TRACKING INNOVATION: RUSSIA'S EVOLVING RESEARCH LANDSCAPE

A **CAS** WHITEPAPER

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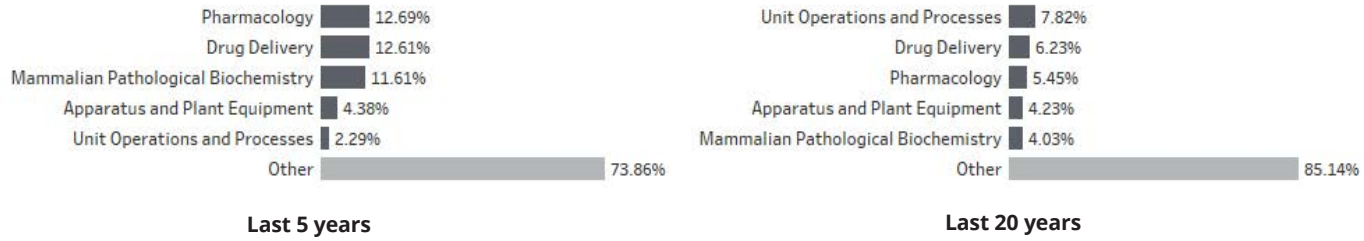
CAS analysis of the chemically-relevant research landscape in Russia illustrates a significant shift in focus in recent years. Historically, Russian scientific focus was scattered and evenly shared across many domains. Prior to 2010, patents from Russia heavily emphasized Unit Operations and Processes, patents that involved more theoretical research on chemicals and physical properties of materials. In the last 5 years, there has been tremendous growth in interest around pharmacology and pharmaceuticals, nearly doubling the share of the overall Russian scientific marketplace. One area that has remained strong is intellectual property development on manufacturing equipment.

Figure 1: Shift in topics of patent applications from Russia. Source: CAS content collection.



Analysis of the diseases being targeted by pharmacological research in Russia shows a primary interest in cancer and infections with a secondary emphasis on chronic disorders. The evolution of the most widely targeted disease in Russia over time is related to growth of the Russian economy. Initially, patents generated by Russian organizations focused on infectious diseases. In the last two years, cancer research has overtaken research on all other diseases. This pattern is a reflection of a shift toward age-related disorders and could be linked to higher life expectancy and overall health.

Figure 2: Top 10 diseases targeted by patents over last 5 years. Source: CAS content collection.

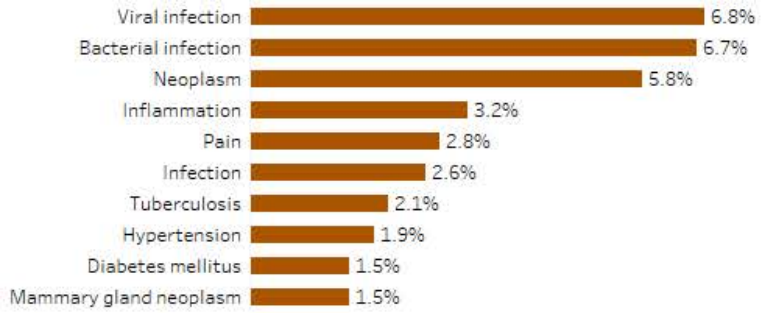
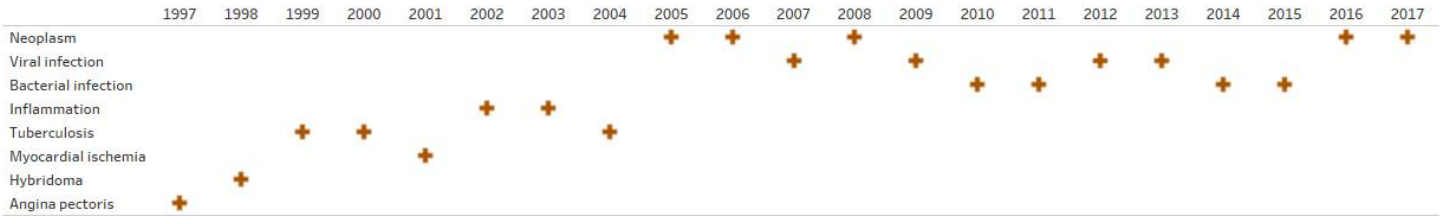
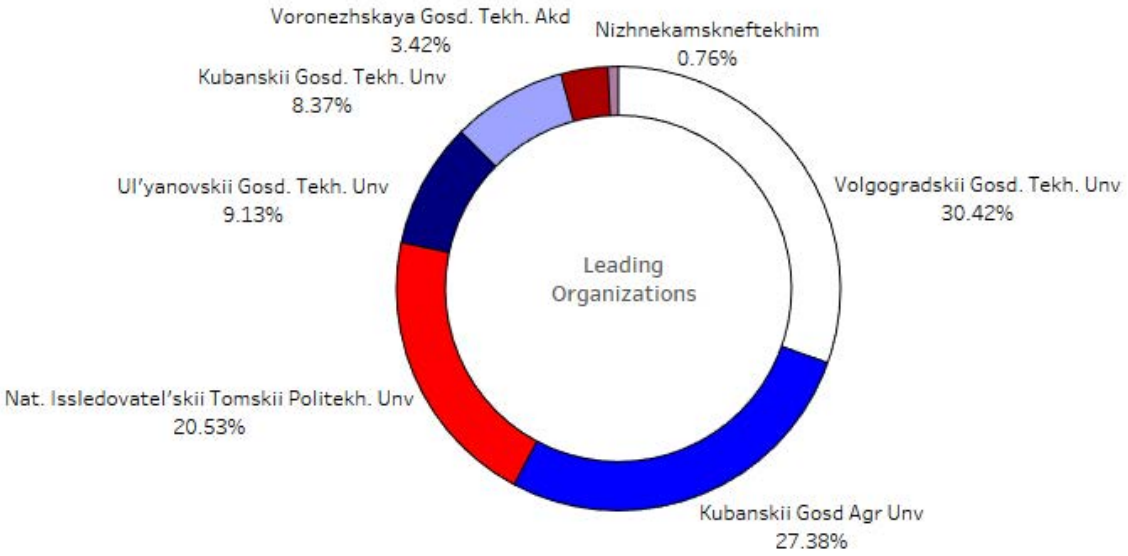


Figure 3: Shift in disease focus of patent applications 1997-2017. Source: CAS content collection.



Patent publications in Russia have been driven primarily by organizations from the southern regions of Russia. Professors from Kuban State University, with its two schools of Technology and Agriculture, have generated over a third of all patents in the last 5 years. The chart below shows that patents are filed primarily by universities rather than privately owned companies.

Figure 4: Leading organizations filing patents over the last 5 years. Source: CAS content collection.



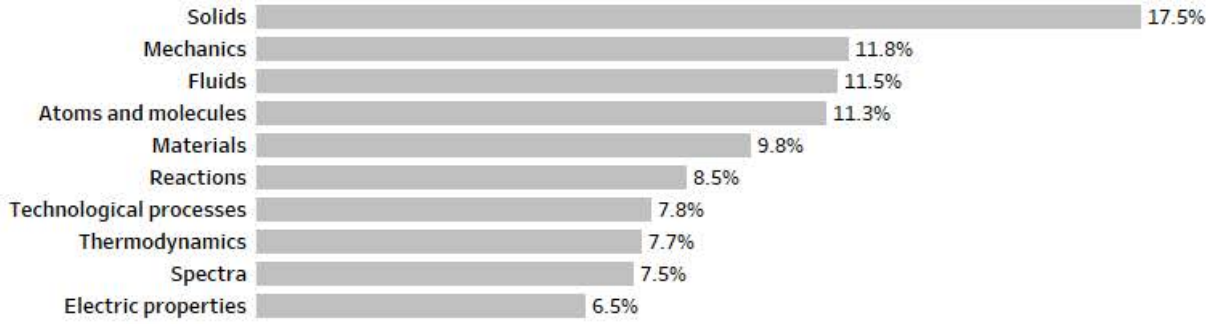
Despite the growth in interest around pharmaceuticals and pharmacology, established scientists in Russia are still heavily involved in industrial research. For example, plastics, ceramics and agrochemicals are still primary topics of interest to Russian scientists. The most prolific Russian institutions and organizations are universities based in the south, southeastern, and far east regions of the country.

Figure 5: Top Russian organizations filing patents. Source: CAS content collection.

Nauki Institut Biokhimii i Genetiki Ufimskogo Nauchnogo Tsentra	Agrochemical Bioregulators	■
	Benzene, Its Derivatives, and Condensed Benzenoid Compounds	■
	Industrial Organic Chemicals, Leather, Fats, and Waxes	■
FGBOU VPO "Bratskii Gosudarstvennyi Universitet"	Cellulose, Lignin, Paper, and Other Wood Products	▪
	Cement, Concrete, and Related Building Materials	■
	Ceramics	▪
Kubanskii Gosd Agr Unv	Animal Nutrition	■
	Apparatus and Plant Equipment	■
	Fertilizers, Soils, and Plant Nutrition	■
Volgogradskii Gosd. Tekh. Unv	Industrial Organic Chemicals, Leather, Fats, and Waxes	■
	Plastics Fabrication and Uses	■
	Synthetic Elastomers and Natural Rubber	■
Nat. Issledovatel'skii Tomskii Politekh. Unv	Electrochemistry	■
	Industrial Inorganic Chemicals	■
	Inorganic Analytical Chemistry	■

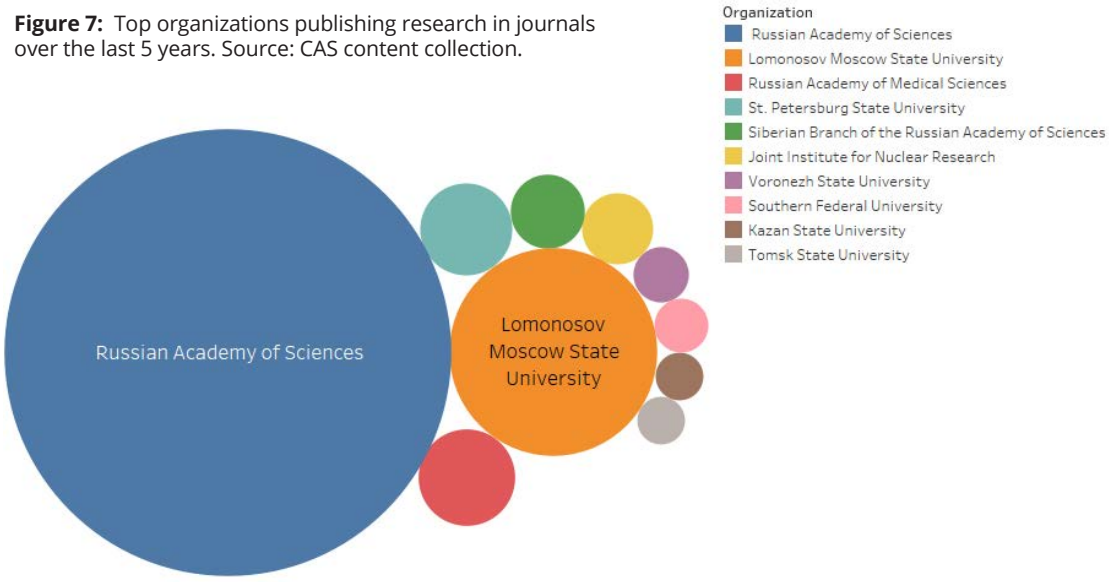
Unlike patent publications, research work published by Russian scientists in journals over the last 5 years remains in the theoretical areas of chemistry. The breakdown of academic studies by subject category shows the focus is on the chemical and physical properties of matter. As the foundation of material science and semiconductors, two critical applications of chemistry, Russia is well-positioned in these spaces. Yet, despite Russian industry shifting its focus towards pharmacology and pharmaceuticals, they are not widely studied in journal publications. There is opportunity for Russian academics to bridge the gap between industry and education by harnessing their knowledge base for pharmaceutical applications.

Figure 6: Top research topics of journal articles published over the last 5 years. Source: CAS content collection.



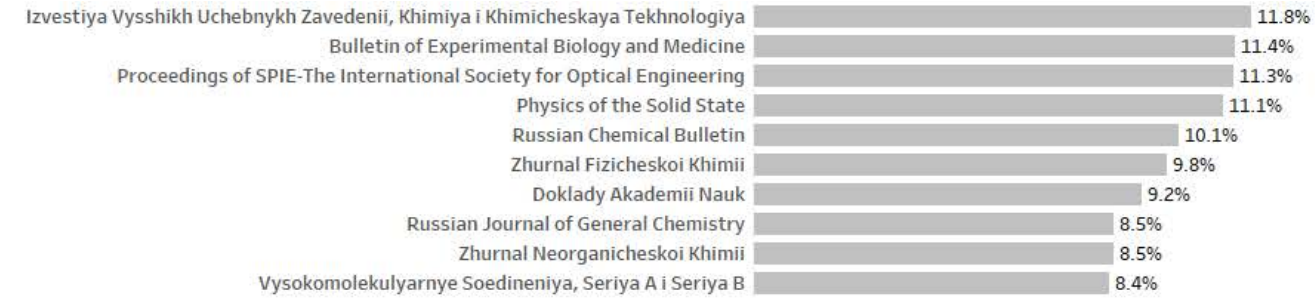
As expected, the majority of academic journal publications are published under the Russian Academy of Sciences, followed by world renowned Lomonosov Moscow State University. Beyond these institutions, the remaining universities have an approximately equal share of chemistry research published in scientific research journals.

Figure 7: Top organizations publishing research in journals over the last 5 years. Source: CAS content collection.



Currently, Russian scientists publish their discoveries primarily within Russian scientific journals. In the last 5 years, journals from Russian academic institutes such as Bulletin of Experimental Biology and Medicine, Physics of the Solid State, Russian Chemical Bulletin, Russian Journal of Physical Chemistry (Zhurnal Fizicheskoi Khimli) and Russian Journal of General Chemistry are being published by the Springer Company. CAS solutions help make this research accessible to scientists around the world. With growing recognition of the impact of Russian research, there is greater opportunity for research from Russia to be published in journals established in other countries and journals in other languages.

Figure 8: Top 10 journals based in Russia published in last 5 years. Source: CAS content collection.



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