Ruth Gebremedhin

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EDUCATION

New York University Tandon School of Engineering, Brooklyn, NY **Aug 2020 - Present**

PhD in Electrical Engineering, ***Advisor:*** *Prof. Thomas Marzetta,* **Tandon SoE Fellowship**

Research Interests: Wireless Communications, Physics based Channel Models, Wave Propagation, Capacity Bounds

M.S. in Electrical Engineering **Aug 2020 - May 2022**

Relevant Coursework: Detection and Estimation, Wireless Communications, Machine Learning, Information Theory, Linear System Approach to Wave Propagation, Deep Learning, Digital Signal Processing, Digital Communications

New York University Abu Dhabi, Abu Dhabi, UAE **Aug 2016 - May 2020**

B.S. in Electrical Engineering & Minor in Computer Science, **Full Scholarship**

SKILLS

Programming: MATLAB, C++, Python, JavaScript, HTML, LaTeX
Software: WebRTC, Unity, 3D design and printing, EEG Data Acquisition
Language: English (Fluent), Amharic (Native), Tigrigna (Native), Korean (Intermediate speaking and listening)

EXPERIENCE

CableLabs, Louisville, CO **May 2023 - Present**

Wireless RF Propagation Intern (MATLAB)

- Analyzed the performance of Fixed Wireless Access in 5G shared spectra at Sub-6 and millimeter wave by studying signal variation over OFDM sub-carriers.
- Designed and implemented a noise removal algorithm to pre-process channel measurement data from a typical suburban house.
- Submitted 2 papers and currently filing 1 patent.

Nokia Bell Labs, Murray Hill, NJ **June 2022 - Aug 2022**

Wireless Propagation Modelling Intern (MATLAB)

- Implemented a parabolic approximation to the wave equation to improve macro-site path loss prediction in over the top propagation scenarios.
- Conducted a comparative study of the newly developed method with measured path loss data, demonstrating a low error rate.
- Received the Outstanding Innovation Award from the Global Student Program, ranking in the top 7% worldwide in an internal competition among interns.

NYU Wireless, Brooklyn, NY **Aug 2020 - Present**

Research Assistant (MATLAB)

- Studied the Heat Equation using communication methods to explore the potential of heat and diffusion as a communication channel (Publication awarded best paper at GLOBECOM 2022).
- Simulated the heat channel model and its impulse response to numerically investigate the channel capacity.
- Examined the effective bandwidth of the heat channel and its relationship to input power.

NYU Tandon Department of Electrical and Computer Engineering, Brooklyn, NY **Jan 2021 - Present**

Course Assistant: Digital Communications, Fundamentals of Communication Theory, Signals and Systems (MATLAB)

- Prepared MATLAB exercises that complement lectures and held weekly lab sessions with ~15 students.
- Evaluated weekly assignments, provided feedback and offered support during office hours to ~35 students.

NYU Abu Dhabi Applied Interactive Multimedia Lab, Abu Dhabi, UAE **May - July 2018, 2019 & 2020**

Research Intern (C++, HTML, JS)

- Proposed and implemented a WebRTC based network handshake protocol that enables bidirectional haptic and audiovisual communication as part of the 1918.1.1 IEEE working group.
- Developed and tested a Leader-Follower Teleoperation Codec to communicate haptic data between two devices and explored its application as part of the 5G Tactile Internet.
- Designed a 3D environment using Unity to assess the impact of haptic feedback on cognition and emotion.

AWARDS & HONORS

Best Paper Award: IEEE Global Communications (GLOBECOM) 2022 Conference **Dec 2022**
Outstanding Innovation Award: Global Student Program, Nokia Bell Labs Internship **Aug 2022**
Winner of Mozilla's Common Voice for Low-bandwidth Challenge: Mozilla and NVIDIA collaboration **July 2022**

PUBLICATIONS

1. **R. Gebremedhin,** and T. Marzetta. "Thermal Conduction as a Wireless Communication Channel." *IEEE GLOBECOM 2022* (**Best Paper Award**).
2. W. Park, M. Jamil, **R. Gebremedhin**, and M. Eid. "Effects of tactile textures on preference in visuo-tactile exploration." *ACM TAP* 2021.
3. K. Iiyoshi, **R. Gebremedhin**, V. Gokhale, and M. Eid. "Plug-and-Play Haptic Interaction for Tactile Internet based on WebRTC." *EAI INTETAIN* 2020.
4. K. Iiyoshi*, M. Tauseef*, **R. Gebremedhin***, V. Gokhale, and M. Eid. "Towards standardization of haptic handshake for tactile internet: a WebRTC-based implementation." *IEEE HAVE* 2019 **(*Equal Contribution)**.

LEADERSHIP & COMMUNITY INVOLVEMENT

Hilary Ballon Center for Teaching and Learning, Abu Dhabi, UAE **May 2020 - July 2020**

Tutor

- Trained underprivileged students on online learning tools during the COVID-19 pandemic shutdown, designed curriculum, and taught 9th grade students Biology, Chemistry, Physics and Math.

TEDxNYUAD, Abu Dhabi, UAE **Aug 2017- May 2018**

Co-chair of Executive Board

- Gained leadership, logistical and interpersonal skills by organizing the nomination and selection of TEDxNYUAD's 2018 speakers with a team of ~20.
- Collaborated with TED Conferences LLC and NYU Abu Dhabi stakeholders to obtain an official TEDx license, organize a public annual event and market to the Abu Dhabi community.

Strength in Vocational Education (STRIVE) Initiative, Abu Dhabi, UAE **March 2017- May 2017**

Tutor

- Mentored refugees by developing English language lessons, providing feedback, giving support, and fostering confident language skills.