Ruth Gebremedhin

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EDUCATION

New York University Tandon School of Engineering — Brooklyn, NY

PhD Electrical Engineering, ***Advisor:*** *Prof. Thomas Marzetta* — **Aug 2020 - Expected 2025**

Tandon SoE Fellowship, ***Research Interests:*** Wireless Communications, Physics based Channel Models, Wave Propagation, Capacity Bounds, Detection and Estimation

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

Relevant Coursework:, Wireless Communications, Machine Learning, Information Theory, Linear Systems for Wave Propagation, Deep Learning, Digital Signal Processing, Digital Communications

New York University Abu Dhabi — Abu Dhabi, UAE

Full Scholarship, *B.S. in Electrical Engineering & Minor in Computer Science* — **Aug 2016 - May 2020**

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

Wireless RF Propagation Intern — **May 2023 - Present**

- 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 typical suburban channel measurement data.
- Submitted 2 papers and currently filing 1 patent.

Nokia Bell Labs — Murray Hill, NJ

Wireless Propagation Modelling Intern — **June 2022 - Aug 2022**

- 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, ranking in the top 7% worldwide in an internal competition.

NYU Wireless — Brooklyn, NY

Research Assistant — **Aug 2020 - Present**

- 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

Course Assistant: Digital Comm, Fundamentals of Comm Theory, Signals and Systems — **Jan 2021 - Present**

- 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

Research Intern — **May - July 2018, 2019 & 2020**

- 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**
SoE Fellowship: NYU Tandon, Department of Electrical and Computer Engineering **Sept 2020**
Full Scholarship: NYU Abu Dhabi Admissions **Aug 2016**

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
Tutor **May 2020 - July 2020**

- 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
Co-chair of Executive Board **Aug 2017- May 2018**

- 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
Tutor **March 2017- May 2017**

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