

Social Network Analysis Project

Network Science course

Irina Yuryeva 2021

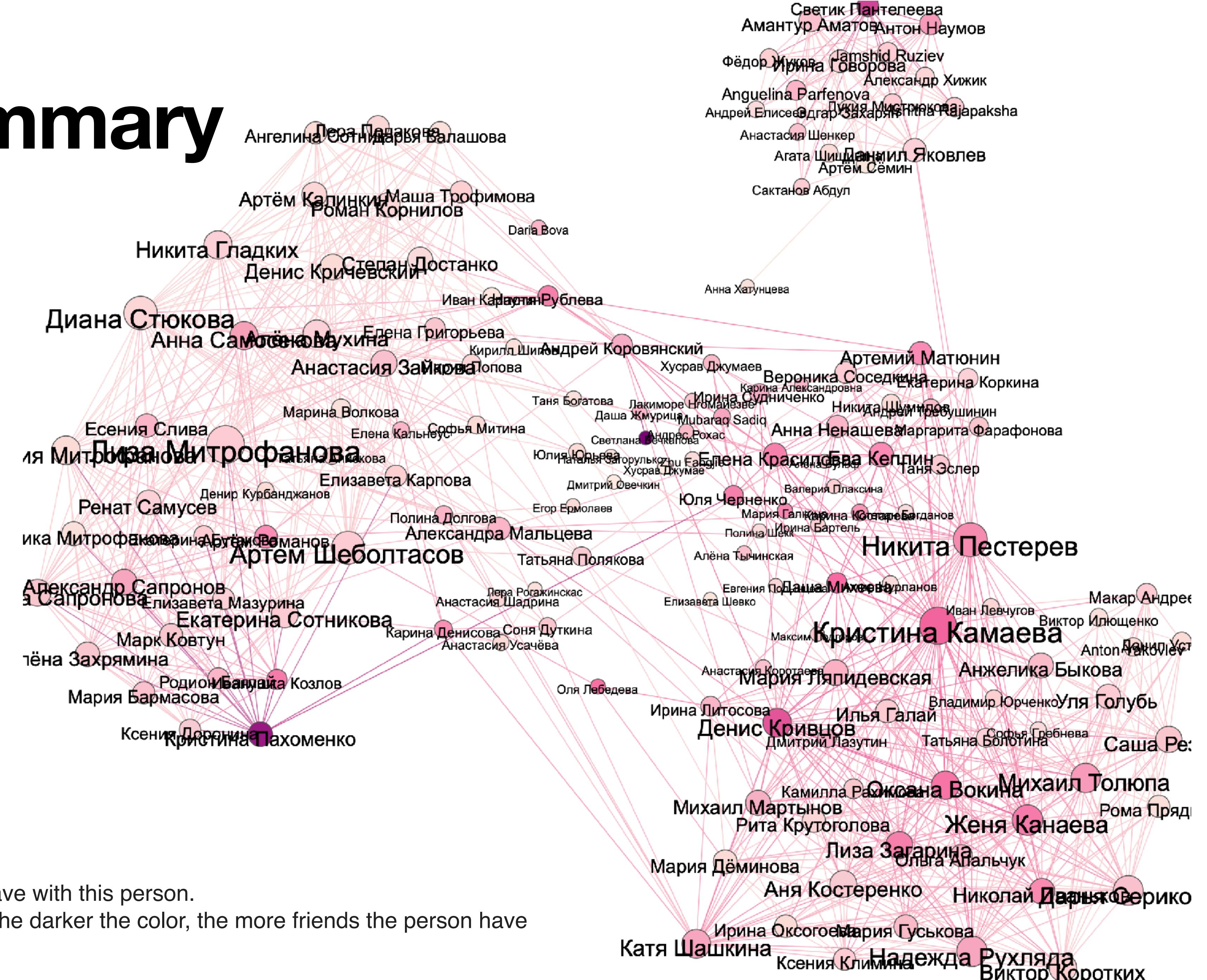
Network Summary

Some information

- **Tool to collect data:** VK-api
 - **Size:** 969
 - **Order:** 158
 - **Node attributes:** name, sex, birth year, city, university, faculty, number of friends
 - **Diameter:** 7
 - **Radius:** 4
 - **Global clustering:** 0.52
 - **Average path length:** 2.97
 - **Average edge length:** 5.61

Network Summary

Network layout

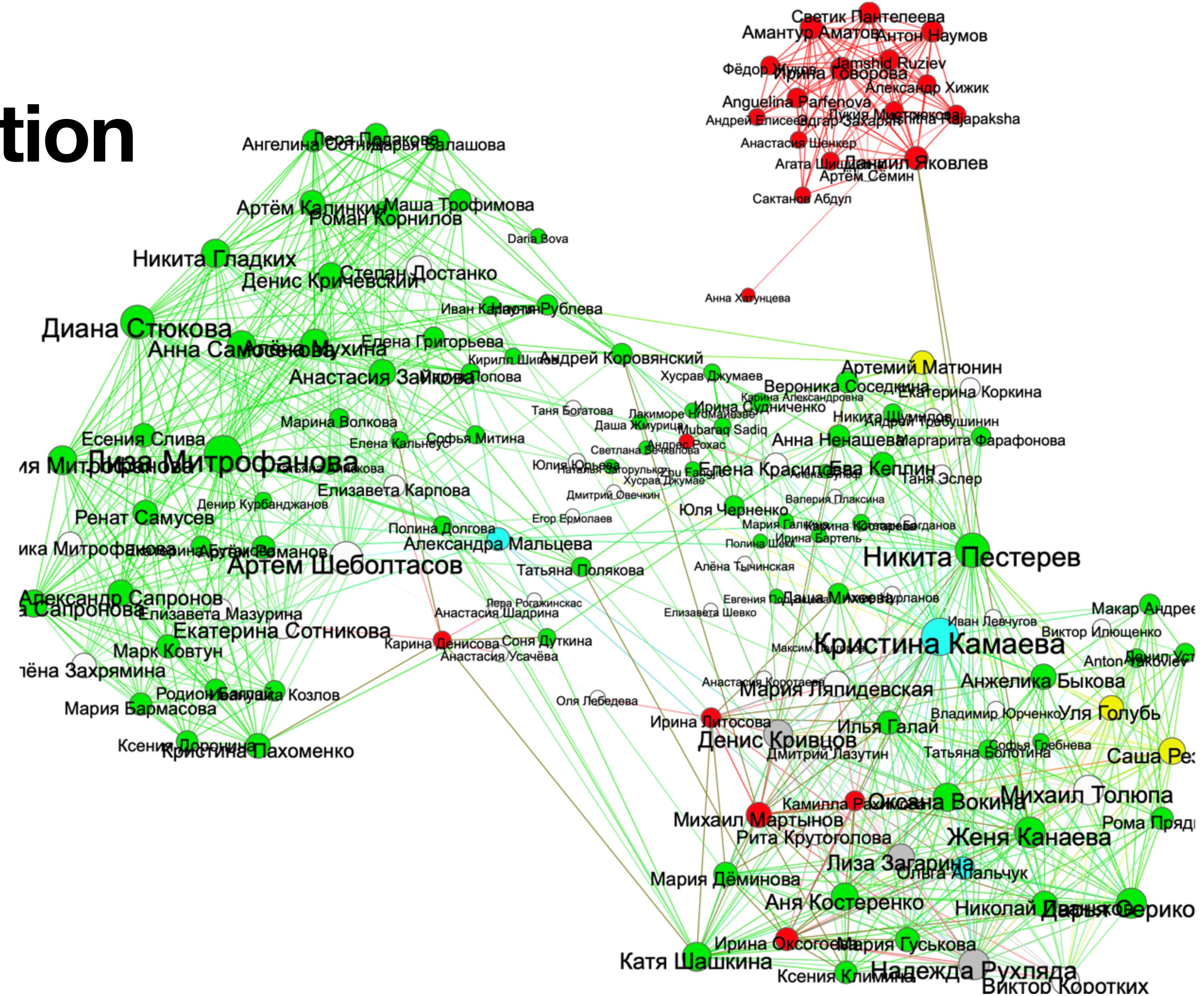


Size of a node shows how many mutual friends I have with this person.

Color shows how many friends the person have. The darker the color, the more friends the person have

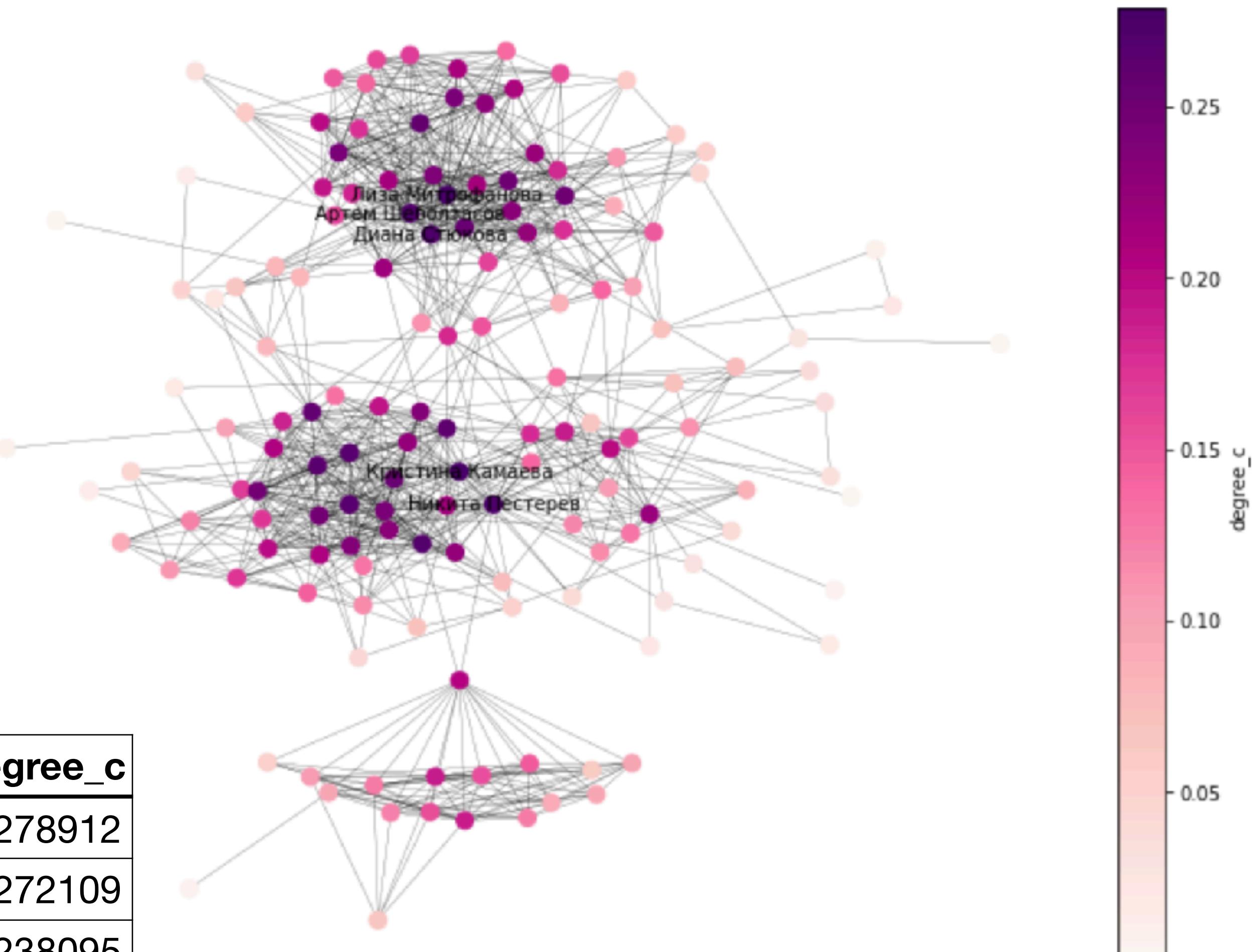
Cities distribution

Novosibirsk
Moscow
St.Petersburg
Omsk
Others
Not shown



Degree centrality

Structural Analysis

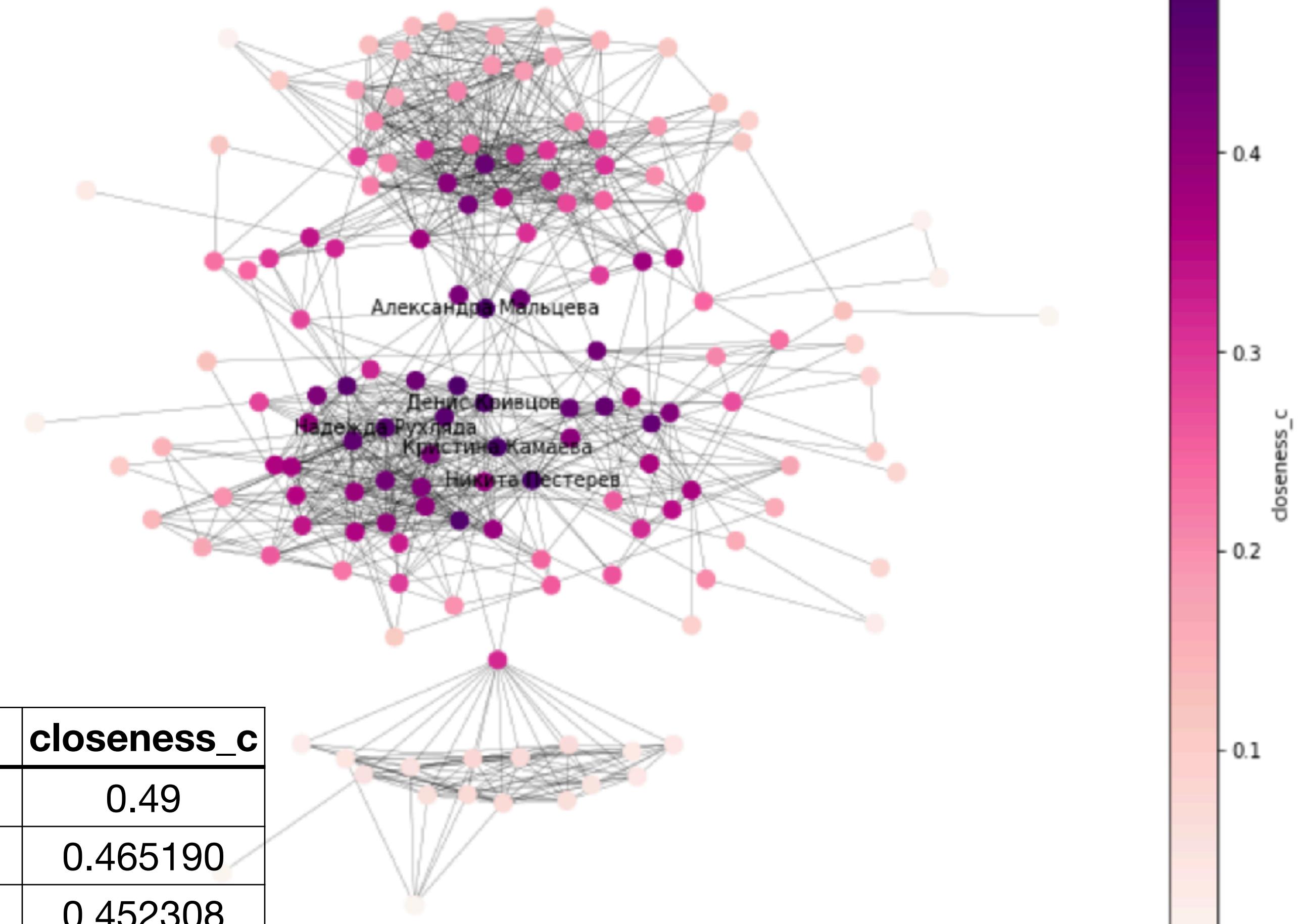


name	city	university	degree_c
Лиза Митрофанова	Новосибирск		0.278912
Кристина Камаева	Санкт-Петербург	СПбГУ	0.272109
Никита Пестерев	Новосибирск	НГУ	0.238095
Диана Стюкова	Новосибирск		0.231293
Артём Шеболтасов			0.224490

Closeness centrality

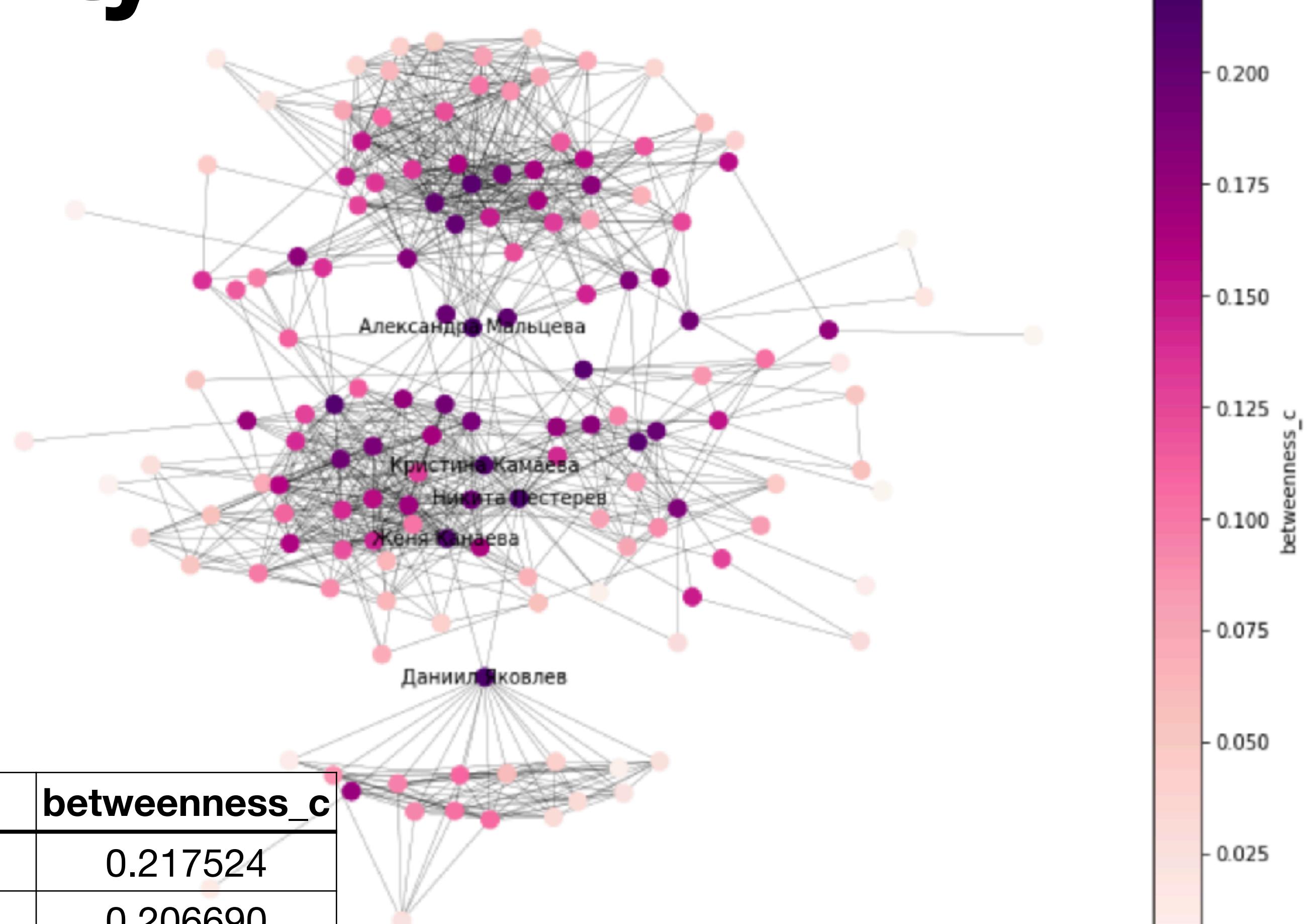
Structural Analysis

name	city	university	closeness_c
Никита Пестерев	Новосибирск	НГУ	0.49
Кристина Камаева	Санкт-Петербург	СПбГУ	0.465190
Денис Кривцов	Севастополь	НГУ	0.452308
Александра Мальцева	Санкт-Петербург	НИУ ВШЭ (СПб)	0.449541
Надежда Рухляда	Бердск	НГУ	0.436202



Betweenness centrality

Structural Analysis

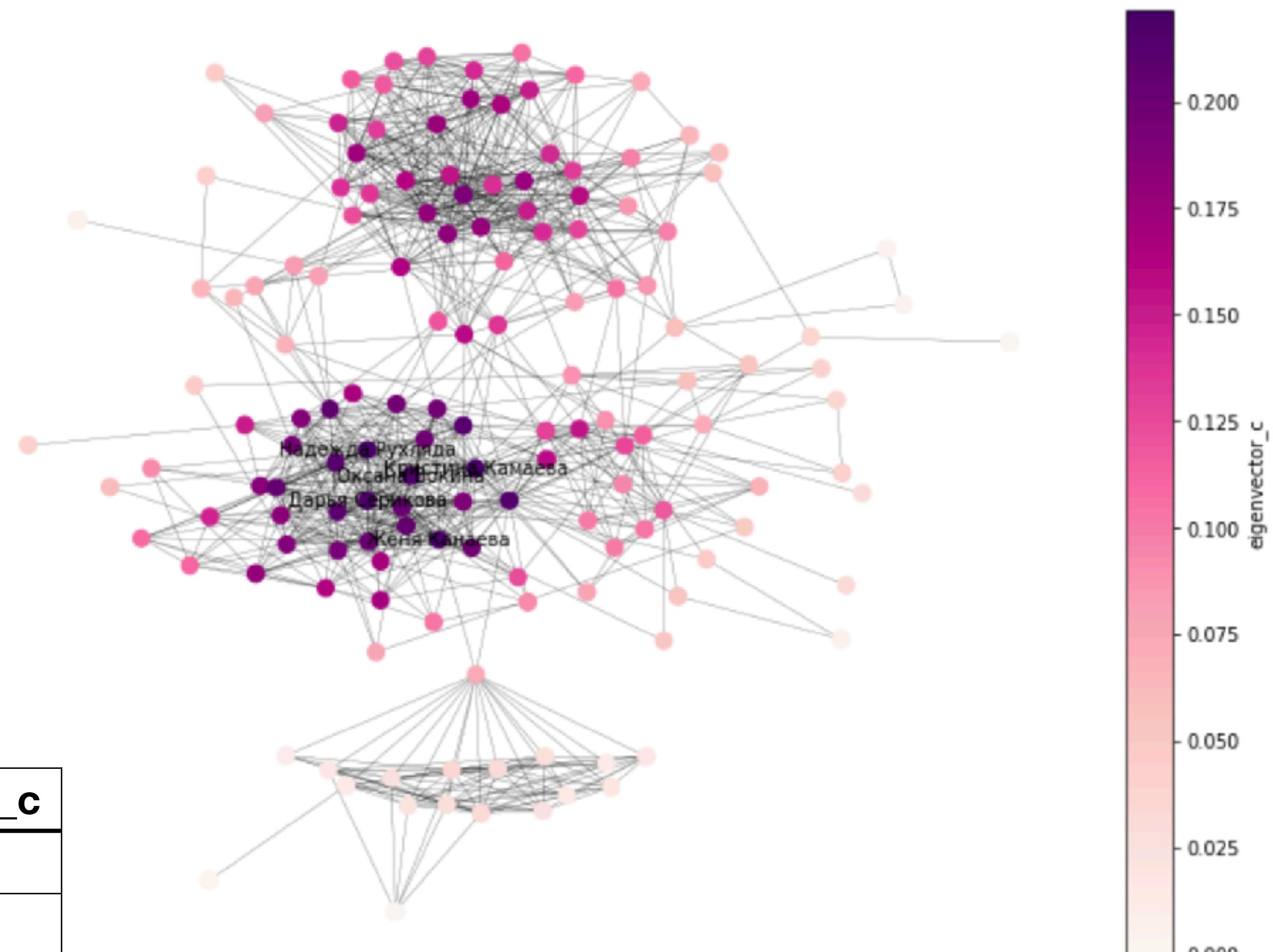


name	city	university	betweenness_c
Никита Пестерев	Новосибирск	НГУ	0.217524
Даниил Яковлев	Москва	НИУ ВШЭ	0.206690
Александра Мальцева	Санкт-Петербург	НИУ ВШЭ (СПб)	0.217524
Женя Канаева	Новосибирск	НГУ	0.078156
Кристина Камаева	Санкт-Петербург	СПбГУ	0.074906

Eigenvector centrality

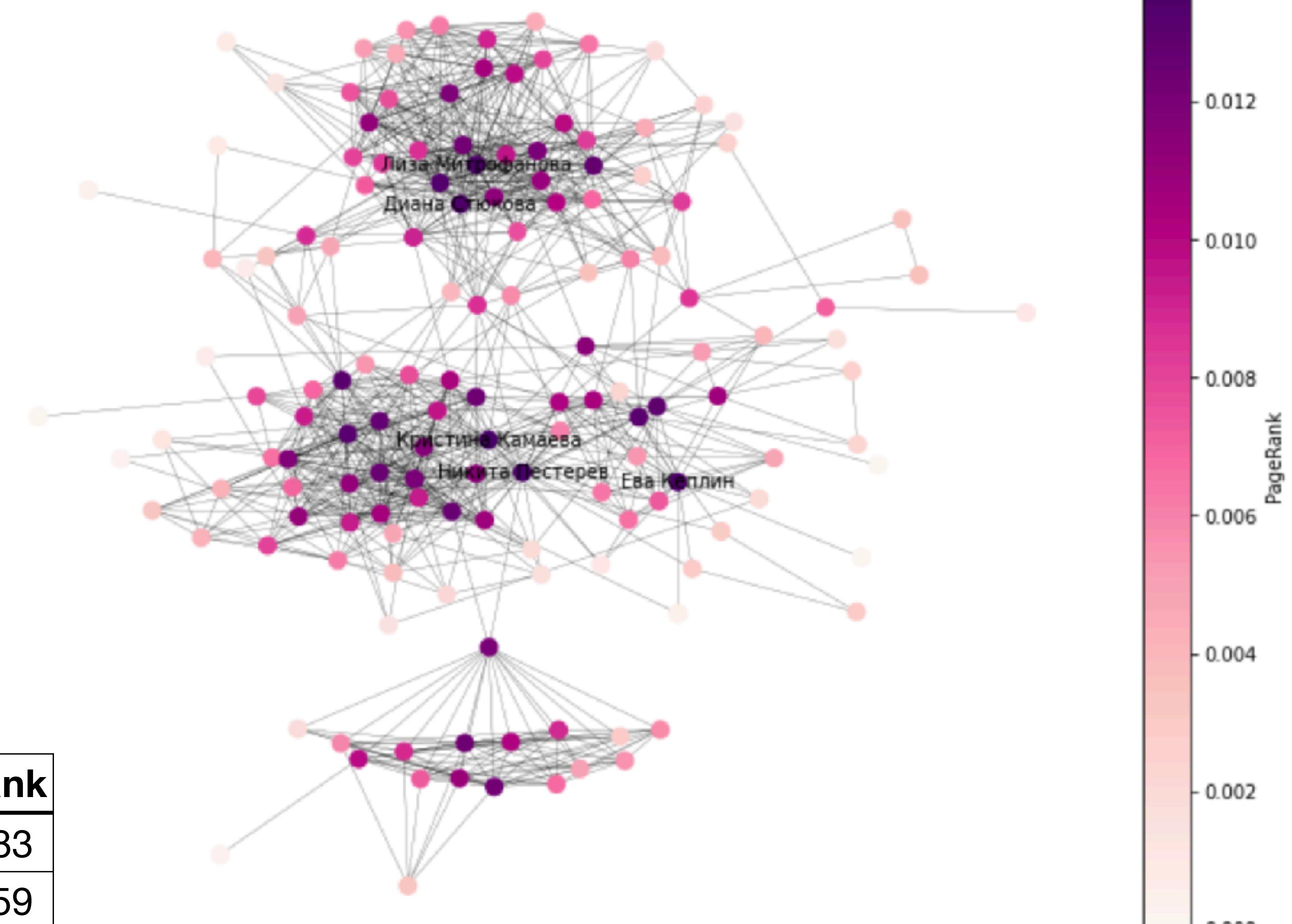
Structural Analysis

name	city	university	eigenvector_c
Кристина Камаева	Санкт-Петербург	СПбГУ	0.221434
Надежда Рухляда	Бердск	НГУ	0.212527
Женя Канаева	Новосибирск	НГУ	0.207174
Дарья Серикова	Новосибирск	НГУ	0.205292
Оксана Воина	Новосибирск	НГУ	0.191043



PageRank Structural Analysis

name	city	university	PageRank
Кристина Камаева	Санкт-Петербург	СПбГУ	0.013783
Никита Пестерев	Новосибирск	НГУ	0.012959
Лиза Митрофанова	Новосибирск		0.012661
Ева Кеплин	Новосибирск	НГУ	0.012482
Диана Стюкова	Новосибирск		0.012148

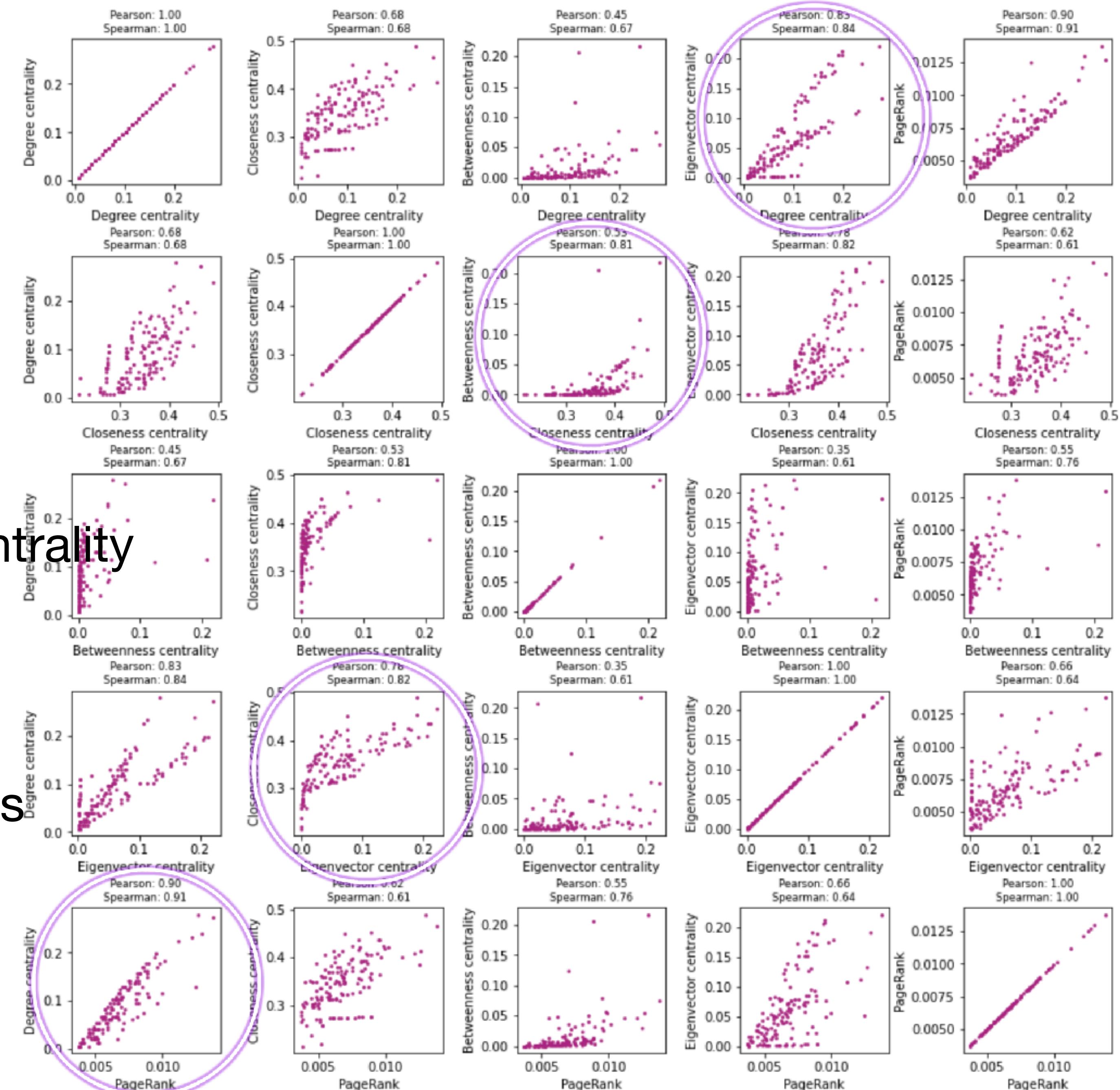


Comparison centralities

Structural Analysis

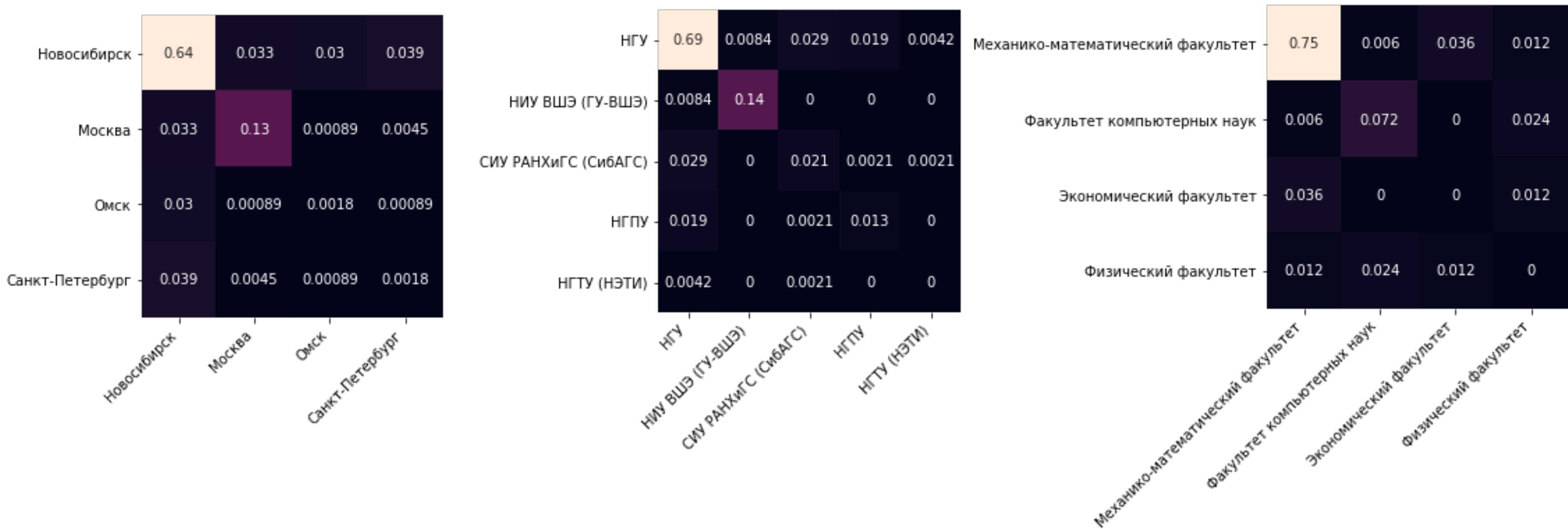
Most correlated:

- Degree centrality and PageRank
- Degree centrality and Eigenvector centrality
- Closeness centrality and Eigenvector centrality
- Closeness centrality and Betweenness centrality



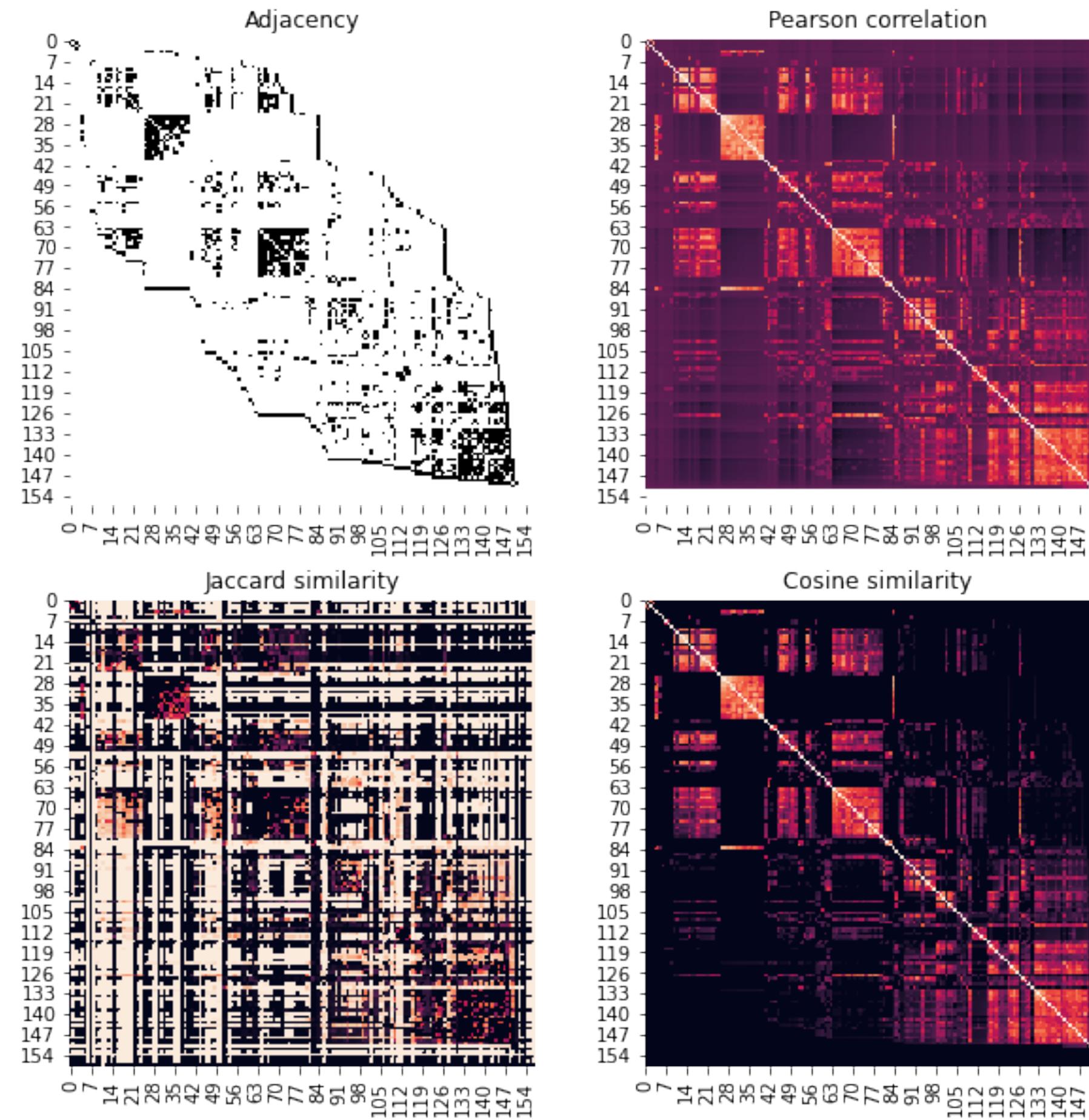
Assortative Mixing

Structural Analysis



Node structural similarity

Structural Analysis

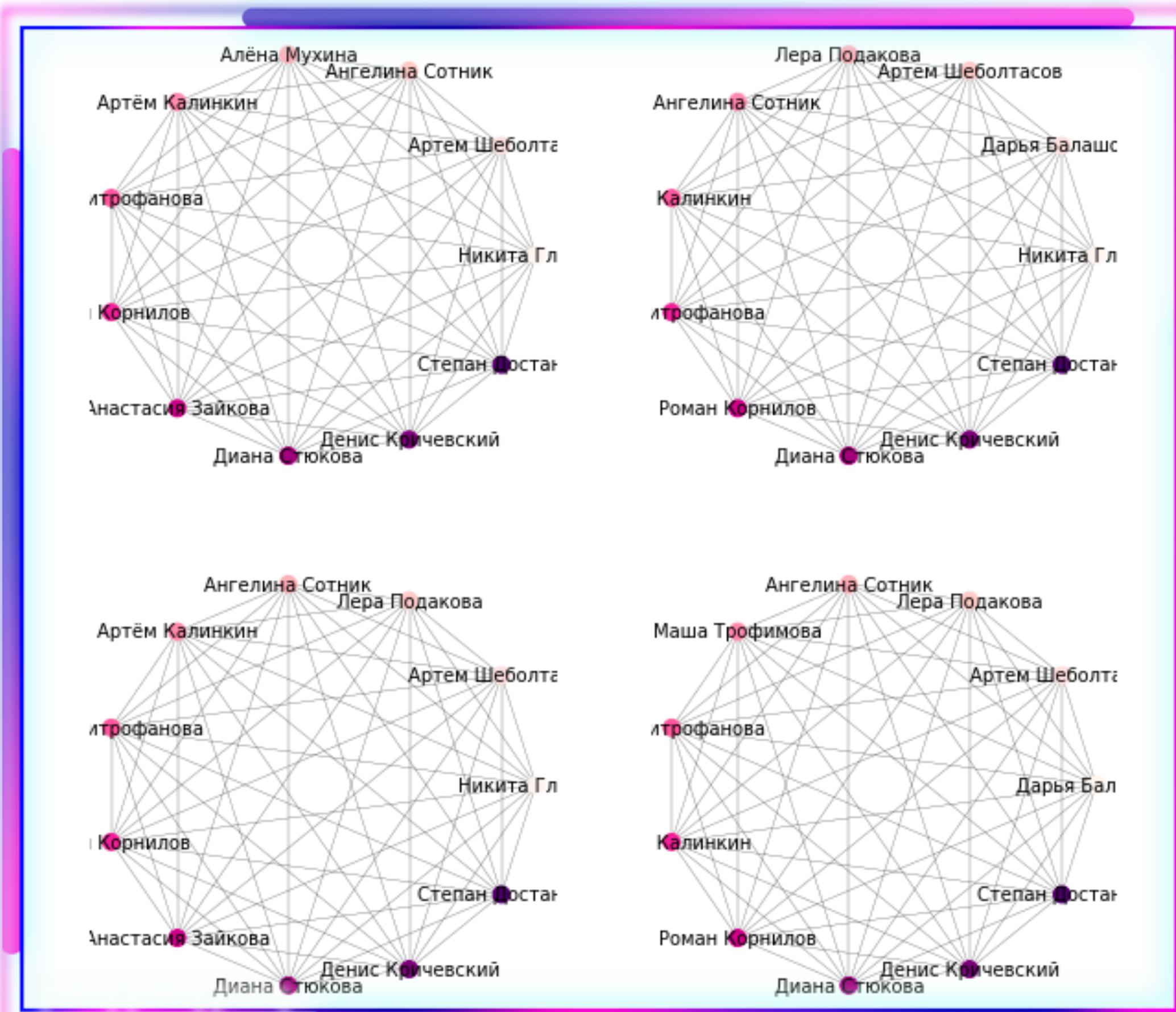


Clique search Community Detection

Size of max clique: 11
Number of max cliques: 6

Close school friends

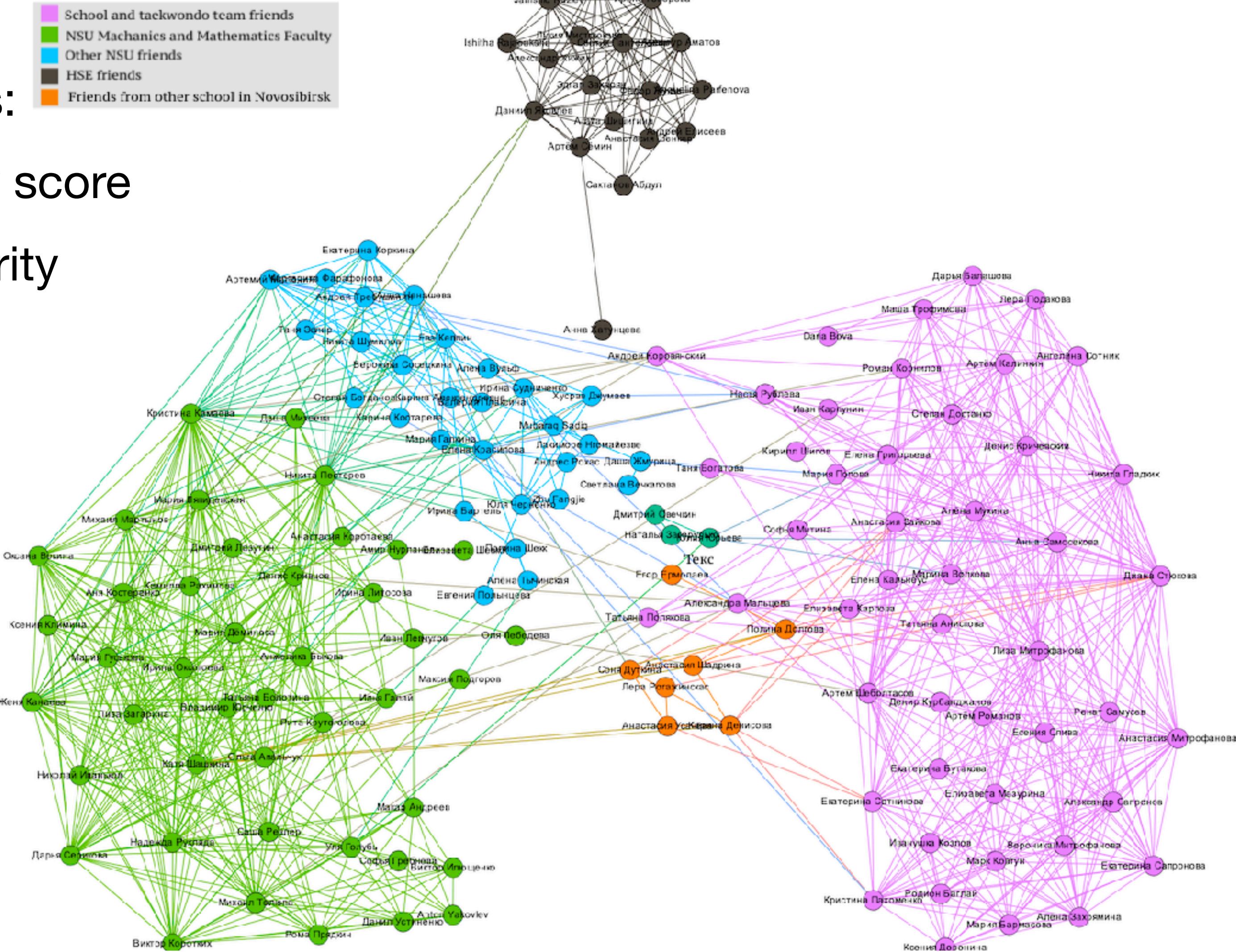
Taekwondo team



Community detection

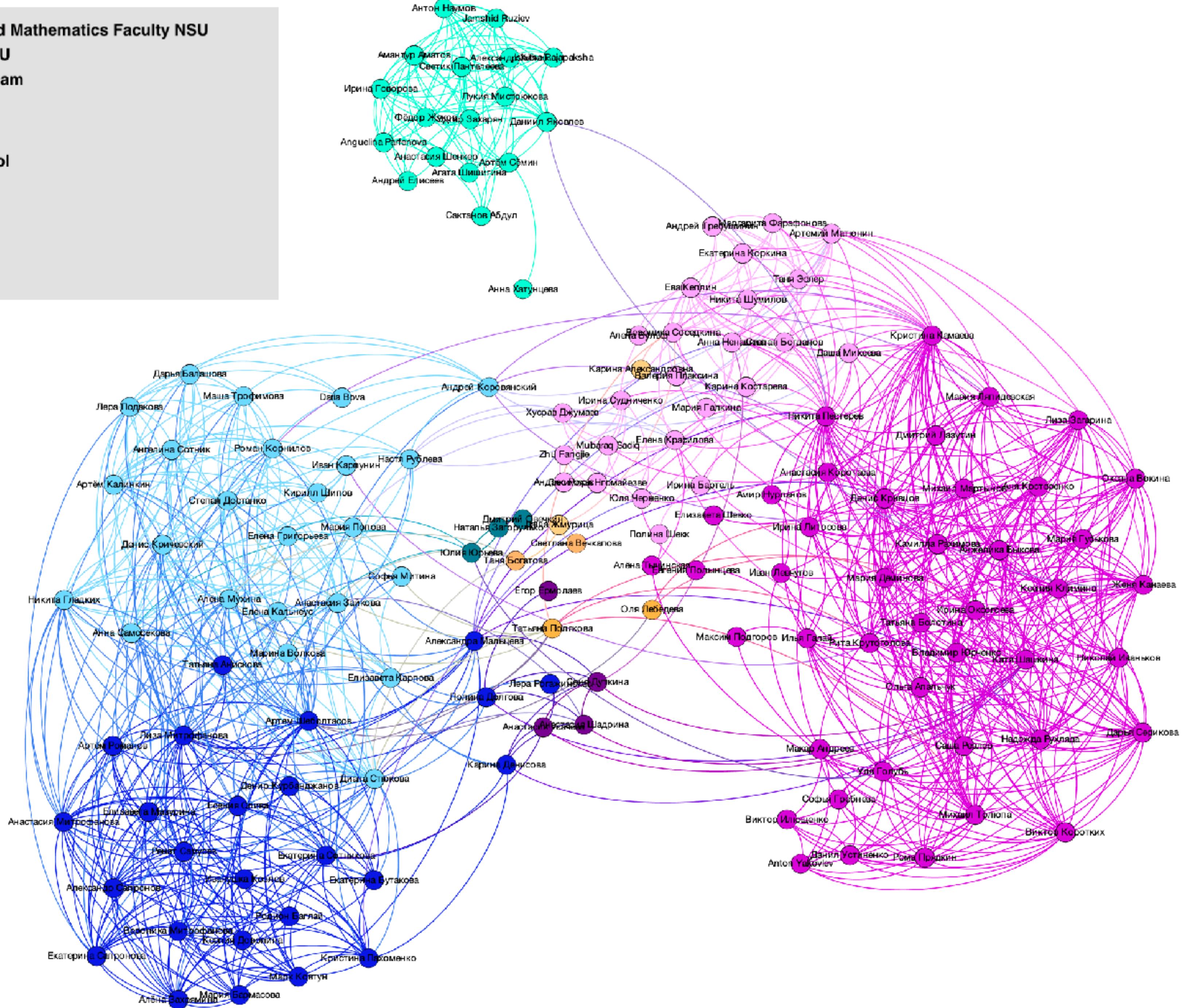
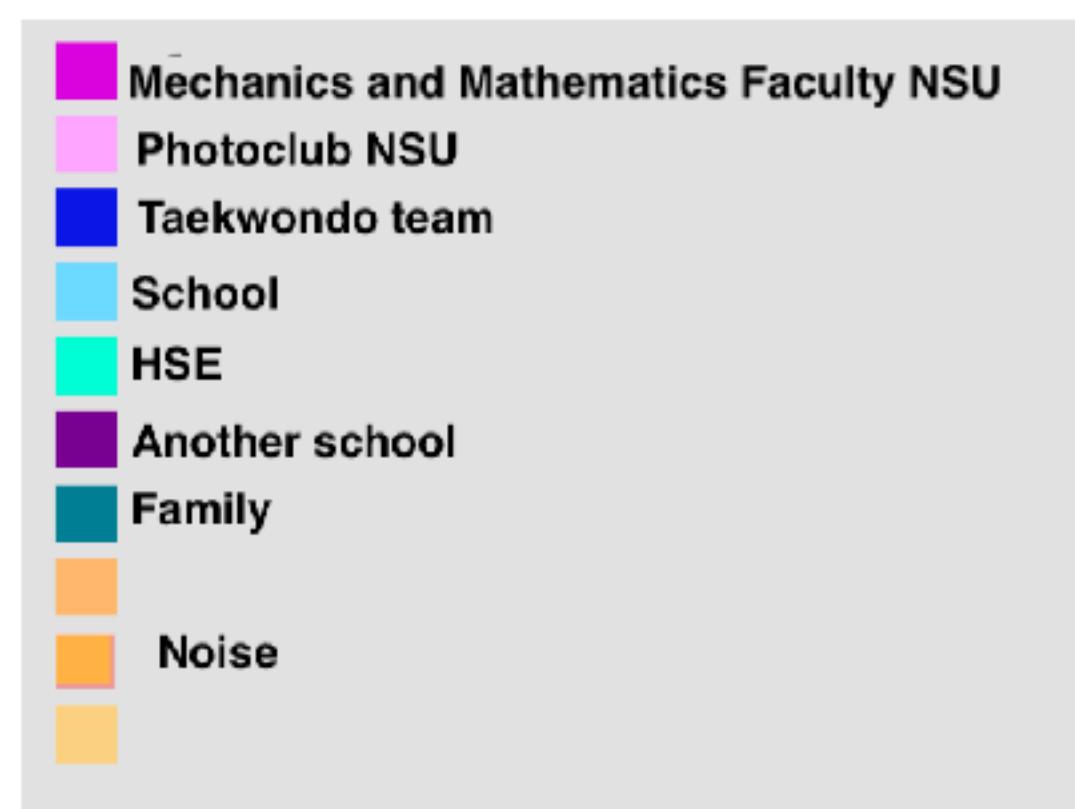
I've tried 5 community detection algorithms:

- Gephi communities based on modularity score
- Clauset-Newman-Moore greedy modularity maximization
- Louvain method
- Spectral clustering
- Agglomerative clustering



Community detection best algorithm

Agglomerative clustering



Thank you!