

Science & Technology Frontiers

科技前沿快报

本期要目

美国“化学安全促进可持续发展”—战略计划分析

德国马普学会研究团队发现高温超导新纪录

国外机构近期关注中国空气污染治理进展

英国研究会指出未来信息技术的挑战

印度农业研究理事会发布2050年战略重点

欧洲发布2015-2017年关键空间技术自主发展

2015年

总第 016 期

第 10 期

		.....	1
		.....	4
		.....	5
-		.....	6
		.....	7
ARPA-E		.....	8
	1100	.....	11
EPA			



EPA

2012

2012-2016

2016-2019

1

8

1

2

3

4

¹ Chemical Safety for Sustainability strategic research action plan 2012-2016. <http://www2.epa.gov/sites/production/files/2014-04/documents/css-strap.pdf>



5

6

7

8

7

8

1

1996

2
21st Century

21

Toxicology in the
² 21

² Toxicology Testing in the 21st Century (Tox21). <http://www2.epa.gov/chemical-research/toxicology-testing-21st-century-tox21>

21

3

8 12

4

1

700

37.5³

2

8

³ Information about the Presidential Green Chemistry Challenge. <http://www2.epa.gov/greenchemistry/information-about-presidential-green-chemistry-challenge>

3

OECD

4

203

-70

133

-140

164

-109

9 3

4

⁴ A. P. Drozdov, M. I. Erements, I. A. Troyan et al. 2015. Conventional superconductivity at 203 kelvin at high pressures in the sulfur hydride system. *Nature*, 525: 73-76



3 1 1986
1993 1994
2 2001 39
- 3
2008
8 34
GRAND ⁵ GRAND
20
2.75
10¹⁵
2011 100

⁵ GRAND plans for new neutrino observatory. <http://physicsworld.com/cws/article/news/2015/aug/18/grand-plans-for-new-neutrino-observatory>



GRAND

10^{20}

10^{16}

35

2018

GRAND

2022

GRAND

-

8 24

-

6

-

University Centre in Svalbard

Marinoan

Milankovitch

Cryogenian

Louis Agassiz 1837

⁶ Orbitally forced ice sheet fluctuations during the Marinoan Snowball Earth glaciation. <http://www.nature.com/ngeo/journal/v8/n9/full/ngeo2502.html>



-

8 20

· *PLoS ONE*
7

4000

17%

EPA

92%

120

38%

PM_{2.5}

30 -

ARPA-E

1	ARPA-E	1450							/
									3.0
									4.0
									1.6
									2.2
									3.8
8	24	ARPA-E							
		MOSAIC	11		2400			2	¹⁰
		MOSAIC							
			30%				4		1
							2		
							3		
			4						
2	ARPA-E	2400							/
									2.1

¹⁰ Micro-scale Optimized Solar-cell Arrays with Integrated Concentration (MOSAIC). http://arpa-e.energy.gov/sites/default/files/documents/files/MOSAIC_Project_Descriptions.pdf

2

2.9

3

1100

1100

8 11

880 1160 ¹¹ 12

1 ¹² 5 1

1-4 2

5 3

6 4 7-9 5

CO₂ 10-12

1 1100

/

93.8

1200

87.0

	100.4
CO ₂	
	93.8
	TDS

EPA

7 21 EPA 800 9

1 13

1 9

2050 2080

¹³ EPA. Understanding the Effects of Climate Change on Indoor Air Quality and Public Health. <http://epa.gov/ncer/indoorair14/factsheet.pdf>



9	1		NSF	SIA
		SRC		
	14		insight computing	
1				
2				

¹⁴ Rebooting the IT Revolution. <https://www.semiconductors.org/clientuploads/Resources/RITR%20WEB%20version%20FINAL.pdf>



3

4

5

6

7

8

AMD

AMD

IEEE Micro 2015 7

15

AMD

CPU GPU

AMD

AMD

10

10

GPU

3

AMD

AMD

AMD

GPGPU

APU

CPU

GPU

CPU

AMD

DRAM

NVM

¹⁵ AMD's Exascale Strategy Hinges on Heterogeneity. http://www.hpcwire.com/2015/07/29/amds-exascale-strategy-hinges-on-heterogeneity/?utm_source=rss&utm_medium=rss&utm_campaign=amds-exascale-strategy-hinges-on-heterogeneity



AMD

DRAM

NVM

DRAM

AMD

2016-2017

HPC

Gartner

2015

8

Gartner

2015

16

digital humanism



1



3

NSF 1310

8 12

NSF

1310

16

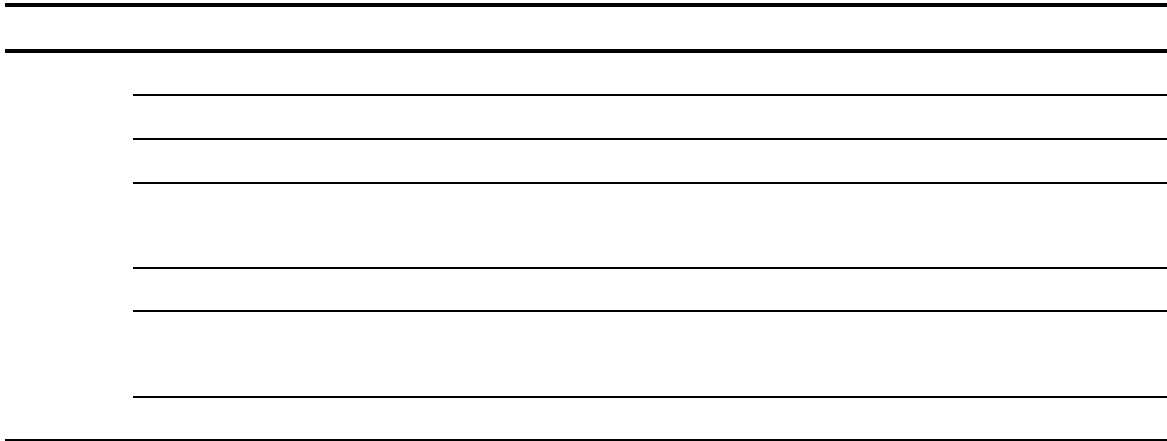
17

NSF

1

1 NSF

16



¹⁷ Bold new brain research in neuroengineering, brain-inspired design, and individuality. http://www.nsf.gov/news/news_summ.jsp?cntn_id=135926&WT.mc_id=USNSF_51&WT.mc_ev=click





NIST

8

NIST

PHM

19

NIST

PHM

PHM

PHM

13

PHM

1

13

PHM

PHM

PHM

PHM

¹⁹ Measurement Science Roadmap for Prognostics and Health Management for Smart Manufacturing Systems. <http://www.nist.gov/el/isd/upload/Measurement-Science-Roadmapping-Workshop-Final-Report.pdf>

2050

			PHM
	PHM		
		PHM	
	PHM		PHM
PHM	PHM		
	PHM	PHM	
	PHM		
PHM		PHM	
	PHM		
		PHM	
	PHM		PHM

2050

7

ICAR

2050

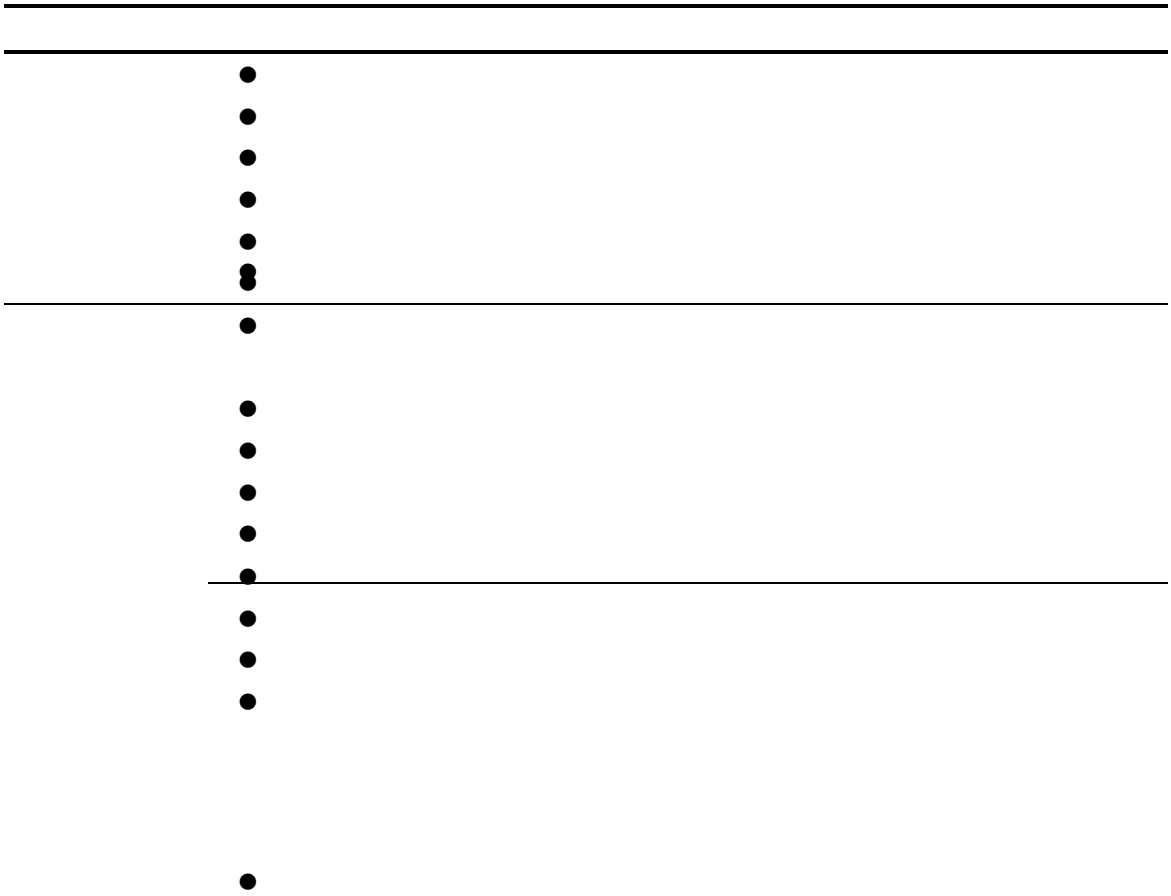




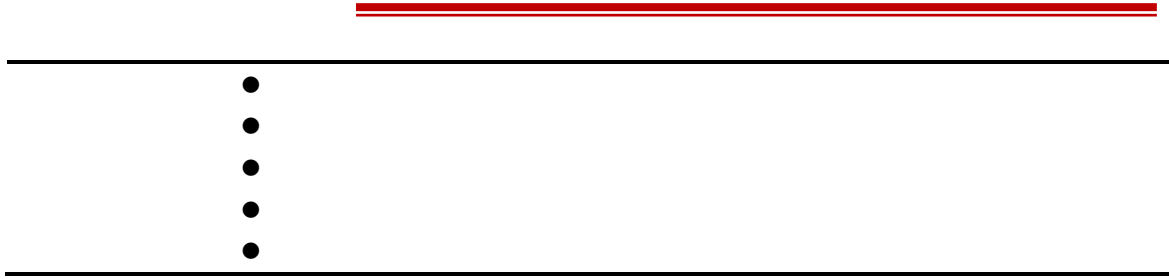
6

1

1



RNA



RNA

RNA

BioDirect

²¹

RNAi

1

2

3

1

2

3

²¹ Agri-biotech researchers develop RNA sprays to modify crops. <http://www.isaaa.org/kc/cropbiotechupdate/article/default.asp?ID=13683>; <http://www.technologyreview.com/featuredstory/540136/the-next-great-gmo-debate/>



NIH

9	1		NIH	5000	22
				eMERGE III	
		12			
				1	
		1	eMERGE III	12	
					/
					338.5
					/
					383.2
					335.3
					342.1
					343.6
					351.8
					343.7
					362.5
eMERGE					330.7
eMERGE III					
					420.6
eMERGE					849.3
DNA			eMERGE III		
					839.2

²² NIH grants seek best ways to combine genomic information and EHRs. <http://www.nih.gov/news/health/sep2015/nhgri-01.htm>

9 3

Fluidigm

²³

ARC

LIFE

Fluidigm

C1

BioMark HD

9000

qPCR

5000 Taqman

8 21

10

²⁴

²³ ? D Q -Cell Genomics Centre of Excellence Opens at Monash Health Translation Precinct. <http://www.businesswire.com/news/bioorg/20150903005030/en/Australia%E2%80%99s-Single-Cell-Genomics-Centre-Excellence-Opens-Monash>

²⁴ Next Steps in Developing the Precision Medicine Initiative. <https://www.whitehouse.gov/blog/2015/08/21/next-steps-developing-precision-medicine-initiative>



1

2

3

4

API Application Programming

Interface

5

6

7

1 BBI PPP 2015

						/
1.			2.			
			3.			
			4.			
			5.			
			6.			2800
7.						
		8.				
					9.	
						1200
1.						
		2.				
			3.			6400
4.						
			5.			
			6.			
7.						
						200

2015-2017

	ESA	EC	EDA
2015	3		2015-2017 ^{26,27}

²⁶ Critical space technologies for European strategic non-dependence. <https://www.eda.europa.eu/info-hub/press-centre/latest-news/2015/03/19/critical-space-technologies-for-european-strategic-non-dependence>

²⁷ Critical Space Technologies for European Strategic Non-Dependence, Actions for 2015/2017. http://www.dlr.de/rd/Portaldata/28/Resources/dokumente/rp6/h2020/newsletter/European-Non-Dependence_Items_2015-2017.pdf



2015-2017
ESA EC EDA 2020

2009 ESA EC EDA

1 / 5 39
1 1

1 2015-2017

IP Core

/

CAN



8 10
 2015-2025 28 2025
 1000

250

GDP 3

1 2 7
 4 3
 6 5
 7

1 2
 3 4
 5 6

1

²⁸ National Marine Science Plan Driving the de ?
 onment/NMSC-WHITE/Documents/NMSP%202015-2025%20report.pdf

, 8- , , -



2

3

4

5

20

6

7

30

NSF

8

300

NSF

8

29



1

2

3

/

3

CMBI

NSF 3-4

CMB-S4

1

2

3

4

5

NSF



2

1

ESA

CCP

GCOS

2

ECMWF

ESA
ECSAT



NSF 5550

		NSF	8	10		5550
3		31				
				5	NSF	
NSF				20		
	3			1		
	1	NSF	5550		3	
<hr/>						
						/
<hr/>						
			3D			
						18.5
POETS						
<hr/>						
						18.5
NEWT						
<hr/>						
						18.5
<hr/>						

³¹ Three new Engineering Research Centers will advance U.S. resiliency and sustainability. http://www.nsf.gov/news/news_summ.jsp?cntn_id=135694&org=NSF&from=news



8 10

Geology

32

20 70

40

70%

14500

³² Census of seafloor sediments in the world's ocean. <http://geology.gsapubs.org/content/early/2015/07/28/G36883.1.full.pdf+html>

科技英语

中国科学院研究生院

左宁红 (按姓氏笔画排序)

于贵瑞 于海斌 马延和 王天然 王 赤 王志峰 王启明 王跃飞 王 琛
甘为群 石晶林 卢 柯 包信和 巩馥洲 吕才典 朱日祥 朱永官 朱 江
朱道本 向 涛 刘春杰 许洪华 孙 枢 孙 松 严陆光 李国杰 李家洋
李 甯 杨 乐 肖 早 早 季 早宏泰 何于白 沈音甫 张双南 张吉强
张建国 张 偲 张德清 陈和生 武向平 林其谁 罗宏杰 罗晓容 周其凤
郑厚植 赵 刚 赵红卫 赵其国 赵忠贤 赵黛青 胡敦欣 南 凯 段子渊
段恩奎 姜晓明 骆永明 袁亚湘 顾逸东 徐志伟 郭光灿 郭 莉 郭 雷
席南华 康 乐

编辑部

任: 冷伏海

主任: 冯 霞 陶 诚 张 军 曲建升 房俊民 徐 萍

址: 北京市中关村北四环西路 33 号, 100190

话: (010) 62538705

箱: lengfh@mail.las.ac.cn publications@casid.ac.cn