

HORIZON 2020

# The European Research Council

European Research Council



*"ERC and the promise in computer science research activities"*

*Danny DOLEV*

始于足下

各位来宾：

ERC Goal

请您脱鞋后

To Catalyze Frontier Research in Europe

漫步摩足健身道

A thousand-li walking  
begins with the first step

Dear Guests:

Please take off your shoes and stroll  
on the rubbing-feet fit route

千里之行

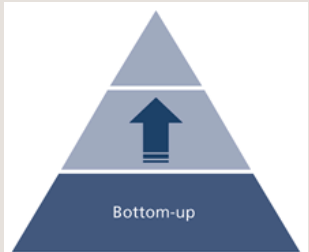


# The European Research Council

## What is ERC



# What is ERC?



The ERC supports excellence in frontier research through a bottom-up, individual-based, pan-European competition

**Budget:** € 13 billion (2014-2020) - 1.9 billion €/year  
€ 7.5 billion (2007-2013) - 1.1 billion €/year

## Legislation

- Scientific governance: independent Scientific Council with 22 members including the ERC President; full authority over funding strategy
- Support by the ERC Executive Agency (autonomous)
- Excellence as the only criterion

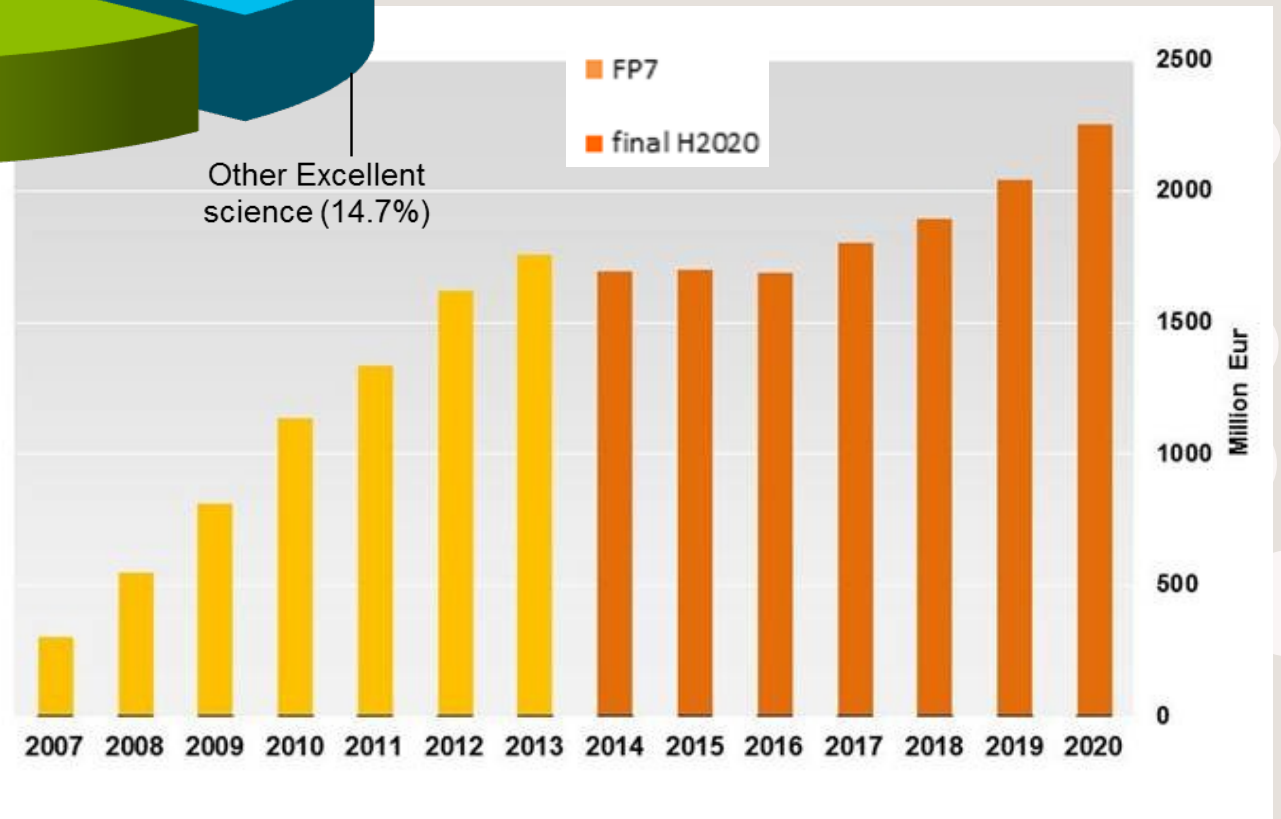
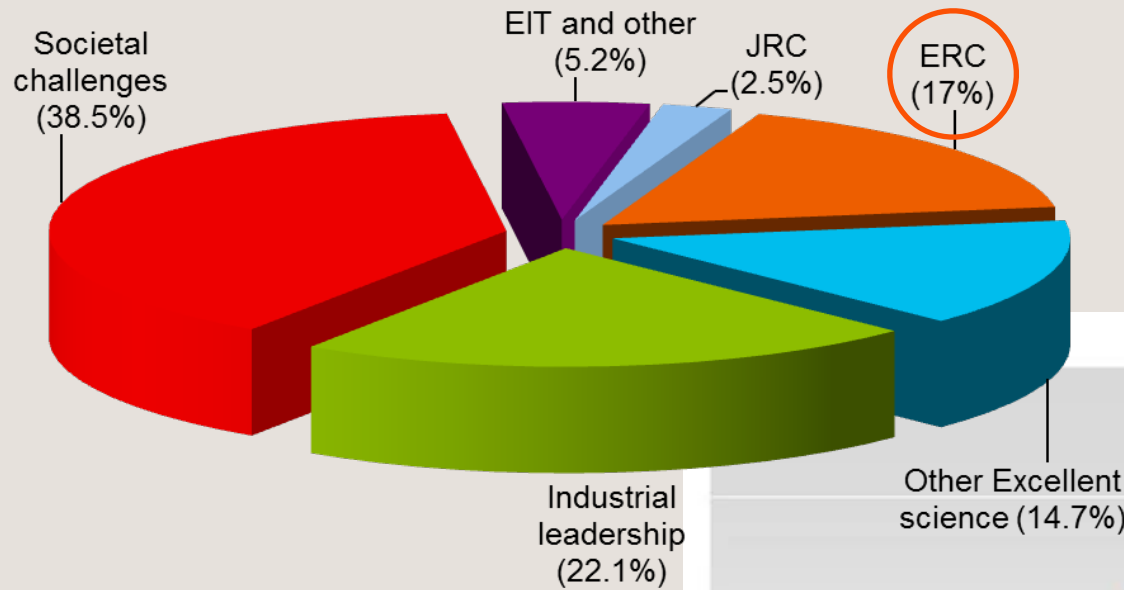
## Strategy

- Support for the individual scientist – no networks!
- Global peer-review
- No predetermined subjects (bottom-up)
- Support of frontier research in all fields of science and humanities



# Horizon 2020 Budget € 77 billion

ERC Budget € 13 billion





# ERC in the H2020 Structure

## ➤ The HORIZON 2020 main components:

- Excellent Science
  - ➔ *World class science is foundation of technologies, jobs, well-being*
  - ➔ *Europe needs to develop, attract, retain research talent*
  - ➔ *Researchers need access to the best infrastructures*
- Industrial leadership
- Societal challenges

## ➤ Excellent Science:

- **European Research Council** (budget under H2020: € 13 billion)
- Future and Emerging Technologies
- Marie Skłodowska Curie Actions
- Research Infrastructures





# ERC Scientific Council Members

- Prof. Klaus BOCK (Chemistry)
- **Prof. Jean-Pierre BOURGUIGNON (Mathematics), ERC President**
- Prof. Nicholas CANNY (History)
- Prof. Sierd A.P.L. CLOETINGH (Earth Sciences)
- Prof. Tomasz DIETL (Physics)
- Prof. Daniel DOLEV (Computer Sciences)
- Prof. Athene DONALD (Biological Physics)
- Dr. Barbara ENSOLI (Medicine)
- Prof. Pavel EXNER (Applied Mathematics & Mathematical Physics), **ERC Vice-President**
- Prof. Reinhard GENZEL (Astrophysics)
- Prof. Carl-Henrik HELDIN (Molecular Cell Biology), **ERC Vice-President**
- Prof. Timothy HUNT (Biology)
- Prof. Matthias KLEINER (Engineering)
- Prof. Eva KONDOROSI (Biology)
- Prof. Mart SAARMA (Biology)
- Prof. Nuria SEBASTIAN GALLES (Psychology), **ERC Vice-President**
- Prof. Nils Christian STENSETH (Ecology & Evolution)
- Prof. Martin STOKHOF (Philosophy)
- Prof. Anna TRAMONTANO (Biochemistry)
- Prof. Isabelle VERNOS (Molecular and Cell Biology)
- Prof. Reinhilde VEUGELERS (Economics)
- Prof. Michel WIEVIORKA (Sociology)



# ERC Grant Schemes



## Starting Grants

starters  
(2-7 years after PhD)  
up to € 2.0 Mio  
for 5 years

## Consolidator Grants

consolidators  
(7-12 years after PhD)  
up to € 2.75 Mio  
for 5 years

## Advanced Grants

track-record of  
significant research  
achievements in the  
last 10 years  
up to € 3.5 Mio  
for 5 years

## Proof-of-Concept

bridging gap between research - earliest  
stage of marketable innovation  
up to €150,000  
(only for ERC grant holders)





# Creative Freedom of the Individual Grantee

## ERC offers independence, recognition & visibility

- to work on a research topic of **own choice**, with a team of **own choice**
- to gain true **financial autonomy** for 5 years
- to negotiate with the host institution the **best conditions** of work
- to attract **top team members** (EU and non-EU) and **collaborators**
- to move with the grant to any place in Europe if necessary (**portability of grants**)
- **to attract additional funding and gain recognition**; ERC is a quality label



# "Excellence is the Sole Criterion of Evaluation"

Evaluation of *excellent quality* at two levels:

## ➤ Excellence of the Research Project

- ✓ Ground-breaking nature
- ✓ Potential impact
- ✓ Scientific approach
- ✓ Added-value of the Group (only Synergy Grant)

## ➤ Excellence of the Principal Investigator

- ✓ Intellectual capacity
- ✓ Creativity
- ✓ Commitment

Referees and panels **evaluate and score** each criterion, and then **rank** the proposals according to these results.

# Evaluation of Proposals

- **The ERC Scientific Council** is responsible for proposing independent experts
- **Structure:** 25 panels distributed across 3 scientific domains (10 *Physical Sciences and Engineering*, 9 *Life Sciences* and 6 *Social Sciences and Humanities*)

## What makes ERC evaluation exceptional?

- ✓ Highly international participation in panels
- ✓ Full autonomy of panels to decide

**Panel members and chairs** based in **49** countries:

**26** EU Member States, **7** Associated Countries, **16** Non-ERA countries

**Remote referees** based in **87** countries



# 25 Panels for All Areas of Science

Physical  
Sciences  
&  
Engineering

10 panels

Mathematics  
Fundamental Constituents of Matter  
Condensed Matter Physics  
Physical and Analytical Chemical Sciences  
Synthetic Chemistry and Materials  
**Computer Science and Informatics**  
Systems and Communication Engineering  
Products and Processes Engineering  
Universe Sciences  
Earth System Science

Social Sciences & Humanities

6 panels

Markets, Individuals and Institutions  
The Social World, Diversity, Institutions  
and Values  
Environment, Space and Population  
The Human Mind and Its Complexity  
Cultures and Cultural Production  
The Study of the Human Past

Life  
Sciences

9 panels

Molecular and Structural Biology and Biochemistry  
Genetics, Genomics, Bioinformatics and Systems Biology  
Cellular and Developmental Biology  
Physiology, Pathophysiology and Endocrinology  
Neurosciences and Neural Disorders  
Immunity and Infection  
Diagnostic Tools, Therapies and Public Health  
Evolutionary, Population and Environmental Biology  
Applied Life Sciences and Non-Medical Biotechnology

# ERC Competitions

	Total number of applications	of which		
		Evaluated*	Funded	success rates**
Starting Grant 2007	9,167	8,787	299	3.4
Starting Grant 2009	2,503	2,392	245	10.2
Starting Grant 2010	2,873	2,767	436	15.8
Starting Grant 2011	4,080	4,005	486	12.1
Starting Grant 2012	4,741	4,652	566	12.2
Starting Grant 2013	3,329	3,255	300	9.2
Consolidator Grant 2013	3,673	3,604	313	8.7
<b>Starting and Consolidator Grant</b>	<b>30,366</b>	<b>29,462</b>	<b>2,645</b>	<b>10.2</b>
Advanced Grant 2008	2,167	2,034	282	13.9
Advanced Grant 2009	1,584	1,526	245	16.1
Advanced Grant 2010	2,009	1,967	271	13.8
Advanced Grant 2011	2,284	2,245	301	13.4
Advanced Grant 2012	2,304	2,269	319	14.1
Advanced Grant 2013	2,408	2,363	291	12.3
<b>Advanced Grant</b>	<b>12,756</b>	<b>12,404</b>	<b>1,709</b>	<b>13.9</b>
Proof of Concept 2011 - 1&2	151	139	51	36.7
Proof of Concept 2012 - 1&2	143	120	60	50.0
Proof of Concept 2013 - 1&2	292	279	67	24.0
<b>Proof of Concept</b>	<b>586</b>	<b>538</b>	<b>178</b>	<b>36.9</b>
<b>Synergy Grant 2012</b>	<b>710</b>	<b>697</b>	<b>11</b>	<b>1.6</b>
<b>Synergy Grant 2013</b>	<b>449</b>	<b>427</b>	<b>13</b>	<b>3.0</b>

\* withdrawn and ineligible proposals not taken into account

\*\* percentage of funded proposals in relation to evaluated proposals

Data as of 21/08/2014



# The European Research Council

## Early Impact Signs



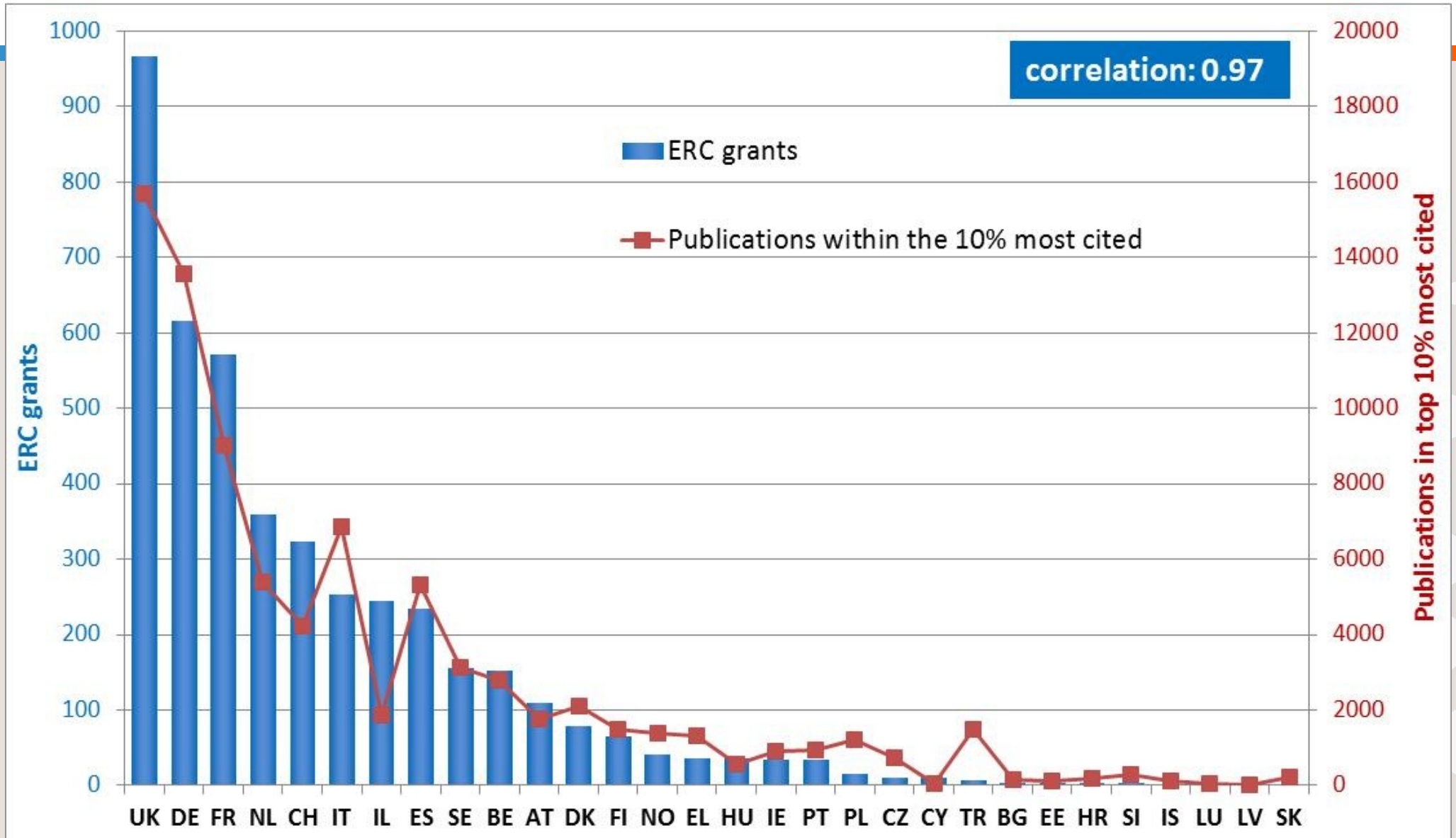


# ERC after 7 Years of Existence

- Highly recognised by the research community
- Over 4300 top researchers funded; 64 nationalities represented
- **Highly competitive** (we try hard to keep the success rate above 10%)
- Working in almost 600 different institutions in 30 countries
- 50% of grantees in 50 institutions : *“Excellence attracts excellence”*
- Efficient and fast grant management
- **Benchmarking** effect: impact on national programmes and agencies; national funding for best "runners-up"



# ERC Grants to Top Publications: Correlation 0.97



correlation: 0.97

ERC grants

Publications within the 10% most cited

Publications in top 10% most cited

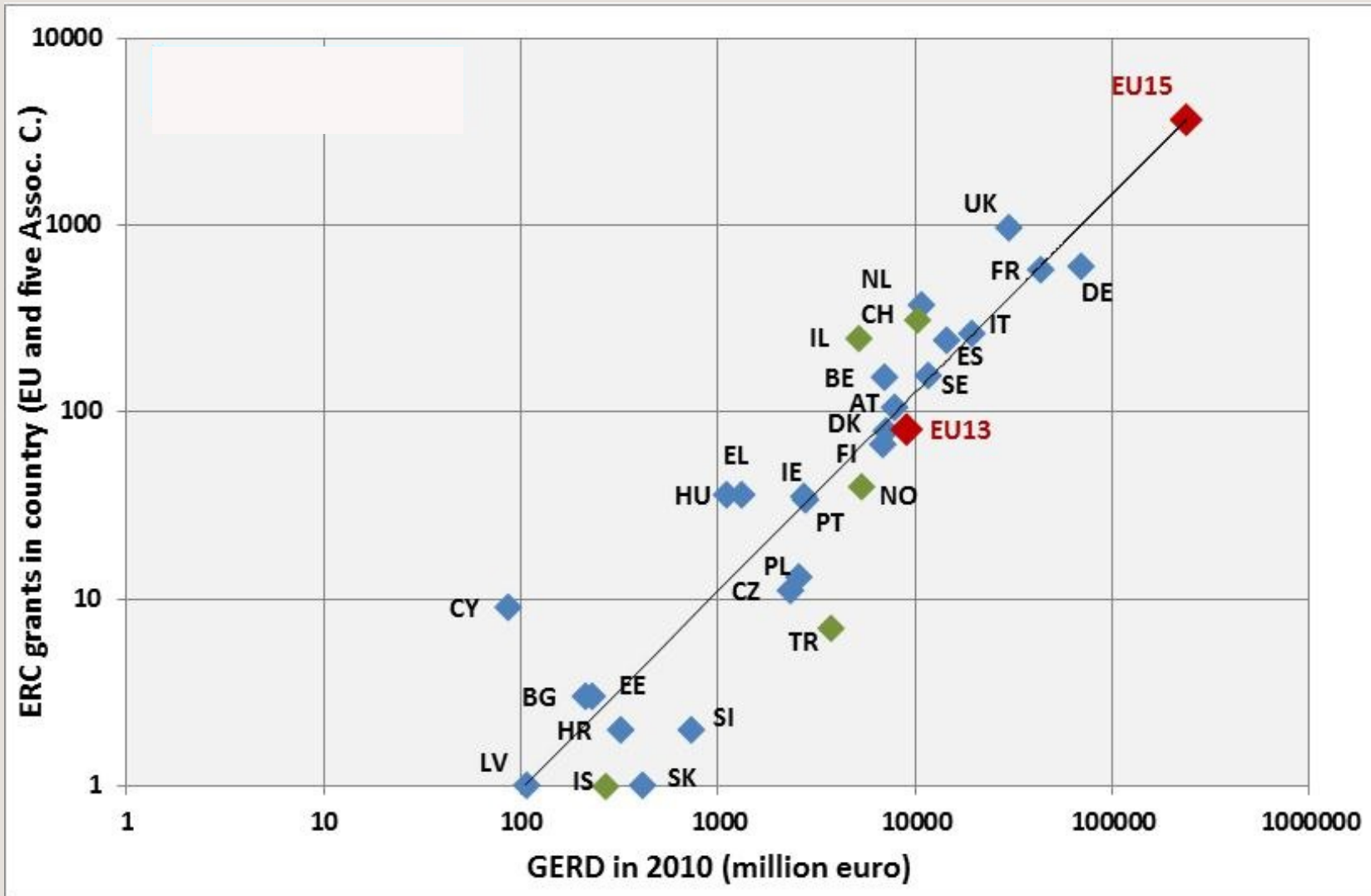
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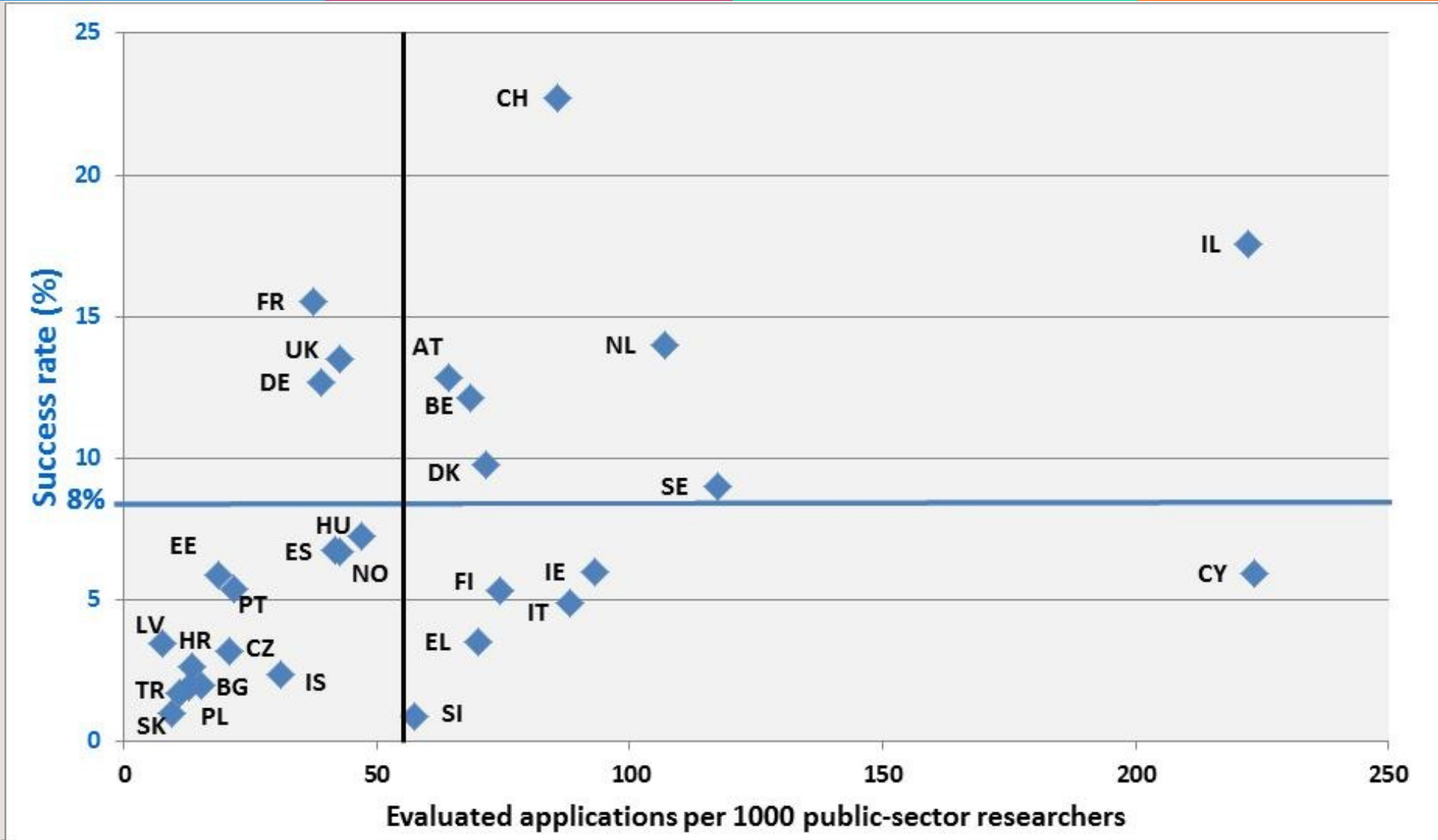


# ERC Grants vs. R&D Expenditure





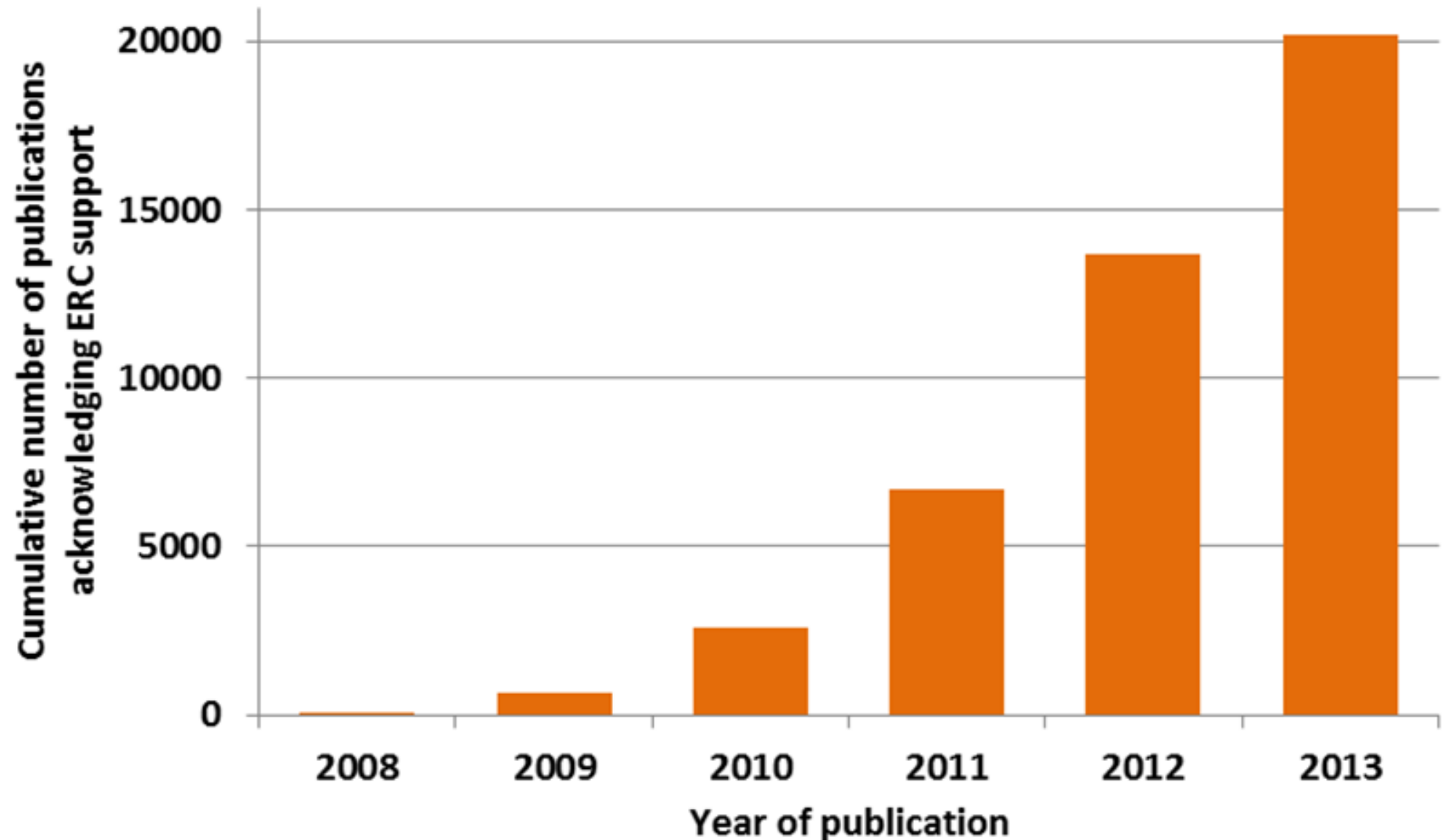
# Success Rates vs. Applications





# Publications from ERC-funded Projects

## Over 20 000 articles acknowledging ERC funding



# Publications from ERC-funded Projects in Top Most Cited



- **12%** of the articles, notes and reviews published between **2008-2010** and acknowledging ERC support were in the **top 1%** most cited in **2012**  
(i.e. 240 publications out of 1996 publications ;  
NSF-selected journals and citations thresholds provided in the NSF Science Indicators 2014 were considered)
- **43%** of the articles, notes and reviews published between **2008-2010** and acknowledging ERC support were in the **top 10%** most cited in **2012**  
(i.e. 855 publications out of 1996 publications ;  
NSF-selected journals and citations thresholds provided in the NSF Science Indicators 2014 were considered)



# Highly Distinguished Grantees

European Research Council



 <p><b>ERC Grantee AdG 2009</b></p> <p>Serge Haroche <b>Nobel 2012</b></p>	 <p><b>ERC Grantee StG 2007</b> <b>ERC Grantee SyG 2012</b></p> <p>Konstantin Novoselov <b>Nobel 2010</b></p>	 <p><b>ERC Grantee AdG 2012</b></p> <p>Ada Yonath</p>	 <p><b>ERC Grantee AdG 2012</b></p> <p>Andre Geim</p>	 <p><b>ERC Grantee AdG 2012</b></p> <p>Christoforos Pissarides</p>	 <p><b>ERC Grantee AdG 2012</b></p> <p>Theodor Hansch</p>	 <p><b>ERC Grantee AdG 2010</b></p> <p>James Heckman</p>	 <p><b>ERC Grantee AdG 2010</b></p> <p>Jean-Marie Lehn</p>
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	Stanislav Smirnov	AdG 2008	<b>2014 Brain Prize</b> <b>2014 Kavli Prize</b> <b>2014 Wolf Prize</b> <b>2014 EMBO Gold Medal</b>	G. Rizzolatti and S. Dehaene - AdG 2009
	Elon Lindenstrauss	AdG 2010		Thomas Ebbesen - AdG 2008
	Simon Donaldson	AdG 2009		Leif Andersson - AdG 2011
	Artur Avila	StG 2010		Sophie Martin - StG 2010
	Martin Hairer	CoG 2013		

## Other Prizes awarded to ERC grantees

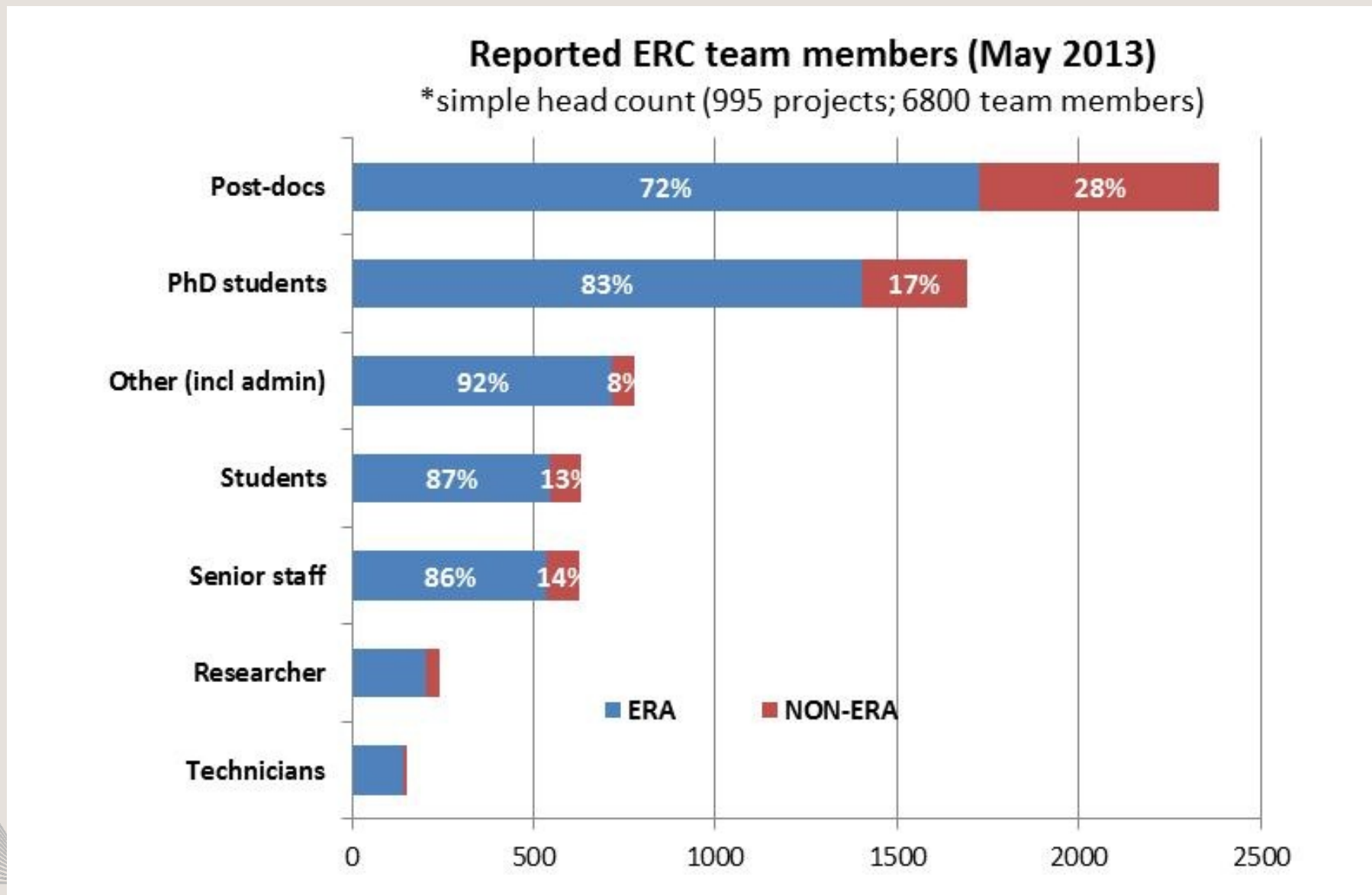
BALZAN PRIZE 2013 - Pascale COSSART - AdG 2008, Alain ASPECT - AdG 2010  
 EUROPEAN LATSIS PRIZE 2012 - Uffe HAAGERUP - AdG 2009  
 LEIBNIZ PRIZE 2012 Michael BRECHT - AdG 2008, Joerg WRACHTRUP - AdG 2010  
 FEBS|EMBO WOMEN IN SCIENCE 2014 - Pascale COSSART - AdG 2008  
 FEBS|EMBO WOMEN IN SCIENCE 2011 - Carol ROBINSON - AdG 2010  
 CRAFOORD PRIZE 2011 and EUROPEAN LATSIS PRIZE 2010 – Ilkka Hanski - AdG 2008  
 L'ORÉAL-UNESCO AWARD FOR WOMEN IN SCIENCE 2011 - Anne L'Huillier - AdG 2008  
 WOLF PRIZE 2010 – Anton ZEILINGER, David BAULCOMBE - AdG 2008, Alain ASPECT - AdG 2010

HOLBERG PRIZE 2013 - Bruno LATOUR - AdG 2010  
 WOLF PRIZE 2013 - Peter ZOLLER - SyG 2012  
 CRAFOORD PRIZE 2013 – L. KLARESKOG - AdG 2009  
 BALZAN PRIZE 2012 - David BAULCOMBE - AdG 2008  
 KELVIN PRIZE 2012 - Colin McINNES - AdG 2008  
 EMBO GOLD MEDAL 2012 - Jiri FRIML - StG 2011  
 EMBO GOLD MEDAL 2011 – S. BOULTON - AdG 2010  
 EMBO GOLD MEDAL 2010 – Jason W CHIN - StG 2007

# Developing a New Generation of Excellent Scientists

2/3 of staff are people in the training phase of their career

Analysis of 995 ERC projects



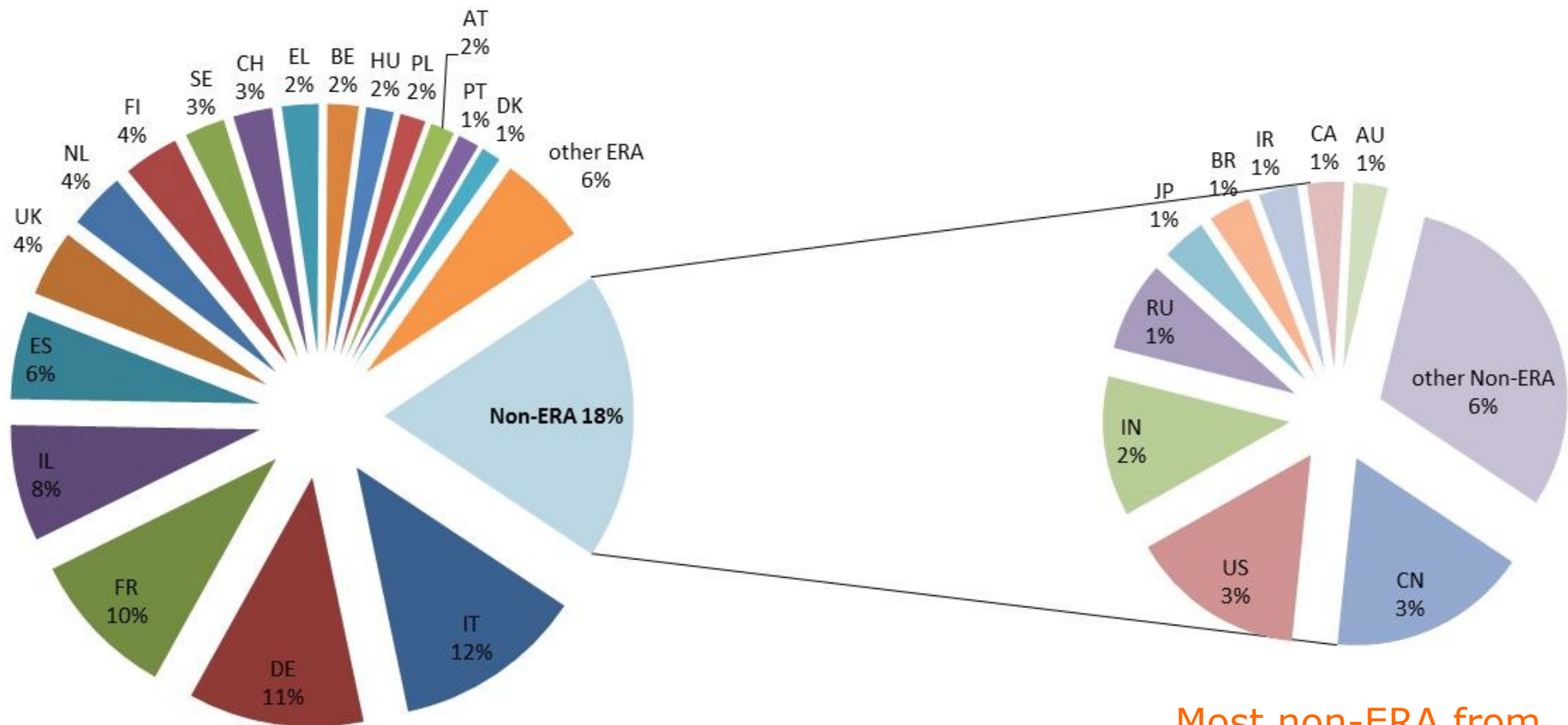


# Attracting Excellent Researchers

Composition of ERC teams (PIs not included)  
 Analysis of 995 Starting and Advanced Grants

**EU: 67%**  
**Assoc. Countries: 12%**  
**non-ERA: 18%**  
**unknown: 3%**

Distribution of ERC team members by nationality - detailed



**53% of non-ERA** team members "attracted" to Europe with there ERC grant (10% of all team members)

Most non-ERA from **China, US, India, and Russia**



# The European Research Council

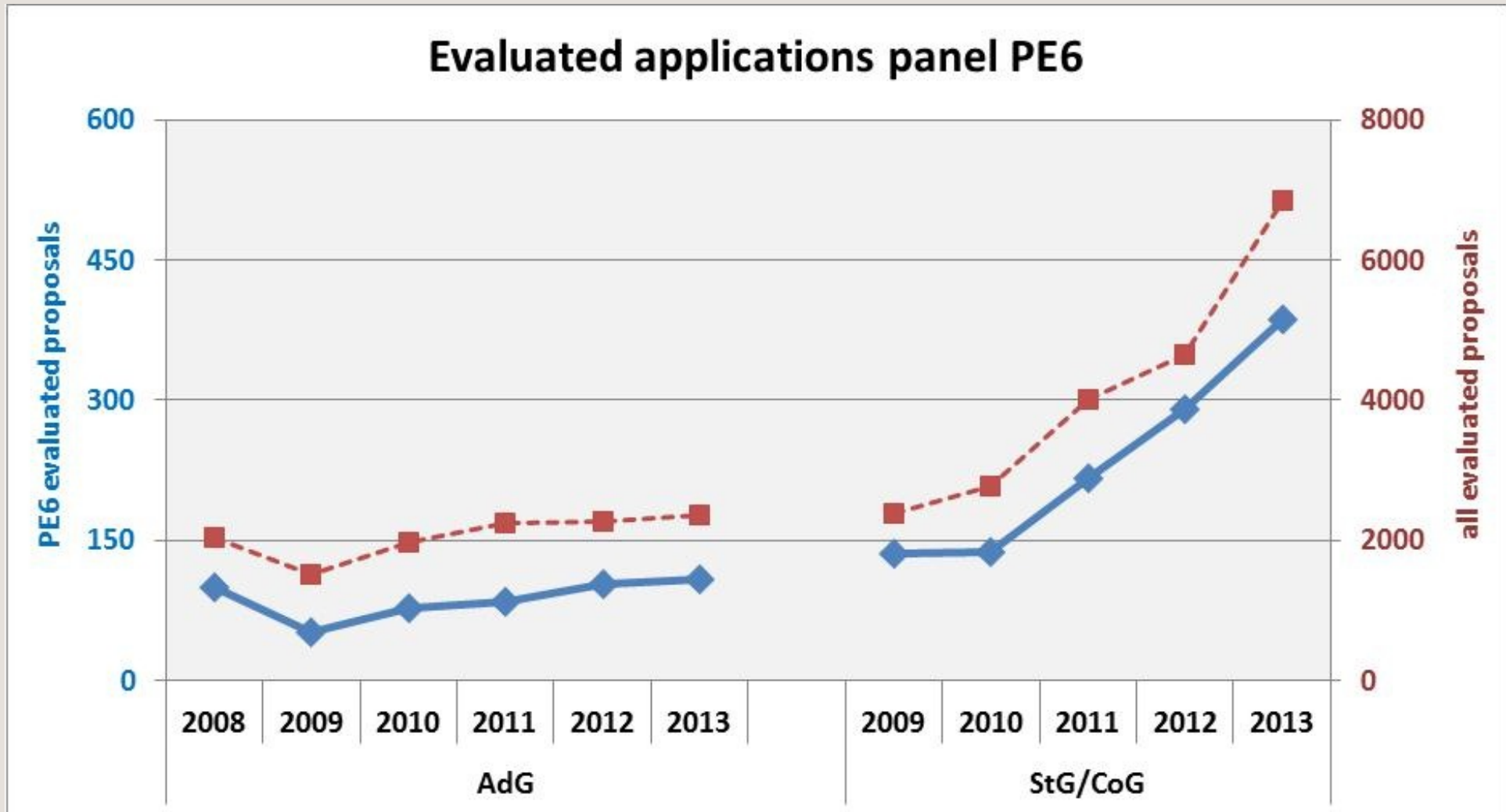
## "Computer Science and Informatics" at ERC





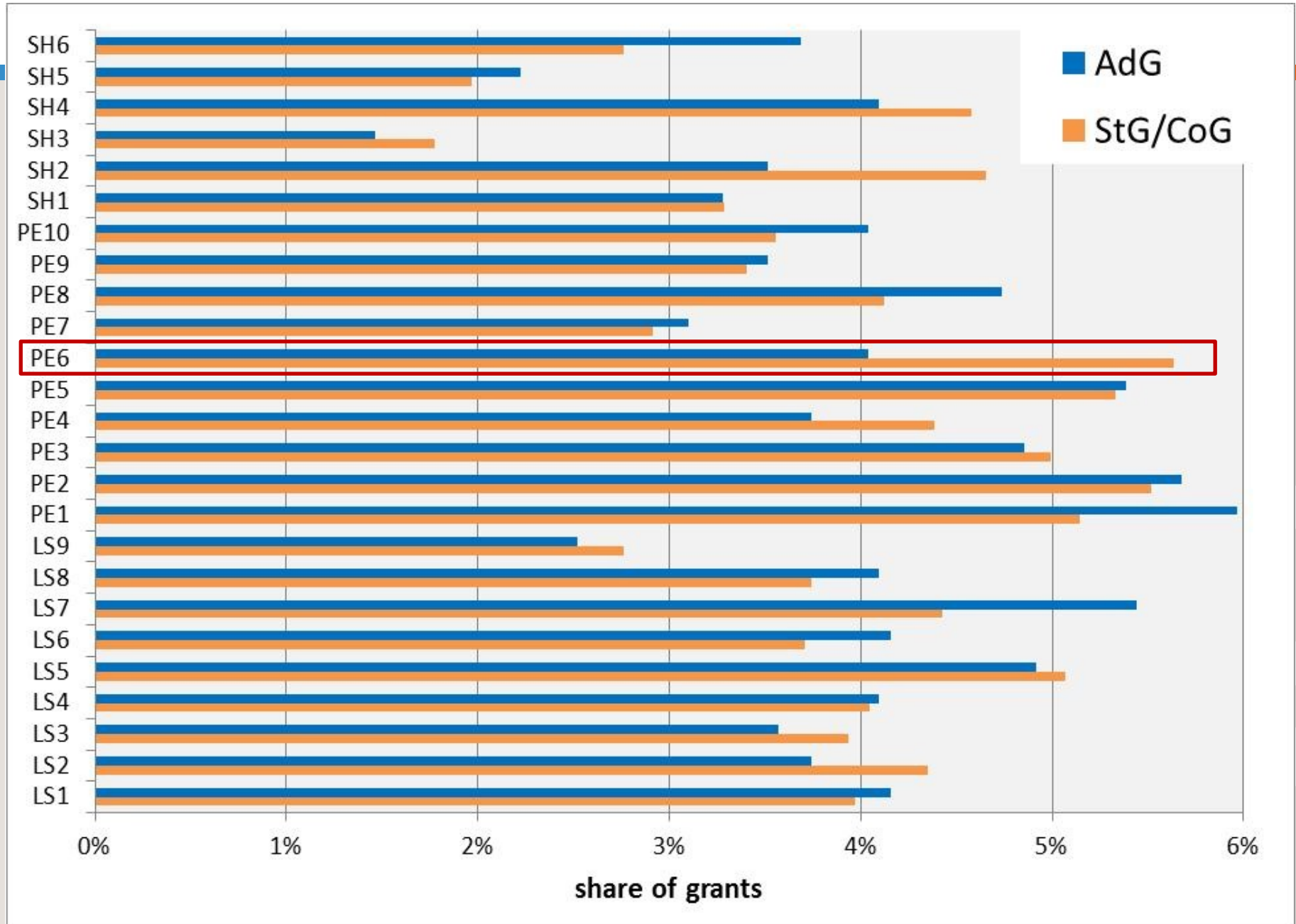
# Evaluated Proposals in Panel PE6

## "Computer Science and Informatics"



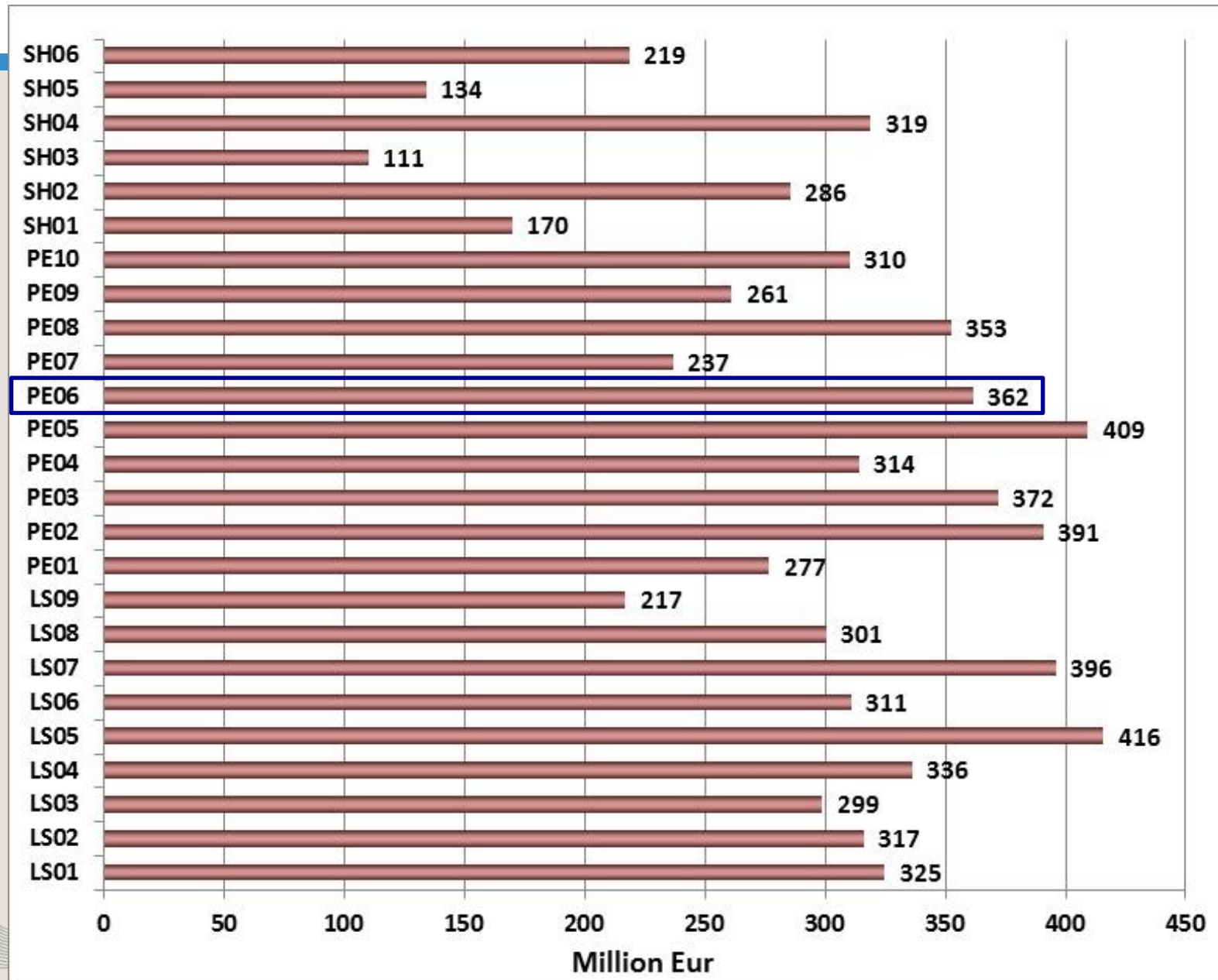
# Grants per Panel

ERC Starting, Consolidator and Advanced Grant 2007-2013

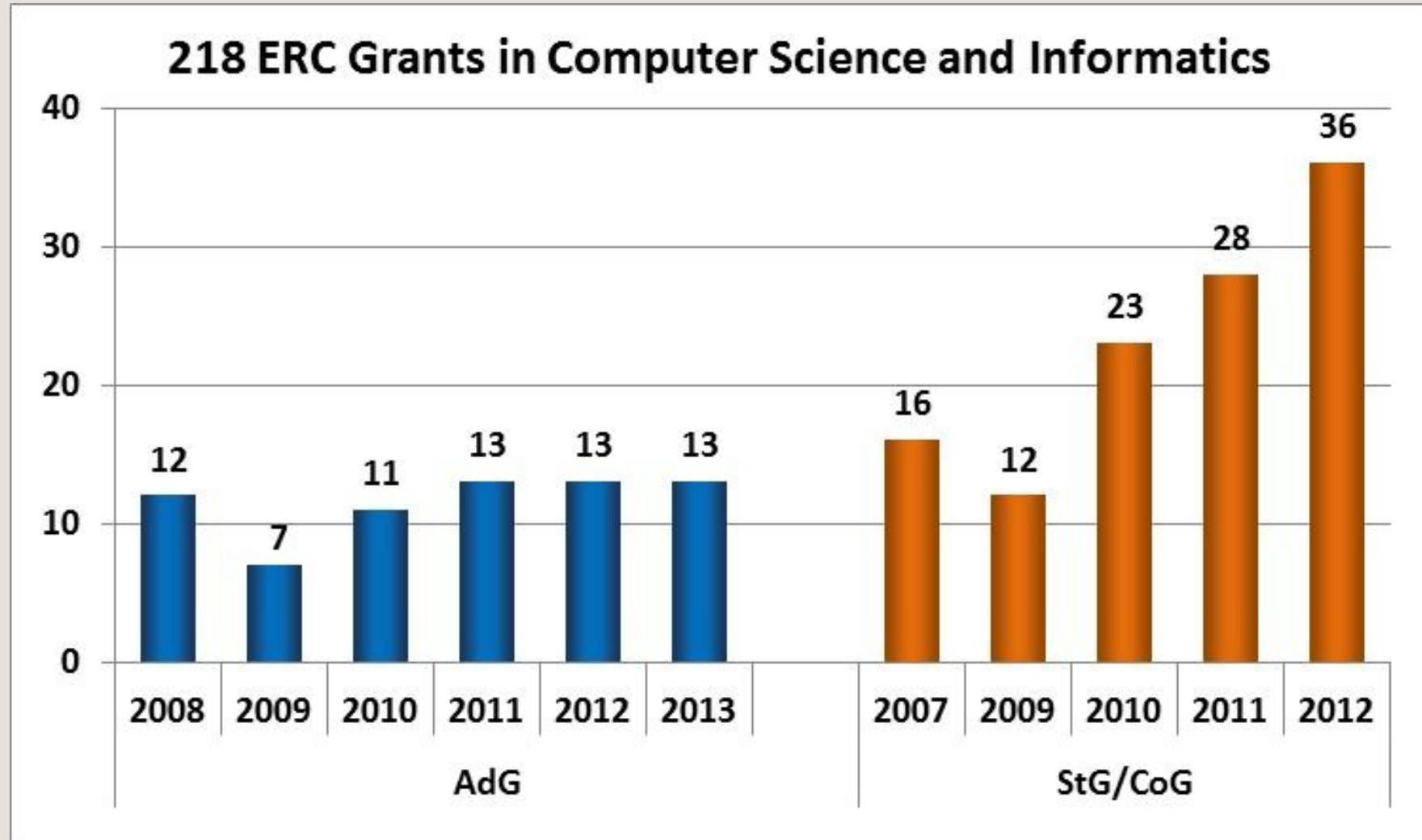


# Budget of Grants per Panel

ERC Starting, Consolidator and Advanced Grant 2007-2013



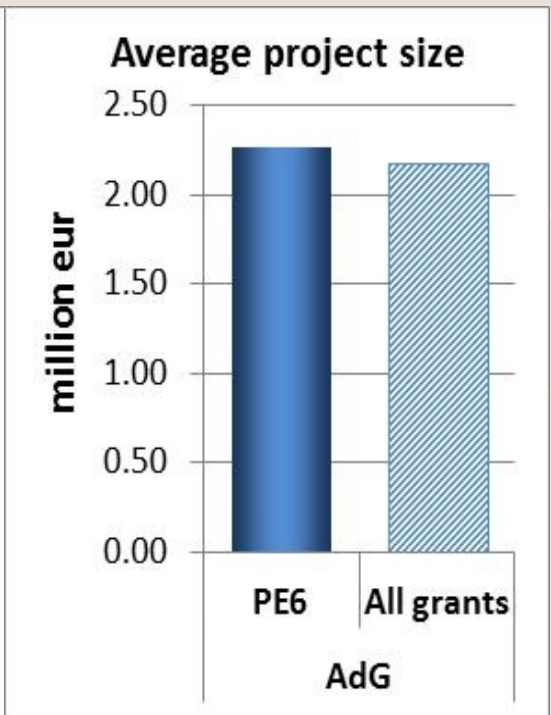
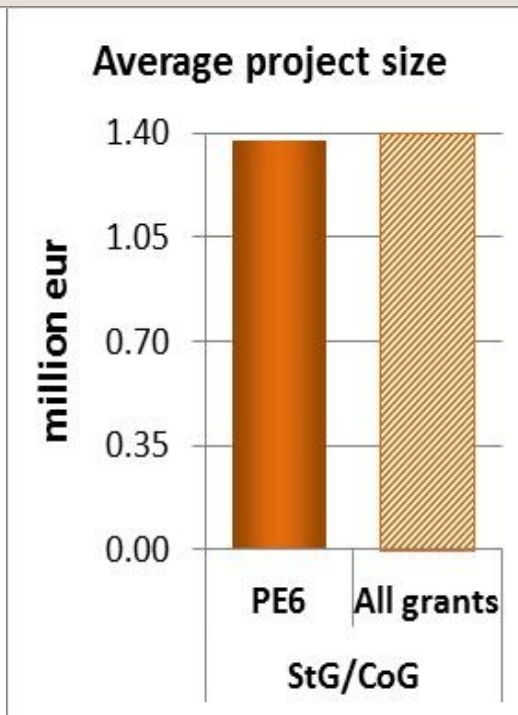
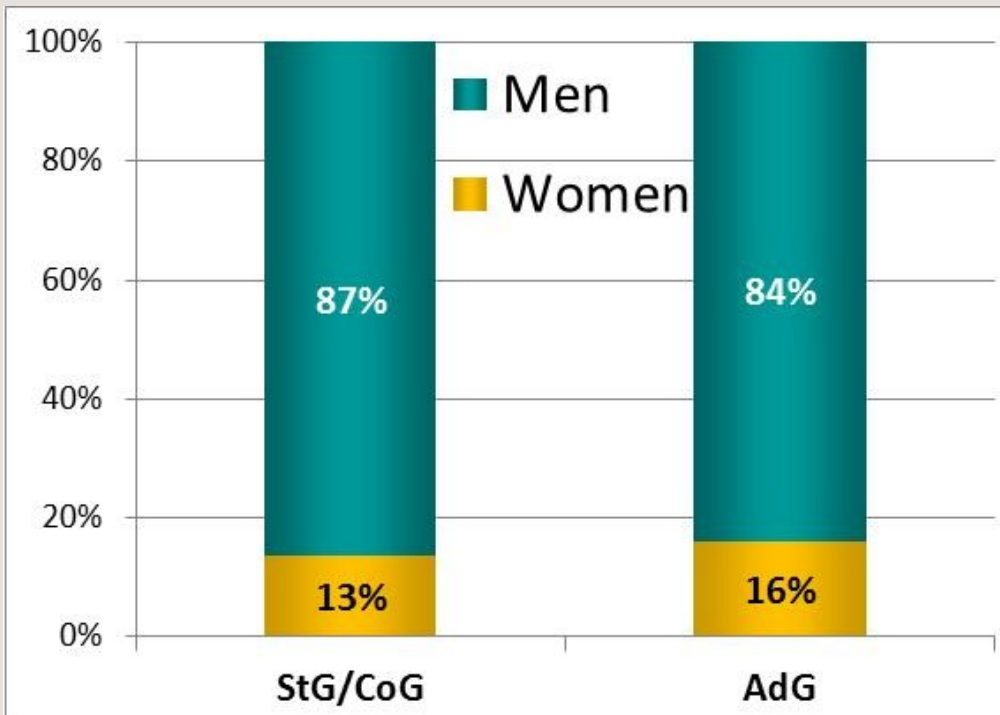
# Total Grants in Panel "Computer Science and Informatics"





# ERC Grants in "Computer Science and Informatics"

## ERC calls 2007-2013

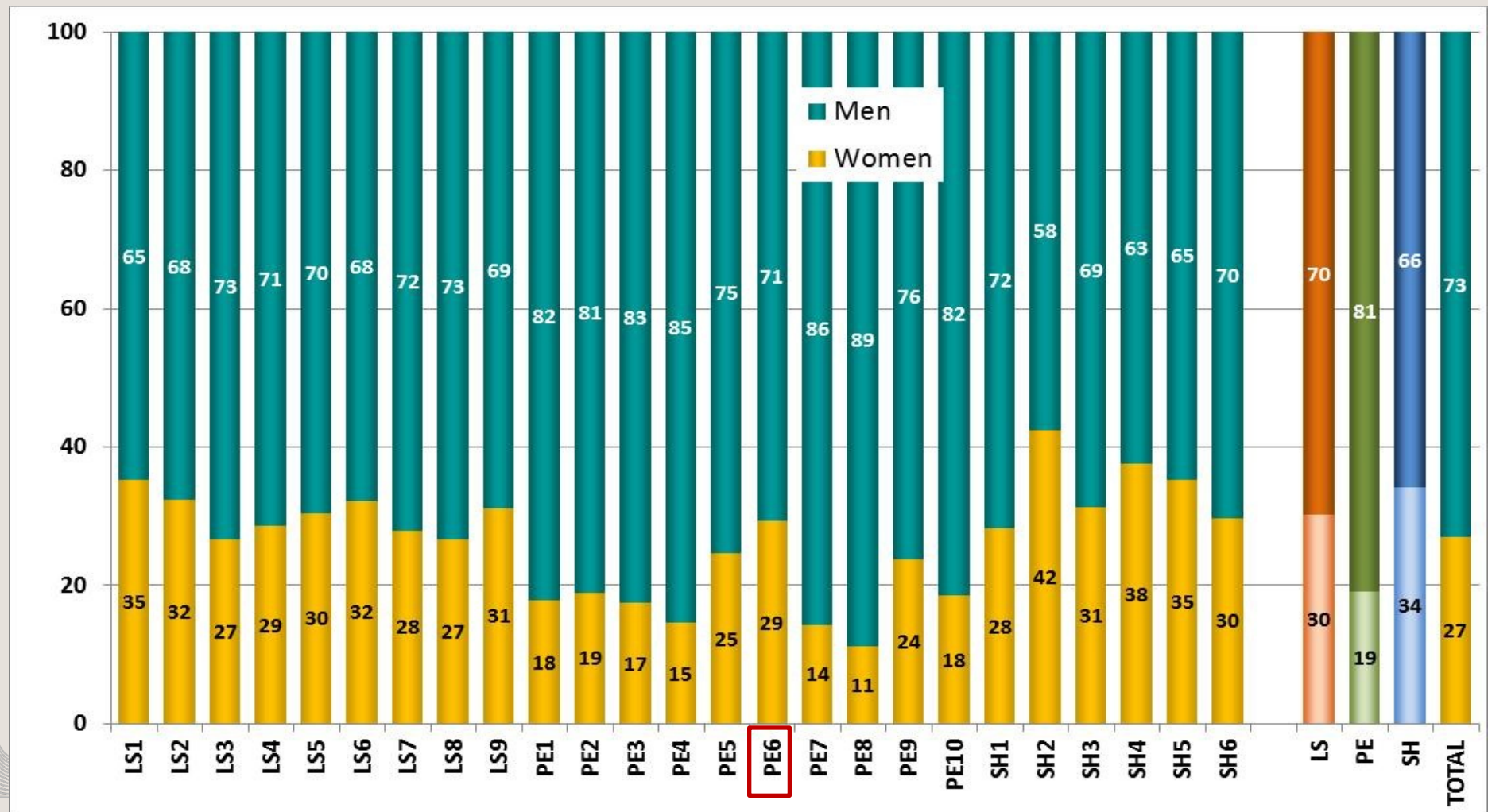


# Panel Members in "Computer Science and Informatics"

ERC calls 2008-2013 (without StG2007)

➤ Panel members from 22 countries in PE6 (EU, Switzerland, Israel, Turkey, Canada, USA)

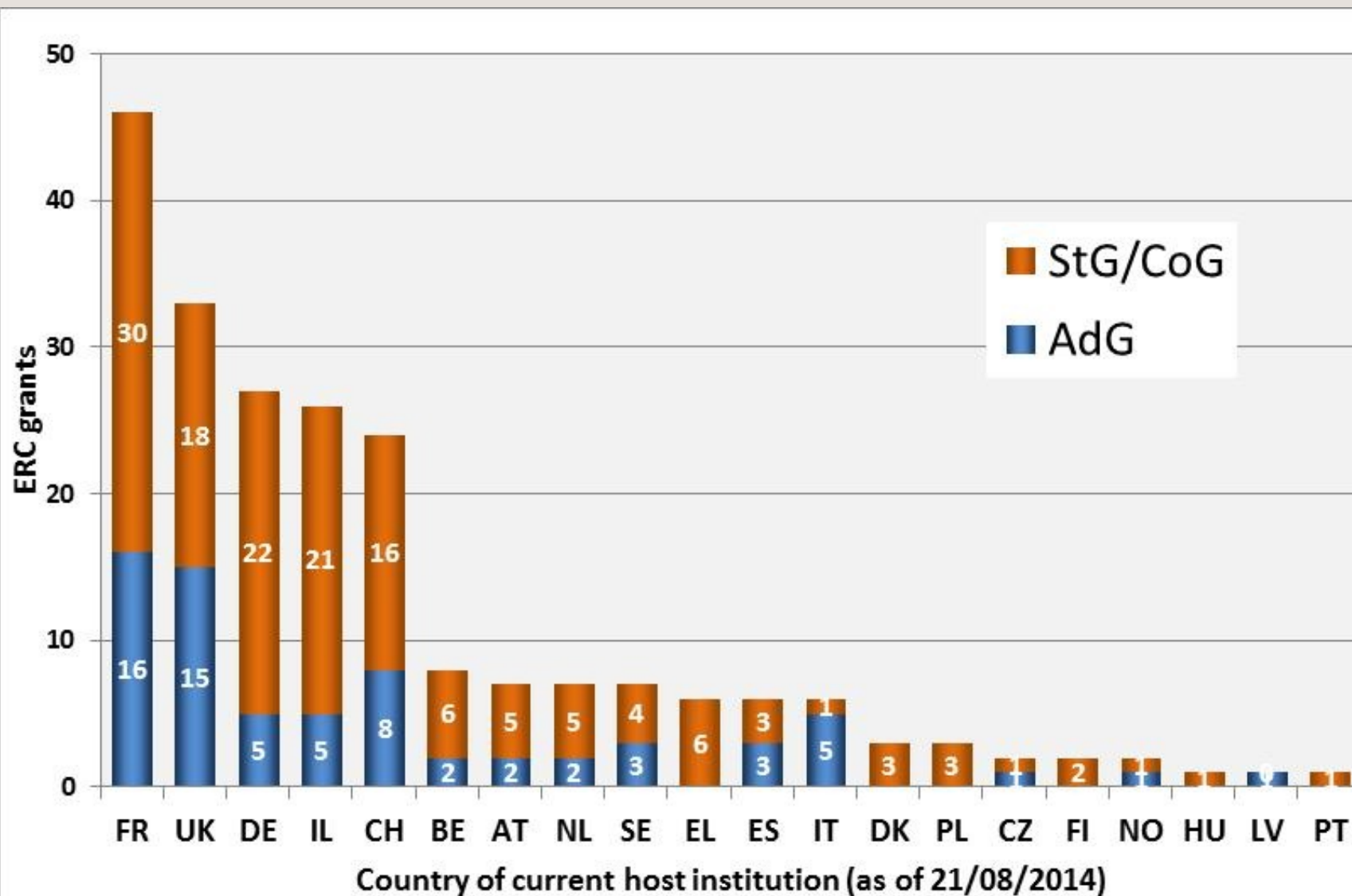
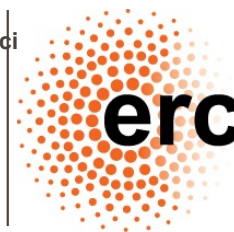
Participation of women over average



# "Computer Science and Informatics" Projects by Country of Host Institution

ERC calls 2007-2013

European Research Council



# Top Host Institutions in Panel "Computer Science and Informatics"

- Currently 94 institutions host at least one "Computer Science and Informatics" grant

Country	Host Institution	Total	StG	AdG
FR	National Institute for Research in Computer Science and Automatic Control	25	15	10
CH	Swiss Federal Institute of Technology Lausanne (EPFL)	12	7	5
FR	National Centre for Scientific Research (CNRS)	10	9	1
UK	University of Oxford	9	2	7
IL	Technion - Israel Institute of Technology	8	7	1
CH	Swiss Federal Institute of Technology Zurich (ETH Zurich)	7	5	2
AT	Institute of Science and Technology Austria	5	4	1
UK	University of Edinburgh	5	4	1
IL	Bar Ilan University	5	4	1
UK	University of Cambridge	4	3	1
UK	University of Bristol	4	2	2
IL	Tel Aviv University	4	2	2
IL	Weizmann Institute	4	3	1
DE	Technical University of Munich	4	3	1



Country	Higher-Education Institution	No	StG/CoG	AdG	Total	LS	PE	SH
UK	University of Oxford	1	64	57	121	37	51	33
UK	University of Cambridge	2	69	49	118	40	57	21
UK	University College London	3	55	30	85	34	18	33
CH	Swiss Federal Institute of Technology Zurich (ETH Zurich)	4	35	46	81	25	53	3
CH	Swiss Federal Institute of Technology Lausanne (EPFL)	5	44	36	80	23	55	2
IL	Weizmann Institute	6	51	28	79	45	33	1
IL	Hebrew University of Jerusalem	7	44	30	74	34	26	14
UK	Imperial College	8	34	27	61	23	38	
BE	University of Leuven	9	30	15	45	12	23	10
UK	University of Edinburgh	10	23	21	44	10	21	13
UK	University of Bristol	11	18	21	39	8	25	6
DE	University of Munich (LMU)	12	14	24	38	16	16	6
NL	University of Amsterdam	12	21	17	38	3	11	24
NL	Radboud University Nijmegen	13	24	12	36	14	11	11
NL	Utrecht University	14	22	13	35	8	17	10
NL	Leiden University	15	19	15	34	1	17	16
IL	Technion - Israel Institute of Technology	16	25	8	33	9	23	1
CH	University of Zurich	16	18	15	33	21	5	7
NL	Free University and Medical Center Amsterdam (VU-VUmc)	17	20	12	32	9	8	15
UK	King's College London	18	22	9	31	12	5	14
IL	Tel Aviv University	18	17	14	31	11	17	3
CH	University of Geneva	18	14	17	31	19	9	3
FI	University of Helsinki	19	16	14	30	21	7	2
SE	Karolinska Institute	19	18	12	30	28		2
DK	University of Copenhagen	19	19	11	30	11	12	7
Country	Research Organisation	No	StG	AdG	Total	LS	PE	SH
FR	National Centre for Scientific Research (CNRS)	1	143	66	209	59	119	31
DE	Max Planck Society	2	66	45	111	59	45	7
FR	National Institute of Health and Medical Research (Inserm)	3	39	18	57	54	1	2
FR	French Alternative Energies and Atomic Energy Commission	4	34	9	43	7	35	1
ES	Spanish National Research Council (CSIC)	5	24	15	39	14	20	5
FR	National Institute for Research in Computer Science and Automatic Control (INRIA)	6	19	12	31		31	

**Top European Institutions Hosting at least 30 ERC Grantees by Funding Schemes**

StG/CoG 2007-2013  
AdG 2008-2013

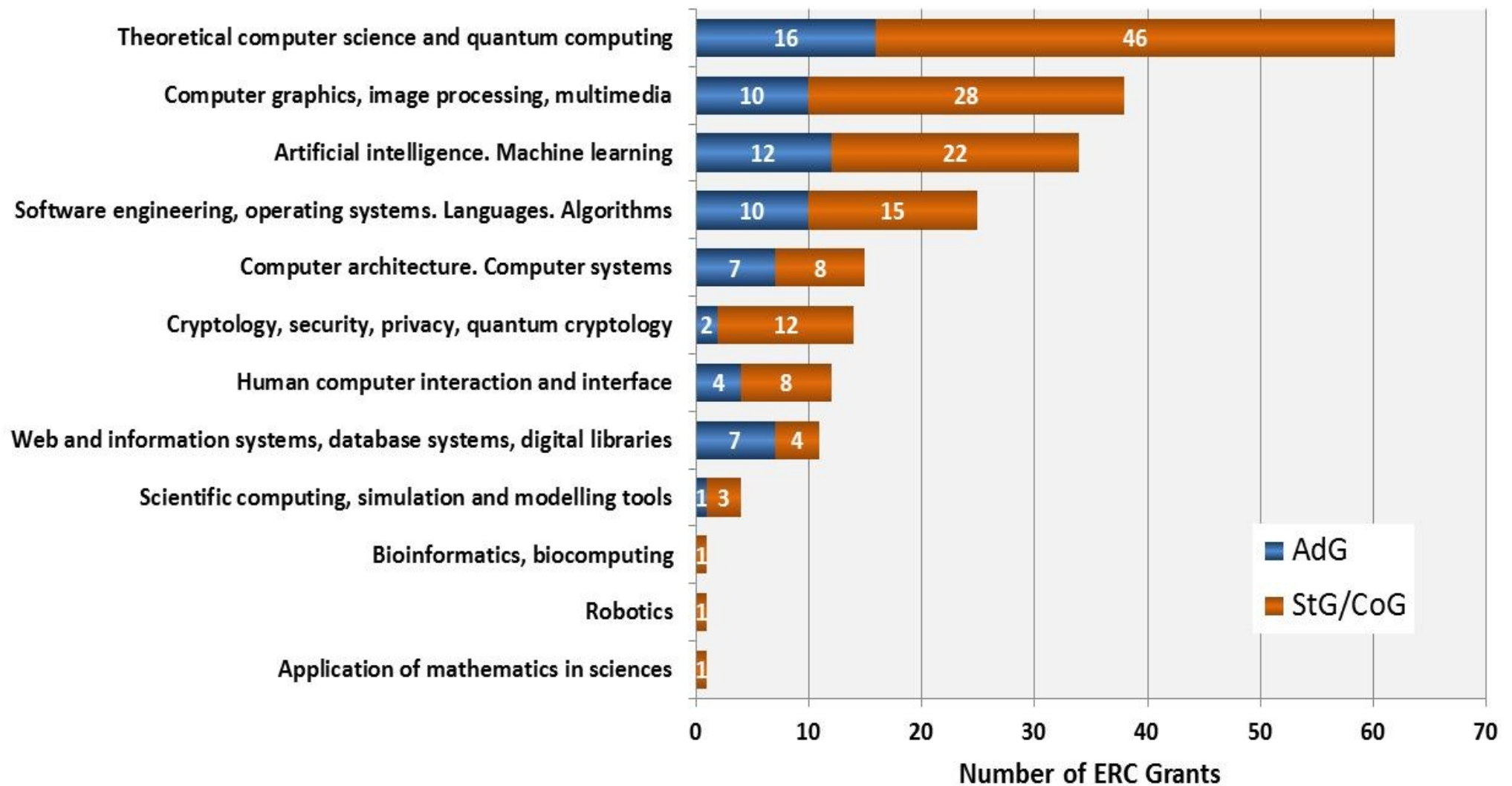
*First legal signatories of the grant agreement*

Data as of 21/08/2014

# Topics in Panel "Computer Science and Informatics"

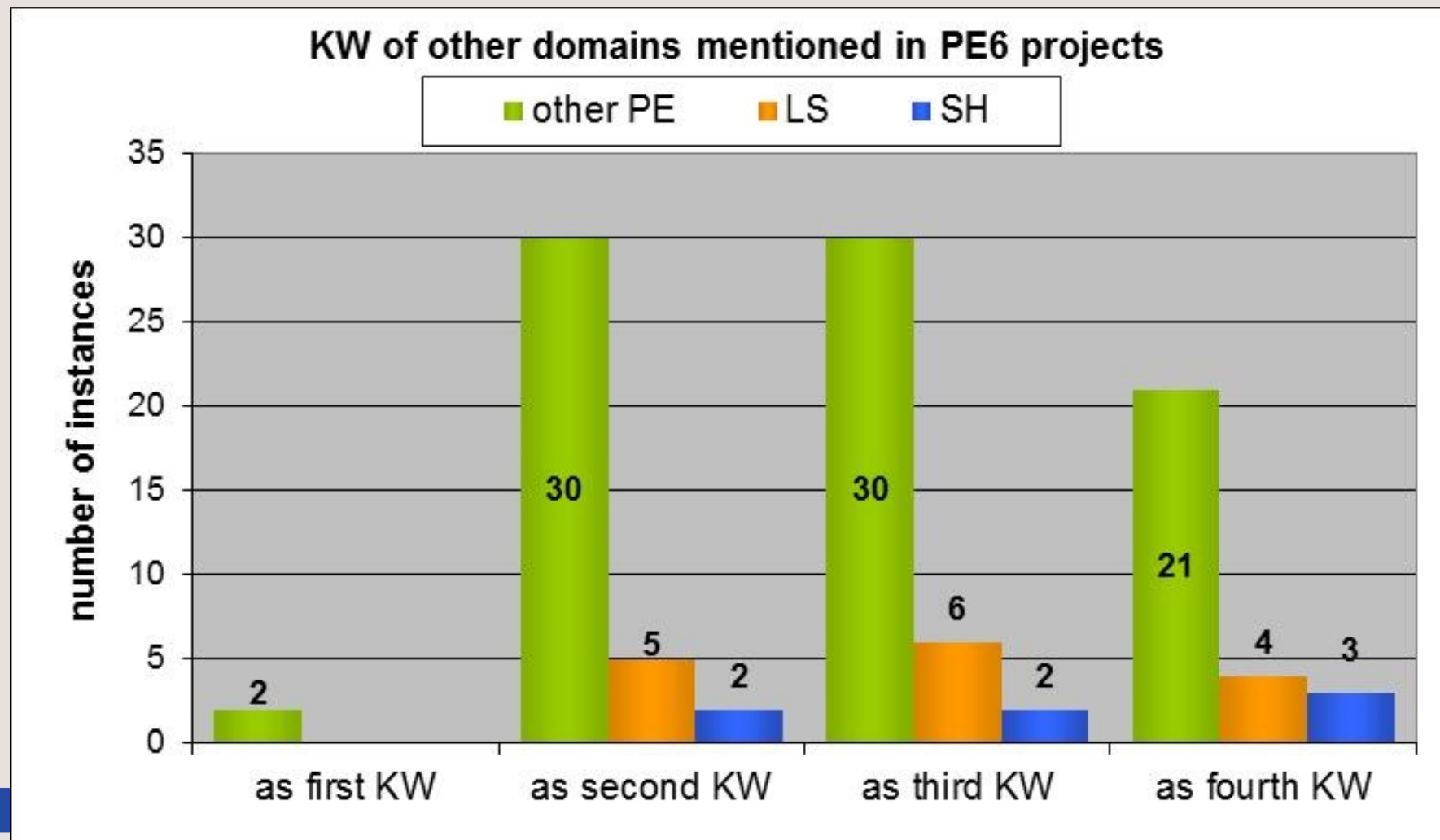
ERC calls 2007-2013

PE6 topics based on the first project keyword



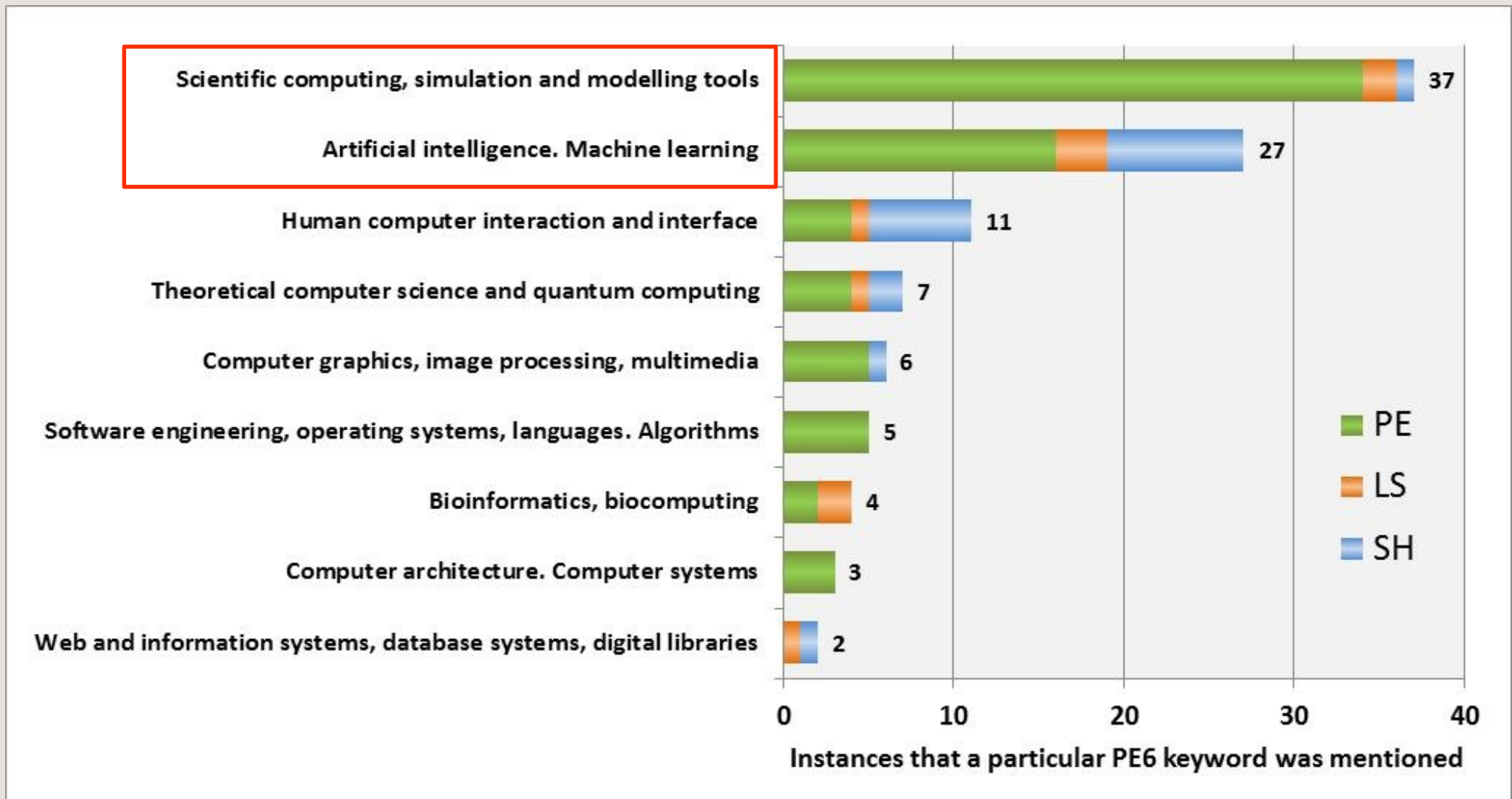
# PE6 Projects are Relevant for Other PE Topics

- Keywords of other panels appear 105 times in 62 PE6 projects (28% of PE6 grants)
- Most references are to PE1 (mathematics) and PE7 (systems & communication) keywords



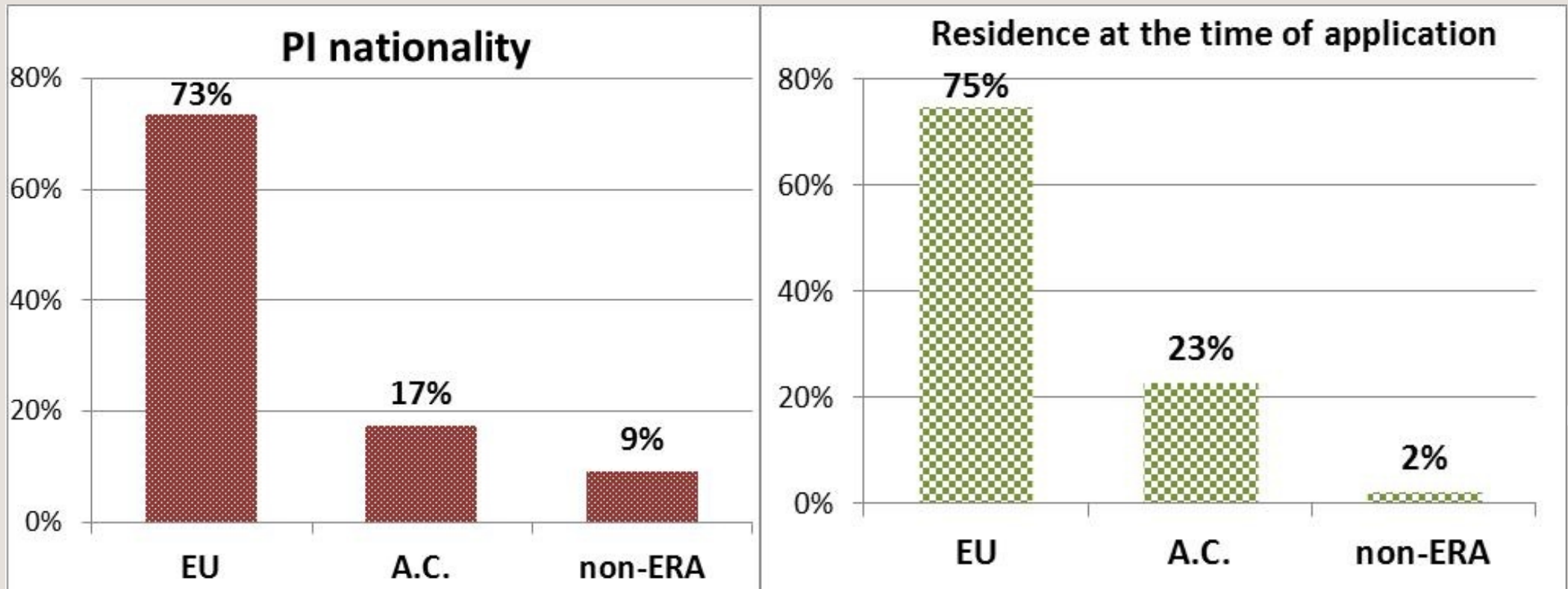
# High Number of Projects Funded in Other Areas have a Computer Science and Informatics Component

- PE6 keywords appear in more than 90 projects from other panels



# International Participation

ERC calls 2007-2013



- Non-ERA grantees are mainly American and Indian nationals
- 76% of the grantees from FP7 Associated Countries are from Israel



# The European Research Council

## Future Opportunities



# Work Programme 2015

- Three ERC grant calls under Work Programme 2015:
  - **Starting**
  - **Consolidator**
  - **Advanced Grants**
- No pre-allocated budget quotas per domain: demand-based allocation of budget per panel
- Restrictions on applications apply to the 2015 calls based on the outcome of the evaluation of the 2014 calls
- Proof of Concept Grants continue

# Forthcoming ERC calls

ERC calls	Budget	Call Publication	Submission Deadline(s)
<b>Advanced Grants</b> ERC-2014-AdG	450 M€	17 June 2014	21 October 2014
<b>Starting Grants</b> ERC-2015-StG	430 M€	7 October 2014	3 February 2015
<b>Consolidator Grants</b> ERC-2015-CoG	585 M€	13 November 2014	12 March 2015
<b>Advanced Grants</b> ERC-2015-AdG	630 M€	10 February 2015	2 June 2015
<b>Proof of Concept</b> ERC-2014-PoC ERC-2015-PoC	15 M€* 20 M€*	11 December 2013 7 November 2014	DL2: 1 Oct. 2014 DL1: 5 Feb. 2015

\*) full-year budget



始于足下

Let's step out of our "comfort zone"

and enjoy the rubbing-feet fit route.

Especially so for New Europe !!!

It is a journey worth taking.

各位来宾：

请您脱鞋后

漫步摩足健身道

A thousand-li walking  
begins with the first step

Dear guests:

Please take off your shoes and stroll  
on the rubbing-feet fit route.

千里之行

The European Research Council



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**Thank you for listening !**

