Workshop @ ICML 2023.

**Future Leader Ph.D. Fellowship** (2021–2023), awarded by NYU Tandon.

Several **student travel grants** by IEEE venues, such as SPAWC 2024, ISIT 2023-2024 and North American School of Information Theory 2023, and by UC Berkeley Simons Institute to attend *"Information-Theoretic Methods for Trustworthy Machine Learning"*, Berkeley, 2023.

**2021 Ivor Tupper Prize in Signal Processing**, awarded by Imperial College London.

### Community Service

**Co-organizer** of the NeurIPS 2024 Machine Learning and Compression Workshop.

**Lead organizer** of the IEEE ISIT 2024 "Learn to Compress" Workshop.

Member of the IEEE IT Society Student and Outreach Subcommittee since 2024.

**Reviewer** for publications in both machine learning, information theory and engineering, such as **NeurIPS, JMLR, ICML, MLSys**, International Symposium on Information Theory (**ISIT**), Data Compression Conference (**DCC**), and several **IEEE Transactions** journals, such as Journal on Selected Areas in Commmunications (**JSAC**), **Transactions on Information Theory**, Transactions on Communications.

### References

**Elza Erkip**, Tandon School of Engineering, New York University
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**Aaron B. Wagner**, School of Electrical and Computer Engineering, Cornell University
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**Deniz Gündüz**, Dep. of Electrical and Electronic Engineering, Imperial College London
d.gunduz@imperial.ac.uk

**Fabien Racapé**, Interdigital AI Lab
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