



UNIVERSITY POLITEHNICA OF BUCHAREST  
ROMANIA

**CONTRIBUTION OF EUROPEAN STRUCTURAL FUNDS TO THE DEVELOPING  
OF RESEARCH INFRASTRUCTURE AND THE IMPROVING OF HUMAN  
RESOURCES QUALITY**

**MIHNEA COSTOIU  
RECTOR**

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Universities of Technology  
Lodz University of Technology  
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# EUROPEAN STRUCTURAL FUNDS IN ROMANIA

- Romania decided 5 years ago:
  - ✓ To coordinate national policies with European policies;
  - ✓ To coordinate financing European projects with national funding.
- The result was a success!



# EUROPEAN STRUCTURAL FUNDS IN ROMANIA

*Financing higher education and research was primarily supported by two operational programs:*

- *Sectoral Operational Programme Human Resource Development (SOP HRD)*
  - *Sectoral Operational Programme Increase of Economic Competitiveness (SOP IEC)*
- Among the over 700 research entities in Romania, **the universities** are a leading factor which regards research policies, nationwide research objectives and most of the time performance.

# EUROPEAN STRUCTURAL FUNDS IN ROMANIA

- By **SOP HRD** - 4 billion Euro ➡ 1,3 billion could be accessed through Axes by universities.
- By **SOP IEC** - 1,2 billion Euro ➡ 273 billion could be accessed by universities

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

	<b>EDUCATION SISTEM</b>	<b>UNIVERSITIES</b>
Financial support	1.319.193.569 Euro	557.310.117
EU financial contribution	1.080.159.141 Euro	459397745
Number of projects	767	352
Number of supported target group	1.346.325	184.990
Paid reimbursements	668.109.334 Euro	379.999.669 Euro

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

*The major domain of intervention: Quality in higher education*

Actions supported under this area of intervention targeted the modernization and restructuring of university education in an integrated approach:

- actions for the system;
- support for providers;
- staff development;
- development and provision of university offers;
- innovative actions to support the improvement and development of university education.

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

	VALUE
Financial support	222.112.823 Euro
EU financial contribution	171.467.787 Euro
Number of projects	169
Number of supported target group	155.313
Paid reimbursements	128.840.812 Euro

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

Target groups	Value
Members of the committee/governing structures of universities and colleges	8501
Social partners in education	2154
Staff involved in the management, monitoring, evaluation and control of the Higher Education	2208
Staff involved in the development and management of qualifications and National Qualifications Framework in Higher Education at the system level	881
Students	128904
Experts in evaluation and accreditation committee for quality assurance in Higher Education	1313
Members of the committee of quality assurance at university/college	3296
Staff involved in developing study programs	8056
<b>Total</b>	<b>155313</b>



# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

*The major domain of intervention: Doctoral and postdoctoral programs in support of research*

## Indicative operations:

- Strengthening the national doctoral and postdoctoral system, including support for networking universities, research centers and enterprises;
- Supporting doctoral and postdoctoral programs by innovating the contents, including the development of researchers managerial skills to promote the valorization of research outputs in economic activities;
- Support for doctoral candidates and senior researchers to participate to doctoral programs and postdoctoral research positions, including transnational cooperation and learning mobility.

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

	VALUE
Financial support	335.197.294 Euro
EU financial contribution	284.929.958
Number of projects	183
Number of supported target group	24277
Paid reimbursements	<b>251.158.857 Euro</b>

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

Target groups	Value
Doctoral / PhD students	11789
Staff of doctoral and graduate schools	7356
Staff involved in higher education, scientific research and post-doctoral systems policy	883
Post-doctoral researchers	4249
<b>Total</b>	<b>24277</b>

Indicators	Value
Doctoral schools financially assisted - doctoral programs	287
Published scientific papers - doctoral programs	30364
Published scientific papers - post-doctoral research	16052
Students who obtained PhD	5042
Transnational partners	287

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

*The major domain of intervention: The transition from school to the active life*

**Funded interventions -Target groups - *pupils and students***

- Practical stages at the potential employers;
- Information and career counselling;
- Entrepreneurial education (training firms and simulated enterprises);
- Locally developed curriculum;
- Partnership school / university and economic environment.

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

*The major domain of intervention: The transition from school to the active life*

## Technical information

- Allocation for the programming period 2007-2013: **315 897 626 Euro**
- **492 implemented projects**, of which **189 projects for students**;
- **441 461 403 Euro** in implemented projects, of which **132,006,762.37 Euro** projects for students (**29.90%**);
- The universities have implemented 189 projects as a leader of partnership, with a worth of **132,006,762.37 Euro** and contributed to the 231 partnerships;
- The rate of absorption in the field – **94.90%** (payments to beneficiaries vs. allocated).

# THE SECTORAL OPERATIONAL PROGRAMME HUMAN RESOURCE DEVELOPMENT (SOP HRD)

*The major domain of intervention: The transition from school to the active life*

## Results

- Participants at the practical stages at the employers - **200 902 persons**;
- Beneficiaries of counselling services - **302 351 persons**;
- **95,50 %** - value validated of the amount requested by the applications for reimbursement.



# **SECTORAL OPERATIONAL PROGRAMME INCREASE OF ECONOMIC COMPETITIVENESS (SOP IEC)**

**2011** - Romania subcontracted **70 million Euro**

**2014** - Romania subcontracted **1,2 billion Euro**

# SECTORAL OPERATIONAL PROGRAMME INCREASE OF ECONOMIC COMPETITIVENESS (SOP IEC)

Beneficiaries	Submitted projects	Selected projects	Financing contracts	
	Number	Number	Number	Value
Companies	954	535	444	283,138,264 Euro
Public institutions	614	239	235	867,302,833 Euro
<b>TOTAL</b>	<b>1568</b>	<b>774</b>	<b>679</b>	<b>1,150,441,097 Euro</b>



# SECTORAL OPERATIONAL PROGRAMME INCREASE OF ECONOMIC COMPETITIVENESS (SOP IEC)

Beneficiaries	Contracted projects	
	Number	Value
<b>Small and medium-sized enterprises (SMEs)</b>	339	230,450,529 Euro
<b>Large enterprises</b>	43	33,257,012 Euro
<b>National Research and Development Institutes</b>	93	423,876,741 Euro
<b>Universities</b>	93	272,854,456 Euro
<b>Other public institutions</b>	49	170,571,636 Euro
<b>Partnerships</b>	62	19,430,723 Euro
<b>Total</b>	<b>679</b>	<b>1,150,441,097 Euro</b>

# SECTORAL OPERATIONAL PROGRAMME INCREASE OF ECONOMIC COMPETITIVENESS (SOP IEC)

	Relevant results	Number
	Partnership projects between R&D institutions and enterprises	41
	Supported research projects	558
	Small and medium-sized enterprises (SMEs) financially assisted in projects	289
	Large enterprises financially assisted in projects	36
	Supported innovative start-ups	98
	Supported innovative spin-offs	18
	Research and development centers connected to GRID structures	11
<b>Employability</b>	Newly created jobs - women	738
	Newly created jobs - men	1200

# EXTREME LIGHT INFRASTRUCTURE NUCLEAR PHYSICS PROJECT (ELI-NP PROJECT)

## Main characteristics

- the world's first international laser research infrastructure, pursuing unique science and research applications for international users;
- Pan-European project involving nearly **40 research and academic institutions** from 13 EU member states;
- ELI will be implemented as a distributed research infrastructure based initially on 3 specialized and complementary facilities located in the Czech Republic, Hungary and Romania;
- the European Commission funded ELI-NP facilities with a budget about **365 mil Euro**;
- the construction started in 2013 at Măgurele, Romania.



# EXTREME LIGHT INFRASTRUCTURE NUCLEAR PHYSICS PROJECT (ELI-NP PROJECT)

## ELI-NP facility consists of two components

- a very high intensity laser system, with two 10 PW laser arms able to reach intensities of  $10^{23}$  W/cm<sup>2</sup> and electrical fields of  $10^{15}$  V/m;
- a very intense ( $10^{13}$   $\gamma$ /s), brilliant  $\gamma$  beam,  $\sim 0.1$  % bandwidth, with  $E_\gamma$  up to 19.5 MeV, which is obtained by incoherent Compton back scattering of a laser light off a very brilliant, intense, classical electron beam ( $E_e$  up to 720 MeV) produced by a warm LINAC.



# EXTREME LIGHT INFRASTRUCTURE NUCLEAR PHYSICS PROJECT (ELI-NP PROJECT)

## The main research fields and applications at ELI-NP

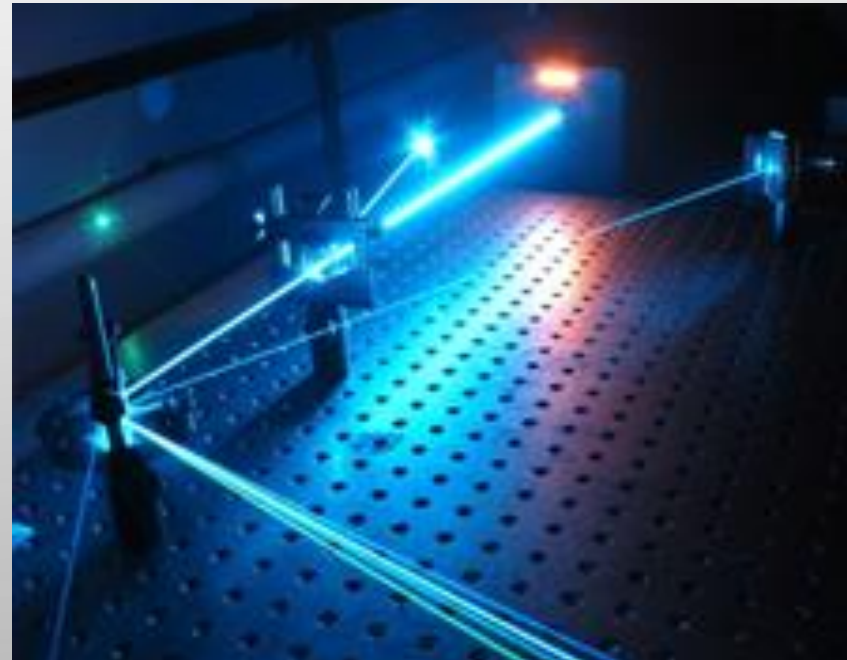
The use of the very high intensity laser and the very brilliant, intense  $\gamma$ -beams will achieve major progress in nuclear physics and its associated fields:

1. Investigation of the high-power laser-matter interactions using nuclear physics methods in order to study the possibilities of obtaining high quality proton and heavy ion accelerated beams using lasers.
2. The extremely high intensity of the laser beam will allow the study of fundamental physics phenomena anticipated by theory, such as vacuum birefringence and pair creation in intense electric fields.
3. Investigation of nuclear structure and cross sections of interest for astrophysics using photonuclear reactions.
4. New methods of identification and remote characterization of nuclear materials will be investigated with application for homeland security (remote automatic scanning of transport containers) and nuclear material management.
5. New ways of producing more efficiently radioisotopes currently used in medicine and the producing of newly proposed ones.
6. Simultaneous use of the high intensity gamma and laser beams will enable fundamental physics studies as pair production in vacuum.



# LASERS RESEARCH - UNIVERSITY POLITEHNICA OF BUCHAREST

Doctoral School of Engineering  
and Applications of Lasers



# UNIVERSITY POLITEHNICA OF BUCHAREST, ROMANIA

- the largest and the oldest technical university in the country and among the most prestigious universities in Romania: ~ **30,000 students** enrolled in BSc, MSc, PhD studies
- All fields of engineering are covered: electrical, mechanical, IT&C, materials science, applied chemistry etc.
- University POLITEHNICA of Bucharest welcomes foreign applicants, offering a number of 20 B.Sc. and 25 M.Sc. programs taught in English, French or German.



# UNIVERSITY POLITEHNICA OF BUCHAREST, ROMANIA

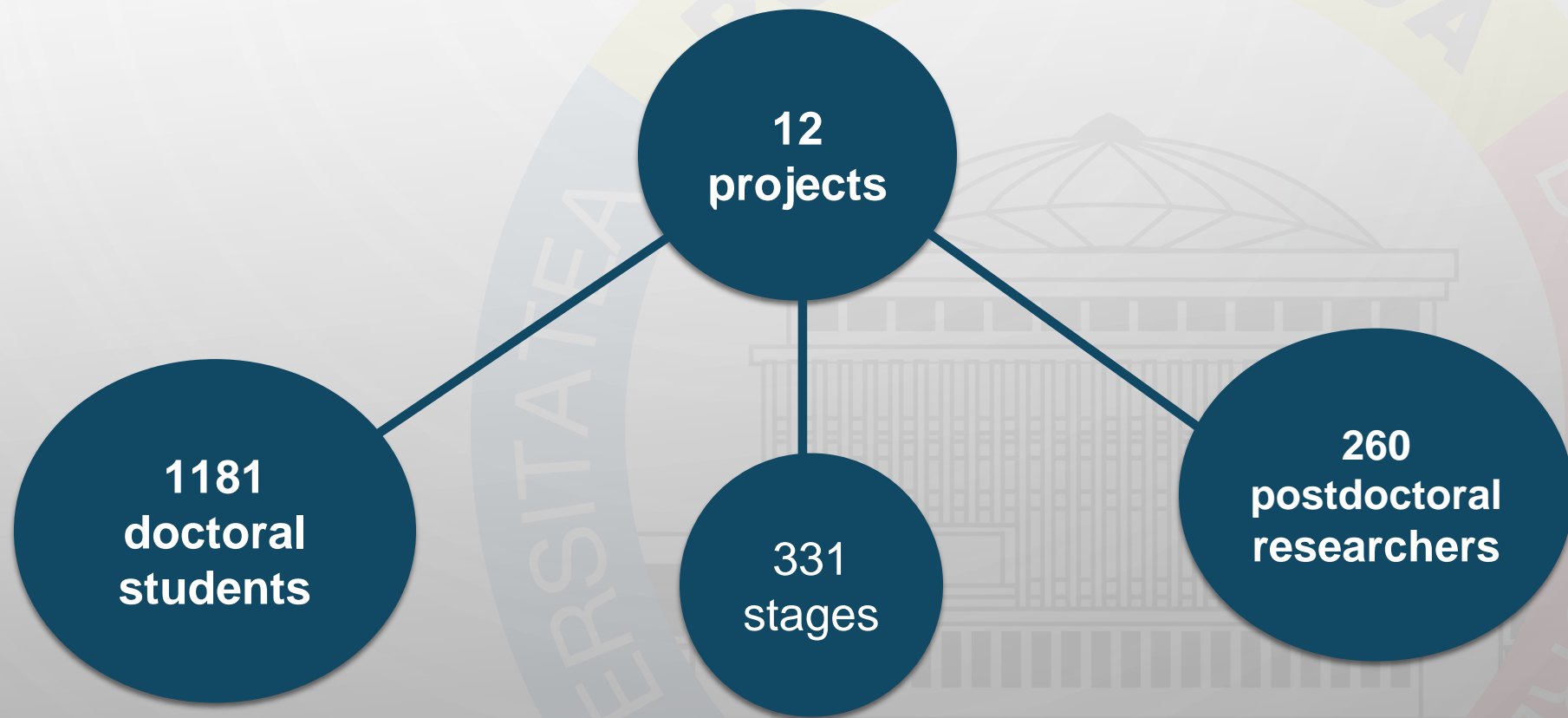
- full member in several academic organizations, the main ones being Conference of European Schools for Advanced Engineering Education and Research (CESAER), International Association of Universities (IAU), European University Association (EUA), Agence Universitaire de la Francophonie (AUF) etc. However, UPB paid a special attention to bilateral cooperation agreements (around 200 agreements in 2010) with similar universities, mainly from Europe, Japan, or the United States of America
- 1400 staff members
- Excellence in education and research in Romania – classified in the top 10 universities at last assessment exercise officially done by Ministry of Education and Research in 2011



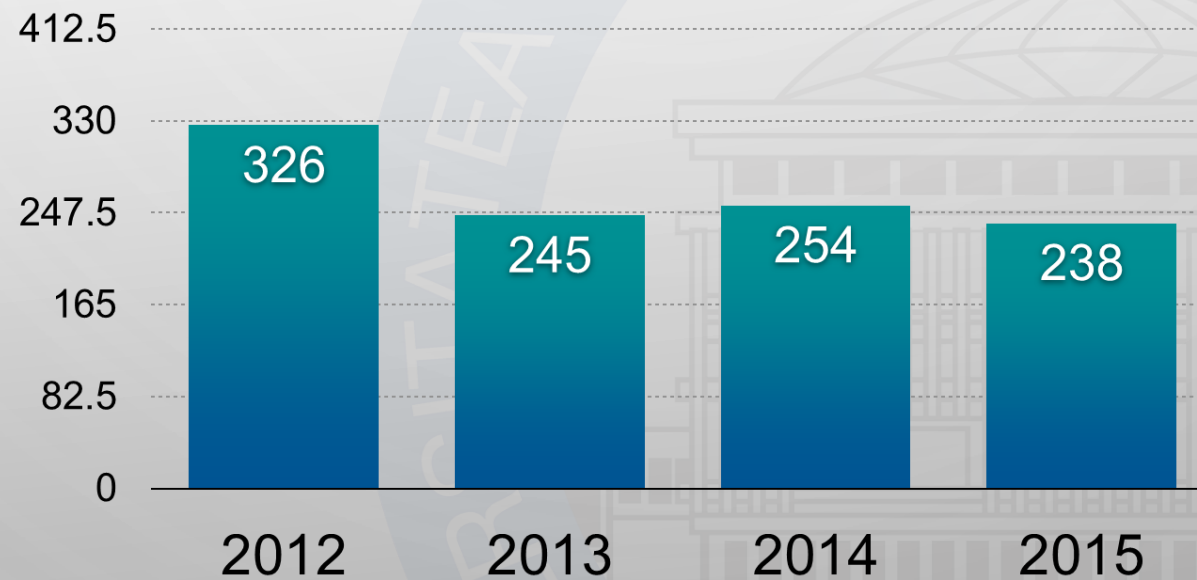
# DEVELOPING OF DOCTORAL SCHOOLS CONCERNING INTERNATIONALIZATION

- Top-down approach for which the deciding body was set up at the university board
- All the strategies should be accompanied by substantial funding allocation including at least money for in-going and out-going mobility of doctoral candidates, supervisors and/or running of joint doctoral programs
- The universities rather preferred to spend more money on research infrastructure than to internationalization component of doctoral studies
- The structural funds allocated in the last six years from EU budget especially for sustaining doctoral programs have contributed to a real stimulation of doctoral studies and allowed universities to develop a significant internationalization component of studies

# PROJECTS FOR DOCTORAL AND POSTDOCTORAL STUDIES



# SUSTAINED DOCTORAL THESIS



# OUTPUTS OF PROJECTS FINANCED FROM STRUCTURAL FUNDS

- The number of native doctoral candidates who benefited from stages abroad tremendously increased and this allows them to gain more experience in research and innovation in other EU countries. This is a “win-win” process since the host-universities received well-educated students with a high research capacity able to produce scientific outputs of high-quality. The length of the stages varies from 3 to 6 months according to the rules established by the EU structural funds authorities but in any cases this was an added value to the candidates training.
- The PhD supervisors are also supported to undertake short stages abroad (2-4 weeks) in order to check and evaluate the progress of their students at foreign universities across EU. By this occasion they established solid contacts with their colleagues from abroad which led in many cases to the organizing of joint doctoral programs.

# OUTPUTS OF PROJECTS FINANCED FROM STRUCTURAL FUNDS

- The activities supported during the doctoral stages provided extra-training for candidates and supervisors e.g., short courses for coaching of candidates and supervisors held by foreign trainees specialized in this field, short talks for managing of intellectual properties and rights, extended courses for entrepreneurship and how to develop a “start-up” company, etc. All these courses benefited from the experience of renowned experts and were substantially funded.
- Developing of coherent institutional strategy for internationalization of doctoral studies including harmonization of all the deciding structures in the university with a single goal: to manage the mobility of doctoral candidates and supervisors in an integrated manner. This may be a difficult task to be performed when the number of doctoral candidates coming perhaps from more doctoral schools is high and their demands are quite different concerning the envisaged stages.

# CONTRIBUTION OF STRUCTURAL FUNDS

## STRENGTHS

The increasing number of mobility allowed both for candidates and supervisors and running of more adequate joint programs in connection with the labor market.

Also a proper funding offers the implementation of the internationalization strategy in a short period of time and with good expected results in terms of collaborations established at international level between research teams

## WEAKNESSES

Inadequate balance between in-going and out-going mobility especially for eastern countries but this will tend to be solved in the future as the professional level of doctoral programs and the quality mechanisms will be implemented in all EU countries.

# CONTRIBUTION OF STRUCTURAL FUNDS

## OPPORTUNITIES

Development of strong interdisciplinary programs which may contribute to the connection between EHEA and ERA

## THREATS

The sustainability gained in the universities after the structural funds period will come to an end, in case of not implementing a real strategy for internationalization including well-based structures at institutional level managing the internationalization component of doctoral studies



# CONTRIBUTION OF STRUCTURAL FUNDS TO BUILDING ADVANCED RESEARCH INFRASTRUCTURE





## CAMPUS



The project financed by SOP IEC – CAMPUS represents a successful project carried out by the University POLYTECHNIC of Bucharest for the development and modernization of the research infrastructure of the university.

Total project value - 16,300,000 Euro

Developed area - 8600 m<sup>2</sup> - 41 research labs, classrooms, a conference room, offices, horizontal and vertical movement, ground floor and 7 floors and underground for civil defense shelter, workshops, technical basement.

# RESEARCH CENTER FOR ADVANCED MATERIALS, PRODUCTS AND PROCESSES (CAMPUS)



**Scanning electronic microscope  
for high resolution imaging**

Nowadays finished, the building for excellence research within the programs resulted from the university's strategy comprises **41 research laboratories**, adequately equipped and intended for top fields such as:

- Micro- and nano-materials;
- Food safety;
- Electronics and telecommunications (ex. circuits, antennas);
- Computers (e.g. artificial intelligence);
- Information technology (e.g. imaging and audio expertise);
- Electrical engineering (e.g. electric cars);
- Energetics and mechanics (e.g. environment protection, alternative energy sources).

PRECIS

## Research Infrastructure for Products Development, Processes and Innovative Intelligent Services



**28 new laboratories and research  
departments**

**8300m<sup>2</sup> developed built area**

**Total project value: 10.937.586 EUR**

**11 international projects in which PRECIS  
infrastructure will be involved**

# 2012-2016

## UPB ACHIEVEMENTS WITH THE SUPPORT OF EU FUNDS

**INVESTMENTS IN INFRASTRUCTURE: 72.5 MIL. EUR**

**BUILT-UP AREA: 138.000 M2**

- ✓ 1971 – 2012: 90.000 M2
- ✓ 2012 – 2016: 48.000 M2



**INVESTMENTS IN HUMAN RESOURCES: 63 MIL. EUR**

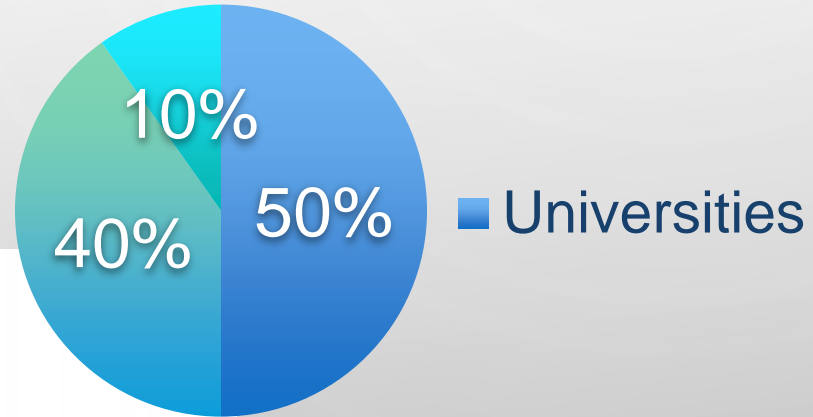




## **OUR MAIN INSTRUMENT**

The European Social Fund is one of the most important financing instruments in the support of developing research infrastructure and growth potential.

# UNIVERSITIES ARE PERFECT BENEFICIARIES FOR RESEARCH FUNDS



The HRD SOP 2007-2013 was one of the most important tools through which universities could invest in their human resource potential. Some of these funds were dedicated to research human resource. This is the representation of the total number of organizations which contracted the funds.

**University POLITEHNICA of Bucharest is:**

- ✓ **a Pole of Competitiveness**
- ✓ **a invitation to cooperation and common use of the infrastructures.**



The image features a light blue background with a subtle, repeating pattern of a stylized globe. In the four corners, there are decorative elements consisting of thin blue lines that branch out like a circuit board, ending in small circles.

***Unfortunately, in 2016 the Structural Funds  
are blocked in Romania!***



**Thank you!**

