Tecnológico de Monterrey

Web Page:	https://studyinmexico.tec.mx/
Contact Information:	studyinmexico@itesm.mx

Undergraduate Research Program

Project Name	Vehicular Millimeter Wave Communications: Opportunities and Challenges
Campus & Location in Mexico	Monterrey
Faculty	Engineering
Research Area	Telecommunications for Digital Transformation
Research Responsible	Leyre Azpilicueta
Description of the Project	The main goal of this project is to explore the opportunities and challenges in vehicular millimeter wave communications to integrate multiple users, multiple vehicles, multiple things and multiple networks, to provide at all times the best connected communication capability in vehicular communications. Connected vehicles will need gigabit per second data rates, which can be achieved only in the millimeter wave (mmWave) band. However, there are still several issues to research and to solve potential problems of wireless communications in this type of environments. It becomes essential, in the first place, to determine the electromagnetic behaviour of the radio channel in V2X communications, which is characterized by being highly time-varying and it is described through a non-stationary fading process. The high velocities of the transmitter and receiver, due to the fast movement of vehicles, and the large number of scattering objects, as well as the massive volume of vehicles in the main roads or in rush hours in large cities, make the prediction of the propagation characteristics of the radio waves not an easy task. In this project, the mmWave band will be assessed and characterized for different V2X communication environments, which will give new opportunities and benefits for the next generation vehicular communications.
Training Provided	Participation in laboratories;Scientific-based problem solving;Writing and reading of essays / articles
Modality	Hybrid
Offered During	Semester

Student	
Tasks/Responsibilities	Literature research, technical skills to use the in-house developed Ray Launching algorithm, discussion of different wireless channel models and algorithms, programming, mathematical analysis, writing of draft paper for future submission, conduct radiofrequency measurements.
Required Language Proficiency	English (Medium);English (Advanced)
Required Skills and Abilities	Fundamentals of signals and systems, Fourier analysis, probability and statistics, basic electronics, programming (preference for Matlab).
Other Documents Required to APPLY for an Internship	1) Being at least in your 2nd year of bachelor 2) Accumulative grade point average (GPA) 2.5 3) Official Transcript 4) 2 letters of recommendation of faculty members 5) Resume 6) Letter of intention explaining the reason why you would like to participate in the research program