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FEATURED ANALYSIS - March/April 2010

The Hottest Research of 2009

by Christopher King, Editor

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Once again *Science Watch* takes its annual look back at the hottest of recent research. Below in table 1 are the researchers who, according to citations recorded during 2009, posted the highest numbers of Hot Papers published over the preceding two years. Table 2 (also below) lists the papers published in 2009 that were most cited by year's end.

The list of researchers is striking for the number of authors who've returned from last year's compilation—or who've reappeared following brief absences—as well as for particular topics that remain highly active and highly cited.

One such topic is the reprogramming of fibroblast cells into a pluripotent state resembling embryonic stem cells, an endeavor embodied here by Rudolf Jaenisch of the Whitehead Institute of MIT. Jaenisch, who occupied the upper rungs of last year's report, tops the current list with 14 Hot Papers on the investigation of reprogrammed cells in models of Parkinson's disease, sickle-cell anemia, and other conditions.

Another hot topic from last year's roundup— graphene—appears again, as discussed in the Hot Papers of Andre K. Geim, who returns from last year, along with his frequent coauthor and University of Manchester colleague Konstantin Novoselov. The two were joined on several of these reports by a new name, Mikhail Katsnelson of Radboud University of Nijmegen, Netherlands. (Note: the order of names within each tier is determined by average citations per Hot Paper.)

Mark J. Daly, of the Harvard Medical School and the Broad Institute of MIT and Harvard, last seen in the 2007 report, finds his way back to the list with 13 Hot Papers on genetic mapping and genome-wide association studies. Several of these reports were coauthored with Harvard/Broad colleagues David Altshuler and Paul I.W. de Bakker, along with Goncalo Abecasis of the University of Michigan; all three are making their first appearance in a year-end roundup.

On the other hand, Eric S. Lander, the Broad Institute's founding director, has been featured on numerous occasions, the last in 2004. He scores again here with 10 Hot Papers on general genomic analysis as well as studies of lung cancer and multiple

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Shizuo Akira (see also | see also)

Carlo M. Croce

Mark J. Daly

Andre K. Geim

Ji-Huan He (see also: 1 ¦ 2)

sclerosis.

Carlo M. Croce of Ohio State University, who last appeared on 2008's list, emerges again with 12 hot reports on microRNA and its role in colon cancer, leukemia, and other malignancies.

In the sphere of mathematics, Ji-Huan He of Donghua University makes a return appearance from last year, with 10 Hot Papers on the variational iteration method and other formulations.

Rudolf Jaenisch	
Eric S. Lander	
Konstantin Novoselov	

Finally, this year marks the return of a fixture of these roundups in recent years: immunologist Shizuo Akira (see also | see also) of Osaka University, last seen on the list in 2008, who emerges with 9 Hot Papers on toll-like receptors and aspects of innate immunity.

Among 2009's most-cited papers, the physical sciences make a strong showing, notably in reports from the five-year release of data from the Wilkinson *Microwave Anisotropy Probe*, accounting for three of the top ten papers. Cosmic rays and dark matter also figure among the year's hottest reports.

And by now it's customary to remark on the strong showing of the *New England Journal of Medicine*: 11 of the 44 featured papers.

Christopher King is the Editor of the *Science Watch*® Newsletter, Thomson Reuters.

Table 1

Scientists with Multiple Hot Papers

Name	Institution	Field	Number of Hot Papers
Rudolf Jaenisch	Whitehead Institute, MIT	Biochemistry	14
Mark J. Daly	Broad Institute of MIT and Harvard	Genetics	13
Andre K. Geim	University of Manchester	Materials	13
David Altshuler	Broad Institute of MIT and Harvard	Genetics	13
Konstantin Novoselov	University of Manchester	Materials	12
Carlo M. Croce	Ohio State University	Cancer Genetics	12
Goncalo Abecasis	University of Michigan	Biostatistics	10
Eric S. Lander	Broad Institute of MIT and Harvard	Genomics	10
Mikhail Katsnelson	Radboud University of Nijmegen	Materials	10
Ji-Huan He	Donghua University	Mathematics	10
Paul I.W. de Bakker	Broad Institute of MIT and Harvard	Genetics	9
Shizuo Akira (see also | see also)	Osaka University	Immunology	9

SOURCE: Hot Papers Database from Thomson Reuters.

Table 2

The Red-Hot Research Papers of 2009

Rank	Paper	Citations
1	E. Komatsu, *et al.*, **"Five-year *Wilkinson Microwave Anisotropy Probe* observations: Cosmological interpretation,"** *Astrophys. J. Suppl. Ser.*, 180(2): 330-76, February 2009.	659
2	J. Dunkley, *et al.*, **"Five-year *Wilkinson Microwave Anistropy Probe* observations: Likelihoods and parameters from the *WMAP* data,"** *Astrophys. J. Suppl. Ser.*, 180 (2): 306-29, February 2009.	274
3	O. Adriani, *et al.*, **"An anomalous positron abundance in cosmic rays with energies 1.5-100 GeV,"** *Nature*, 458(7238): 607-9, 2 April 2009.	173
4	W. Duckworth, *et al.*, **"Glucose control and vascular complications in veterans with type 2 diabetes,"** *New Engl. J. Med.*, 360(2): 129-39, 8 January 2009.	172
5	G. Hinshaw, *et al.*, **"Five-year *Wilkinson Microwave Anisotropy Probe* observations: Data processing, sky maps, and basic results,"** *Astrophys. J. Suppl. Ser.*, 180(2): 225-45, February 2009.	171
6	F.H. Schröder, *et al.*, **"Screening and prostate-cancer mortality in a randomized European study,"** *New Engl. J. Med.*, 360(13): 1320-8, 26 March 2009.	148
7	Novel Swine-Origin Influenza A (H1N1) Virus Investigation Team (F.S. Dawood, *et al.*), **"Emergence of a novel swine-origin influenza A (H1N1) virus in humans,"** *New Engl. J. Med.*, 360(25): 2605-15, 18 June 2009.	141
8	N. Arkani-Hamed, *et al.*, **"A theory of dark matter,"** *Phys. Rev. D*, 79(1): No. 015014, January 2009.	137
9	G.L. Andriole, *et al.*, **"Mortality results from a randomized prostate-cancer screening trial,"** *New Engl. J. Med.*, 360(13): 1310-9, 26 March 2009.	130
10	J.L. Mega, *et al.*, **"Cytochrome P-450 polymorphisms and response to clopidogrel,"** *New Engl. J. Med.*, 360(4): 354-62, 22 January 2009.	120
11	S. Finfer, *et al.*, **"Intensive versus conventional glucose control in critically ill patients,"** *New Engl. J. Med.*, 360(13): 1283-97, 26 March 2009.	109
12	O. Adriani, *et al.*, **"New measurement of the antiproton-to-proton flux ratio of up to 100GeV in the cosmic radiation,"** *Phys. Rev. Lett.*, 102(5): No. 051101, 6 February 2009.	108
13	K.S. Kim, *et al.*, **"Large-scale pattern growth of graphene films for stretchable transparent electrodes,"** *Nature*, 457(7230): 706-10, 5 February 2009.	102
14	S.M. Lippman, *et al.*, **"Effect of selenium and vitamin E on risk of prostate cancer and other cancers: The Selenium and Vitamin E Cancer Prevention Trial (SELECT),"** *JAMA*, 301(1): 39-51, 7 January 2009.	102
15	D.C. Elias, *et al.*, **"Control of graphene's properties by reversible hydrogenation: Evidence for graphane,"** *Science*, 323(5914): 610-3, 30 January 2009.	96
16	Z. Ahmed, *et al.*, **"Search for weakly interacting massive particles with the first five-tower data from the Cryogenic Dark Matter Search at the Soudan Underground Laboratory,"** *Phys. Rev. Lett.*, 102(1): No. 011301, 9 January 2009.	95
17	M. Cirelli, **"Model-independent implications of the e(+/-), *P* (over-bar) cosmic ray spectra on properties of Dark Matter,"** *Nucl. Phys. B*, 813(1-2): 1-21, 21 May 2009.	95
18	C. Fraser, *et al.*, **"Pandemic potential of a strain of influenza A (H1N1): Early findings,"** *Science*, 324(5934): 1557-61, 19 June 2009.	93
19	C.J. Willer, *et al.*, **"Six new loci associated with body mass index highlight a neuronal influence on body weight regulation,"** *Nature Genetics*, 41(1): 25-34, January 2009.	91
20	A. Gustavsson, **"Algebraic structures on parallel M2 branes,"** *Nucl. Phys. B*, 811(1-2): 66-76, 11 April 2009.	89

21	T. Simon, *et al.*, **"Genetic determinants of response to clopidogrel and cardiovascular events,"** *New Engl. J. Med.*, 360(4): 363-75, 22 January 2009.	85
22	M.R. Nolta, *et al.*, **"Five-year *Wilkinson Microwave Anisotropy Probe* observations: Angular power spectra,"** *Astrophys. J. Suppl. Ser.*, 180(2): 296-305, February 2009.	84
23	K. Woltjen, *et al.*, **"piggyBac transposition reprograms fibroblasts to induced pluripotent stem cells,"** *Nature*, 458(7239): 766-70, 9 April 2009.	83
24	P.M. Ho, *et al.*, **"Risk of adverse outcomes associated with concomitant use of clopidogrel and proton pump inhibitors following acute coronary syndrome,"** *JAMA*, 301(9): 937-44, 4 March 2009.	81
25	A.A. Abdo, *et al.*, **"Measurement of the cosmic ray e+ + e- spectrum from 20 GeV to 1 TeV with the Fermi Large Area Telescope,"** *Phys. Rev. Lett.*, 102(18): No. 181101, 8 May 2009.	80
26	V. Cvetkovic, *et al.*, **"Multiband magnetism and superconductivity in Fe-based compounds,"** *EPL*, 85(3): No. 37002, February 2009.	80
27	P. Horava, **"Quantum gravity at a Lifshitz point,"** *Phys. Rev. D*, 79(8): No. 084008, April 2009.	77
28	P.W. Serruys, *et al.*, **"Percutaneous coronary intervention versus coronary-artery bypass grafting for severe coronary artery disease,"** *New Engl. J. Med.*, 360(10): 961-72, 5 March 2009.	77
29	M. Paez-Ribes, *et al.*, **"Antiangiogenic therapy elicits malignant progression of tumors to increased local invasion and distant metastasis,"** *Cancer Cell*, 15(3): 220-31, 3 March 2009.	77
30	S.H. Park, *et al.*, **"Bulk heterojunction solar cells with internal quantum efficiency approaching 100%,"** *Nature Photonics*, 3(5): 297-302, May 2009.	70
31	G. Thorleifsson, *et al.*, **"Genome-wide association yields new sequence variants at seven loci that associate with measures of obesity,"** *Nature Genetics*, 41(1): 18-24, January 2009.	70
32	K. Kaji, *et al.*, **"Virus-free induction of pluripotency and subsequent excision of reprogramming factors,"** *Nature*, 458(7239): 771-5, 9 April 2009.	69
33	P.L. Alireza, *et al.*, **"Superconductivity up to 29 K in $SrFe_2As_2$ and $BaFe_2As_2$ at high pressures,"** *J. Physics- Condensed Matter*, 21(1): No. 012208, 7 January 2009.	69
34	A. Reina, *et al.*, **"Large area, few-layer graphene films on arbitrary substrates by chemical vapor deposition,"** *Nano Letters*, 9(1): 30-5, January 2009.	69
35	F. Soldner, *et al.*, **"Parkinson's disease patient-derived induced pluripotent stem cells free of viral reprogramming factors,"** *Cell*, 136(5): 964-77, 6 March 2009.	68
36	J.Y. Yu, *et al.*, **"Human induced pluripotent stem cells free of vector and transgene sequences,"** *Science*, 324(5928): 797-801, 8 May 2009.	67
37	J.M.L. Ebos, *et al.*, **"Accelerated metastasis after short-term treatment with a potent inhibitor of tumor angiogenesis,"** *Cancer Cell*, 15(3): 232-9, 3 March 2009.	66
38	A. Garber, *et al.*, **"Liraglutide versus glimepiride monotherapy for type 2 diabetes (LEAD-3 Mono): a randomized, 52-week, phase III, double-blind, parallel-treatment trial,"** *Lancet*, 373(9662): 473-81, 7 February 2009.	65
39	R.J. Garten, *et al.*, **"Antigenic and genetic characteristics of the swine-origin 2009 A(H1N1) influenza viruses circulating in humans,"** *Science*, 325(5937): 197-201, 10 July 2009.	64
40	F. Wang, *et al.*, **"Functional renormalization-group study of the pairing symmetry and pairing mechanism of the FeAs-based high-temperature superconductor,"** *Phys. Rev. Lett.*, 102(4): No. 047005, 30 January 2009.	64
41	J. Tol, *et al.*, **"Chemotherapy, bevacizumab, and cetuximab in metastatic colorectal cancer,"** *New Engl. J. Med.*, 360(6): 563-72, 5 February 2009.	63
42	T.E. Klein, *et al.*, **"Estimation of the warfarin dose with clinical and pharmacogenetic data,"** *New Engl. J. Med.*, 360(8): 753-64, 19 February 2009.	62
43	J.P. Collet, *et al.*, **"Cytochrome P450 2C19 polymorphism in young patients treated with clopidogrel after myocardial infarction: a cohort study,"** *Lancet*, 373 (9660): 309-17, 24 January 2009.	61
44	B.C. Fellstrom, *et al.*, **"Rosuvastatin and cardiovascular events in patients undergoing hemodialysis,"** *New Engl. J. Med.*, 360(14): 1395-1407, 2 April 2009.	60

SOURCE: *ISI Web of Knowledge*® from Thomson Reuters (Citations recorded as of late December 2009).

KEYWORDS: Hottest research of 2009, 2009's most-cited papers, Rudolf Jaenisch, Andre K. Geim, graphene, Wilkinson Microwave Anisotropy Probe, WMAP, genomics.

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