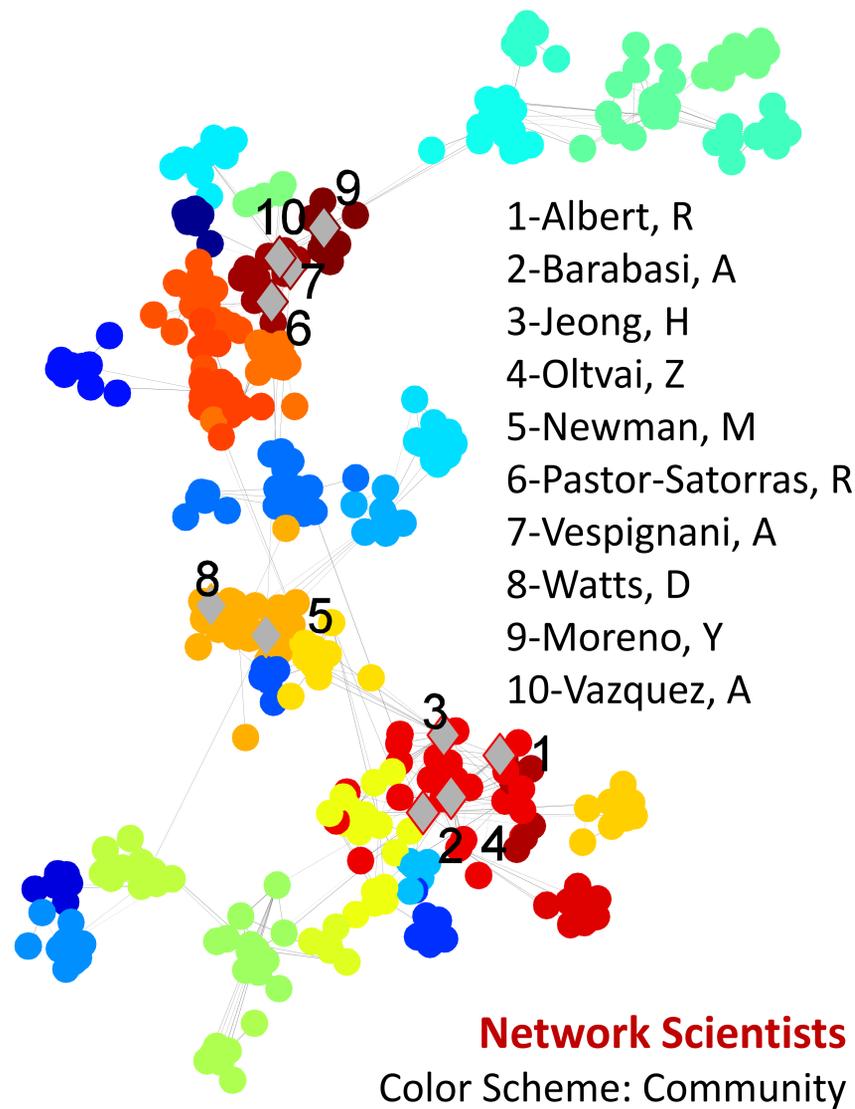
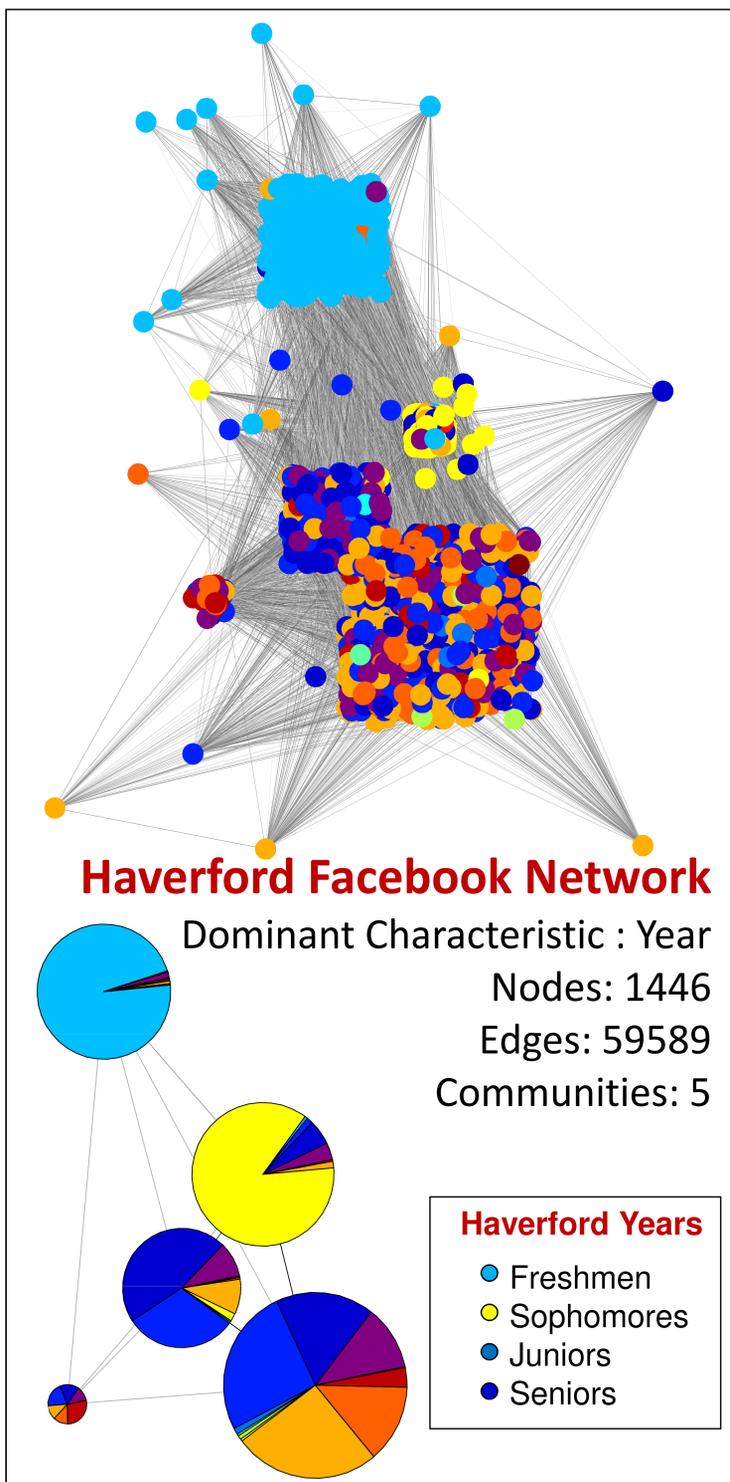
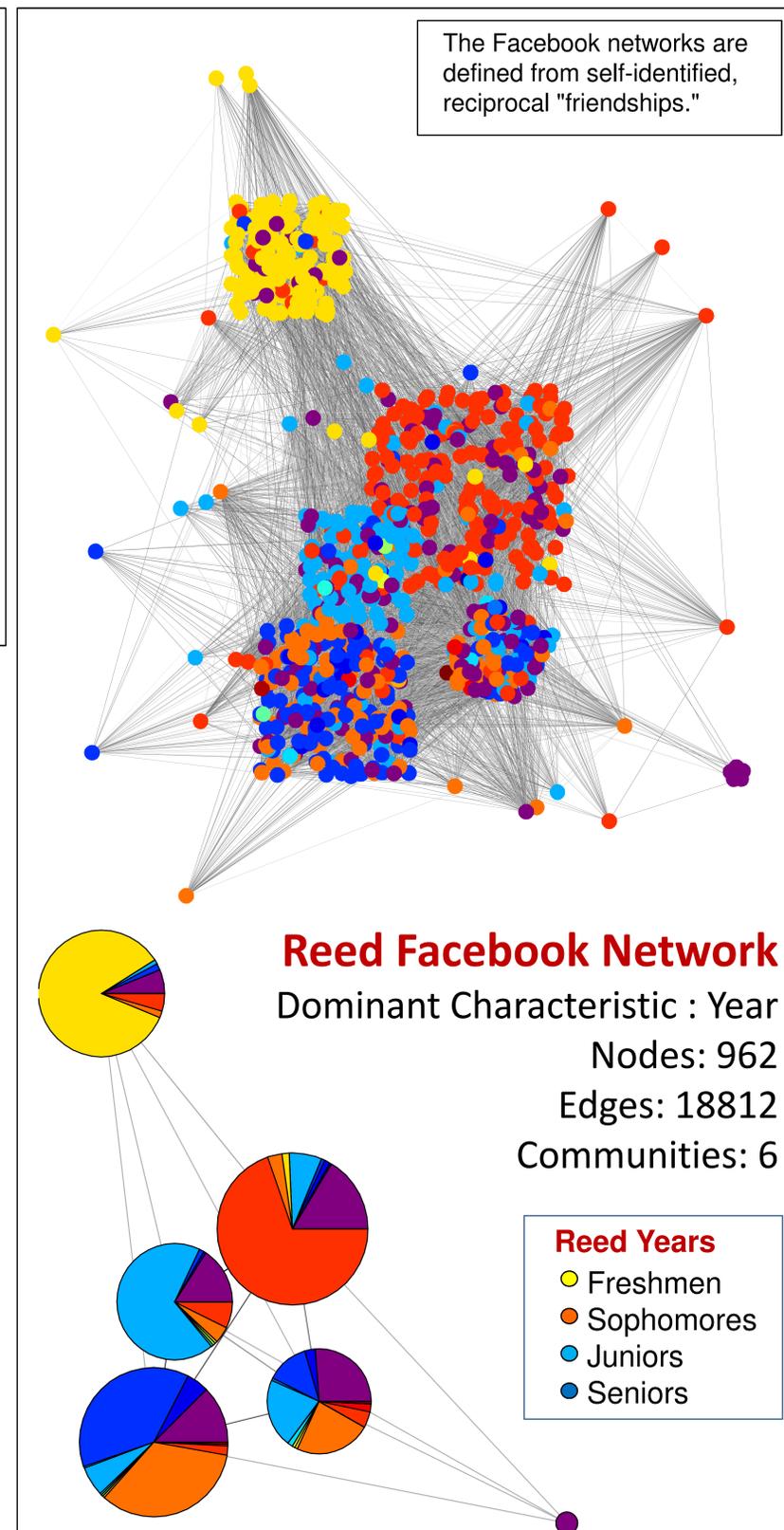
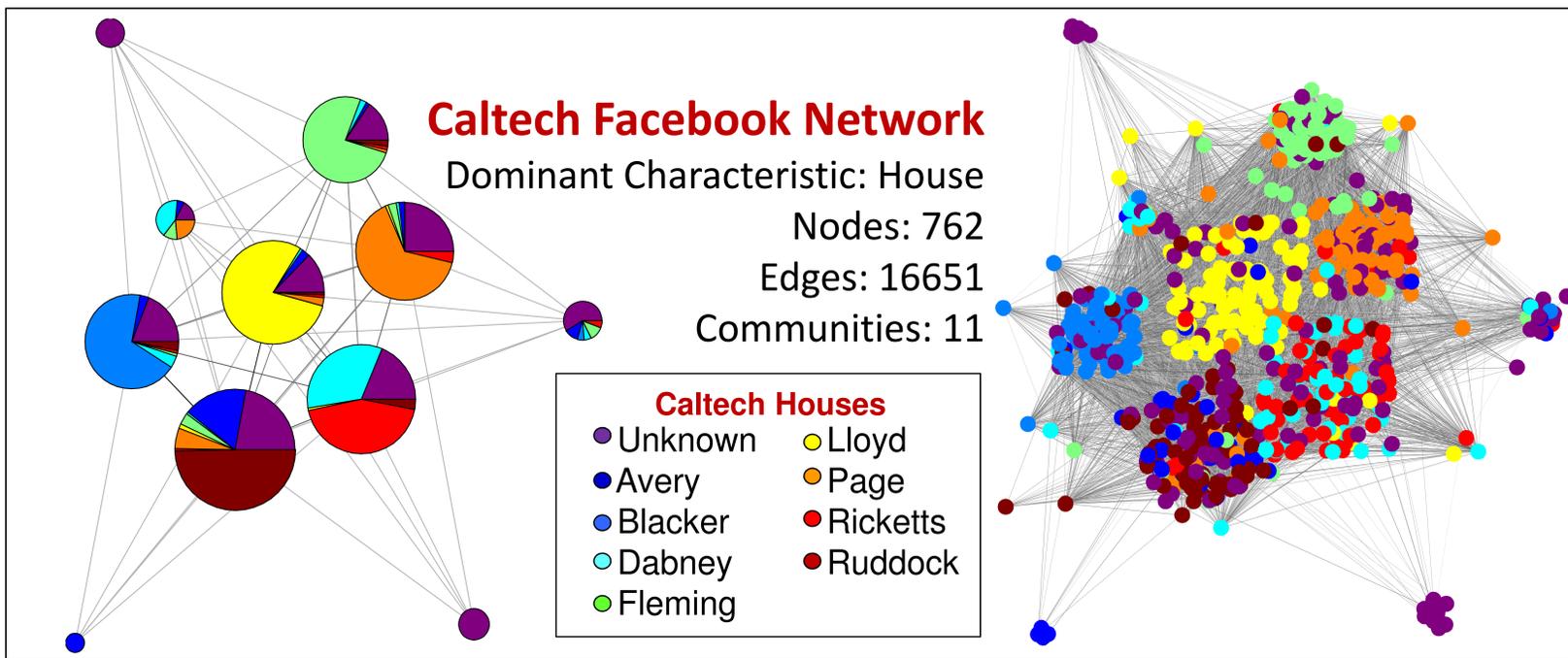


Visualization of Communities in Networks

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The network of network scientists, compiled by Mark Newman [3], has nodes given by people and edges based on paper co-authorship. We label the 10 nodes with the largest-magnitude two-dimensional vertex vectors from the initial step of the spectral community-detection algorithm we employed.

<http://netwiki.amath.unc.edu>

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Visualizing the social networks in this poster was a multiple-step process. For each network, we identified communities of the largest connected component using a modified version of the algorithm in [3]. Namely, we heuristically maximized the quality function known as modularity, which measures the weight of within-community edges versus between-community edges for a partition of a graph, using a spectral method followed by Kernighan-Lin node-swapping steps between communities. To determine the community placement (the coordinates of their centers) in our visualizations, we use the Fruchterman-Reingold algorithm [1], a force-directed layout method that is closely related to modularity maximization [4], treating the communities themselves as the nodes of a (significantly smaller) network with connections weighted by rescaled inter-community links. We then use the Kamada-Kawai spring-embedding graph visualization algorithm [2] to place the nodes of each individual community (ignoring inter-community links) and then to rotate and flip the communities for optimal placement (including inter-community links). Our pie chart visualizations show the attributes of communities rather than individual nodes using the same Fruchterman-Reingold coordinates.

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