This is the fourth consecutive year in which leading institutions of China, France and Germany have topped the field in high-quality chemistry research output.

The biggest movers in this category for 2018 include Tsinghua University in China, which jumped from 17th place in 2015 to 6th place in 2018, and Nanjing University, which climbed six spots from last year to secure the 4th spot for 2018. Kyoto University in Japan dropped out of
Chinese Academy of Sciences

Fractional count*: 881.87, (6.8%), Article count: 2,206

The Chinese Academy of Sciences (CAS) has retained the world's top slot in chemistry for the past four years in the Nature Index, and in 2018 had almost four times the fractional count of the number 2 seed, the French National Centre for Scientific Research.

A major point of difference for CAS is its enormous size, encompassing 105 institutes across China, which support more than 60,000 research staff. Of note among its many chemistry-focused institutes are the highly productive Institute of Chemistry (IOC), based in Beijing, and the Dalian Institute of Chemical Physics, which specializes in such areas as catalytic chemistry, chromatography and pharmaceutical chemistry.

In 2018, in a high-impact paper published in the Journal of the American Chemical Society by IOC scientists described a new type of solar cell that can achieve unprecedented power conversion efficiency rates.

CAS president, Bai Chunli, is a physical chemist and nanoscientist, known for his pioneering work in scanning tunnelling microscopy and nanotechnology.

2. French National Centre for Scientific Research

Fractional count: 240.53 (−4.8%), Article count: 1,111

Based in Paris, the French National Centre for Scientific Research (CNRS) is the only French organization for multidisciplinary research. It is also the largest governmental research organization in France, and the largest agency in Europe undertaking basic research.

With an annual budget of €25.5 million (US$28 million), its Institute of Chemistry supports 12,000 staff, including researchers, teacher-researchers, engineers, technicians and
Fractional count: 223.91 (2%), Article count: 560

Chemistry is fundamental to the Max Planck Society’s history; its Institute of Chemistry was one of the first established within the German research organization. Its performance in the discipline continues to flourish, earning it third place among the top institutions in the field.

The Max Planck Society’s work ranges from investigating the chemical processes in Earth’s foundations, to understanding how cells communicate. The Max Planck Institute for Chemical Energy Conversion, re-established in 2012, focuses on the storage of energy, such as solar and wind power.

Last year, Max Planck Society researchers were part of an international team that discovered how tiny aerosol particles can fuel storms and alter weather patterns. Published in Science, the findings showed that even the smallest particles can generate large effects.

4. Nanjing University
Fractional count: 207.77 (25.6%), Article count: 379

With an incredible surge of 25.6% over the previous year, Nanjing University (NJU) jumped from tenth position in 2017 to fourth place in 2018, according to its high-quality research output in chemistry, as tracked by the Nature Index. The university owns China’s oldest chemistry department, launched in 1920 at the National Southeastern University, which later became the National Central University before being renamed again to Nanjing University in 1950.

Today, NJU produces the country’s highest-profile chemistry research, owning two government-funded State Key Labs – the State Key Lab of Coordination Chemistry and the State Key Lab of Analytical Chemistry for Life Science – a very rare point of difference for a university in China. Its School of Chemistry and Chemical Engineering boasts 101 full professors, including 5
5. Peking University  
**Fractional count: 189.09 (5.6%), Article count: 574**

Peking University was China’s first public comprehensive university, set up in 1898. Since then, it’s been considered one of the country’s two best universities, with Tsinghua University.

In 2018, its positions in the categories for chemistry, physical sciences, Earth and environmental sciences, and life sciences were 5th, 11th, 10th, and 39th, respectively. Its budgets are more limited than Tsinghua’s: in 2018 and 2019, its overall budgets were 12.55 billion yuan (US$1.82 billion) and 19 billion yuan respectively.

Of Peking University’s 4,573 faculty members, 78 are Chinese Academy of Sciences members and 18 are Chinese Academy of Engineering members. High-profile alumni include pharmaceutical chemist Tu Youyou, credited with discovering the malaria treatments artemisinin and dihydroartemisinin – a major breakthrough in tropical medicine.

6. Tsinghua University  
**Fractional count: 183.83 (5.7%), Article count: 471**

As one of China’s most prominent universities, Tsinghua University has made impressive progress in chemistry in recent years. Its ranking climbed to 6th in 2018, up from 17th place in 2015.

Tsinghua’s chemistry research is conducted by the Department of Chemistry, Department of Chemical Engineering and the School of Materials Science and Engineering, and has a strong industry connection. Boosted by significant research funding of the university (15.7 billion yuan in 2019, or US$2.27 billion), which is the highest among all Chinese universities, Tsinghua chemists have excelled in nanomaterial, industrial catalysis and low-carbon technologies.
Established by the Chinese Academy of Sciences (CAS) in 1958 in Beijing, the University of Science and Technology of China was launched to drive the higher education of the country’s top talent in interdisciplinary science and technology. In 1970, it moved to its current location in Hefei, the capital of the Anhui province.

The institute’s achievements include establishing the first graduate school in China as well as the first class for gifted young people in China and the first ‘big science’ facility in China, the Hefei Synchrotron Radiation Facility. With CAS, it now also jointly operates the Experimental Advanced Superconducting Tokamak and the Steady High Magnetic Field of the High Magnetic Field Laboratory.

Key chemistry papers of recent years concern the electroreduction of carbon dioxide into ‘clean’ fuels (*Nature*, 2016) and more environmentally friendly plastic crystals for refrigeration (*Nature* 2019).

8. Massachusetts Institute of Technology  
**Fractional count: 164.31 (2.5%), Article count: 350**

The Massachusetts Institute of Technology (MIT) appears in several top 10s in the Nature Index 2019 Annual Tables, for chemistry, physical sciences, life sciences, academic institutions, and the global top 10. As one of the world’s most prestigious higher-education institutions, it’s been at the frontier of research for more than 150 years, fostering an emphasis on entrepreneurship and applied science through close ties with industry.

Its Department of Chemistry dates back to 1865, and is recognized as one of the best places in the world for chemistry research. Known for achievements in polymer synthesis and medical imaging, key focus areas include discovering new chemical syntheses, creating sustainable energy solutions, detecting and curing disease, and developing novel materials.
Founded as a private research university in 1851, Northwestern University, based in Evanston, Illinois, now also has campuses in Chicago and Doha, Qatar, and employs 3,300 full-time research staff. It has an annual budget of US$2 billion and attracts more than US$700 million for sponsored research each year.

Northwestern is the second-fastest rising institute among the top 10 in high-quality chemistry research output for 2018 (Nanjing University was the fastest).

One of the star researchers in its Department of Chemistry is Emily Weiss, winner of the 2018 American Chemical Society’s Early-Career Award for her pioneering work on nanocrystals and low-conductivity materials. Another is Chad Mirkin, whose 1999 invention of dip-pen nanolithography — a nanotechnology tool that allowed circuit boards to become smaller — was recognized in 2012 by *National Geographic* as one of the top 100 scientific discoveries that changed the world.

10. Stanford University

Fractional count: 158.02 (−7.4%), Article count: 340

Chemistry was one of the 25 founding departments at Stanford University when it opened in 1891. The department awarded its first undergraduate degree to Charlotte Wray in 1894, and its first PhD in 1907 to William Draper Harkins, who would go on to predict the existence of the neutron in 1920.

There are now 24 faculty members in the department. Among them is Nobel laureate W. E. Moerner, who was awarded the 2014 Nobel Prize in Chemistry for his role in the invention of microscopy techniques that could reveal molecular processes in real time.

Other notable Stanford chemists include Frank Abild-Pedersen, who in 2018 was one of the world’s most highly cited researchers – his 2004 paper on atomic-scale imaging of carbon
The bracketed figure shows the percentage change in the institution's Fractional Count in the subject in 2018.

An institution is given an article count of 1 for each article that has at least one author from that institution in one of the 82 journals that make up the Nature Index.

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Pre-2018 rankings may have changed owing to adjustment for a small annual variation in the total number of articles published in the journals.

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UPDATES & CORRECTIONS

Correction 12 August 2019: The original version of this article used incorrect fractional counts, percentage changes and article counts to derive the rankings, which meant that some institutions were ranked incorrectly. The data and rankings have now been corrected.
Top 10 institutions for chemistry in 2018