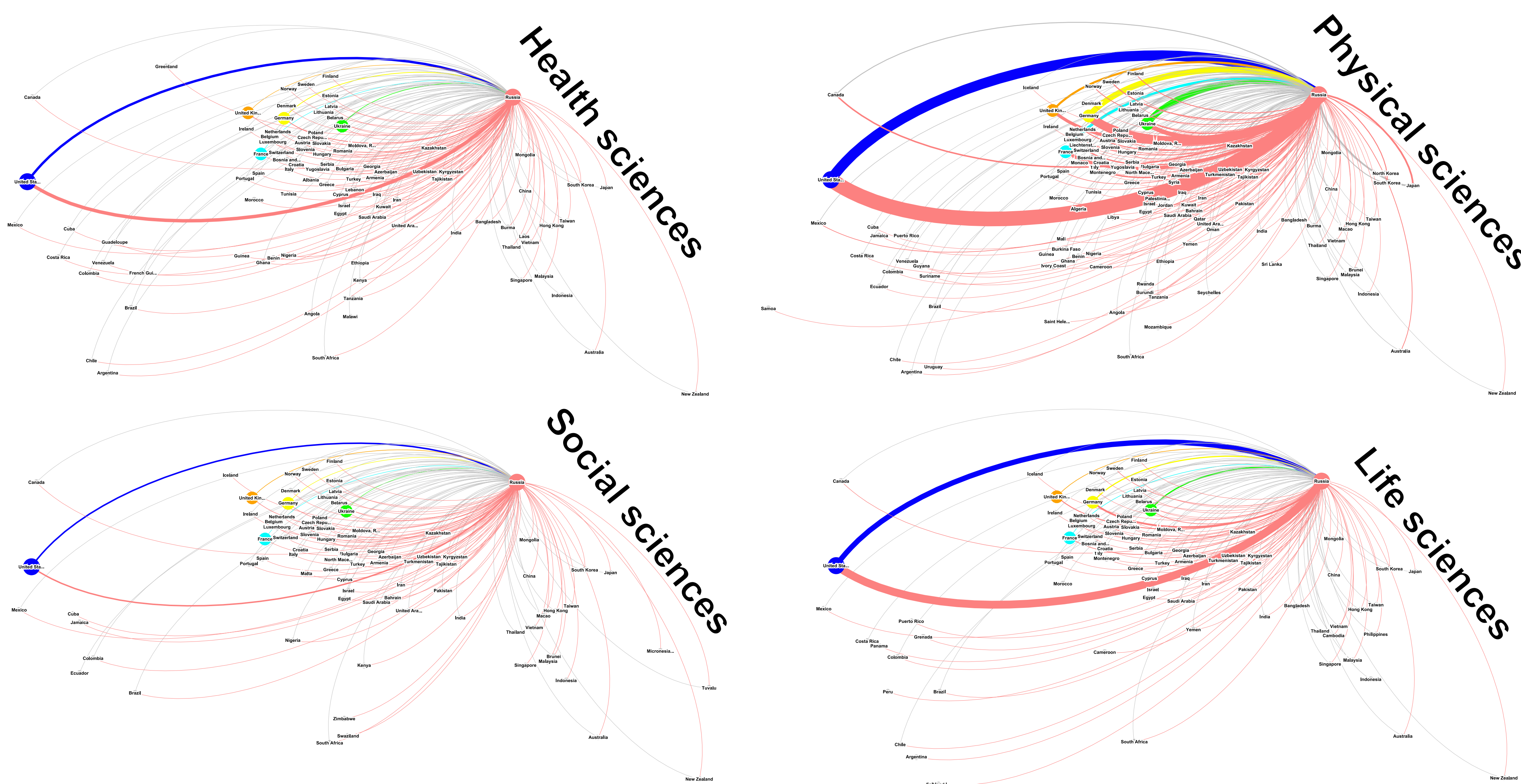# Our "brain drain" measurement based on millions of Scopus publications shows that Russia has suffered a net loss in almost all disciplines; and more so in neuroscience, decision sciences, dentistry, biochemistry, and mathematics.

Scan the QR code for our preprint.

Brain Drain and Brain Gain in Russia: How does migration in academia impact fields of scholarship in a country?

Health sciences

Physical sciences

Social sciences

Life sciences

terms of FNBD pertaining to each migrant type

FNBD (total)

discipline

Neuroscience
Decision Sciences
Dentistry
Biochemistry, Genetics and Molecular Biology
Mathematics
Chemistry
Pharmacology, Toxicology and Pharmaceutics
Chemical Engineering
Materials Science
Nursing
Veterinary
Medicine
Computer Science
Psychology
Health Professions
Physics and Astronomy
Arts and Humanities
Immunology and Microbiology
Engineering
Social Sciences
Energy
Earth and Planetary Sciences
Business, Management and Accounting
Agricultural and Biological Sciences
Environmental Science
Economics, Econometrics and Finance

■ Immigrants   ■ Emigrants   ■ Return migrants   ■ Transients   ■ Total value of FNBD

Materials

Scopus publications over 1996-2020: Affiliation addresses and research subjects of 2 million publications from 659,000 researchers who have had ties to Russia at some point.

Method

1) Data pre-processing: Resolving data quality issues (missing values, author ambiguity) using machine learning methods.
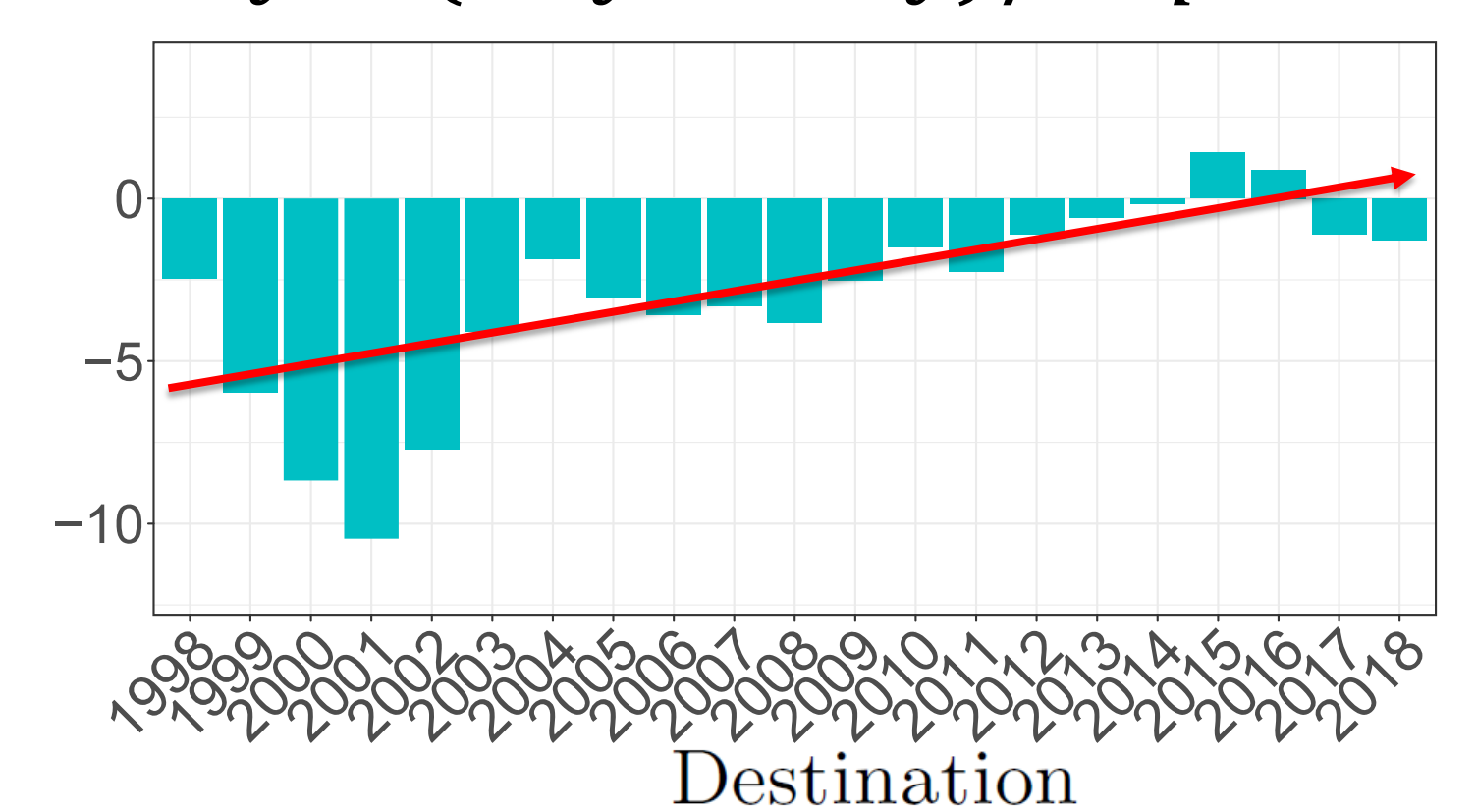
2) Detecting migration events: Each change of mode affiliation country i to country j is recorded as a directed edge (i,j) in a network.

3) <u>Net Migration Rate</u>: NMR_t is calculated based on the difference between immigrant (IM) and emigrant (EM) scholars in year t:
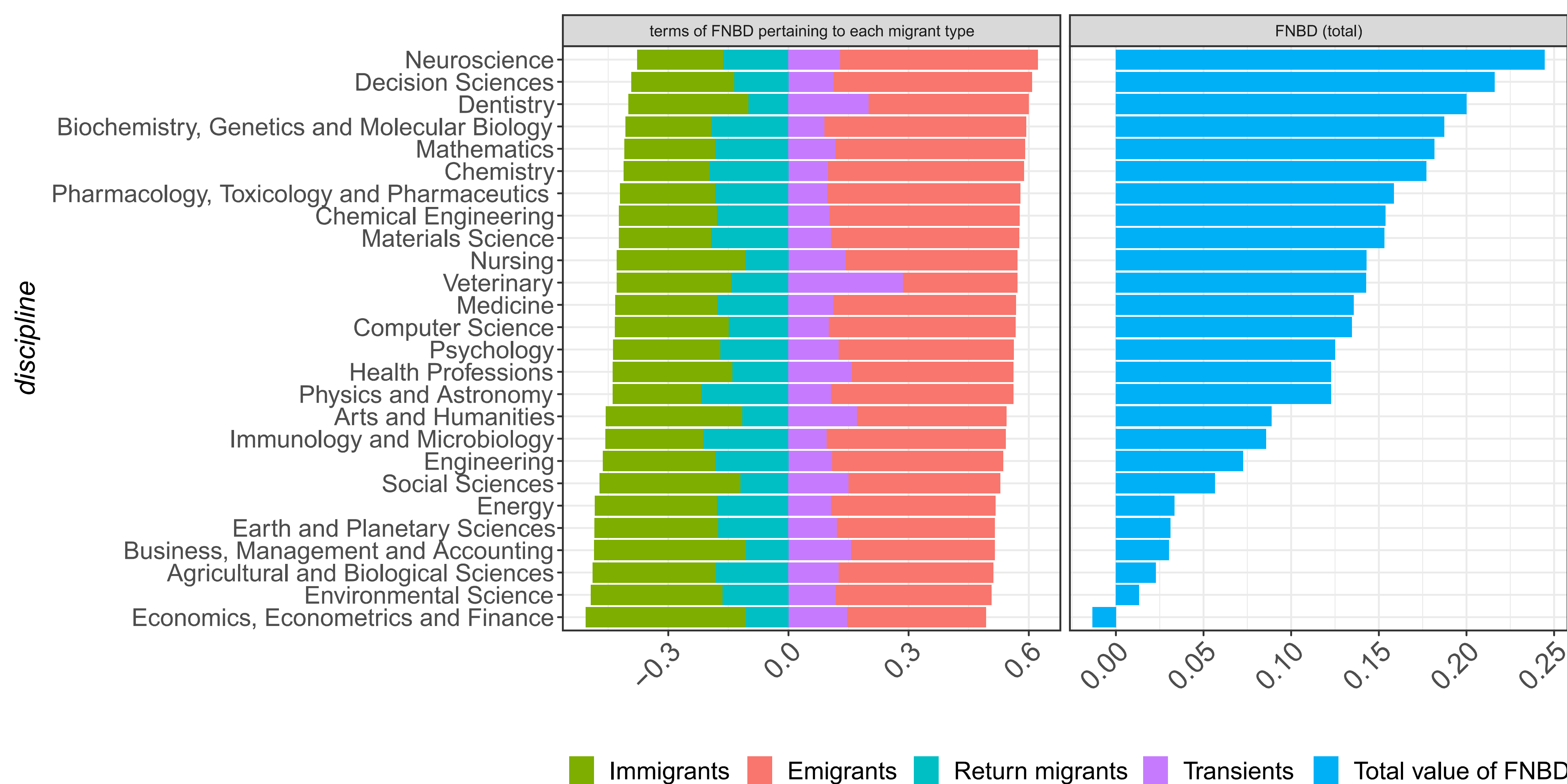$$NMR_t = (IM_t - EM_t)/Population_t$$

	Destination	
Origin	Russia	Not Russia
Russia	Return migrants	Emigrants
Not Russia	Immigrants	Transients

4) <u>Field-based Net Brain Drain</u>: $FNBD$ is calculated based on the normalized populations of *immigrants*, *return-migrants* (-1), *emigrants*, and *transients* (+1) for each of the 26 fields of scholarship.

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SocInfo 2020