
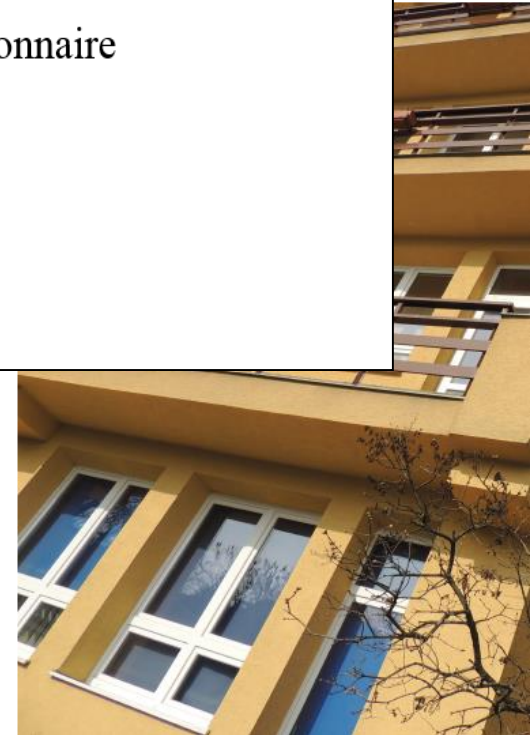
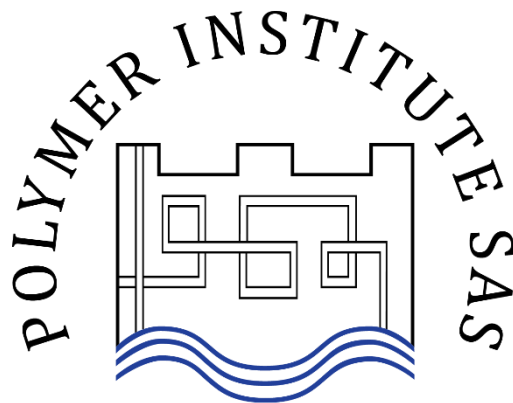


# Evaluation of Polymer Institute SAS by the International evaluation panel (Nov 24 2016)

## Agenda

14.30 - 14.35		Opening and introduction of the Evaluation Panel Members (Member of the Accreditation Committee)
14.35 - 14.55		Presentation of the institute and its results (director and/or representatives of selected research teams)
14.55 - 15.15		Discussion to the presentation and to the questionnaire
15.15 - 15.40		Discussion with institute research community
15.40 - 16.00		Discussion with PhD students (closed section)
16.00 - 16.20		Visit of institute infrastructure (laboratory)
16.20 - 16.30		Conclusions (closed section)





# Polymer Institute SAS

## 2012 - 2015

Igor Lacík  
Director

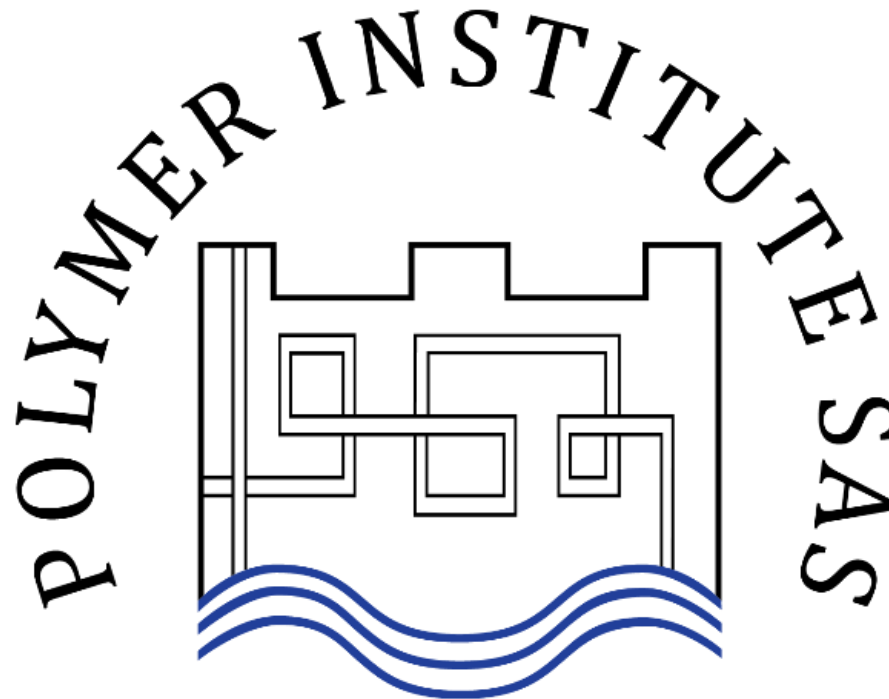
Evaluation Nov 24 2016

Polymer Institute SAS  
Dúbravská cesta 9  
845 41 Bratislava 45  
SLOVAKIA



[polymer.sav.sk](http://polymer.sav.sk)

# Evaluation is a milestone



**November 24 2016:** A new logo of Polymer Institute SAS

# Introduction of Polymer Institute SAS

# In 2017 we celebrate the 55<sup>th</sup> anniversary

**Dec 17 1962:**

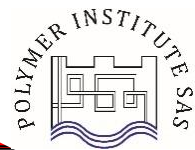
***The Polymer Laboratory*** was established by Dr. Milan Lazar from The Laboratory of synthetic polymers of The Institute of wood, cellulose and chemical fibres SAS



**Sep 12 1966:**

***Polymer Institute of the Slovak Academy of Sciences***

# Mission



The excellent research in the areas of synthetic polymers, natural polymers, and polymeric materials, which is focused on fundamental and applied research in the contemporary topics of polymer science and which globally contributes to the knowledge in this area.

The institute is the research and education center that in parallel to the research activities acts as an external education institution in the areas of macromolecular and physical sciences as well as in other relevant scientific areas.

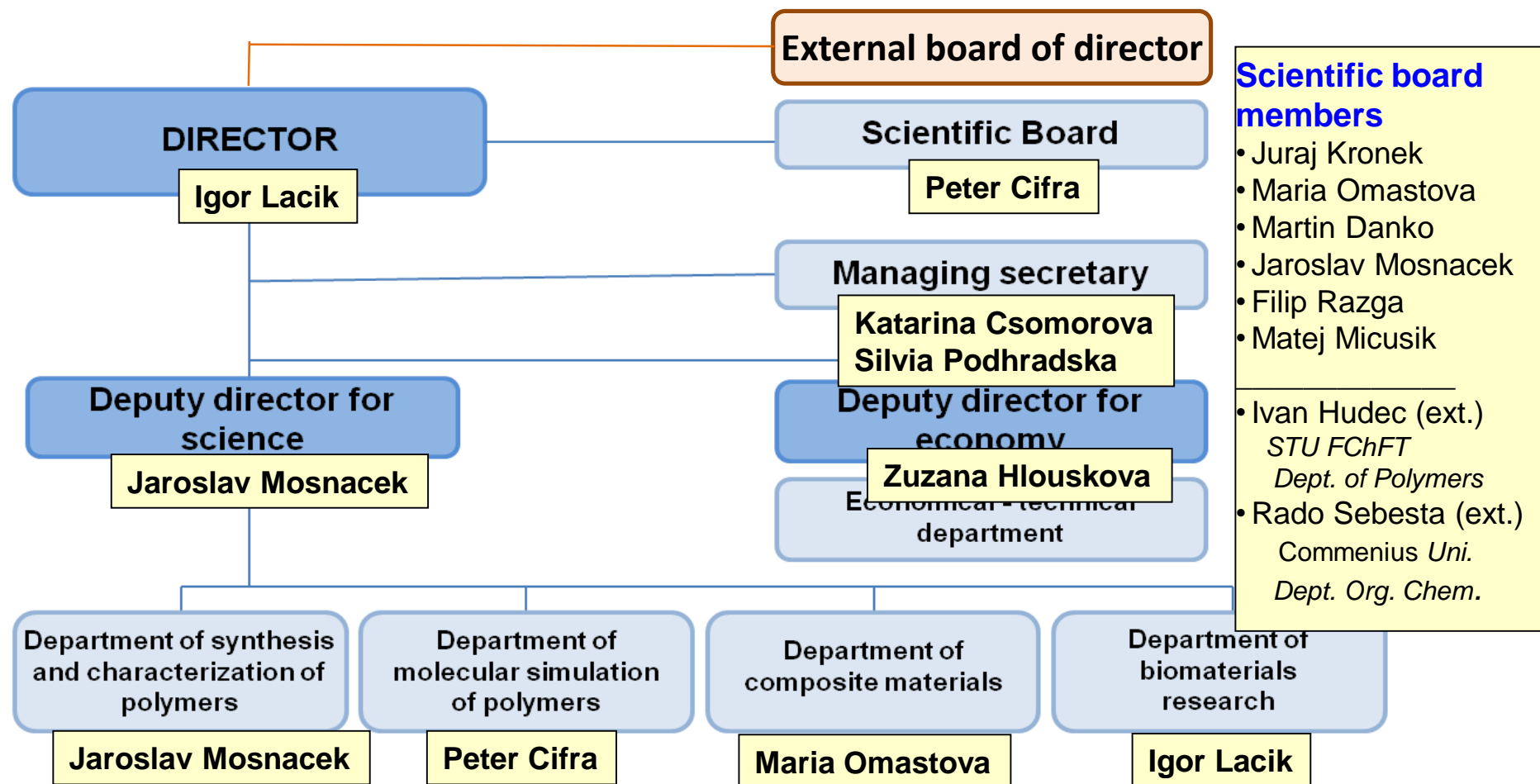
The institute provides the specialized services, which include consultations, infrastructure and innovative solutions for partners from academic institutions, universities and industry both nationally and internationally.

Nationally, the institute has a significant position in the area of polymer science and disseminates the information to the public about research activities, obtained results and applications.

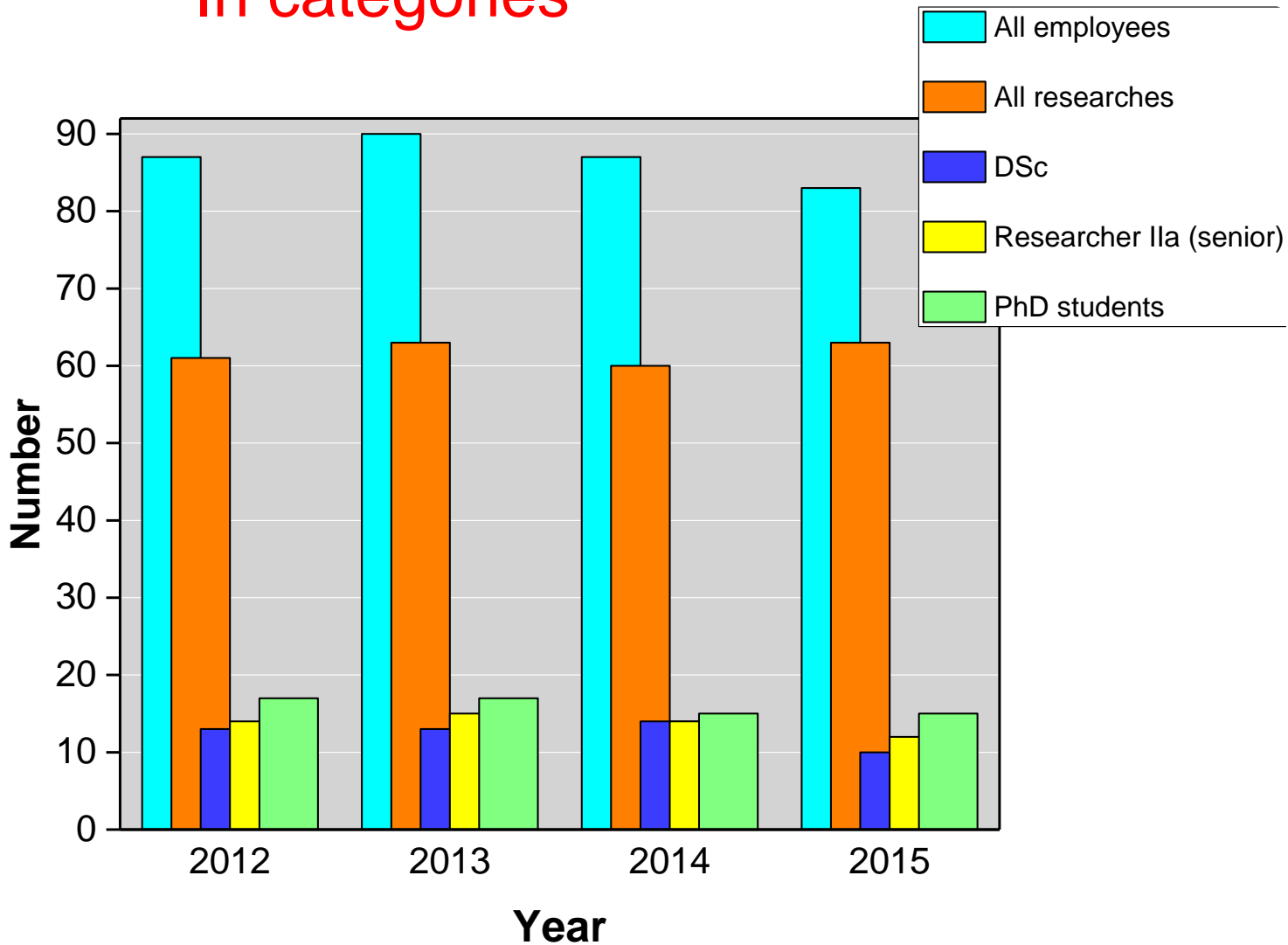
# Organization structure

## External board members

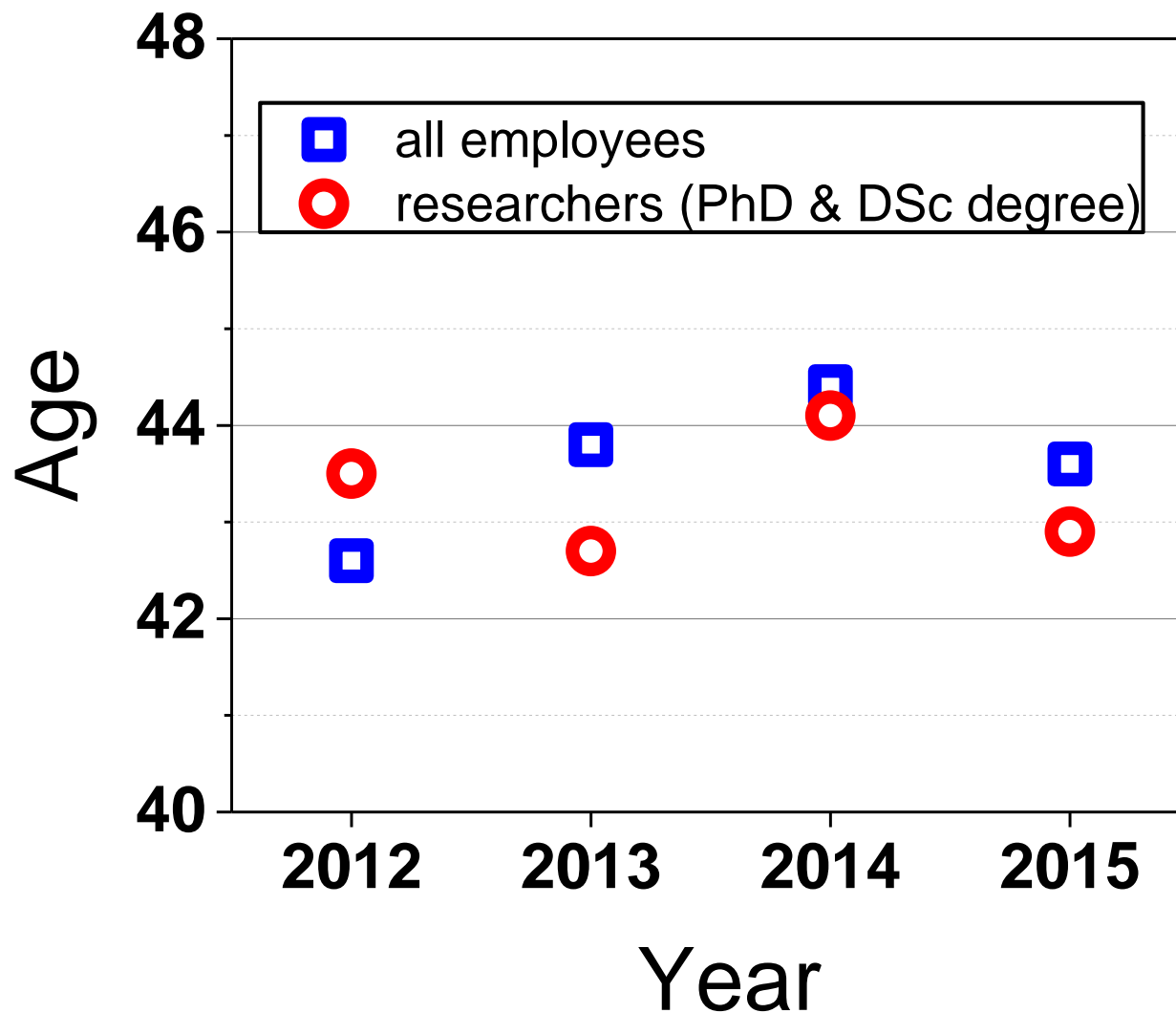
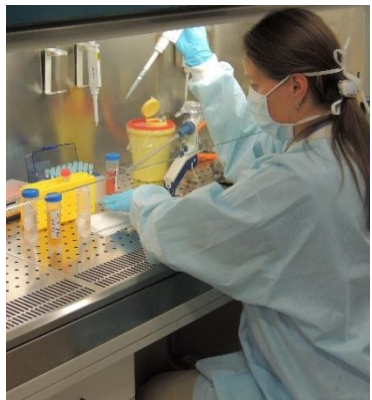
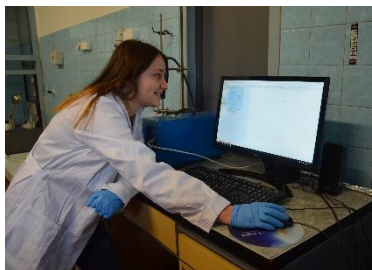
Frantisek Rypacek (IMC, CR)  
Robert Liska (TUV, A)  
György Marosi (UTE, H)  
Christos N. Likos (VU, A)  
Jozef Kristofcak (industry, SR)



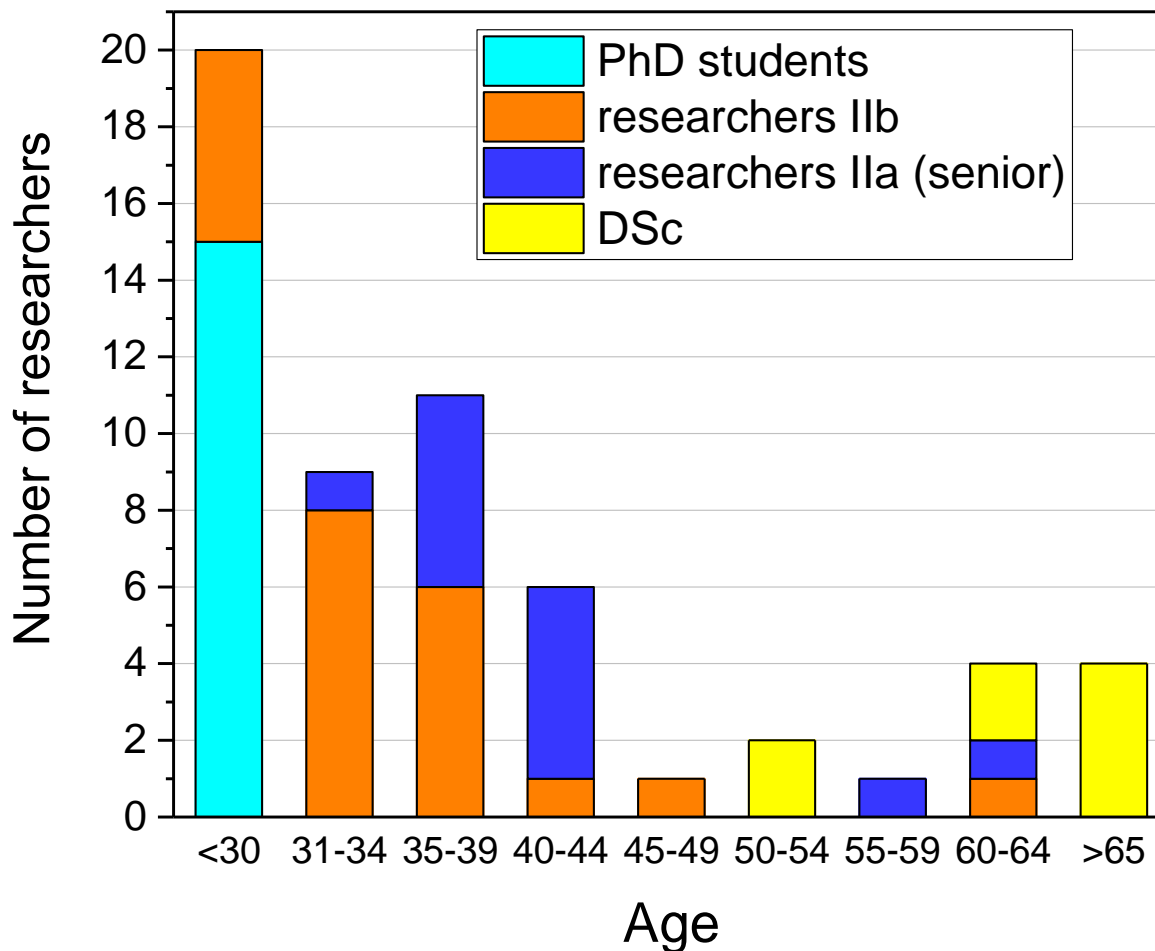
## In categories







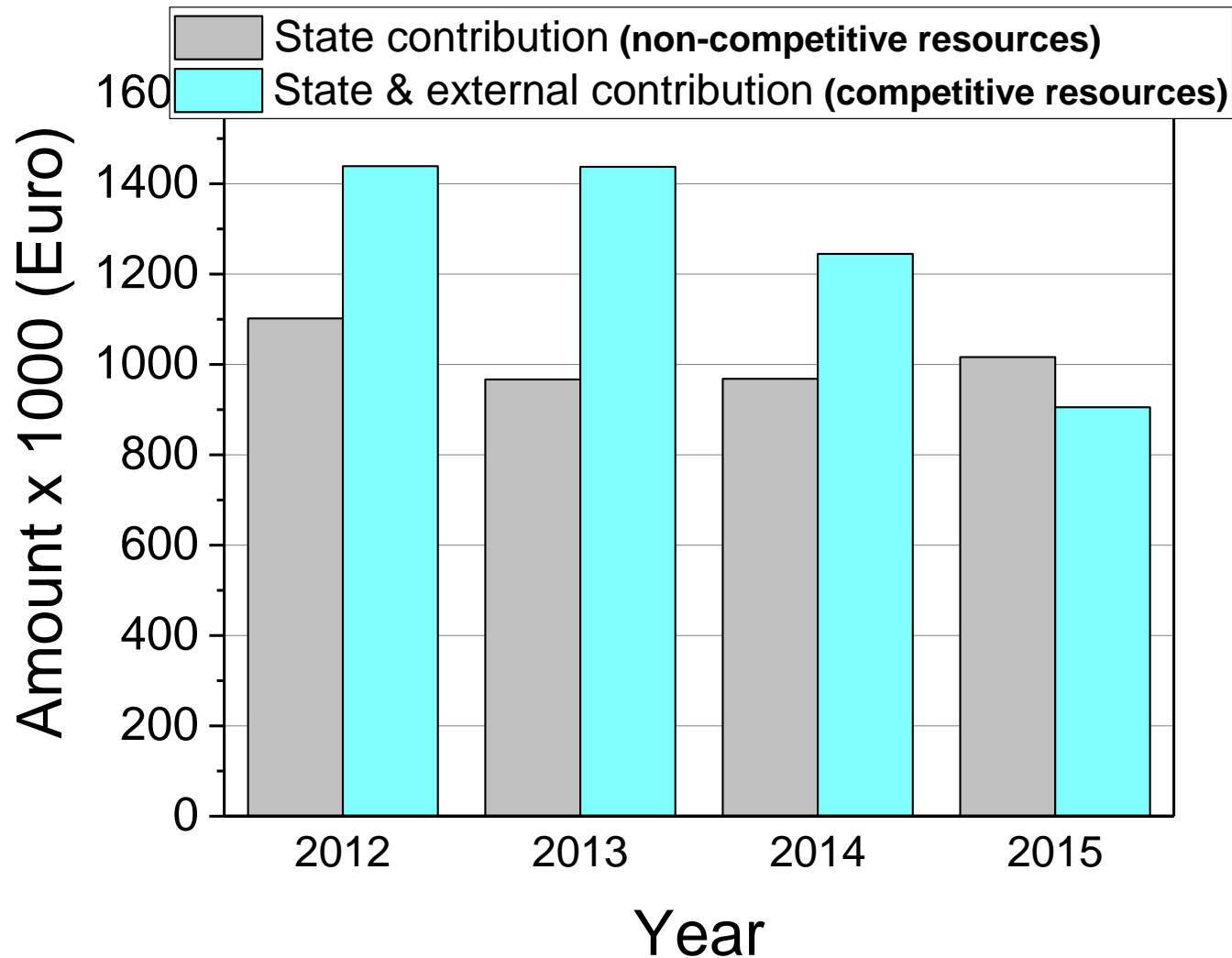
## Age distribution of researchers (12/2015)



Budget

# Budget

A contribution organization (since Jan 1 1993): **state + external contribution**



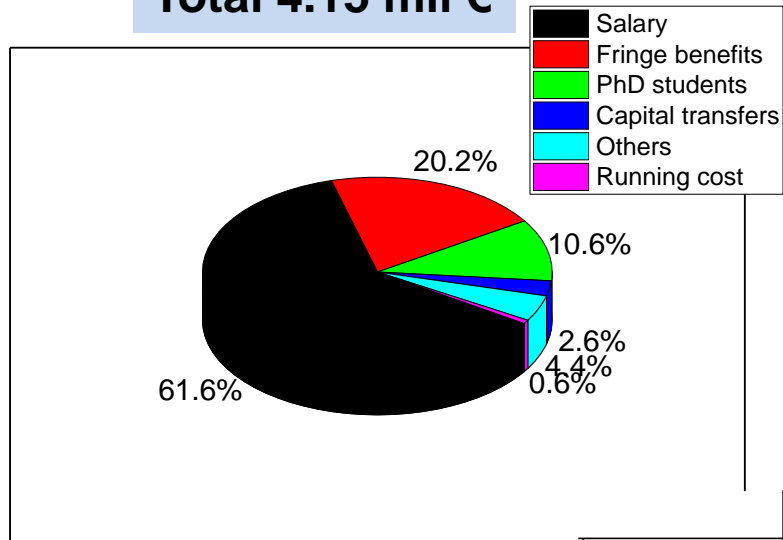
# Budget

2012 - 2015

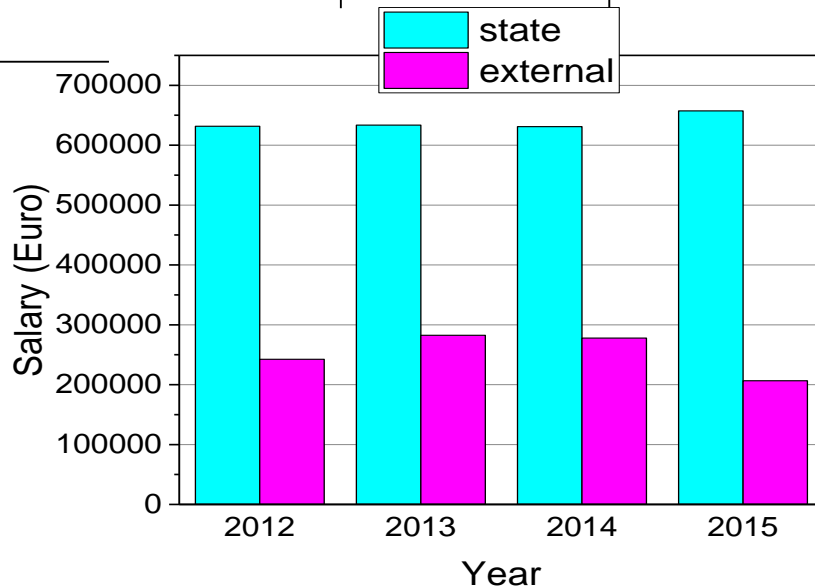
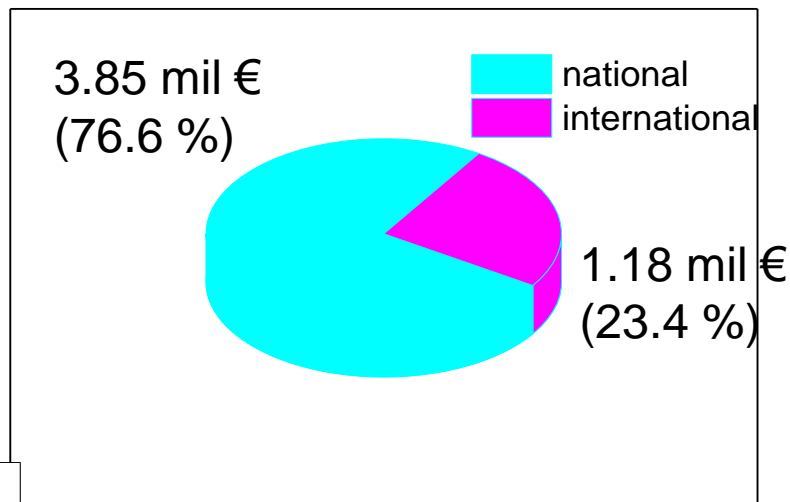
Non-competitive resources

Competitive resources

Total 4.15 mil €



Total 5.03 mil €



**Salary**

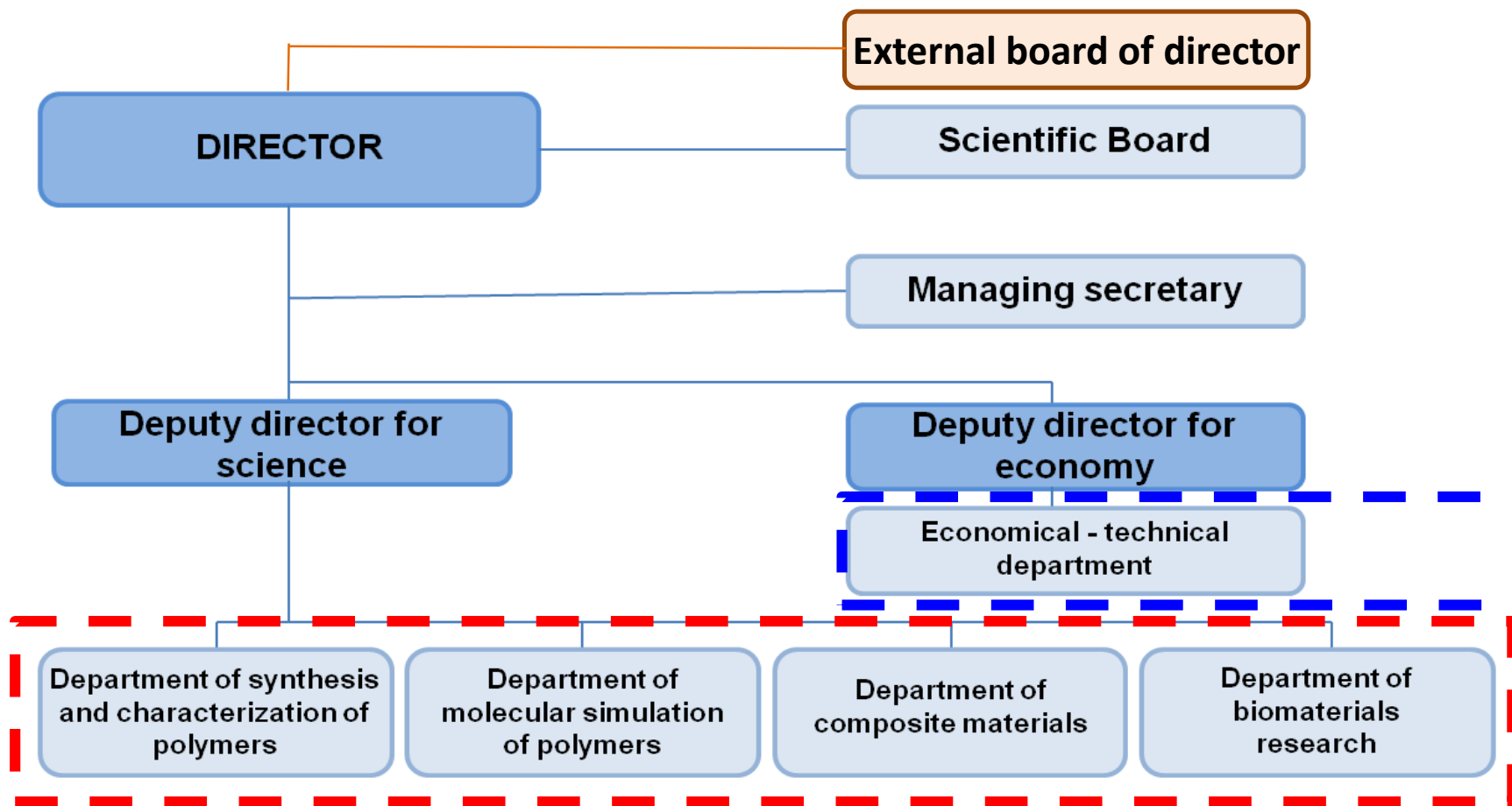
2.6 mil (state)

1.0 mil (external)

Research and Development

Research Departments

## 4 research departments



## Department of Synthesis and Characterization of Polymers (Head: Jaroslav Mosnacek)



- Reversible deactivation radical polymerizations
- Polymers from renewable monomers and natural polymeric materials
- Photochemical studies of small molecules and polymers
- Inorganic nanoparticles and hybrids
- Degradation and stabilization of polymers
- Structure and physico-chemical properties of polymers



## Department of Composite Materials (Head: Maria Omastova)



- Carbon based nanoparticles for smart materials
- Antibacterial graphene/polymer nanocomposites
- Surface treatment of textiles
- Biodegradable bioplastics-based materials
- Electrospinning of polymeric nanofibers
- Antibacterial modification of polymers by cold plasma

## Department of Molecular Simulations of Polymers (Head: Peter Cifra)



- **Molecular computer simulations of polymers** using (i) coarse-grained Monte Carlo, and (ii) atomistic or coarse-grained molecular dynamics
  - geometrically confined polymers
  - modification of solid surfaces
  - supercoiled DNA molecules

## Department for biomaterials research (Head: Igor Lacik)

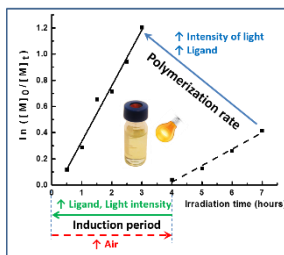
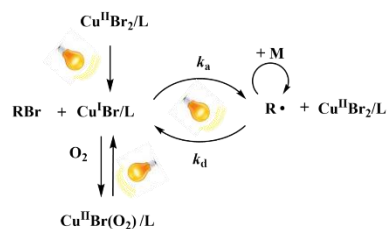


- Encapsulation of living cells towards the diabetes treatment
- Polymers for anti-cancer therapy
- Biomaterials based on 2-oxazoline chemistry and zwitterions
- Evaluation of biocompatibility of polymers and polymeric materials
- Free-radical polymerization of water-soluble monomers

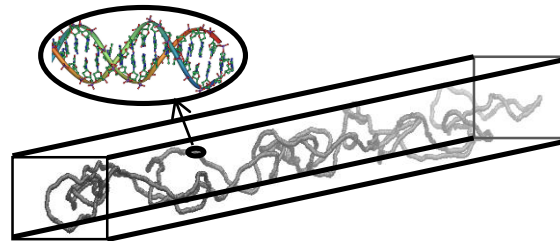
# Research and Development

## Where we have formulated global trends in polymer science

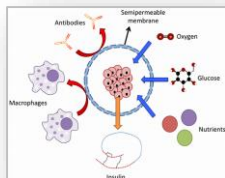
- Photochemically induced reversible deactivation radical polymerization techniques (photoATRP)



- Understanding confined polymers through molecular simulation



- Immobilization of pancreatic cells for diabetes treatment



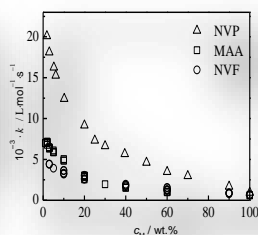
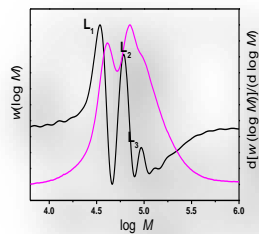
**JDRF** IMPROVING LIVES. CURING TYPE 1 DIABETES.

- Chemiluminescence (research & instrument)



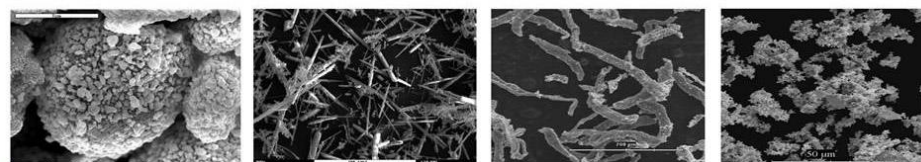
Lumipol 3

- Mechanism and kinetics of free-radical polymerization in aqueous solutions



**BASF**  
We create chemistry

- Electroconductive polymers, composites and nanocomposites

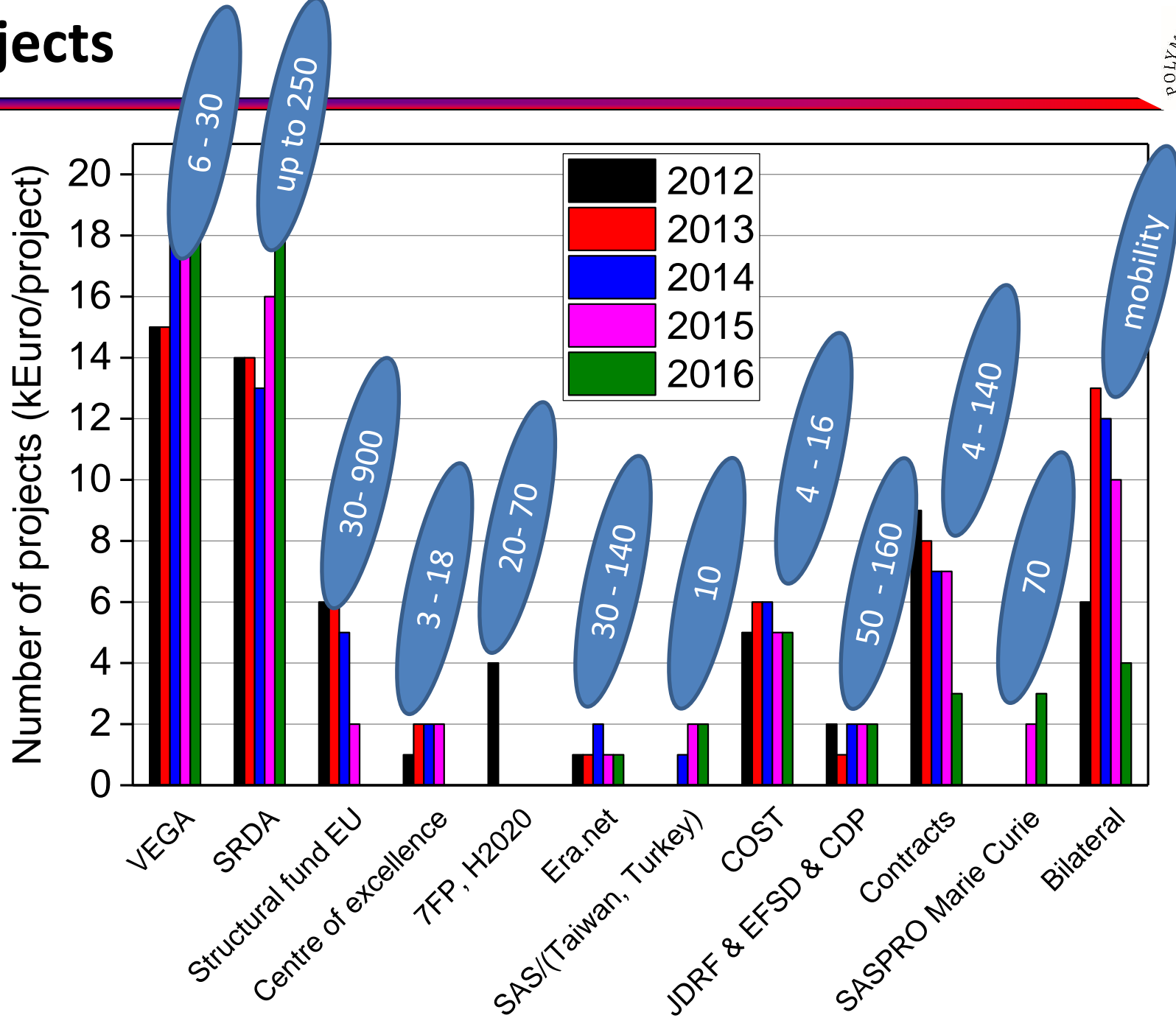


Research and Development

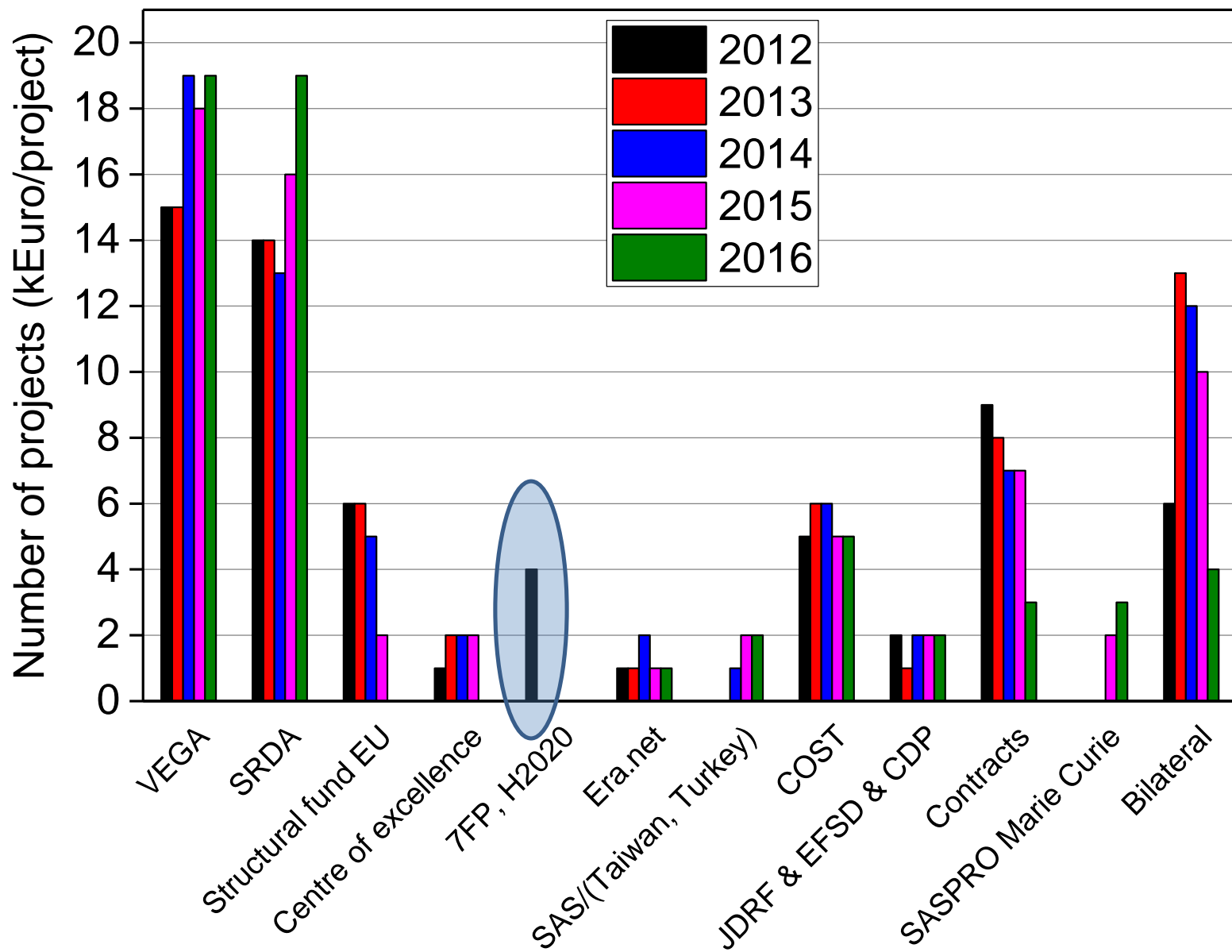
Projects



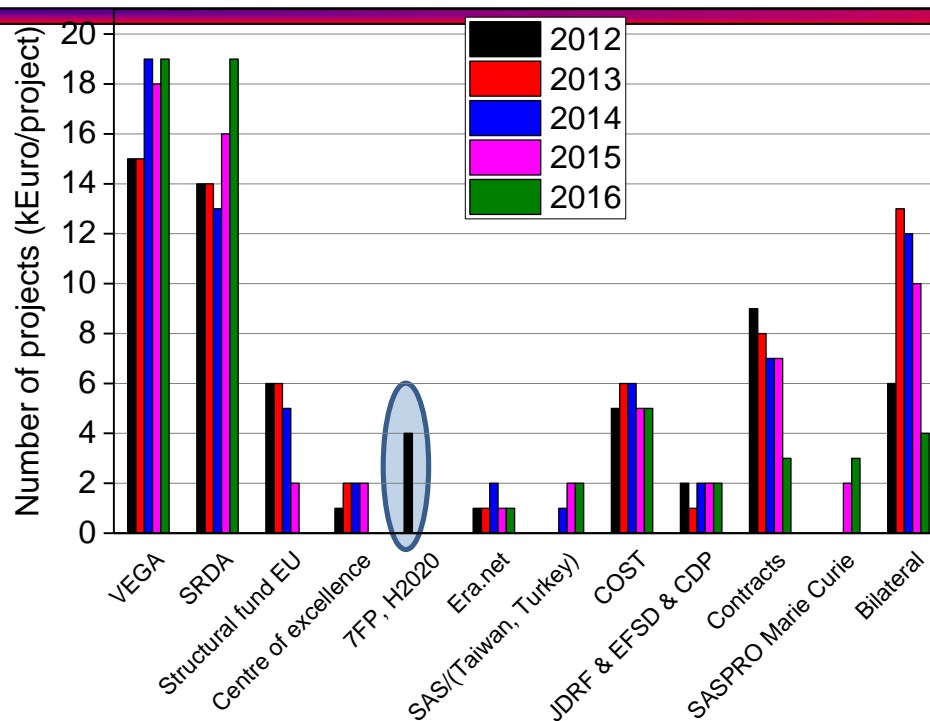
# Projects



# Projects



# Projects



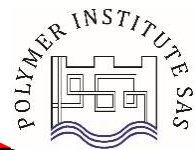
Project proposals submitted to 7RP or H2020	2012	2013	2014	2015
Institute as coordinator	0	0	0	0
Institute as participant	7	2	10	5

**1 x ERC starting grant**

**2x GRAPHENE Flagship, 2x FET, etc. (~14/15 points insufficient)**



# Contracts



**Kinetic coefficients and models for existing and future polymerization processes and systems at BASF, BASF SE, Ludwigshafen, Germany**

**Technological procedure for preparation of poly(L-lactide) (PLLA) by polymerization of L,L-dilactide (L-Lactide, L-LA) with defined properties Tau-Chem, s.r.o., Bratislava, Slovak Republic**

**Monomers for adhesive polymers in dental composites; partner: IVOCCLAR VIVADENT, Liechtenstein**

**New phase change materials with improved heat transfer properties: Qatar University, Doha, Qatar**

**Production of connections to chemiluminescence device for UV irradiation; DSM, The Netherlands**

**Construction of Lumipol 3, Queensland University of Technology, Brisbane, Australia**

**Development and characterization of alginate microbeads for cell encapsulation, Beta Cell NV, Brussel, Belgium**

**Evaluation of electrically conductive nanosols parameters, VÚTCH-Chemitex s.r.o., Slovak Republic**

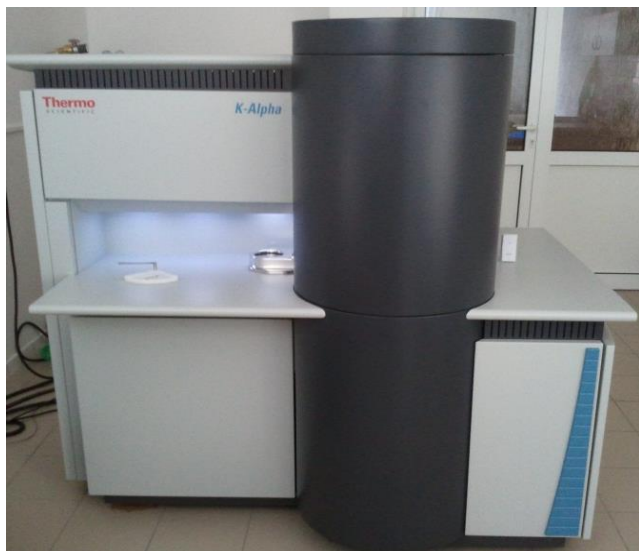
**Bonding of ultrasound transducers, Ecoson, spol s r.o., Nové Mesto n.V, Slovak Republic**

**Electrically conductive adhesive Gravipol Electro, SOS Electronic spol. s r.o., Košice, Slovak Republic**

**Study of high temperature effect on mechanical properties of membrane blends based on butyl rubber as a result of plasticizers loss, Continental, a.s. Púchov, Slovak Republic**

**The Member of Automotive Cluster Slovakia**

**The Member of Slovak Plastic Cluster**



XPS K-Alpha  
ThermoFisher Scientific



Nanoindenter Hysitron TI-750



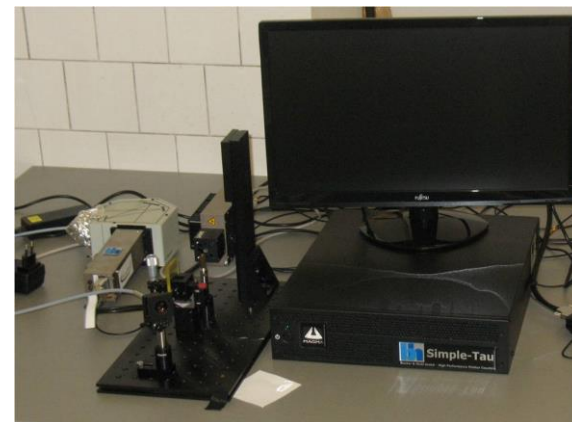
Conical calorimeter



Infrared spectrometer with microscope



Microcompounder DSM

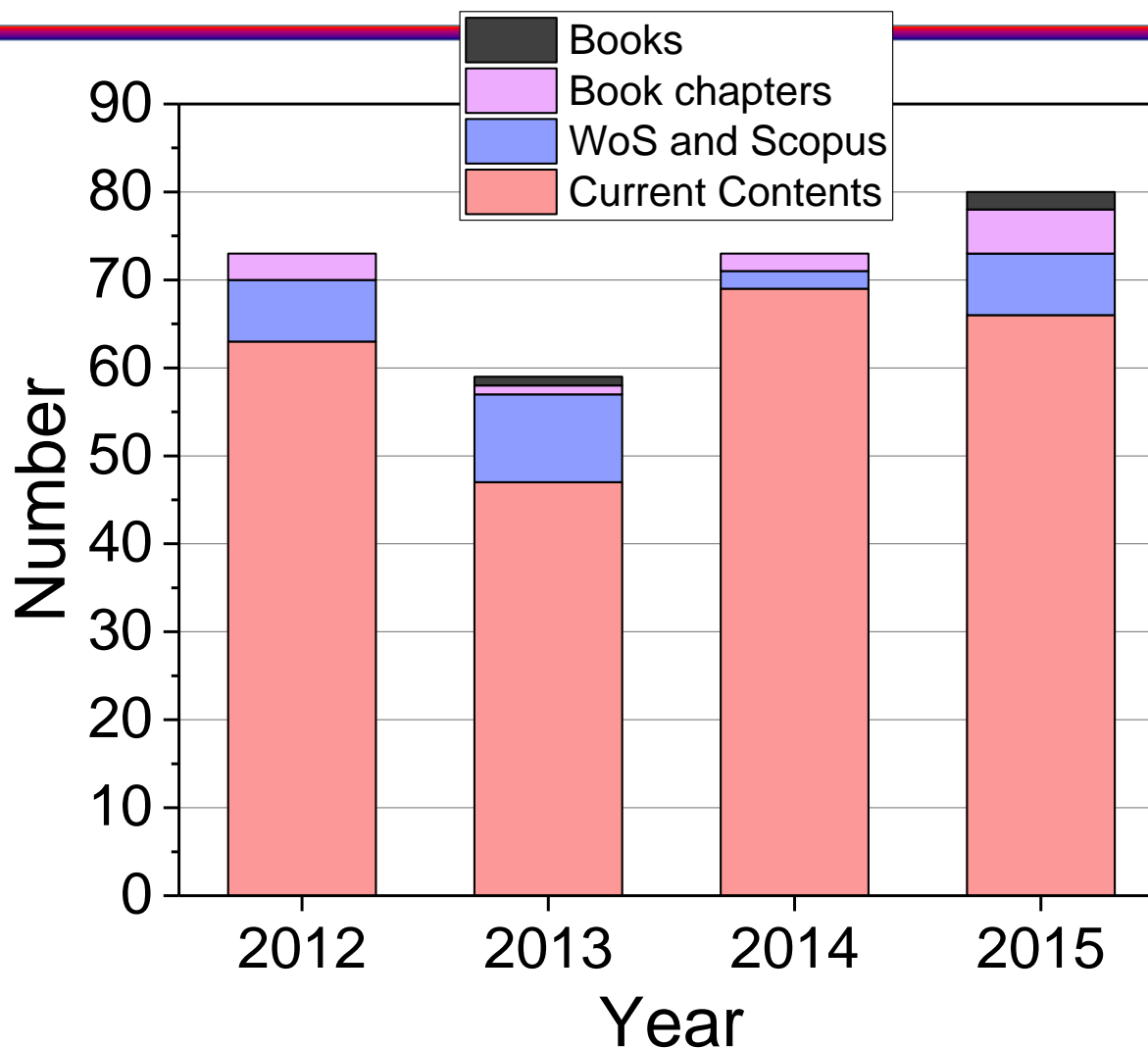


Fluorescence lifetime determination

Research and Development

Outputs

# Publications



- ~ 1 publication/FTE
- ~ 45 % PI SAS is the corresponding affiliation
- IF > 3 for ~ 50 % of publications in y. 2015

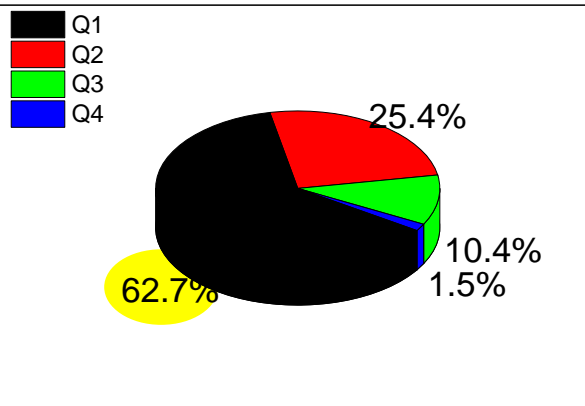


## Where we publish?

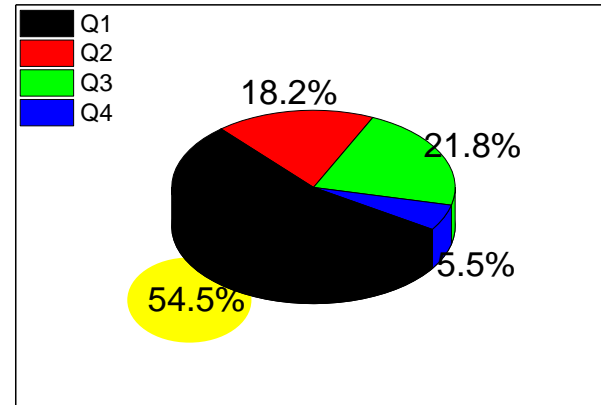
Quartiles of journals  
2012 - 2015

(see exhibited information)

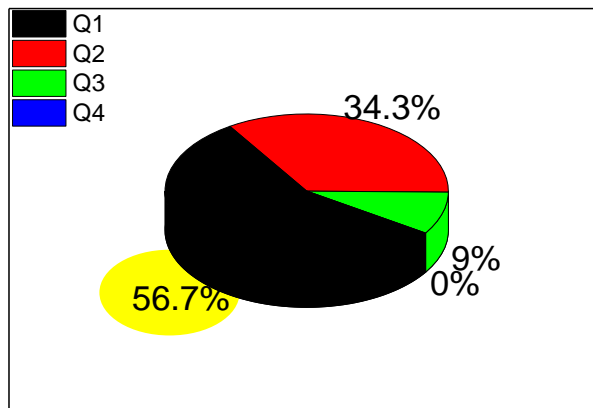
**2012**



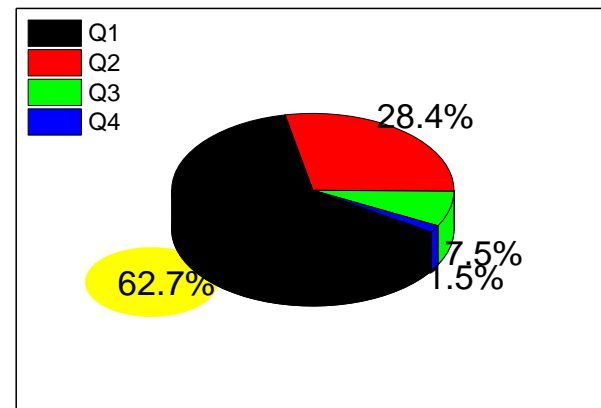
**2013**



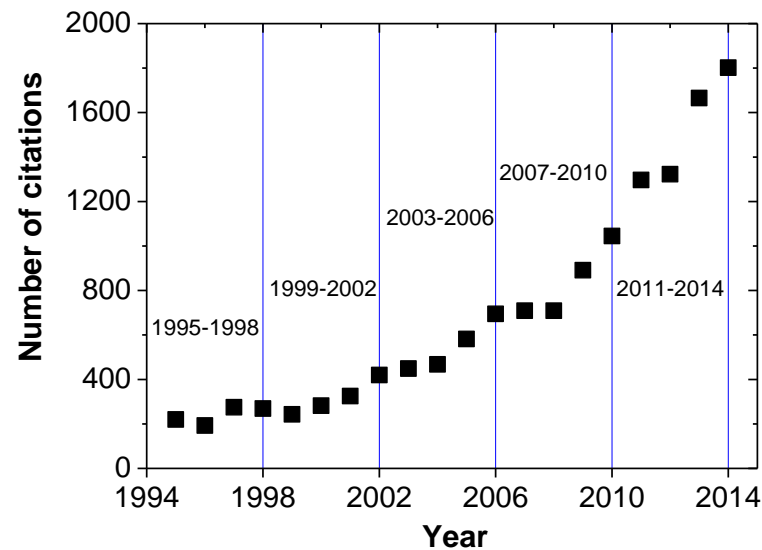
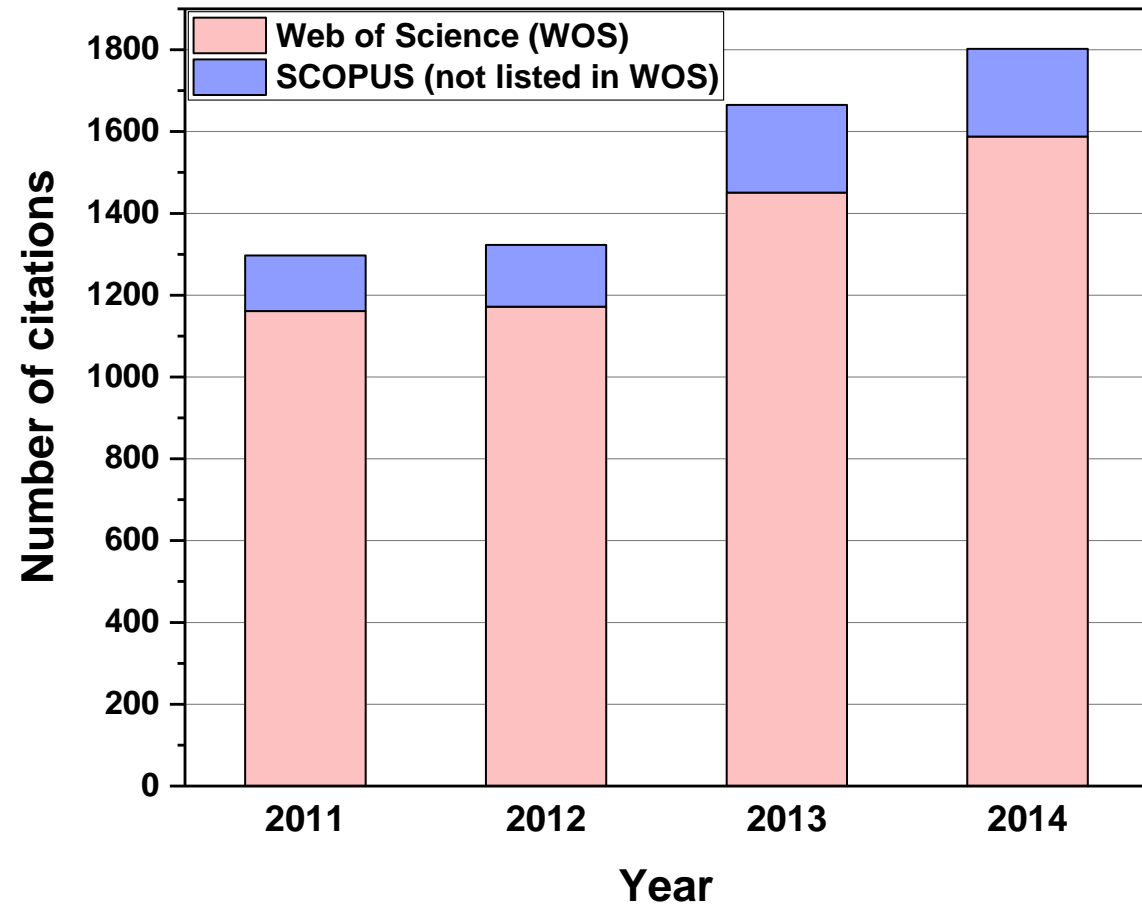
**2014**

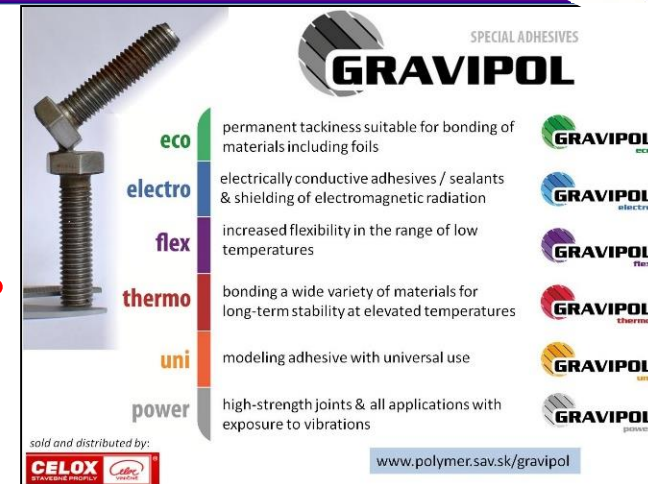
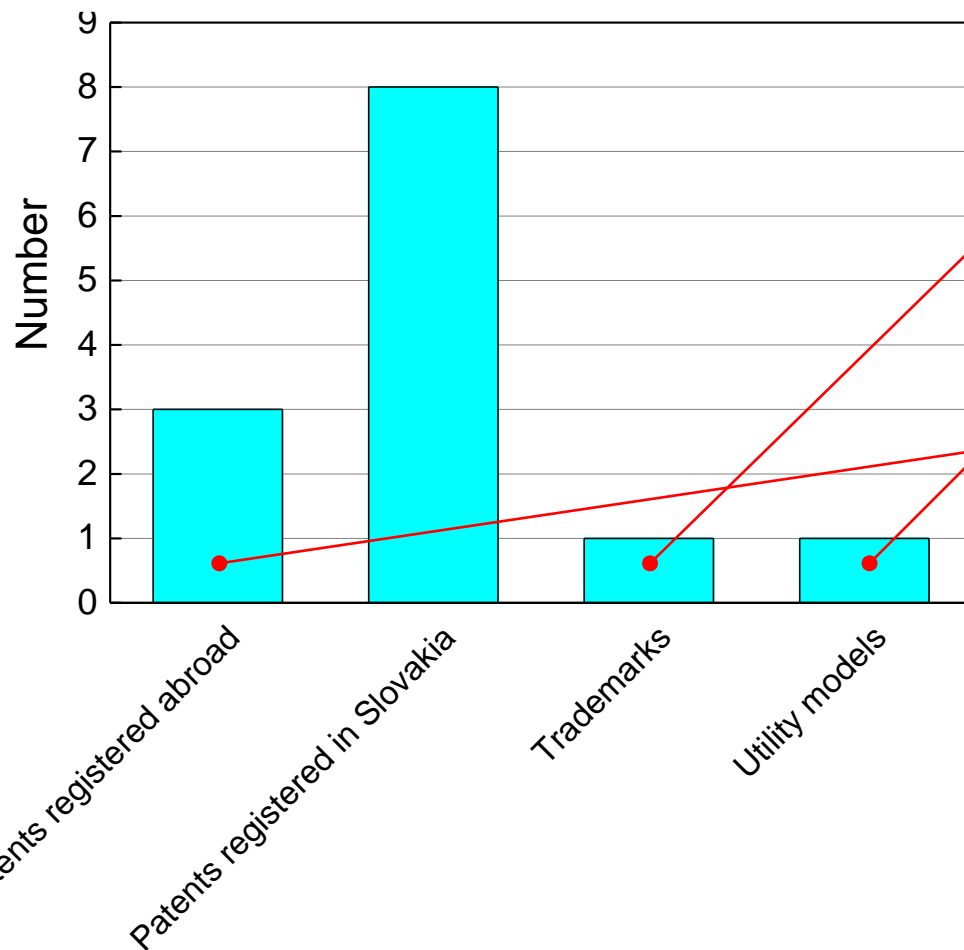


**2015**



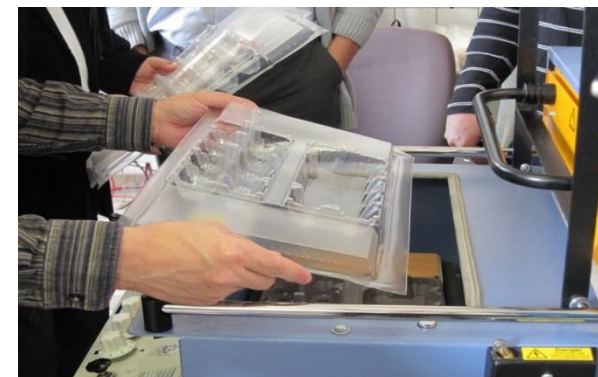
- ~ 1 publication/FTE
- ~ 45 % PI SAS is the corresponding affiliation
- IF > 3 for ~ 50 % of publications in y. 2015





## Biologically degradable polymeric composition with high deformability

- with Slovak technical university & Panara s.r.o. (Nitra, SR)
- Protected in Japan, Korea, India, Russia, Singapore, China, USA, Canada, EU



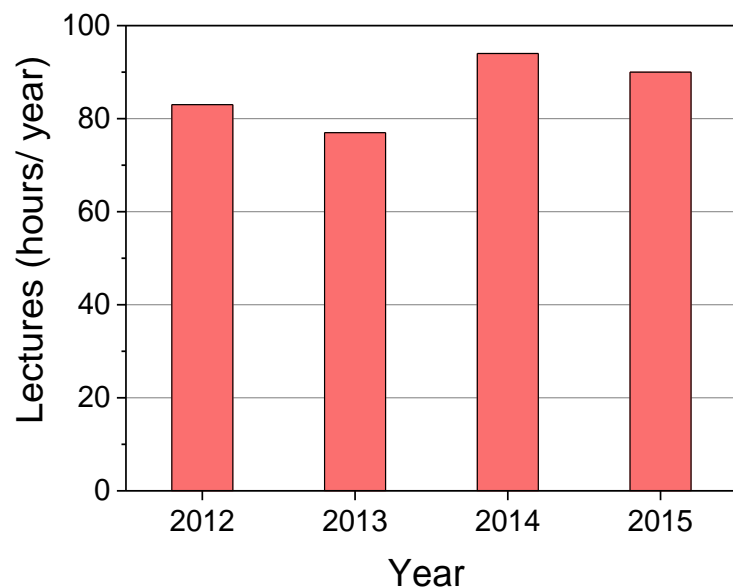
# Education & Training



## Teaching at Universities // Theses // Committees

### Pedagogical activities

1. Faculty of Chemical and Food Technology, Slovak Technical University Bratislava
2. Faculty of Natural Sciences, Comenius University, Bratislava
3. Faculty of Materials Science and Technology, Slovak Technical University Bratislava, Trnava
4. Faculty of Industrial Technologies of Trencin University, Puchov

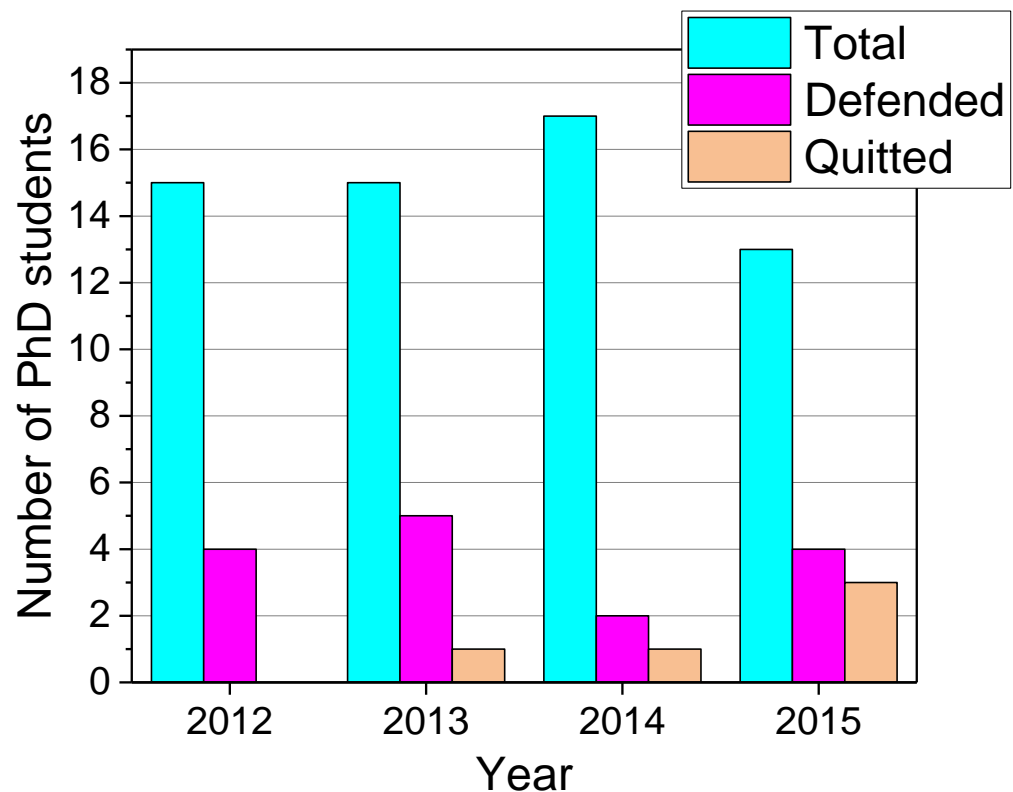
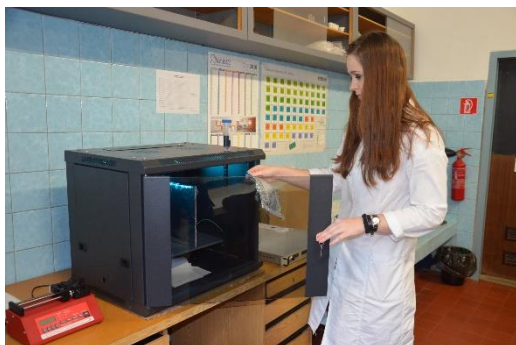


Supervised bachelor theses (in total)	0	0	1	2
Supervised diploma theses (in total)	1	3	1	4
Supervised PhD theses (in total)	18	20	19	16
Members in PhD committees (in total)	13	12	12	12
Members in DrSc. committees (in total)	6	6	7	2
Members in university/faculty councils (in total)	3	2	2	3
Members in habilitation/inauguration committees (in total)	5	1	3	3

## Accredited programs for doctoral studies

- ❑ 4.1.18 **Physical Chemistry** (Faculty of Chemical and Food Technology Slovak Technical University; validity 2004 – 2014, and Faculty of Natural Sciences Comenius University; validity 2004 - present)
- ❑ 4.1.19 **Macromolecular chemistry** (Faculty of Chemical and Food Technology Slovak Technical University; validity 2004 - present)
- ❑ 5.2.21 **Technology of Polymeric Materials** (Faculty of Chemical and Food Technology Slovak Technical University; validity 2004 – present)

# Human Resources



## Targets:

- Quality
- Training
- Creativity
- Independence
- Satisfaction

## Opportunities:

- Participation
  - Projects
  - Conferences
  - Dissemination
- International environment

## Evaluation

### ➤ **PhD students:**

- annual evaluation of the PhD by Scientific board
  - progress
  - recommendations

### ➤ **Young scientists (since 2012):**

- **contract** between 1 and 5 years by the Institute management
- **criteria:**
  - publications, national/international projects, stay abroad, career plans
    - up to 12 years after the PhD

# PhD students and young researchers

## Opportunities by Institute management

- **Open positions** are almost constantly available to attract young scientist
  - **dynamics:** contracts + Slovak national scholarship program

<b>PhD students:</b>	2 x Canada, 2x Ukraine
<b>Post-docs:</b>	3 x Czech Rep., 1 x Poland
<b>Profs:</b>	1 x Canada (sabbatical), 1 x Russia

- **Communication** with the Scientific board and Management (**Board of Young Scientists at the Polymer Institute SAS**)
- **Conditions** for the independence and scientific growth
- **Starting grant** < 35 years
- **Competition** for the best paper < 35 years
- **Support** of other activities (English, gym..)



3 successful applicants = a significantly critical mass

Filip Razga, PhD



Zoran Markovic, PhD



Christian Peptu, PhD



## Expectations

- Creativity
- Significant impact on scientific environment
- Scientific foot-steps at the Polymer Institute SAS

## Evaluation (since 2012)

- **Contract** between 1 and 5 years by the Institute management
- Based on the **questionnaire for the DSc** habilitation
- **Criteria:**
  - Publications,
  - National/international projects
  - National/international recognition
  - Scientific school
  - Other activities for the benefit of institute
- Rules for contracts > **65 years**



# Conferences

# International visibility: (co)organized conferences

- 4<sup>th</sup> Bratislava Young Polymer Scientists Workshop BYPoS; October 1-5, 2012; Relax Hotel Avena – Liptovský Ján, Slovak Republic; responsible person: Podhradská Silvia; number of participants: 38
- 5<sup>th</sup> International Conference Polymeric Materials in Automotive & 21<sup>st</sup> Slovak Rubber Conference; April 23-25, 2013; Hotel Bonbón - Bratislava, Slovak Republic, responsible person: Chodák Ivan; number of participants: 169
- 10<sup>th</sup> Anniversary Meeting EUROFILLERS 2013 (Eurofillers 2013); August 25-29, 2013; Hotel Park Inn, Bratislava, Slovak Republic; responsible person: Omastová Mária; number of participants: 170
- 6<sup>th</sup> European Weathering Symposium EWS; September 11-13, 2013; Hotel Park Inn, Bratislava, Slovak Republic; responsible person: Rychlá Lyda; number of participants: 100
- POLYFRIEND Educational Course and Workshop; September 5, 2013; Polymer Institute of SAS, Bratislava, Slovak Republik; responsible person: Mosnáček Jaroslav; number of participants: 50
- 5<sup>th</sup> Bratislava Young Polymer Scientists Workshop BYPoS; June 16-20, 2014; Zázrivá, Slovak Republic; responsible person: Šišková Alena; number of participants: 40
- XXII. International Conference on Bioencapsulation; September 17-19, 2014; Hotel Holiday Inn Bratislava, Slovak Republic; responsible person: Lacík Igor; number of participants: 120
- 12<sup>th</sup> International Seminar on Elastomers ISE'14; August 24-27, 2014; Hotel Park Inn, Bratislava, Slovak Republic; responsible person: Chodák Ivan; number of participants: 110
- 9. International Conference on Bio-Friendly Polymers and Polymer Additives: From Scientific Aspects to Processing and Applications BPPA14; May 19-21, 2014; Research Centre for Natural Sciences of the Hungarian Academy of Sciences in Budapest; responsible person: Mosnáček Jaroslav; number of participants: 110
- 6<sup>th</sup> International Conference Polymeric Materials in Automotive & 22<sup>nd</sup> Slovak Rubber Conference; May 26-28, 2015; Hotel Park Inn, Bratislava, Slovak Republic; responsible person: Chodák Ivan; number of participants: 119
- EUPOC 2015 Conducting polymeric materials; May 24 -28, 2015; Palazzo Feltrinelli Lake Garda, Gargnano, Italy; responsible person: Omastová Mária; number of participants: 85



## Organizing committee BYPoS 2016

- BYPoS (series)
- Polymers in Automotive (series)
- International (series)
- Bio-friendly polymers

# International visibility

- ~ 50 invited lectures at the international conferences
- visiting and visitors

	Scientists from PI SAS abroad		Scientist visiting PI SAS	
Year	number	days	number	days
2012	38	1908	30	286
2013	44	2284	46	878
2014	42	2451	40	915
2015	38	2088	44	883

## ➤ visits of distinguished scientists

- prof. Terentjev, Cambridge (UK)
- prof. Hadjichristidis, KAUST (Saudi Arabia)
- prof. Tsiang, NCCU (Taiwan)
- prof. Liska, TU Vienna (Austria)
- prof. Meira, CONICET (Argentina)
- prof. Moscatelli, TU Milano (Italy)
- prof. Hutchinson, Queen's Uni (Canada); & **sabbatical**
- prof. Kajiwara, NUE (Japan)
- prof. Shipp, CUP (USA)
- prof. Matyjaszewski, CMU (USA)

## ➤ international organizations

- European Polymer Federation, EPF (M. Omastova, national representative)
- International Union for Pure and Applied Chemistry, IUPAC (I. Lacik, titular member)

# National visibility: (co)organized conferences

1. VII. Slovak-Czech Conference Polymers 2012, November 2012, KC Smolenice, Slovak Republic
2. 65. Congress of Chemical Societies, September 2013, Hotel Hutník, Tatranské Matliare, Slovak Republic (with Slovak Chemical Society)
3. 67. Congress of Chemical Societies, September 2015, Hotel Bellevue, Starý Smokovec, Slovak Republic (with Slovak Chemical Society)

## Major involvement of the Polymer Institute SAS



**Prof. J.-M. Lehn**

Nobel Prize laureate for chemistry, 1987

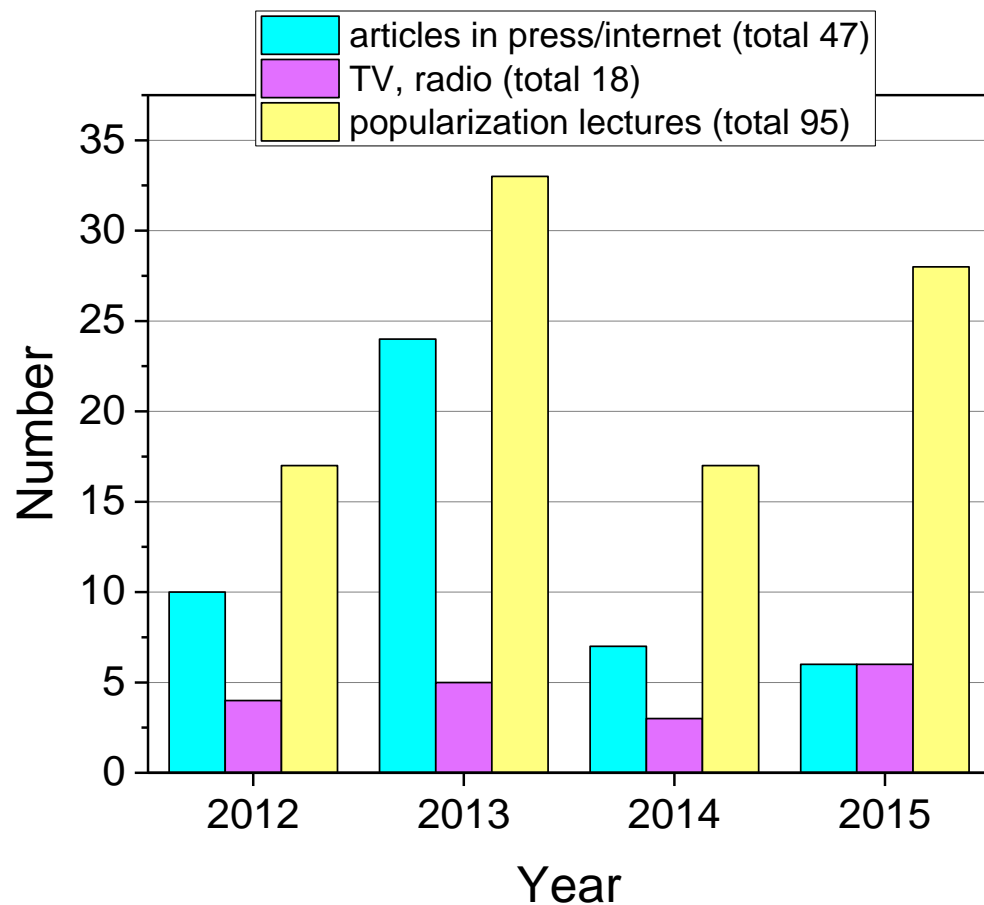


# Popularization



# Popularization of science

- the inherent part of our life
- numerous forms of popularization



Week of science and technology



cukrovka  
neinvestičný fond

Diabetes non-profit  
foundation



Final evaluation of high-school teams  
chemgeneration.com (BASF)



## NANO - Art

Ústav polymérov SAV, Bratislava  
Vysoká škola výtvarných umení, Bratislava

VÝSTAVA  
28.11. - 22.12. 2016

VERNISÁŽ  
28.11.2016 o 14,00 hod.

KDE? Ústav polymérov SAV  
Dúbravská cesta 9, 845 41  
Bratislava - Patrónka

foto: Michal Jakubec, BASEfactory

**A. Siskova** (Polymer Institute SAS)  
&  
**J. Frajova** (Academy of Fine Arts and Design)

**Exposition opens on Nov 28**

# Awards: national and international



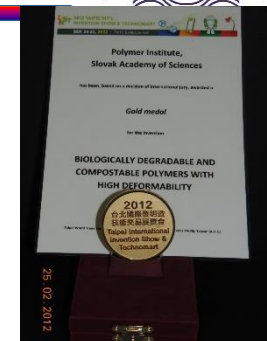
Z. Benkova  
Young scientist 2012



M. Omastova, I. Lacik, I. Capek;  
Top Teams SAS (3 of 21)



I. Chodak, P. Alexy (STU)  
Technology Transfer Award  
(Taipei International Invention Show  
and Technomart 2012)



I. Chodak & I. Lacik et al  
Popularization of science



I. Novak, Z. Spitalsky  
Slovmedica Gold Incheba Award



I. Chodak, T. Bleha, J. Rychly  
Gold medal SAS



Z. Spitalsky  
Top cited paper



I. Lacik  
Crystal Wing laureate



Impact on the society

## “The Polymer Age” vs “The Label Polymer Institute SAS”

How useful are we to the society?



Importance of  
polymer science  
to humans

Dissemination of  
results to  
professionals

Cooperation  
academia and industry

External activities  
committees,  
organizations, legislation

Development of  
knowledge in  
polymer science

Application of  
polymer science

Education of future  
generations

# SWOT analysis

## STRENGTHS

- dedicated employees
- external funding
- young generation
- regular evaluation (competitiveness)
- traditional and new expertise
- cooperation and multi-disciplinarity
- national and international visibility
- infrastructure

## WEAKNESSES

- poor competitive conditions for employing (young) scientists
- fragmented research (no core projects)
- 42-55 generation gap
- uneven distribution of responsibility
- quality of PhD studies
- no H2020 projects

## OPPORTUNITIES

- competitiveness in European and world research area (H2020, SF EU)
- transformation to the public research institution
- hiring experienced post-docs
- hiring PhD students from abroad
- cooperation with universities
- cooperation with industry

## THREATS

- perspective for young personnel
- continuity of research
- insufficient number of leaders
- granting system (no grants for young researchers, no grants for capital cost)
- small infrastructure & running cost incl. new infrastructure
- non-availability of Structural funds EU

# Previous accreditation (2012)

## Organization accredited in **category A** (88.31 %)

### Conclusions:

- ❑ The institute **fulfilled all qualitative and quantitative criteria of excellence** in a given research area.
- ❑ It is **internationally well recognized organisation**. It should be emphasized that excellent **fundamental research has also close links to application sphere**.

### Recommendation:

1. Development **in the direction of the technological transfer** by helping young researchers or postdoctoral fellows to create new activities in connection with the main research items of the institute (**start-up companies, etc**).
2. **More effort to attract foreign PhD students and postdoctoral fellows** to not only preserve but enhance the reputation it has in the scientific community.

### Action:

- ❑ **To point 1.** Technology transfer is an important part of our outputs
  - Strong support //numerous discussions and contacts created
  - Open option as soon as this step is needed
- ❑ **To point 2.** We work on improving
  - Active in the SASPRO program
  - Active in SAIA National scholarship program
  - Open post-doctoral positions

Vision

## **Mission:**

- Expertise
- Education
- Cooperation
- Dissemination



## **Vision:**

- Enhanced recognition in the global polymer science and related fields
- Demonstrated usefulness to professionals and lay public

## **1. Personnel**

- to create the “good to be here” conditions to fulfil the expectations and plans for creative scientific personnel
- to continue in evaluation towards a competitive environment
- to increase the number of core leaders
- to increase the number of project-employed researchers and PhD students
- to implement the “financing vs performance” principle
- to promote personal growth
- to promote mobility

## **Mission:**

- Expertise
- Education
- Cooperation
- Dissemination



## **Vision:**

- Enhanced recognition in the global polymer science and related fields
- Demonstrated usefulness to professionals and lay public

### **1. Personnel**

### **2. Research topics**

- to identify the “core” topics to both reduce fragmented research and enhance the recognition of the institute based on the “core” topics

### **3. Research environment**

- purchase/replace the medium cost equipment
- sophisticated plan for major infrastructure (equipment & laboratory space) from Structural funds EU

### **4. International recognition**

- The key is a high quality personnel producing the research outputs and recognition

**To establish the positive loop for all these aspects**



...there is a good future for the Polymer Institute SAS

The Open-door day Nov 10 2016, ~ 270 visitors



# Evaluation of Polymer Institute SAS

## by the International evaluation panel (Nov 24 2016)

### Agenda

14.30 - 14.35	Opening and introduction of the Evaluation Panel Members (Member of the Accreditation Committee)
14.35 - 14.55	Presentation of the institute and its results (director and/or representatives of selected research teams)
14.55 - 15.15	Discussion to the presentation and to the questionnaire
15.15 - 15.40	Discussion with institute research community
15.40 - 16.00	Discussion with PhD students (closed section)
16.00 - 16.20	Visit of institute infrastructure (laboratory)
16.20 - 16.30	Conclusions (closed section)

