

BIG DATA IN DEMOGRAPHIC RESEARCH: ANALYSIS OF GEOGRAPHY AND STATISTICAL ASSESSMENT OF THE RUSSIAN COMMUNITY ABROAD

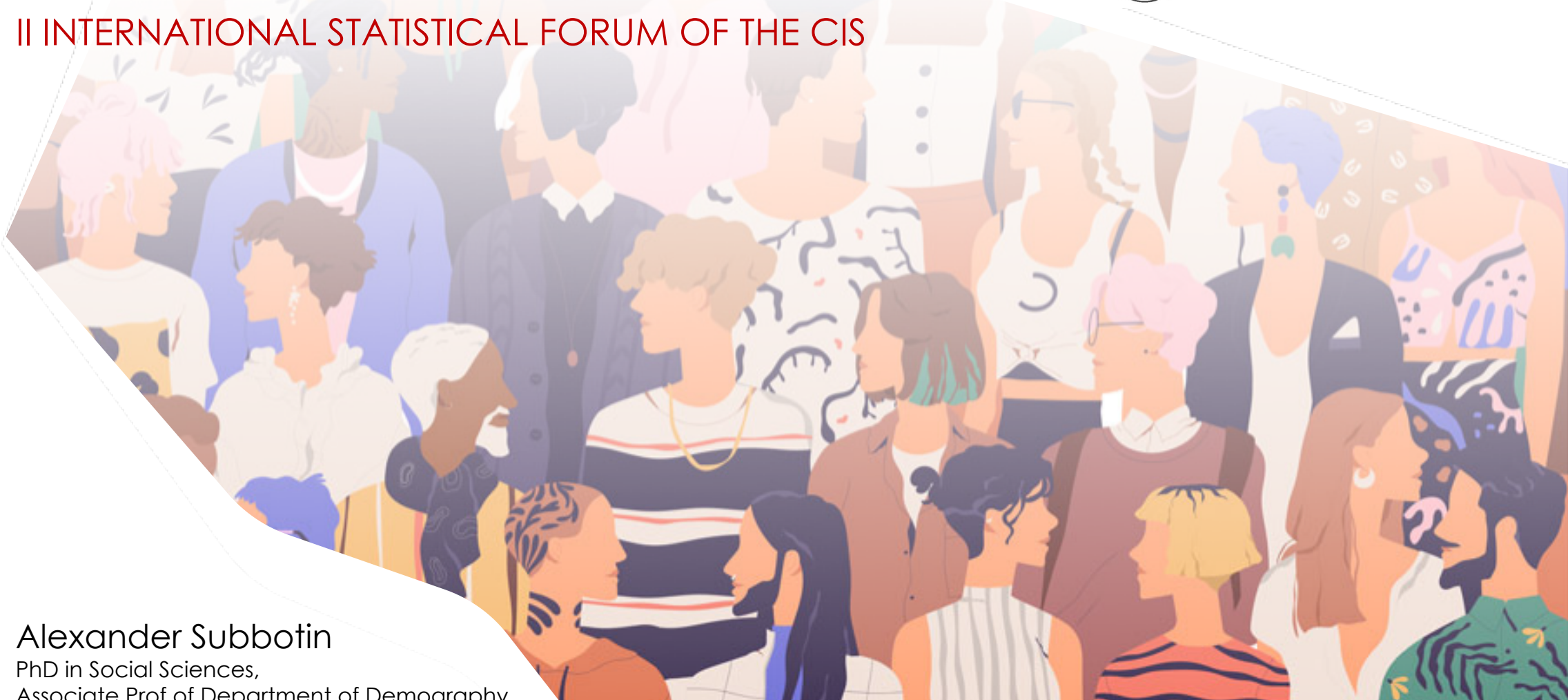
II INTERNATIONAL STATISTICAL FORUM OF THE CIS



LOMONOSOV MOSCOW STATE UNIVERSITY
Higher School of Contemporary
Social Sciences
Department of Demography

Alexander Subbotin
PhD in Social Sciences,
Associate Prof of Department of Demography

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POPULATION



DIGITAL
(VIRTUAL)
POPULATION



DIGITAL DEMOGRAPHY

– a **new area of research** studying

- demographic processes using **innovative methods and new data sources**
- **"digital" population**
- **impact of digitalization** on demographic behavior

Digital demography is concerned with the study of what the virtual world generated by users can tell about real society from the perspective of the subject of demography

Data and methods of digital demography

▪ **Traditional data sources**

(censuses, current population accounting, population registers, sample surveys, etc.)

▪ **Alternative data sources**

- Mobile operators
- Search queries
- Electronic social networks (VK, Facebook, etc.)
- E-mail
- Bank transactions
- Online shopping
- Environment (traffic jams, weather, epidemics)
- Bibliographic databases
- Face and object recognition
- Etc

Examples

- Facebook data was used **to study the level of assimilation** of Arabic-speaking migrants in Germany (based on their interests listed on the network) [Dubois et al. 2018]
- Data from mobile operators allows
 - **to obtain information about the population of territories** hold active housing construction
 - **to assess circular migration:** daily, by periods of the year
 - **to assess seasonal changes in population**
 - etc.

Data mining, machine learning, general scientific methods are powerful tools that expand the possibilities of analyzing and understanding demographic processes

RESEARCH 1/2

Analysis of international academic migration in Russia based on Scopus bibliometric data

Scientometrics (2021) 126:7875–7900
<https://doi.org/10.1007/s11192-021-04091-x>



Brain drain and brain gain in Russia: Analyzing international migration of researchers by discipline using Scopus bibliometric data 1996–2020

Alexander Subbotin^{1,2}  · Samin Aref² 

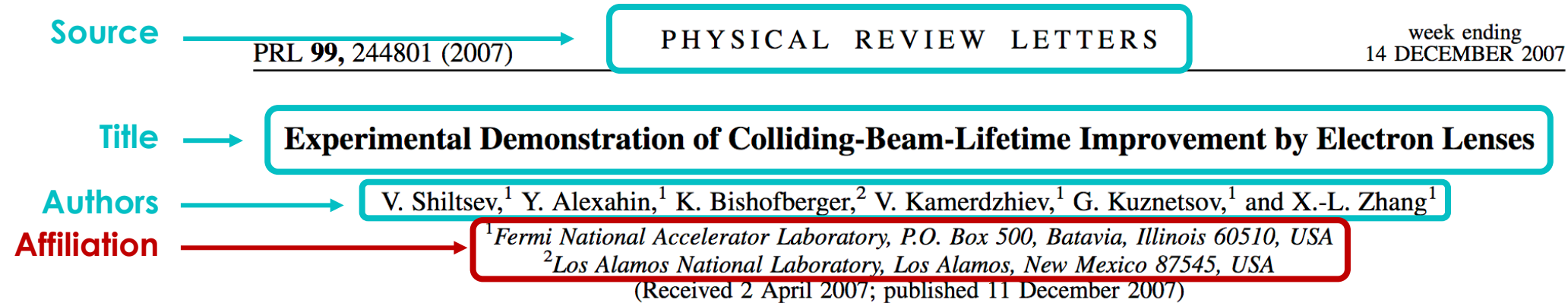
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MAX PLANCK INSTITUTE
FOR DEMOGRAPHIC
RESEARCH



A typical structure of a scientific publication



Abstract

We report the successful application of space-charge forces of a low-energy electron beam for improvement of particle lifetime determined by beam-beam interaction at a high-energy collider. In our experiments, an electron lens, a novel instrument developed for the beam-beam compensation, was set on a 980-GeV proton bunch at the Fermilab Tevatron proton-antiproton collider. The proton-bunch losses due to its interaction with the antiproton beam were reduced by a factor of 2 when the electron lens was operating. We describe the principle of electron lens operation and present experimental results.

DOI: [10.1103/PhysRevLett.99.244801](https://doi.org/10.1103/PhysRevLett.99.244801)

PACS numbers: 29.27.Bd, 29.20.-c, 29.27.Eg, 41.85.Ja

⋮

References

- [1] W. Fischer and T. Sen, in *Proceedings of HALO-2003 Workshop*, edited by J. Wei, W. Fischer, and P. Manning, AIP Conf. Proc. No. 693 (AIP, New York, 2003), pp. 215–220.
- [2] J. LeDuff *et al.*, in *Proceedings of the 11th International Conference on High-Energy Accelerators*, edited by W. S. Newman (Birkhauser Verlag, Basel, 1980), p. 707.

An authorship record is

a unit of data representing the relationship between a publication and an author's affiliation

Big data for academic migration analysis

IDEA: Each authorship record can be considered as a set of data that **combines the author with a specific location on a specific publication date**

We **track the international movements** of scientists and researchers **through changes in their affiliation addresses**

Revision of well-known concepts in terms of the academy

For example,

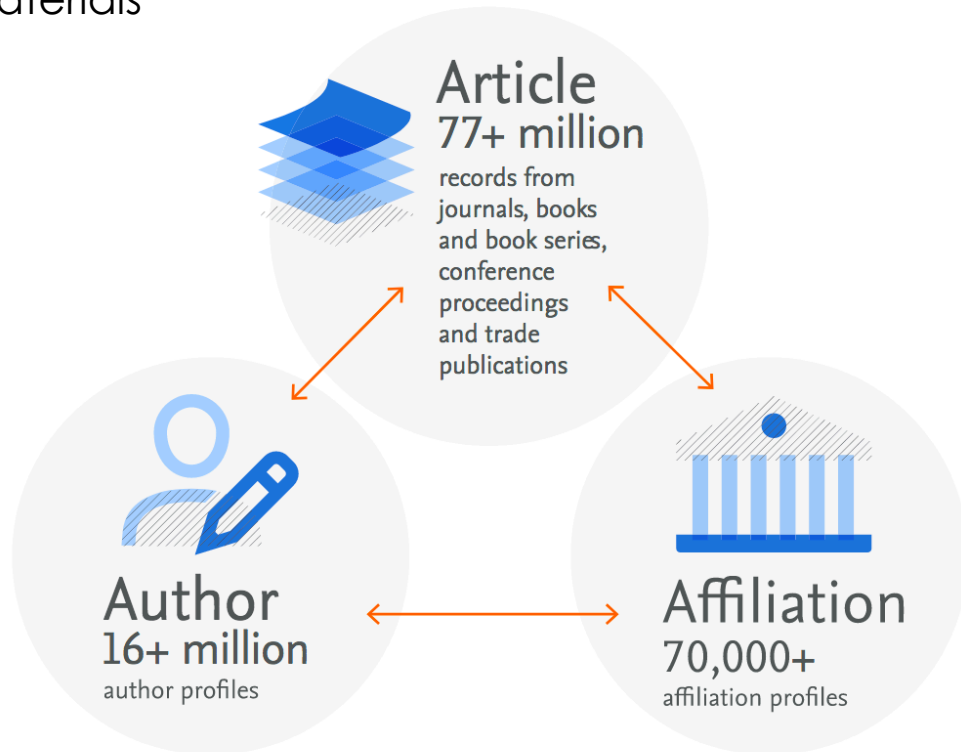
- academic birth – publication of the first publication
- academic life course – publication activity
- academic country of origin (destination) – country of the first (last) publication
- academic age – number of years since the first publication

NB The nationality of the authors does not matter

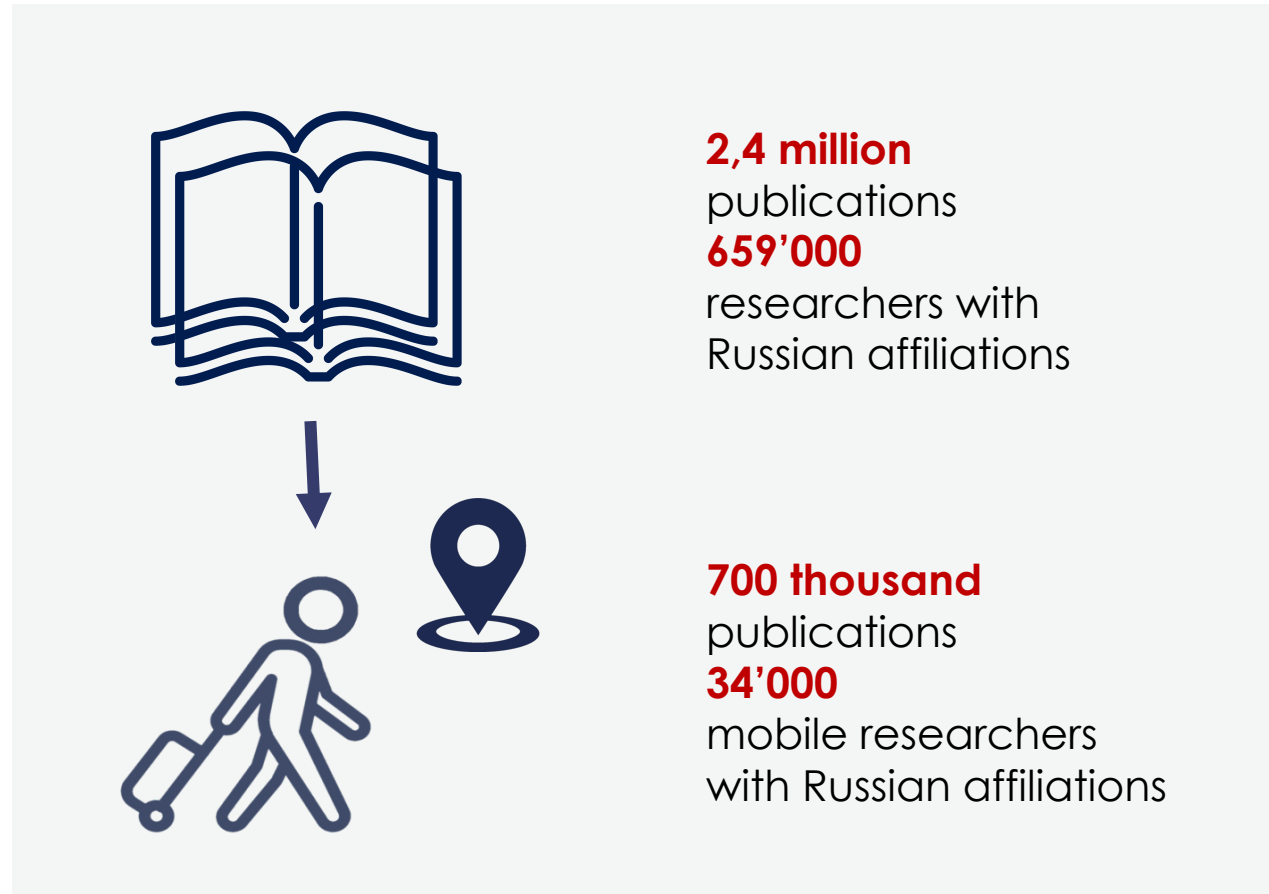
Big bibliometric data

Scopus 

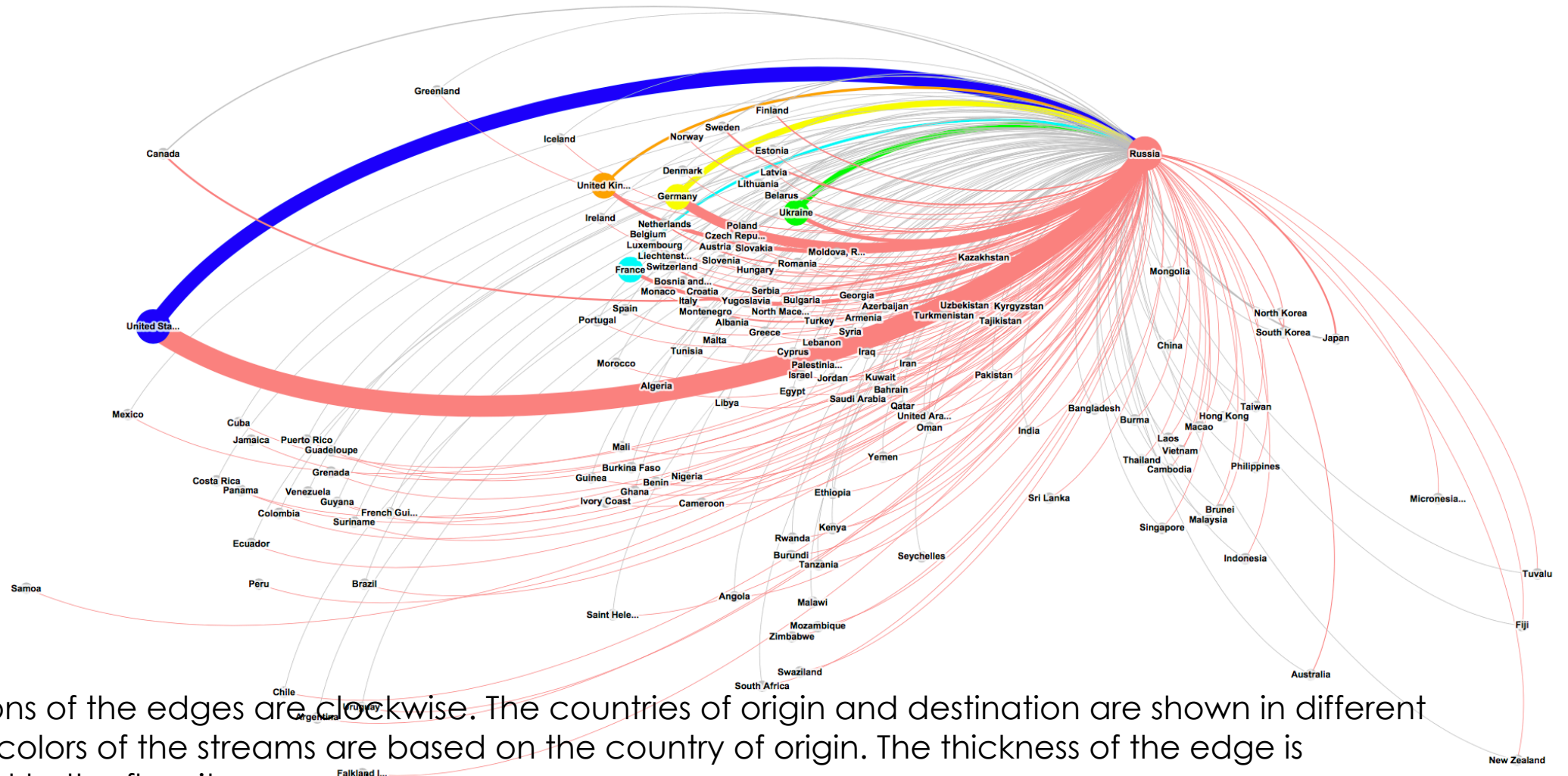
the largest database of short descriptions and information on the citation of peer-reviewed literature: scientific journals, books and conference materials



BIBLIOMETRIC DATA SCOPUS, 1996-2020



International paths for researchers who moved to or from Russia over the 1996–2020 period

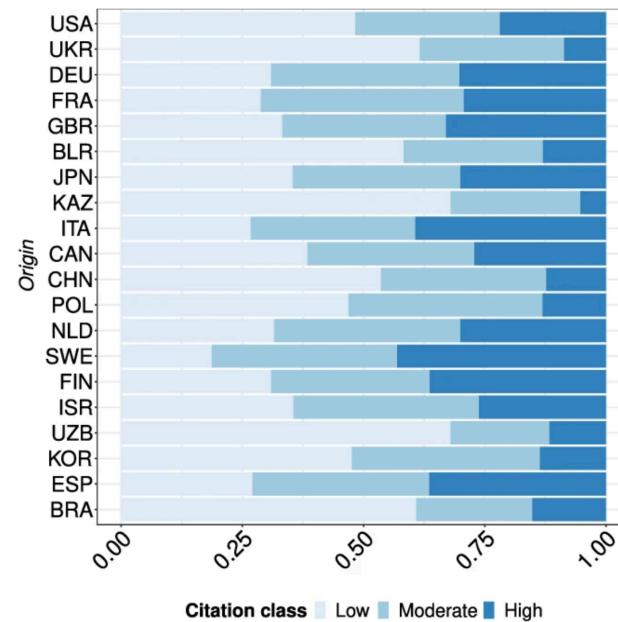


The directions of the edges are clockwise. The countries of origin and destination are shown in different colors. The colors of the streams are based on the country of origin. The thickness of the edge is proportional to the flow it represents.

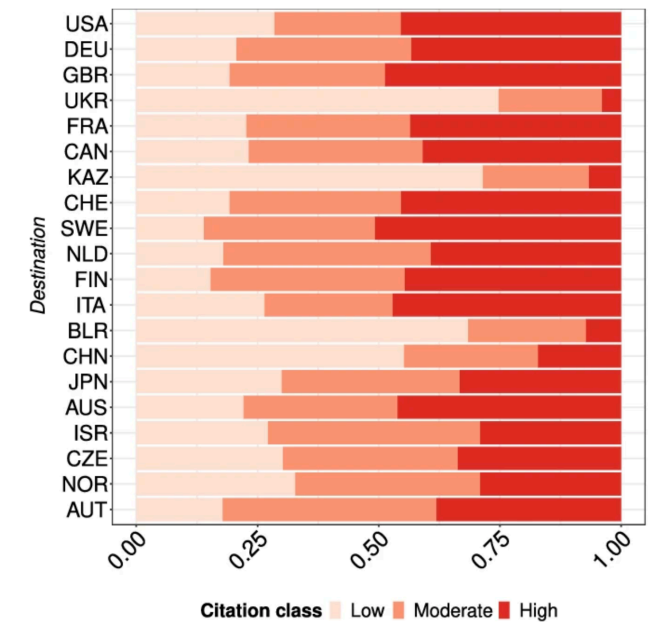
Qualitative composition of migration flows to and from Russia

- **Significant differences in citation rates of migrants depending on the direction of migration flow**
- For example,
 - 48% of academic immigrants from the USA to Russia belonged to the lowly cited class, while 30% were moderately cited, and 22% were highly cited (see fig. a)
 - for emigrants from Russia to the US, 46% were in the highly cited category, 26% were in the moderately cited category, and 28% were in the lowly cited category (see fig. b)

Composition of citation performance of top 20 origins for immigrants (a), and top 20 destinations for emigrants (b)



(a)



(b)

RESEARCH 2/2

Analysis of geography and statistical assessment of the Russian community abroad

CONTEXT

- Increasing the role of diasporas in international cooperation
- Countries with significant human capital abroad may have foreign policy and economic resources
- Number of diasporas continues to grow, and it takes new forms
- Need for cooperation with compatriots living abroad

TERMS

- Lack of a single conceptual framework
- Russian emigration, diaspora, Russian abroad or the Russian-speaking community?

ASSESSMENT

- Russian community abroad is one of the largest in the world, and according to various sources has from 20 to 40 million people living abroad

AIM: search for approaches to analyzing of geography and statistical assessment of the Russian community abroad

Data and methods

Approaches to assess emigration from the country

- **first way** is to rely on various sources of **information in the country of departure**
- **second way** is to use **data from various sources in the host country**. The most accurate result will be given by data obtained separately for each country that accepts Russian or former Soviet migrants

The official sources of accounting for citizens who have left Russia are data from Rosstat and the Ministry of Internal Affairs of Russia. At the same time, the Russian statistical service receives information from the Ministry of Internal Affairs, where it comes from passport offices

Registration of those who have left for permanent residence is based on de-registration or renunciation of citizenship, which does not always happen

The research uses UN data, official statistics from national statistical services of various countries (including the results of censuses), as well as expert assessments

There is a hypothesis about significant differences between Russian data on emigration and information from countries receiving these migrants

For example, S. Ryazantsev and E. Pismennaya revealed a **significant underestimation of the emigration by Russian statistics**

[Ryazantsev, Pisannaya, 2016]:

- in Spain – **22** times
- in France – **14** times
- in Germany – **8** times

O. Vorobyova and A. Grebenyuk argue that in order to obtain the real scale of emigration, **Russian statistics data should be increased at least 3-4 times** [Vorobyova, Grebenyuk, 2017]

SOURCES:

1. Ryazantsev S.V., Pishchennaya E.E. Emigration of scientists and highly qualified specialists from Russia: trends, consequences, state policy // Sociology, 2016, No. 4, p. 20.
2. Vorobyova O.D., Grebenyuk A.A. Comparative analysis of domestic and foreign statistical information on emigration of Russian citizens // Questions of Statistics, 2017, No. 9, p. 19.

Russian community abroad according to UN data

- According to the UN, the number of emigrants from Russia from 1990 to 2020 decreased from 12.7 million to 10.8 million people
- The share of emigrants from Russia in the total number of international migrants is permanently decreasing (from 8.3% in 1990 to 3.8% in 2020)
- **More than half of emigrants from Russia** live in Ukraine (31%) and Kazakhstan (23%)
- In 2020, 75% of all migrants from Russia lived in ten neighboring countries (in 1990, this figure exceeded 89%)
- The largest number of emigrants from Russia is concentrated in Germany (1.2 million people), USA (397 thousand people), Israel (111 thousand people), Spain (96), Canada (85), Italy (83), France (73), Greece (55), Poland (50)

DISTRIBUTION OF EMIGRANTS FROM RUSSIA BY COUNTRY OF RESIDENCE (TOP 20 COUNTRIES) In 1990-2020.

Country of residence	1990		2000		2010		2020	
	thousand people	% of all emigrants from Russia	thousand people	% of all emigrants from Russia	thousand people	% of all emigrants from Russia	thousand people	% of all emigrants from Russia
Ukraine	5 018,1	39,66%	3 745,8	35,12%	3 265,8	32,27%	3 330,6	30,96%
Kazakhstan	2 474,1	19,55%	2 032,9	19,06%	2 211,9	21,86%	2 476,0	23,02%
Germany	77,3	0,61%	903,8	8,47%	857,2	8,47%	1 198,8	11,14%
Uzbekistan	1 267,2	10,01%	1 067,2	10,01%	913,7	9,03%	871,0	8,10%
Belarus	791,5	6,26%	708,0	6,64%	688,4	6,80%	672,5	6,25%
USA	190,7	1,51%	348,8	3,27%	405,7	4,01%	397,1	3,69%
Tajikistan	363,6	2,87%	252,1	2,36%	238,1	2,35%	235,0	2,18%
Estonia	283,5	2,24%	189,0	1,77%	154,7	1,53%	119,1	1,11%
Latvia	473,2	3,74%	234,8	2,20%	163,6	1,62%	116,8	1,09%
Israel	175,9	1,39%	162,2	1,52%	111,1	1,10%	111,3	1,03%
Kyrgyzstan	349,2	2,76%	212,4	1,99%	126,9	1,25%	108,9	1,01%
Spain	3,1	0,02%	8,3	0,08%	58,5	0,58%	96,1	0,89%
Canada	95,3	0,75%	50,3	0,47%	73,0	0,72%	84,7	0,79%
Italy	7,4	0,06%	14,8	0,14%	79,6	0,79%	82,9	0,77%
Turkmenistan	118,3	0,93%	79,2	0,74%	75,5	0,75%	74,6	0,69%
France	21,4	0,17%	22,8	0,21%	60,1	0,59%	73,2	0,68%
Greece	28,3	0,22%	72,0	0,68%	57,4	0,57%	55,3	0,51%
Lithuania	158,4	1,25%	95,3	0,89%	70,3	0,69%	51,7	0,48%
Poland	77,0	0,61%	56,3	0,53%	39,6	0,39%	50,3	0,47%
Moldova	225,6	1,78%	102,7	0,96%	52,1	0,51%	40,0	0,37%

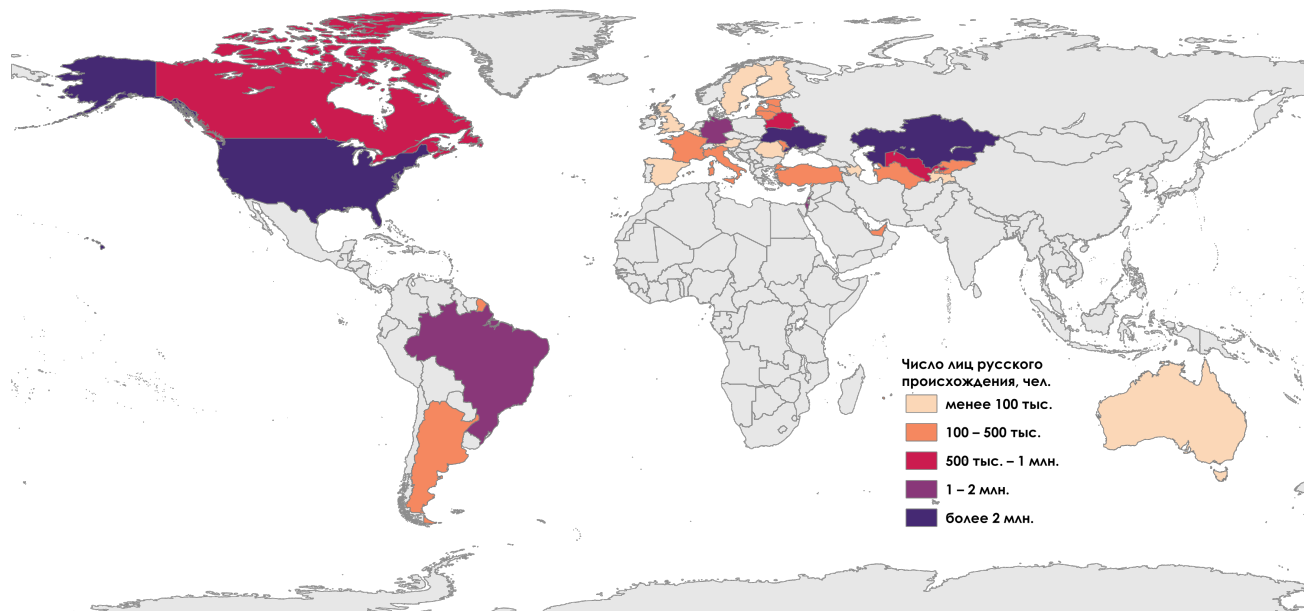
Source: United Nations Department of Economic and Social Affairs, Population Division. (2020). International Migrant Stock 2020.

Russian community abroad according to data from host countries

- Ethnic Russians make up a significant part of the population outside the Russian Federation. According to various estimates, their number varies from **20 to 40 million people**, depending on how ethnicity (origin) is determined
- Many national statistical services tend to **take into account only one nationality**. However, there are countries that provide more detailed information about citizens, including data on multiple ethnicity
- **EXAMPLE**
According to the results of the 2021 census in Canada, the following data on **the number of emigrants from Russia** are presented:
 - **by place of birth** – 87,380 people
 - **by ethnic or cultural origin** – 548,145 people

SOURCE:
Statistics Canada. (2023). Census Profile. 2021 Census of Population. Statistics Canada Catalogue No. 98-316-X2021001. Ottawa. URL: <https://www12.statcan.gc.ca/census-recensement/2021/dp-pd/prof/index.cfm?Lang=E> (дата обращения: 01.08.2024).

NUMBER OF PERSONS OF RUSSIAN ORIGIN



The figure shows countries with a population of more than 30 thousand people of Russian origin. Compiled by: Population, employment and living conditions in the countries of the Commonwealth of Independent States: a statistical collection. (2023). М., Interstate Statistical Committee of the CIS. p. 48; data from national statistical services of individual countries; expert assessments from open sources.

- Ethnic Russians have the largest number in neighboring countries, such as Ukraine (8,334 million), Kazakhstan (3,512 million) and Belarus (707 thousand), which is due to the historical resettlement and the presence of Russian communities in these regions
- In non-CIS countries, significant Russian-speaking communities are present in the USA (2,538 million), Germany (1,213 million), and Israel (1,217 million)

Discussion (conclusion)

- Great deal of uncertainty, primarily in terminology defining different categories of migrants, entails a **significant variation in statistical assessment** of migration processes
- Significant differences between the data from Russian and foreign sources make **difficult to estimate the scale of Russian community abroad**
- The role of alternative data sources in modern research is **underestimated**, despite the fact that such data can complement traditional administrative data and provide a more complete picture of current trends and dynamics of settlement of immigrants from Russia and their descendants

Thank you for your attention

aasubbotin@yahoo.com