

Postgraduate Seminar Series

Venue: Graduate Seminar Room

Date & Time: October 17, 2026 at 2:30 PM

Speaker Information

Nirob Arefin (Std No. 0421052036) is a part-time M.Sc. student in the Department of CSE, BUET. He completed his undergraduate studies from Bangladesh University of Engineering and Technology (BUET) in 2021. He is currently working as a Practice Manager at Incepta Solutions Inc. His research interests lie in the field(s) of Machine Learning and Next-Generation Wireless Networks. He is currently doing his postgraduate thesis under the supervision of Dr. A.B.M. Alim Al Islam. He will be speaking about his ongoing research in this talk.



Mitigating Adversarial Virtual Jamming Attack in Terahertz Communication Networks

Terahertz (THz) communication can enable beyond-5G and 6G wireless networks to reach terabit-per-second data rates. A THz link needs highly directional antennas at both ends to reach these rates. This directional design creates a deafness problem at the medium access control (MAC) layer. Researchers have proposed receiver-initiated handshake-based MAC protocols to solve this problem. ADAPT-3, a three-way handshake protocol, is one of the most widely studied protocols in this domain. However, a receiver-initiated handshake also opens a new vulnerability. A node can complete the handshake with the access point and then send no data. This wastes the access point's time without the node ever sending any radio interference. This behavior is a form of virtual jamming, a broader attack category where a node abuses a MAC protocol's control frames instead of sending radio interference. Virtual jamming is well studied in different networks such as IEEE 802.11, WiMAX, and Bluetooth. However, this specific form, i.e., virtual jamming, has not been studied in THz networks.

In this study, we investigate this attack on ADAPT-3. Adversary nodes respond to the access point's Call-To-Action packet with a Request-To-Send packet, however, they never send any data afterward. We also propose two defenses against this attack. The first, Early Sector Exit, lets the access point check its Physical layer for real data in a sector, and move on early if it finds none. The second, Adversary Node Tracking, lets the access point track nodes that repeatedly skip their data, and ignore their future handshake attempts. We implement the attack and both defenses in TeraSim, an ns-3 extension for THz networks. We evaluate them through simulations and compare them against ADAPT-3, using performance metrics such as network throughput, packet time, and packet discard rate. Our results show that even a small number of adversary nodes can severely degrade the network's throughput. Both defenses recover much of this lost performance, and Adversary Node Tracking brings the network closest to its original, attack-free behavior. These results show that a receiver-initiated THz MAC protocol is vulnerable to a virtual jamming attack. However, it can defend against the attack if appropriate defenses are implemented.