Wireless And Mobile (WAM) Systems Lab   http://wam.ece.ufl.edu
Director: Dr. Janise McNair

Available Position: Undergraduate Research Student
Topic: 5G Multi-Radio Access Technology (Multi-RAT) Handover Protocol Analysis
PhD Student Supervisor: Pavan Mangipudi

Research overview: In an NSF-supported project, we are developing a mobility management-related project to improve the operation and availability of services in the 5G multi-radio access technology (RAT) network. This project involves creating new protocols to enable 5G heterogeneous RATs to interact and cooperate. We will use open-source network simulators to demonstrate the performance of our new protocols.

What is 5G Multi-Radio Access Technology?
5G has revolutionized the cellular and wireless industry, due to its promises of ultra-low latency, fast data rate, and expanded bandwidth allocations, which make new services, like virtual reality, possible. Specifically, (1) the cellular industry has expanded from sub 6 GHz frequency to millimeter wave (mm-Wave) frequencies, and (2) 5G will bring a co-existence of various IP-based wireless networks like satellite, Internet of Things (IoT), Device to Device (D2D) networks, vehicular networks, etc. within or alongside the 5G networks, These advances allow an increase in subscribers and connected devices, but require a system for interoperation and cooperation that is not currently available, or possible.

What is Software-Defined Networks (SDN)?
Software Defined Networks (SDN) enable programmable network control by segregating the control decisions of the network away from forwarding hardware, e.g., can implement a cloud controller that adaptively manages the forwarding policy of the routers. This project examines how the principles of SDN can be used to improve handover performance and enable interoperation and mobility within a Mult-RAT environment.

Undergraduate Project. We are looking for an undergraduate student with experience in computer networks/computer communications, as well as programming experience in C/C++ and/or Python. The project would consist of helping to build network simulations that demonstrate the performance of newly developed SDN-based handover protocols. In this position, the student will be exposed to the following tools: Matlab, ns-3, or Mininet, and will learn the following skills: how to program network simulations, conduct network analysis, and develop network protocols. There is a potential opportunity to obtain a paid position to continue participating in our work beyond the initial scope of this project.

Minimum Qualifications
• Experience in C/C++ or Python.
• Basic understanding of computer communications and/or wireless and mobile networks.
• Desire to learn more about network simulations.

Responsibilities
  (1) Attend all required meetings
        a. Project group meetings (Individual task assignment. Updates will be expected at each meeting)
        b. WAM Systems Lab meetings. (Project group update presentations will be given at meetngs.)
  (2) Present progress reports and project updates at project group and lab meetings.
  (3) Maintain and regularly check your gatorlink email, or provide other means of reliable communication.
  (4) Submit all reports on overleaf, or to WAM Systems Lab MS Teams site, using your gatorlink access.

   Except when lab/individual meetings conflict with student responsibilities. These must be communicated by the student. Meeting schedules will be determined at the beginning of the term.