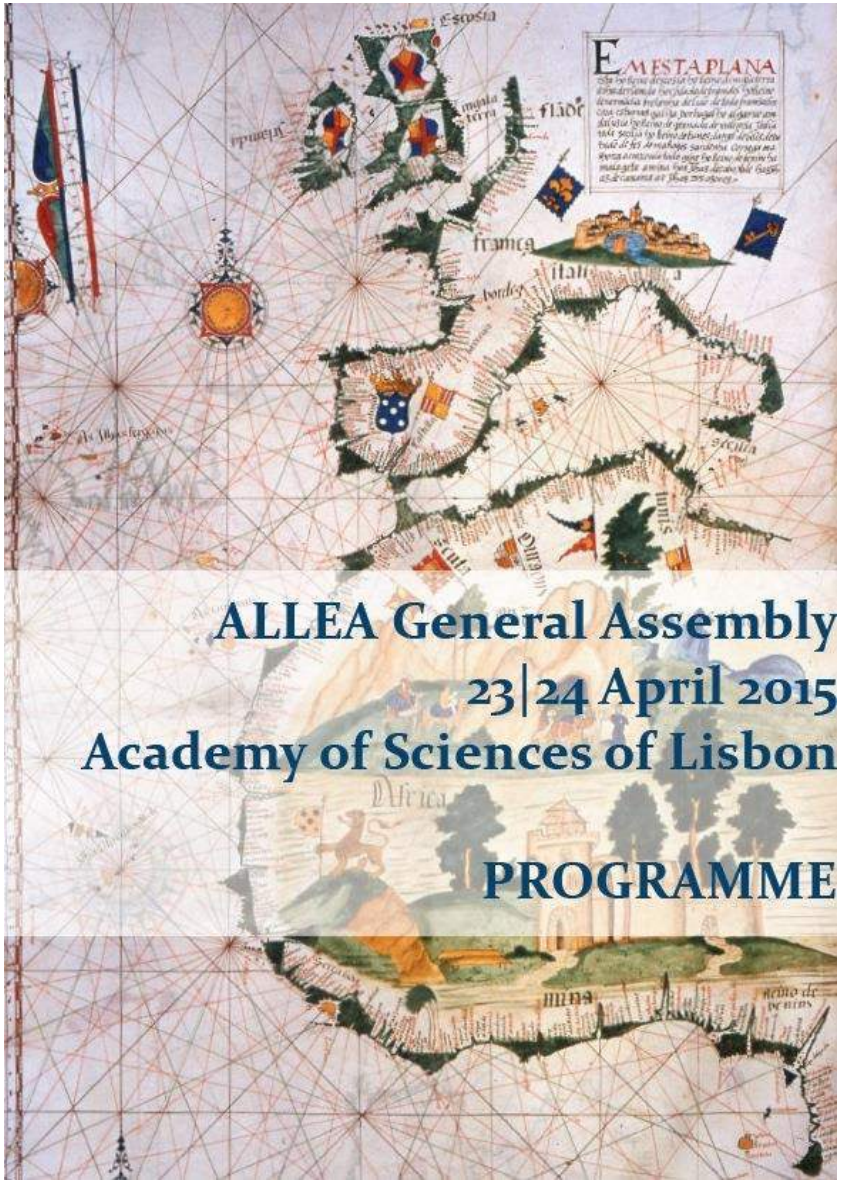
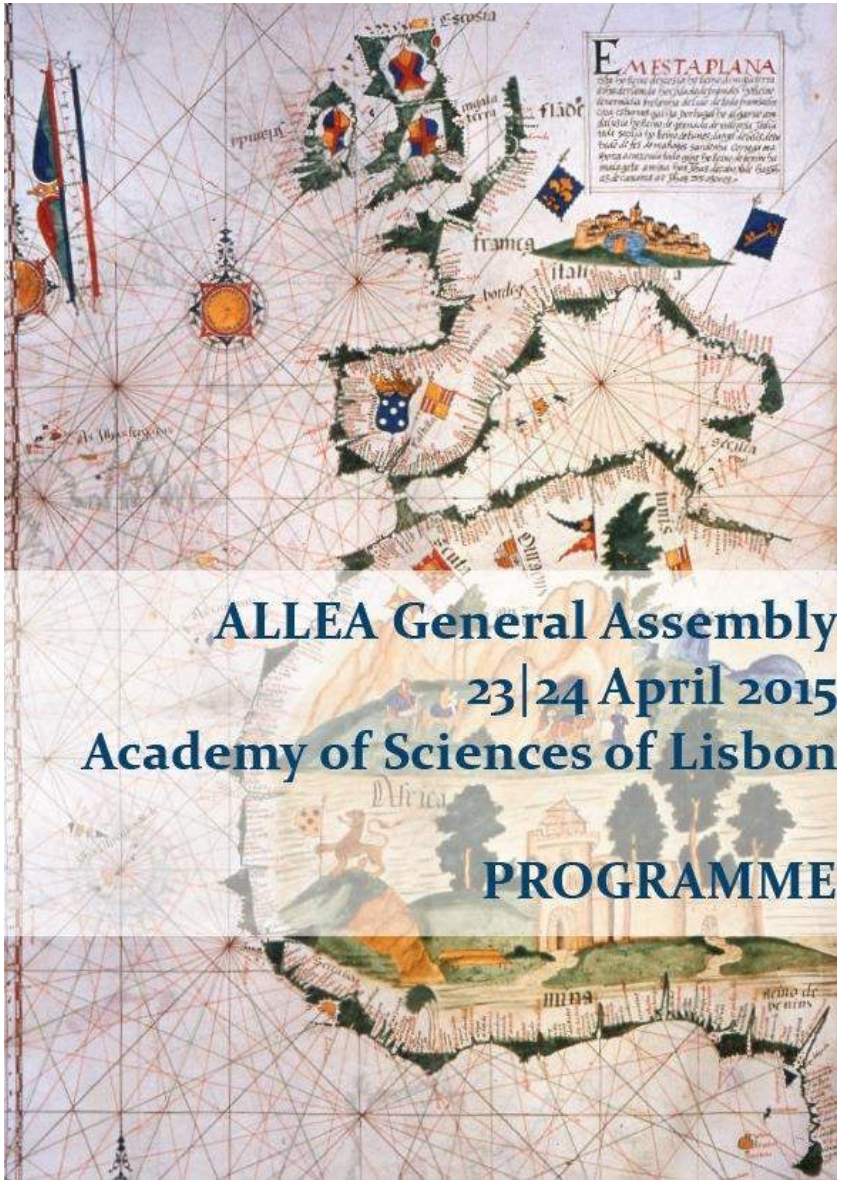


ALLEA
ALL European Academies

Scientific Symposium

Science and Research in Europe - Past, Present and Future

15 Years of Lisbon Agenda



Scientific Symposium

Science and Research in Europe

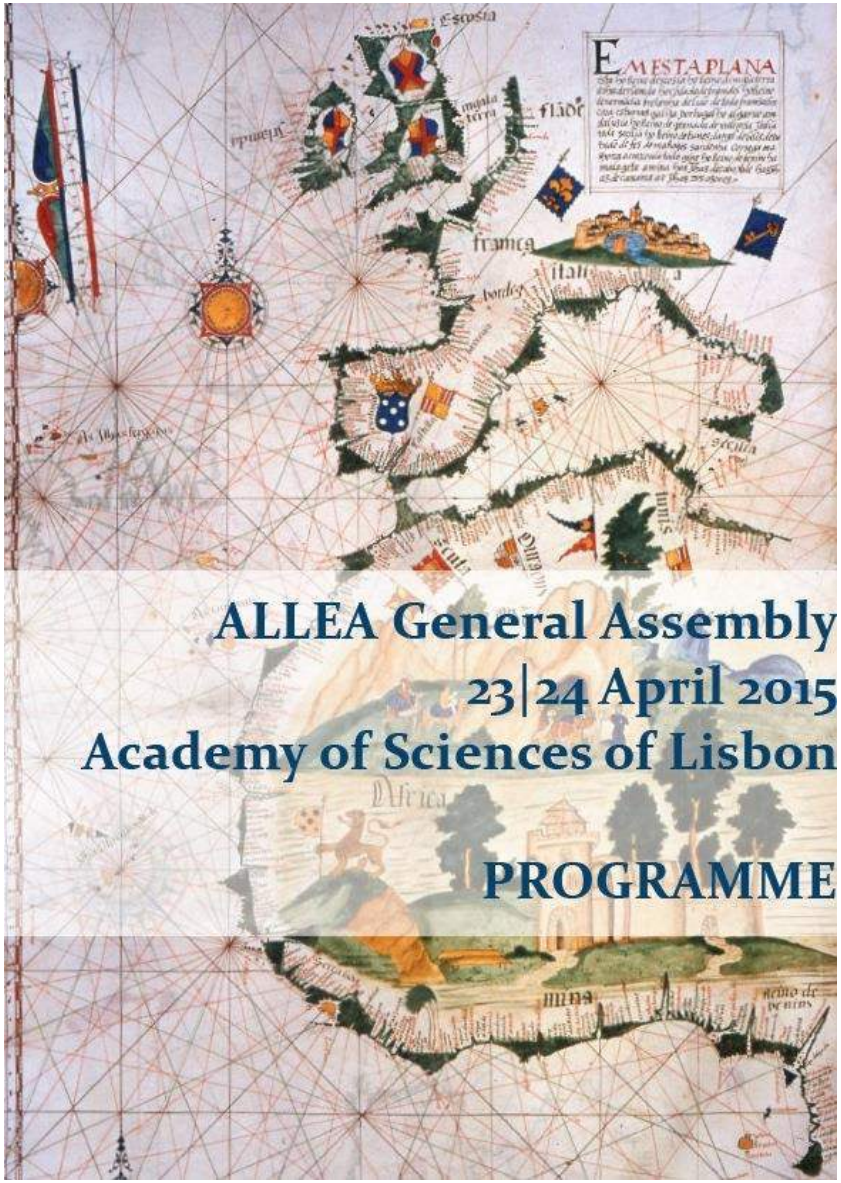
Past, Present and Future: 15 Years of Lisbon Agenda

Opening

Prof. Luís Aires-Barros
President, Academy of Sciences of Lisbon

Prof. Günter Stock
President, All European Academies (ALLEA)

Prof. Leonor Parreira
Secretary of State for Science, Portugal



Scientific Symposium

Science and Research in Europe

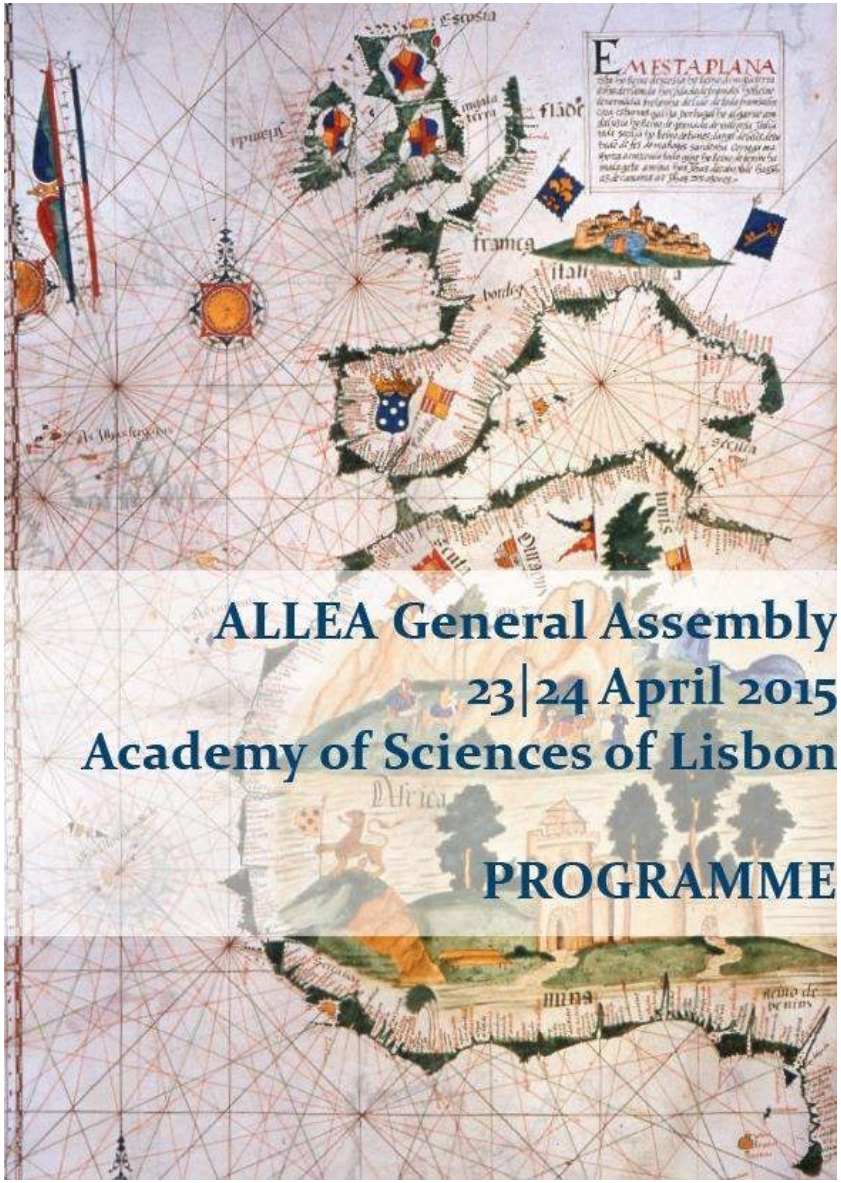
Past, Present and Future: 15 Years of Lisbon Agenda

Keynote Lecture

Science and Research in Europe – Past, Present and Future: 15 Years of Lisbon Agenda

Prof. Maria da Graça Carvalho

Senior Adviser to the European Commissioner for Research, Science and Innovation; former Minister of Science, Innovation and Higher Education, Portugal



Scientific Symposium

Science and Research in Europe

Past, Present and Future: 15 Years of Lisbon Agenda

Symposium Lecture

Pros and Cons of the European Strategies for Science and Research

Prof. José Viriato Soromenho-Marques
Academy of Sciences of Lisbon, University of Lisbon

Pros and Cons of the European Strategies for Science and Research (ERA/Horizon 2020): Putting Emphasis in what Matters.

Viriato Soromenho-Marques
(UL/ASL)

Science and Research in Europe- Past, Present and Future: 15 years of Lisbon Agenda
ASL, ALLEA General Assembly 2015, Lisbon,
23 April 2015

Table of Topics

- Why do we need a Science Policy able to Exercise Critical Reflexivity?
- What are the two key issues deserving more emphasis in the heart of our Science and Research Agenda?
- Conclusions.

1

Why do We need a Science Policy able to Exercise Critical Reflexivity?

Trying to cope with the challenges of our time

"Where most postmodern theorists are critical of grand narratives, general theory and humanity, I remain committed to all of these, but in a new sense (…) my notion of «reflexive modernity» implies that we do not have ENOUGH reason (*Vernunft*)."

- Ulrich Beck, "Politics of Risk Society", *The Politics of Risk Society*, Jane Franklin (ed.), Cambridge, Polity Press/IPPR, 1998, pp. 20.

Paul Crutzen and the «Anthropocene»

- “To assign a more specific date to the onset of the 'anthropocene" seems somewhat arbitrary, but we propose the latter part of the 18th century, although we are aware that alternative proposals can be made (some may even want to include the entire holocene). However, we choose this date because, during the past two centuries, the global effects of human activities have become clearly noticeable.”
- Crutzen, P. J., and E. F. Stoermer (2000). "The 'Anthropocene'". *Global Change Newsletter* **41**: 17–18.

Science is embedded in/with Modern expectations

- Science was created to serve a hopeful and useful truth. Remember F. Bacon in *New Atlantis* (1624):

"The End of our Foundation is the knowledge of Causes, and secret motions of things, and the enlarging of the bounds of Human Empire, to the effecting of all things possible." (71).

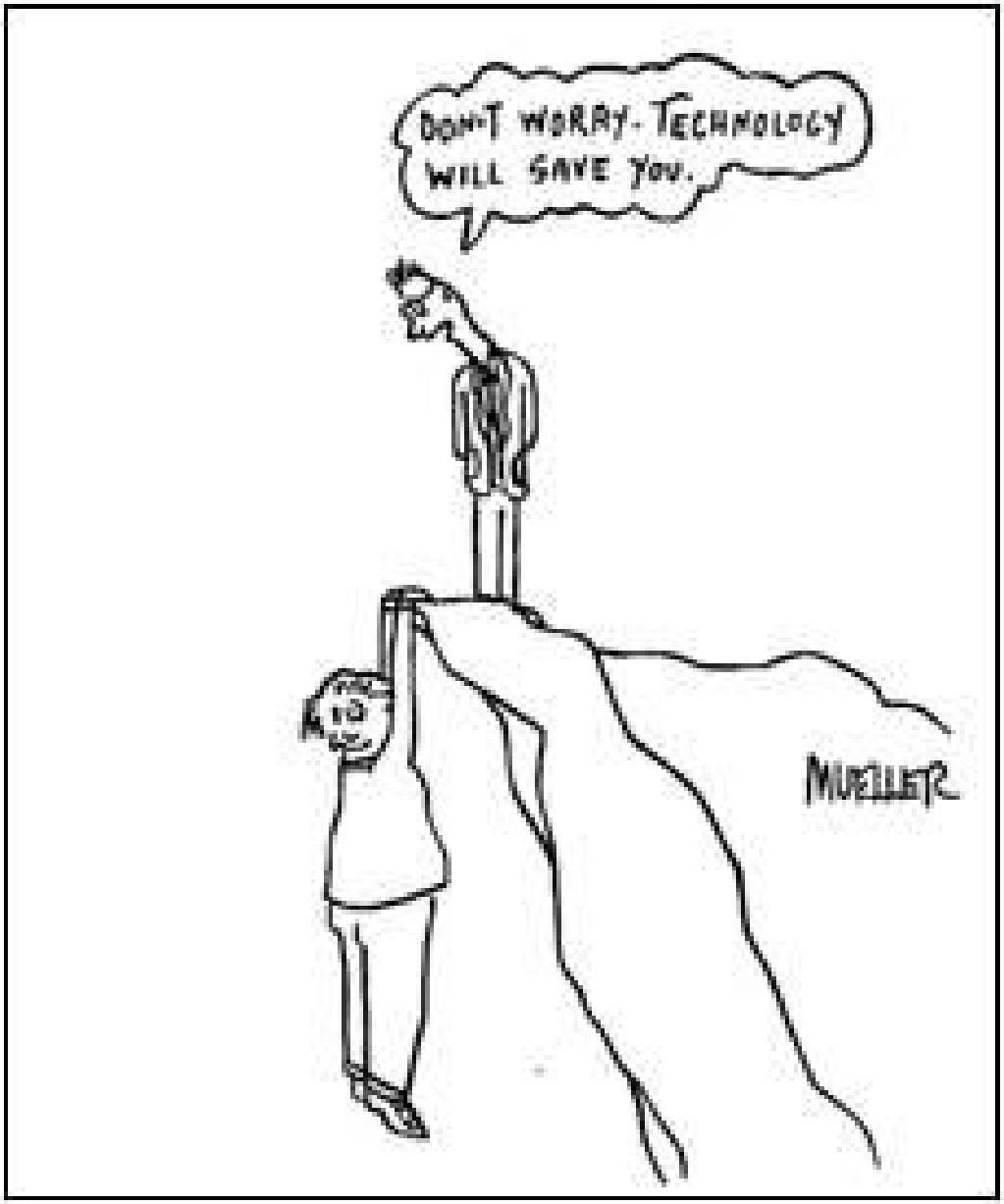
Non-scientific drivers of science

- Scientific research as a societal process is driven by many strong non-cognitive forces: financing constraints; personal narratives and expectations, vested interests, political agendas.
- Science is asked to produce technical operational solutions to market oriented demands; it's easy to neglect complexity and "small details".

EEA, *Late Lessons from Early Warnings II* (2013).

Modern Science is the main weapon of a conquest narrative

- "Whatever else in the world we know survives to the year 2000, that won't. Once the trick of getting rich is known, as it now is, the world can't survive half rich and half poor. It's just not on"(42). Ch. P. Snow, 1959
- The ideology of "technological fix": there is always a technological remedy for a technological shortcoming…Optimism became a secular religion!


DON'T WORRY. TECHNOLOGY WILL SAVE YOU.
MUELLER

The pattern of disaster in a "Risk-Society"

- More technological power than political wisdom (sectorial interests stronger than public interest).
- Linear causal planning instead of holistic approach.
- Arrogance of the will and poor scientific understanding of complexity.
- Priority to short-term, instead of long-term strategic vision.

Science for risk governance

"In addressing major public risks issues, science can reaffirm its role as a trusted partner of society and thus enlarge its constituency (…) Multidisciplinarity is imperative; the social sciences and humanities (…) have to be combined with engineering and the natural sciences to develop useful decision-making tools.",

Mariano Gago, EMBO Reports, 2004, p.5.

Tasks for an European Science Policy

- Not compromising with mythological fancies about science.
- Being able to contribute for "problem solving" solutions (Th. S. Kuhn).
- To understand its own socio-political *habitat* as part of its nature and task.
- To face the B. Russell riddle: "Can a Scientific Society be stable?" (1949).

2

What are the two key issues deserving more emphasis in the heart of our Science and Research Agenda?

The Vision in the Lisbon Agenda (2000)

- Science policy is always based on a "vision", a certain "Weltanschauung".
- The goal was to transform the EU on 2010 into "the most competitive and knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion.", Lisbon European Council, 23-24 March 2000

Horizon 2020

- Significant budget increase (from € 52 bn in FP7 [2007-2013] to around € 80 bn.
- Three Relevant Pillars: "Excellent Science"; "Leadership in Enabling and Industrial Technologies"; "Societal Challenges".
- Is there a vision sufficiently in line with the major challenges the EU is facing?

2003, a view from USA: A bright vision of the next wave...

"The integration of Europe is one of the most significant geopolitical events of the twentieth century. It represents a turning point every bit as momentous as the founding of the United States as a federal union, perhaps more so. Europe has taken history into its hands and is sculpting its own landscape...

...for the European integration...that quickly was vanished

...After centuries of rivalry and bloodshed among competing poles, the Europeans have had enough. They are in the midst of a revolutionary process of geopolitical engineering aimed at merging these competing polities into a collective hole, eliminating once and for all war among Europe's national states." (Charles Kupchan, *The End of the American Era*, 2003:152)

What are the two major driving forces in contemporary crisis?

- A crisis bigger than the one of 1929…: "*Nature still offers her bounty*" (Roosevelt, 4th March 1933)?
- "*My country is going to disappear under water…*", Mr. Anote Tong, President of the Kiribati Republic , New Delhi, 05.02.2009.

Looking to the big picture of the EZ crisis

- "If one link has broken so has the whole chain", Jewish Proverb (Yiddish).
- The Greek issue is not (solely and primarily) a question of debt, but the first overwhelming evidence of a failed European strategy driven by "an utterly dysfunctional policy regime that has proved economically illiterate and politically unsustainable" (Wolfgang Münchau, FT, 15 02 2015).

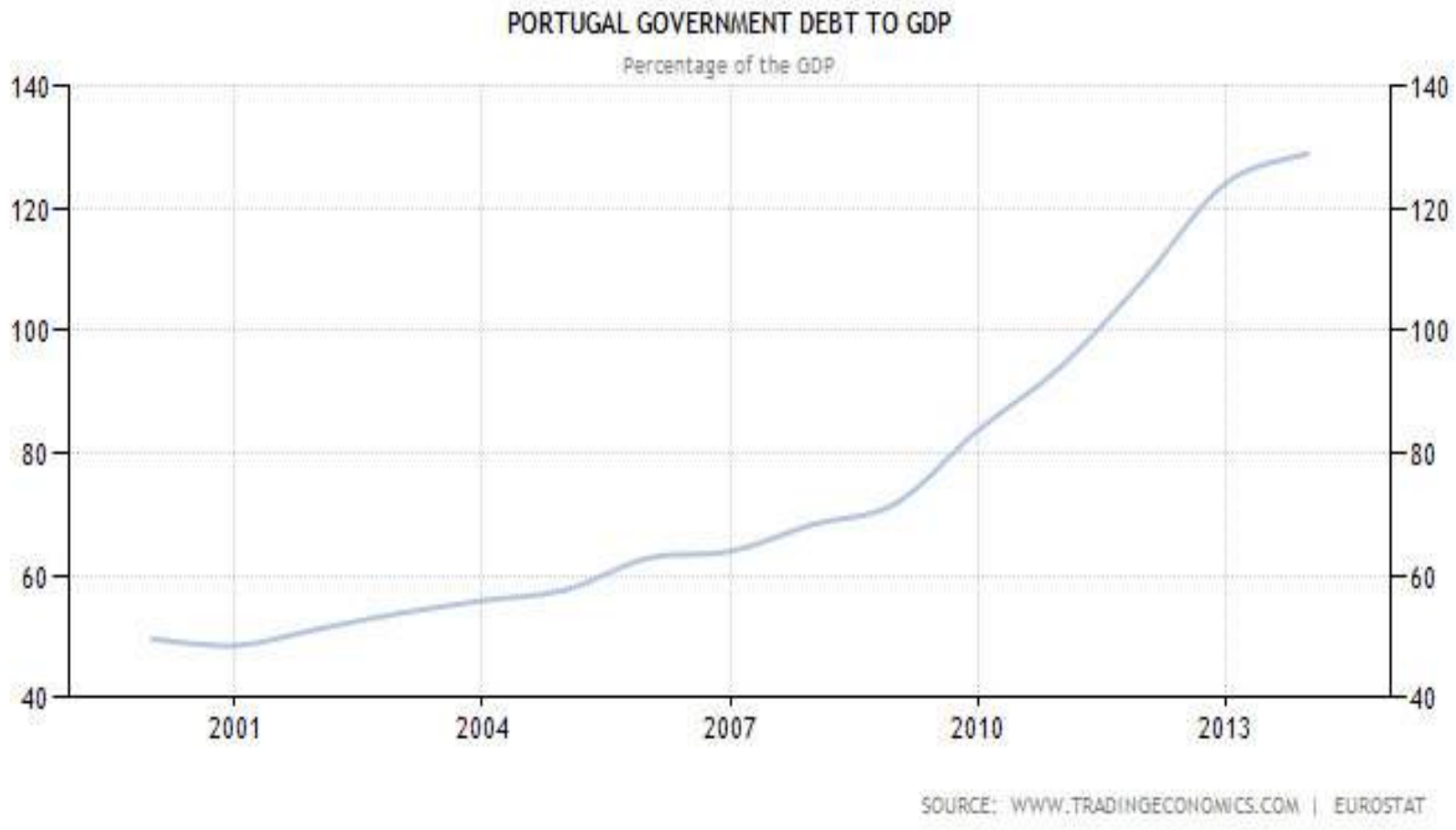
Is this dual European integration sustainable?

- Losses in GDP (2008-2013) Greece: -27%.
- Portugal: -8,2%.
- Italy: -8,1%.
- Spain: -6,5%.
- Ireland: -6,2%
- In 2014, 9 countries (Estonia, Ireland, Greece, Spain, Cyprus, Malta, Portugal, Slovenia, Slovakia) although having just 25% of EZ population had 50% of the total EZ unemployment.

Causes and Effects: How the bank crisis increased sovereign debt of EVERY EZ and EU country (Source: Eurostat)

Countries /Areas	2007	2008	2009	2010	Increase variation (p.p.)
Germany	65,2%	66,8%	74,5%	82,5 %	17,3
Portugal	68,4%	71,7%	83,7%	94%	25,6
Ireland	24,9%	44,2%	64,4%	91,2 %	66,3
Greece	107,4 %	112,9 %	126,7 %	148, 3%	40,9
Eurozone (17)	66,4%	70,2%	80,0%	85,4 %	19
European Union (27)	58,9%	62,2%	74,5%	80,0 %	21,1

Government Debt in Portugal. Or the image of the doubtful "success" of austerity policies (Mark Blyth, Lisbon, 07 10 2014):



Courage to the truly vital EU "structural reform"

" What is needed is not structural reform within Greece and Spain so much as structural reform of eurozone's design and a fundamental rethinking of the policy frameworks that have resulted in the monetary union's spectacularly bad performance", Joseph E. Stiglitz, Feb. 3, 2015, "Project Syndicate".

C – Possible Scenarios in the MACDOUGALL Report (1977)

	Federal Public Expenditure - *% in GDP*	Features &Likehood
Federal	**20 - 25%**	Like in **USA** and **FR Germany** – possible at some distant date
Early Stage of a Federation	**5 - 7%**	**Social and welfare services would nearly all remain at the national level.** ***Such an arrangement could provide sufficient geographical equalisation of productivity, living standards and cushioning of temporary fluctuations to support a monetary union*.** But there are various degrees of confidence as to whether this would in practice be feasible.
Pre-Federal Integration	**2 - 2,5%**	**Studied Scenario**

Can we neglect the political principles of federalism in the European integration?

- A polycentric non-vertical conception of "State".
- Federalism is a power-cooperative-network among different although combined political units.
- The model is based in a cooperative division of tasks, according to constitutional boundaries and bridges.

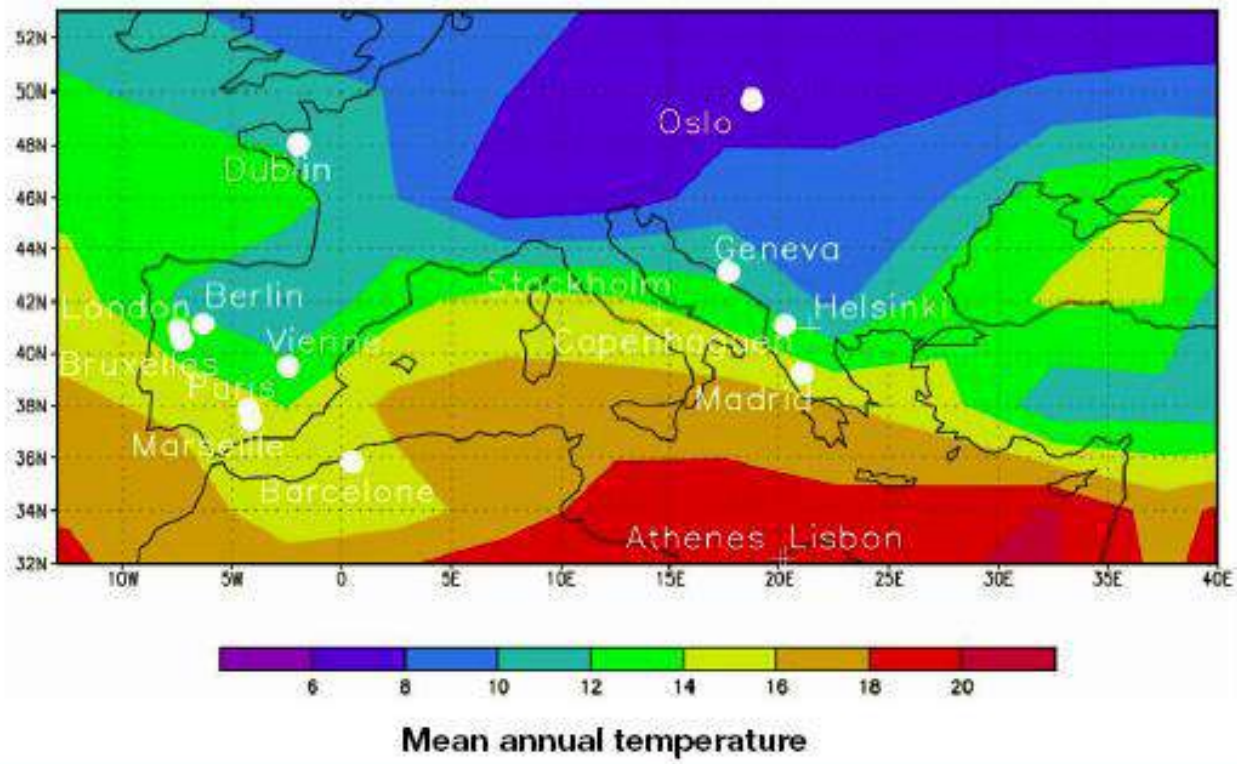
What's new about environmental crisis?

- Planetary dimension (climate change)
- Irreversibility and entropy (massive biodiversity extinction)
- Cumulative acceleration (justice between generations)
- Growing political and social unrest (decline of classical State's power)

5th IPCC Report

- WG I (Science): Stockholm, September 2013.
- WG II (Adaptation): Yokohama, March 2014.
- WG I (Mitigation): Berlin, 7-11 April 2014.
- WG I (Synthesis): Copenhagen, October 2014.
- Beyond 2ºC is almost sure.
- New knowledge on growing impacts: ocean acidification; fire and ice; economic and social impacts; greater pressure on natural resources…

Figure 8.3 Spatial climate analogue for European cities for 2100 [a]



(a) Map of Europe and Mediterranean basin, with a few cities at the location of their future climate analogue, i.e. a location that presently enjoys a climate close to their future climate. The model used is Hadley Centre HafRM3H model.

Source: Hallegatte, S. et al (2005)

UNWTO (2008) Climate Change and Tourism – Responding to Global Challenges

An epistemic shift in Academia?

"One of the problems is that the issue is still being framed as a scientific and environmental issue. This is a major mistake. Climate change is just a symptom of dysfunctional social and economic practices and policies. It is a social and economic issue. The emphasis needs to shift away from the biophysical sciences now to the social sciences if we have any hope of solving this problem.", Bob Doppelt, *The Guardian*, 14.04.2009

Prudential approach: "the ingenuity gap"

"We are indeed in a race between hard imaginative thinking – or what I call ingenuity – and the ever expanding complications of our world. And in too many critical places, and on too many critical issues we're losing the race.", Thomas Homer-Dixon, "Ingenuity Theory: Can Humankind Create a Sustainable Civilization", 2003.

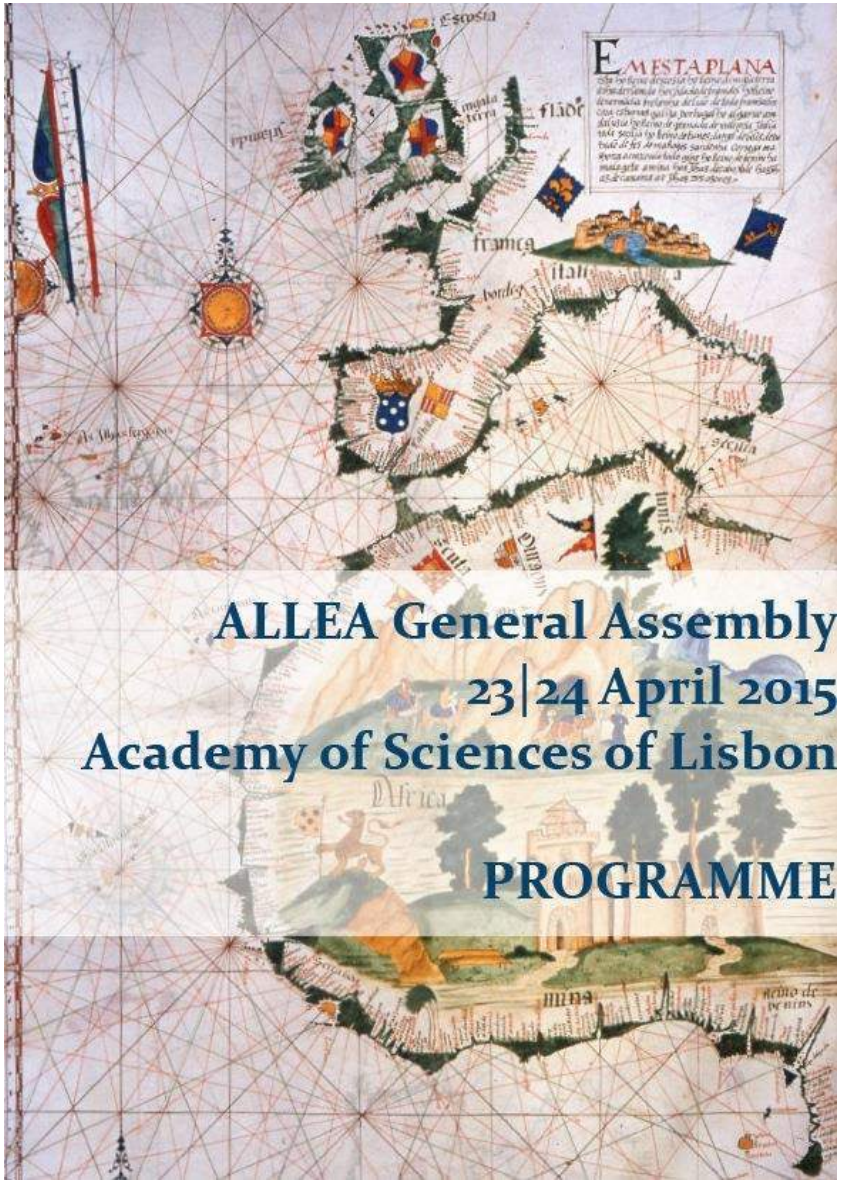
Towards a "Back to Earth" policy in science?

- "This new revolution will be in a way a reversal of the first: it will enable us to look back on our planet to perceive one single, complex, dissipative, dynamic entity, far from thermodynamic equilibrium — the 'Earth system'" (C20)

Hans Joachim SCHELLNHUBER, **'Earth system' analysis** and the second Copernican revolution", *NATURE,* VOL 402 |SUPP|, 2 DECEMBER 1999 |www.nature.com, **C19-C23.**

Final Remarks

- We need more science in politics, but also more science policy regarding the strategic planning in Research & Development.
- We need less political arrogance and more scientific humility.
- We need more democratic, active and enlightened citizenship.
- We need more goal-oriented cooperation within EU countries and at broader international level.



Scientific Symposium

Science and Research in Europe

Past, Present and Future: 15 Years of Lisbon Agenda

Symposium Lecture

Challenges and Opportunities for Science in Europe: Perspectives from the ERC and Academia Europæa

Prof. Sierd Cloetingh
President, Academia Europæa; Vice-President, ERC Scientific Council

Challenges and opportunities for science in Europe: *Perspectives from the ERC and Academia Europaea*

Prof. Dr. Sierd Cloetingh

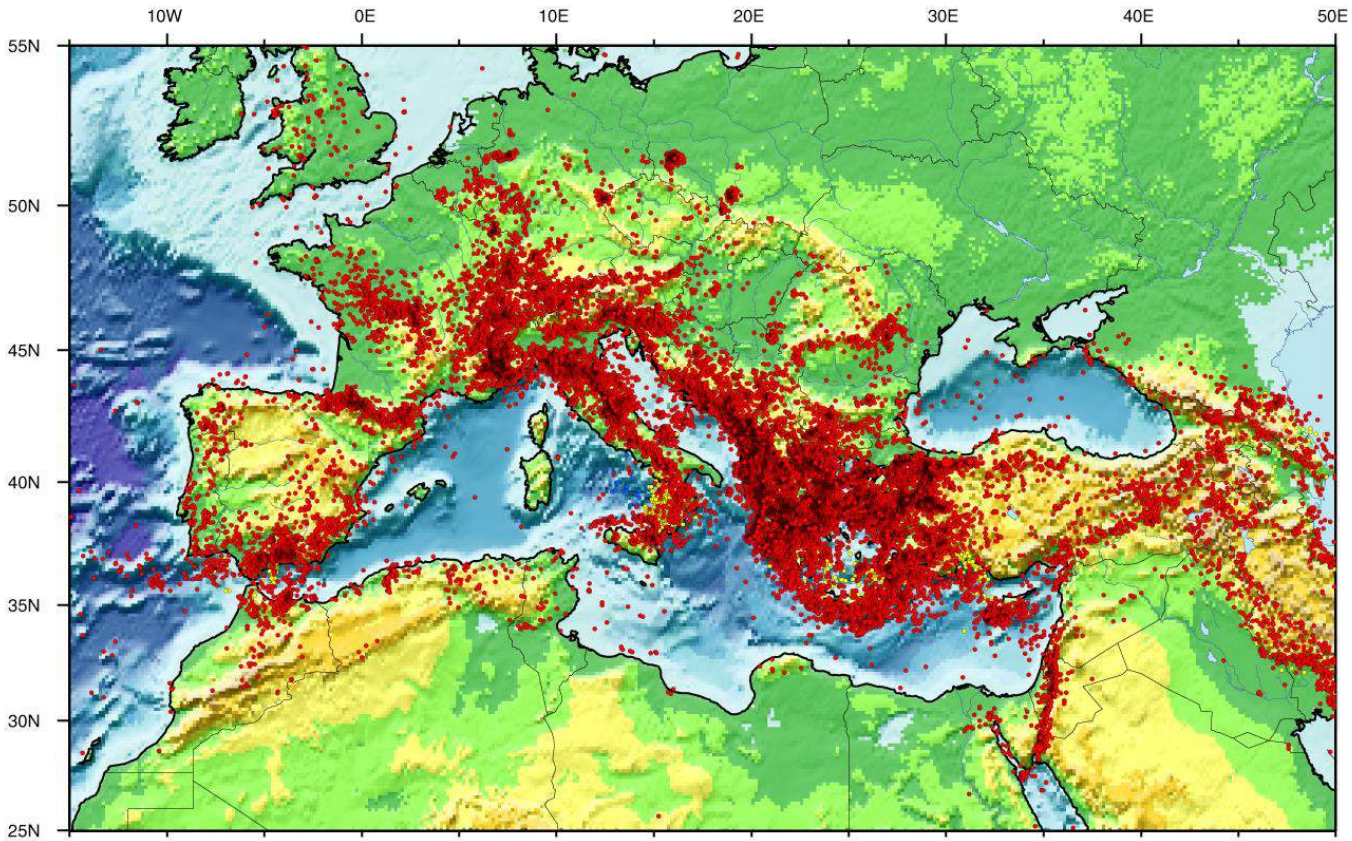
Faculty of GeoSciences

Utrecht University

(sierd.cloetingh@uu.nl)

Cross-border nature of earth sciences

Natural hazards occur everywhere and do not respect national borders



Societal impact of geohazards: the European continent

Sierd Cloetingh, Sean Willett
& TOPO-EUROPE team

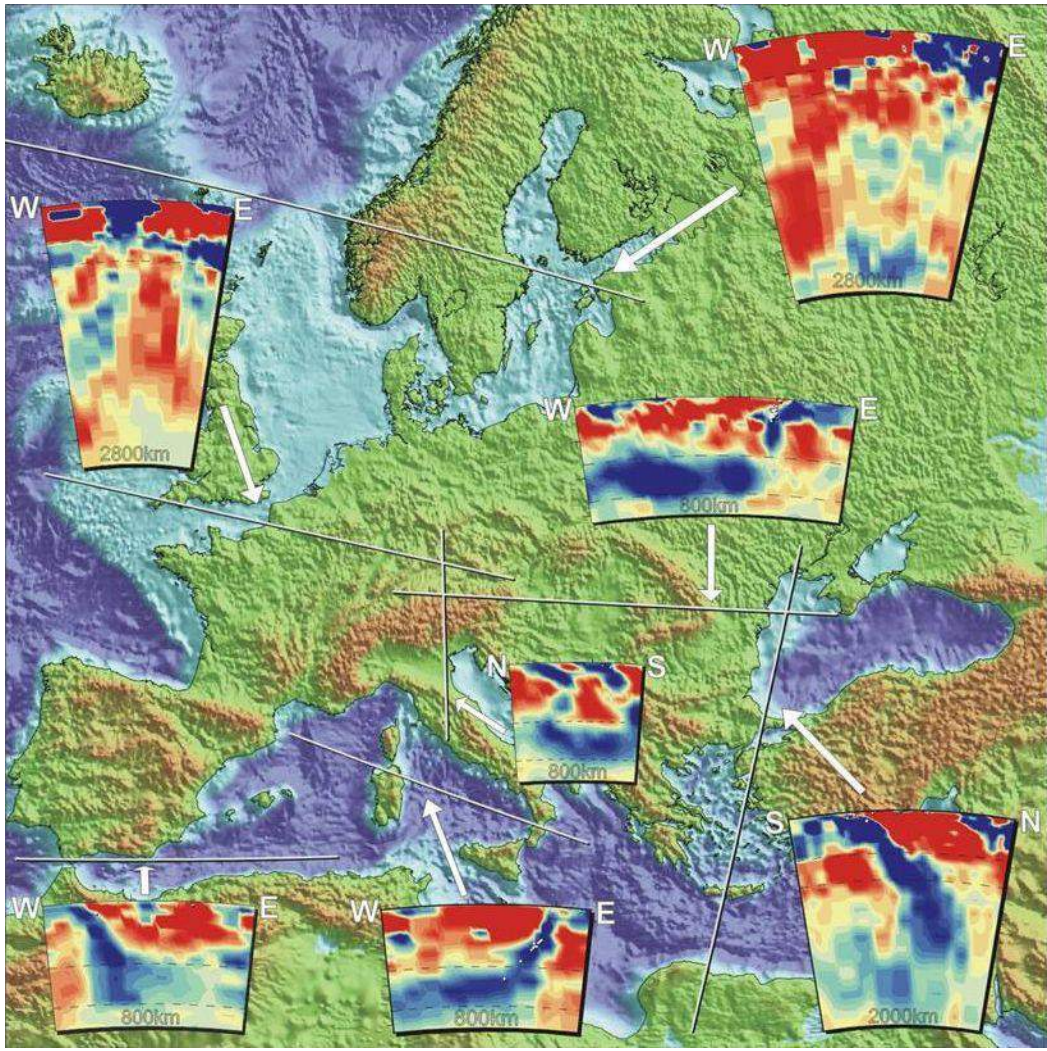
TOPO-EUROPE

Fundamental Premise

Continental topography is the product of the interaction between processes operating deep in the Earth, on its surface and in the atmosphere

It's understanding requires a multidisciplinary approach

- ***23 participating countries***
- ***14.5 M Euro funding***
- ***60 new positions for young researchers***



Academia Europaea ~19 88~

INTERNATIONAL LITHOSPHERE PROGRAM

EUROPEAN SCIENCE FOUNDATION

TOPO-EUROPE
A EUROCORES PROGRAMME
EUROPEAN COLLABORATIVE RESEARCH

TOPO-EUROPE workshops

Academia Europaea's first TOPO-EUROPE workshop in Heidelberg, Germany (2006)

Participants of the TOPO-EUROPE workshop at the Studio Villa Bosch in Heidelberg, Germany.

Barcelona, September 17-19, 2014
CosmoCaixa, Science Museum Barcelona

"Interplay between surface, lithospheric, and mantle processes"

International Lithosphere Program

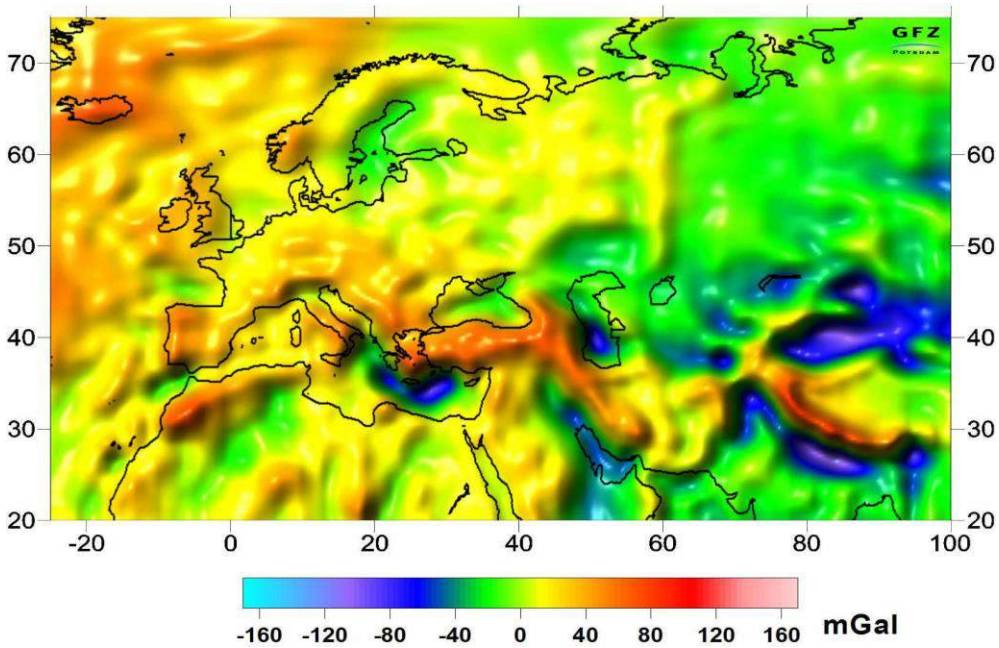
Academia Europaea ~1988~

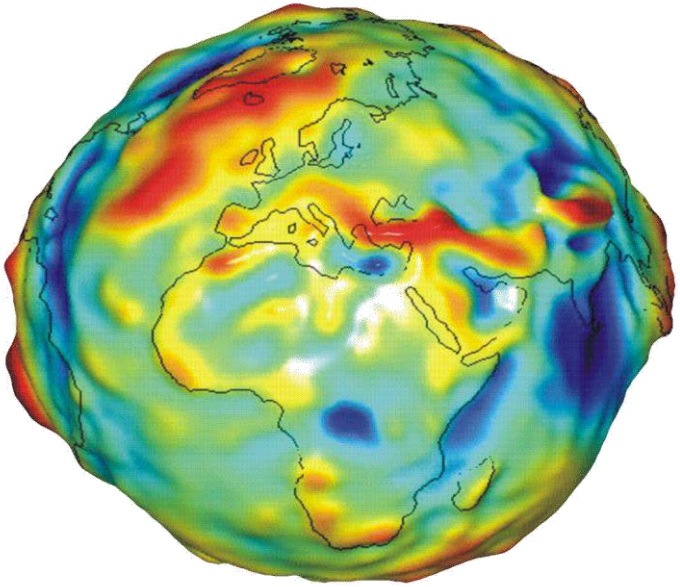
ICTJA CSIC
Institute of Earth Science Jaume Almera, Barcelona

Obra Social "la Caixa"

Academia Europaea
Barcelona Knowledge Hub

Europe monitore



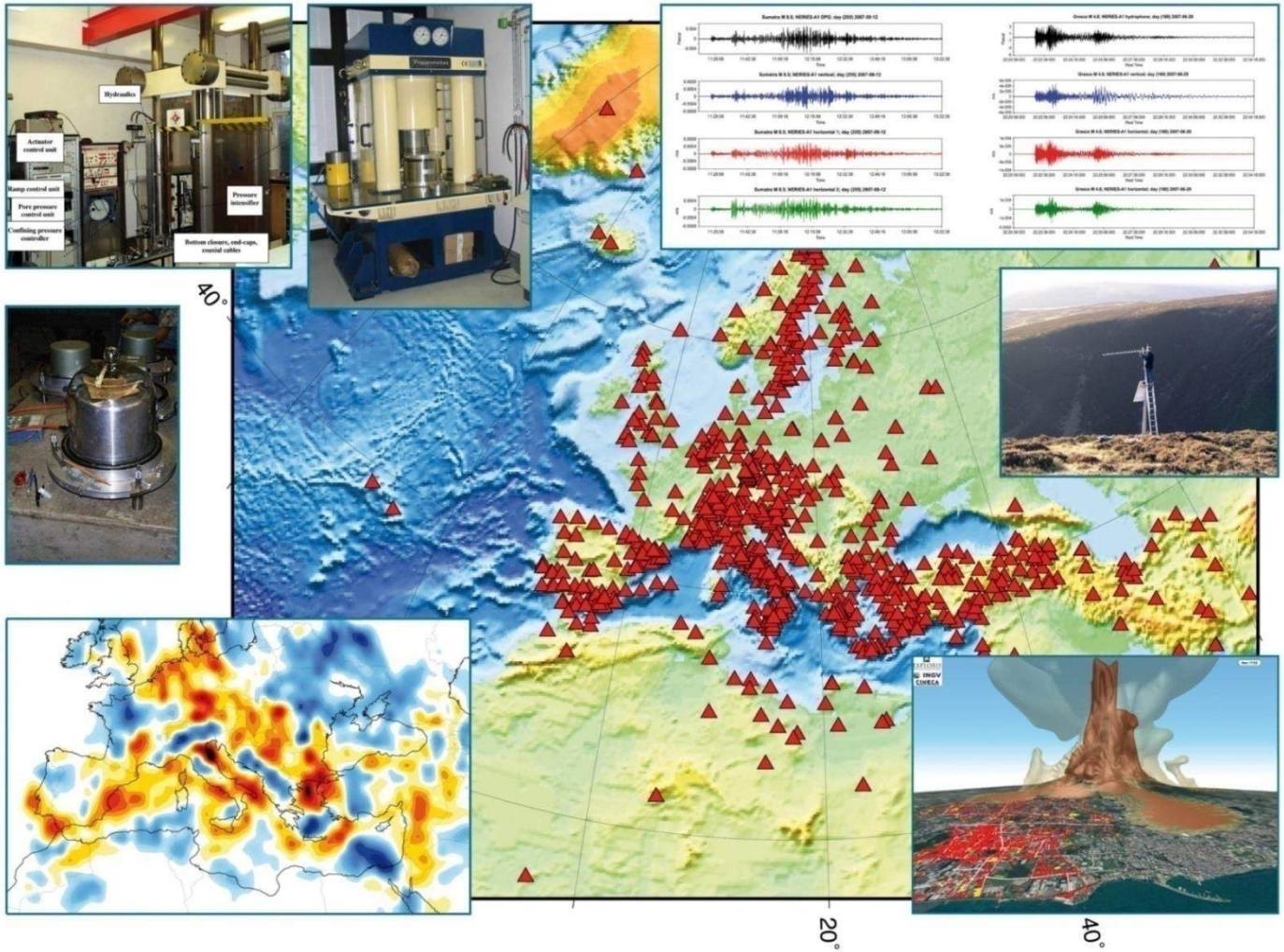


Recent (micro-)satellite missions have led to great improvements in the resolution of gravity measurements. Picture shows an artists' impression of the GRACE satellites and gravity models of Europe and the Earth.

Courtesy GFZ Potsdam

EPOS
EUROPEANPLATEOBSERVINGSYSTEM

Research Infrastructure and E-science for Data and Observatories on Earthquakes, Volcanoes, Surface Dynamics And Tectonics



EPOS
EUROPEANPLATEOBSERVINGSYSTEM

ESFRI

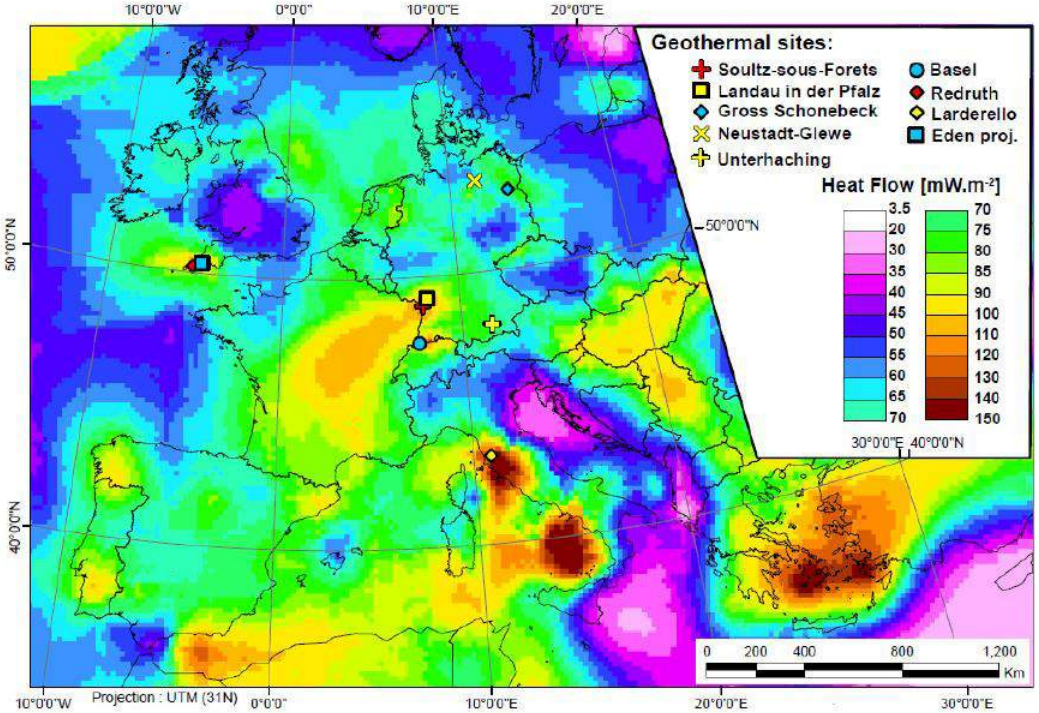
SEVENTH FRAMEWORK PROGRAMME

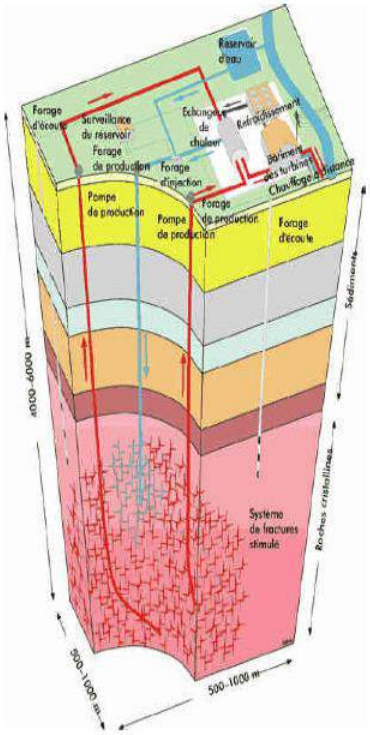
Geothermal energy

EERA European Energy Research Alliance
Joint Programme Geothermal Energy

ISES

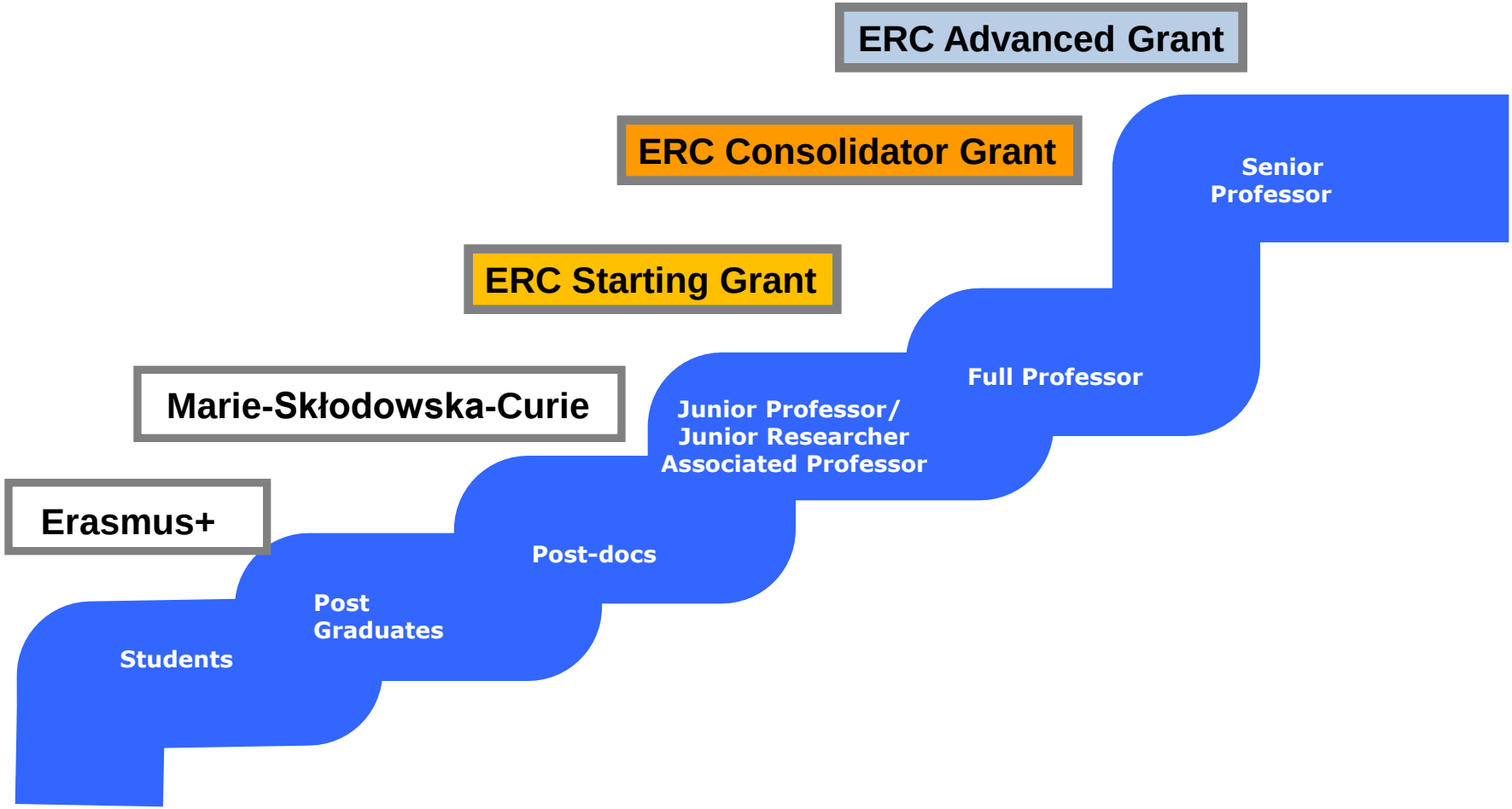
Engineered Geothermal Systems - EGS





Cloetingh et al. 2010 (Earth-Science Reviews)

Researchers career development and complementary funding schemes



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

ERC Structure

The European Commission

- **Provides financing** through the EU framework programmes
- **Guarantees autonomy of the ERC**
- **Assures the integrity and accountability of the ERC**
- **Adopts annual work programmes** as established by the Scientific Council

The ERC Scientific Council

- **22 prominent researchers** proposed by an independent identification committee
- **Appointed by the Commission** (4 years, renewable once)
- **Establishes overall scientific strategy;** annual work programmes (incl. calls for proposals, evaluation criteria); peer review methodology; selection and accreditation of experts
- **Controls quality of operations and management**
- **Ensures communication with the scientific community**

The ERC Executive Agency

- **Executes annual work programme** as established by the Scientific Council
- **Implements calls for proposals** and provides information and support to applicants
- **Organises peer review evaluation**
- **Establishes and manages grant agreements**
- **Administers scientific and financial aspects** and follow-up of grant agreements
- **Carries out communications activities** and ensures information dissemination to ERC stakeholders

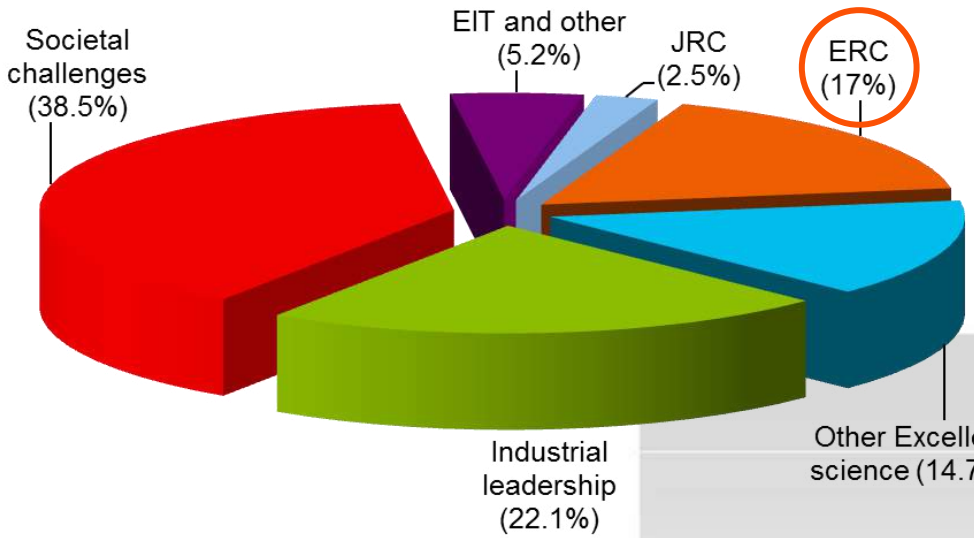
ERC in the H2020 Structure

- **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

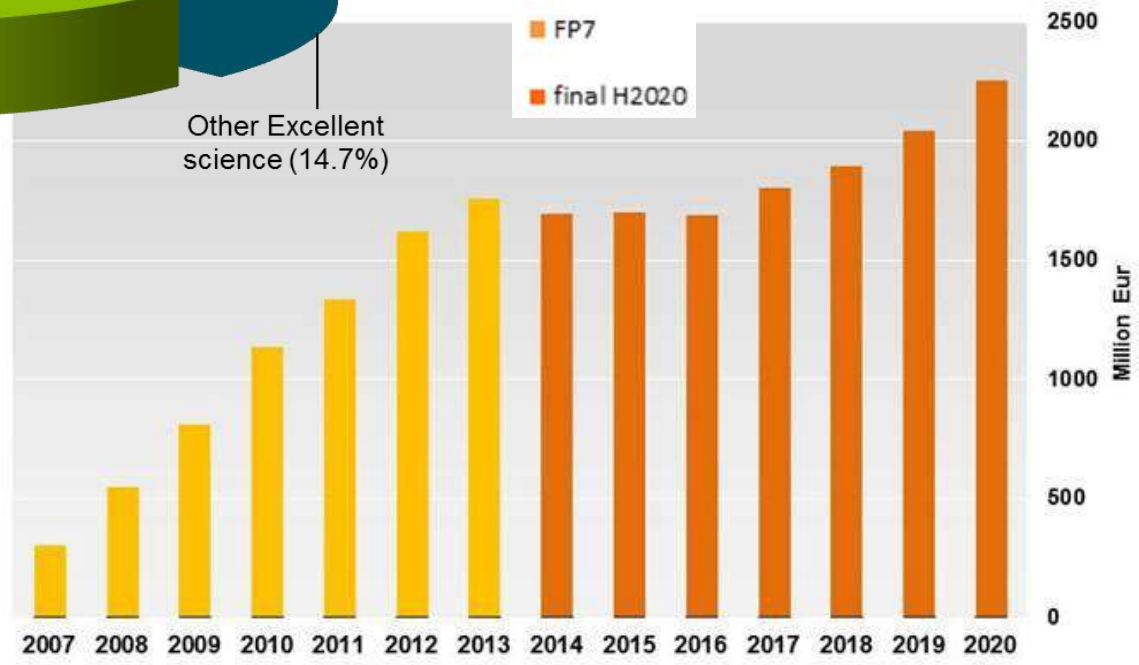
- **Excellent Science:**
  - **European Research Council** (budget under H2020: € 13 billion)
  - Future and Emerging Technologies
  - Marie Skłodoswka Curie Actions
  - Research Infrastructures

| 49

ERC H2020 Budget



ERC Budget € 13 billion



ERC Grant schemes in 2015

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 for ERC grant holders

After 8 Years of Existence…
A Success Story

- Highly recognised by the research community
- Over **4 300** top researchers funded during FP7 (2007-2013)
- 65% are at an early-career stage
- Other **375** Starting and **372** Consolidator grantees selected 2014
- **66** nationalities represented
- **Highly competitive** (overall success rate tending to 10%)
- Working in almost 600 different institutions in **32** countries
- 50% of grantees in 50 institutions : “Excellence attracts excellence”
- **Benchmarking** effect: impact on national programmes and agencies; national funding for best "runners-up"
- Efficient and fast grant management

ERC Delivers

- **30 000** publications acknowledging ERC support by September 2014
- **7%** of these publications were in the **top 1%** most cited in their scientific field and year of publication
- **20%** of completed LS and PE projects reported at least one patent (on average **2** patents reported per project)

Priorities

- Encourage interdisciplinary and international research in all areas of learning, particularly in relation to European issues.
- Identify topics of trans-European importance to science and scholarship, and propose appropriate action to ensure that these issues are adequately studied.
- Promoting synergy between Academia Europaea and the Young Academy of Europe
- Pro-active role as voice for science in Europe, in close partnership with e.g. EASAC, ALLEA, Euro-CASE, FEAM and national academies

Academia Europaea ~19 88~

easac European Academies Science Advisory Council

ALLEA | ALL European Academies
European Federation of Academies of Sciences and Humanities

Euro-CASE

FEAM

Berlin, March 26, 2015.

Academia Europaea hubs

AE head office, London

AE hub Barcelona

AE hub Wroclaw

NEW: Knowledge Hub Region Bergen, Norway

The Academia Europaea Knowledge Hub Region Bergen will provide the national academies of science and letters in Norway with a European partner in Bergen. The focus of Academia Europaea's hub in Bergen will be resources and expertise relating to the 'Northern seas' – Europe's northern dimension.

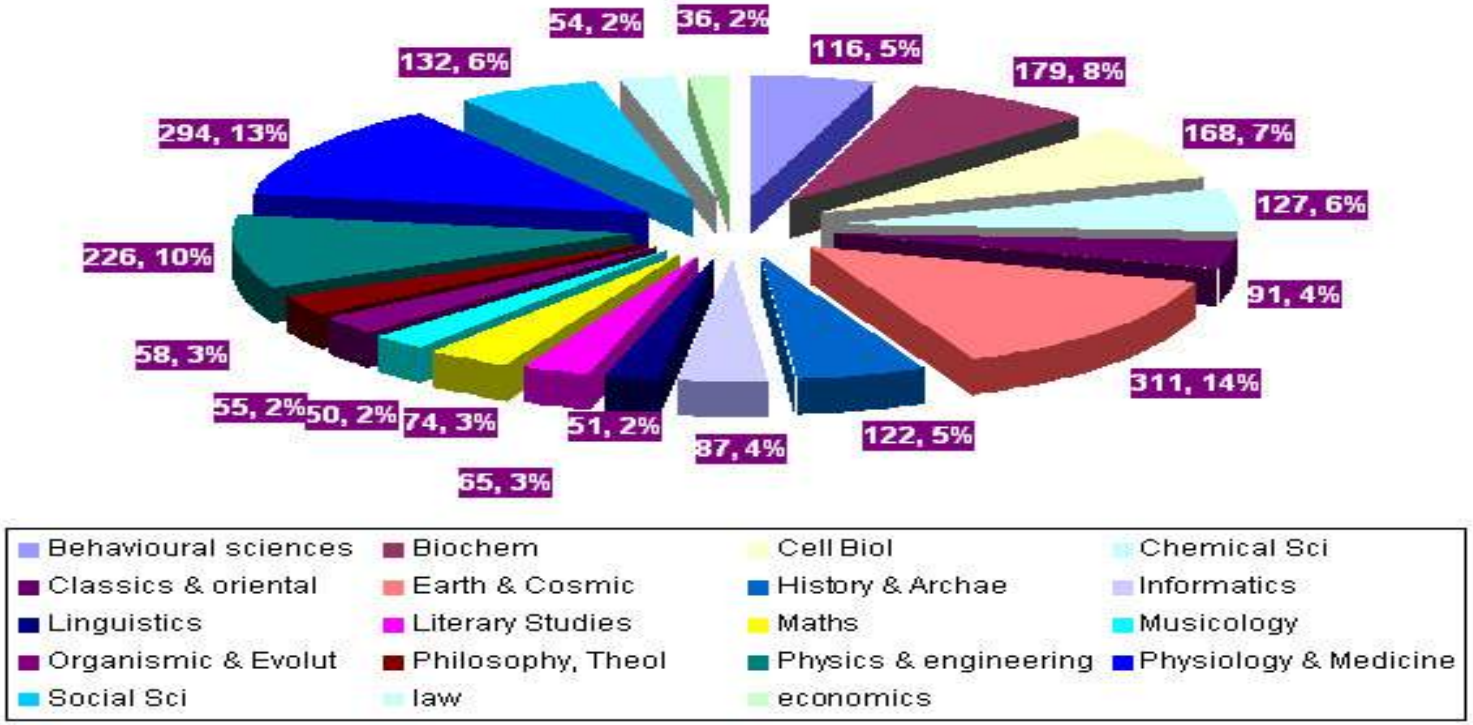
Academia Europaea organisation

Members of the Board, Nov. 2014

Ole Petersen
Chair of Nominations Committee

David Coates
Executive Secretary

Membership



In 2015 we have 20 Academic Sections, a membership of around 3,3000 scholars who are elected, following a strict peer review process and who are drawn from all European countries. We also have a number of non-European based members

Young Academy of Europe (YAE)

A pan-European initiative of young scientists and scholars with outspoken views about science and science policy

- *YAE is a **multidisciplinary and pan European not-for-profit organisation** of individual scientists and scholars, who are experts and leaders in their respective fields.*
- Currently about 150 members
- YAE has a Board and is divided into **three Domains**
- YAE forms **working groups** with regard to its activities (across domains)
- **Members of the YAE Board** are selected from among its members representing the three Domains

Examples of YAE activities

Lynn Kamerlin
YAE president

- Science policy
- Interdisciplinary exchange
- Networking
- Science communication

- **European Commission**
  - European Research Area-Manifesto Initiative
- **Initiative for Science in Europe**
  - Petition against budget cut Horizon2020
  - Scientific Visa
  - Open Access
- YAE aims for **Strategic Partnerships** to increase impact

Examples of YAE activities (cont'd)

- **EuroScience Open Forum**
  - 2014 ed. in Copenhagen: EuroScience and ISE panel discussion
  - Dedicated session in 2012

- **European Research Council**
  - 5th Annual Workshop on Best Practices of Research Funding Agencies. "MONITORING THE PERFORMANCE AND QUALITY OF PEER REVIEW SYSTEMS.", Brussels, Nov. 2013
  - Meeting with new ERC President
  - Feedback on current funding scheme

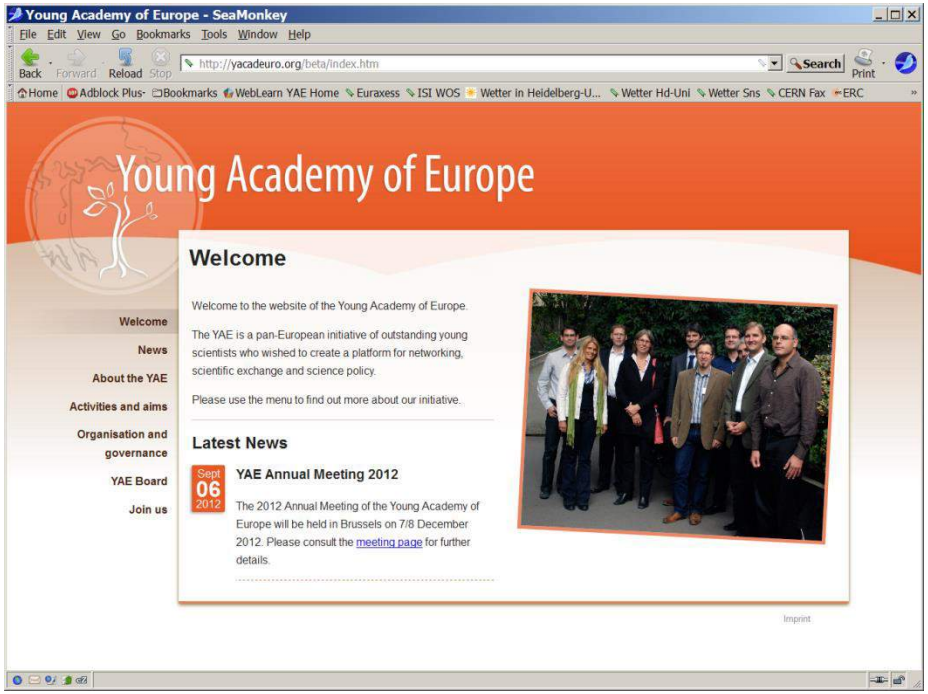
- **EURAXESS - Voice of the Researchers**
  - Conference "Raising Researchers' Voices – opinions on jobs, careers and rights", Brussels, Nov. 2013: Round table discussion

Examples of YAE activities (cont'd)

- **EURODOC**
  - Annual meeting
- **Falling Walls Circle**, Berlin
- **Academia Europaea**
  - Affiliation
  - Annual Conference; contributions to scientific programme since 2013
  - Common workshops/symposia

YAE: media presence

- Website: www.yacadeuro.org
- Facebook and Twitter
- YAE forum

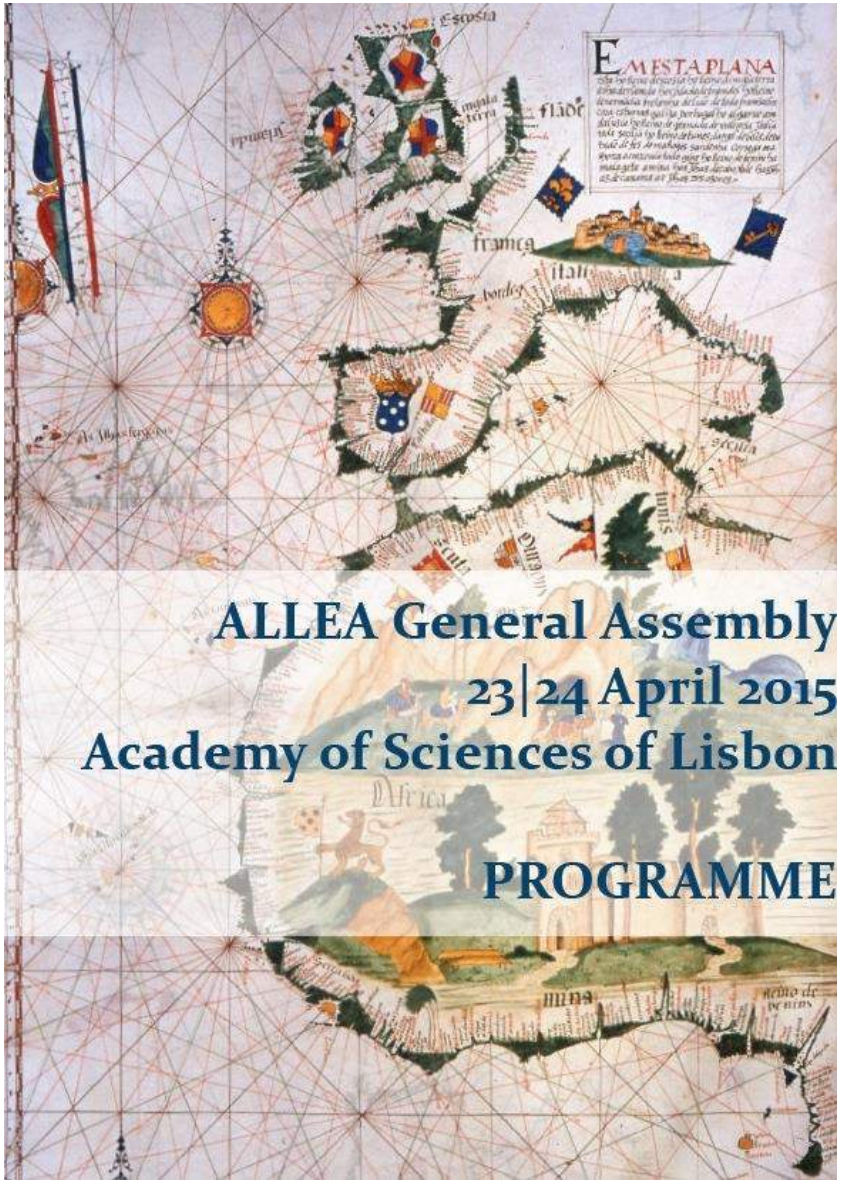


2012-11-15 edition of Nature, "Nature jobs" supplement

Research Europe, Jul. 2013

ERC Tweet, Dec. 2012

SAVE THE DATE



Scientific Symposium

Science and Research in Europe

Past, Present and Future: 15 Years of Lisbon Agenda

Symposium Lecture

The Third Industrial Revolution: Information Technologies and Telecommunication in Europe and Portugal

Prof. Carlos Eduardo Costa Salema
Academy of Sciences of Lisbon; Instituto Superior Técnico, Lisbon

ALLEA General Assembly
Lisbon, 23rd of April 2015

INSTITUÇÕES ASSOCIADAS

The third industrial revolution
Information Technologies and Telecommunications in Europe and in Portugal

Carlos Salema

instituto de telecomunicações

Layout

1. Introduction
2. Europe
3. Portugal
4. Conclusions

1. Introduction

Introduction

- The third industrial revolution is often defined as the changes brought about in manufacturing by the introduction of digital technologies

- Here I will broaden the concept to the changes brought about in our lives by information and communication technologies

Introduction (electromagnet)

It all started in the middle of the XIX century with the telegraph that in a couple of decades changed the way to disseminate news and to run a business

Towards the end of the XIX century came telephone which enabled voice communication between end users

Introduction (electromagnetic field)

The discovery of the electromagnetic field postulated by Maxwell and whose existence and main properties were experimentally proved by Hertz was soon envisaged as the way of dispensing with the electric line required both by the telegraph and the telephone

$$\nabla . \ H = 0$$

$$\nabla . \ E = 0$$

$$\nabla \times H = \varepsilon_0 \frac{\partial E}{\partial t}$$

$$\nabla \times E = -\mu_0 \frac{\partial H}{\partial t}$$

Introduction (radio)

Against many odds Marconi, in 1902, proved that it was possible to communicate by wireless (on land and across the oceans). Ships were no long isolated when they were at sea.

The invention of the diode and triode initiated a new scientific field electronics. Radio receivers become popular. Broadcasting of news and entertainment started a new information era.

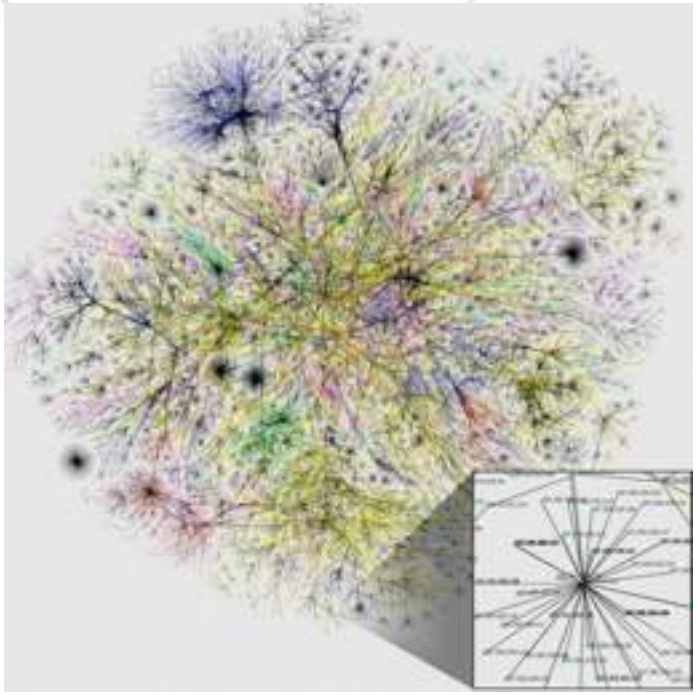
Introduction (radar and television

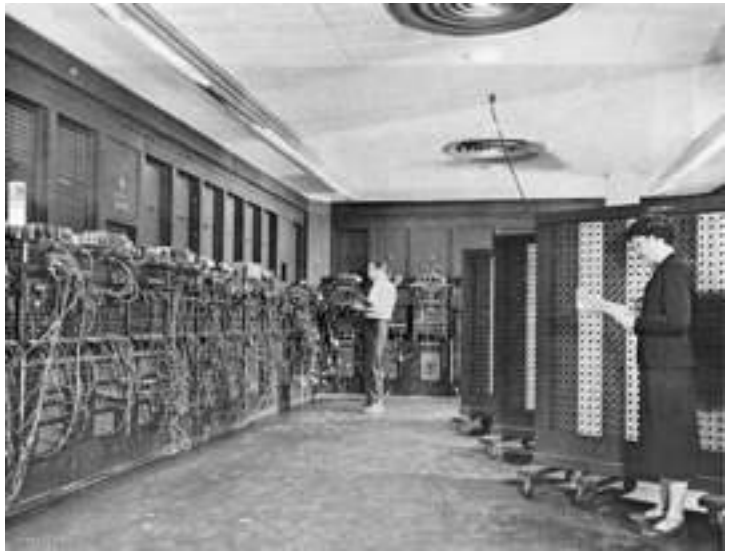
Radio Detection and Ranging (i.e. RADAR) developed during World War II firstly soon left the arsenals of the military to become indispensable both in ships and airplanes

Television, first black and white, later colour, very soon 3D, become irreplaceable as a news and entertainment media

Introduction (computer and internet

The computer started its life as a calculator, grew in importance and became an endless repository of information.





The internet, first connecting computers, then people, soon things, started the third industrial revolution

2. Europe

Mobile communications

- Common adoption of standards gave Europe a head start in mobile communications (GSM)
- Mobile technologies were highly supported in earlier Framework Programmes (3 and 4).
- Today Europe lost the lead in mobile communications
- 5G, a possible successor to GSM and UMTS, and low power microprocessors (a must in advanced mobile phones) may offer Europe an new opportunity to be the leader in mobile communications

Losing the lead and regaining it

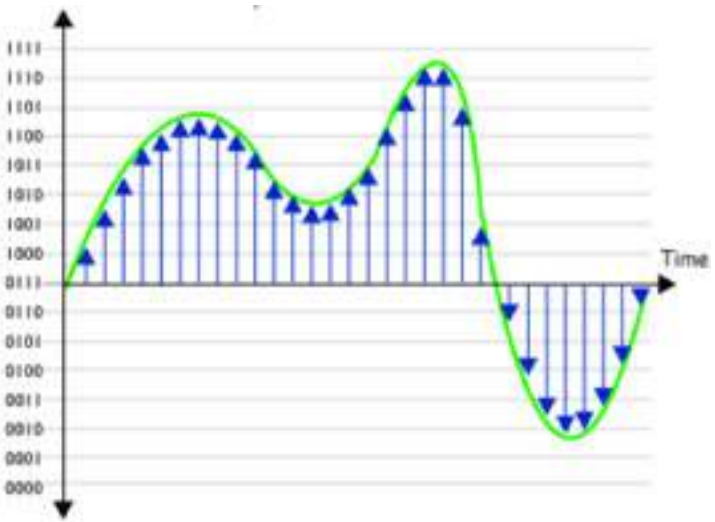
Optical communications

- Use of optical fibre for communications was first proposed in Europe (1966) and the first wide area optical fibre network was deployed in Europe (1978)
- Europe is still at the leading edge of optical fibre communications and photonics
- FP7 supported novel uses of optical fibre communications such as radio over fibre
- R&D in photonics and optical fibre communications should continue in order to keep the lead

Keeping the lead

Digital audio and video

- Standards for audio (MP3), video compression (MPEG) and broadcasting (DVB) were mostly developed in Europe and supported by earlier Framework Programmes.
- Today Europe lost the lead in the market



- FP7 supported advanced 3D-TV technologies that may help Europe to regain not only the lead in technologies but also in devices in the market
- Adoption of common standards and legal frameworks are a must to enable a European single digital market

Losing the lead and regaining it

Internet

- The Internet is the result of a military funded R&D project (Arpanet) subsequently supported by the NSF (CSNET)
- European scientists got a huge boost in Internet connectivity through the GÉANT project (since 2000), possibly the farthest reaching FP7 project
- Advanced Internet (such as the Internet of Things) and new applications are being widely researched

Gaining the lead

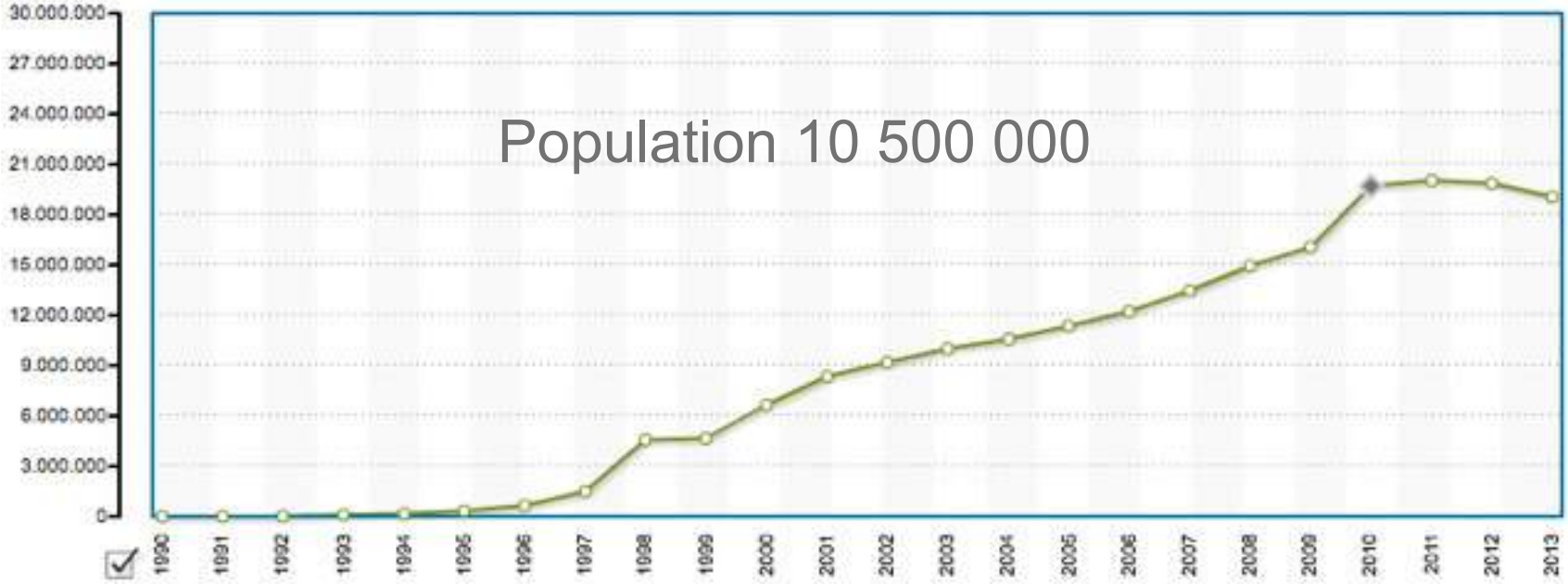
Applications

- The World Wide Web was born in Europe, at CERN (1989)
- The first popular web browser — Mosaic — was developed in the US
- Search engines that crawl the net searching for pages became indispensable (hence the prominence of Google)
- Europe is lagging far behind the US in everyday applications for the internet yet its superior communication infrastructure provides opportunities for new and exciting applications

3. Portugal

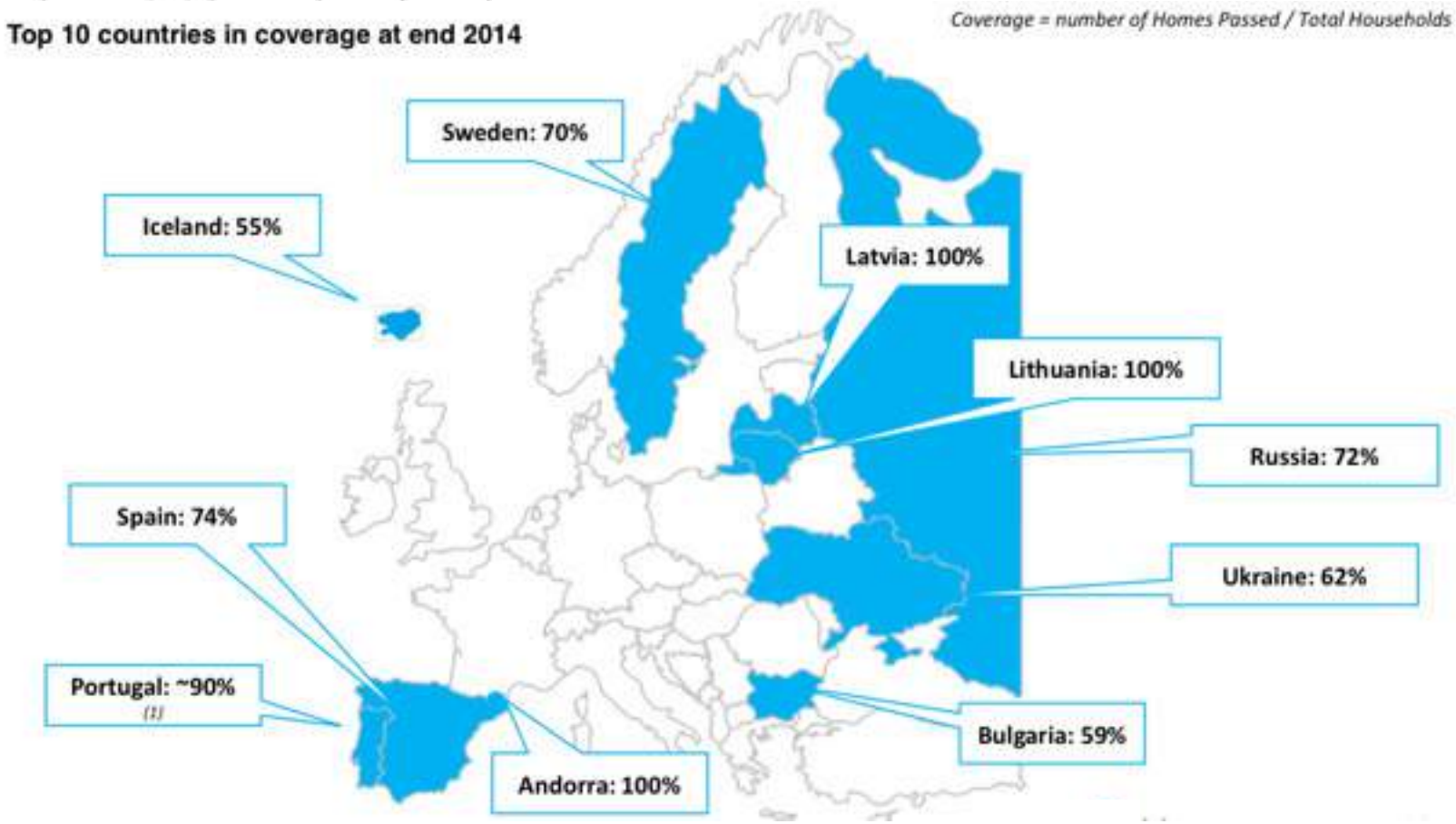
Mobile communications

Pre-paid cell phones were a Portuguese invention (Mimo in 1995), now they represent ~ 70 %



Optical communications

Penetration of FTTH



Source:IDATE for FTTH Council Europe

Applications - the cashless society

Multifunction ATM

- Very popular (14 000)
- Cash dispensers
- Payments (water, electricity, …)
- Tax payment
- Money transfer
- Buy tickets for trains, cinema, …
- Compatible with points of sale

Applications - the cashless society

Points of Sale (POS) — 274 000

Cards (credit and debit) — 20 000 000

Transactions per year — 20 000 000 000

Applications - the cashless society

Electronic tolls

- Buy or rent a small device
- Fix it to your car windscreen
- Drive through all motorways (without stoping at toll gates)
- Toll will be debited automatically
- May be used in many car parks and gas stations

instituto de telecomunicações

Applications - personalised TV

Using a high debit digital communication network viewers may:

- select at any time, any TV program broadcasted in any of hundreds of channels up to one week old
- create their own channel, uploading videos, photos, …

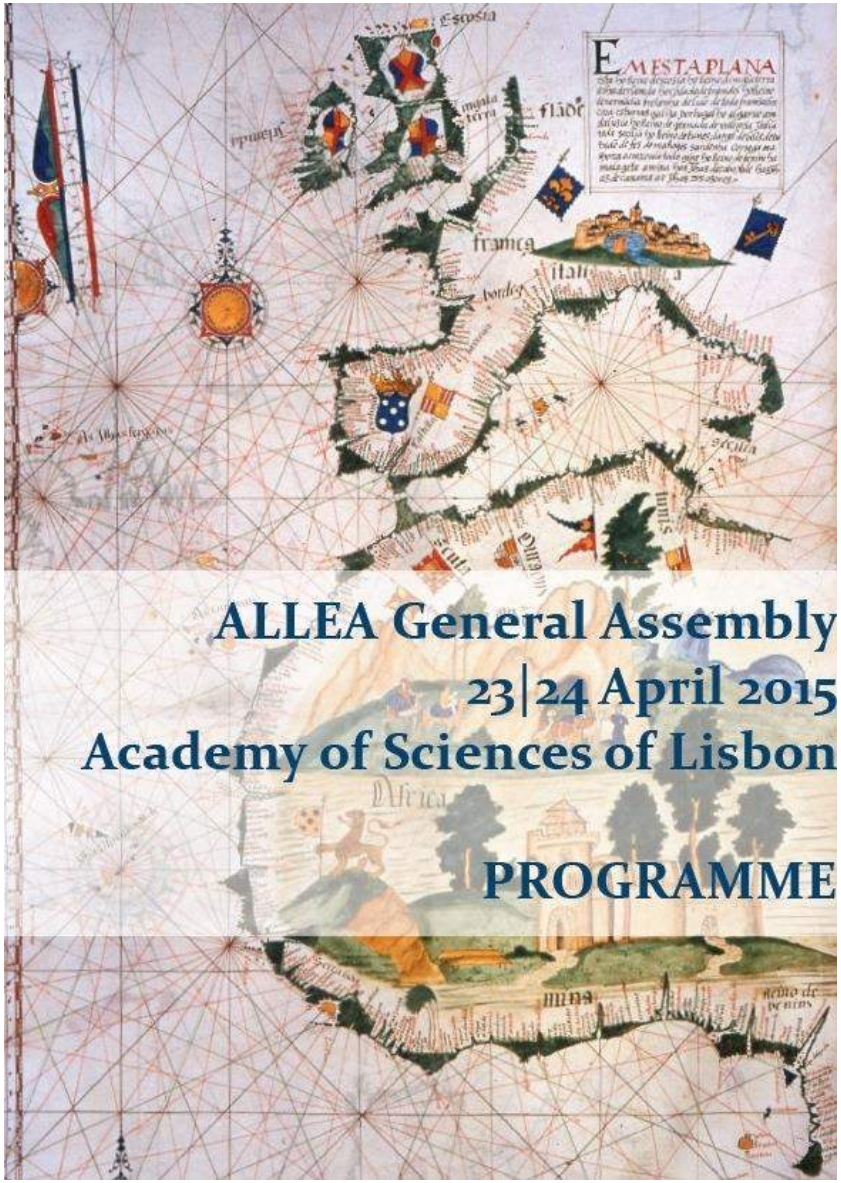
4. Conclusions

Some ingredients for success in ICT

1. Basic and fundamental R&D are key for disruptive innovation and require public (and private) funding
2. Time & Trust are essential (10-15 years is the typical time lag from discovery to product on the market)
3. Standards are vital to achieve market success
4. Regulator action (mainly in telecommunications) should not be over protective preventing new ideas to reach the market
5. Public authorities openness promotes the use of new technology

instituto de telecomunicações

Thank you very much for your attention



Scientific Symposium

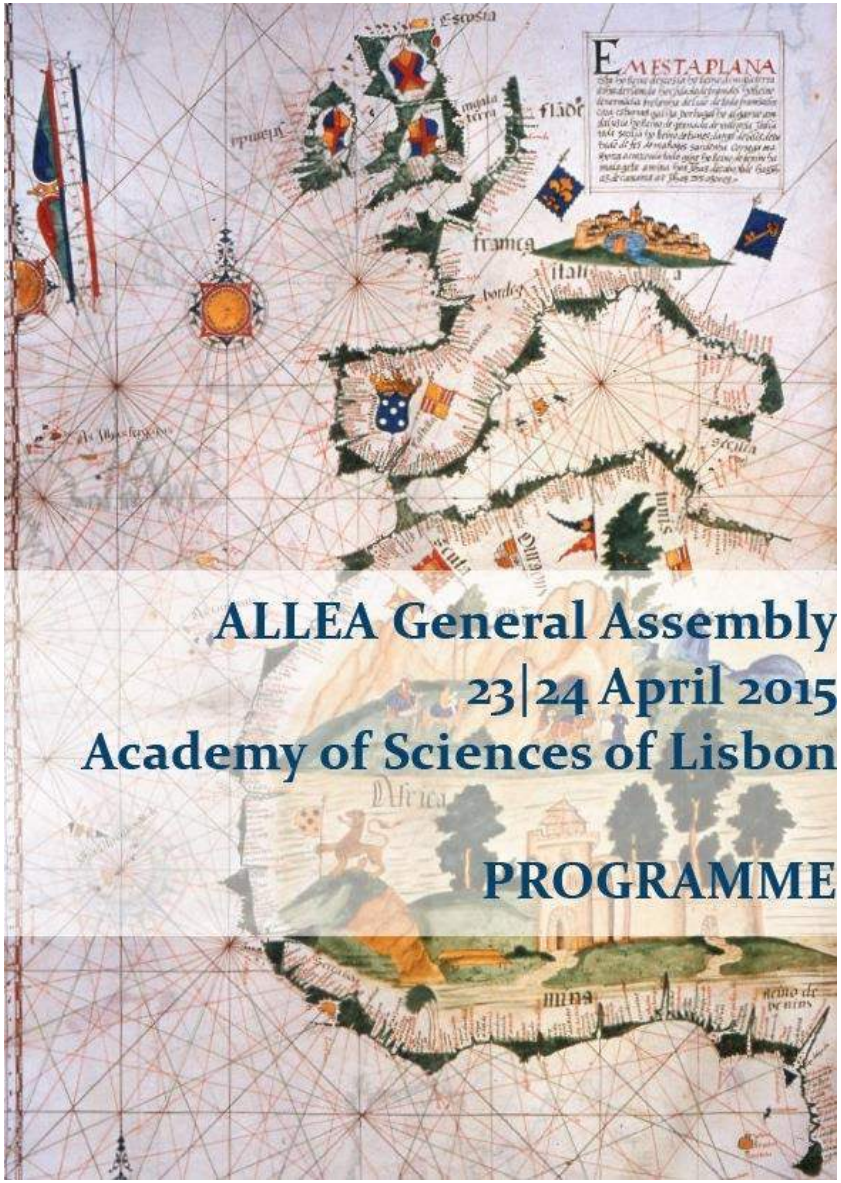
Science and Research in Europe

Past, Present and Future: 15 Years of Lisbon Agenda

Discussion

Perspectives and Conclusions

Chair: Prof. Günter Stock



Scientific Symposium

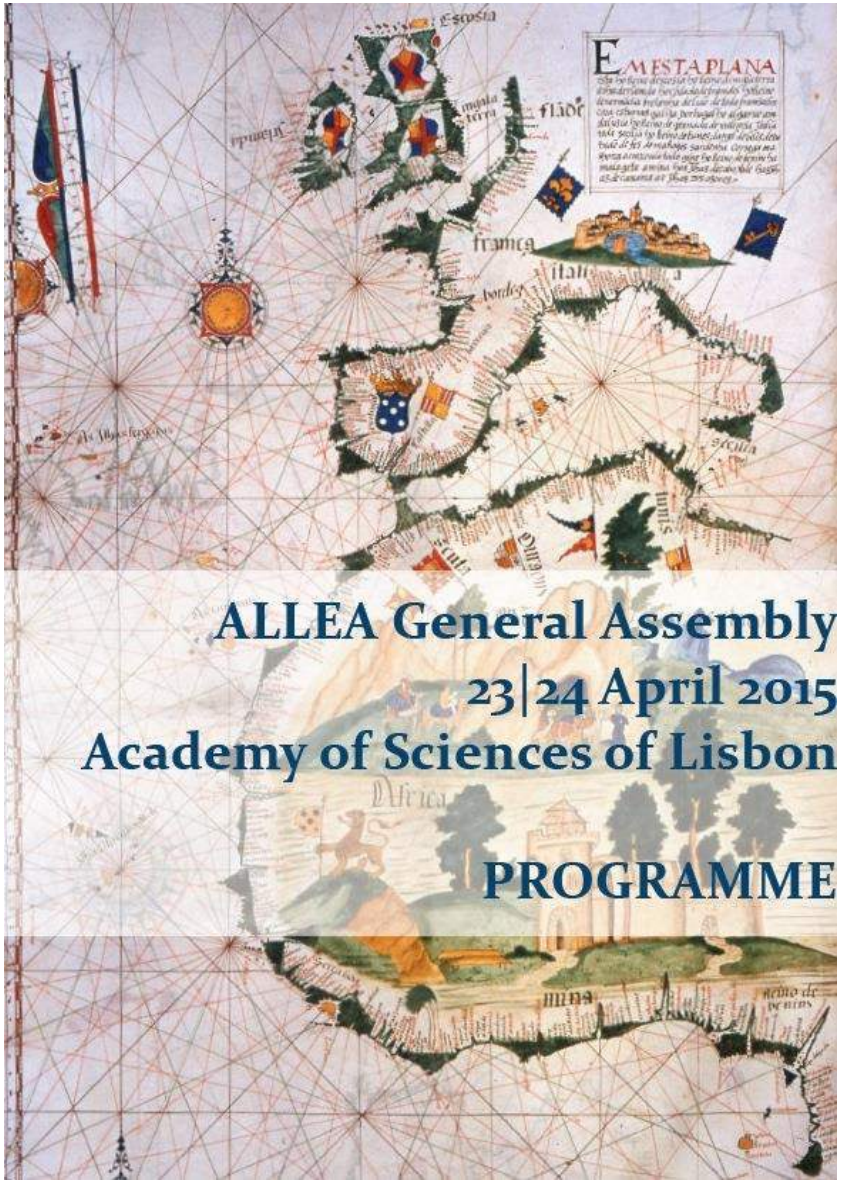
Science and Research in Europe

Past, Present and Future: 15 Years of Lisbon Agenda

Keynote Lecture

Competitive Europe: Funding and Excellence in the ERA

Prof. Emilio Lora-Tamayo
President, Spanish National Research Council - CSIC; Vice-President, Science Europe



Scientific Symposium

Science and Research in Europe

Past, Present and Future: 15 Years of Lisbon Agenda

ALLEA
ALL European Academies

Panel

European Universities in 2015 and Beyond

European Universities in 2015 – the view of LERU

Prof. Kurt Deketelaere (Secretary-General, League of European Research Universities - LERU)

Portuguese Universities in 2015 and beyond

Prof. Ana Costa Freitas (Rector, University of Évora; former member of BEPA)

The Special Case of Younger Universities in Portugal: Braga

Prof. António Magalhães Cunha (Rector, University of Minho, Braga)

UNIVERSIDADE DE ÉVORA
Ana Costa Freitas

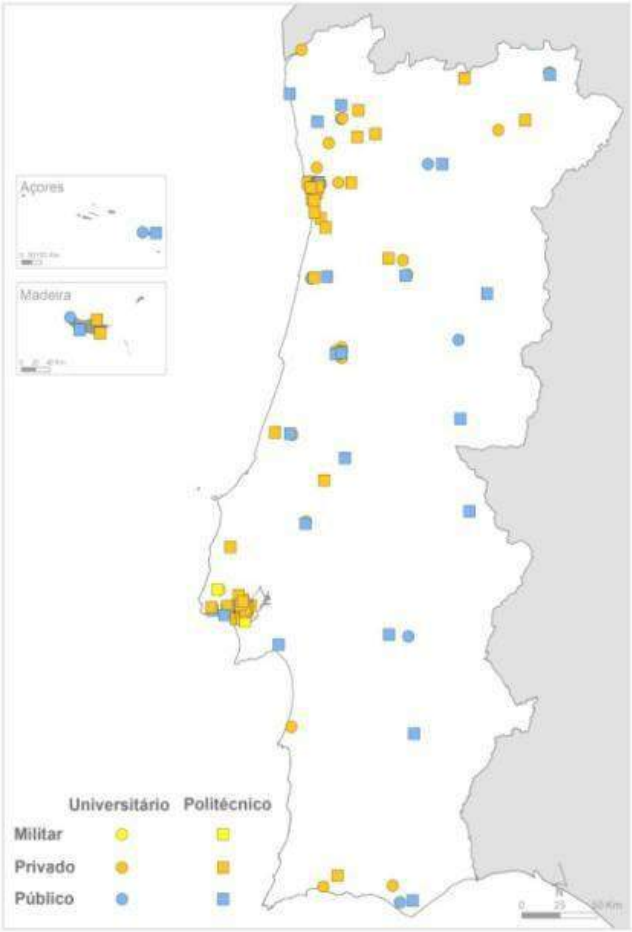
PORTUGUESE UNIVERSITIES IN 2015 AND BEYOND

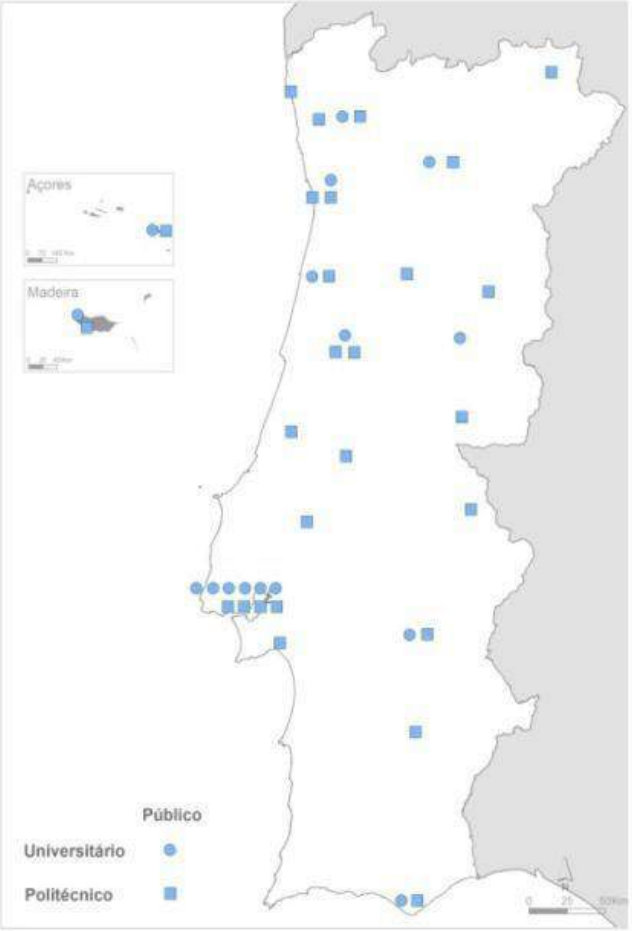
Academia das Ciências de Lisboa

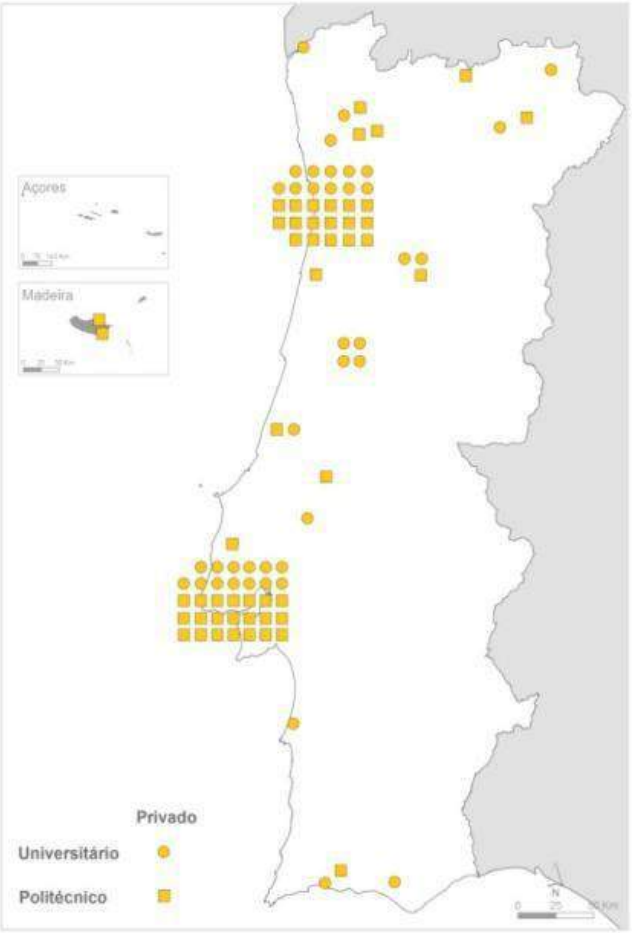
23 abril 2015

Science and Research in Europe – Past, Present and Future: 15 years of Lisbon Agenda

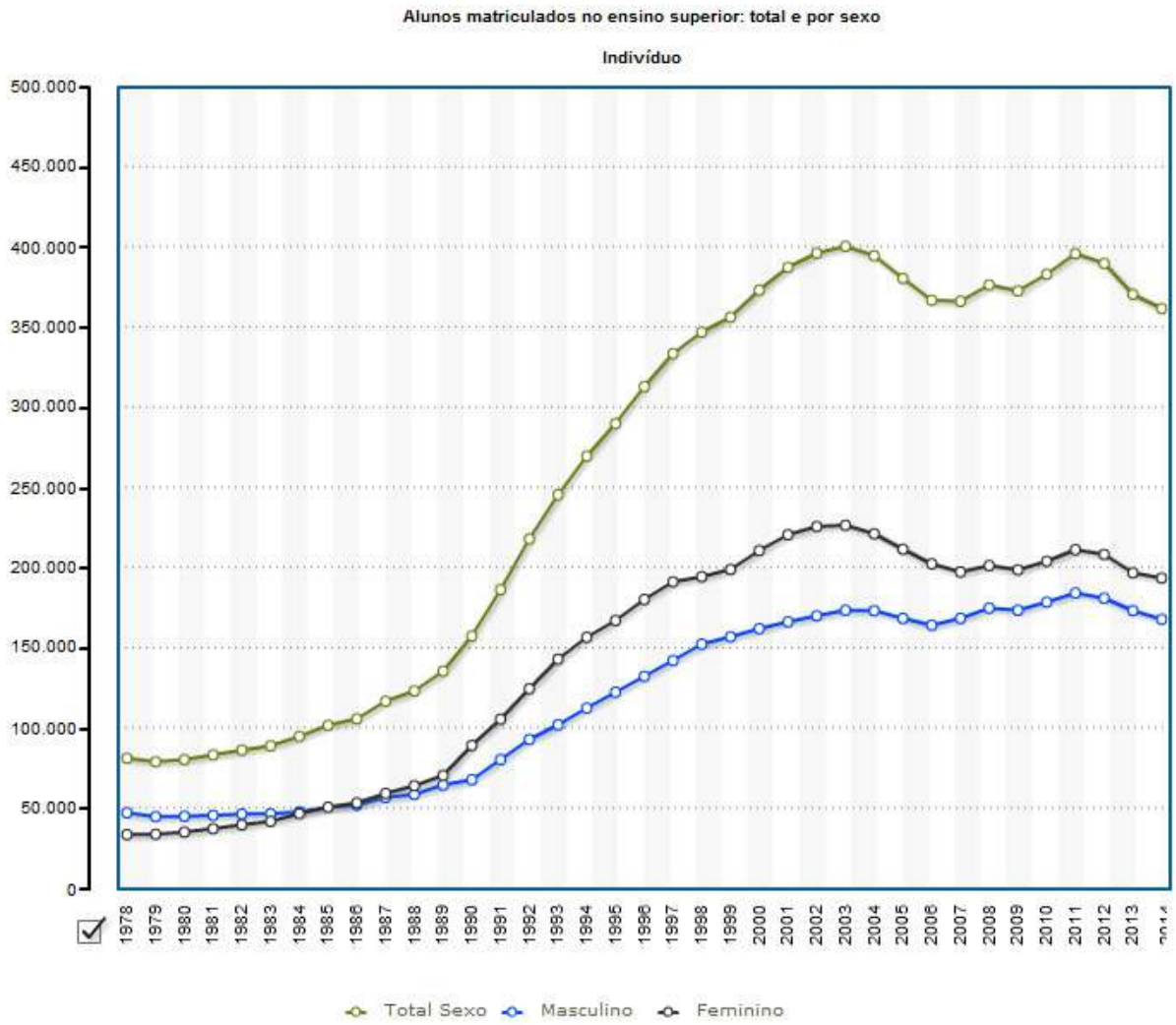
Portuguese Universities in 2015 and beyond



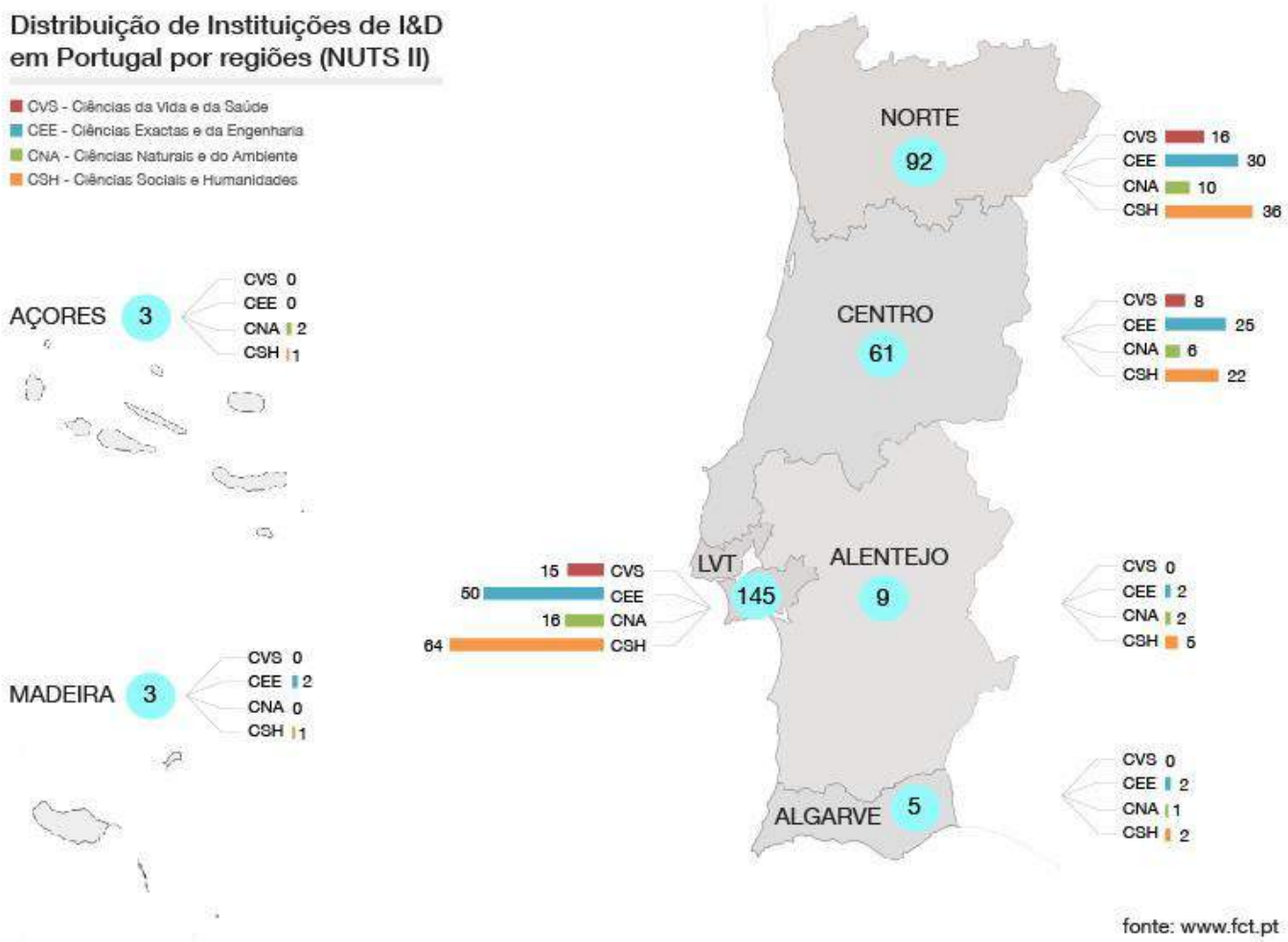




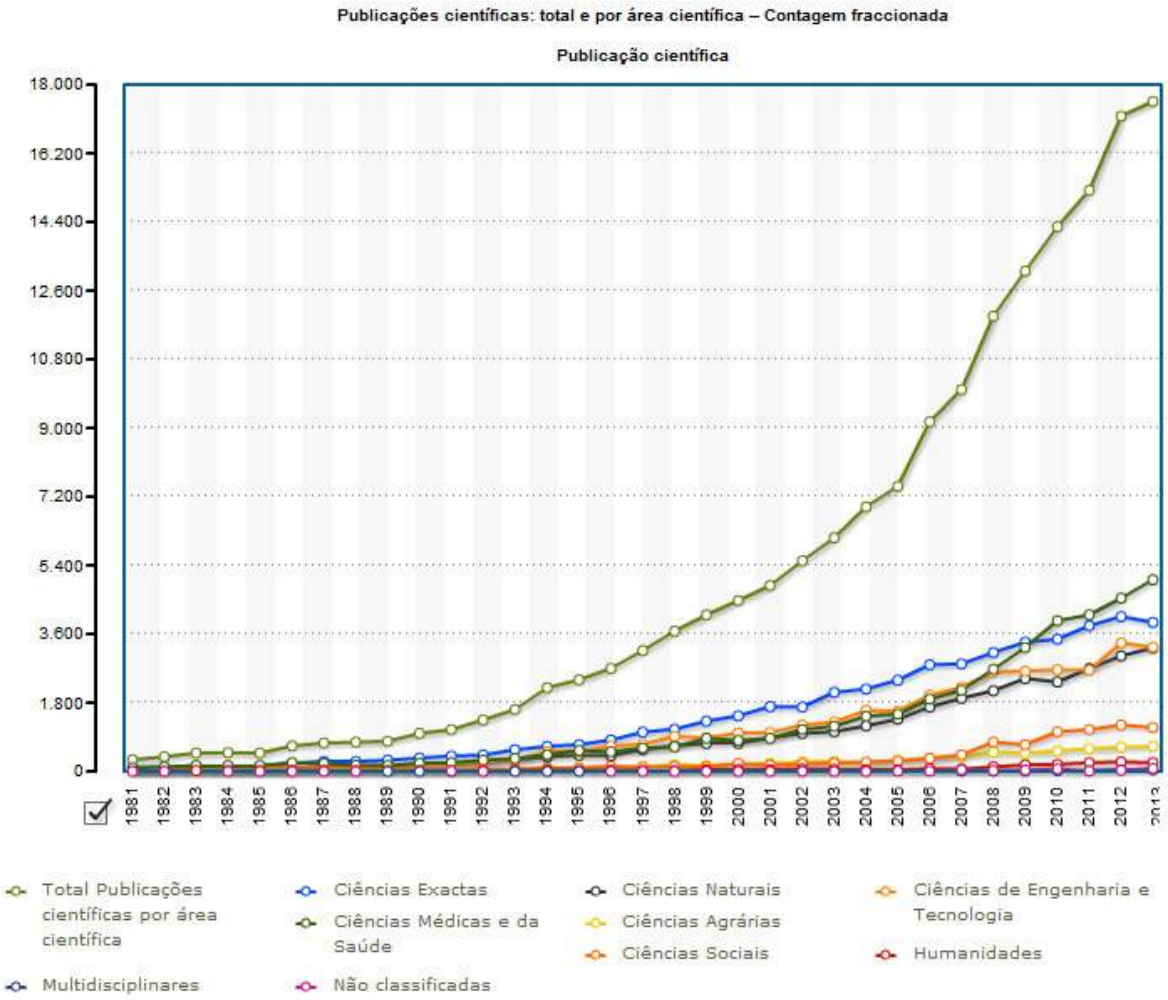
Portuguese Universities in 2015 and beyond



Portuguese Universities in 2015 and beyond



Portuguese Universities in 2015 and beyond



Portuguese Universities in 2015 and beyond

In spite the clear increase in research and the high number of institutions ...we are still far from the goals for E2020, in education % and we are still a medium innovator country.

THE FACT IS:

Higher education has not traditionally been seen as a leading player in the development arena.

Portuguese Universities in 2015 and beyond

BUT CLEARLY:

Universities are central to any sustainable effort to develop social and economic wellbeing.

In the world beyond 2015, will and should things be different?

Are we aware of the need to change?

The answer is clearly **YES!**

Portuguese Universities in 2015 and beyond

Universities are expected to play an increasingly prominent role in addressing societal issues, however society, and some times governments (and the Portuguese is no exception) still perceive UNIVERSITIES as remote, elite institutions detached from everyday life.

AND this has changed TOTALLY!

Portuguese Universities in 2015 and beyond

Universities in the world, and again Portugal is not an exception, are envolving themselves more and more with society.

HOW?

- ✓ By establishing partnerships with different organizations to ensure they reach and serve the right stakeholders in the right way.
- ✓ Ensuring knowledge transfer (not just technology transfer) is accomplished and competitiveness increases.

Portuguese Universities in 2015 and beyond

However:

In Portugal (and I just want to talk **in fact** of Portugal), Universities are facing growing constraints on their budgets following the 2008 recession.

And these constraints are slowly (not so slowly in fact) are spreading, as well, into the research budgets.

THIS is a NON SENSE!

Portuguese Universities in 2015 and beyond

BUT:

- ✓ We are aware of our mission(s)!
- ✓ We are fighting for diferenciated fundings!
- ✓ We are sustaining, to our limits, the QUALITY of the system!
- ✓ We know that the future depends on US!

Portuguese Universities in 2015 and beyond

Now let me talk for a while on the problems, or the challenges, faced by small and "regional" Universities

Which means:

- ✓ In PORTUGAL the system is not equal!
- ✓ The challenges are different!

Portuguese Universities in 2015 and beyond

Small and "regional" universities need to take into account "regional" needs but they need to balance local needs with the pressure for international visibility.

Is it possible to do both to the benefit of all?

YES!

International partnerships, in this global world in which we live, are A MUST.

Portuguese Universities in 2015 and beyond

To ensure there mission BEYHOND 2015 Universities need:

1. To address a multiplicity of missions
2. To engage with different stakeholders
3. Ensure Internationalization if they want to play the "global competition" (there is no other way . Globalization is a fact!)

Portuguese Universities in 2015 and beyond

All of these changes, we are aware of, need to be considered whilst:

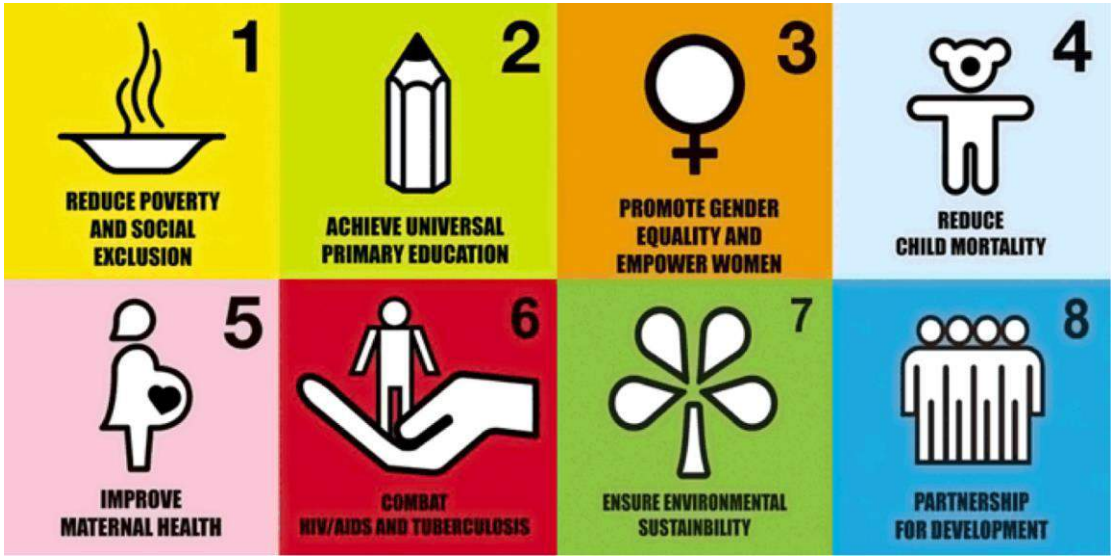
1. The funding crunch IS A FACT!
2. Competition is increasing!
3. Students are more demanding!
4. WWW is real, information travels faster and faster!
5. Traditional disciplinary boundaries have collapsed!
6. Teaching and Learning has changed!
7. Knowledge transfer is an obligation!
8. Excellence has to be a priority!

Portuguese Universities in 2015 and beyond

- ✓ We prepare the future!
- ✓ Our QUALITY determines the Quality of our FUTURE!
- ✓ **There is no FUTURE without EDUCATION!**

Portuguese Universities in 2015 and beyond

THANK YOU!



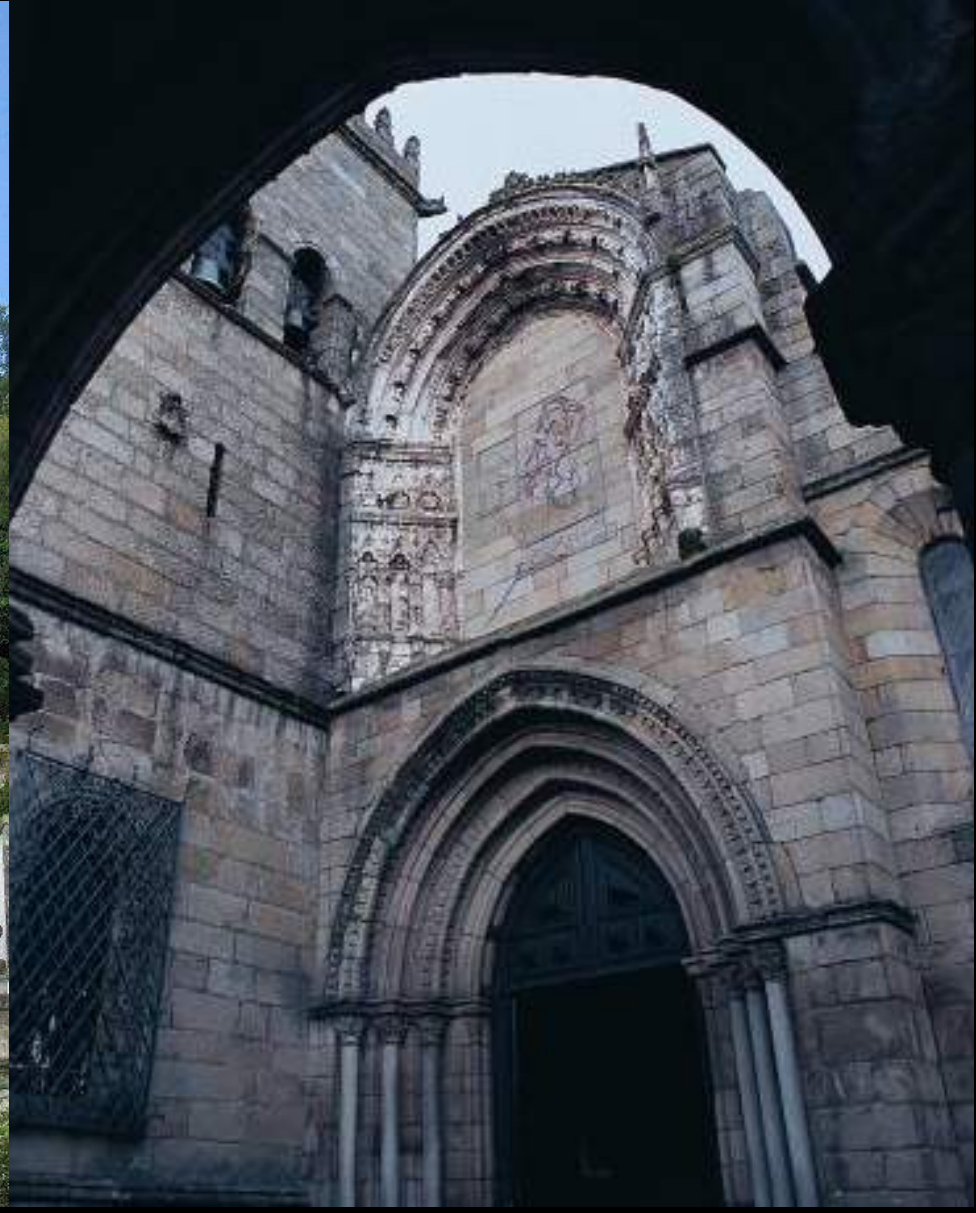
universidade do minho | www.uminho.pt


Universidade do Minho


PORTUGAL
SPAIN
La Coruña
Santiago de Compostela
Gijón
Santander
Oviedo
Bilbao
San Sebastián
Toulouse
Montpellier
Marseille
Toulon
Pamplona
Vitoria
León
Logroño
Andorra la Vella
Orense
Vigo
Burgos
Bragança
Braga
Guimarães
Valladolid
Zaragoza
Lleida
Sabadell
Barcelona
Tarragona
Porto
Salamanca
Guarda
Alcalá de Henares
Madrid
Móstoles
Leganés
Toledo
Leiria
Castelo Branco
Santarém
Valencia
Palma
Badajoz
Mérida
Albacete
Évora
Lisbon
Setúbal
Alicante
Elche
Murcia
Córdoba
Jaén
Cartagena
Huelva
Seville
Dos Hermanas
Granada
Faro
Jerez de la Frontera
Málaga
Almería
Cadiz
Marbella
Algeciras
Mediterranean Sea
Algiers
Alger
Bejaïa
Skikda
Blida
Ech Cheliff
Sétif

Braga

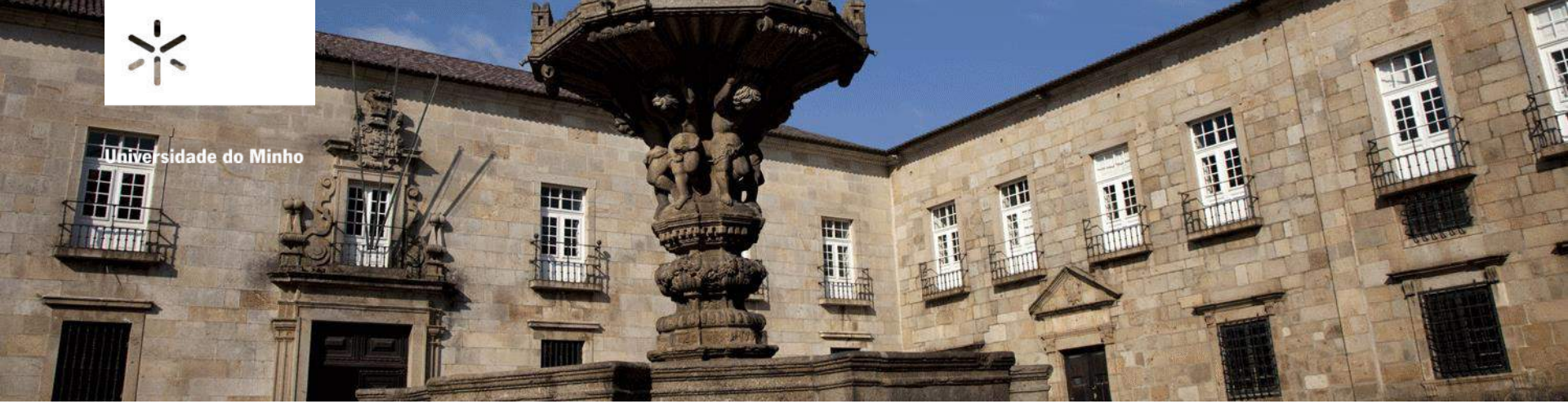
the ancient and 3rd Portuguese city



Guimarães

the cradle of the Portuguese Nation

UNESCO Human Heritage



universidade do minho / university of minho

Universidade do Minho

people

- **19 100 students**
- **1 300 faculty**

  900 as full-time academic staff (96% PhD)
- **850 technical and administrative staff**

  - 250 grant-holding researchers working in R&D projects and units
  - 900 students holding research grants working in the University's Research Centres
  - 30 tenured full time researchers
  - 50 post-doctorate scholarship researchers

infrastructures

2 main *campi*

- Campus of Gualtar (38 ha)
  Braga
  3rd Portuguese city

- Campus of Azurém (27 ha)
  Guimarães
  cradle of the Portuguese Nation

Gualtar Campus , Braga

Azurém Campus , Guimarães

4 multi-functional complexes

- Rectorate
  Historical building, Braga

- *Congregados*
  Historical building, Braga
  Music

- *AveParque*
  Science & Technology Park
  Laboratories; Incubator

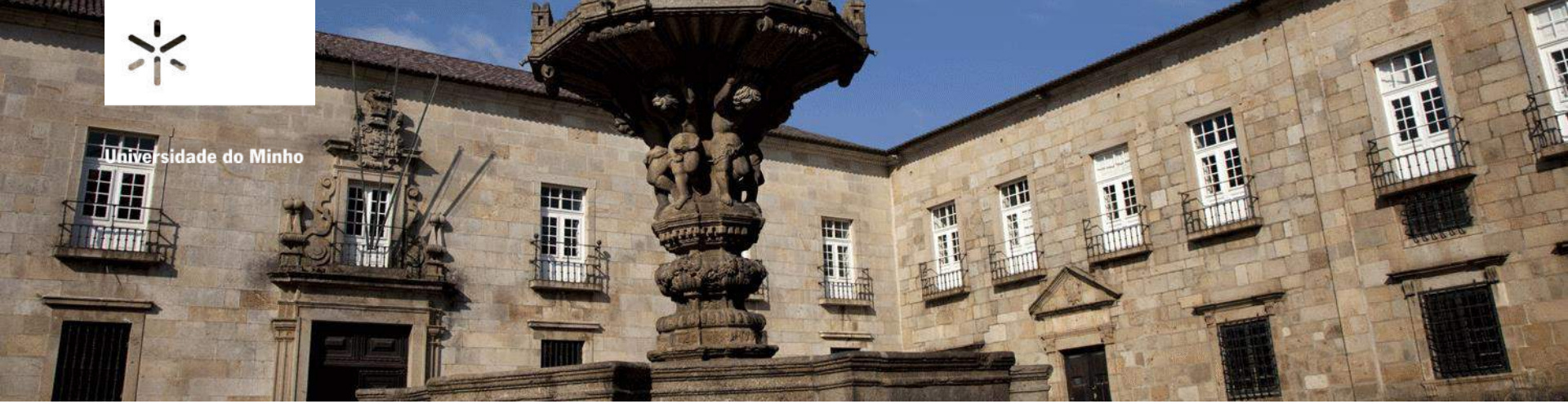
- *Couros*
  Guimarães,
  Post-graduation Centre
  Design Institute

Couros Campus , Guimarães

AvePark

schools / faculties

- Architecture
- Arts and Humanities
- Economics and Management
- Education
- Engineering
- Law
- Medicine
- Nursing
- Psychology
- Sciences
- Social Sciences



Mission

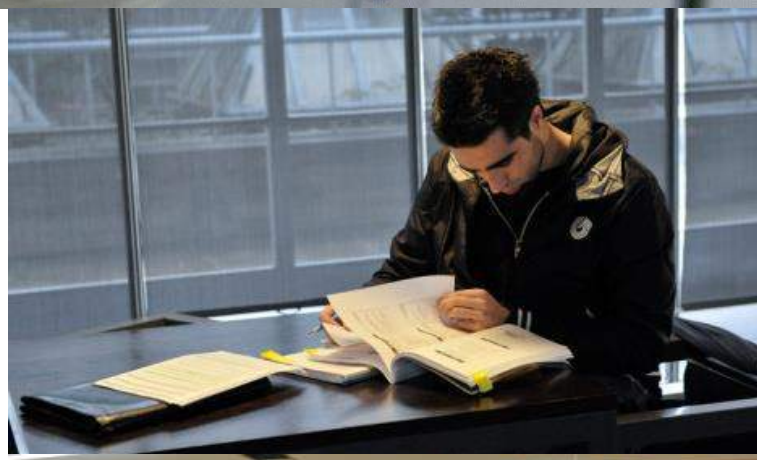
The University's mission shall be the creation, dissemination and application of knowledge, under the spirit of freedom of thought and plural critical judgments, through the promotion of higher education and the construction of a society paradigm based on humanistic principles, and having knowledge, creativity and innovation as cornerstones for growth, sustainable development, welfare and solidarity

teaching

- 55 undergraduate and integrated master degrees
- 110 master courses
- 40 doctoral courses

- advanced training courses

- 19 100 students
  8 000 undergraduate students
  4 500 integrated masters degree students
  4 500 master students
  2 100 doctoral students



Inter-institutional teaching projects

- Students mobility (700 in/out, 300 protocols worldwide)
- 25 joint programs at master and doctoral level
  - Europe
  - EUA (MIT and CMU) and China
  - Brazil, Angola, Mozambique, Cape Verde and East-Timor
- Erasmus Mundus / Erasmus+ Masters
- Double diplomas (Portugal and Europe)
- European doctorate and master degrees


孔子学院
Instituto Confúcio
Universidade do Minho

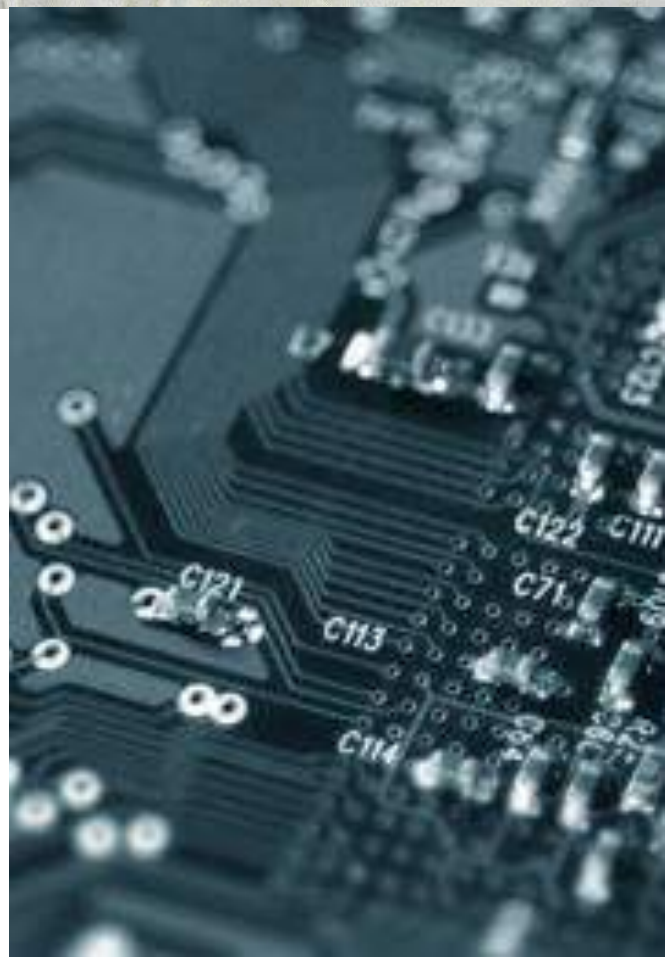
UNU
Operating Unit

e-governance

UNITED NATIONS UNIVERSITY

research units

- 27 Research Centres
- 15 ranked as *Outstanding, Excellent or Very Good* (80% researchers)
- Associated Labs: bioengineering
  computing
  medicine & biomaterials
  particle physics
  polymers & nanomaterials
- European Institute of Excellence in Tissue Engineering and Regenerative Medicine



Universidade do Minho

research results

- > 22 000 scientific papers produced at UMinho:
  1 512 ISI-WoS in 2014
  1 900 Scopus in 2014

- > 33 000 academic publications stored in ***RepositoriUM***
  (University's Open Access Institutional Repository)
  > 2 100 000 downloads/year

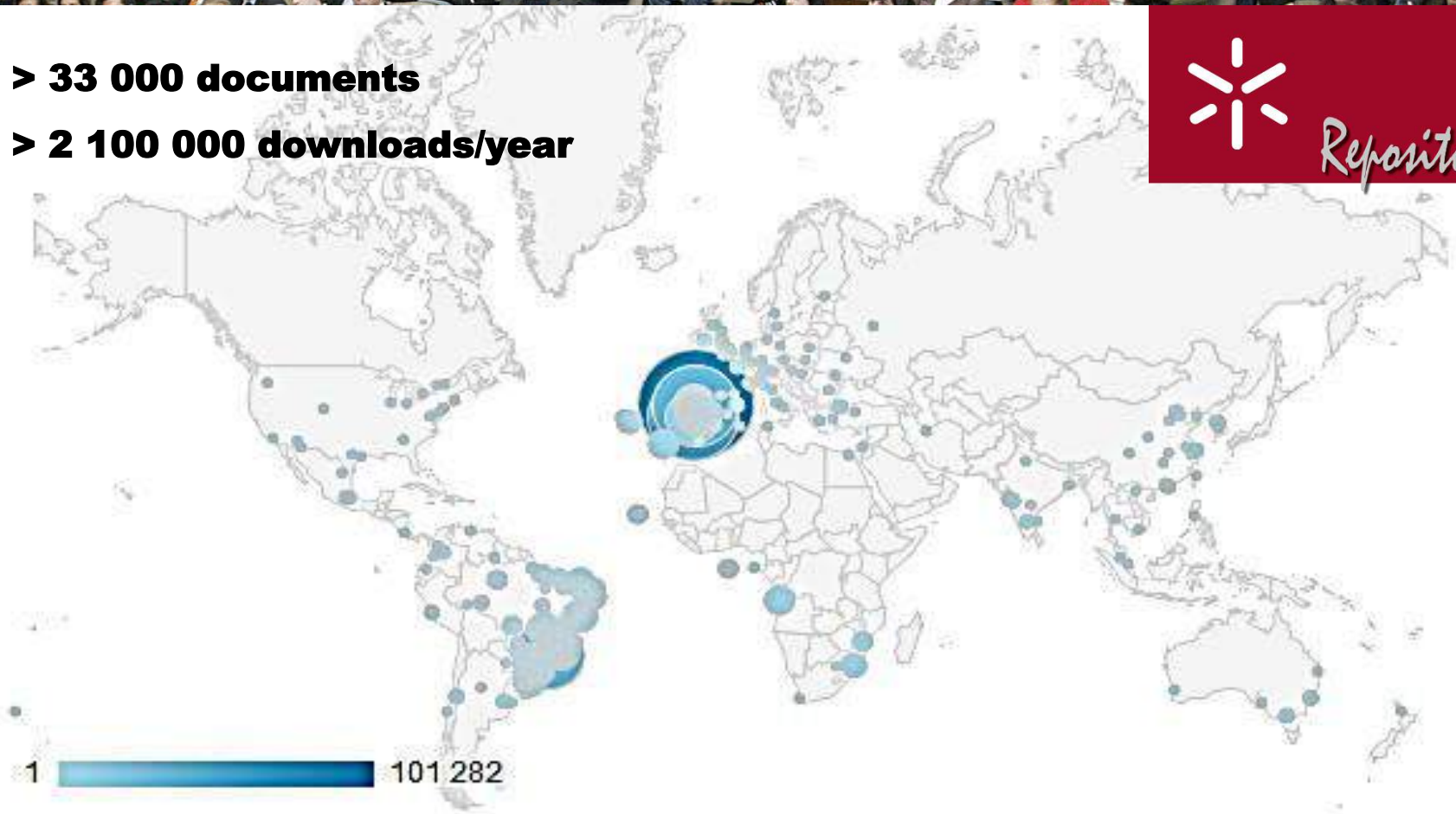
- 150 registered patents since 2000

  - 2014: 35 applications

> 33 000 documents

> 2 100 000 downloads/year

RepositóriUM



innovation and knowledge valorisation

AvePark - Science and Technology Park

Spinpark - Technology-based Incubator

- Valorisation of knowledge
- 50 companies in the areas of communication and information technologies, biotechnology/environment and new materials
- 500 people involved
- Customised training for enterprises; support and protection of industrial property, patent registration

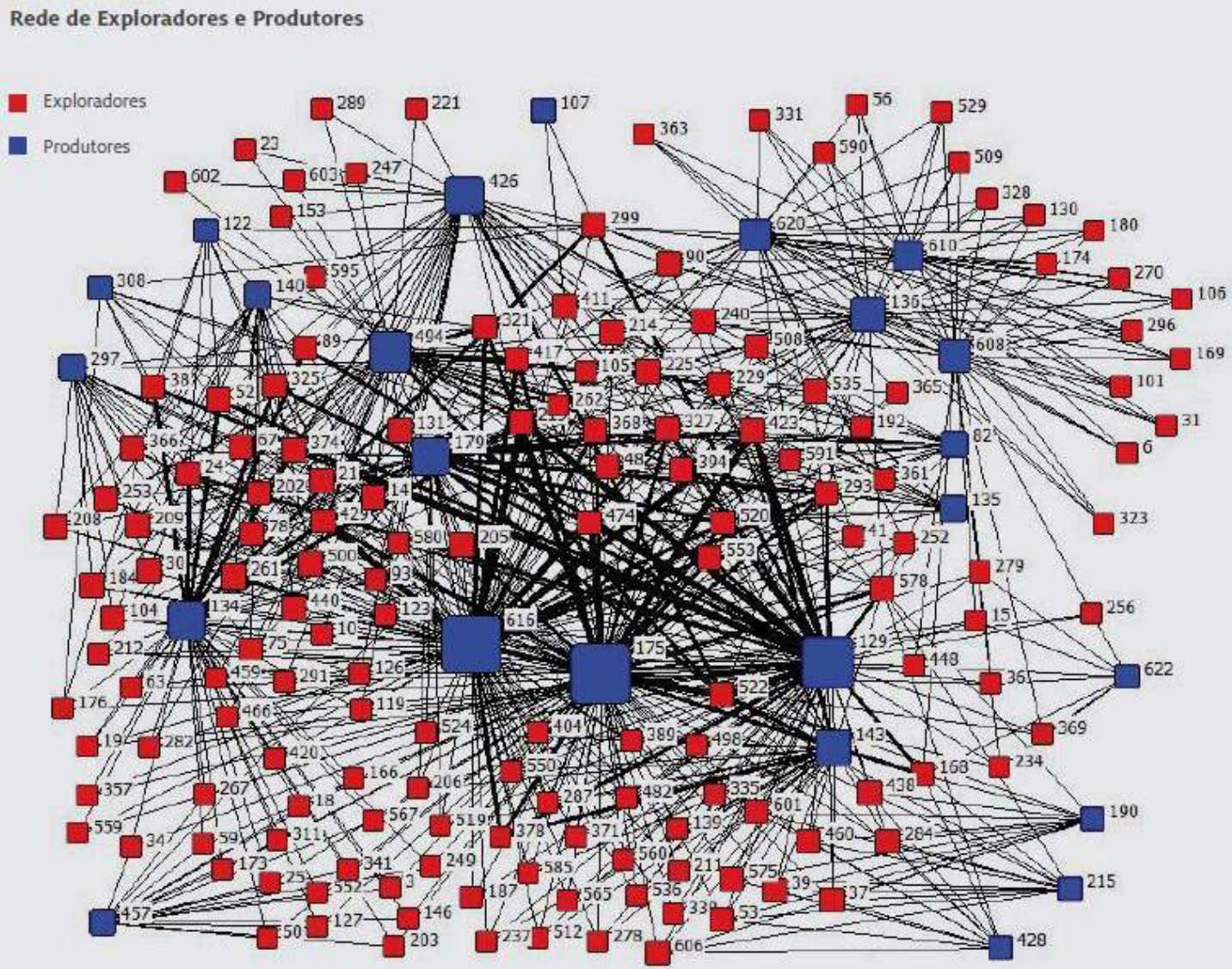
- **TecMinho**: intellectual property management and entrepreneurship promotion

interface units

- Centro Clínico Académico, **2CA**
  Academic Clinic Centre
- Centro de Computação Gráfica, **CCG**
  www.ccg.pt *Centre for Computer Graphips and Virtual Reality*
- Centro para a Valorização de Resíduos, **CVR**
  www.cvresiduos.pt *Centre for Residue Valorisation*
- Instituto para Bio-Sustentabilidade, **IB-S**
  Sustainable solutions
- Instituto de Design, **IDG**
  Design Institute
- Inovação em Engenharia de Polímeros, **PIEP**
  www.piep.pt *Innovation in Polymer Engineering*

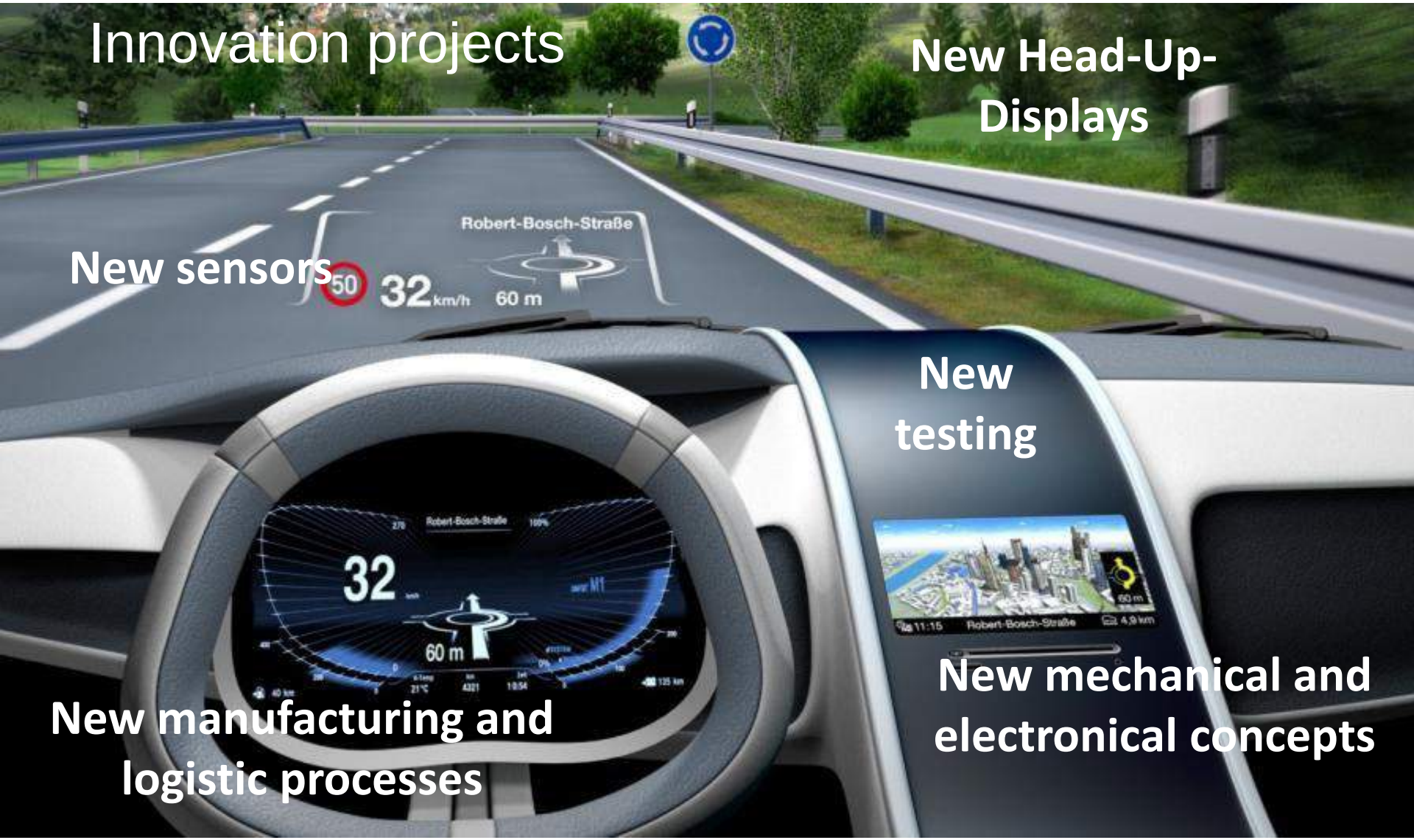
[redacted]

UMinho ecosystem for entrepreneurship and innovation



As entidades com maior centralidade na rede são a **Universidade do Minho** (175), a Faculdade de Engenharia da Universidade do Porto (616) e a Universidade de Aveiro (129). Fazendo um segundo círculo, mais alargado, de centralidade na rede, encontramos ainda a Universidade de Coimbra (143), a Universidade da Beira Interior (179), o Centi – Centro de Nanotecnologia e Materiais Técnicos, Funcionais e Inteligentes (494) e o Instituto Superior Técnico (134).

Innovation projects



New Head-Up-Displays

New sensors

New testing

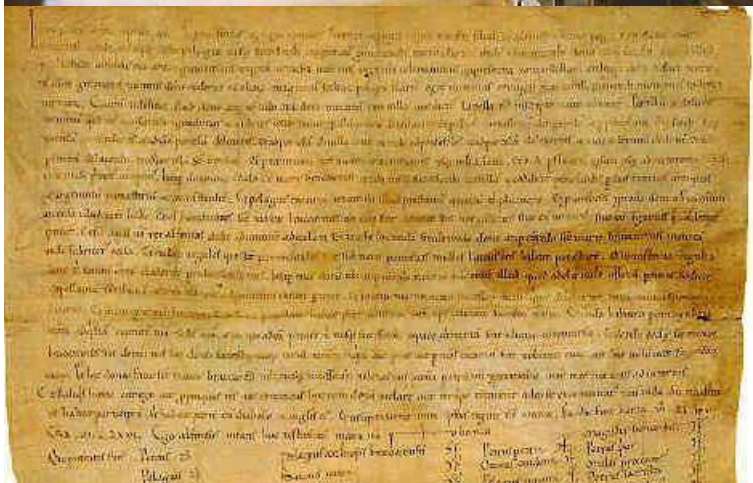
New manufacturing and logistic processes

New mechanical and electronical concepts

cultural and special units

- the District Archive of Braga
- the Public (historical) Library of Braga
- the House Museum of Monção
- the *Lusíadas* Study Centre
- the Nogueira da Silva Museum
- the Archaeology Unit
- the Adult Education Unit

- **Lúcio Craveiro da Silva Library**
  - partnership with the Braga City Council
  > 1 300 visitors/day




University Orchestra

Universidade do Minho

best European university in sports
(EUSA ranking 2013)

sports

- 471 students wit
- 112 medals in nati
- European champion
  Handball (2012, 2013 2014)
- > 7 000 students enrolled in sport activities
- > 140 sport events in the university each year

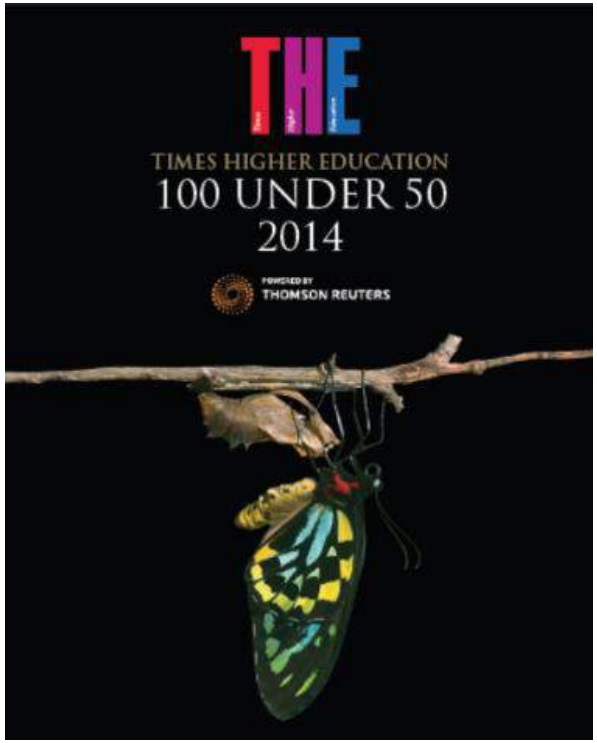
(2014 figures)

Quality assurance

- Quality Assurance System

  SIGAQ-UM

  A3ES Certified



POWERED BY
THOMSON REUTERS

Universidade do Minho

the future

Challenges

Opportunities

Strategy

the future

- UMinho 2020, Strategic Plan

Sustainable growth to win the future

UMinho strategy 2020

Universidade do Minho

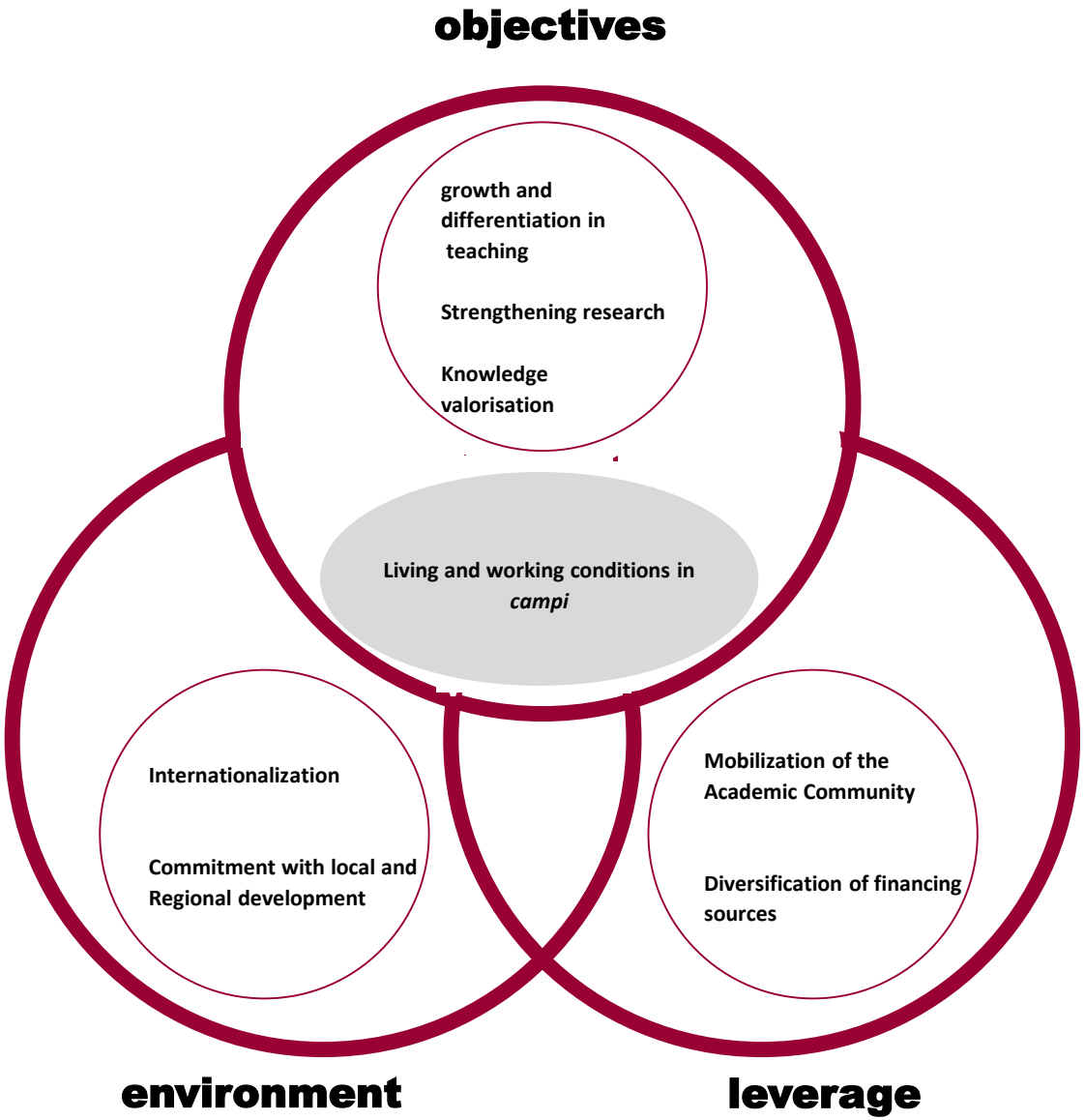
Objetives UMinho 2020

25.000 students
(45% Msc & PhD)
development on-line
teaching

international reference
in research

Portuguese university
with higher impact in
social & economic
development

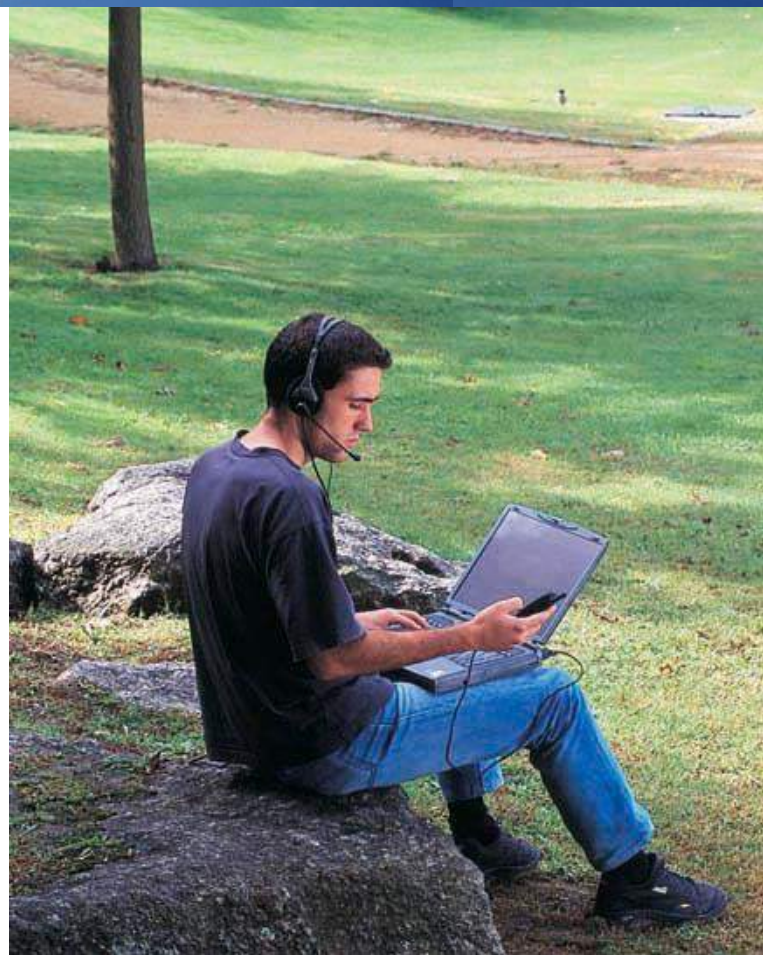
top Portuguese university
in major performance
indicators



Universidade do Minho

the future (... in teaching)

- Teaching-research coupling
- Internationalization
- New publics and e-learning
- Emerging areas
- Teaching (also) in English
- Teaching Support Center



Universidade do Minho

the future (... in research)

- International partnerships
- Groups of excellence
- Multidisciplinary areas with societal relevance
- Mobility of students and researchers

Universidade do Minho

the future (... of the Region)

- development of UMinho / Regional innovation ecosystem
- engagement in the economy of creativity
- commitment with intelligent specialization strategies …. EU2020 / RIS3
- cultural promotion and production

NORTE 2020

Smart Specialization Strategy

Priority Domains

University-Regional partnerships for Smart Specialization

Northern Portugal

University Consortium

UNorte.pt

- University of Minho (UMinho)
  19 000 students
- University of Porto (UPorto)
  31 000 students
- University of Trás-os-Montes e Alto Douro (UTAD)
  8 000 students

Universidade do Minho

key concepts

Openness

- Open access / Open innovation / Open education

International

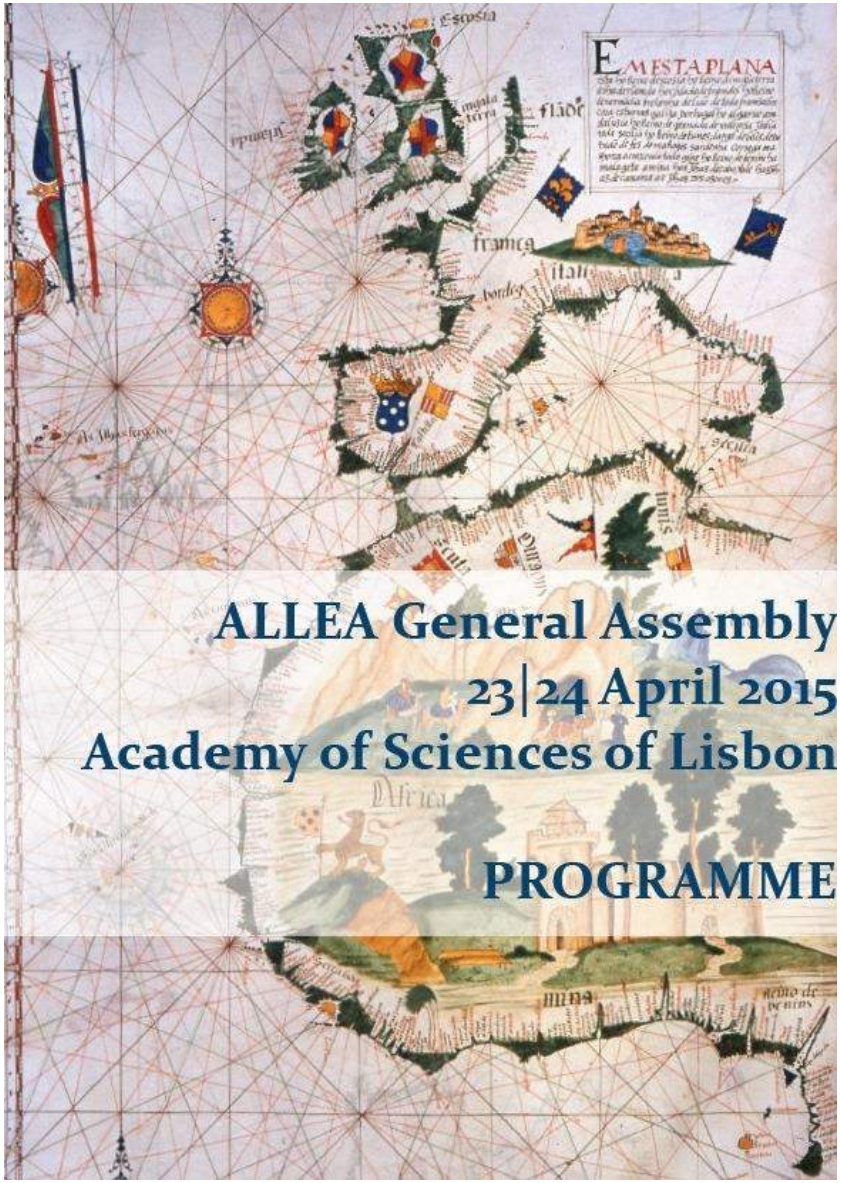
Coupling education and research

Creativity

Ethics

universidade do minho | www.uminho.pt

www.uminho.pt



Scientific Symposium

Science and Research in Europe

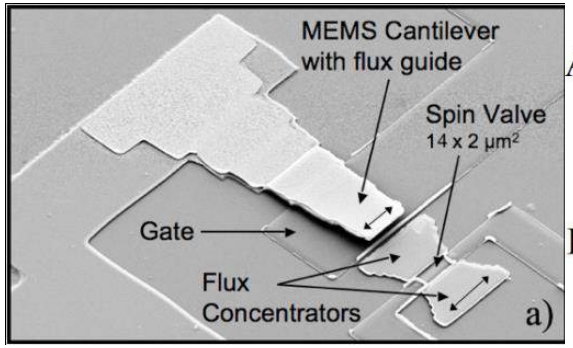
Past, Present and Future: 15 Years of Lisbon Agenda

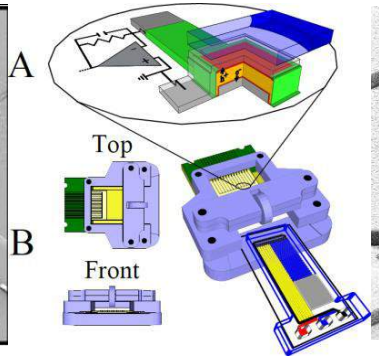
Showcase

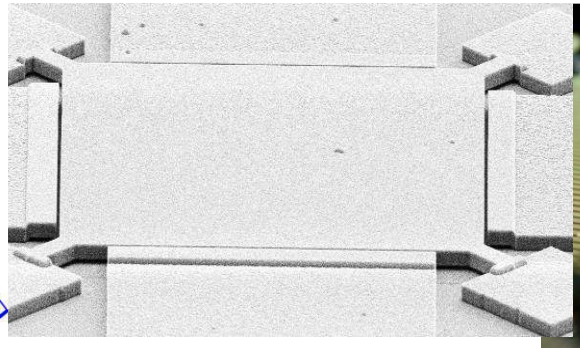
Excellent Science in Portugal

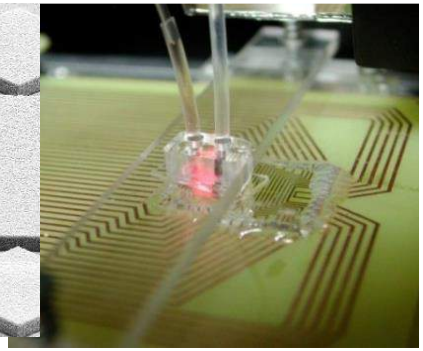
Prof. João Pedro Conde
Instituto Superior Técnico, Lisbon

Prof. Nuno Ferrand
University of Porto









Showcase: Excellent Science in Portugal - Nanotechnology

João Pedro Conde

INESC Microsistemas e Nanotecnologias and IN - Institute of Nanoscience and Nanotechnology, Lisbon, Portugal

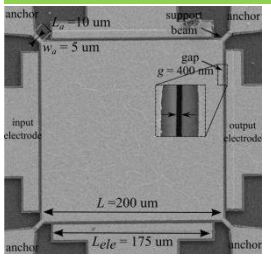
Dept. of Bioengineering, Instituto Superior Técnico, University of Lisbon, Lisbon, Portugal

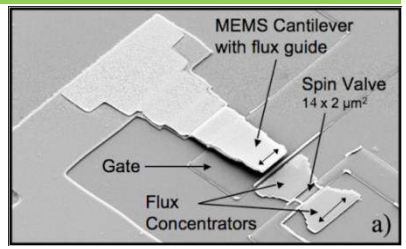
ALLEA General Assembly 23-24 April 2015 – Academy of Sciences of Lisbon

Thin-film MEMS and BioMEMS group at INESC-MN

<u>Thin-film silicon MEMS and NEMS</u>

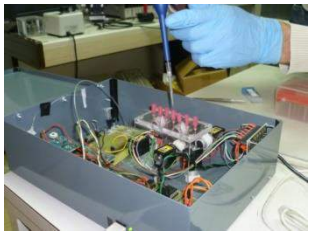
- Amorphous and nanocrystalline silicon MEMS and NEMS
- Large area applications
- CMOS integration
- Electromechanical biosensing

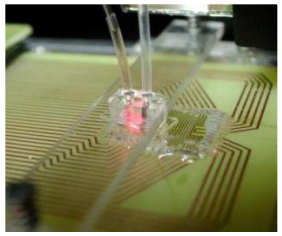




<u>Lab-on-chip biosensing systems</u>

- Integration of optical detection
- Electrical detection
- Integrated multiplexed systems for toxin and biomarker detection
- Integrated sample preparation
- Capillary fluidic handling

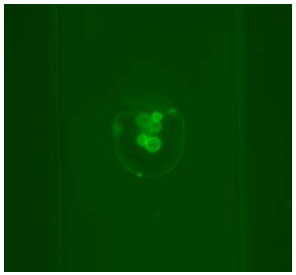


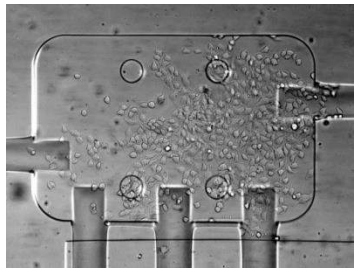


PRO Sense

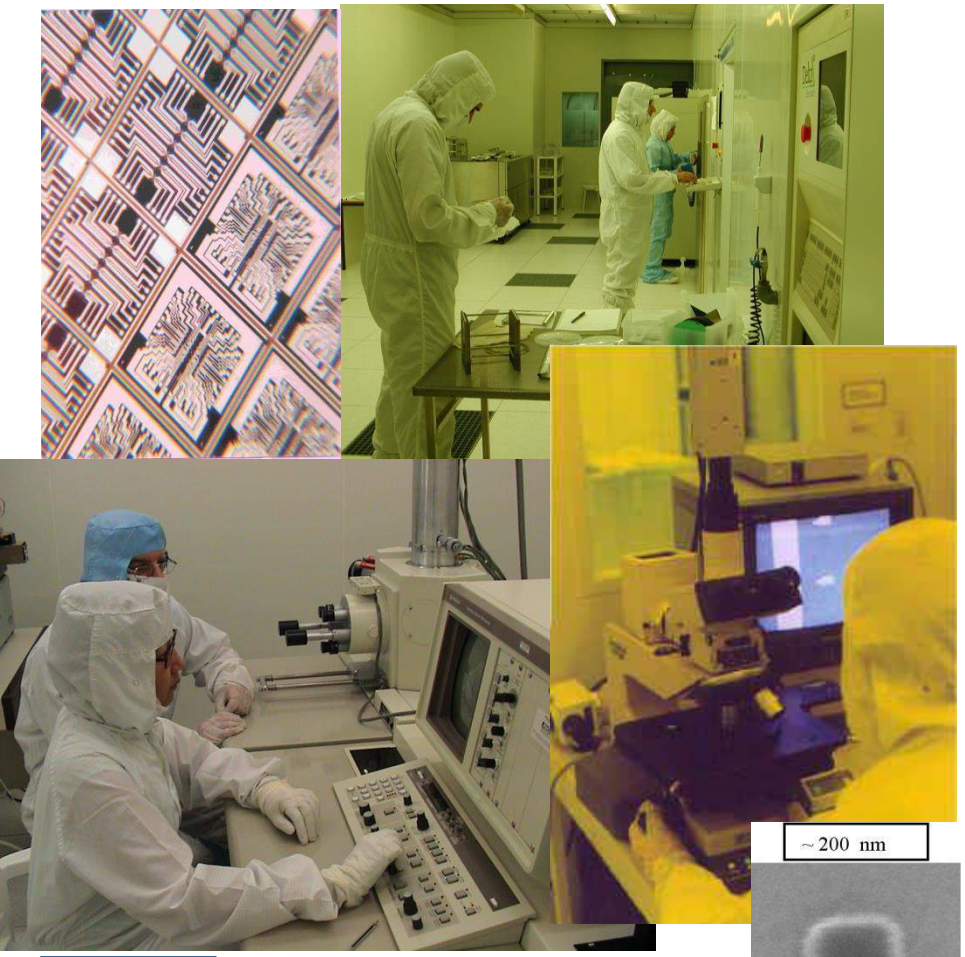
<u>Cell-chips for biomedical research</u>

- Cell-culture in microfluidics
- Single cell tests for Parkinson´s disease
- GCPR high-throughput testing
- Cell-cell communication
- Electronic “Petri-dish”

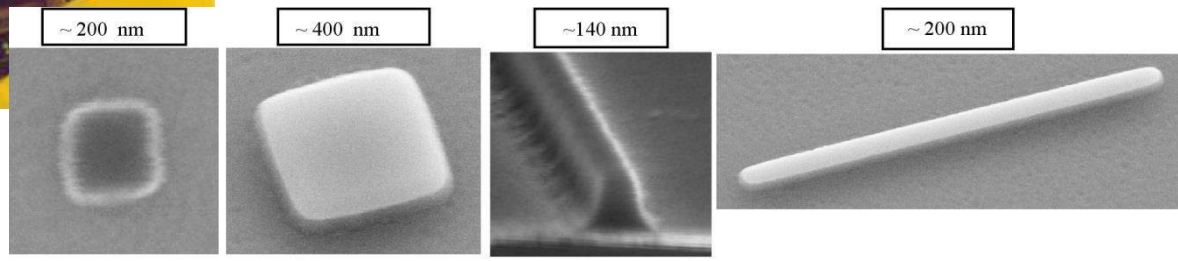




INESC Microssistemas e Nanotecnologias – INESC MN
the infrastructure for micro and nanofabrication



- Class 100/10 cleanroom (~100 m^2) constructed in 1992/1993
- Micro and nanofabrication for feature sizes down to 1.2 µm (optical) and 20 nm (e-beam)
- Chemical wetbench for biological processing in Class 100 cleanroom
- Class 10,000 area for support equipment and film deposition laboratory (~150 m^2)
- Laboratories for film and device characterization (electronic, optical, micromechanical and biological)
- Laboratory for soft-lithography



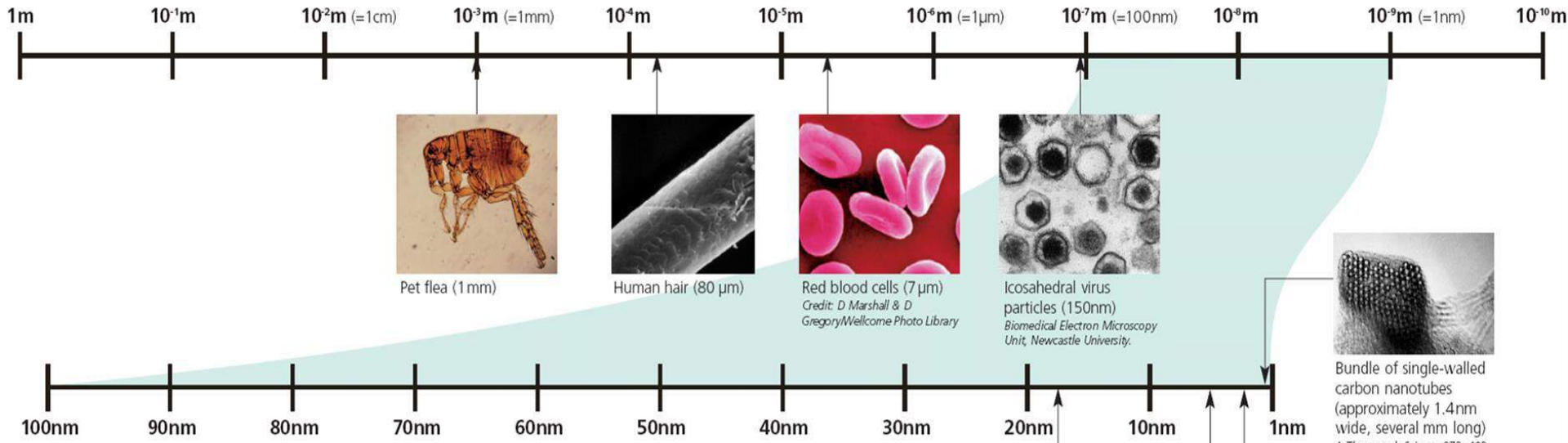
INESC MN
Microsistemas &
Nanotecnologias

The Lisbon node of the Micro&NanoFabs@PT of the Roteiro Nacional de Infrastructures

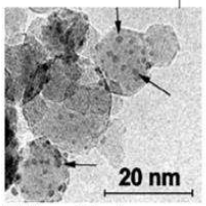
The main idea:
there is plenty of room at the bottom
and this room is different!

Football (approximately 22 cm)

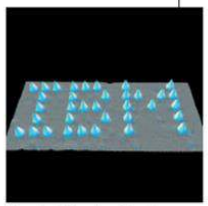
carbon 60 (0.7 nm)
R. Drautz



Bundle of single-walled carbon nanotubes (approximately 1.4 nm wide, several mm long)
A Thess et al, Science 273, 483, 1996



Platinum/Titanium dioxide particles (Platinum particles less than 3 nm in diameter are indicated by arrows on titanium dioxide)
R Strobel et al, J Catal 222, 296, 2003



Each letter in the logo is about 5 nm from top to bottom.
Image reproduced by permission of IBM Research, Almaden Research Center. Unauthorized use not permitted.

Strand of DNA (approximately 2 nm wide)

Figure 2.1. Length scale showing the nanometre in context. The length scale at the top ranges from 1 m to 10^{-10} m, and illustrates the size of a football compared to a carbon 60 (C_{60}) molecule, also known as a buckyball. For comparison the world is approximately one hundred million times larger than a football, which is in turn one hundred million times larger than a buckyball. The section from 10^{-7} m (100 nm) to 10^{-9} m (1 nm) is expanded below. The lengthscale of interest for nanoscience and nanotechnologies is from 100 nm down to the atomic scale - approximately 0.2 nm.

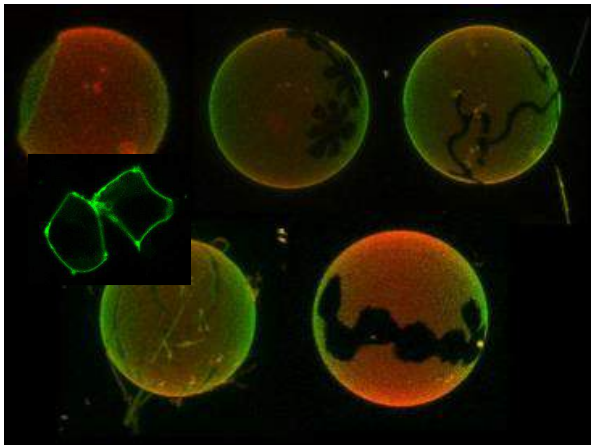
Royal Academy of Engineering

What is nanoscience and nanotechnology?

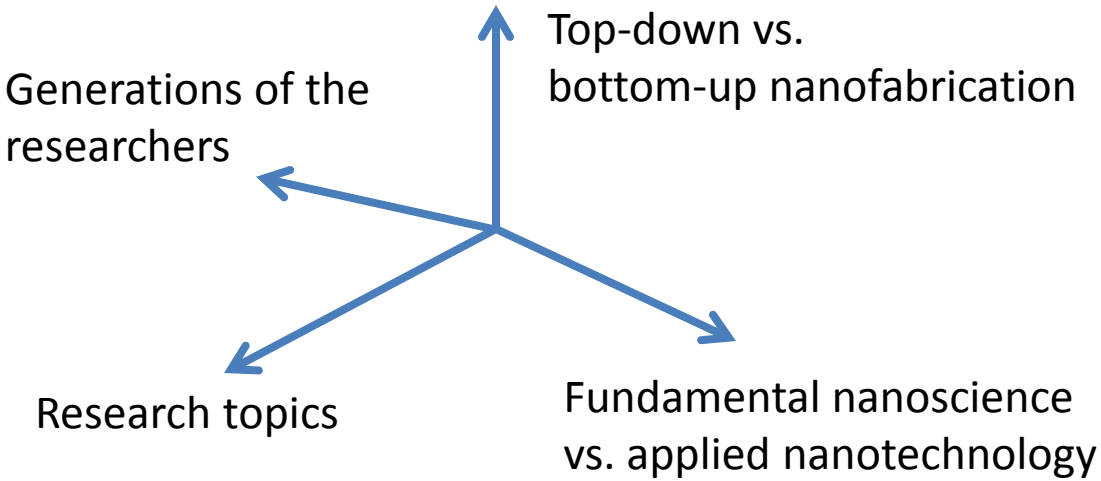
- ***Nanoscience*** is the study of phenomena and manipulation of materials at atomic, molecular and macromolecular scales, where properties differ significantly from those at a larger scale.

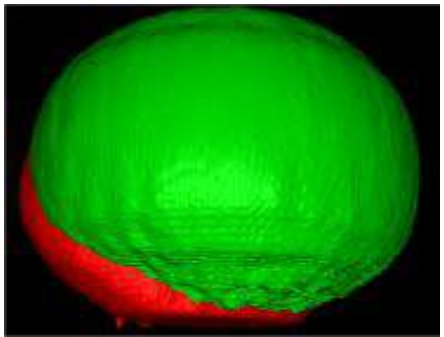
- ***Nanotechnologies*** are the design, characterization, production and application of structures, devices and systems by controlling shape and size at nanometre scale.

Interdisciplinar !



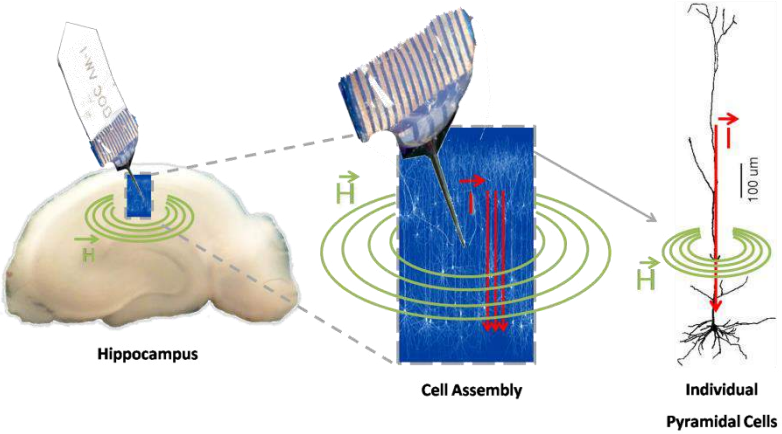
Projection of giant unilamelar vesicles (GUVs) obtained using confocal microscopy, using different lipid mixtures and showing the presence of several phases.
Fluorescence and Biosystems Group – CQFM/Técnico/UL and IN – Manuel Prieto



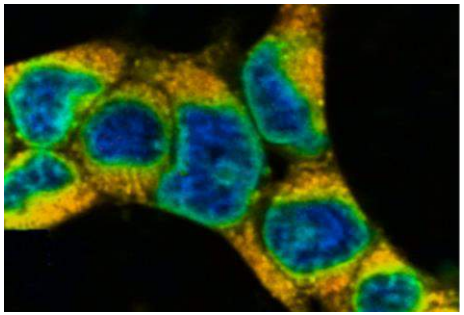


Science and applications of nanotechnology

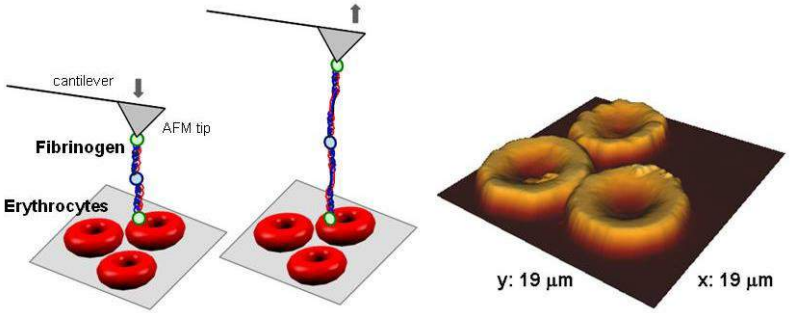
- Nanostructured products, nanomaterials
- Electronics, optoelectronics and information and communication technology
- Lab-on-a-chip and chemical micro process engineering
- Nanobiotechnology and nanomedicine



Magnetoresistive sensors for measuring neuronal activity
INESC MN and IN and INL – Paulo Freitas



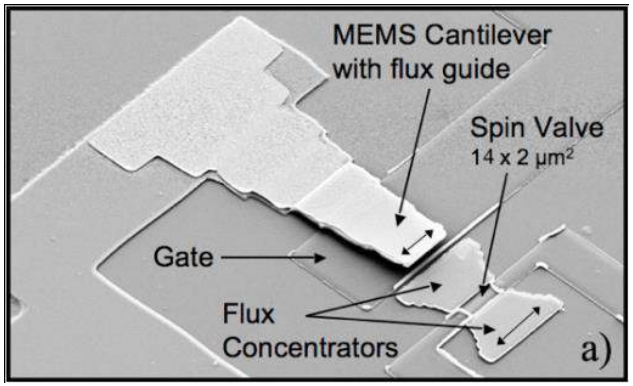
Hybrid nanoparticles for DNA testing
CQFM/IN/Técnico/UL – Gaspar Martinho



Fibrinogen-erythorcyte interactions in cardiovascular diseases
Biomembranes Research Unit IMM/UL – Nuno Santos

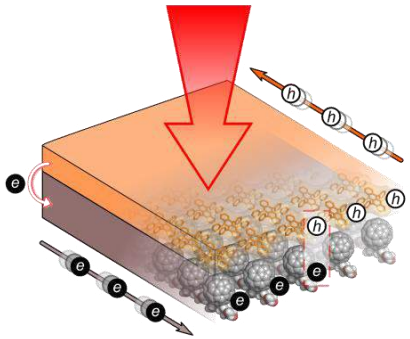
Top-down vs. bottom-up micro and nanofabrication

Top-down
Micro and nanofabrication cleanroom-based technology



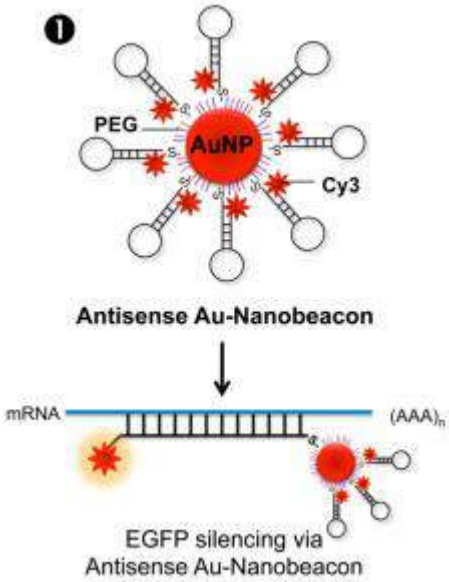
High sensitivity magnetic sensor integrated with a thin-film silicon MEMS field modulator
INESC MN and IN – Paulo Freitas and João Pedro Conde

Photovoltaics – Hybrid metal nanostructures and organic charge-transfer interfaces
Optical and Multifunctional Materials Group – CQFM/Técnico/UL and IN – Gaspar Martinho



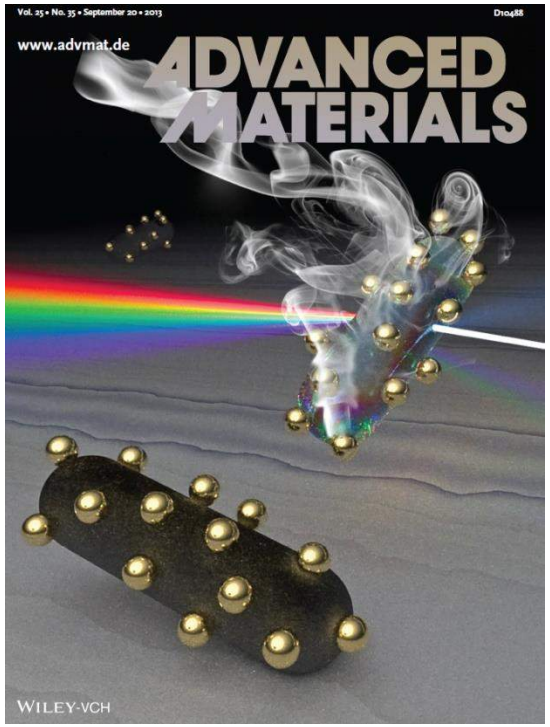
Bottom-up
Self-Assembly
Nanoparticles
Self-assmbled monolayers

Nanodiagnostics EGFP silencing via Antisense Au-Nanobeacon
Nanomedicine@FCT/UNL – Pedro Baptista

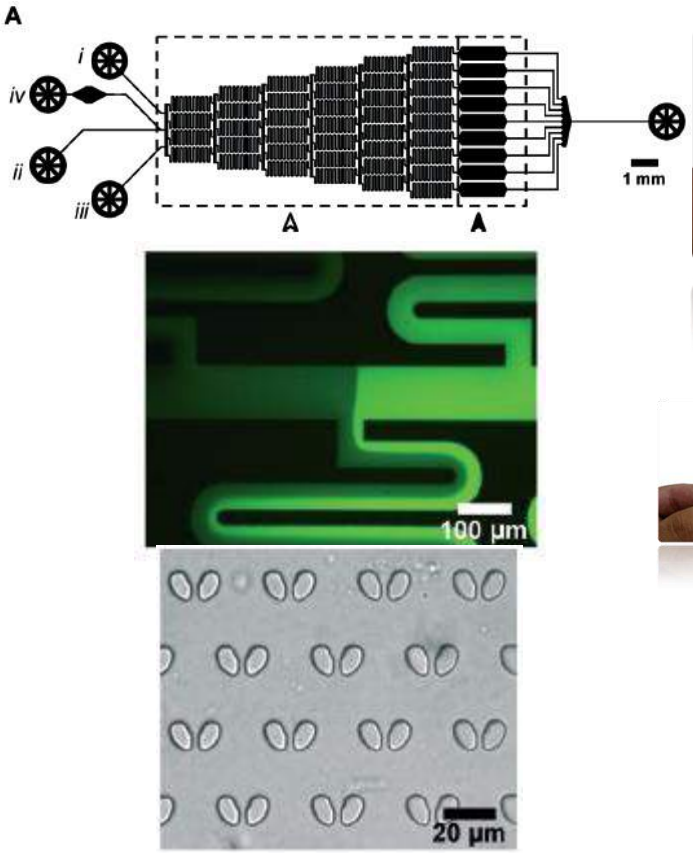


Fundamental nanoscience and applied nanotechnology

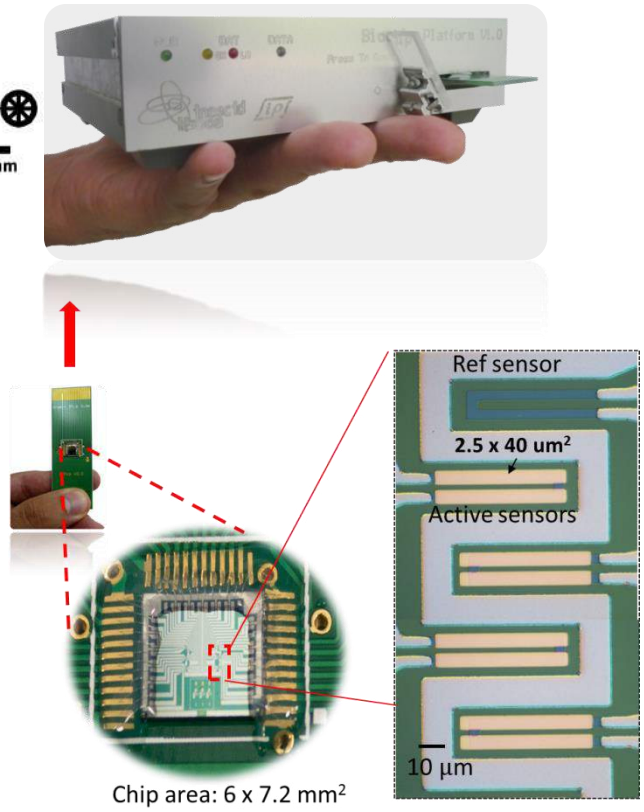
Fundamental → Applied



Au NP surface-decorated (Gd,Yb,Er)2O3 nanorods as a thermometer nanoplatform
Ciceco/UAveiro – L.D. Carlos



Lab –on-chip system for medical research
INESC MN and IN – João Pedro Conde

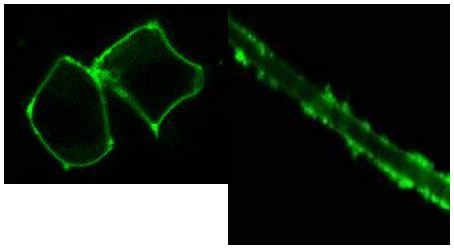


Point-of-care MR biochip diagnostic platform
INESC MN and IN – Paulo Freitas

A topic for all generations of researchers

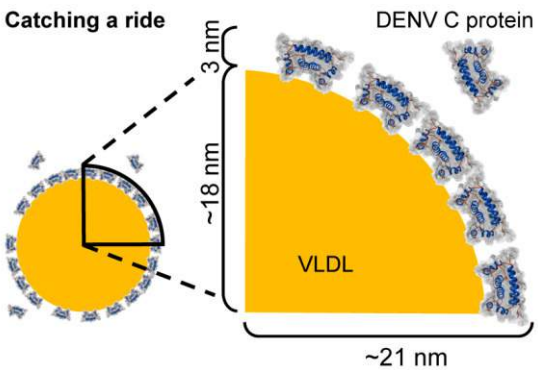
PhD

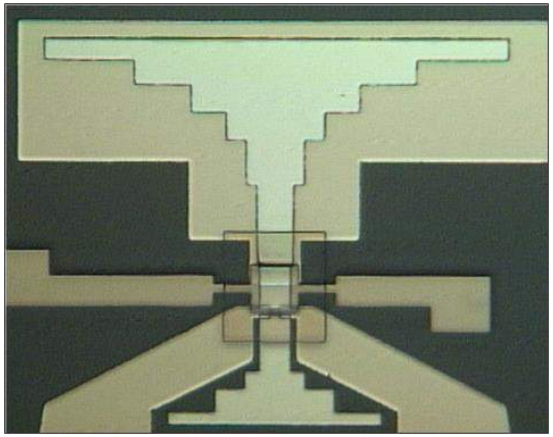
80´s **90´s** **00´s**



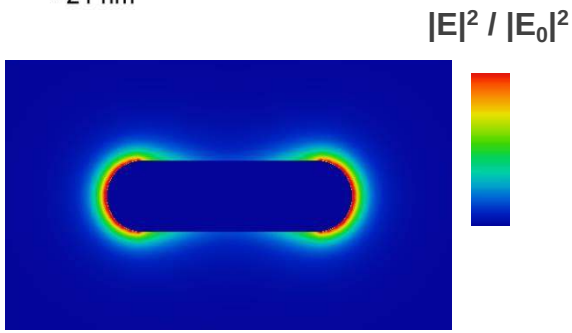
Nanoscale organization of lipids in biomembranes
Fluorescence and Biosystems Group – CQFM/Técnico/UL and IN – Manuel Prieto

Dengue virus capsid protein: towards a novel drug target.
Biomembranes Research Unit IMM/UL – Nuno Santos





Spintronic-MEMS hybrid
INESC MN and IN – Paulo Freitas and João Pedro Conde



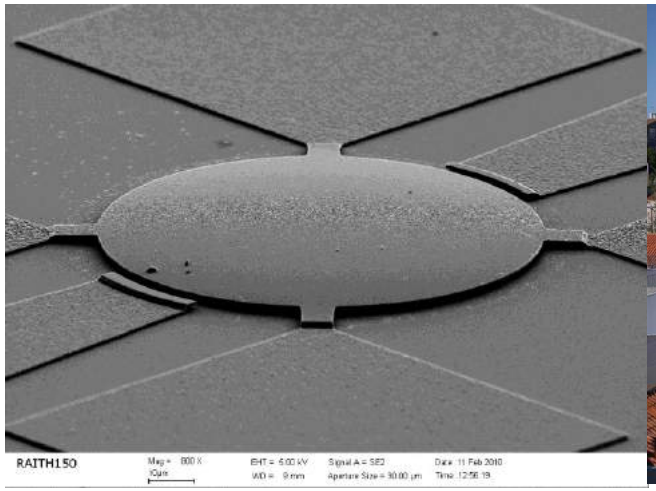
Plasmonic nanorods for fluorescence enhancement
Molecular Photochemistry CQE/Técnico/UL – Pedro Paulo

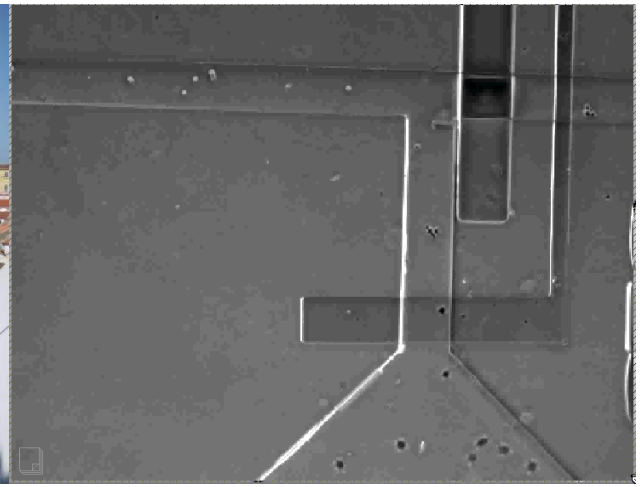
A set of final comments from Lx, PT

- Science and research in Europe is <u>not</u> a level playing field
  - Resources
  - Industrial environment
  - Organization and focus
- Necessary to give opportunities for independent research to younger scientists and researchers
  - At the universities need Assistant Professor jobs with start-up funds and strong tenure reviews
  - Increase mobility
- Excellent students/young researchers/scientists
  - Fear extensive departures at 2nd cycle and doctoral level without being able to attract corresponding European candidates
- Increasing entrepreneurial activity
  - Need to support communication between university and industry

Workshop nano14 — Shaping the future

ACADEMIA DAS CIÊNCIAS DE LISBOA





Thank you!

joao.conde@tecnico.ulisboa.pt
www.inesc-mn.pt

Lisbon Strategy 2000

Teaching and research should be better coordinated at the European level

This can be achieved by creating networks of national and joint research programmes

InBIO RESEARCH NETWORK

Biodiversity and Evolutionary Biology

CIBIO

Centro Ecologia Aplicada "Prof. Baeta Neves"

U.PORTO

U LISBOA

UNIVERSIDADE DE EVORA

UNIVERSIDADE DOS AÇORES

Mission Statement

Advance scientific knowledge
in the field of biodiversity and evolutionary biology

Improve and Integrate
taxonomic and biogeographic knowledge at different scales

Use Scientific Data
from wild and domestic breeds to improve species management

Apply scientific knowledge
to propose conservation priorities and management tools

Provide top level MSc & PhD programs
in evolutionary and conservation biology

Foster public awareness,
understanding and appreciation of biodiversity

InBIO

Milestones

2003	2006	2009	2011
concept	presentation	reformulation	Associated Lab status

CIBIO

2002 — Very Good — Excellent

foundation

Centro Ecologia Aplicada "Prof. Baeta Neves"

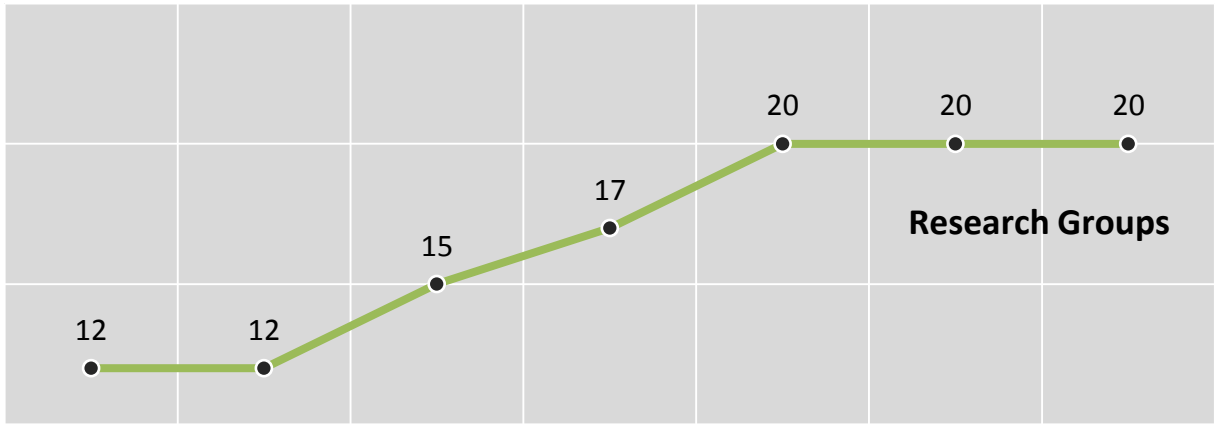
FCT Evaluation 2003

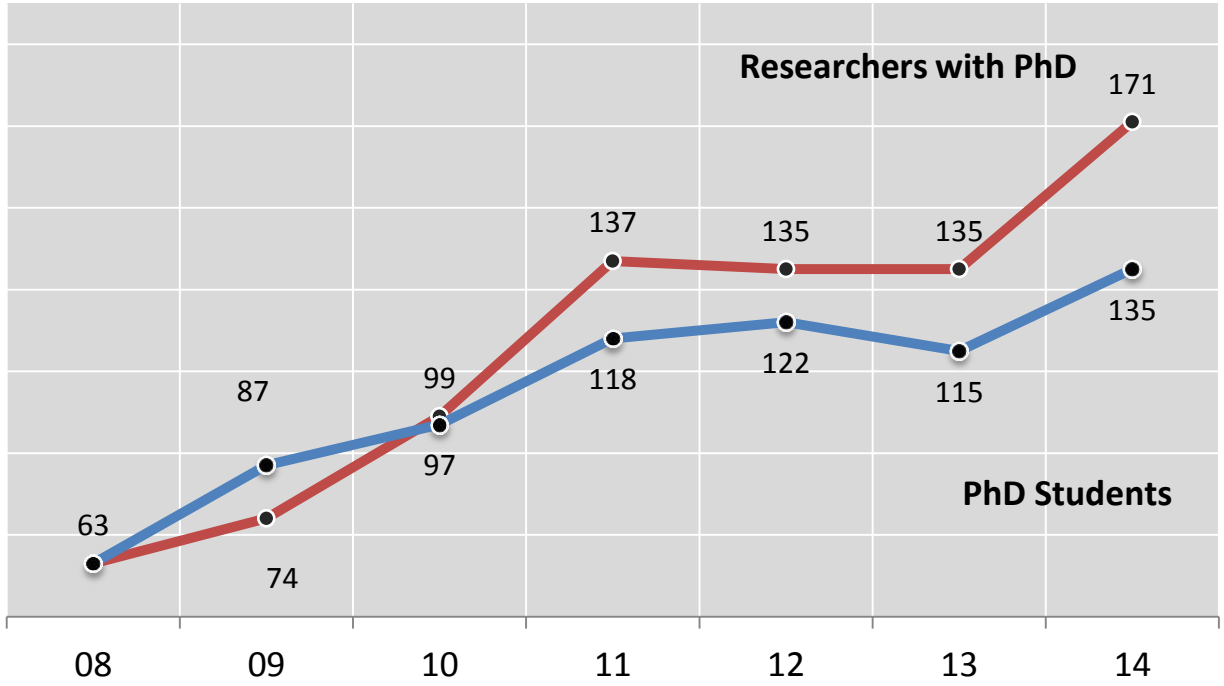
FCT Evaluation 2008

Very Good — Very Good

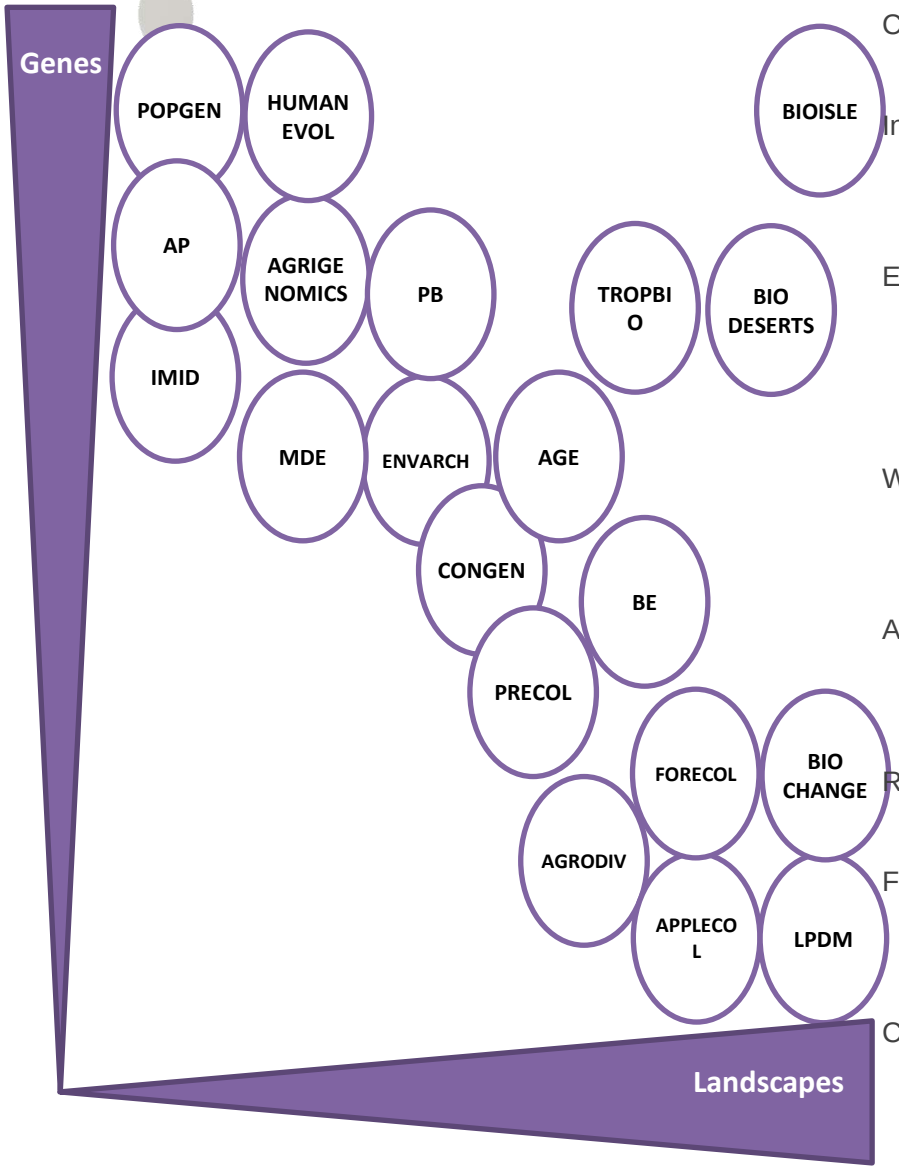
foundation

Human Indicators





Research Groups



AP Applied Phylogenetics

POPGEN Population Genetics, Hybridization and Speciation

AGRIGENOMICS Livestock Genomics and Conservation

IMID Immunogenetics, Microbes and Infectious Diseases

HUMANEVOL Human Evolutionary Genetics

MDI Microbial Diversity and Evolution

PB Plant Biology

ENVARCH Environmental Archaeology

CONGEN Conservation Genetics and Wildlife Management

BE Behavioural Ecology

AGE Ecology and Evolution of Aquatic Organisms

TROPBIO Tropical Biology

BIODESERTS Biodiversity of Deserts and Arid Regions

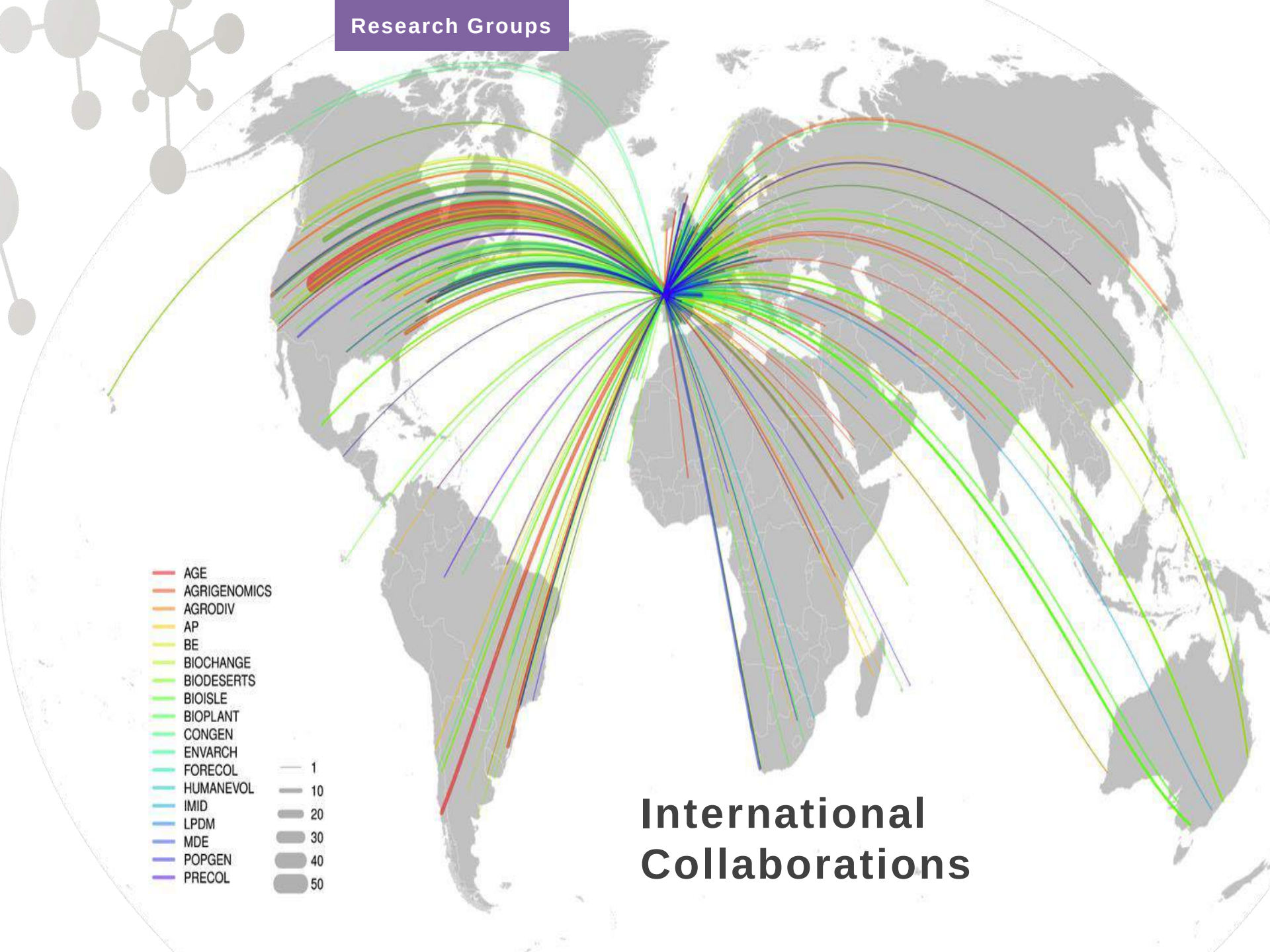
AGRODIV Biodiversity of Agricultural and Forest Ecosystems

BIOISLE Biodiversity and Islands

APPLECOL Applied Population & Community Ecology

PRECOL Predictive Ecology

LPDM Landscape Planning, Design and Management



International Collaborations

Impact of Research

Articles

Highlights

Released simultaneously 29 August 2014

Recurrent Introgression of Mitochondrial DNA Among Hares (*Lepus* spp.) Revealed by Species-Tree Inference and Coalescent Simulations

Decline of forereef corals in response to recent warming linked to history of thermal exposure

Adapted conservation measures are required to save the Iberian lynx in a changing climate

Rabbit genome analysis reveals a polygenic basis for phenotypic change during domestication

Molecular Biology and Evolution

nature climate change

Science

Genetic Architecture of Skin and Eye Color in an African-European Admixed Population

The Genomic Architecture of Population Divergence between Subspecies of the European Rabbit

Global Change Biology

Nesting and acoustic ecology, but not phylogeny, influence passerine urban tolerance

nature COMMUNICATIONS

Three decades of high-resolution coastal sea surface temperatures reveal more than warming

MBE Advance Access published March 21, 2012

Evidence for Widespread Positive and Purifying Selection Across the European Rabbit (*Oryctolagus cuniculus*) Genome

The Timing of Pigmentation Lightening in Europeans

Research article

Article

Fast Track

PLOS | GENETICS

Global Change Biology

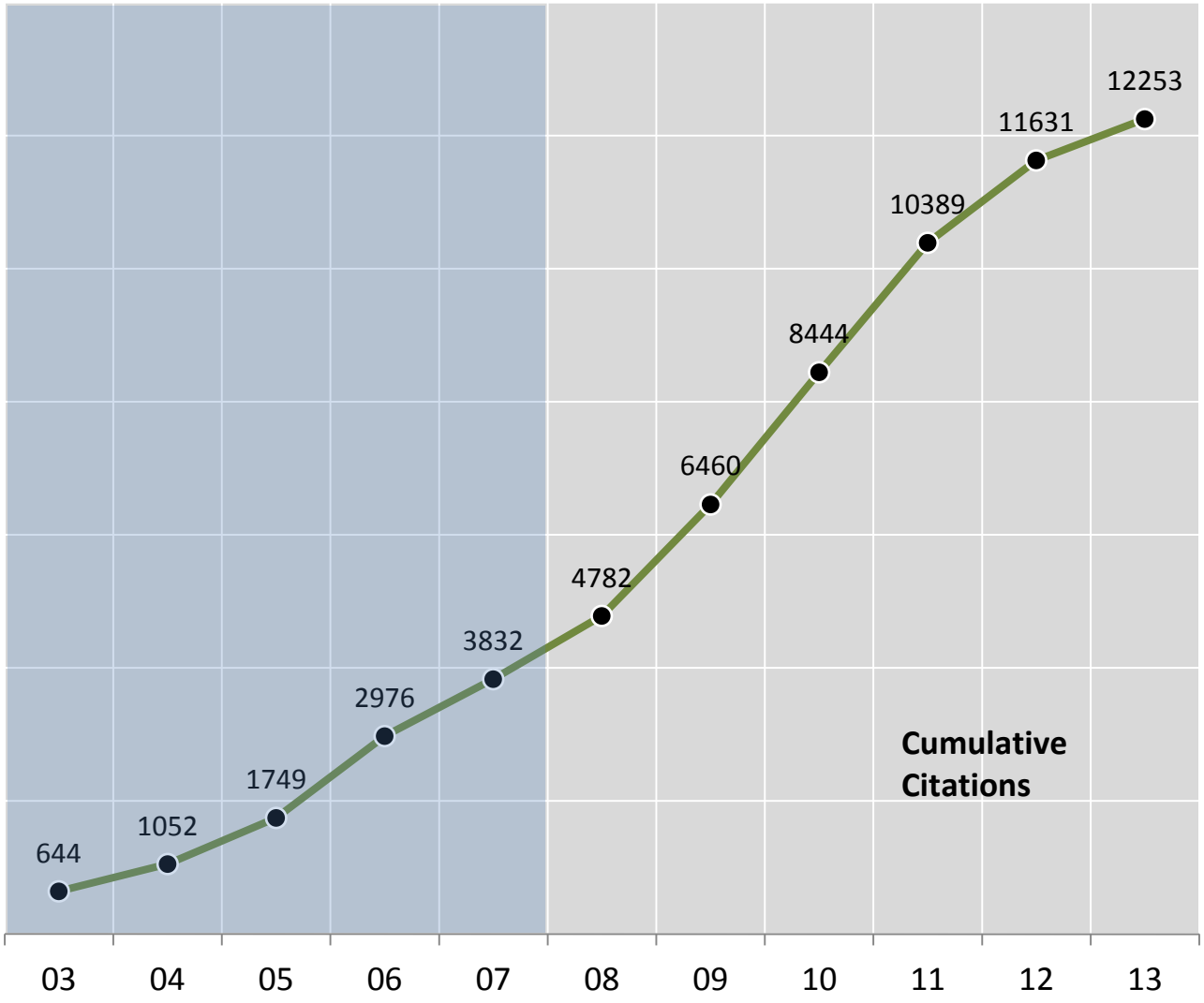
nature COMMUNICATIONS

Systematic Biology

Molecular Biology and Evolution

Articles

Citations



Transfer Technology

variety of services to the community, through contracts with enterprises and other public and private entities

CTM
provides Molecular & Genetic Expertise & Services

GEPE
provides Ecological Expertise & Services

Hall of Biodiversity

4 M€ grant (2012-14)

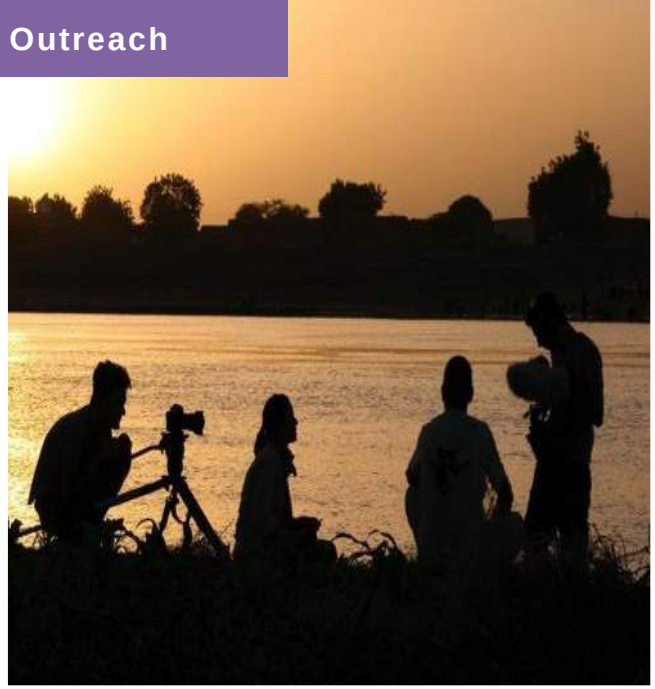
May 2015	**Symbolic opening**
Feb 2016	**Museum Centenary**
Jun 2017	**ECSITE Conference**

U.PORTO

MUSEU DE HISTÓRIA NATURAL DA UNIVERSIDADE DO PORTO

ecsite

Documentaries

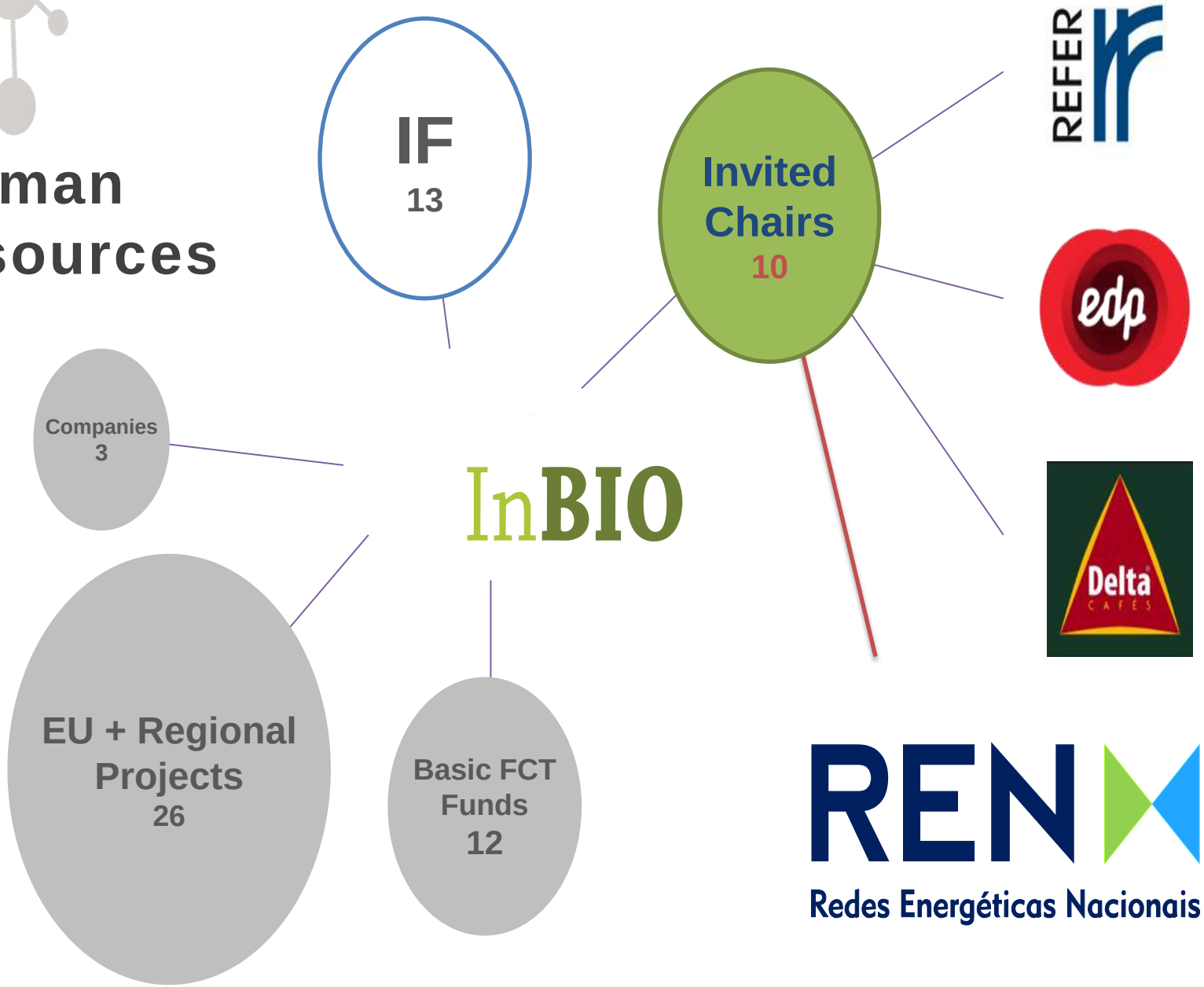


26 docs (30 min each)

International dissemination

First broadcast early 2015

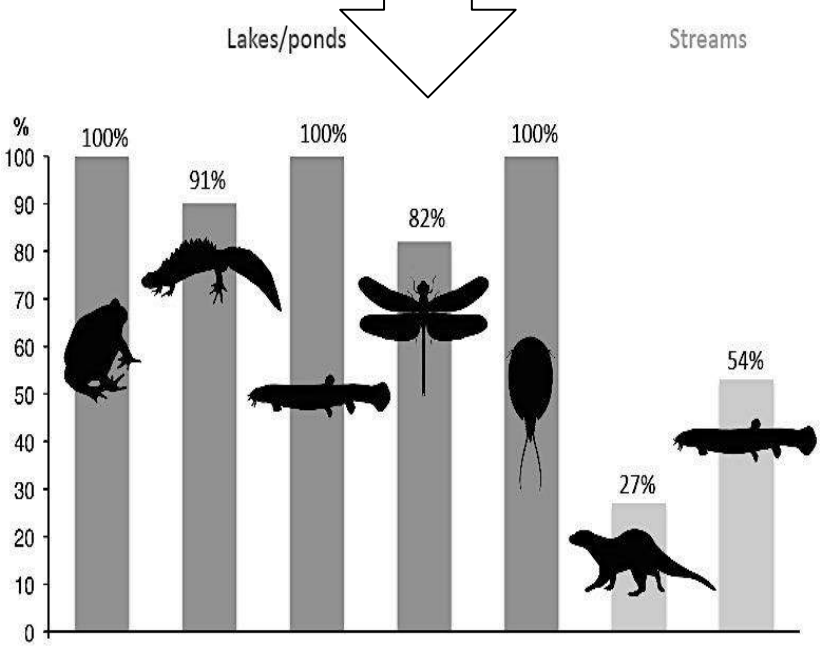
Human resources



EnvMetaGen

Capacity Building at InBIO for Research and Innovation Using Environmental Metagenomics

Environmental DNA



European Research Area

ERA-Chair (2015-20)

European Commission

Advanced Training Doctoral Programs

BIOdiv

In 2013 and 2014

12 PhD scholarships

- + 250 applications
- + 40% foreign applicants
- + 30 countries

In the next 4 years:

- 36 PhD scholarships (FCT)
- 16 PhD scholarships for Angolan citizens

SusFOR

In 2013

8 PhD scholarships

- 52 applications
- 2 foreign grantees

In 2014

- 8PhD scholarships
- 36 applications
- 2 foreign grantees

Strategic Programme

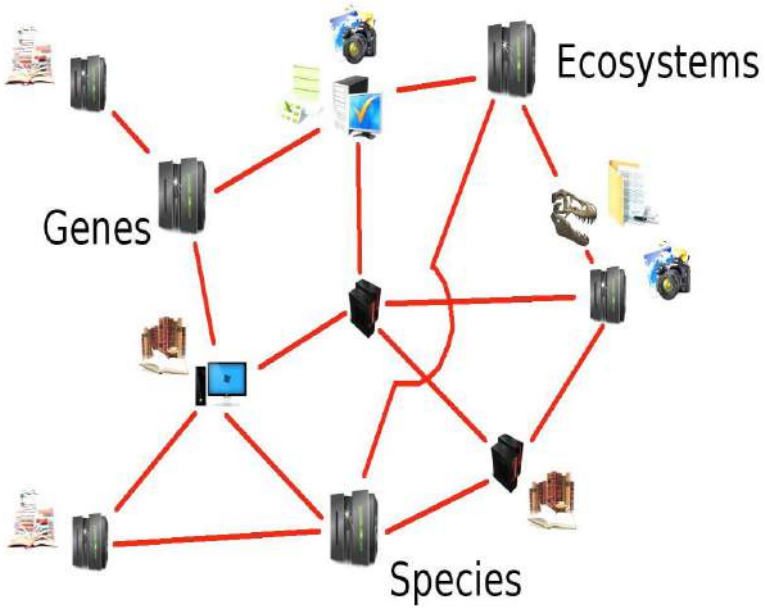
PORBIOTA

8.9 M€ (2.5 InBIO)

e-Infrastructure for Information, Research and Services on Portuguese Biodiversity, Ecosystems and Biological Resources

Infrastructures

ESFRI
LifeWatch



CIBIO New-Gen

Next Generation Sequencing platform

3.6 M€

GenomePortugal

Next Generation Sequencing

9 M€ (1.1 InBIO)

Strategic Programme

Internationalization

Twin Labs

Morocco
Mauritania
Cape Verde
Guiné-Bissau
São Tomé e Príncipe
Angola
Mozambique
Brasil

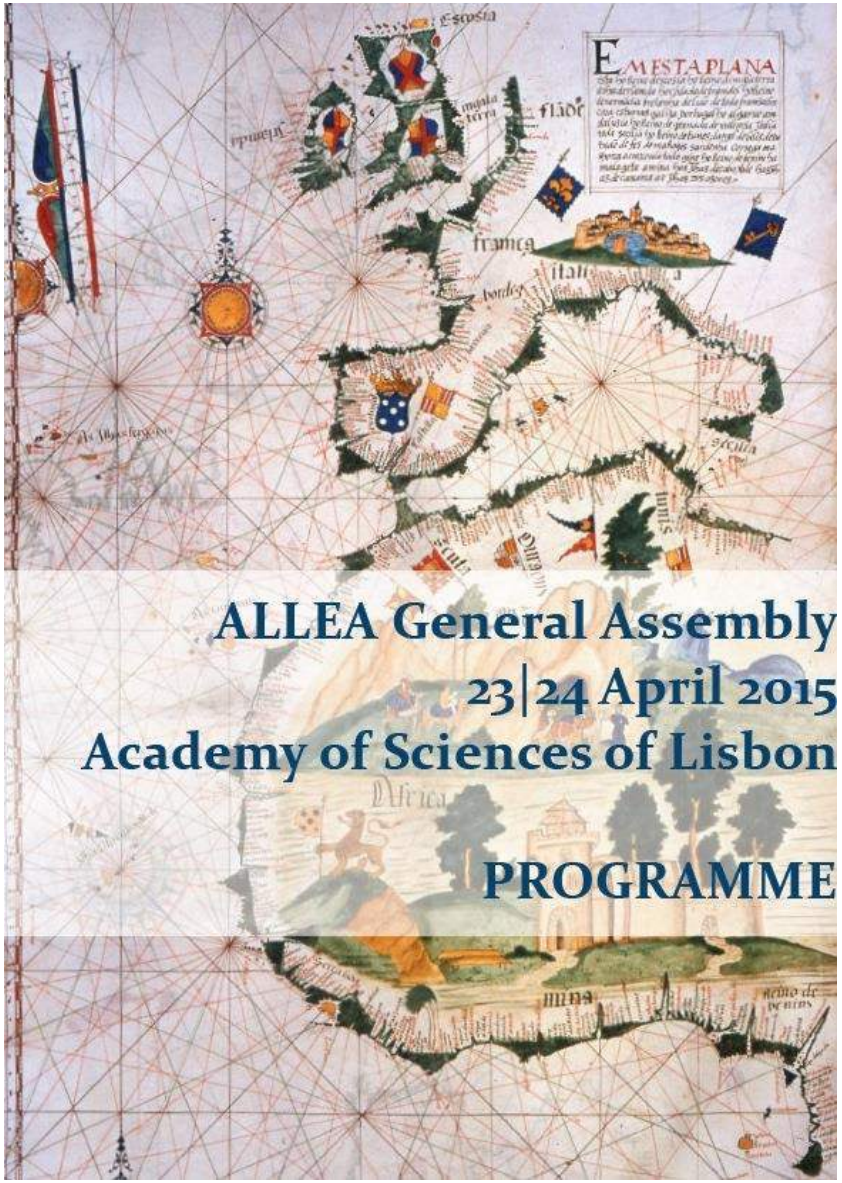
CIBIO CEBEA
TwinLab
Angola

Internationalization

Twin Labs

You are all welcome!

José Mariano Gago



Scientific Symposium

Science and Research in Europe

Past, Present and Future: 15 Years of Lisbon Agenda

ALLEA
ALL European Academies

Panel

Challenges, Demands and Perspectives - Conditions for Early Career Scientists in Europe

Prof. Ana Margarida Fortes
University of Lisbon

Dr. Rossana Henriques
Centre de Recerca en Agrigenòmica (CRAG), Barcelona

Challenges, Demands and Perspectives – Conditions for Early Career Scientists in Europe

Ana Margarida Fortes

BioISI
Biosystems and Integrative Sciences Institute

Ciências ULisboa

Academy of Sciences, Lisbon
April 2014

- Lines of research and impact
- Challenges, demands and perspectives
- Portuguese scenario

Market-driven research: the need for wine industry relying on scientific knowledge

According to wine producers, the main constrains in wine industry are:
* irregular ripening among berries of the same cluster and among seasons,
* the high costs resulting of disease management and yield losses due to pathogenic fungi diseases.

By identifying genes responsible for the control of ripening and resistance to fungal diseases (capable of being used in future breeding programs), the research addresses two challenges faced by agriculture in this century:

food security and agriculture sustainability.

Reduction in the use of agrochemicals
Improve productivity and quality of grapes and wine

Main lines of research

1- identification of the regulatory or structural genes controlling grape development and ripening as a way to improve grape quality traits.






Grape ripening

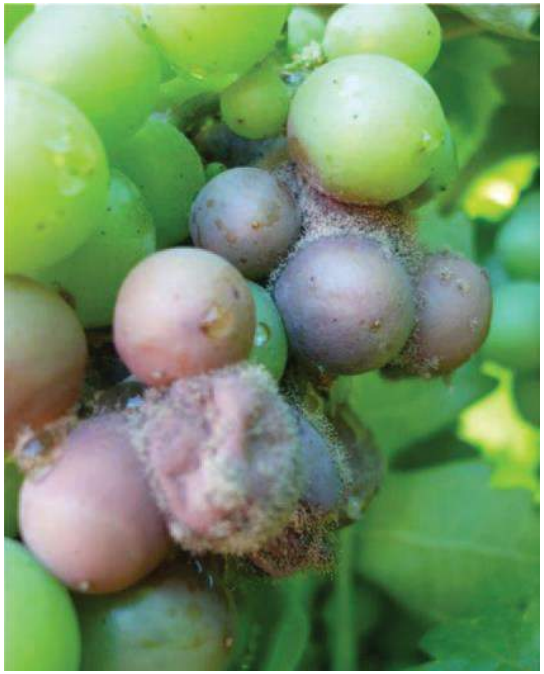
Transcription factors

Hormones (Polyamine metabolism)

Terroir, secondary metabolism and grape quality

Main lines of research

2- understanding biotic stress response in wine grape together with the investigation of the promoters of the genes involved in resistance.



Resistant/ tolerant and susceptible cultivars

Transcription factors and R genes

Fungal Infection and Wine quality

Botrytis cinerea, Powdery mildew

Biomarkers of infection

Approaches

- Transcriptomics
- Metabolomics and targeted metabolic profiling
- Transgenic approaches and Fruit agroinfection
- Enzymatic studies

Main collaborations

Dr. Joachim Kopka, Germany

Prof. Dr. Rob Verpoorte, The Netherlands

Prof. Dr. António Tiburcio , Spain

Dr. José Miguel Zapater, Spain

Prof. Antonio Granell, Spain

nature International weekly journal of science

NATURE | NEWS FEATURE

The future of the postdoc

There is a growing number of postdocs and few places in academia for them to go. But change could be on the way.

Kendall Powell

07 April 2015

http://www.nature.com/news/the-future-of-the-postdoc-1.17253?WT.mc_id=TWT_NatureNews

Concluding aspects of the paper

* Not all the research is making it into high-profile journals so very difficult to apply for the few places in academia;

* Researchers end up trapped as ‘permadocs’: doing multiple postdoc terms, staying in these positions for many years with insecurity and few benefits;

* Enforcing a rule that researchers could hold a postdoc for a maximum of 5 years but then which options? Also postdocs constitute a main driving force in labs;

* Some promoted to ‘auxiliar or assistant researcher’ but with a defined limit

* Postdocs are too expensive to be funded from research grants. So when the government funding disappears so many postdoc spots will also;

* Solution may be that planning has to start in graduate school;

* Ensure that the most talented in their own areas are always funded and for these create more staff-scientist positions.

Main challenges and demands

* Lack of regular funding both for research and human resources

* Lack of a strong connection between private sector and academia

* Lack of any stability:
- time consuming
- difficult to consolidate a research group
- difficult to engage in long-lasting but highly innovative projects due to constant demands for high productivity

Perspectives for *Early Career Scientists in Portugal*

?

Waste of valuable and highly qualified resources that will emmigrate dooming the country to a **serious delay** in the **scientific progress** and loss of previous investment

Professor Mariano Gago (1948-2015)

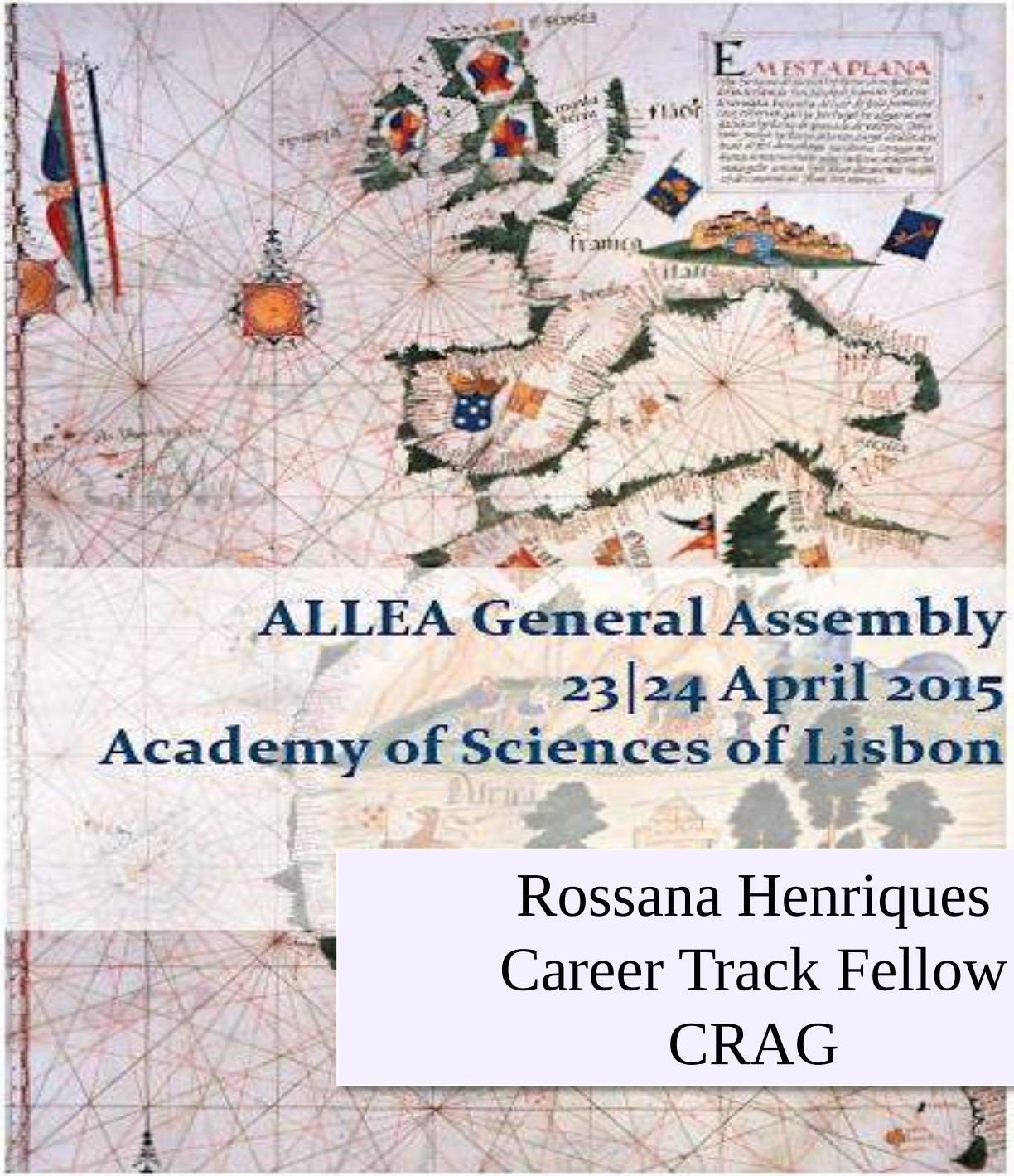
Former Minister of Science & Technology

We deeply thank you for your vision and efforts

Acknowledgements

ALLEA and Academy of Sciences of Lisbon

Thank you for your attention!



Rossana Henriques
Career Track Fellow
CRAG

Challenges, Demands and Perspectives

Conditions for Early Career Scientists in Europe

Career path

FACULDADE DE CIÊNCIAS
UNIVERSIDADE DE LISBOA

Max Planck Institute for Plant Breeding Research

- Identification of metal transporters in *Arabidopsis thaliana* and *Camellia japonica*
- Developing basic molecular biology tools in *Arabidopsis* and non-model species
- Learning basic tissue culture techniques
- Evaluation of phenotypes

ROYAL HOLLOWAY UNIVERSITY OF LONDON

- Function of protein kinases and transcription regulators
- Protein/protein interactions
- Study of the TOR signaling pathway

CELEBRATING 100 YEARS · 1901 · THE ROCKEFELLER UNIVERSITY · PRO BONO HUMANI GENERIS

- Protein stability control in light signalling and the circadian clock
- Chromatin remodeling at the core of the clock

Europe – 8 years (PhD & Postdoc)

USA – 7 years (Postdoc & RA)

Current position

Career Track Fellow at CRAG, Barcelona, Spain

Ramón y Cajal Contract
Career Integration Grant
Finalist ERC CoG 2014

- Circadian regulation of growth and proliferation
- Non-coding RNAs regulated by the circadian clock

Career perspectives

- The Ramón y Cajal program was conceived as a tenure track opportunity to attract young and excellent research talent to Spain
- Nowadays, this tenure track system has been blocked due to no or very few stable research opportunities
- The funding agencies in Spain design their calls towards “tenured researchers” and this prevents many RyC fellows from applying to projects and getting PhD students

Career perspectives

- It would be important to design real tenure track programs where researchers are evaluated in a clear and transparent way so that all this “critical mass” is not lost

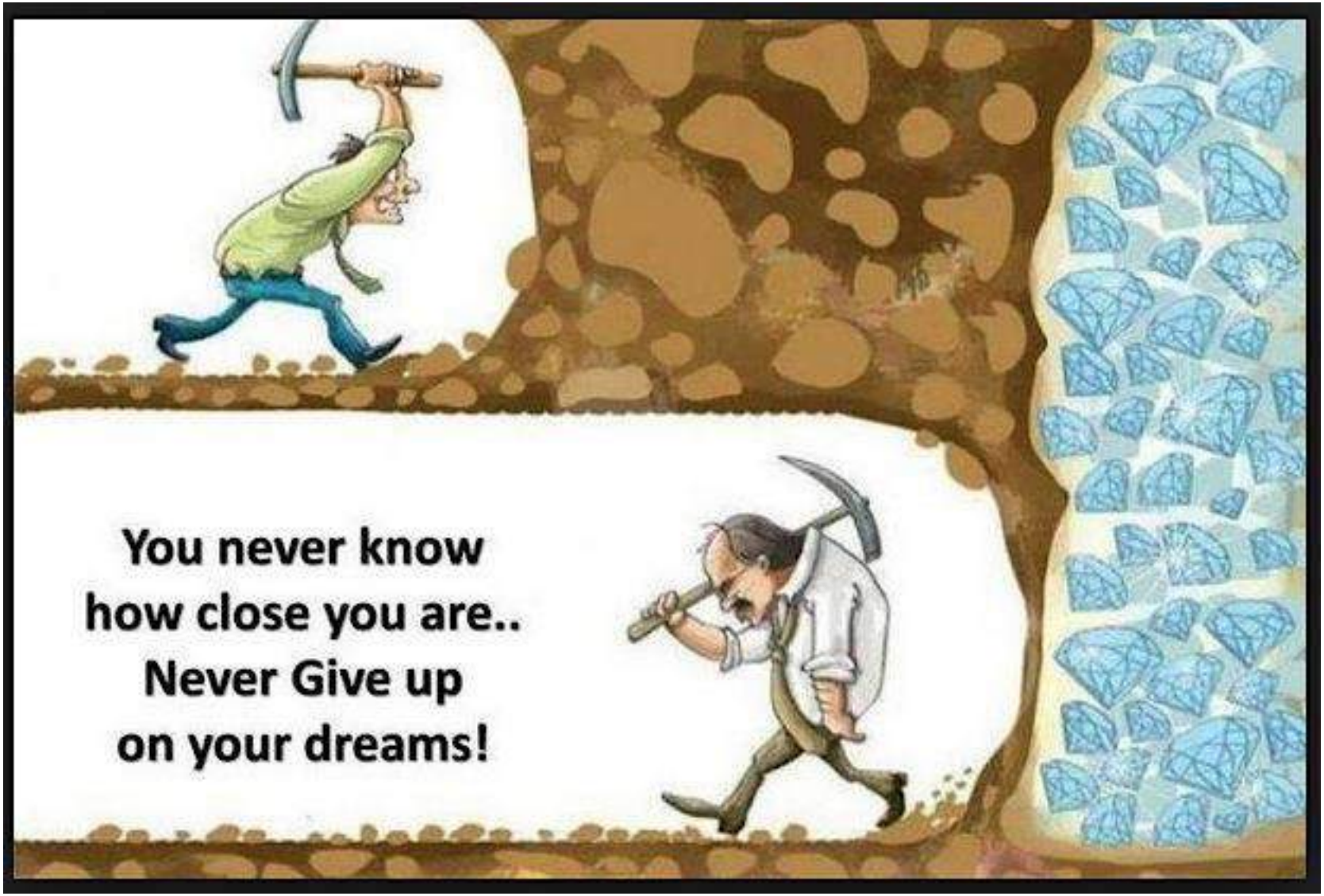
- With the ageing of the last generation of “tenured researchers”, Spain and many other European countries risk to lose one or more generations of scientific talent

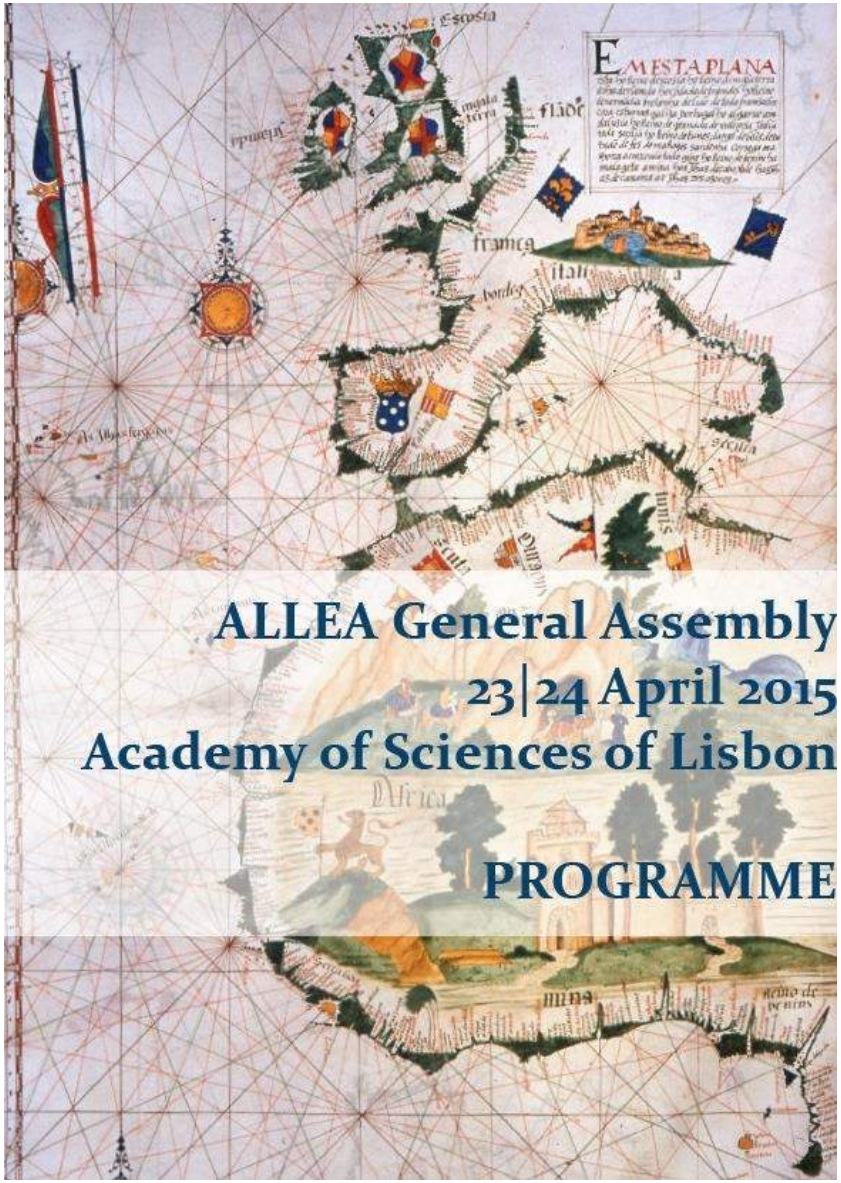
What could be improved

- Implement a European research career
- Set up specific calls for funding for young researchers (not only ERCs)
- Promote European networks of young researchers
- Change the definition of young researchers – time from PhD or independence?
- Invest in young researchers and recognize their potential

Concluding remarks

- Invest in young researchers and recognize their potential
- Ensure the renewal of scientific talent
- Expand European scientific excellence


You never know
how close you are..
Never Give up
on your dreams!



Scientific Symposium

Science and Research in Europe

Past, Present and Future: 15 Years of Lisbon Agenda

Discussion

Perspectives and Conclusions

Chair: Prof. Luís Aires-Barros

Presentation

Joint Declaration: 15 Years of Lisbon Agenda

Prof. Luís Aires-Barros and Prof. Günter Stock

All European Academies Joint Declaration "15 Years of Lisbon Agenda"

issued at the Academy of Sciences of Lisbon, Portugal, on 23 April 2015

We, the European Federation of Academies of Sciences and Humanities (ALLEA), bringing together eminent scientists and scholars from 58 member academies in over 40 countries from the Council of Europe region, on the occasion of the General Assembly in Lisbon on 23/24 April 2015,

- *express* our conviction that the aims of the Lisbon Agenda and its successor, the Europe 2020 Strategy, remain necessary for sustainable economic growth, environmental balance, social cohesion and long-term prosperity in Europe,
- *welcome* that the majority of these targets continue to be incorporated into the current Europe 2020 strategy, particularly the aim to achieve a knowledge-based society and economy through fostering science, research and innovation,
- *assert* that a European Research Area must follow the principles of excellent research and science-led innovation encompassing both fundamental and applied research
- *realise* that the objectives of the Lisbon Agenda and Europe 2020 have not yet been fully achieved,
- *note* with great concern that recent proposals of the European Institutions towards boosting job creation and accelerating economic recovery entail significant cuts to the budget for research and innovation in Europe,
- *believe* that these cuts are not in the best interest of realising the goals established with the Lisbon Agenda and now reflected within the Europe 2020 Strategy,
- *affirm* the need to strengthen the role of evidence-based advice in the European Union's decision-making process, namely by improving its institutional design, in order to deliver adequate responses to the multiple and complex challenges the EU is facing in this critical period of its history.

All European Academies Joint Declaration "15 Years of Lisbon Agenda"

issued at the Academy of Sciences of Lisbon, Portugal, on 23 April 2015

Therefore, ALLEA appeals both to the policymakers in the European Institutions and to the Member States to follow through on the measures that are required for achieving the aims that were set out in the Lisbon Agenda and the Europe 2020 Strategy, namely to

- **continue to support the excellent Horizon 2020 programme at the level originally agreed in the Multiannual Financial Framework starting in 2014 in order to maintain Europe's position at the forefront of research and ensure that newly designed funding schemes are developed that prioritise this goal,**
- **work to develop scientific and research capacity in all European countries such that they can each contribute to advances that tackle the challenges, which Europe is facing today,**
- **support and nurture the development of a generation of early career researchers and provide them with adequate career opportunities,**
- **take steps to enable and promote scientific excellence in Europe and therewith boost its international competitiveness, such as through the enhancement of the European Research Council,**
- **design and maintain sustainable research infrastructures, which are capable of keeping pace with innovation,**
- **build a system for reliable and impartial evidence-based policy advice in order to ensure that policy decisions are taken on the basis of scientific data and rational arguments.**