

The final project is a student-selected research project related to wireless networking. You can complete the final project in **one** of the following three ways:

1. (Recommended for MS students) A literature **survey** project for a recent wireless research topic of interests. Examples can be mmWave networking, massive MIMO networking, Internet-of-Things networking, etc. You need to study at least 10 research papers and summarize the key state-of-art, challenges and opportunities.
2. (Recommended for MS or PhD students) A **simulation** project. You may reproduce an experiment/simulation and add in new scenarios that could lead to new insights. Or, you may numerically compare algorithms from different papers that have not been evaluated side-by-side. Or, you may design a new algorithm or a new system, and you wish to understand its performance via simulation.
3. (Recommended for PhD students) An **analysis** project. You may generalize an existing analytical result under a new set of assumptions. Or, you may try out a new method for analyzing performance.

For simulation/analysis projects, it is desirable to have something new in your project. Be careful not to propose an overly ambitious project though, since everything must be done within the semester.

The final project could be a **collaborative** project with at most two students. If a collaborative project is pursued, the scope of the project is expected to be about twice that of a one-student project, and the works of each student must be clearly stated so that I can grade them separately.

Start early with your project! Think about what you want to do. Discuss with the instructor early about your plans. Think about what you need (any equipments, etc.). Talk to the instructor if you need anything special. Do not wait until the last minute.

1. A proposal for your final project is due March 2nd, 2020 in class. Your proposal should be 1-2 pages. Your proposal should provide a detailed description of what you plan to do and why you feel it is an important problem. For example, if it is a survey project, what recent features do you wish to focus on and what are the relevant papers that you wish to study? If it is a simulation project, what system you plan to simulate? What part of the system you will focus on? Why is it important? What simulation scenarios you plan to run? If it is analysis project, what system you plan to analyze? What aspect you will focus on? What is the methodology you will use for the analysis? You should also state what you plan to deliver at the end of the project. You should include a list of references that are related to your project. If it is a joint project, you should state the planned division of work. I will give you feedback on your proposal within two weeks.
2. Your project report is due April 17th, 2020 in class. Your report should be within 20 pages (single-column, single-space). For a survey project, your final report should include an abstract, an introduction of the feature/problem, a classification

of existing state-of-art solutions, their strength and weakness, and a summary of open challenges and opportunities. For simulation/analysis projects, your final report should contain: an abstract, an introduction of the problem, an overview of related works, detailed descriptions of the system model, the methodology, and the results, and a conclusion and discussion on future work. If it is a joint project, you should also clearly state the division of work.

If time permits, we will schedule a presentation session for the final projects towards the end of the semester.

Some suggested topics for the final project:

1. Low-overhead IoT access for 5G
2. Ultra low-latency connectivity for 5G
3. mmWave systems, massive MIMO systems, LTE-U for unlicensed band
4. Virtual reality, augmented reality, 360-degree video over wireless networks
5. Wireless network slicing/virtualization, software-defined wireless networks
6. Edge computing over wireless networks, AI and machine learning over wireless networks
7. And other topics that you are interested in!