

Topics left for Graduates (could be selected by undergraduates)

Data will require finding interested subset of the data and comparing results with the paper, can be assigned to two students.

Review will require finding follow up research and selecting 3-4 papers with interesting extensions/applications to be presented.

5. Scientific prize network predicts who pushes the boundaries of science, Yifang Ma, Brian Uzzi, *Proceedings of the National Academy of Sciences* **115**(50):12608-12615 (2018), **Review**
6. Quantifying patterns of research-interest evolution, Tao Jia, Dashung Wang, Boleslaw K. Szymanski *Nature Human Behaviour* **1**(4):0078, 2017, **Data**
11. Quantifying Long-Term Scientific Impact, Dashun Wang, Chaoming Song, Albert-László Barabási, *Science* **342** (6154):127-132 (2013), **Data**
12. A universal model for mobility and migration patterns, Filippo Simini, Marta C. González, Amos Maritan, Albert-László Barabási, *Nature* **484**:96–100 (2012), **Data, Review**
14. Quantifying social group evolution, Gergely Palla, Albert-László Barabási, Tamás Vicsek, *Nature* **446**:664–667 (2007), **Data, Review**
15. Limits of Human Mobility, Chaoming Song, Zehui Qu, Nicholas Blumm, Albert-László Barabási, *Science* **327**(5968):1018-1021 (2010), **Data, Review**

Additional Topics for Undergraduates only

Requires study of the textbook and cited papers and presenting the findings

1. Section 3.14-15 Advanced Topics 3.C Giant component and 3.D Component sizes
2. Section 4.12-13 Advanced Topic 4.B: Plotting power laws and 4.C Estimating the degree exponent
4. Section 9.4.3: Limits of modularity and optimized greedy algorithms; arxiv.org/pdf/1902.04243
5. Section 9.5.1-9.5.2, Clique and link percolation
6. Section 9.6 1: Testing communities; IEEE Tran Knowledge & Data Eng, 2019.
7. Section 9.12 Advanced Topic C: Fast Algorithm for Community Detection
8. Section 10.2: Epidemic modeling
9. Section 10.3: Epidemics on networks
10. Section 10.4: Contact networks
11. Section 10.5: Beyond the degree distribution
12. Section 10.6: Immunization; <https://arxiv.org/pdf/1908.04901.pdf>