

# In Search of Excellence

## - the International Competition for Talents and Innovation

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of European Universities of Technology  
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# Innovation

How to stimulate and “control” it?

# The Global Competitiveness Report 2010–2011

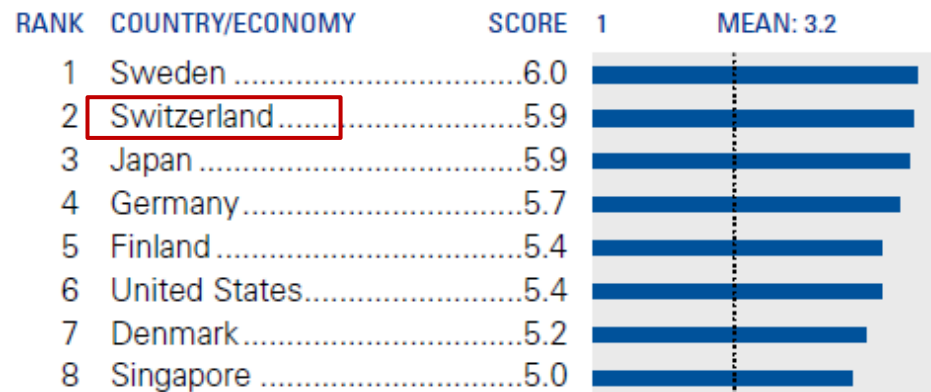
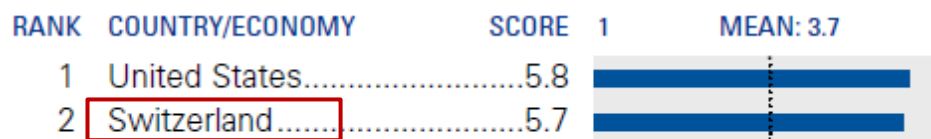
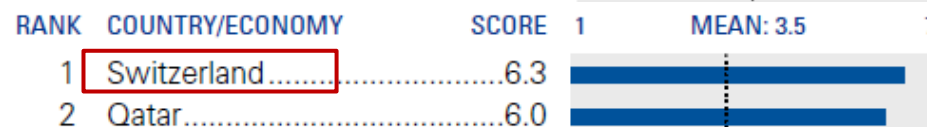
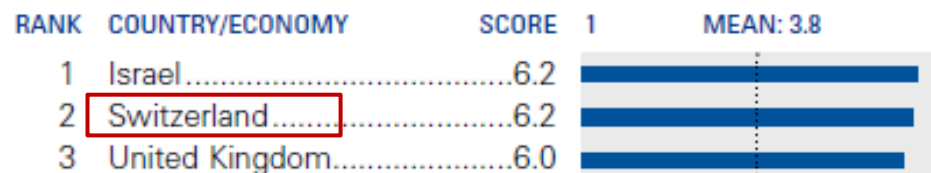
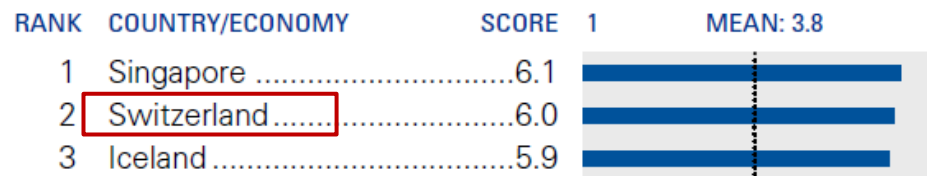
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Country/Economy	GCI 2010–2011		GCI 2010– 2011 rank among 2009 countries	GCI 2009–2010 rank *	2000
	Rank	Score			
Switzerland	1	5.63	1	1	Finland 1
Sweden	2	5.56	2	4	United States 2
Singapore	3	5.48	3	3	Germany 3
United States	4	5.43	4	2	Netherlands 4
Germany	5	5.39	5	7	Switzerland 5
Japan	6	5.37	6	8	Denmark 6
Finland	7	5.37	7	6	Sweden 7
Netherlands	8	5.33	8	10	United Kingdom 8
Denmark	9	5.32	9	5	Singapore 9
Canada	10	5.30	10	9	Australia 10

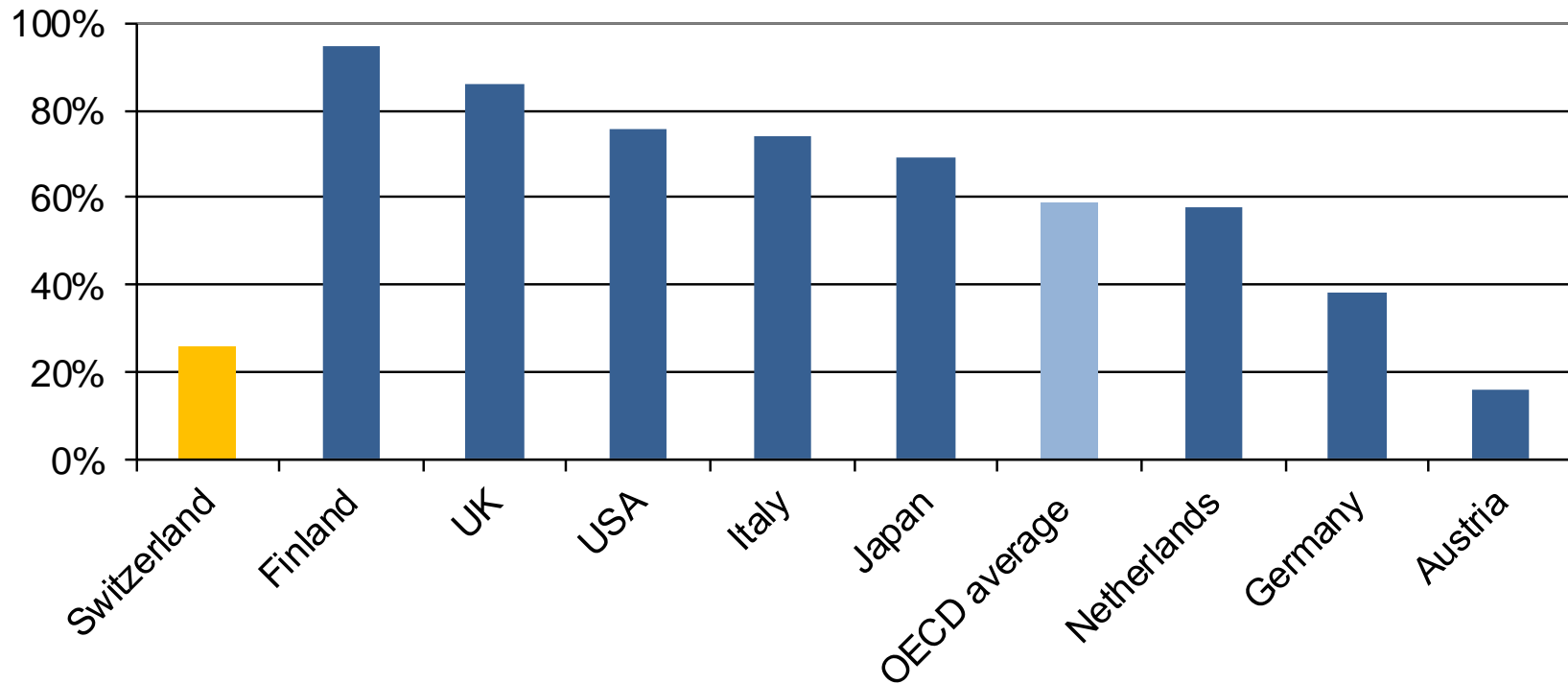
# The Global Competitiveness Report 2010–2011

© 2010 World Economic Forum

- Quality of the educational system **2**
- Quality of scientific research institutions **2**
- Brain Drain / Brain Gain **1**
- University-industry collaboration in R&D **2**
- Company Spending on R&D **2**



# Rate of Age-Group Qualifying for Academic Studies



# Switzerland's Innovation Strategy

We don't have a specific innovation strategy  
and no direct funding for R&D activities at companies!

But we have a culture

... where innovation happens

... where people learn and do what they do best

... where excellence and autonomy exists on all levels

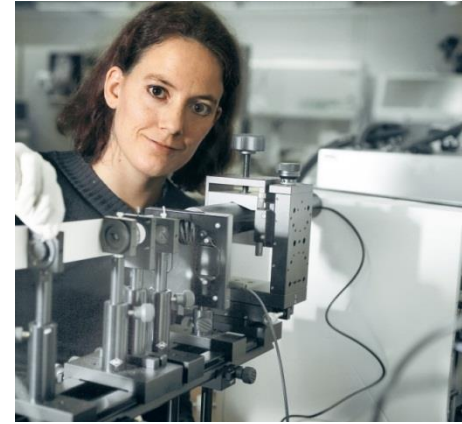
... where those people decide, that should decide

However ...

... innovation is endangered by increasing regulations

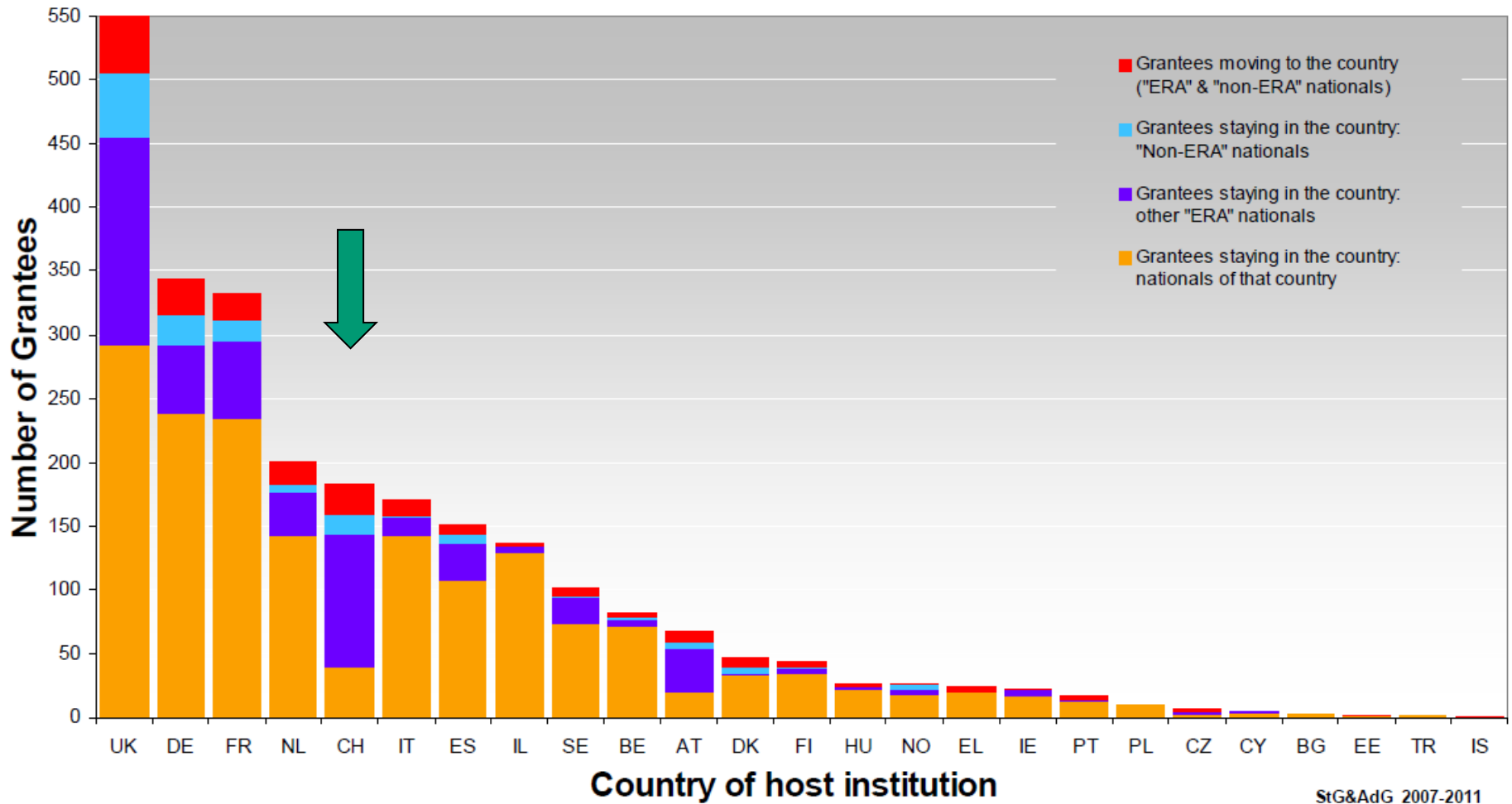
# ETH's Pathway to Excellence and Innovation

- **get the best talents**
  - the most gifted students
  - the most creative engineers
  - the most brilliant scientists
- ***“The university is the professors”*** (I.Rabi)
- **give them autonomy and academic freedom**
  - allowing them to follow up on their visions and crazy ideas
  - creating the required “enabling culture”
  - build on trust instead of controlling
- **team up with industry and society**
  - to address the big societal challenges and accelerate technology transfer



# ERC Grants – a Measure for Excellence

ERC Starting grant calls 2007 – 2011  
ERC Advanced grant calls 2007 – 2011





# Stimulating Innovation and Entrepreneurship



**Student Projects**  
(eg. Focus-Projects)

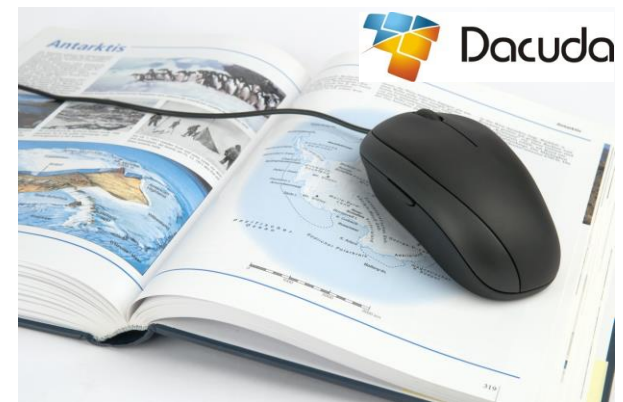


*taenia tec*



**Jan Lukas Giesbrecht**  
PlyEx: the ultra-high performance  
monolithic composite

**Pioneer Fellowships**  
Since 2010

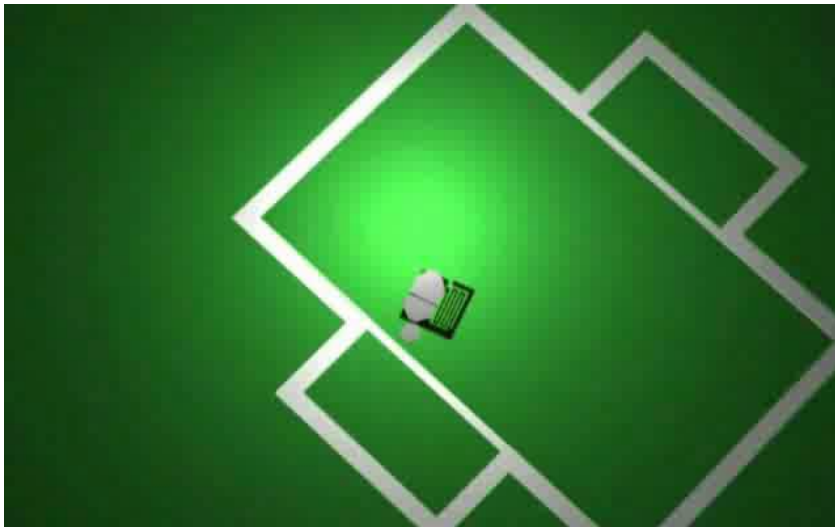


**Spin-off Support**

# Focus Project - Getting students excited about I&E

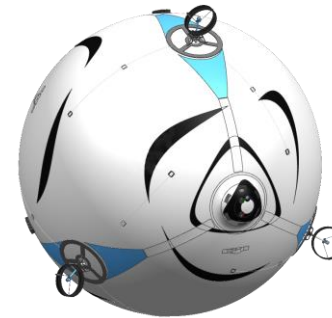
## NanoSoccer

- World Champion Built by Student



Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich

Prof. Brad Nelson, ETH

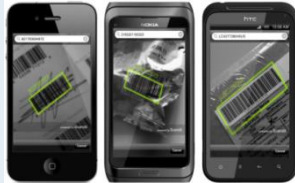


**Skye**

- the Ultimate Unmanned Airship



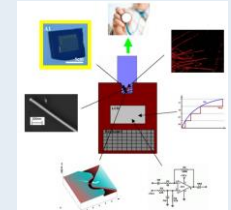
# Pioneer Fellowships – from discovery to entrepreneurship



**Robert Adelman**

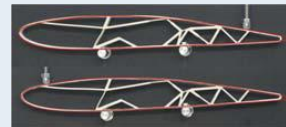
BaToo: Mobile phone-based  
barcode scanning

- Since 2010
- 150 kFr. for 18 month

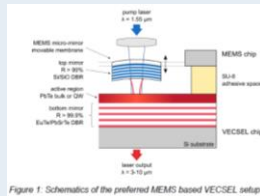


**Jörg Albuschies**

Low-cost medical diagnosis device  
based on disposable silicon  
nanowire technology

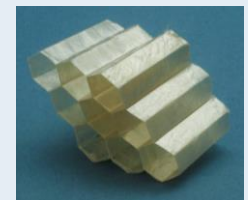


**Alexander Hasser**  
Monolithic Morphing Airfoil



**Ferdinand Felder &  
Mohamed Rahim**

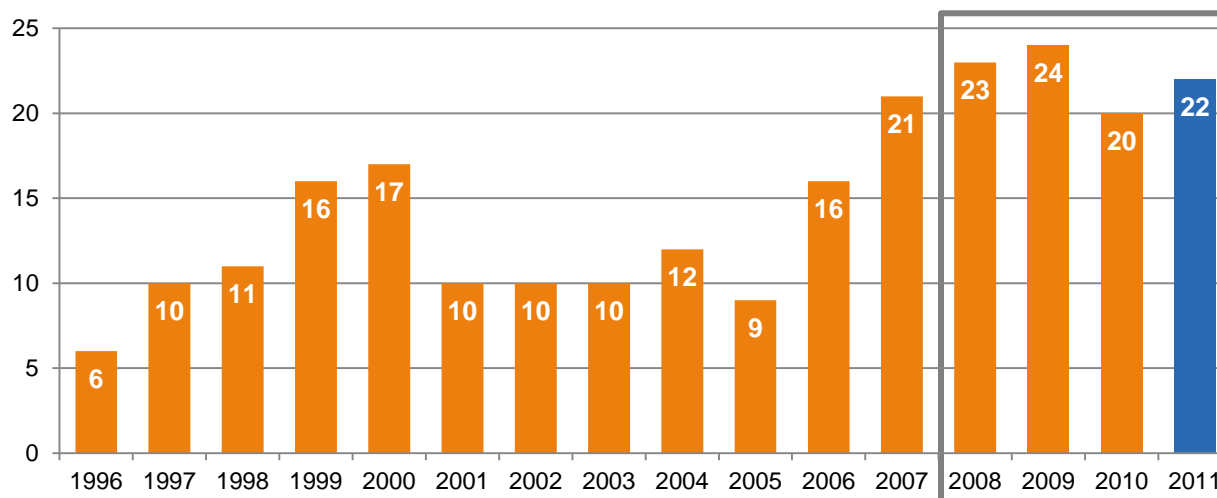
Compact mid-infrared tunable  
VECSEL using MEMS micro-mirror



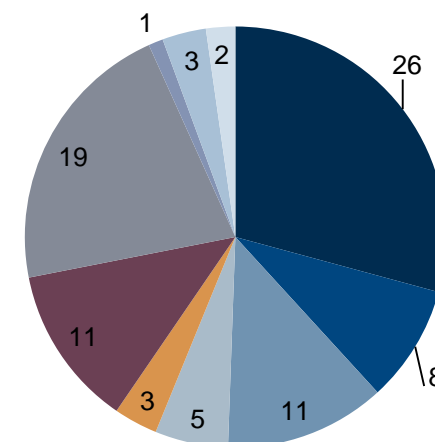
**Jan Lukas Giesbrecht**

PlyEx: the ultra-high performance  
monolithic composite

# 237 spin-off companies founded at ETH Zurich between 1996 and 2011



Total over 4 yrs



- 90% survival rate after 5 years
- Creation of thousands of new jobs

**Swiss  
Technology  
Award  
2010**



«SEED»: MALCISBO  
Bruno Oesch (links) und Irene Schiller  
von Malcisbo.

Zuckersüss gegen  
Durchfall impfen



«START-UP»: OPTOTUNE  
Manuel Aschwanden (links) und Mark  
Blum von Optotune.

Fokussieren wie das  
menschliche Auge



«MATURITY»: HEIQ MATERIALS  
Carlo Centonze von HeIQ Materials mit  
einer Vliesmatte.

Vliesmatten gegen  
Rohölkatastrophen

- ICT
- Biotechnology and Pharma
- Electrical Eng. and Electronics
- Medical Devices
- Micro- and Nanotechnology
- Mechanical Eng. and Aerospace
- others
- Advanced Materials
- Chemical Processes
- Sensors and Analytics

# Strategic Partnerships (companies)

Energy, Environment  
and Sustainability



Science and  
Technology for Health



Information and  
Complexity



Materials, Technol  
and Proce



around 200 Mio CHF in the last four years!



**Entrepreneurial  
Scientists**

**Discoveries**

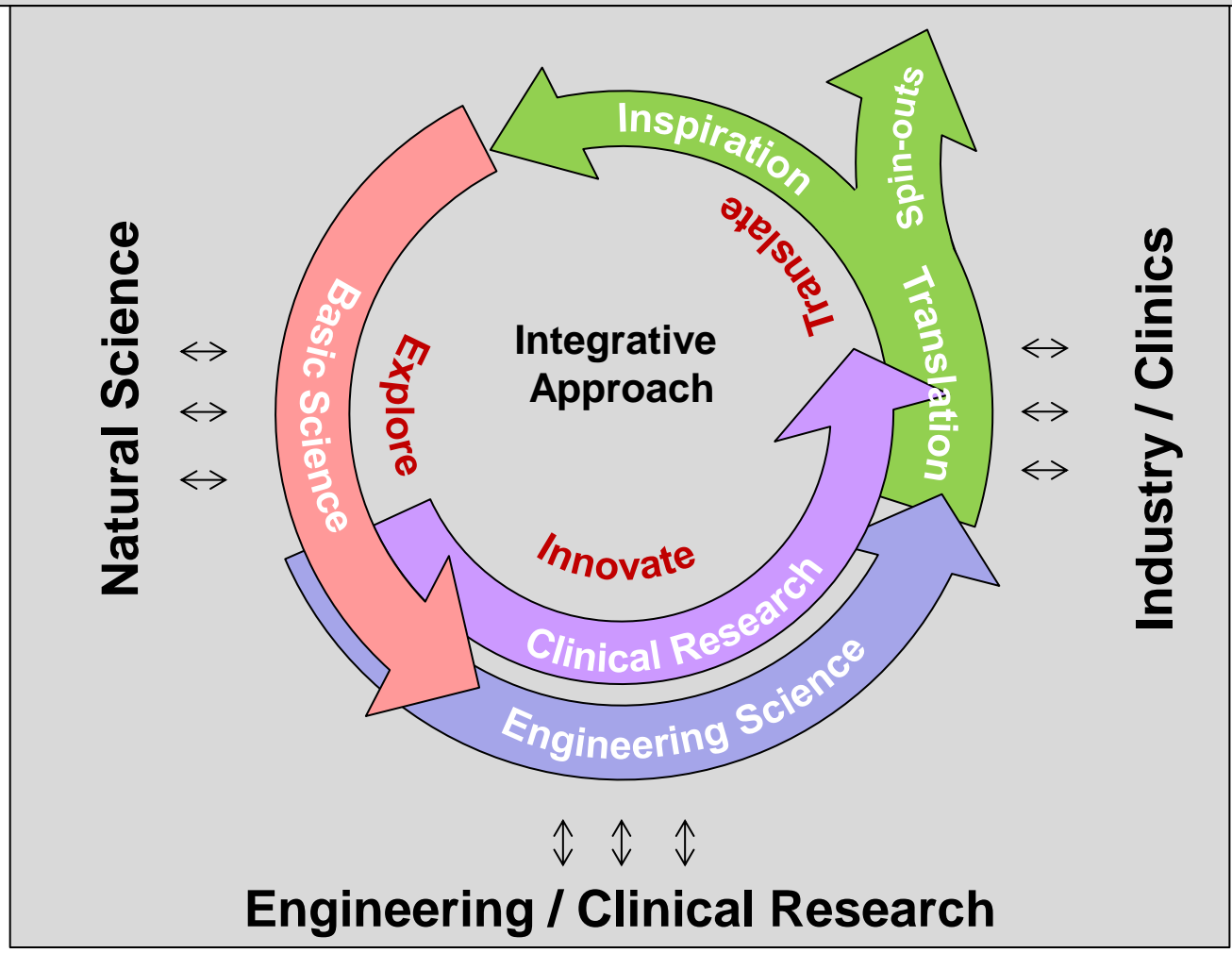
**New Technologies**

**Industry  
Spin-offs**

**ieLab**

an ecosystem for  
discovery, innovation and entrepreneurship

**Innovation requires  
sustainable collaborations**



# Striving for Excellence

## the International Competition for Talents and Innovation

- Build a true European academic market
- Focus on people (e.g. ERC grants, Marie Curie)
- Sustainable long-term funding
- Don't spread the funding
  - few outstanding instead of many mediocre researchers
- Be carefully with big programs (EIT KIC, FET Flagships, ...):
  - Coordination scale poorly with the size of the consortium
  - Interactions happen in the lab and at the coffee machine, and less in meeting rooms
  - Industry is not interested to collaborate with large consortia (control of IP)



# Horizon 2020

... has the ingredients to make a change

## Some Key Drivers

- developing, **attracting** and **retaining research talent**
- improving **access** to the **best infrastructures**
- strategic investments in key technologies  
e.g. advanced manufacturing, micro-electronics
- creating and supporting **innovative SMEs**



## Simplifications

- Single set of simpler and more **coherent participation rules**
- New balance between **trust** and control
- **single flat rate**, and **simplified financial regulations**





## Take-Home Message



- It's about **talents** – quality before quantity
- It's about **trust** and **high autonomy**
- It's about **sustainable** and **solid basic funding**
- It's about **strong partnerships** with industry
- It's about **embracing bottom-up initiatives**
- It's about **impact**, combining **rigor** with **relevance**
- It's about **passion**, **dedication**, **belief** and **perseverance**