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Institutional Interviews : 2010 : The Most-Cited Institutions in Engineering, 1999-2009

INSTITUTIONAL INTERVIEWS - 2010

February 2010



The Most-Cited Institutions in Engineering, 1999-2009

Featured Institutional Profile

This month, ScienceWatch.com presents a listing of the top 20 institutions which, as of the fifth bimonthly update of Essential Science IndicatorsSM (January 1, 1999-October 31, 2009) attracted the highest total citations to their papers published in Thomson Reuters-indexed Engineering journals. These institutions are the top 20 out of a pool of 1,084 institutions comprising the top 1% ranked by total citation count in this field.

 The University of Illinois

The Engineering field includes journals that cover the following specific areas of study:

- aerospace engineering
- mechanical engineering
- nuclear energy
- electrical and electronics engineering
- civil engineering
 - water resources and supply
 - transportation, and municipal engineering
- effects of humans on the environment
- controls to minimize environmental degradation
- artificial intelligence
- robotics and automatic control
- engineering mathematics
 - mathematical modeling
 - optimization techniques
 - statistical methods in engineering systems
- development, manufacture, and application of instruments

The top 20 institutions in Engineering consist of 13 US-based institutions—12 of which are academic, with four being California-based, and one of which is governmental—two European organizations, and five

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Asian academic and government-based institutions. The international cooperative effort of various research projects is evident in the presence of several heavily cited reports, including the GEANT4-A simulation toolkit, the BABAR and DO detectors, and the RD48 (ROSE) project.

The top-ranked institution in this field is the University of Illinois, with 5,821 papers cited a total of 44,094 times. Diverse topics such as mechanism-based strain plasticity, microchannel flow studies, single-wall carbon nanotubes, **face recognition**, direct formic acid **fuel cells**, and technology for **climate research** are among the most-cited papers for this university.

At #2 is the University of California, Berkeley, with 4,517 papers cited a total of 43,003 times. Among Berkeley's most-cited topics are image segmentation, shape matching, applications for **quantum dots**, dielectrics, liquefaction resistance of soils, microfluidic DNA amplification, and the aerodynamics of insect flight.

MIT places third, with 4,586 papers cited a total of 42,264 times. MIT's highly cited papers in this field cover such topics as object learning, wireless microsensor networks, speaker verification technology, spectrographic analysis of aerosols, and support vector machines.

The second California-based university ranks at #4: Stanford University, with 3,531 papers cited a total of 37,086 times. Optical trapping, voting algorithms, picture matching, and semantic web services are just a few of the topics included in Stanford's most-cited papers in Engineering. Clinician **Christopher Contag** spoke with *ScienceWatch.com* about his paper on bioluminescence imaging, and statistician **David Donoho**, who has spoken with us more than once about his research, has a paper of high interest to the field on the list.

The fifth slot belongs to the University of Michigan, with 4,534 papers cited a total of 30,545 times. Tissue engineering and robotics research are prominently featured on Michigan's most-cited papers list. Other topics covered include **wireless sensor networks** and implantable microsystems, fluid interfaces, and **MEMS**.

Coming in at #6 is the Georgia Institute of Technology, with 4,803 papers cited a total of 30,042 times. Among Georgia Tech's highly cited papers are such topics as MIMO-OFDM wireless systems, synthetic jets, tissue engineering, microchannel flow studies, aerosol chemical composition methods, and the fluid mechanics of vascular systems.

The first non-US-based institution ranks at #7: the Chinese Academy of Sciences, with 7,057 papers cited a total of 29,624 times. Reports on various aspects of time-delay systems dominate the top topics from CAS. Other highly cited areas include motion and behavior analysis, iris texture analysis, polymer electrolyte fuel cells, spectrographic analysis for plant saponins, plastic solids, and small-world dynamic networks.

Nanyang Technological University, in Singapore, ranks at #8, with 5,912 papers cited a total of 28,516 times. Nanyang researcher Yew-Soon Ong spoke with *ScienceWatch.com* about his paper, "Meta-Lamarckian learning in memetic algorithms" (Ong YS, **Keene AJ**, *IEEE Trans. Evol. Computat.* 8[2]: 99-110, April 2004). Other highly cited topics coming out of Nanyang include facial recognition, MEMS micropumps, impulse-control systems, and proton-exchange membrane fuel cells.

Singapore also accounts for the ninth-ranked institution, the National University of Singapore, with 5,031 papers cited a total of 27,626 times. Highly cited papers for this university include such topics as two-

dimensional solids, optical tweezers, support vector machines, applications for carbon nanotubes, and reports on the National University of Singapore High Energy Ion Nano-Probe Facility performance tests.

Rounding out the top 10 is the first of the two European-based institutions: the University of London Imperial College of Science Technology & Medicine, with 3,555 papers cited a total of 25,429 times. Imperial's highly cited papers include reports on constrained systems, metabonomics, solid oxide fuel cells, laminated composites, nanocrystalline dye-sensitized solar cells, and pattern recognition applications in biomedical magnetic resonance.

The 10 remaining institutions on this list include two more from California (the University of California, Los Angeles at #12 and the University of California, San Diego at #18), four other US-based universities (Purdue University at #14, the Pennsylvania State University at #16, Texas A&M University at #19, and the University of Wisconsin at #20), one US government organization (NASA at #13), one other European agency (France's CNRS at #15), and two more Asian institutions (the Indian Institute of Technology at #11 and the University of Tokyo at #17).

Scientists from these institutions who have spoken with us about their work include [Kalyanmoy Deb](#) and [Avinash Kumar Agarwar](#) from the Indian Institute of Technology, [Joel Susskind](#) from NASA, and [Dominique Massiot](#) from the CNRS.

Full citation details of all of these institutions in the table below can be seen in *Essential Science Indicators*. The top 20 institutions in Engineering are listed in full in the table below:

Ranked by Citations				
Rank	Field	Papers	Citations	Cites Per Paper
1	UNIV ILLINOIS	5,821	44,094	7.57
2	UNIV CALIF BERKELEY	4,517	43,003	9.52
3	MIT	4,586	42,264	9.22
4	STANFORD UNIV	3,531	37,086	10.50
5	UNIV MICHIGAN	4,534	30,545	6.74
6	GEORGIA INST TECHNOL	4,803	30,042	6.25
7	CHINESE ACAD SCI	7,057	29,624	4.20
8	NANYANG TECHNOL UNIV	5,912	28,516	4.82
9	NATL UNIV SINGAPORE	5,031	27,626	5.49
10	UNIV LONDON IMPERIAL COLL SCI TECHNOL & MED	3,555	25,429	7.15
11	INDIAN INST TECHNOL	7,115	25,386	3.57
12	UNIV CALIF LOS ANGELES	2,561	24,991	9.76
13	NASA	4,064	24,848	6.11
14	PURDUE UNIV	3,765	23,863	6.34
15	CNRS	3,817	23,530	6.16
16	PENN STATE UNIV	3,602	22,464	6.24
17	UNIV TOKYO	4,752	21,342	4.49
18	UNIV CALIF SAN DIEGO	2,635	20,850	7.91
19	TEXAS A&M UNIV	4,113	20,760	5.05
20	UNIV WISCONSIN	3,130	20,511	6.55

SOURCE: *Essential Science Indicators*SM from the January 1, 2010 update to cover an 10-year plus 10-month period, January 1, 1999-October 31, 2009.

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