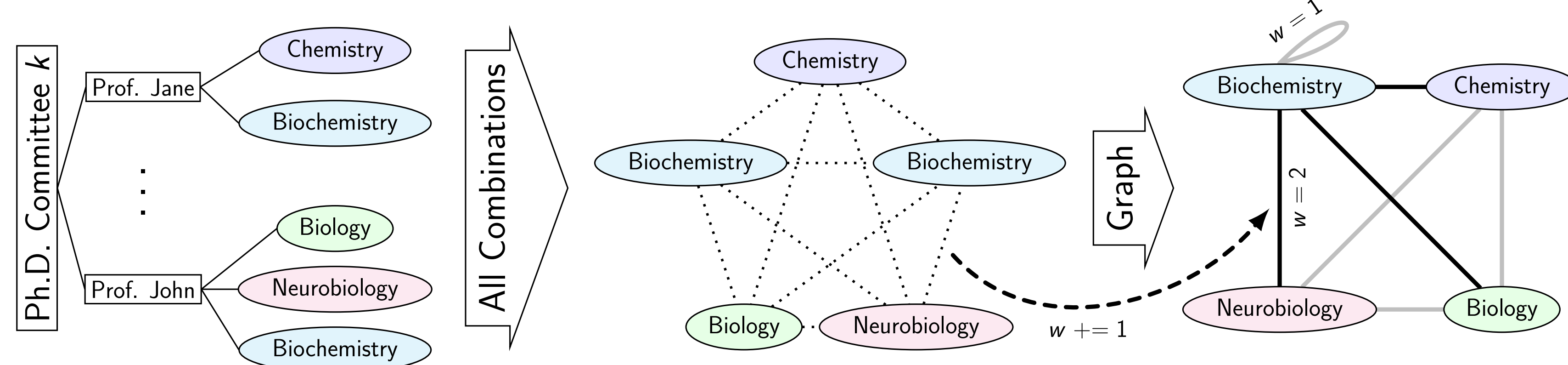


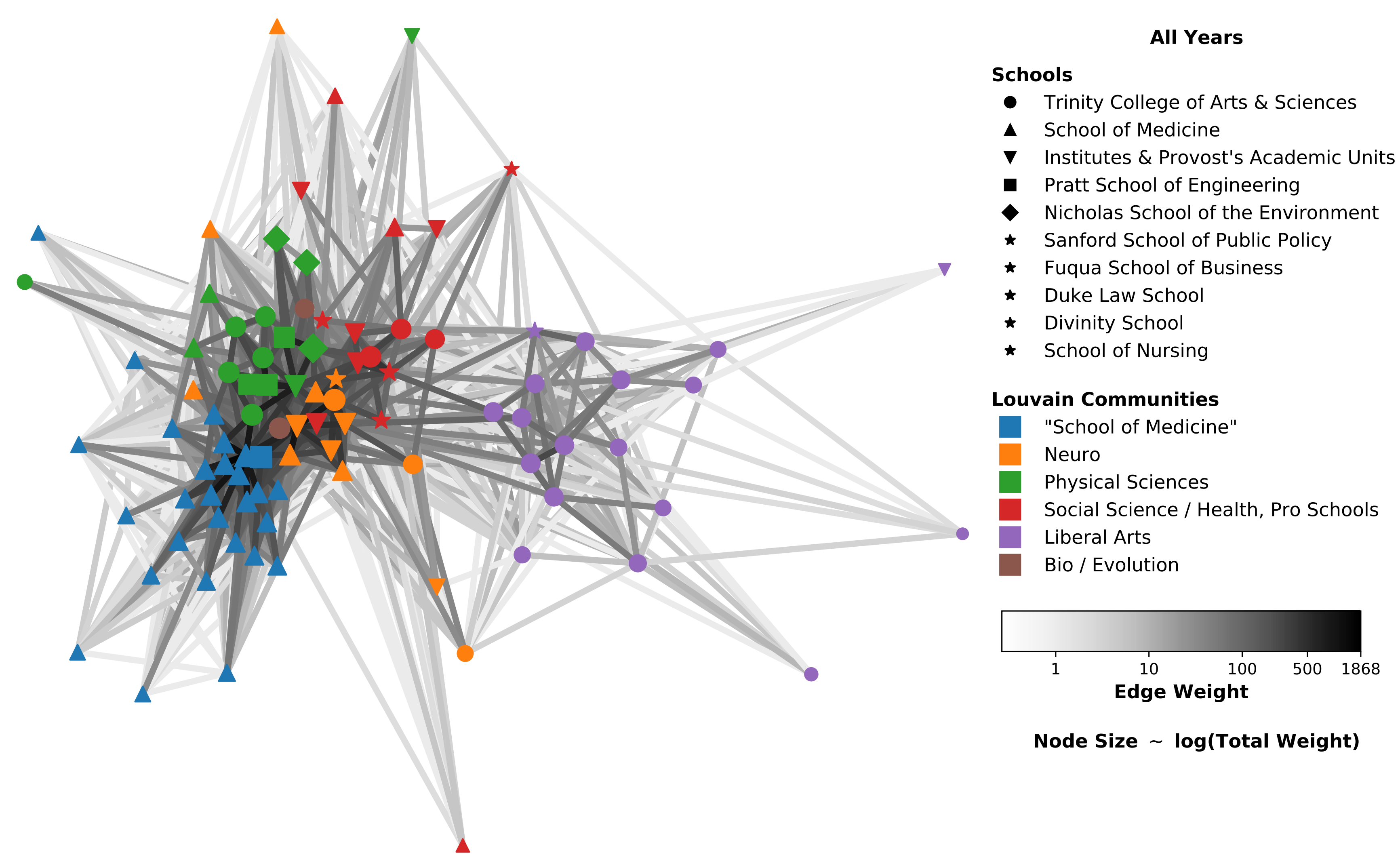
## Methods

- ▶ Graph connections between academic organizations found in Duke Ph.D. committees
  - ▶ For each committee, find all combinations of committee member's non-administrative appointments
  - ▶ For each combination, increase the graph's corresponding edge weight ( $w$ ) by 1



- ▶ Find communities of organizations (nodes) in graph via the Louvain method [1]
  - ▶ Construct communities by optimizing the density of interior to exterior edges (modularity)

## Academic Organizations Graph



## Conclusions

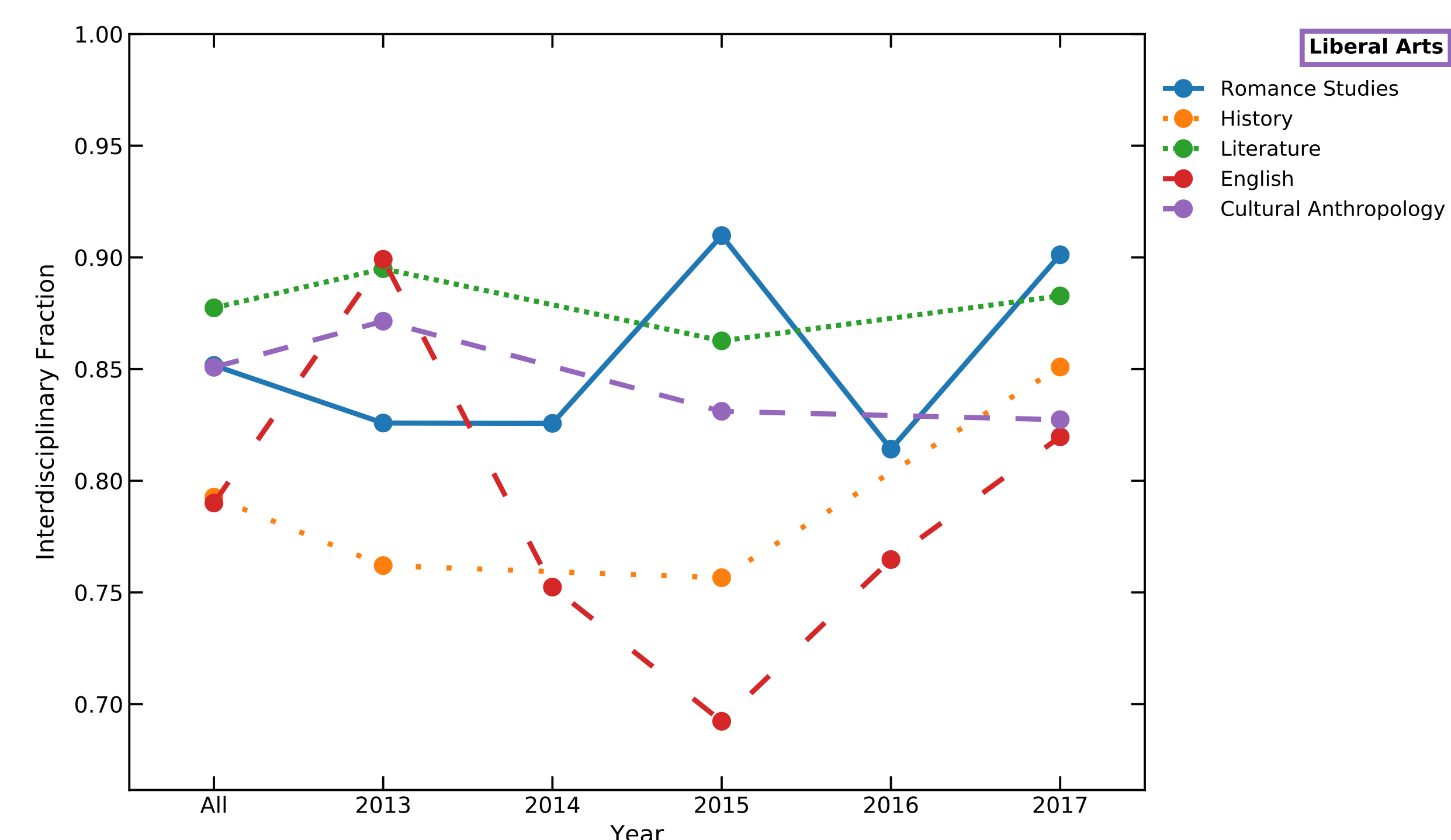
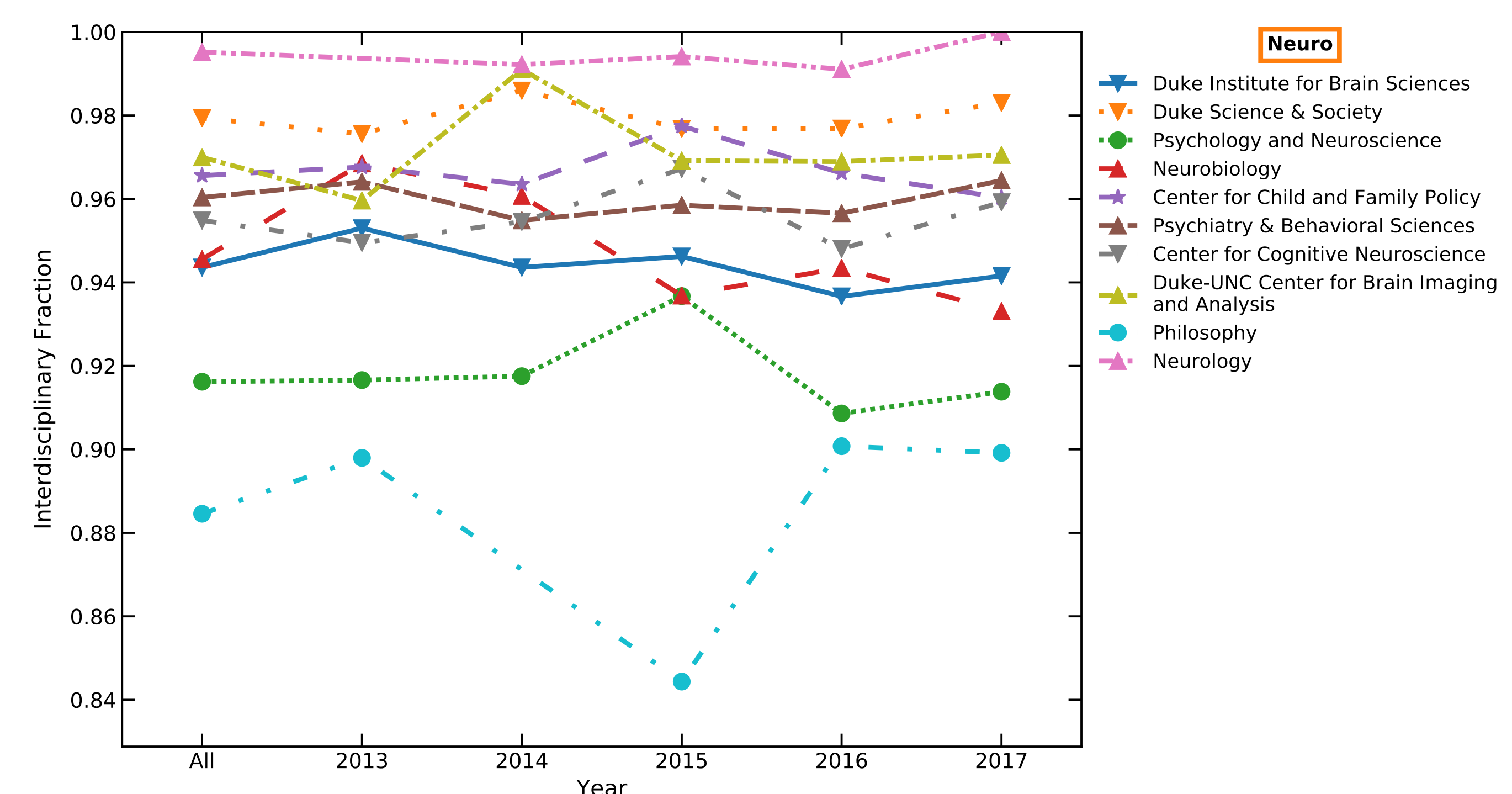
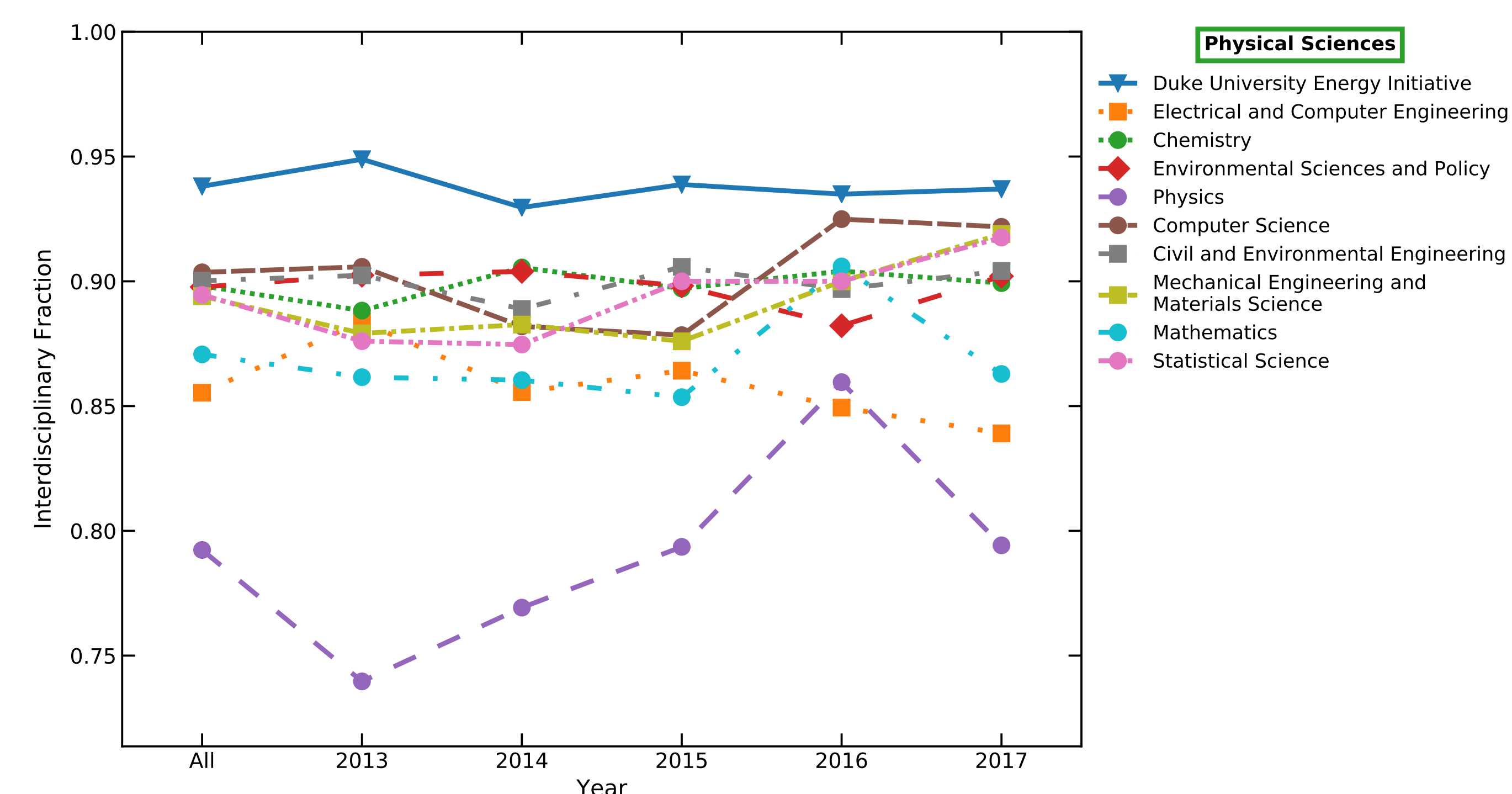
- ▶ **Identified communities of closely connected academic organizations at Duke**
  - ▶ Most as expected, but with interesting Neuro cluster, and insular Biology / Evolutionary Anthropology pairing
- ▶ **Measured interdisciplinary activity via organization's external/total edge weights**
  - ▶ Most large organizations in the Physical Sciences and Neuro clusters were steady at  $f \approx 90 - 95\%$ 
    - ▶ Excluding the noticeably lower & more variable Physics, Psychology and Neuroscience, and Philosophy departments
  - ▶ As a community the Liberal Arts were lower at  $f \approx 75 - 90\%$ , but suffered from poor statistics

## Potential Future Improvements

- ▶ Non-Ph.D. granting orgs have low statistics and artificially high interdisciplinary fractions
  - ▶ Collect data on other graduate degrees (M.D. J.D., ...) to improve professional school statistics
  - ▶ Could create a similar graph from publication author lists to better include institutes & centers
- ▶ Try different weighting schemes to isolate secondary appts from interdisciplinary committees

## Measuring Interdisciplinary Activity

- ▶ Compute "Interdisciplinary Fraction"  $f = w_{\text{external}} / (w_{\text{external}} + w_{\text{self}})$
- ▶ Bin graph by academic year to observe any changes over time
- ▶ Plot the top 10 organizations by total weight for each community
  - ▶ For satisfactory statistics require  $w_{\text{total}} > 100$  per year, for  $\geq 3$  years



## References

- [1] V. D. Blondel, J.-L. Guillaume, R. Lambiotte, and E. Lefebvre, *Journal of Statistical Mechanics: Theory and Experiment* **2008** (2008) P10008, <http://stacks.iop.org/1742-5468/2008/i=10/a=P10008>.
- [2] A. A. Hagberg, D. A. Schult, and P. J. Swart, *Exploring network structure, dynamics, and function using NetworkX*, in *Proceedings of the 7th Python in Science Conference (SciPy2008)*.