

Hefei

Hefei has kept a low profile for many years. However, as the University of Science and Technology of China continues to break new ground in the physical sciences, the city is moving into the global spotlight.

ARTICLE COUNT (AC): **530**
 FRACTIONAL COUNT (FC): **226**
 WEIGHTED FRACTIONAL COUNT (WFC): **212**

Hefei, the capital city of the eastern Anhui province, is the smallest of the cities profiled in this supplement. But it is growing rapidly in population, disposable income levels and gross domestic product (GDP) — and when it comes to the pursuit of basic science, it holds its own among much larger cities.

Hefei is home to the University of Science and Technology of China (USTC), one of three universities affiliated with the Chinese Academy of Sciences (CAS). When USTC's first president Moruo Guo laid its foundation stone in 1958, he set out its mission to focus on basic research and to nurture world-class talent. Ever since, the institution has been faithful to this ideal.

USTC is by far Hefei's largest contributor to the Nature Index, and fifth overall in China by weighted fractional count (WFC) — a measure of the relative contribution of an institution to the papers it has published. In 2013, USTC accounted for 83% of Hefei's WFC (see 'City WFC breakdown'). In addition, USTC made a strong showing in *Nature* and *Science* journals, with eight articles (WFC = 1.7) representing 1% of its WFC — well above other Hefei institutions.

Most of USTC's WFC is in chemistry. Yi Xie from the division of nanomaterials and nanochemistry is the university's most prolific

researcher in this field, with 17 articles (WFC = 13.2) in the index, mostly on graphene-like materials. "Graphene comprises carbon atoms only, so its structure and chemical properties are rather simple," she says. "We are developing graphene-like inorganic materials with unusual properties that may find applications in photocatalysis and biomedicine." Another successful chemistry researcher from the same division, Shuhong Yu co-authored 12 articles (WFC = 11.4) in 2013 on aerogels. His team manufactured carbon aerogels by freeze-drying bacterial cellulose and attaching CH groups, Yu explains. The resultant hydrophobic material "can be used to remove organic pollutants from water," he adds.

However, it is physics for which USTC is most renowned. The strongest contributor in this field is Guangcan Guo from the Key Laboratory of Quantum Information. Guo has 11 articles (WFC = 8.7) on quantum optics, quantum communication and topological superfluids in the index. His team developed a technique to record the orbital angular momentum of a single photon. An advance that Guo says "represents an important first step towards the realization of long-distance quantum communication." USTC's president, Jianguo Hou, from the division of atomic and molecular sciences, is another active researcher. In 2013, Hou contributed to six

articles (WFC = 5.73) — including one in *Nature* — about molecular and surface imaging.

USTC also hosts the CAS Key Laboratory for Research in Galaxies and Cosmology in its department of physics. Tinggui Wang is the biggest contributor in astrophysics, with seven articles on quasars and active galactic nuclei. However, owing to the down-weighting of astrophysics journals in the index, these papers only add a WFC of 1 to the institution (see 'A guide to the Nature Index', page S76).

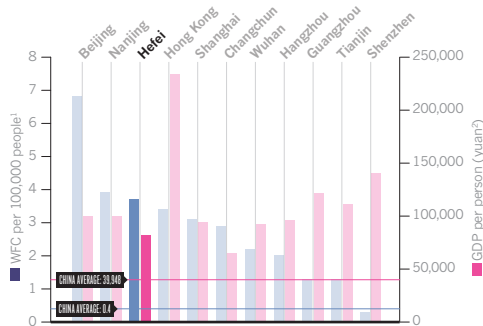
Life-science research comprises only 11% of USTC's output. Much of the university's best research in this field is carried out by Zhigang Tian from the division of structure and function of biomacromolecules. Tian's six articles (WFC = 4.2) on the regulatory functions of natural killer cells represent more than 13% of USTC's total life science WFC.

Hefei is also home to Hefei University of Technology (HFUT), an older but smaller institution with a focus on engineering. Linbao Luo from the laboratory of micro/nano functional materials and devices and Ruzhong Zuo from the school of materials science and engineering are HFUT's top two contributors, both publishing almost exclusively in *Applied Physics Letters*. Luo led two papers on nanowires — both authored wholly in-house — while Zuo contributed to two papers (WFC = 1.7) on lead-free ceramics. ■

HEFEI ANALYSIS

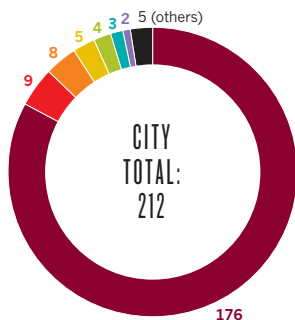
Hefei data

Hefei's WFC per person is the third highest in the index, indicating a strong concentration of research.



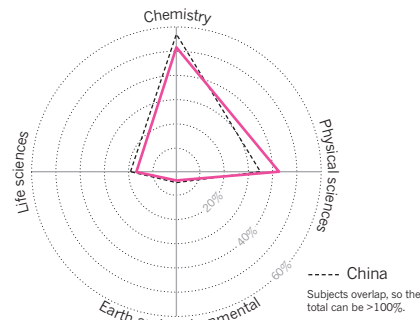
City WFC breakdown

University of Science and Technology of China is by far Hefei's largest contributing institution.



City subject spread

Hefei is focused on the broad range of physical sciences.



■ University of Science and Technology of China ■ Hefei University of Technology ■ Institute of Solid State Physics*
 ■ Institute of Intelligent Machines* ■ Anhui University ■ Institute of Plasma Physics* ■ Anhui Medical University

*CAS institute: 1.360doc.com; 2.cnpop.org; yuan = US\$0.16