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## Comparing the Collaboration Network in Music Across Time

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Physics 465-0: Advanced Topics in Nonlinear Dynamics

### Introduction

- Billboard's Hot 100 tracks the most popular songs via multiple metrics (streaming, radio, etc.)
- Want to examine the differences in musical collaboration using data from the Hot 100 in 1995-1999 and 2015-2019

### Data

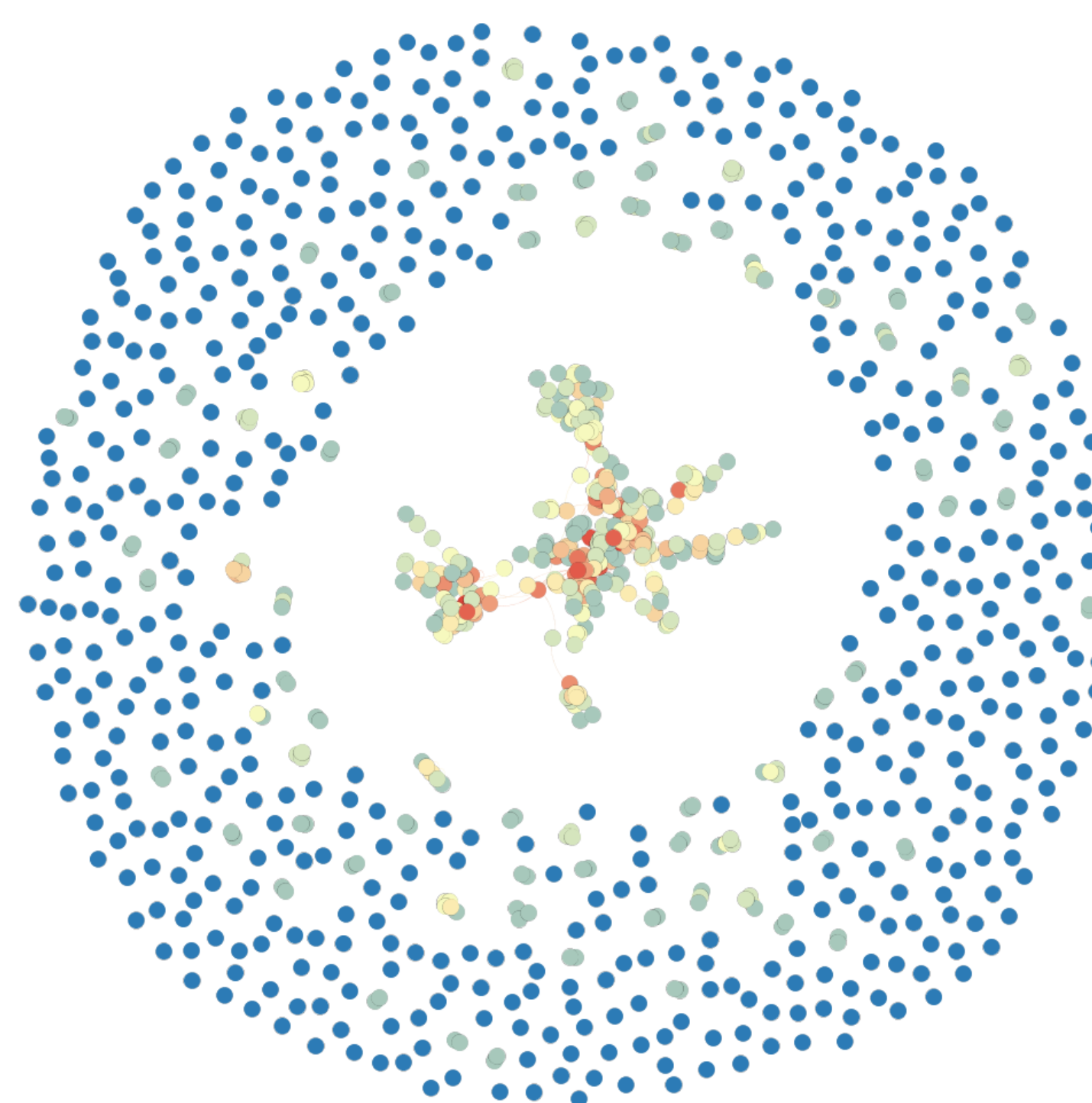
- Used billboard API to extract data.
- Can extract song title, featured artists, and number of weeks on the charts

```
>>> song = chart[0] # Get no. 1 song on chart
>>> song.title
'Nice For What'
>>> song.artist
'Drake'
>>> song.weeks # Number of weeks on chart
2
```

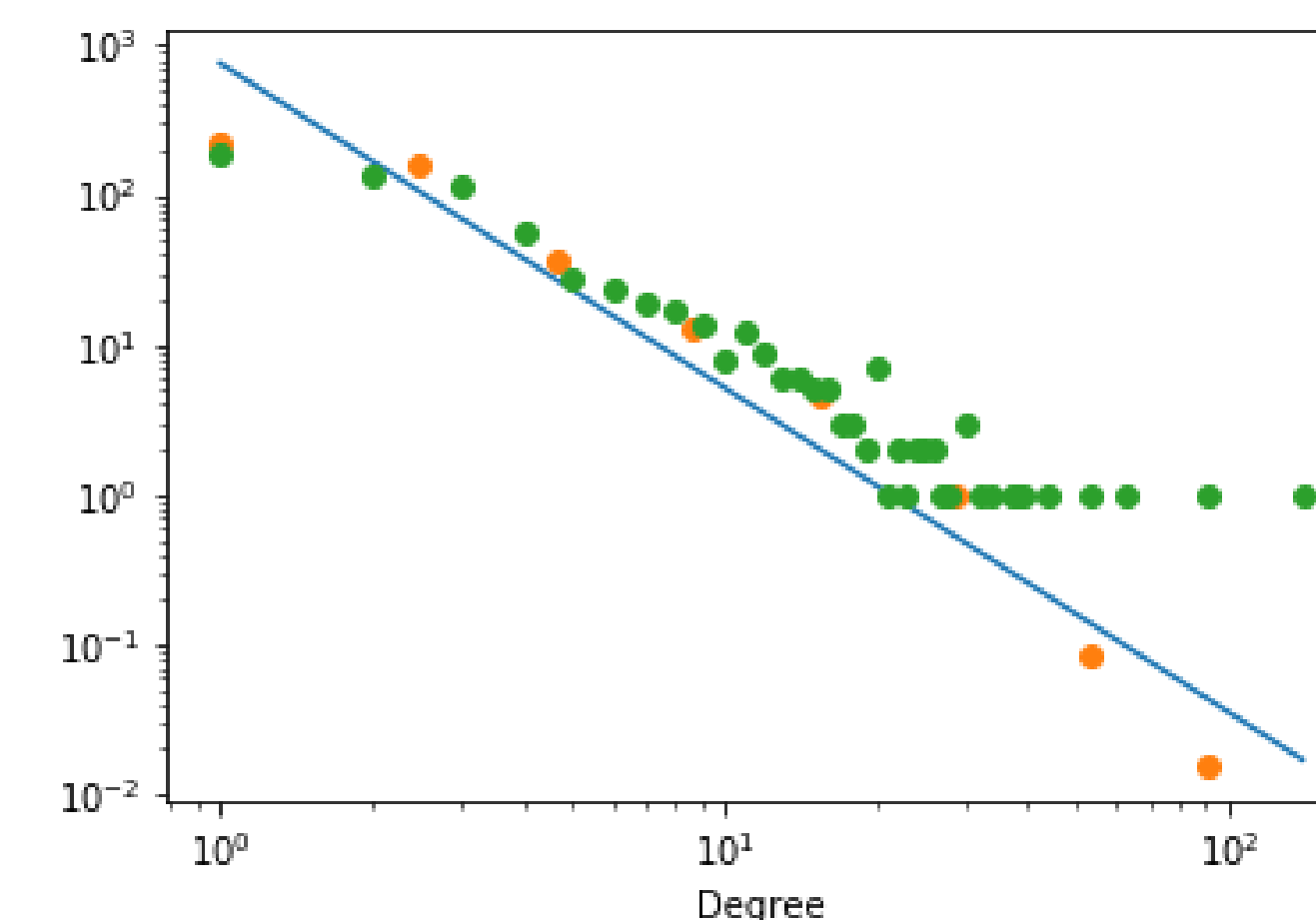
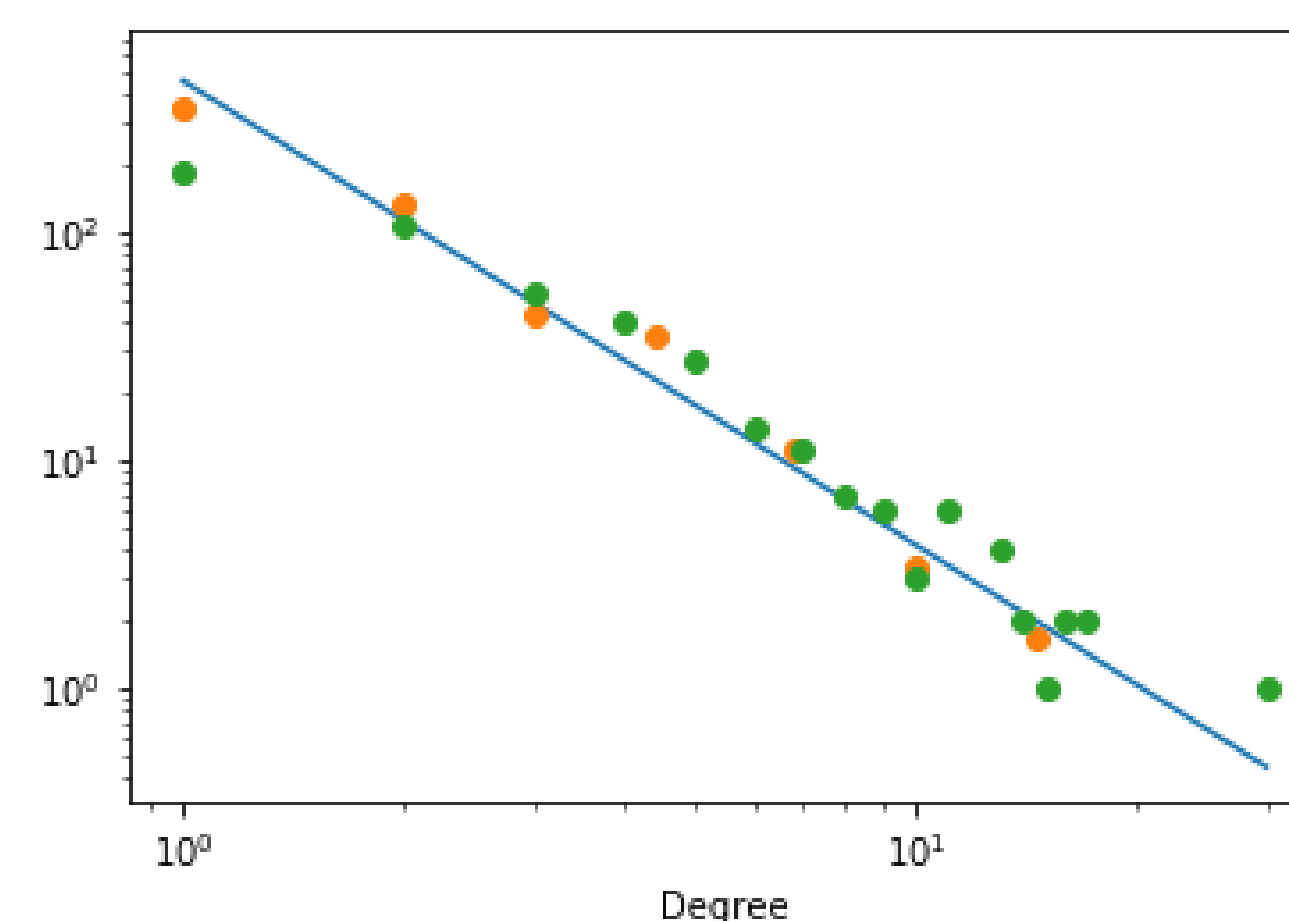
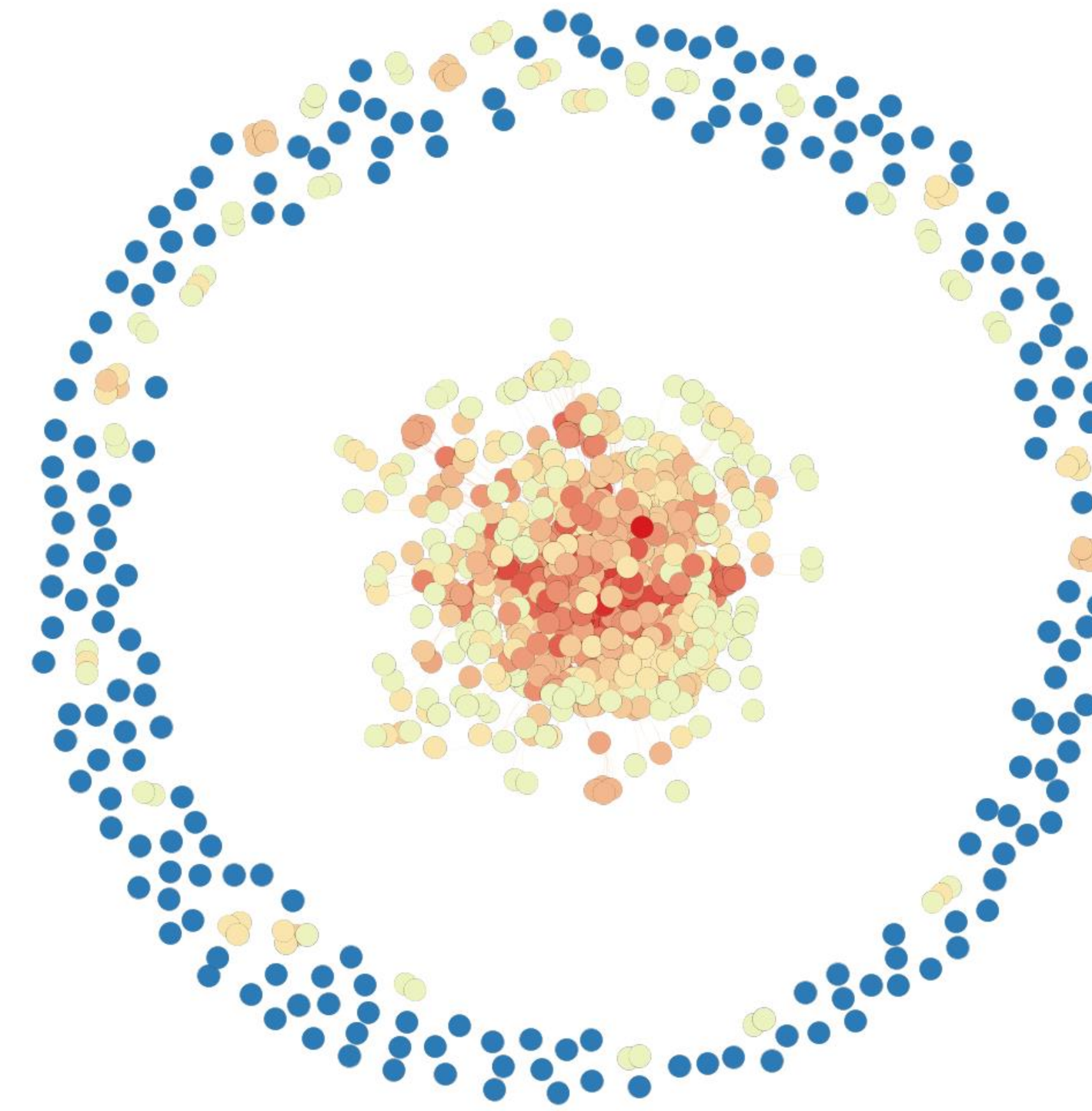
### Results

Parameter	1995-99	2015-19
N	1027	886
L	709	1788
$\langle d \rangle$	5.81	3.73
$\langle k \rangle$	1.38	4.04
C	0.578	0.535

Collaboration Network (1995-1999)



Collaboration Network (2015-2019)



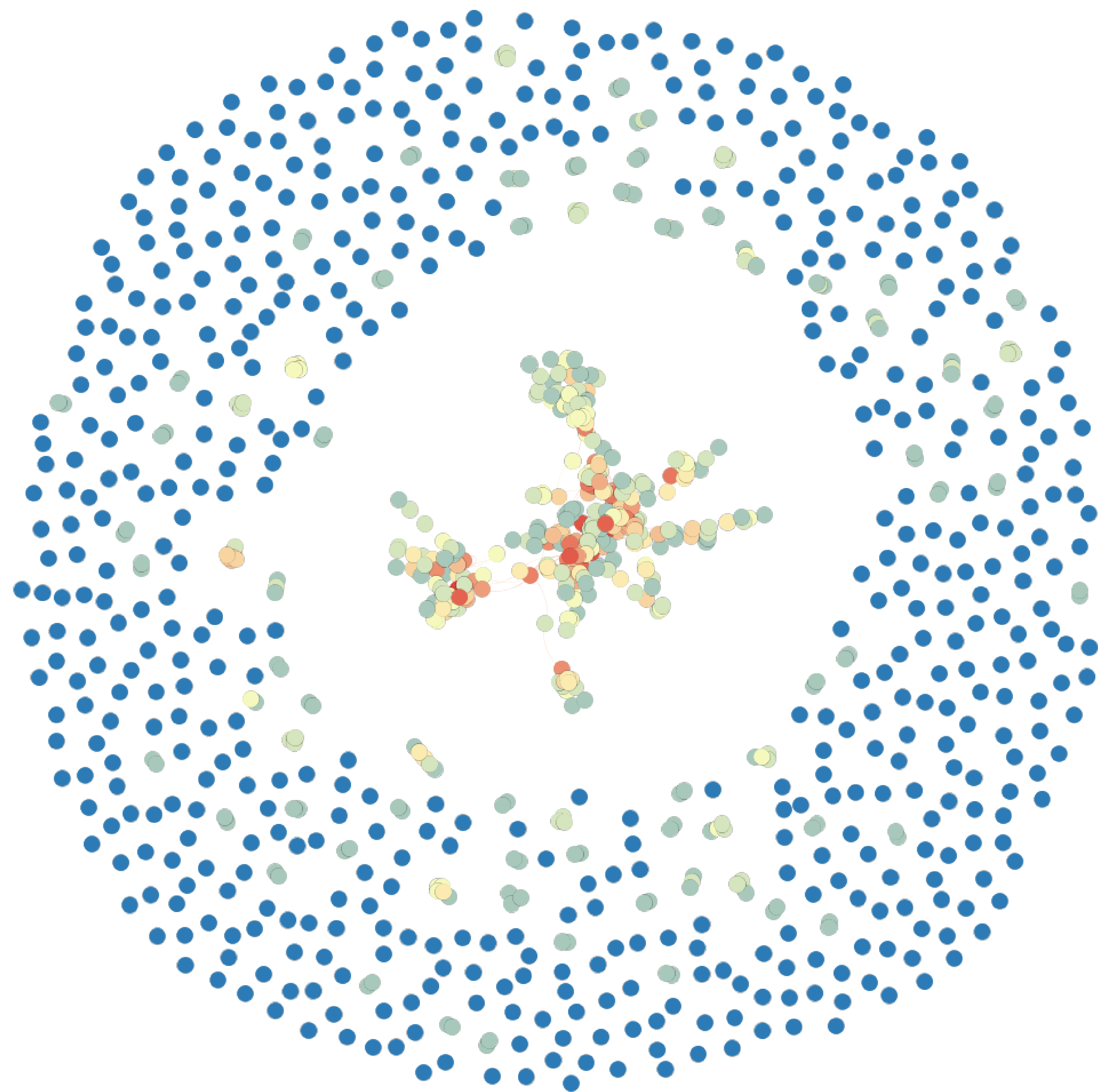
- Both networks follow a power law  $\gamma = -2.04, -2.16$  for 1995-99 and 2015-19 respectively

### Results

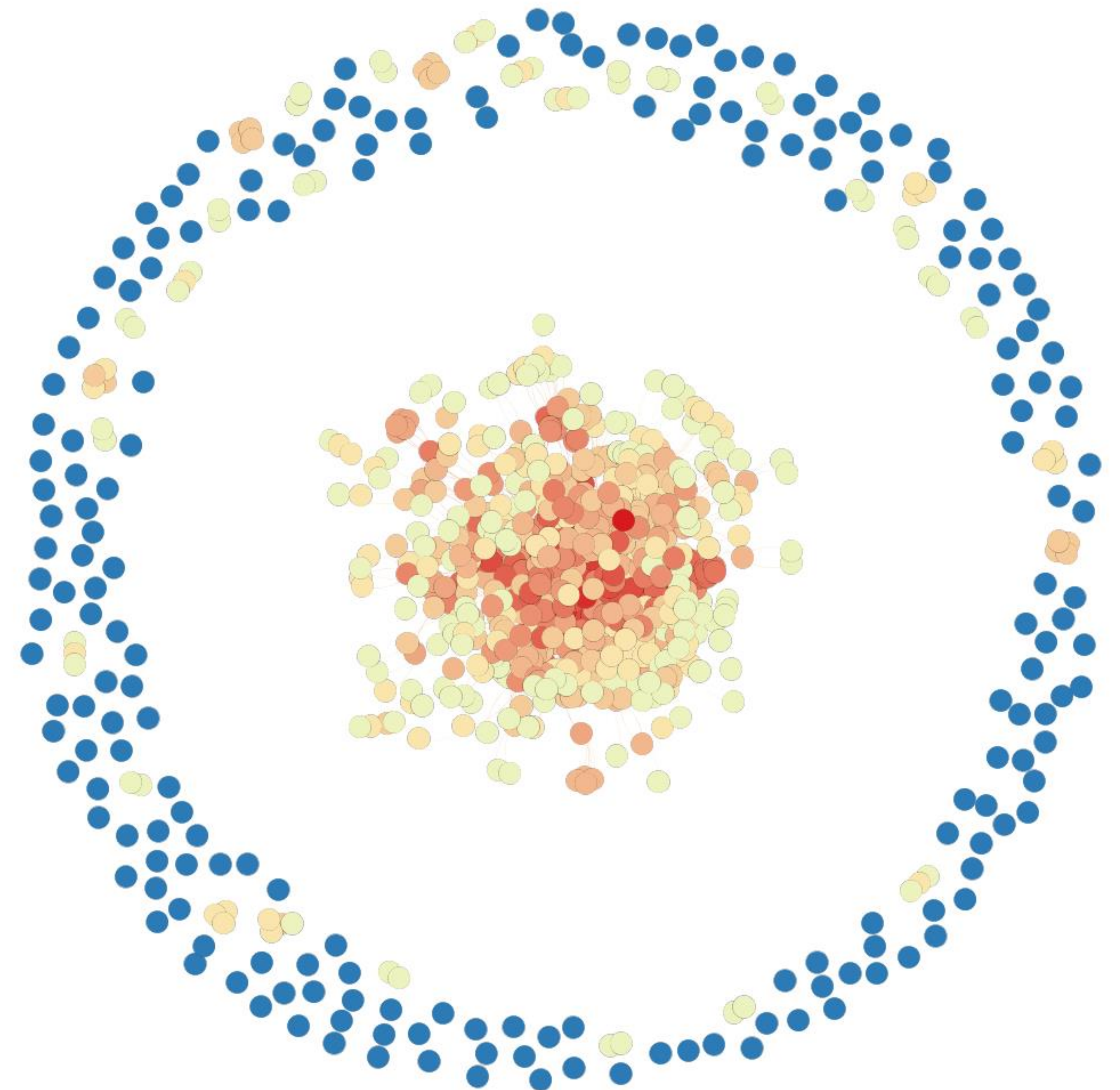
- Large hubs predominantly from Hip-Hop and R&B
- The two distributions were found to be statistically different (2 Sample KS Test  $p = 0.005$ )
- Collaboration network is more assortative in 2015-19 ( $r = -0.12$ ) compared to 1995-99 ( $r = -0.25$ )

### Discussion

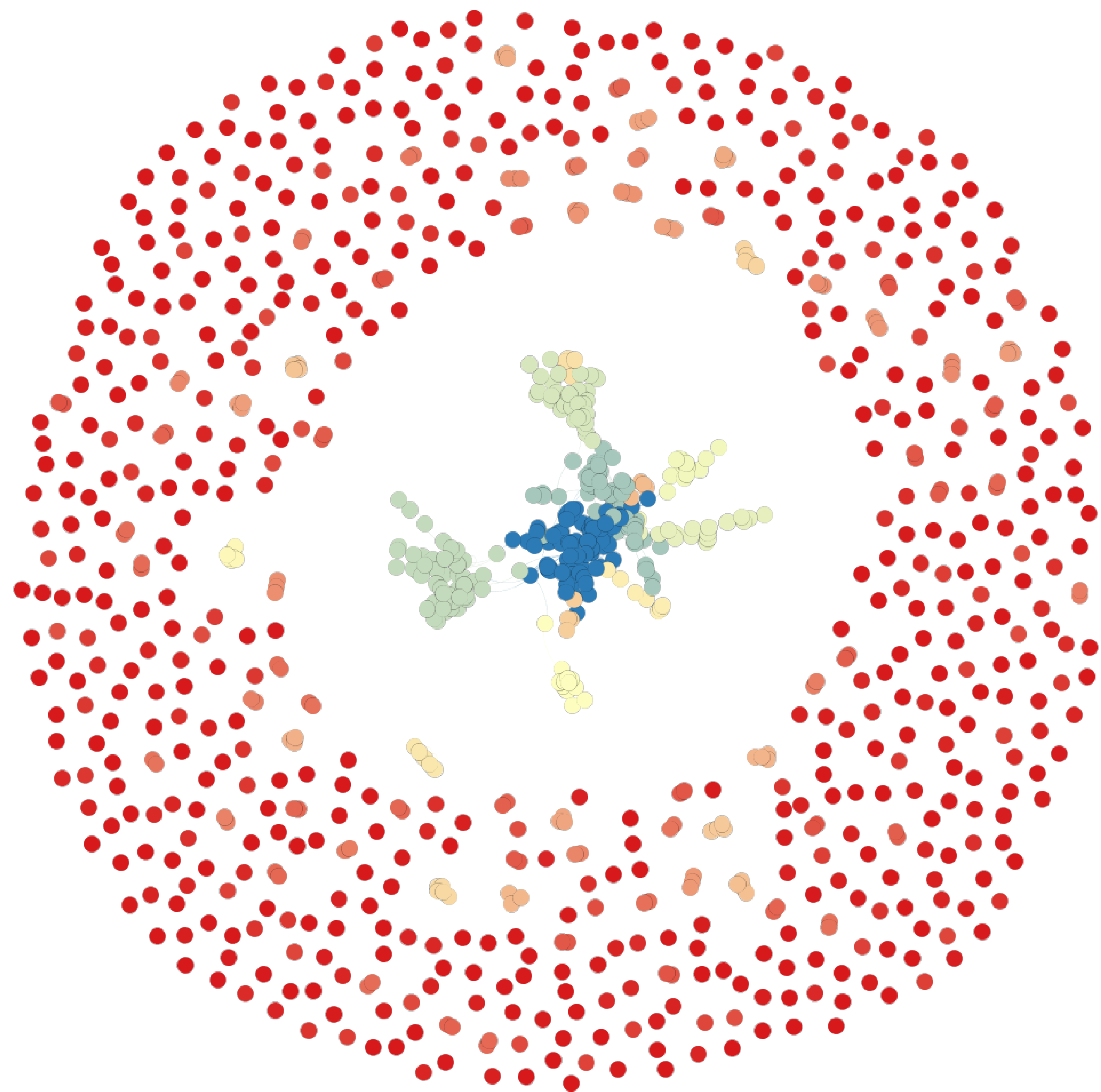
- Popular music appears to have become more connected (ease of collaboration?)
- Most artists were gone after 20 years (only 48 entries shared between the years)
- Next Steps: A deeper dive between genre and degree. Weeks on chart and degree



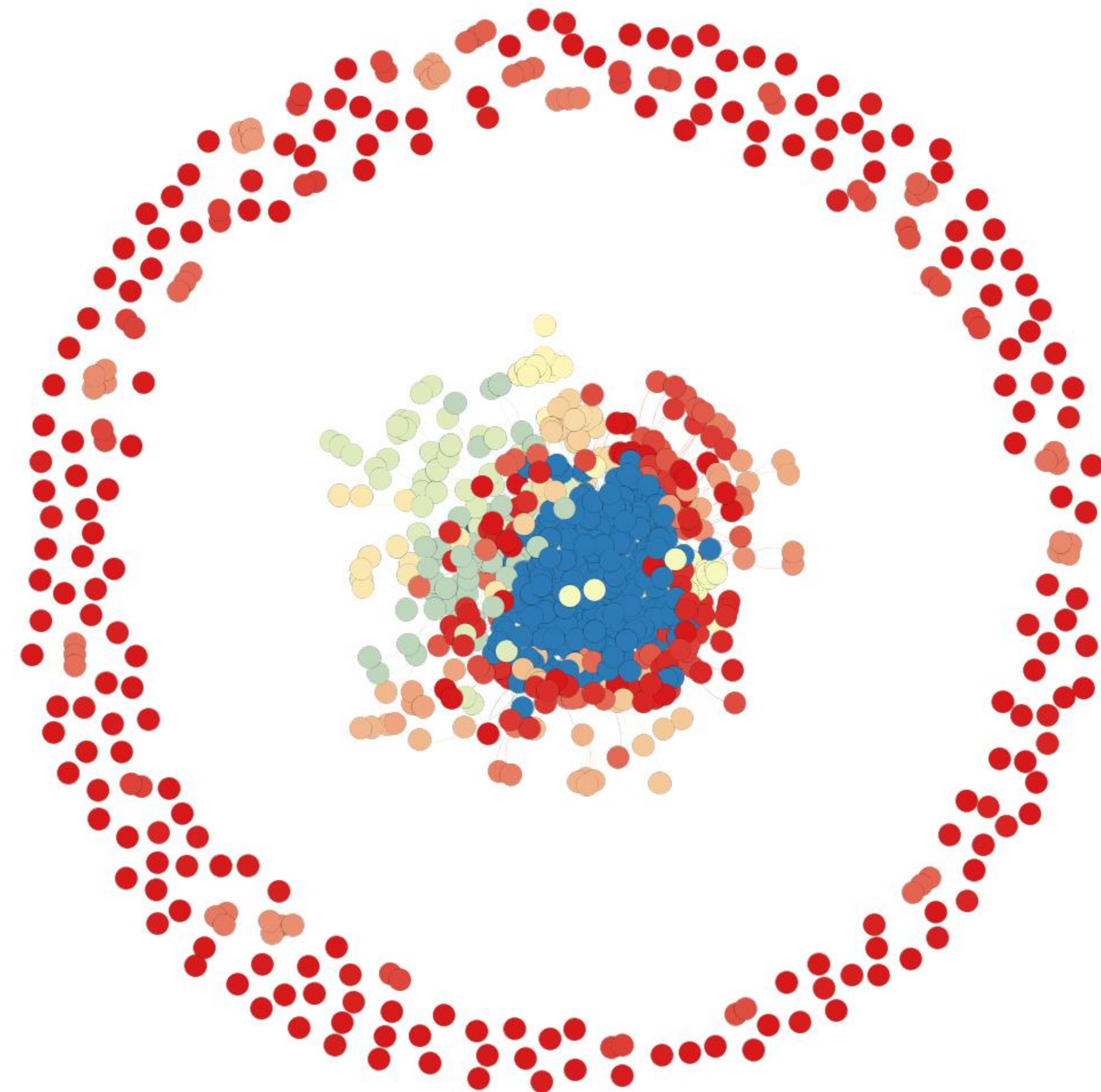
Collaboration Network  
(1995-1999)



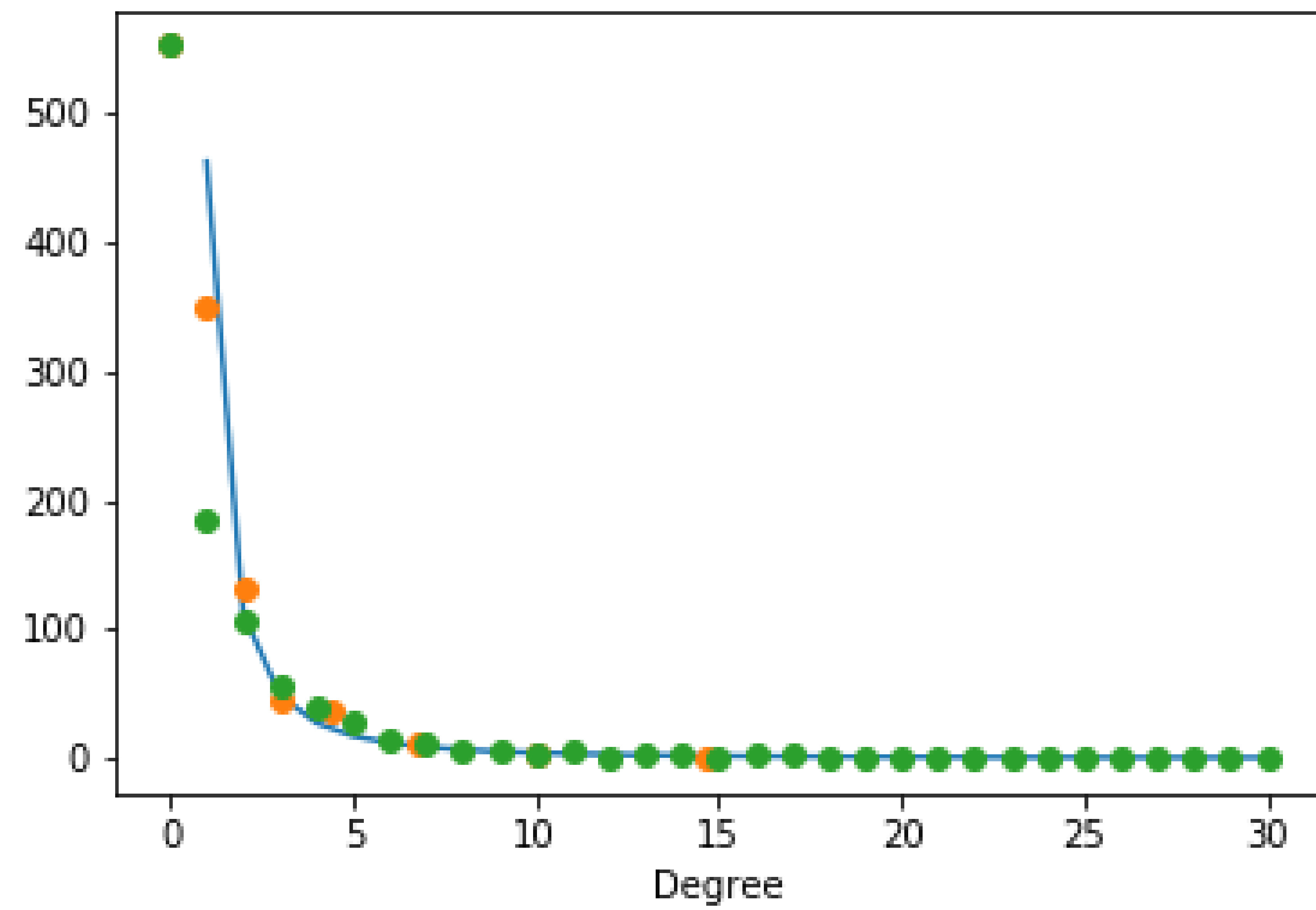
Collaboration Network  
(2015-2019)



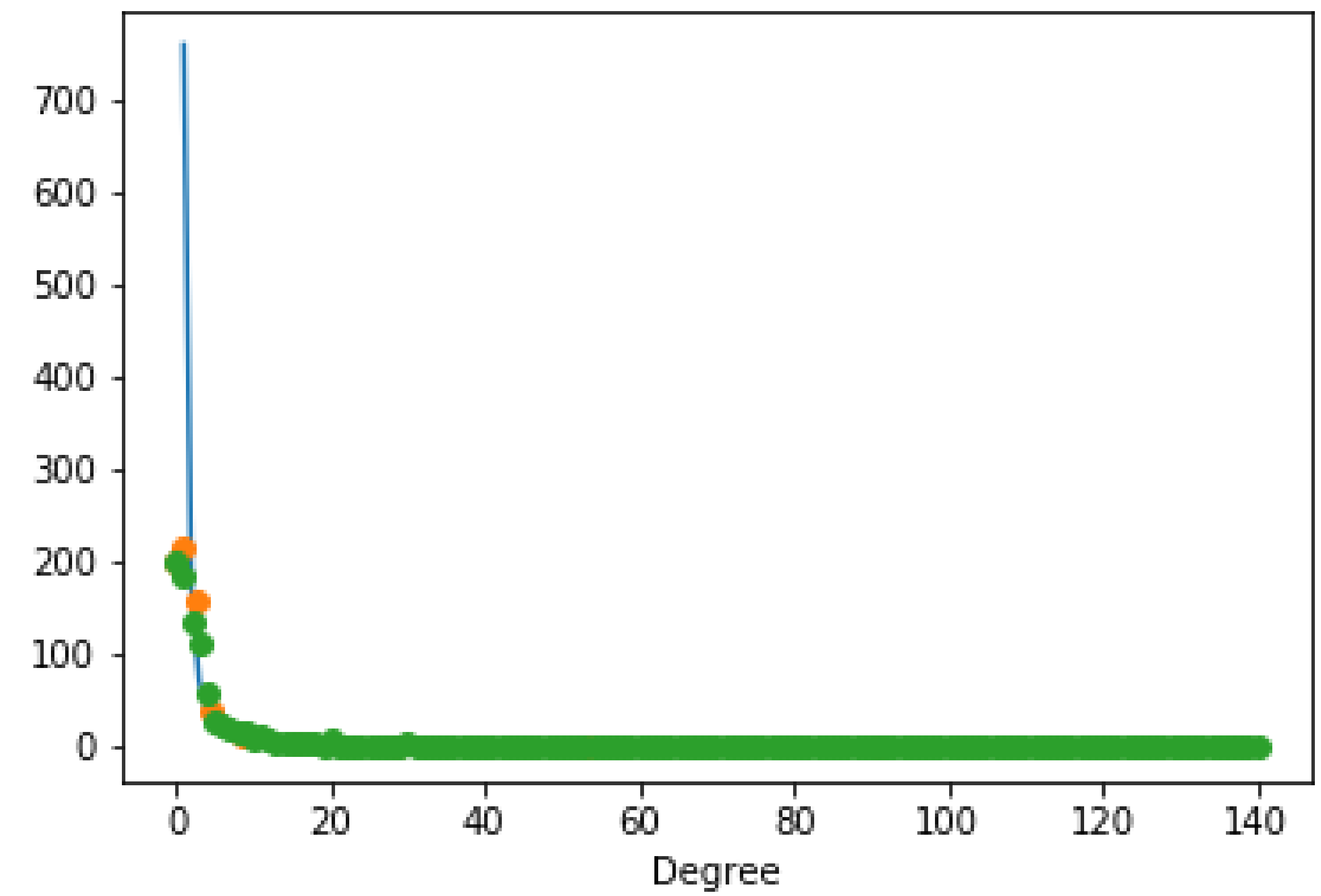
Collaboration Network  
(1995-1999)



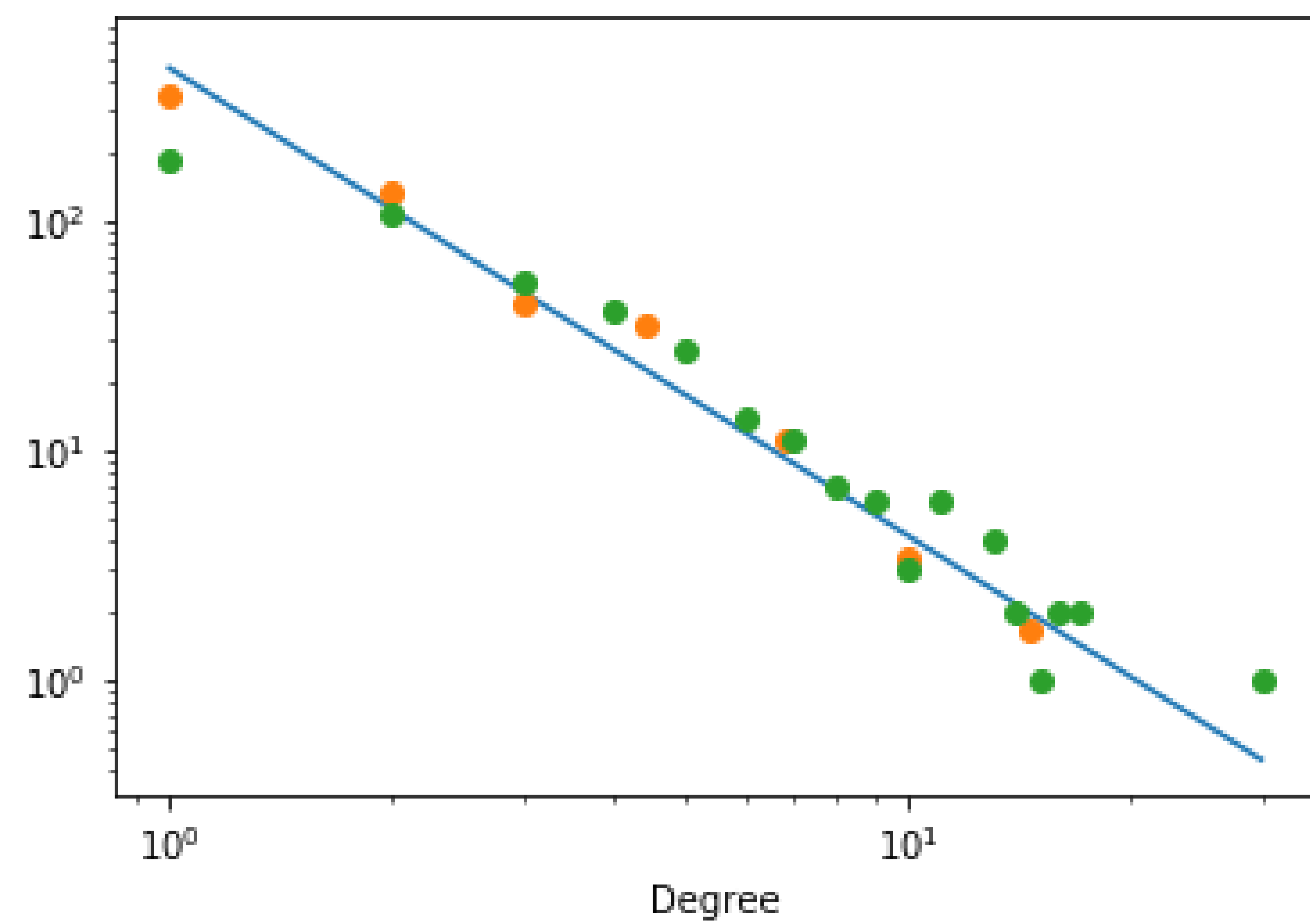
Collaboration Network  
(2015-2019)



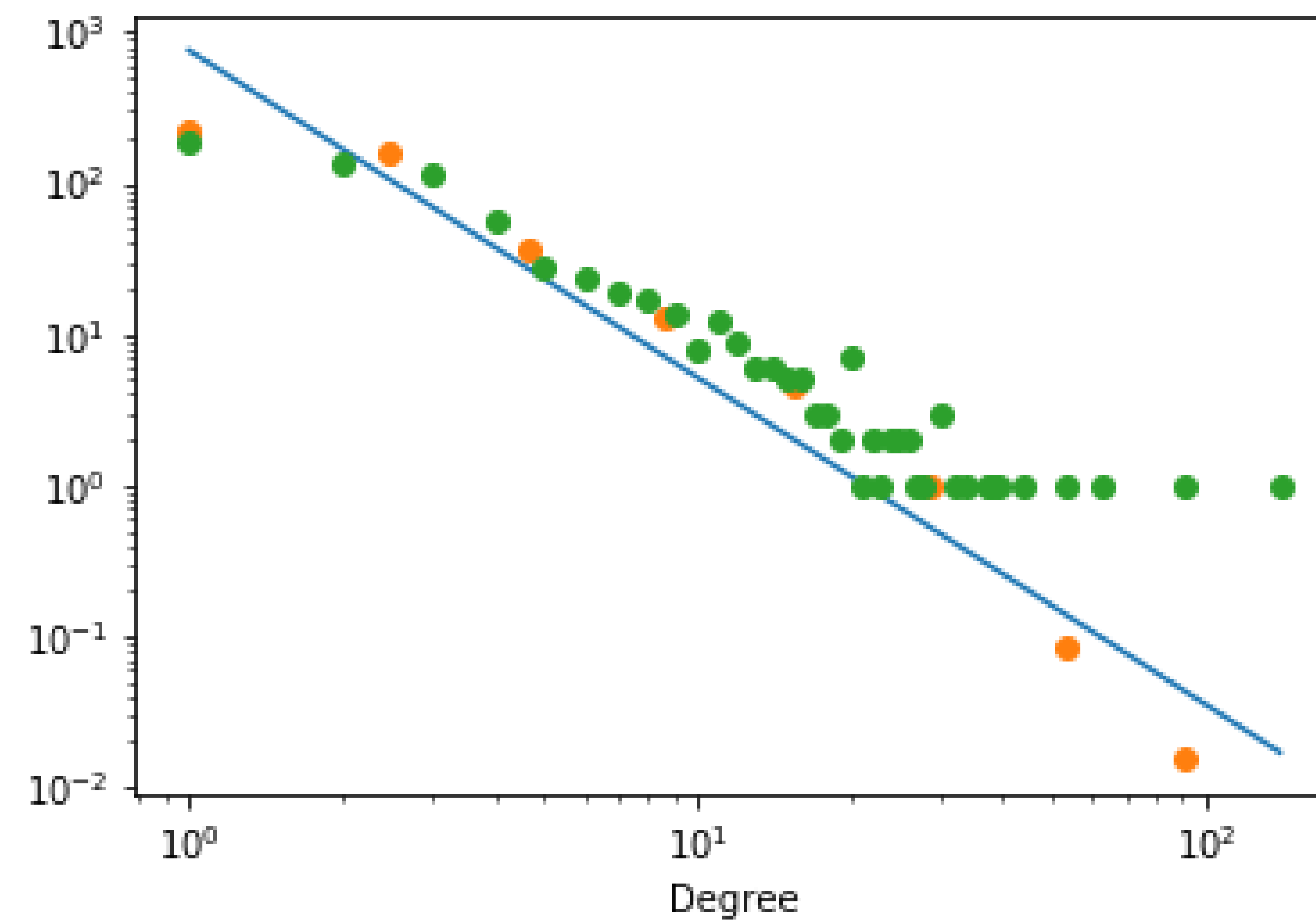
Collaboration Network  
(1995-1999)



Collaboration Network  
(2015-2019)



Collaboration Network  
(1995-1999)



Collaboration Network  
(2015-2019)