

Clarivate Analytics and Chinese Academy of Sciences collaborate on fourth annual report identifying 100 hottest and 43 emerging specialty areas in global scientific research spanning sciences and social sciences

PHILADELPHIA, November 2, 2017 – [Clarivate Analytics](#), the global leader in providing trusted insights and analytics to enable the research ecosystem to accelerate discovery, and the [Chinese Academy of Sciences](#) today released *“Research Fronts 2017”*, their joint annual report identifying 143 prominent areas of scientific research over the past years. This is the fourth collaborative report from the two organizations and was launched at today’s joint forum held at the Chinese Academy of Sciences in Beijing.

“*The analysis of Research Fronts at a national level provides invaluable insights about a country’s current and potential leading performance.*”

The report identifies 143 key research fronts including 100 hot and 43 emerging specialty areas spanning 10 broad areas of sciences and social sciences, based on a comprehensive analysis of scientific literature citations. The analysis was based on 9,690 *Research Fronts* generated from the [Essential Science Indicators \(ESI\)](#) database during the period from 2011 until 2016. *Research Fronts* are specialties discovered when clusters of highly cited papers are frequently cited together, reflecting a specific commonality in the research, which can be experimental data, a concept or hypothesis or even a method.

Working in collaboration with the Chinese Academy of Sciences, Clarivate bibliometric experts utilized the ESI database, a web-based research analytics platform and a unique compilation of science performance metrics and trend data based on scholarly publication and citation data from [Clarivate Analytics Web of Science](#). Once identified, the *Research Fronts* built on recently published “core” or foundational journal articles. The Institutes of Science and Development of the Chinese Academy of Sciences selected 27 key *Research Fronts* and interpreted these specialty areas for the joint report. It is worth mentioning that two of the key *Research Fronts* identified are related to the award-winning research by this year’s Nobel Laureates in chemistry and physics (see ‘*Hot Research Fronts*’ and ‘*Emerging Research Fronts*’ as tabled below).

“We are honored and pleased to continue our strategic collaboration with the Chinese Academy of Sciences to produce our fourth annual joint *Research Fronts Report*,” said Robert Lemmond, chief commercial officer of Clarivate Analytics. “The report represents the collective strength of trusted data and analysis capabilities from Clarivate Analytics and the Chinese Academy of Sciences’ deep domain expertise in scientific research. The in-depth analysis of the report provides a solid foundation to help researchers, funding agencies, administrators, policy makers and other key stakeholders make better decisions by identifying key research trends and new areas of study. The analysis of *Research Fronts* at a national level provides invaluable insights about a country’s current and potential leading performance.”

The president of the Chinese Academy of Sciences, Professor Bai Chunli said, “The *Research Fronts 2017 report* marks our fourth year of collaboration with Clarivate Analytics, and remains a meaningful part of our continuous efforts to engage the international scientific community by sharing in-depth analysis and interpretation of the dynamic research and technology landscape. The report showcases China’s domain expertise in evaluating research fields and reaffirms the role of the Chinese Academy of Sciences as China’s foremost think tank on global science and technology issues and trends. We hope that the Chinese Academy of Sciences and Clarivate Analytics will continue to deepen our collaboration especially on the analysis of hot research areas, and together transform our annual *Research Fronts Report* into a world-class resource for think tanks to help them advance global science & technology.”

In conjunction with the *Research Fronts 2017* report, the Chinese Academy of Sciences and Clarivate Analytics also published a new analytical report which examines and compares national performance across the 143 *Research Fronts*, thereby reflecting a country's contribution and citation impact (global influence) in a particular *Research Front*. This report reveals that based on the 143 *Research Fronts*, the USA is still leading global research followed by China in second place ahead of the UK and Germany. China is most prolific in chemistry, materials science, mathematics, computer science and engineering, and is leading the rest of the world in terms of research in mathematics, computer science and engineering.

Twenty noteworthy topics among the 100 hottest *Research Fronts* are:

Hot Research Fronts

Field of Science

Research on genome editing in plants and the utility in crops	Agricultural, Plant and Animal Sciences
Regulation mechanism and function of DNA Methylation in plants	Agricultural, Plant and Animal Sciences
The formation mechanism of east-central China's heavy haze pollution in January 2013	Ecology and Environmental Sciences
Monitoring of biodiversity using environmental DNA metabarcoding	Ecology and Environmental Sciences
Precambrian geological evolution of the North China Craton	Geosciences
Types and characterization of gas shale pore systems	Geosciences
Radionuclides-labeled PSMA PET for diagnosis and treatment of prostate cancer	Clinical Medicine
Clinical whole-exome sequencing for the diagnosis of genetic diseases	Clinical Medicine
Application of cryo-electron microscopy in 3D Structure Analysis of Biological Macromolecules (related to research by 2017 Nobel Prize Laureate in Chemistry)	Biological Sciences
Application of chromatin conformation capture and its derivative technology based on high-throughput	Biological Sciences
Cp*Co(III)-catalyzed C-H activation reactions	Chemistry and Materials Science
Nanoarchitectonics	Chemistry and Materials Science
Lepton-flavour-violating decays of the Higgs boson and B meson semileptonic decays	Physics
Tetraquark and pentaquark states	Physics
Exoplanets detection and characterization with Kepler SDO mission and performance and other heliophysics research	Astronomy and Astrophysics
Second strain gradient theory and its application	Mathematics, Computer Science and Engineering
Energy storage device based on advanced hybrid supercapacitor	Mathematics, Computer Science and Engineering
Genomics research on the origins, evolution and migration of human beings	Economics, Psychology and other social sciences
Social investigation of human papillomavirus (HPV) vaccination	Economics, Psychology and other social sciences

Seven noteworthy topics among the 43 emerging *Research Fronts* are:

Emerging Research Fronts

Analysis of tree rings and its application in environment and climate change study

Highly siderophile and strong chalcophile elements in high temperature geochemistry

Zika virus infections and prevention

Introgression of mosquito and its reticular phylogenetic patterns

Non-noble metal-based bifunctional electrocatalysts for overall water splitting

Standard Model Interpretation of 750 GeV Diphoton

Formation and merger of double compact objects (e.g. binary black hole); related to research by [2017 Nobel Prize Laureate in Physics](#))

Field of Science

Agricultural, Plant and Animal Sciences

Geosciences

Clinical Medicine

Biological Sciences

Chemistry and Materials Science

Physics

Astronomy and Astrophysics

Read the full [‘Research Fronts 2017](#) report in Simplified Chinese [here](#). The [English version](#) of the report is available for [download here](#).

Clarivate Analytics

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About the Chinese Academy of Sciences

The Chinese Academy of Sciences (CAS) is the linchpin of China’s drive to explore and harness high technology and the natural sciences for the benefit of China and the world. Comprising a comprehensive research and development network, a merit-based learned society and a system of higher education, CAS brings together scientists and engineers from China and around the world to address both theoretical and applied problems using world-class scientific and management approaches. Since its founding, CAS has fulfilled multiple roles — as a national team and a locomotive driving national technological innovation, a pioneer in supporting nationwide S&T development, a think tank delivering S&T advice, and a community for training young S&T talent. For more information, please visit <http://english.cas.cn/>.

For further information: please contact Lisa Hulme, Clarivate Analytics, Head of Global Communications, email: lisa.hulme@clarivate.com, tel: +44 (0) 7464 646536 and Pamela Lim, Clarivate Analytics, External Communications Manager, Asia Pacific, email: pamela.lim@clarivate.com, tel: +65 6870 3212.

<http://news.clarivate.com/ResearchFronts2017>