

# Large Infrastructures: point of view of panel member

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RNDr. Martin Pumera, PhD



Key Foreign Researcher

Director of the Center for  
Advanced Functional Nanorobots

publications: >500

citations: >20,000

h-index: 70



## Positions held

**Associate Professor**  
Nanyang Technological  
University, Singapore

**Group Leader**  
National Institute for Materials Science  
Japan

**Senior Scientist**  
Autonomous University of  
Barcelona, Spain

**Researcher**  
New Mexico State University, USA

## Awards & Recognition:

2017 Highly Cited Researcher

Top Scientist 2012 (MRS)

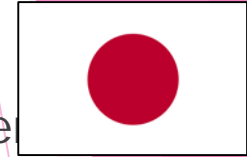
Teaching Excellence Award (NTU)

ERC-StG 2009

Marie Curie IEF 2003, Marie Curie OIF 2005

AvH fellowship 2005

Editor-in-Chief: Appl. Mater. Today (Elsevier)



# Content

- ▶ Why to invest in research?
- ▶ Where do YOU want to be?

# Who pays for the large research infrastructures?



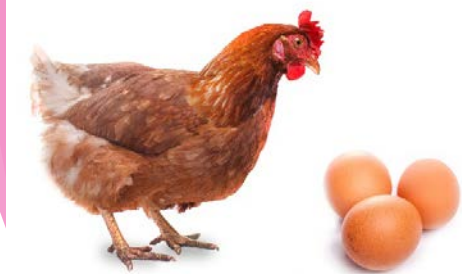


# We are funding R&D because....(?)

- ▶ ...it leads to better medical care....
- ▶ ...it helps to provide better environment...
- ▶ ...it helps with energy crisis...
- ▶ ....it fulfils basic human need for discovery....
- ▶ .....
- ▶ ....**IT LEADS TO ECONOMIC GROWTH!**



# Countries are developed and therefore they can afford luxury of basic research or ....



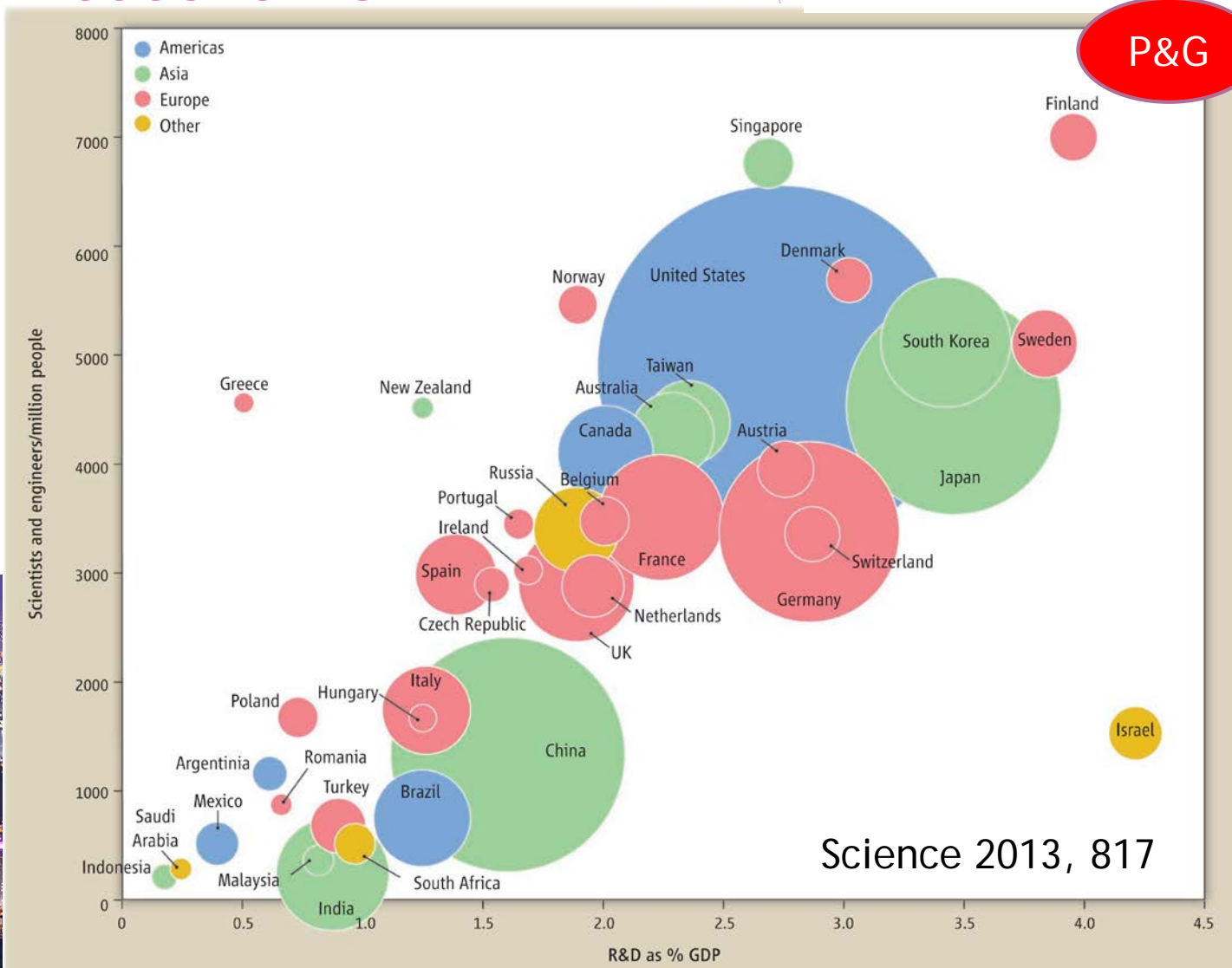
- ▶ Developed countries spend most on the research. Is it because they are rich or they are rich because they spend money on the basic reserch.
- ▶ Return of the investment 20-40%/year.



J. Korea 1955



J. Korea 2015

































# Where do YOU want to be? ....and where WE want you to be....






The RI is of **excellent quality compared to the leading actors worldwide** with respect to its uniqueness, originality, importance and impact on the user community. The RI is highly relevant for the future development of research and innovation environment of the Czech Republic as well as inevitable for **strengthening the competitiveness of the Czech Republic.**

The RI's quality and potential enables it to contribute to provision of services in the given sphere. However, the RI has **only minor user community, limited importance** and thus also **limited relevance for the future development** of research and innovation environment of the Czech Republic.



# Czech Universities in the World

1	 Massachusetts Institute of Technology (MIT)	
2	 Stanford University	
3	 Harvard University	
4	 California Institute of Technology (Caltech)	
5	 University of Cambridge	
6	 University of Oxford	
7	 UCL (University College London)	
8	 Imperial College London	
9	 University of Chicago	
10	 ETH Zurich - Swiss Federal Institute of Technology	
11	 Nanyang Technological University, Singapore (NTU)	
12	 Ecole Polytechnique Fédérale de Lausanne (EPFL)	
13	 Princeton University	
14	 Cornell University	
15	 National University of Singapore (NUS)	

314	 Charles University
491-500	 Czech Technical University in Prague
551-600	 Masaryk University
601-650	 Brno University of Technology
701-750	 Palacký University in Olomouc

401-500 Charles University in Prague  
 Czech Republic  
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601-800 University of Chemistry and Technology, Prague  
 Czech Republic  
[Explore](#)



601-800 Czech Technical University in Prague  
 Czech Republic  
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Indicator	Weighting
Academic peer review	• 40%
Faculty/Student ratio	• 20%
Citations per faculty	• 20%
Employer reputation	• 10%
International student ratio	• 5%
International staff ratio	• 5%



# Vision of other countries

- ▶ India - in 20 years 10 Universities in the first 100
- ▶ S. Korea - UNIST - in 2025 in top 25 Universities

97.	University of Würzburg	72	41.11	41.11
98.	Weizmann Institute of Science (WIS)	60	40.62	40.62
99.	Catholic University of Leuven (KU Leuven)	81	40.26	40.26
100.	Southwest University (SWU)	45	40	40
101.	Southeast University (SEU)	58	39.88	39.88
102.	University of Göttingen	79	39.77	39.77
103.	Rice University	73	39.40	39.40
104.	Tianjin University (TJU)	186	38.45	38.45
105.	Monash University	100	38.38	38.38



# Wish for 2027

- ▶ Two universities in top 50

**The best is yet to come!**