Things to talk about w/Mohammad

- Paper proofreading marks
  - Title
  - Comment on the bottom of page 1 – cannot completely read
  - "Let \mathcal{M} \defeq \{1, 2, \ldots, \} be the set…"
  - "approaches for optimally"
  - Allocating the demand…
- Possible extensions
  - Modifying the problem to allow for multiple resulting networks
    - Needs an updated stochastic problem and DEP
  - Het Net data

Notes:

- Alterations
  - Remove capacitated-set cover; too far removed to be warranted to be mentioned
  - No tools exist to solve stochastic problems; to optimize to a single result is an inherently deterministic exercise, and any tools to solve linear programs will simplify and make jumps that can only be done if all values are deterministic.
  - Consider the story.
    - Instead of it being a GA approximation of the stochastic problem, it is both the DEP and GA as approximate solutions to the original stochastic problem. Virtualization occurs with a single SP providing the demand field to the VNB. All resources are compiled resources obtained by the VNB from its constituent RPs. Once the selected subnetwork of resources (BSs) has been created by the VNB, the virtual network is allocated as available to the SP and the resources are "sliced" (in this context, portions of the resources are allocated) dynamically to the demand points within the coverage area of the resources. This dynamic allocation is what the second-stage-only version of the DEP performs. As demand changes (individual demand points shift locations, a different scenario of \rho, the number of demand points changes, etc.), the second-stage only version of the DEP dynamically slices the selected subnetwork (the virtual network) to the demand points within the SP.
    - Further, consider the extension situation with multiple SPs, each wanting a virtual network. The VNB can construct a single subnetwork of the available resources – the VNB's combined network, which is what it obtains collectively from the RPs – as determined by either the GA or the full DEP where the demand being considered is the aggregate of the demand of all SPs; demand points of each SP are truncated into a large, full set, \mathcal{M}, for the full DEP, and as a summed version of the constituent \rho s for the GA. This VNB subnetwork is then dynamically sliced to the individual demand points as described for the single SP case, with the resources being sliced (dynamically) to the demand points of a single given SP being that SP's virtual network.

Thesis Outline:

- Preamble Materials
    - Abstract
    - Acknowledgements
    - Table of Contents
    - Table of Figures
    - List of Tables
    - List of Acronyms and Abbreviations
- Ch 1 – Introduction and Motivation
- Ch 2 – System Model and Stochastic Approach
    - Sec 2a – Model
        - Parameters, lay out how the network is structured
        - SSLT – log-normal demand field
    - Sec 2b – Approach
        - Compile parameters and network into stochastic optimization problem
        - Analytical conversion to pure DEP
            - Infinite Omega causes the scenarios to be a deterministic equivalent to the stochastic variable
- Ch 3 – Approach Approximations
    - Sec 3a – Sampled DEP
        - Sampling approach to the DEP; limited subset of \Omega causes this to be a computationally solvable approximation to the stochastic variable
        - Motivation as replacement of stochastic optimization problem (original is impossible to solve)
        - Two-stage (Full DEP, BS selection and Dynamic Slicing)
        - One-stage (Dynamic Slicing) for runtime
        - Extension if possible – SAA analysis for when DEP is a worthwhile approximation of initial stochastic optimization problem
    - Sec 3b – GA
        - Motivation as alternative to DEP (GA is more tractable)
        - Solves BS selection; still needs one-stage for runtime (aka Dynamic Slicing)
        - "Voronoi Model" assumptions, differences, and changes
        - Background/setup of what a GA is. Specific implementation considerations
            - Include tradeoffs?
            - Cost/Fitness function w/breakdown of *why*
- Ch 4 – Testing and Simulations
    - Here is where I provide the several simulations I run with separate data
    - Sec 4a – Single SP (Service Provider) and Network
        - Homogenous Resources Tests
            - The work of the conference paper
            - With more resources, demand points, and scenarios (where does the DEP break down fully where the GA continues to function)
        - Heterogeneous Resources Tests

- Differing costs
- Differing ranges
- Differing capacities
  - Sec 4b – Multi SP and Network
    - Real proposed extension work – demonstration of more interesting virtualization work
    - Homogenous resources examples
    - Heterogeneous resources examples (if hetnets introduce non-trivial differences in 3a)
- Ch 5 – Conclusions and Future Work
  - Future work
    - Any extensions missed
    - Different metaheuristic approaches, like particle filter optimization
- References
- Appendices