

Fabrizio Carpi

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Education

New York University

PhD in Electrical Engineering

Brooklyn, NY

Expected graduation: 05/2024

- Advisors: Prof. Elza Erkip and Prof. Siddharth Garg.
- Research focus: communication and information theory, semantic communications, task-aware compression, applied machine learning.

University of Parma

MS in Communication Engineering (*summa cum laude*)

Parma, Italy

10/2018

BS in Information Engineering

12/2015

Experience

Nokia Bell Labs

Communication Systems Summer Intern

Murray Hill, NJ

06/2022 - 08/2022

- Project: “Channel state information (CSI) feedback: a semantic communications perspective” (Python, Pytorch).
 - Received the Outstanding Innovation Award after joining the best intern competition with the global student program (top 7%).
 - Developed proof of concept for autoencoder-based CSI feedback and presented project updates to higher management.

Intel — Next Generation and Standards group

Wireless Standards Research Intern

Remote

05/2021 - 08/2021

- Project: “AI-assisted channel state information (CSI) feedback for MIMO systems” (Python, Pytorch).
 - Implemented autoencoder-based simulations for beyond-5G use cases.
 - Analyzed system performance and robustness in wireless scenarios specified by 3GPP models.
 - Evaluated performance-complexity tradeoffs based on neural network pruning and quantization.

New York University — Tandon School of Engineering — NYU Wireless

Graduate Research Assistant

Brooklyn, NY

09/2019 - Present

- Project: “Task-aware compression with constrained nodes” (Python, Pytorch).
 - Investigated scalar quantization schemes for binary hypothesis testing.
 - Proposed a compressor scheme based on greedy optimization and analyzed rate-accuracy tradeoffs.
 - Investigated performance of neural network-based solutions for end-to-end simulations.

Teaching Assistant — ECE 2233, Introduction to Probability

09/2020 - 12/2020

- Lead exercise sessions, held office hours, and prepared video tutorials for students.

University of Parma — Internet of Things (IoT) Lab

Research Associate

Parma, Italy

11/2018 - 08/2019

- Project: “Mitigation of NLOS effects in indoor/outdoor localization” (MATLAB).
 - Developed methods to detect non-line-of-sight (NLoS) transmissions based on statistical features of the received signal strength indicator (RSSI).
 - Investigated pre-processing of RSSI data in order to mitigate distance estimation errors due to NLoS conditions.
 - Analyzed performance improvement due to the “NLoS detection + pre-processing” in *agnostic* localization algorithms.
 - Organized research meetings, collected WiFi and LTE measurements, implemented simulations, and drafted technical papers/reports.

Duke University — Information Initiative at Duke (IID)

Visiting Student for MS thesis

Durham, NC

03/2018 - 08/2018

- Project: “Optimization of LDPC decoding with supervised learning” (Python, Tensorflow).
 - Optimized belief propagation decoding with supervised learning using a simple parameterization based on weight sharing.
 - Investigated the impact of different loss functions and proposed a new loss for channel coding problems.
- Project: “Reinforcement learning for bit-flipping decoding” (Python, Tensorflow).
 - Proposed a new reinforcement learning-based approach for the decoding of linear block codes.
 - Developed a curriculum learning approach to accelerate convergence by modifying the exploration strategy.

Awards

- 2022 **Outstanding Innovation Award**, Global Student Internship Program 2022 at Nokia.
- 2022 **Dante Youla Award**, Graduate Research Excellence in Electrical Engineering at NYU Tandon.
- 2021 **Best Student Paper Award (2nd place)**, IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC).
- 2021 **Best Poster Award (1st place)**, IEEE Communication Theory Workshop (CTW).
- 2021 **Chang Education Award**, Excellence in Teaching Assistantship in the ECE department at NYU Tandon.

Leadership

- **NYU Tandon Graduate Admissions**, *Ambassador* representing NYU Tandon graduate programs with prospective students. 02/2020 - Present
- **Electrical and Computer Eng. PhD Students Organization (NYU Tandon)**, *Organizer* for peer-support and networking events. 09/2021 - Present
- **Italian Scientists & Scholars in North America Foundation (ISSNAF)**, *Mentee* within the ISSNAF network. 01/2022 - Present
- **LeadTheFuture**, *Mentee* within the LTF network, an Italian leading non-profit organization for people in STEM (acceptance <20%). 09/2020 - 09/2021

Publications

1. **F. Carpi**, S. Garg, E. Erkip, “*Single-Shot Compression for Hypothesis Testing*,” IEEE SPAWC 2021 + poster at IEEE CTW and ITR3 @ ICML.
2. **F. Carpi**, C. Häger, M. Martalò, R. Raheli, H. Pfister, “*Reinforcement Learning for Channel Coding: Learned Bit-Flipping Decoding*,” ALLERTON 2019.
3. M. Lian, **F. Carpi**, C. Häger, H. D. Pfister, “*Learned Belief-Propagation Decoding with Simple Scaling and SNR Adaptation*,” IEEE ISIT 2019.
4. **F. Carpi**, L. Davoli, M. Martalò, A. Cilfone, Y. Yu, Y. Wang, G. Ferrari, “*RSSI-based Methods for LOS/NLOS Channel Identification in Indoor Scenarios*,” ISWCS 2019.