

14th International Conference on Technology Policy and Innovation

*Building Sustainable R&D Centers
in Emerging Technology Regions*

PROGRAMME & ABSTRACTS

*Brno, Czech Republic
September 9–12 2014*

ictpi.ctt.muni.cz



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Welcome to ICTPI Brno





As the creation, diffusion, and use of knowledge increasingly becomes a key strategic resource for regional as well as national economic development and social wellbeing, there is a need to enhance our understanding of the barriers and incentives for science and technology (S&T) knowledge generation, transfer, application, and diffusion in developed, developing, and emerging regions worldwide.

Since 1997, the main objective of the International Conference on Technology Policy and Innovation has been to bring together leading representatives of academic, business, and government sectors worldwide to present and discuss current and future issues of critical importance for using science and technology to foster economic development and social wellbeing locally and globally. Multidisciplinary perspectives are encouraged to provide state-of-the-art and useful knowledge to decision makers in both the private and public sectors – including up-to-date and effective education, business, and government policies and strategies. In this context, the 14th ICTPI Conference in Brno “Building Sustainable R&D Centers in Emerging Technology Regions” is focused on exploring opportunities, challenges, and policies related to capacity building in emerging technology regions.

I wish to thank conference organizers at the Technology Transfer Office, Masaryk University and regional and institutional partners from the South Moravian Region with special recognition to the Rector of Masaryk University Mikuláš Bek as well as local conference sponsors and the organizers namely Jan Slovák (Chair), Martin Bareš, Eva Janoušková, Markéta Vlasáková, Miroslav Mašek and Petra Nováková. I also thank members of ICTPI's International Organizing Committee representing 14 institutional and national participants. We all extend our appreciation to the conference keynote and other presenters and attendees and we look forward to coming together to learn from each other, to get to know each other, and to better know the City of Brno and Masaryk University. Sincerely

David Gibson

*IC² Institute, The University of Texas at Austin,
ICTPI Chair*

******The ICTPI Conferences are organized through a close partnership between the IC² Institute, The University of Texas at Austin, USA and the International Organizing Committee with participants from Centro Internacional de Inovação C2i, Curitiba, Brazil; Delft University of Technology, The Netherlands; Higher School of Economics, Moscow, Russia; Zernike (UK) Limited, Cambridge, UK; EGADE, Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM), Mexico; EMPI Business School, India; National Technical University, Athens, Greece; INESC, University of Porto, Portugal; Open University, Milton Keynes, UK; University of Tromsø, Norway; Institute of Federal Studies, National Research Council, Rome, Italy; LBJ School of Public Affairs, The University of Texas at Austin, USA; and The Center for Technology Transfer, University of Lodz, Poland.



It is my great honour and privilege to welcome all the foreign guests to Brno, Czech Republic, for this wonderful conference. I believe, you will enjoy a few days together in the vibrant atmosphere of the Town, whose fast development in Education, Research and High-Tech Industry makes many Czech regions jealous.

I am also happy to see many Czech participants at the conference and I am proud that we have established such a wonderful platform for high level international networking concerned with one of the most hot questions nowadays – how to build the sustainable Human Resources capacities for emerging large R&D Centres.

I am grateful to the Masaryk University and all our partners for the support, and to all of you for being here.

Eva Janoušková

Director

Masaryk University, Technology Transfer Office

Conference schedule

Tuesday		Wednesday
9:00		Charles Wessner
9:30		Yevgeny Kuznetsov
10:00		Coffee Break
10:30		
11:00	City Guided Tour	Connect&Coop 1
11:30		Education 1
12:00		
13:00	Tuesday Seminar Strategy R&D – Czech Rep. Strategy South Moravia CEITEC, NETME	Lunch
14:00	Strategy Masaryk University	Connect&Coop 2
14:30		Public Policies 1
15:00	Coffee Break	
15:30		Coffee Break
16:00	Honeywell IT development	Juan M. Sanchez
16:30	Bio development TESCAN, FEI	Jiří Blažek
17:00		
17:30		
18:00		
19:00	Villa Tugendhat Party Welcome Party and official Conference Opening (7pm – 10pm)	City Guided Tour
20:00		

	Thursday	Friday
9:00	Manuel Heitor	Additional Networking
9:30	Gerd Kortuem	
10:00		
10:30	Coffee Break	
11:00	Smart Cities/Regions 1	
11:30	Public Policies 2	
12:00		
13:00	Lunch	
14:00	Connect&Coop 3	
14:30	Education 2	
15:00		
15:30	Coffee Break	
16:00	Massimo Monteleone	
16:30	Jane Davies	
17:00		
17:30		
18:00	Farewell Banquet	
19:00		
20:00		

General information

About the Conference

ICTPI 2014 (International Conference on Technology Policy and Innovation) is devoted to opportunities, challenges, and policies related to capacity building in emerging technology regions.

The conference is being organized by Masaryk University Technology Transfer Office with further regional and institutional partners from the South Moravian Region. The goals of the conference include shaping the institutional, regional, and national eco-system supporting technology transfer.

*The event is held under the auspices of rector of Masaryk University,
Lord Mayor of Brno and British Embassy Prague.*

Apart of the two main programme days, September 10–11, there will be a special seminar on Tuesday before the conference followed by the Welcome Party, and additional events will be also offered after the conference on Friday.

Masaryk University will publish the proceedings of the conference in the form of an e-book, based on selected contributions. Authors will be invited to submit the full papers before October 31, all participants will obtain a printed version of the book.



VENUE

The conference takes place at the historical campus of the Faculty of Science, Masaryk University in Brno which is situated at Kotlářská 2.



CITY TRANSPORT

You can use the city public transport. The cost per one ticket (60 minutes, with changes) is 25 CZK. The one-day ticket costs 90 CZK, five-day ticket costs 250 CZK. You have to stamp the ticket, when you get on the streetcar, bus, or trolleybus. The other option is to take a taxi. The drivers are in general more reliable than in Prague. Count with 40 CZK per kilometer.

Social programme

WELCOME PARTY AND OFFICIAL CONFERENCE OPENING

TUESDAY, 19:00 – 22:00



The event will take place in the unique functionalist interior of the famous Villa Tugendhat (Černopolní 45, Brno). The conference will be opened by the vice-rector of Masaryk University Prof. Martin Bareš. There will be guided tours, banquet and live music for the guests to enjoy.

Transport to the venue: Transportation will be provided by busses leaving at 18:40 and 19:40 from Hotel Continental (Kounicova 6, Brno). The bus from Villa Tugendhat back to the hotel will be leaving at 22:00. In case you do not want to take the bus, you can use a taxi or public transport.

GUIDED CITY TOURS

TUESDAY, 10:00 – 12:00

WEDNESDAY, 18:00 – 20:00 START AT HOTEL CONTINENTAL, KOUNICOVA 6

We have prepared two guided walking tours around Brno (in English). The tours will focus on the most interesting historic sights and places of this Moravian city.

Y FAREWELL BANQUET

THURSDAY, 18:00 – 20:00



The event will take place on the premises of the newly renovated observatory (Kraví hora 2, Brno). The guests will be able to enjoy a projection in the new digitarium, banquet and live music prepared for the guests. There will be no group transportation organized.

👤 ADDITIONAL NETWORKING

FRIDAY

Registered guests will take part in the official opening of the new building of CEITEC – Central European Institute of Technology (Univerzitní kampus, Kamenice 5, Brno).

The conference organizing team will be happy to prepare individual programme for any guests interested in networking, learning about research capacities or sightseeing.

i City of Brno



- The capital of the South Moravian Region with a population of almost 400,000 people
- Modern, dynamic and fast growing centre of industry, trade, science, information technology, research and innovation with business incubators and centres of excellence in science
- A city of universities with more than 86,000 students at 14 universities and 3 university campuses
- Important centre of international trade fairs and exhibitions
- Good business environment – major global companies and property developers
- Support infrastructure for business in the field of science, research and innovation
- High quality of life – a centre culture and sports, historical sights, functional architecture, shopping centres and services for leisure time

Places to see



CATHEDRAL OF ST. PETER AND PAUL

The Cathedral of St. Peter and Paul (Petrov) is one of the dominating features of the city of Brno. A Romanesque church was originally on this site; in the 14th century it was re-built in the Gothic style. Right from its inception, Petrov was an important church within the city.

OLD TOWN HALL

The Old Town Hall is connected with many legends. One of them tells of the creator of the Gothic portal, master Anton Pilgram; the most well-known ones are about the legendary Brno dragon and the Brno wheel.



THE OSSUARY OF ST. JAMES' CHURCH

The cemetery by St. James' Church at the present Jakubské square was established as early as in the 13th century. Like other city cemeteries, it was surrounded by a wall that prevented its later extension. The capacity soon became insufficient for the growing town, and that is why an exchange burial system was adopted: after a lapse of 10 to 12 years from the burial the grave was opened, the remains of the deceased person exhumed, and a recently deceased was buried in the same place. The contents of the original graves were then placed in special underground areas – charnel houses.

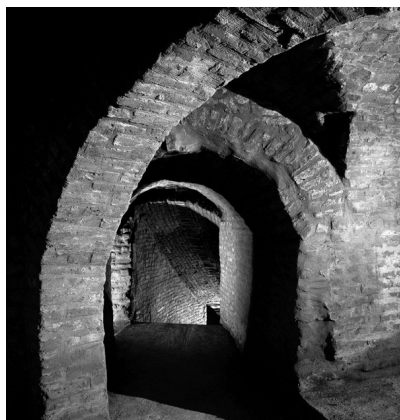
ŠPILBERK CASTLE

The castle was founded in the middle of 13th century by the Czech king Přemysl Otakar II. In the middle of 14th century under the reign of Jan Jindřich and his son Jošt of the House of Luxembourg Špilberk became the seat of Moravian margraves. During the 17th and 18th century the castle was converted to a Baroque fortress is known as the „Jail of nations“ for its reputation of the most feared prison in Habsburg monarchy.



PARNAS FOUNTAIN

In the Middle Ages, stalls had already begun to be put up around the Parnassus Fountain. It was built between 1690 and 1695 according to the design of Viennese architect Jan Bernard Fischer of Erlach.



LABYRINTH UNDER CABBAGE MARKET

You can enjoy the unique and mysterious atmosphere of the maze of medieval corridors and cellars in the Labyrinth under Cabbage Market. Moreover, the tour does not lack the element of surprise, for example you can see a real medieval pillory. Guided tours of the Labyrinth for groups (maximum 25 persons) begin every 30 minutes. The entrance is in Zelný trh 21.

CAPUCHIN MONASTERY

The Capuchin monastery and church of the Discovery of the Holy Cross is an early Baroque structure built in the typical Capuchin architectural style in simplistic spirit. The church and the tomb underneath were completed in 1651. The tomb served as a final resting place for monks, nobility and benefactors of the order.



JURKOVIČ HOUSE

Together with buildings to Jurkovič's designs in Pustevny, Luhačovice and the Nové Město nad Metují chateau, it makes up the nucleus of his surviving work in the Czech Republic. What the Tugendhat Villa did for functionalism in Brno, the Jurkovič Villa does for art nouveau architecture.

ST. JAMES' CHURCH

The earliest written record of the church of St. James in Brno dates back to 1228. The Romanesque church from the early 13th century was later replaced by a Gothic one. Until Joseph II's reforms in 1784 the church was surrounded by a cemetery. For more than 500 years it served as a burial place for wealthy citizens and renowned artists as well as ordinary people.



More information: www.gotobrna.cz/en

Programme

TUESDAY, SEPTEMBER 9

Guided City Tour (10:00, Brno)

Tuesday Seminar, Block 1 (13:00, Aula)

Dalibor Štys

Full Professor, Czech Technical University in Prague
Former Minister of Education, Youth and Sports (2013)
Institute of Complex Systems, FFPW and CENAKVA,
University of South Bohemia, Nové Hradky, Czech Republic

Support to research infrastructures in the Czech Republic – sketches of history and possible futures

In the lecture will be introduced main standings which determined the existence, history and future of research infrastructures which have been built from EU structural funds in the period 2007-2013 (+2) in the Czech Republic. There will be discussed the history of public funding of research and the history of funding of research infrastructures from EU funds in the Czech Republic. The description will be exemplified on author's personal experience in these subjects. Crucial aspects such as political influence on call profiles, evolution of rules and their contradiction with law and with reality, mistakes made by project proponents and their reasons etc. will be discussed. Solutions for the problem of Prague exclusion from structural funds – if there is any – will be proposed. The future of new research infrastructures will be outlined in the context of the recipient's obligations, legal status, national sustainability program, evaluation of research centres by international boards and the future rules of research funding in the Czech Republic. Possible futures will be forecasted.

Petr Chládek

Regional Innovation Strategy Manager,
South Moravian Innovation Centre

Regional Innovation Strategy for the South Moravian Region

Markus Dettenhofer

Executive Director, Central European Institute of Technology – CEITEC

CEITEC: Building an excellent infrastructure for science in Brno, Czech Republic

The opportunity to develop a first class research institute within a rapid time frame does not occur often and harbours many management challenges. CEITEC was founded largely by a generous investment directed to provide stimulus to the research environment for areas of convergence within Europe. An investment of over 200M€ within the span of 4 years will transform the research foot-print within Brno, Czech Republic, however the process of equipment purchase, core facilities organization, and most importantly, the sustainability of these facilities will require adaptive learning and ingenuity. The availability for state-of-art equipment covering both the life science and material science disciplines has proved to be an attractive force for hiring of qualified international scientists. The potential to perform cutting-edge equipment intense research has served as a nucleating point for the orchestrated core facilities clusters. The value proposition for CEITEC generally, and our core facilities specifically, are being examined to determine the right mix of fee-for-service practices with supplementary support. These and other issues can be addressed in a systematic fashion since all facilities are being established concurrently.

Jiří Hlinka

Researcher, NETME Centre, Brno

NETME – New Technologies for Mechanical Engineering

The presentation will provide information on regional R&D centre, closely connected to the university. It will describe model of the centre integrated within Faculty of Mechanical Engineering at Brno University of Technology, and how it supports research in mechanical engineering field, one of traditional domains of Brno region.

Martin Bareš

Vice-rector for development, Masaryk University, Brno, Czech Republic

Masaryk University and its engagement in regional innovations and tech-transfer

While teaching and research are the first and second stream of activities of universities, a third stream of activities is the contribution of universities to society by transferring their know-how. This third stream of activities builds upon the first and second, but it is increasingly being seen as important and distinctive in its own right, deserving of specific policies and resources to ensure their effective functioning (Reinhilde Veugelers and Elena Del Rey: EENEE Analytical Report No. 18, January 2014). The vast majority of economic growth in America arises from technological innovation, which depends heavily on research universities. If Europe (including the Czech Republic) would like to stay competitive with U.S. universities and fastly growing Asian universities, it has to modify its strategy and long-term support of this uneasy task. Masaryk University, the second largest university in the Czech Republic, had obtained almost 400 millions of Euros from ERDF in the period of 2007-2013. This extraordinary funding

had enabled to build several strategic projects: CEITEC (together with other 5 partners), CETOCOEN, CESEB, CERIT, CERIT-SC and others. These projects have emphasized the role of Masaryk University in tech-transfer and regional innovations and boosted the internal discussion within the university. Masaryk University has been building up the partnerships with local companies involved in innovations, it has revised its internal policy and rules towards the intellectual property and founding the spin-off companies. The legal, economic and expert management are vital for emerging role of Masaryk University on the national and international map of innovative universities. The collaboration with the partners in the region- universities, university hospitals, regional and city government and other important legal bodies- is essential and provides the pathway towards the long-term goal of economic stability of the South Moravian region and the attraction of the know-how and talent to the city of Brno also in the science and education. Masaryk University was a co-founder (together with the Region, the City and other universities) of an innovation agency called South Moravian Innovation Centre (JIC) in 2003 and also was also a co-founder of JCMM, the talent development agency, in 2005. Several start-ups and spin offs are originated from Masaryk University, such as Y Soft Corporation, Invea-Tech, Comprinato, CaverSoft, Aceemce, Enantis, PhoneX which have created hundreds of high tech jobs. Internationally recognized scientific achievements like ERC grant and ERA chair have been recently obtained and fulfill priority of the excellence in research.

Coffee Break (15:00)

Tuesday Seminar, Block 2 (15:30, Aula)

Michal Kostka

Deputy CEO, BioVendor – Laboratorní medicína a.s., Brno

Reviving Life Sciences business in South Moravia

Life Sciences traditionally represent a local area of research excellence. Local Life Sciences industry was composed of mostly mature companies that faced

daunting problems in early 2000s. Several went under. A question whether or not Life Sciences can be revived and developed into a thriving industry in South Moravia was posed more than a decade ago by regional development specialists and local stakeholders. Subsequently initiated policies and projects have changed Life Sciences in South Moravia substantially in several important aspects. Selected policies and projects will be overviewed and their impact discussed. Examples of successful and unsuccessful attempts to influence Life Sciences by the local stakeholders will be given. The story of the past decade will be told as experienced first-hand in a role of regional development staff, public research center senior manager and senior executive in a private biotech company operating globally.

Ladislav Chodák

Entrepreneur, Brno

IT projects in Brno's environment in last decade

Brief description of the IT business environment formation in Brno. The level of cooperation within triangle Public - Academic - Business is slow but developing. Mutual understanding, cooperation and the results of activities in last decade grow. Brno area can provide success stories, such as world-known university CSIRT centre, successful start-ups and technologies with high innovative and world-wide business potential.

Zora Střelcová

Project Manager, TESCO Brno, s.r.o.

Proud to be Czech Made

The TESCO story is one of these dreams which come true, the story of great vision, and the example of excellent R&D skills in combination with number of

successful managerial decisions, which allowed to the small Czech enterprise to grow to international level. Herby, we introduce one of the key high-tech companies located in the south Moravia region, which expertise is in the field of charge particle beam optics. Starting its business in early nineties, hiring both experienced researchers and young talented specialist, being brave enough to compete to the international corporate companies – all these single facts let TESCANA become one of the worldwide leaders in scanning electron microscopy. Under the label „Czech made“, the customers can find unique instrumentation with wide range of analytical abilities, functions and applications. The TESCANA instruments are also known due to the excellent quality and customer oriented solutions. Nowadays, there is more than 1700 TESCANA microscopes installed all around the World in both academic and commercial labs and the number is increasing every day.

Jiří Očadlík

CEO, FEI Czech Republic s.r.o.

The World Largest Electron Microscopy Facility

With more than 60 years of innovation and leadership, FEI enables customers to find meaningful answers to questions that accelerate breakthrough discoveries, increase productivity, and ultimately change the world. FEI designs, manufactures, and supports the broadest range of high-performance microscopy workflows that provide images and answers in the micro-, nano-, and picometer scales. Combining hardware and software expertise in electron, ion, and light microscopy with deep application knowledge in the materials science, life sciences, electronics, and natural resources markets, the worldwide FEI team of 2,700+ employees is dedicated to customers' pursuit of discovery and resolution to global challenges.

FEI, with its headquarters in US, have many locations where various activities are centralized. Some of them are regional where customer short distance and

culture adherence is needed, some are global where focus is on best skills, performance, costs etc.

FEI have grown in Brno for more than 20 years own activity of major company processes including but not limited to

- New product introduction and product improvements, where substantial part is performed in R&D;
- Customer order fulfilment consisting of material procurement, manufacturing, delivery to customer, where operation departments are mainly involved;
- Service support, where technical service support department play important role.

Currently there has been newly build the World largest electron microscopy facility in Brno with about 600 employees. The facility allows FEI to maintain its leadership on the market through highly innovative best in class products developed by teams from Brno and flexible, efficient factory which supplies about 60% of company product revenue on time at perfect quality.

The success is based on favorable regional conditions with sufficient amount of talented people and labor cost structure combined with company talent policy and their growth.

Jiří Tomíček

Vice President General Manager, Honeywell Technology Solutions Czech

Introduction to Honeywell Technology Solutions – R&D Centre of Excellence

Honeywell Technology Solutions (HTS) is an R&D center for Honeywell with operations in Czech Republic, India, China. It provides technology, product and business solutions for multiple businesses of Honeywell meeting global standards of quality,

innovation and lifetime performance. Honeywell Technology Solutions, Brno, Czech Republic is involved in providing Research, Product Design, Development and Engineering to deliver best value to Honeywell customers. The center in Brno with its world-class engineering talent and state-of-the-art infrastructure works on current and next generation products for Aerospace, Automation Control Solutions and Transportation Systems business of Honeywell.

Welcome party and official Conference Opening (19:00, Villa Tugendhat)

WEDNESDAY, SEPTEMBER 10

Plenary session – Keynote speakers (9:00, Aula)

Charles Wessner (Georgetown, U.S.A.)

U.S. Best Practices in Regional Policies for Innovation

Yevgeny Kuznetsov (Washington, U.S.A.; Moscow, Russia)

Experimenting with smart specialization: Open economy industrial policy

Coffee Break (10:30)

Connectivity and Cooperation, Session 1 (11:00, Aula)

Kavita Mehra (New Delhi, India)

Role of Public Private Partnerships in Promoting Innovations in India

Emmanuel G. Koukios, Massimo Monteleone (Athens, Greece)

Regional, National and International Cooperation on Green Bioeconomy Themes – The Case of Southern Europe

Dariusz Trzmielak (Lodz, Poland)

The Science and Technology Commercialization, Financing, Cooperation – Empirical Analysis

Małgorzata Grzegorzczuk, Dariusz Trzmielak (Lodz, Poland)

The Knowledge and Technology Transfer – the Effects of Science and Business Cooperation

Education, Session 1 (11:00, S2)

Jan Slovák (Brno, Czech Republic)

The paradigm change in STEM Education – has it happened already?

Cliff Zintgraff (Austin, TX, U.S.A.)

StemDev: Instrument Proposal to Assess Regional STEM–Economic Development Alignment

Magda Dostálová (Jeseník, Czech Republic)

FIRST® LEGO® League – Program for support youngsters in order to introduce them to science and technology – part of a 40 min discussion block

Lunch (13:00)

Connectivity and Cooperation, Session 2 (14:00, Aula)

Carlos Scheel Mayenberger (Monterrey, Mexico)

Transition Beyond sustainability. Breaking the paradigm, reaching economic growth from the resilience of natural resources

Evgeny Kutsenko (Moscow, Russia)

Trust in society and innovation policy design. The case of the pilot innovative clusters in Russia

Rut Bízková (Prague, Czech Republic)

Five years of Technology Agency of the Czech Republic fostering cooperation of research institutions and companies

Otakar Fojt (Prague, Czech Republic)

Science Diplomacy as a Tool of Technology Policy and Innovation

Public Policies, Session 1 (14:00, S2)

Robert Hodgson (Cambridge, UK)

Ambitious Modesty: developing and sustaining world class R&D for regional competitiveness

Maria Douglass (Thuwal, Kingdom of Saudi Arabia)

Building Innovation Ecosystems at the Energy-Water-Food-Environment Nexus

Alejandro Ibarra-Yunez (Monterrey, Mexico)

Government versus Governance as a Framework to analyze Mexico's Energy Reform

Jerzy Róžański (Lodz, Poland)

Barriers of Science and Business Cooperation – Polish Perspectives and The Region of Lodz Case Study

Coffee Break (15:30)

Plenary session – Keynote speakers (16:00, Aula)

Juan M. Sanchez (Austin, TX, U.S.A.)

Research Centers and their Development at the University of Texas

Jiří Blažek (Prague, Czech Republic)

Key challenges and implications stemming from smart specialization concept for regions with less advanced research and innovation system

Guided City Tour (18:00, Brno)

THURSDAY, SEPTEMBER 11

Plenary session – Keynote speakers (9:00, Aula)

Manuel Heitor (Lisbon, Portugal)

What has changed in Europe after the European Research Area and times of increased uncertainty?

Gerd Kortuem (Milton Keynes, UK)

Building a Smart City Data Ecosystem

Coffee Break (10:30)

Smart Cities/Regions, Session 1 (11:00, Aula)

Aline Figlioli, Mauro Faiad, Soraia Paranhos (Goiás State, Brazil)

Fostering the development of Clusters through the generation of critical mass and access of technology services in emerging technology regions

Filip Procházka (Brno, Czech Republic)

Models and simulation of future energy grids

William J. Nuttall, Ettore Bompard, Marcelo Masera

(Milton Keynes, UK; Petten, Netherlands)

Smart Meters, Grids and Criminality

Eduardo E. Aguiñaga Maldonado, Carlos Scheel Mayenberger

(Monterrey Mexico)

Transforming Residues and Wastes into Economic Value for Zero-waste Communities

Public Policies, Session 2 (11:00, S2)

Marina van Geenhuizen (Delfts, Netherlands)

Accelerating market acceptance of innovation: Critical factors in local Living Labs

Jan Polecha (Prague, Czech Republic)

Technology and Knowledge Transfer by means of Support for Pre-seed Activities

Filipe Miguel Cassapo (Senai, Brazil)

The Implementation of Applied R&D Centers in Brazil as a Strategy for Sustainable Industrial Growth

Giorgio Sirilli (Rome, Italy)

Research policy and evaluation in Italy

Lunch (13:00)

Connectivity and Cooperation, Session 3 (14:00, Aula)

David Gibson, Elin Merethe Oftedal, Robert Hodgson

(Austin, TX, U.S.A.; Tromsø, Norway; Cambridge, UK)

The Entrepreneurial University Embedded in Context: Case Studies and Policy Implications

Elin Merethe Oftedal (Tromsø, Norway)

Unlocking the Entrepreneurial Potential through University Context: Impact of entrepreneurial education on entrepreneurial intentions

Manuel Au-Yong Oliveira, Marina van Geenhuizen, Qing Ye

(Aveiro, Portugal; Delfts, Netherlands)

Improving the growth rate of university spin-offs

Martin Duda (Ostrava, Czech Republic)

Supporting start-ups – much needed, yet often overrated

Education, Session 2 (14:00, S2)

Emmanuel G. Koukios, Lazaros Karaoglou, Sofia Papadaki, Dimitrios

Koullas, Nikolaos Kourakos, George Nassos (Athens, Greek; Chicago, U.S.A.)

*Experimenting with New Educational Models to Teach Engineers and Executives
Green Technologies, Green Economy, and Sustainability Policy and Practice*

Jeffrey W. Amos (Austin, TX, U.S.A.)

*Enhancing Entrepreneurial Education and Skills Development for the
Individual through Structured Networking*

David M.S. Rodrigues, Mafalda Teixeira de Sampaio, Cristian Jimenez-

Romero, Jeffrey Johnson (Lisbon, Portugal; Milton Keynes, UK)

Peer Assessment in Architecture Education

Miloš Šifalda (Brno, Czech Republic)

*Regional strategy for the development of human capital: the model of the
South Moravian Region*

Coffee Break (15:30)

Plenary session – Keynote speakers (16:00, Aula)

Massimo Monteleone (Foggia, Italy)

Unlocking and developing research potentials: regional implications

Jane Davies (Belfast, Ireland)

Connecting the Corridor, Manchester

Farewell Banquet (18:00, Brno Observatory and Planetarium)

FRIDAY, SEPTEMBER 12

Additional Networking

Registered guests will take part in the official opening of the new building of CEITEC – Central European Institute of Technology (Univerzitní kampus, Kamenice 5, Brno).

The conference organizing team will be happy to prepare individual programme for any guests interested in networking, learning about research capacities or sightseeing.

Keynote speakers

Jiří Blažek (Prague, Czech Republic)

Key challenges and implications stemming from smart specialization concept for regions with less advanced research and innovation system

Jane Davies (Belfast, Ireland)

Connecting the Corridor, Manchester

Manuel Heitor (Lisbon, Portugal)

What has changed in Europe after the European Research Area and times of increased uncertainty?

Gerd Kortuem (Milton Keynes, UK)

Building a Smart City Data Ecosystem

Yevgeny Kuznetsov (Washington, U.S.A.; Moscow, Russia)

Experimenting with smart specialization: Open economy industrial policy

Massimo Monteleone (Foggia, Italy)

Unlocking and developing research potentials: regional implications

Juan M. Sanchez (Austin, TX, U.S.A.)

Research Centers and their Development at the University of Texas

Charles Wessner (Georgetown, U.S.A.)

U.S. Best Practices in Regional Policies for Innovation

Jiří Blažek

Smart specialisation - opportunities and challenges in less developed regions

Associate Professor at the Department of Social Geography and Regional Geography, Charles University in Prague. Main research interests are formation of regional innovation systems in new member states, the geography of knowledge sources, analysis of regional impacts of sectoral policies and evaluation of the impacts of the EU cohesion policy. Author of about 50 scientific papers on regional development and policy.

Jiří has more than 20 years of professional expertise in the sphere of regional development and policy. He provided consultancy services to a number of international firms and organization (e.g. ECORYS, CSIL, GDSI, World Bank, EPRC, APPLICA). He was member of Policy Advisory Unit and later of the Task Force at the Ministry for Regional Development of The Czech Republic where he provided consultation services in the sphere of EU cohesion policy. In 2004–2006 he was member of senior expert group on “Constructing Regional Advantage” (DG RESEARCH). Currently he provides consultation services to the Czech Ministry for Regional Development, to Czech Ministry of Education and to several regional development bodies. He participated in about a dozen of evaluation projects (ex-ante, mid-term, ex-post) for both European Commission and for the Czech government. He was the national coordinator of several international research projects (FP7, European Science Foundation). Currently, he acts as a national coordinator of international FP7 research project “Smart specialisation for regional innovation” and of “Cluster life cycles – the role of actors, networks and institutions in emerging, growing, declining and renewing clusters” EUROCORES, Grant Agency of the Czech Republic.

Jane Davies

Connecting the Corridor, Manchester

Jane was Chief Executive of Manchester Science Parks (msp) from 2000-12. She was on the Board of the UK Science Parks Association from 2004-09 and its Chairman from 2007. She also served on the board of the International Association of Science Parks (IASP), and was President of its Advisory Council from 2009-13. Since 2013 she has been a non-executive director of the Northern Ireland Science Park in Belfast.

In her time at msp, the importance of the science park and its tenants to the economic success of the city region became widely acknowledged and its international profile grew significantly. Consequently, Jane was appointed to the boards of several economic development agencies in Manchester, including the Corridor Partnership which was formed to leverage the activities of two universities and their associated research hospitals, and was chairman of the Manchester Innovation Group which had oversight of all innovation activities in the city region.

Jane has a degree in chemistry from St Anne's College, Oxford and joined BP Chemicals on graduation. She spent 18 years with BP in a range of roles including two years on secondment to the Foreign Office, and on leaving BP, ran the Buxton Opera Festival for four years.

She now works as an independent consultant, applying her expertise in the development and management of science parks and the contribution of innovation to economic activity. She is a Companion Member (honorary) of UKSPA and received her OBE in 2010 for services to innovation.

Manuel Heitor

What has changed in Europe after the European Research Area in times of increased uncertainty? Challenges and opportunities for science, technology and education policy

Manuel Heitor is Full Professor at Instituto Superior Técnico, Lisbon, and director of the Center for Innovation, Technology and Policy Research, IN+, which was awarded in 2005 by the International Association of Management of Technology, IAMOT, has one of the top 50 global centres of research on “Management of Technology”. From March 2005 to June 2011 he served as Secretary of State for Science, Technology and Higher Education in the Government of Portugal. Most recently, in the 2011-12 academic year, he was a Visiting Scholar at Harvard.

He earned a PhD at Imperial College, London, in 1985 in combustion research and did post-doctoral training at the University of California San Diego. Then he pursued an academic career at Técnico, Lisbon, where he served as Deputy-President for the period 1993–1998. Since 1995, he has been Research Fellow of the IC² Institute of the University of Texas at Austin. He was co-editor of the book series on “Technology Policy and Innovation”, launched through Greenwood Publishers, Connecticut and continued through Purdue University Press. He was co-founder in 2002 of “Globelics – the global network for the economics of learning, innovation, and competence building systems” and, in 2004, a founding member of the S&T Council of the “International Risk Governance Council”, IRGC. He is member of the Portuguese Engineering Academy and a foreign member of the Spanish Royal Academy of Engineering and the Serbian Academy of Sciences. In 2003 he was awarded with the Dibner Award of the Society for the History of Technology, SHOT.

His current research interests and main publications are in the area of science, technology and higher education policy, management of technology and the development of innovation policies. He is currently involved in several initiatives in the areas of knowledge for development and risk governance. He chairs the academic network “International Risk Governance Council - Portugal”, IRGC-Portugal, and heads the doctoral Program on “Engineering and Public Policy, EPP” at Técnico, Lisbon.

Gerd Kortuem

Tackling Economic Growth Barriers with Smart City Initiatives

Gerd Kortuem is Professor of Computing at The Open University and Director of the Ubiquitous Computing & Sustainability Lab. His research focuses on the design of digital technologies for tackling key societal issues in areas such as energy, transportation, health, and education, and covers digital cities, urban data mining, the Internet of Things, human computer Interaction and wearable computing.

He currently runs research projects on smart energy, intelligent transport and smart education with BT, E.On, Intel, INRIA and others. His most recent research project is MK:Smart, a £16M Milton Keynes-based smart city project (www.mksmart.org), where he leads the smart energy, citizen innovation and education work streams.

Prof Kortuem is involved in the Milton Keynes Low Carbon Living Programme, acts as mentor to several software and Internet of Things start-ups, and has been teaching software entrepreneurship at Lancaster University and Saïd Business School, Oxford University. He can be found online at www.kortuem.com.

Yevgeny Kuznetsov

How is country's talent abroad co-create changes in national innovation system? Evidence for a new policy agenda

Yevgeny Kuznetsov is Senior Research Fellow, Migration Policy Institute (a global think tank in Washington, DC) and Deputy Director of Center for Research and Industrial Policy at SkolTech (a part of MIT family in Moscow).

He has been working on innovation, growth and talent mobility issues for 17 years in the World Bank which he joined in 1995 from Brookings Institution. He has acquired a unique perspective on reforms which blends insights of a practitioner

(operational support to innovation projects in India, China, Vietnam, Argentina, Chile, Mexico, Iran, Armenia, Tanzania, Morocco, Colombia and other economies) and a scholar (more than 30 articles and books on innovation and knowledge-based growth). In recent years, he also focuses on diasporas of highly skilled as change agents to promote institutional development in home countries and has published two books and articles on that issue.

His recent book “How Can Talent Abroad Induce Development at Home? Towards a Pragmatic Diaspora Agenda” brings together innovation and international mobility of talent perspectives.

Massimo Monteleone

Unlocking and developing research potentials: regional implications

Massimo Monteleone, is professor of “Crop Ecology” and “Environmental and Territorial Agronomy” at the Department of Agriculture, Food and Environment of the University of Foggia (Italy). The unifying concept of “bioeconomy” is particularly useful to largely portray his scientific interest. In his research, non-food crops, crop residues, by-products and waste, together with alternative cultivations (such as algae) are considered for industrial and energy applications. The optimization of the whole value chain is targeted to build up a strategy to reconcile bio-based productions with the ecological harmony and the cultural heritage of the most relevant rural areas of Southern Europe.

At present, he is coordinating the European FP7 project “STAR*AgroEnergy” that strives to work out an integrated approach to renewable energy generation and knowledge-based economy according to sustainability criteria. In the frame of this project, an interdisciplinary research team was born and is actively growing, establishing strong connections both at regional and European level. His current research interests include crop ecology; environmental analysis; agroecosystem and energy planning; biomass, bioenergy and bio-materials; crop irrigation and soil salinization. Until 2013 he was coordinator of the Ph.D. course on “Rural Land and Sustainable Agro-systems”, deputy coordinator of the Ph.D.

school on “Environment & Landscapes” at the University of Foggia and coordinator of the Master degree in Agriculture at the same University.

Juan Sanchez

Research Centers and their Development at the University of Texas

Dr. Juan M. Sanchez is the Vice President for Research at The University of Texas at Austin and holder of the Temple Foundation Endowed Professorship #4 in the Department of Mechanical Engineering. He obtained his B.S. in Physics at the University of Cordoba, Argentina, 1971; M.S. in Materials Science, 1974; and Ph.D. in Materials Science, 1977 at the University of California, Los Angeles. Dr. Sanchez is the author and co-author of over 140 technical publications on a wide range of topics in materials science and engineering. His current research interests are in the electronic, thermodynamic and structural properties of materials including intermetallic compounds, magnetic and non-magnetic alloys, thin films and magnetic multilayers. Primary interest is the development and application of first principles computational methods for the construction of phase diagrams of multicomponent material systems. Other research interests include the development of laser-controlled selective chemical vapor deposition processes for metals, alloys and ceramics.

Dr. Sanchez serves as a Representative to the Government-University-Industry Research Roundtable of the National Academies, member of the Committee on Science, Engineering and Public Policy of AAAS, and member of the Advisory Council of the Hogg Foundation for Mental Health. Dr. Sanchez is past member and Chair of the Visiting Committee for Advanced Technology of NIST, and a past member of the Board of Visitors of the US Army War College.

Charles Wessner

U.S. Best Practices in Regional Policies for Innovation

Charles Wessner is a National Academies scholar and a powerful advocate of effective innovation policies. As the founder and Director of the National Academy of Sciences Technology, Innovation, and Entrepreneurship Program, he is recognized nationally and internationally for his expertise on innovation policy, including public-private partnerships, entrepreneurship, early-stage financing for new firms, and the special needs and benefits of high-technology industry. As an outgrowth of his work with the U.S. government, he advises technology agencies, government ministries, and the Prime Ministers of countries in Europe and Asia. In addition, he cooperates closely with international organizations and lectures at major universities in the U.S. and abroad. The overarching goal of his work is to develop a better understanding of how we can bring new technologies forward to address global challenges in health, climate, energy, water, infrastructure, and security. Reflecting his commitment to international cooperation, he was recently nominated as an Officer of the Order of Merit by the President of the Republic of France.

Titles and abstracts of talks

Eduardo E. Aguiñaga Maldonado

PhD Student & Research assistant, Tecnológico de Monterrey, Mexico

Transforming Residues and Wastes into Economic Value for Zero-waste Communities

SMART CITIES/REGIONS, SESSION 1 (THURSDAY, 12:10, AULA)

In this paper an industrial ecology systems model (the SWIT Model: Sustainable Wealth creation based on Innovation and Technology) is described, that has been designed to create zero-waste communities. Our research is guided by two main questions: is it possible to transform scarce resources into valuable increasing returns? Is it feasible to create a regional “closure” to produce sustainable wealth based on residues? To answer these interrogations we review several world-class cases of study such as the city of Kalundborg, Denmark, and Las Gaviotas, Colombia through several indicators of innovativeness and sustainability in order to identify the drivers that made these regions so extraordinary. We argue that Circular Economy coupled with the principles of industrial ecology systems provide enough support to comprehend how these regions became a standard of truly sustainable regions, where residues and wastes from urban consumption and product cycles can be transformed into environmentally reversible and recoverable products, economically viable and competitive, as well as socially equitable and responsible through sustainable cycles. Furthermore we stress the importance of a systemic approach entrepreneur as a decisive enabler in the construction of these regions. Finally we conclude that the establishment of a zero-waste community needs to fulfill several requisites, which among other entail: disruptive public policies, sustainable technologies, systemic innovation, trust and a lot of creativity.

Jeffrey W. Amos

IC² Fellow, The University of Texas at Austin
Adjunct Professor of Business Strategy, Pepperdine University
President, Clear Oak Taxes, Inc. dba Liberty Tax
Partner, Clear Oak Partners, LLC

Enhancing Entrepreneurial Education and Skills Development for the Individual through Structured Networking

EDUCATION, SESSION 2 (THURSDAY, 14:20, S2)

Individuals (and company leaders) are looking for ways to obtain or enhance or properly balance the critical skills deemed essential to the entrepreneur. A successful approach to date has been to place individuals in real world incubator-like environments with an advisory team and task them with creating a new venture within a short specified time period thereby directly building personal experience. Experience might be seen as the best teacher. However, in absence of that supervised environment, many entrepreneurs do not have the time or money to simultaneously balance their entrepreneurial skill set while innovatively developing a product or service for the market. The question becomes, is there a lower cost way to deliver these skills to many individuals over a longer time period to allow for internalizing these skills?

This research explores these issues and looks at utilizing the arena of ‘business networking, as a hands-on, real world method for developing and enhancing the skills required for an individual entrepreneur. For this analysis, the broad topic of networking is broken into three areas: informal social networking, formal referral networking and structured referral-fee based networking. Each type has learning outcomes and benefits for the individual. The current paper reviews a consensus set of entrepreneurial skills and how they are taught to or learned by individuals. It also presents and proposes that the same skill set that is critical to the entrepreneur can be efficiently obtained by participating in structured networking.

Manuel Au-Yong Oliveira

(joined with Marina van Geenhuizen and Qing Ye)

Assistant Professor at DEGEI, University of Aveiro, Portugal

Improving the growth rate of university spin-offs – The significance of internationalization skills and strategy

CONNECTIVITY AND COOPERATION, SESSION 3 (THURSDAY, 14:50, AULA)

University spin-off firms increasingly attract the attention of researchers and policymakers. Though they constitute just one channel of technology transfer and their direct impact on employment growth tends to be modest, spin-off firms are seen as important actors due to a positive impact on the regional business infrastructure and services, informal ways of technology diffusion, and a positive influence on the university's image and reputation. The increased attention also responds to criticism of higher education institutions as being referred to at times as an "ivory tower". Today, however, it is not a matter of establishing collaboration between academia and business, but to make it more effective and productive (van Geenhuizen, 2013).

University spin-off firms (USOs) can be delineated as those high-technology start-ups that bring university knowledge to market. Currently, there is an increased need for such high-technology firms in Europe to develop internationalization, be it in knowledge exchange, import, outsourcing, export, etc. This is because new centers of innovation and economic activity are emerging at large distances from the home country, such as in Brazil, Korea, and China. However, in this situation, many kinds of obstacles may arise in attempts by spin-off firms to increase internationalization. This situation constitutes the background of our research questions which run as follows: To which extent are university spin-off firms internationalized and how does a lack of internationalization skills hamper internationalization? How can the outcomes, regarding skills, be translated into action-based learning?

The sample of university spin-off firms underlying the current study has been composed in the framework of the Spin-Up study, a European project aimed at picturing missing skills in order to develop an effective training and coaching program to enhance growth (URL: www.spin-up.eu). The countries involved are Finland, the Netherlands, Poland and Portugal. We measured internationalization in terms of knowledge relationships and amount of export. In order to reveal the ‘causal structure’ behind different levels of internationalization, including present/absent skills, regression analysis is applied. We also discuss six specific case studies, involving differing degrees of internationalization and the influence of missing skills, on which we provide in-depth insights. In addition, we also give suggestions for action-based learning in the context of USOs. We conclude that strategies concerning export and knowledge collaboration cannot be changed overnight and not all in the same way, requiring a multi-faceted approach and no solution of the type ‘one-size-for-all’, among others due to differences between spin-off firms’ skill levels.

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Rut Bízková

Chairperson of Technology Agency of the Czech Republic, Czech Republic

Five years of Technology Agency of the Czech Republic fostering cooperation of research institutions and companies

CONNECTIVITY AND COOPERATION, SESSION 2, (WEDNESDAY, 14:50, AULA)

Jiří Blažek

Scientific Council of the Geography Section; Department
of Social Geography and Regional Development,
Charles University in Prague, Czech Republic

Key challenges and implications stemming from smart specialization concept for regions with less advanced research and innovation system

KEYNOTE SPEAKERS (WEDNESDAY, 16:45, AULA)

The aim of the presentation is to discuss key challenges stemming from the concept of smart specialisation for the regions with less advanced research and development system. It is argued that there are three key dimensions of smart specialisation: i) application of the state-of-the-art theoretical concepts in the sphere of R&D and innovation support (GPN/GVC, RIS, related variety, triple/quadruple helix, knowledge bases etc), ii) best practices in designing and in implementation of strategic/programming documents, iii) set of new elements such as selection of key priorities with respect to critical size, entrepreneurial discovery process, stress on policy learning etc. In addition to the new elements of smart specialisation concept, a particular attention will be paid to challenges and to policy implications stemming from two state-of-the-art regional development theories, namely from the theory of global production networks and of the regional innovation system with special regard to concept of related variety. The presentation will conclude by several examples of a potential contribution of smart specialisation for development of regions with less advanced research and innovation system.

Filipe M. Cassapo

Executive Manager of International Innovation
Center of SENAI Paraná, Brazil

The Implementation of Applied R&D Centers in Brazil as a Strategy for Sustainable Industrial Growth

PUBLIC POLICIES, SESSION 2 (THURSDAY, 11:50, S2)

In 2011, the Federal Government of Brazil announced a bench of policies aimed at promoting the sustainable growth of the industry through innovation. This is the so-called “Brasil Maior” plan, which is composed by several instruments, such as tax reductions for local R&D activities, subventions and low-rate financing of R&D, and the creation of new national R&D centers. It is in this very context that the National Service of Industrial Apprenticeship (SENAI) signed in 2012 a cooperation agreement with the National Development Bank of Brazil (BNDES), consisting on a US\$ 1 Billion loan for the implementation and improvement of 25 applied research facilities, 63 technology transfer centers and 53 professional education centers. This project, which aims at strengthening R&D and entrepreneur technical and technological education, started in 2013 and shall be fully deployed in 2015.

The first of these Institutes to be inaugurated by SENAI was the Innovation Institute in Electrochemistry, which was deployed in Curitiba (Paraná), in September 2013, inside the so-called “Industry Campus”. This Campus consists on an innovation ecosystem which is being developed all together with the State Government, the universities and research centers of the State, investments funds, startups incubators, and the Federation of Industries of the State of Paraná. In a 20 Km² surface, the Industry Campus gathers most of the PhDs and MScs students, from the major universities of the State. It is therefore a strategic territory to be converted into an applied research and technology transfer pole. To ensure state-of-art R&D processes and infrastructure of this research center, SENAI has developed agreements with the Massachusetts Institute of Technology (MIT – USA), and the Fraunhofer Society (Germany).

The SENAI Innovation Institute in Electrochemistry has received from BNDES a total investment of US\$ 20 million for equipment and facilities. It is for the moment composed by an 8 members research team, and shall to a 20 members research team until 2015. This applied research center was built based on the needs of the industry, taking into account present and future technological challenges. It also works as a broker between industrial needs and the offer of basic research of the Brazilian universities, to scale-up and apply research that may improve productivity of the industry. The inauguration of this Innovation Institute was the opportunity of realizing the 1st International Seminar on Industrial Innovation in Electrochemistry, which gathered industrial companies as well as applied research centers from different countries.

Jane Davies

Non-executive director of the Northern Ireland Science Park in Belfast, Ireland

Connecting the Corridor, Manchester

KEYNOTE SPEAKERS (THURSDAY, 16:45, AULA)

One of the most difficult concepts to communicate to policy makers anywhere in the world is that innovation, that over-worked word used to describe the mysterious process of creating wealth from creative thinking, is not the inevitable outcome of shiny new buildings, investment in academic research or financial support for business growth. These are necessary but not sufficient conditions to support the development of an innovative region. At all levels, innovation is about people, and so innovation capacity can only be built at a human pace, on foundations of existing strengths, combining a range of interventions that remove barriers and support the growth of human capital and trust between the key actors.

Manchester was the birthplace of the industrial revolution but in the 1980s it became a classic example of the impact of industrial decline. Now the UK's second

city in terms of economic activity, it has reinvented itself as the original modern city by exploiting the talent pool associated with its five higher education institutions, several major research hospitals and a reputation for urban grit and creative flair.

One location where Manchester's knowledge assets are physically concentrated is an area south of the city centre, known as the Corridor. The key institutions in the area are two large universities and a cluster of NHS research hospitals. In 2006, the leaders of these three organisations formed a not-for-profit partnership with the Council of the City of Manchester, constituted as a limited company, with the aim of leveraging the already significant investment in physical assets to create a new destination in the city,a place that is original, creative and smart, where knowledge is put to work.

In describing my experience of one area of one city in the UK, my aim is to identify some of the barriers that could be dismantled by policy makers, to describe some of the achievements that have been the result of a partnership approach to improving the innovation capacity of the city and to identify the drivers which made this unusual partnership a success.

Magda Dostálová

High School Teacher, High School Jeseník, Czech Republic

FIRST® LEGO® League – Program for supporting youngsters in order to introduce them to science and technology

EDUCATION, SESSION 1 (WEDNESDAY, 11:50, S2)

FIRST® LEGO® League (FLL) is a program that supports children and youngsters in order to introduce them to science and technology in a sporty atmosphere.

The objectives of FLL are to:

- make children and young people enthusiastic about science and technology
- to equip the participants with the idea of team spirit
- to encourage children and youngsters to solve complex tasks in a creative way.

FLL is one of the biggest international robotic competitions for kids and youngsters between the age of 10 and 16. The idea of FLL was developed by U. S. foundation FIRST® and LEGO®, the pilot competition was held in the USA (1998). The main organizer in Central Europe is a German non-profit organization HANDS on TECHNOLOGY e.V.

The basis of FLL is a robotics tournament in a cheerful atmosphere where kids need to solve tricky “missions” with the help of a robot using LEGO MINDSTORMS®. The kids are researching a given topic within a team, they are planning the programming and testing an autonomous robot to solve the missions.

The FLL teams are working on the missions of the FLL Robot Game and the presentation of the FLL Research Project. The topic of the challenge changes every year and refers to current development and situation in the world (for example: Energy crisis, climate change, food security, natural disasters etc.).

The challenge documents and necessary information relating to the tournament are announced online exclusively. When preparing for the FLL Regional Tournament, each FLL team is guided by its FLL Coach.

During the preparation period, the team constructs, programs and learns how to find and analyse information and prepares a presentation of their research results which will be presented to the FLL Jury on a tournament day. There are no limits for presenting. It is good to keep up the fun factor: poems, songs, plays – whatever fantasy can imagine.

What is the future of learning? In the 2014 FLL WORLD CLASSSM Challenge, over 230,000 children from over 70 countries will redesign how we gather knowledge and skills in the 21st century. Teams will teach adults

about the ways that kids need and want to learn.

The FLL teams take the opportunity to experience all steps of a real product development process: solving a problem under time pressure with insufficient resources and unknown competitors. FLL is a small micro-cosmos of real business life in all its respects. FLL challenges kids to think like scientists and engineers.

Maria Douglass

Strategist – Economic Development, King Abdullah University
of Science & Technology, Thuwal, Kingdom of Saudi Arabia

Building Innovation Ecosystems at the Energy-Water-Food-Environment Nexus

PUBLIC POLICIES, SESSION 1 (WEDNESDAY, 14:20, S2)

The term *innovation ecosystem* conjures up the image of fast-paced, high-growth entrepreneurial ventures thriving around angel and venture capital networks and universities where a lot of new ideas are generated. Such ecosystems are populated by ICT, internet and social media start-ups. These sectors have timeline drivers like Moore's Law¹ and Metcalfe's Law² denominated in months, not years. The installed base of information technology is 3 years, therefore, 5–10 year venture capital fund lifecycles work with the industry dynamic.

In contrast, products at the energy-water-food nexus are commodities. The scale, scope and time horizons of technology development and deployment at the nexus, however, are capital intensive with timelines for adoption of innovation measured in decades: largely incompatible with venture capital cycles. Water and energy are characterized by exquisite supply chains and infrastructure, which leads to it being a system with considerable inertia and aversion to risk. Products at the energy-food-water nexus are often public goods that are necessities for human life, and innovations in this space are often related to processes rather than products, themselves, or business model innovations in their delivery systems. Customers

having the greatest unmet market need for these products are often at the base of the economic pyramid, the four billion people who live on the equivalent of less than \$2 per day. They live in countries having the greatest need for the resilience to climate change. Thus, there is a humanitarian dimension to innovating and realizing the nascent value of innovation in this space.

Given planetary boundaries, robust innovation ecosystems at the energy-food-water-environment nexus are essential for sustainable international development. Innovation ecosystems at the nexus are more challenging to architect, as they involve engaging new partners that have not traditionally played a major role in such ecosystems, including philanthropic organizations, development agencies, grass-roots stakeholders and innovators. They also involve traditional actors such as academic institutions and multinational corporations playing expanded and different roles, and startups evolving in the direction of social enterprise.

King Abdullah University of Science & Technology in Saudi Arabia is one example of an institution that is building an innovation ecosystem at the energy-food-water-environment nexus, establishing novel practices and forms of partnership in the process.

1 The number of transistors that can be placed inexpensively on an integrated circuit doubles approximately every two years.

2 The value of a telecommunications network is proportional to the square of the number of connected users of the system (n^2).

Martin Duda

Director, Innovation Support Centre,
Technical University of Ostrava, Czech Republic

Supporting start-ups – much needed, yet often overrated

CONNECTIVITY AND COOPERATION, SESSION 3 (THURSDAY, 15:10, AULA)

The aim of this report is to point out the situation when the support of creation of start-ups is often regarded as a key solution of the bad economic situation in a region. The author of the paper is drawing from the experience particularly concerning the Moravian-Silesian Region (MS Region).

Supporting start-ups is these days a “cool” topic. The Czech Republic has hardly underwent the stage of building business incubators and technology parks, and suddenly springs up a new wave of establishing co-working centres, hubs etc.

The above mentioned trend is often interpreted by the key actors in the region as an important tool for decreasing the region’s growing economic problems. In the moment when another coal mine is about to be closed down and hundreds of employees are in danger of being made redundant even almost absurd proposals are presented to teach these people to make business.

Currently, there are over 30,000 square meters of office and working spaces available in the framework of the infrastructure for supporting entrepreneurship in the MS Region. As an expert-based estimate it can be said that this infrastructure is utilized by a maximum of 40 to 50 “pure” start-up companies, i.e. not more than 300 employees and 2,500 square meters of space. The rest of the space is used by companies and organizations that cannot be labelled as start-ups. It is evident that the start-up companies are not emerging only in the framework of this support infrastructure, nevertheless even these figures can be regarded as certain indicator of the volume of the “start-up scene”.

In the field of supporting start-ups is generally said that out of 100 ideas are only about 10 that are worth trying and in the end only one can be successful as a start-up with a significant growth potential. In the past, we announced every year a student competition for the best business plan at our university, usually with few applicants. One year ago, we have decided to implement a new product named Green Light which works in a more complex way: it is an acceleration programme, but to a large measure, it is creating marketing for the topic of entrepreneurship. Already at the end of the first year of its implementation, the number of interested students increased by multiplication.

The support for start-ups in regions, where starting a business is not a frequent thing, should thus begin with fostering the spirit of entrepreneurship. These are more educational and motivational activities towards the main target groups. From the short-term perspective this supporting activity cannot serve as tool of an active employment policy, but from the long-term perspective this is a key activity for setting up the positive atmosphere and environment for making business.

Aline Figlioli (joined with Mauro Faiad, Soraia Paranhos)

Superintendent of Technology Development, Innovation and Support to ICT Science, Technology and Innovation Secretariat of Goiás State/Brazil

Fostering the development of Clusters through the generation of critical mass and access of technology services in emerging technology regions: the case of public policies from Goiás State/Brazil

SMART CITIES/REGIONS, SESSION 1 (THURSDAY, 11:00, AULA)

Goiás is a state located in the Brazilian Midwest, and its capital, Goiania, is located 200km from Brasilia, capital of Brazil. The state has an area of 340,000 km²

(4 % of the Brazil's area), 246 municipalities and a population of approximately 6.1 million inhabitants. The economy of Goiás is breaking all the records of growth. The state is going through an extraordinary and unprecedented momentum of development, even in the face of serious international crisis since mid-2008 has affected all economies of the world.

Goiás currently appears at the 9th position on Brazilian State Ranking of GDP and 11th position when it comes to GDP per capita, which shows a gap in terms of economic productivity. This gap can only be overcome through the increasing of business competitiveness, intrinsically related to the (a) volume and quality of the critical mass of the region (training) and (b) innovative capacity of firms. Thus, Goiás State, through the Department of Science, Technology and Innovation (Sectec), focused on the implementation of programs on two fronts, acting jointly, whose central element is the development of Clusters: promoting innovation and professional education.

The promotion of innovation is through the establishment of laboratories that provide access to technological services from expensive and rare, or nonexistent, equipment in the region, and considered critical by entrepreneurs in improving the productivity, quality and promotion of product innovation. Some laboratories will perform testing and certification of products.

The professional education ensures access to the skills needed to enable companies to make the most of the access to laboratories and technologies, in addition to allowing them not just the use of technology, but the internalization of it by the company. In addition, training related to the management aspects of the business is offered.

Both actions, innovation and professional education, take place in Technological Institutes of Goiás (ITEGOS) and its decentralized units, called Technological Colleges (COTECs). Thus, the State Government, through Sectec, ensures the presence in each of the clusters.

Thus, the public policy regard to innovation and professional education works together to promote Goiás as a fertile field for innovation: skilled labour, innovation environments prepared to receive them, and technological support for developing their activities that result in innovations.

Otakar Fojt

Senior Science and Innovation Adviser, The Science and Innovation Network of the UK Government, The British Embassy, Czech Republic

Science Diplomacy as a Tool of Technology Policy and Innovation

CONNECTIVITY AND COOPERATION, SESSION 2 (WEDNESDAY, 15:10, AULA)

Science has grown considerably since the second half of the 20th century. It is estimated that there were only about 150.000 scientists worldwide in 1945. The 2010 estimate of the number of scientists by the Royal Society states about 7 million people working in science and a global spending exceeding 20 trillion USD. While the global world population only tripled since 1945, the number of scientists at the same time increased 47 times.

Science is an international endeavour and to be successful, scientists in any country need to collaborate with the best in the world. No country on this planet is able to undertake all scientific work on its own. If you e.g. study rare cancers, you need to gather evidence of rare diseases globally to get enough patients and biological and data samples to produce any meaningful results of your work. There are many areas where scientists and innovators need to communicate and build best practices, which benefit all – share funding and data resources, unify and harmonize the best formats of data storage to be applied by all, advice policies and policy-makers, shape future research directions, identify and mitigate risks, and promote the best research opportunities.

You could say that scientists can do and do all these things themselves and that science community is very organised, disciplined and international. Yes, science community is very organised, but there are areas, which need international support and bridges between governments, academia, and industry globally. In such areas, direct scientist to scientist links are not enough and science diplomacy plays its important role. That was the reason, why in 2000 the UK Government established the SIN. The network consists of 90 diplomats and locally engaged staff based in 25 countries in the British Embassies and High-Consulates across

the world in all major scientifically active nations. The UK has only 1% of global population, but invests 3% of global science spending, produces 6.6% of all science papers and has 15.5% of all highly cited papers. Clearly, the UK undertakes world-class science, but at the same time 97% of all science spending happens abroad.

The role of the SIN is to inform the UK science and policy community on global S&I; maintain a flow of information on developing policies and programmes of interest to the UK. We identify emerging challenges and opportunities, do horizon scanning and respond flexibly on emerging issues. The Network identifies opportunities to share good practice, influences EU policy making, and creates excellence through collaboration on the principle of the best with the best. Our role is also to inform our host country stakeholders about the latest science, technology and innovation developments in the UK, for example recent 11 industrial strategies, government's focus on 8 great sciences and a recent establishment of 7 sector focused Catapult centres. My conference presentation will describe a few examples from my 11 years of working in the SIN.

Marina van Geenhuizen

Professor of Innovation and Innovation Policy in the Urban Economy (Chair),
Faculty of Technology, Policy and Management Delft University
of Technology, Delft, The Netherlands

Accelerating market acceptance of innovation: Critical factors in local Living Labs

PUBLIC POLICIES, SESSION 2 (THURSDAY, 11:00, S2)

Living Labs, as a relatively new and increasingly popular tool to enhance innovation, include user-groups as a primary requirement and constitute daily living environments. Many universities, companies and cities today are involved in Living Labs to benefit from the input of user-groups with the aim to shorten

time to market and better match new technology with user-needs, including needs of civic society. Despite their popularity, Living Labs just started to be the subject of systematic research, for example, on their characteristics, aims and critical factors in order to be effective. The focus of this paper is on Living Labs for health innovations, mainly in cities. Health care is under pressure as a consequence of the ageing population and fast increasing groups with chronic conditions in a situation of diminishing financial resources. At the same time, the way to commercialization of health inventions, i.e. to bring them to market and widespread use, is littered with many blocks.

Living Labs as delimited environments for co-creation, like a hospital or residential area, may offer various solutions to this situation, for example, by bringing the relevant actors together, among them user-groups, and by the design of new models of financing R&D. Against this background, the research question of the paper is as follows: What are the characteristics of Living Labs, particularly of the user-groups involved? Which factors are critical in the involvement of these groups and in effective Living Labs in general, and what could be the role of local authorities?

Drawing on the literature, first, a list is composed of critical factors influencing the role of Living Labs in innovation, specifically of user-involvement, and these factors are explored using case study analysis of four Living Labs in Europe, in health care (elderly care) and medical technology. As the main outcomes, we observe the involvement of different types of users in medical Living Labs, like elderly people, patients, clinicians and hospitals, and a different involvement of them, running from almost passive to active, and combinations. Similarly, there is diverse involvement of Triple Helix actors, with sometimes absence of the university and absence of governance. Also in some cases, but limited to elderly care, business is not strongly involved. Critical factors concerning user-involvement include a solid preparation study of user needs prior to project start, an adequate selection of users, the creation of trust and the guarantee of privacy and self-determination, all mainly dependent on the aim of the Living Lab.

David Gibson

Associate Director, IC² Institute and Senior Research Scientist,
The University of Texas at Austin

The Entrepreneurial University Embedded in Context: Case Studies and Policy Implications

In addition to the key objectives of excelling in research and education, universities worldwide are increasingly tasked with fulfilling and enhancing their third mission of service with a concerted effort to help stimulate and to sustain economic development. However, it is clear that governments, businesses, and societies differ in how they expect universities to contribute to knowledge-based growth as do regional challenges and assets for stimulating and sustaining such growth. Recognizing these important global challenges, The Norwegian Science Council funded a collaboration among researchers from Norway, Finland, Sweden, United Kingdom and the US to develop case studies of universities embedded in different national and regional contexts and to compare how these universities have accepted and fulfilled their third mission with regards to contributing to or participating in technology-based economic development. Rather than searching for one ideal model, the objective of this research is (1) to build on an understanding of the uniqueness of the history of each university's development and operation in relation to its institutional and regional context and, (2) through the application of Institutional Theory (Scott, 2014) to enhance the understanding of the interrelationships and interdependences among policy, culture, norms and values on different university innovation ecosystems.

Małgorzata Grzegorzcyk (joined with Dariusz Trzmielak)

Assistant Professor, Faculty of Management, University of Lodz, Poland

The Knowledge and Technology Transfer – the Effects of Science and Business Cooperation

CONNECTIVITY AND COOPERATION, SESSION 1 (WEDNESDAY, 12:10, AULA)

Globalization involves the integration of markets, technologies and research enabling people and ventures to reach around the world to offer and sell their ideas and know-how in any country in the world. The companies and universities use facilities and organizations for expansion from local to regional and then to national markets. They follow a natural progression. A successful knowledge and technology transfer from academia to business is based on their strong collaboration. In spite of the facts that universities and firms are organizations with different purposes, mandates, value and reward systems, cultures and codes of practice universities tend to adopt its “third mission”. The science and research organizations stimulate the development of micro and small entrepreneurship. Their know-how and research results can be the sources of knowledge and new technologies.

In the paper, authors empirically study the key elements affecting academia and business collaboration. Based on thorough analysis of empirical study, the authors indicate important issues influencing on the effects of science and business cooperation within two market segments: scientists and business.

Direct and indirect methods of data gathering were used in the research: direct measurement (in-depth interview, participant observation) and indirect measurement (e-mail survey). An online questionnaire has been sent to 10.000 respondents of two target groups: scientist and business representatives in Poland, four EU countries and the United States by e-mail. Additionally in Poland in-depth interviews have been conducted with Technology Transfer Office (TTO) staff, faculties and university top management representatives among the 20 biggest universities. Two measuring instruments were created: a questionnaire and

interview scenario. The study examined the stimulants and barriers of knowledge and technology transfer from science to business and focus on the assessed effects of cooperation between entrepreneurs and scientists in chosen European countries and US. The authors of the article identified and study the following factors :

- acquired knowledge;
- access to ideas for further research;
- improved image of the organization;
- access to additional funding resources;
- creating new technologies;
- international cooperation;
- improvement of competitive position;
- access to experts.

In the final part, the paper characterizes the various countries and key elements for successful the science and business cooperation, taking into consideration their importance assessed by identified groups. It is recognized that some of the most important features of identified market segments have roots far back in R&D market structure. The survey results also acknowledged that the scientists and entrepreneurs cooperation is the consequences of government political efforts and sources of financing joint projects.

Manuel Heitor

Center for Innovation, Technology and Policy Research,
IN+, Instituto Superior Tecnico, University of Lisbon, Portugal

What has changed in Europe after the European Research Area and times of increased uncertainty? Challenges and opportunities for science, technology and education policy

KEYNOTE SPEAKERS (THURSDAY, 9:00, AULA)

In a decade hit by recession and economic and budgetary problems, which public policies for science, technology and education are necessary in the near future, both for individual member states as well as the EU as a whole?

This question has driven the creation of “step4EU – Science, Technology, Education and Policy for Europe” (<http://www.step4eu.org/>), a European wide network aimed to foster the systematic observation of issues in science and technology, higher education and public policy in Europe based on in-depth research. Its rationale derived from the observation that the quasi stagnation of R&D public investment in Europe over the last decade, which now accounts for about 2.0% of EU's GDP (for comparison, GERD in the US is about 2.8% GDP), hides a major trend of internal divergence inside Europe itself. For example, in the year 2000, Germany and France presented similar national R&D budgets; today, Germany outpaces France by 50%. Italy budgets have declined since 2007, and in real terms are 15% lower than in 2000. And, most of small countries have slowed down, or cancelled, previous increases in R&D budgets.

Overall, the average investment in R&D per citizen has decreased comparatively with that in USA and the accumulation of R&D investment over the last 30 years is 50% lower in Europe than in the USA by 2012. Undoubtedly there was progress in Science, Technology and Higher Education throughout Europe, but as a whole, Europe has met neither its goals nor its promises in this area.

The challenges for Europe are immense, independently if they are global, national or local in nature, as most are to all effects transversal (e.g., global warming). An adequate policy framework not only helps mediating the interface between science, education and society, but also contributes to shaping systems, strategies and development patterns. Ultimately, the question is how to avoid the surprising estimates of UNESCO (2012), that warns about the possibility to have a “lost generation” of 200 million of young people – the bulk of which are expected to possess some kind of higher education qualification.

These issues, among many others that could have been listed, recall similar debates in the eighties, as associated with overcrowding among students, lack of resources, increased costs of the school places, maladjustment between the educational and productive systems and the slow speed of response to labour market demands in the educational response.

In that occasion, it was clear that investments in education were important drivers of economic and social development. Indeed, investing in education in Europe, and elsewhere, contributed to develop new capacities and skills, together with professional competencies that mitigated negative effects of cyclic crisis. The flexibility in addressing economic and societal dynamics has been facilitated and stimulated through science and education, although many authors have argued that in the absence of a coherent policy framework (including collaborative arrangements, quality assurance procedures and other feedback mechanisms, among other issues) science and education are necessary conditions but not sufficient for wealth generation. In addition, analysis has also shown that budgetary cuts in science and (higher) education over time have exacerbated economic inequality and social exclusion.

In this context, scientific and higher education institutions are critical agents given their privileged locus as repositories of knowledge, skills and competencies, as well as their effective contributions to the economy. Thus, the current economic situation presents a strategic opportunity for revisiting the role and mission of advanced training, knowledge and innovation in a post-financial crisis in Europe. This requires the adequate and systematic observation of policies and budgets across Europe in a way to report, publicly and periodically, relevant information and early warnings on the state of policies and budgets in each country and at EU level.

Robert Hodgson

Managing Director Zernike (UK) Ltd, Cambridge, United Kingdom

Ambitious Modesty: developing and sustaining world class R&D for regional competitiveness

PUBLIC POLICIES, SESSION 1 (WEDNESDAY, 14:00. S2)

This presentation will explore the challenges of non-metropolitan regions growing and sustaining knowledge assets as a key component of the development of their regional economy. It will highlight the need to develop cohesion and alignment with priority areas relevant to the region's history and to its future. Examples will be drawn from the developments in very different places and very different cultures – among others, the network of R&D centres in the Basque country of Spain; the cluster of very high value engineering around Bariloche in Argentina and the growth of high technology enterprise in the Cambridge area of the UK. The emphasis will be on a developmental approach characterised by ambitious modesty and the role of formal and informal networks of sticky people in developing and sustaining a new vision for the region and building a new culture of innovative entrepreneurship.

Alejandro Ibarra-Yunez

Professor of Economics and Public Policy, EGADE Business School,
Tecnológico de Monterrey – Monterrey, Mexico

Government versus Governance as a Framework to analyze Mexico's Energy Reform

PUBLIC POLICIES, SESSION 1 (WEDNESDAY, 14:50, S2)

Mexico's new administration of Pres. Enrique Peña Nieto has actively passed Reform Proposals for at least six key policy aspects of the country's economic

life, with a basic argument of moving towards efficient government and a new enhanced social orientation dearly needed in that society. Using the theoretical framework of the definition of government versus governance in political economy and organization, the strengths and potential weaknesses of the proposed reforms are put into perspective with emphasis on the energy reform passed in August 2013, and under discussion in Mexico's Congress until the end of the year. The theoretical framework is also useful to make a comparison of the proposal with governance structures in oil companies that have been mentioned as paradigms for Mexico by the Peña Nieto administration: Petrobras, Ecopetrol, and Statoil. With this framework, one can finally delineate true economic efficiency incentives and welfare sharing under Mexico's proposal.

Gerd Kortuem

Professor of Computing, Department of Computing and Communications at The Open University, United Kingdom

Building a Smart City Data Ecosystem

KEYNOTE SPEAKERS (THURSDAY, 9:45, AULA)

Today's cities are generating and collecting more data than ever – public (open) data, corporate (proprietary) data, infrastructure data from sensors and citizen data from mobile apps and tweets. This talk will explore opportunities and challenges in building smart city data ecosystems to harness the value of urban data. Using the smart city initiative of Milton Keynes in the UK as case study this talk will investigate how data enables smart city solutions (for example in mobility and energy), explore the technical foundation and business models of a smart city data ecosystem, and highlight the stakeholder relationship between civic authorities, private organisations and citizens.

Emmanuel G. Koukios (joined with Massimo Monteleone)

Head, Bioresource Technology Unit, School of Chemical Engineering, National Technical University of Athens, Greece

Regional, National and International Cooperation on Green Bioeconomy Themes – The Case of Southern Europe

CONNECTIVITY AND COOPERATION, SESSION 1 (WEDNESDAY, 11:20, AULA)

A Manifesto for Growth: This paper is based on a broader work, which has taken the form of a Manifesto, co-authored by scientists and engineers from the five Southern EU countries that are all presently experiencing a deep and complex systemic crisis: Portugal, Spain, Italy, Greece and Cyprus. This Manifesto advocates the adoption of a new development model, focusing on the target of sustainable bioeconomy, around which other themes and topics will crystallize. Implementing this model will act as a locomotive to get the economies and societies of these countries efficiently out of their crises, and smoothly into greener post-crisis pastures. The proposal is articulated in ten critical steps or theses for immediate action by the policy- and decision-makers, as well as other key actors within this troubled area of the European Mezzogiorno. Cooperation at all levels – regional, national and global – constitutes one of the “ten commandments” for sustainable change. This paper explains why and how.

Open Systems – Closed Cycles: Bioeconomic systems are usually open ones, communicating, trading and exchanging goods and services with each other. That has been the tradition with the Mediterranean valleys, exporting their olive-oil, fruits, raisins, and early vegetables, and importing dairy products and grain from the large European plains. Today, this communication and exchange might involve any of their essential flows (molecular, cellular, energy, information, financial, and human) present in all bio-systems. Self-sufficiency is normally an exception, usually caused by extreme conditions: wars, catastrophes, crises, political isolation. So, the target of sustainability should not lead to the wrong idea of closed, self-sufficient systems. Therefore, interregional and international cooperation become

key ingredients of the proposed new bioeconomic strategies. On the other hand, we must clearly distinguish such product and service openness from the green accounting of the closed eco-cycles of nutrients, carbon, water and energy in rural and urban ecosystems.

New Cooperation Trends: In the last period, when the trend of “globalization” has affected a large part of world activities, the basic conditions of collaboration have significantly changed. So, in order to include this component into a new strategy, we will have to take into account the rules of the new innovation and technological cooperation landscape for the Southern European regional and national bioeconomies to network with each other, and with those in other countries and regions across all continents. These new major trends, to be discussed in this paper, affect both the form and content of the linking, bridging and bonding actions, and include (a) Goals and issues; (b) Tools and approaches; and (c) Research agendas.

Emmanuel G. Koukios

Head, Bioresource Technology Unit, School of Chemical Engineering, National Technical University of Athens, Greece

Experimenting with New Educational Models to Teach Engineers and Executives Green Technologies, Green Economy, and Sustainability Policy and Practice

EDUCATION, SESSION 2 (THURSDAY, 14:00, S2)

A number of innovative educational methods have been recently used in teaching various “green” subjects at the National Technical University of Athens (NTUA). In this paper, we will present their rationale and approach, assess the performance and acceptance by students and educators, and discuss their conclusions

and recommendations, within the STEM – Policy and Innovation frame. The following is a list of the experimental courses or programs with an innovative structure, form and/or content:

- A sequence of three Green Engineering design courses for senior NTUA Chemical Engineering students – as part of the Organic Industries option (elected);
- A Bioenergy course for the post-graduate NTUA's program on Energy Production and Management – as part of the Renewable Energies option (elected);
- A week-long Advanced Summer School on Biobased Technologies for European and Indian Young Researchers organized by NTUA;
- A training program on Technology Management organized by NTUA – a long version for business persons, and a short one for PhD level researchers;
- A Master-level program for re-training executives on Sustainability Policy and Practice, also organized by NTUA and taking place during summers on Greek islands.

A summary of the innovative elements which have been introduced above follows:

- Project- and group-based learning;
- Individual learning through projects different for each student;
- Balanced group and individual learning activities;
- Thematic character of yearly course runs; e.g., this year, projects on wastes;
- Preparation of short executive reports, with a set table of contents;
- Oral presentations by groups and individuals under strict time constraints;
- Molecular and other fundamental approaches of the problems addressed;
- Quantitative vs. descriptive solutions to problems; emphasis in design ;
- Product innovation, combined with process and system ones;
- Simulation games, e.g. to consider and model stakeholders' involvement;
- Laboratory work planned and executed by students to fill gaps in their work;
- Optimal use of web-based sources of information and learning methods;
- Feasibility and sustainability criteria systematically searched and applied;
- Course/program evaluated with results communicated to class on final day.

Evgeny Kutsenko

Head of cluster policy department, Institute for Statistical Studies
and the Economics of Knowledge, Higher School of Economics, Russia

Trust in society and innovation policy design. The case of the pilot innovative clusters in Russia

CONNECTIVITY AND COOPERATION, SESSION 2 (WEDNESDAY, 14:20, AULA)

State of the art innovation policy requires a high level of trust between 1) regional actors and the government, 2) regional actors representing different sides of the “triple helix”. Innovation performance is extremely sensitive to the regular “face-to-face” communication, local “buzz” and ideas exchange, involvement of different people and organizations in start-ups, venture capital inflow. Since the level of trust in society directly influences the effectiveness of innovation policy, it is important that the design of its instruments includes mechanism to develop (or at least maintain) trust in local/regional communities. This is especially important for developing and transition economies, in which problems with “social virtues” are especially acute.

Russian government started the program to support the 25 pilot innovative clusters in 2012. 13 of them got a subsidy from the federal budget (approximately M 30 euro at the whole) in addition to the subsidies from regional budgets in 2013. Analysis of the detailed applications from the clusters and results of the special survey conducted in the late 2013, allows to compare the Russian cluster program and the pilot clusters with the European ones (on the base of Lindqvist et al., 2013; Müller et al., 2012). Research focus is made on indirect parameters which could “catch” and evaluate the level of trust in regional communities that constitute clusters.

The conclusion is the state program to support innovative clusters in Russia has traditional design, borrowed elements of administration from the previous programs, and does not contribute to solving identified problems with trust. Fundamental features of even new policy are prone to path dependent. There is enormous space for improvement in the sphere of the program design related to the trust issues. The first-priority recommendations from our view are as follows:

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- balance the composition of the main governing boards of clusters toward greater conformity to the composition of its participants (large corporations, SMEs, universities, etc.);
 - develop procedures of the involvement of all stakeholders in the formation/correction of the action plan of a cluster organization;
 - implement the practice of making annual reports by the cluster organization to the cluster members;
 - establish open procedures and formal criteria for the selection of the projects applying for public funding as well as provide information and ensure participation of the maximum number of cluster participants in the projects;
 - develop formal procedures to enter and exit a cluster, institute the membership fees (eventually) to ensure the financial independence and stability of a cluster organization.
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Yevgeny Kuznetsov

Migration Policy Institute and the World Bank,
Washington DC, USA

Experimenting with smart specialization: Open economy industrial policy

KEYNOTE SPEAKERS (WEDNESDAY, 9:45, AULA)

How can policy makers – operating under pressures from politicians and vested interests, and with only a partial view of the economy – make accountable choices on which economic activities to support? I discuss open economy industrial policy which focuses on connections among domestic firms and between firms and the world market. In contrast to import substitution policies, the objective of such policies is to increase economic openness: enhance flows of knowledge, foster productive innovation and strengthen non-traditional exports. The objective is to shift the debate on government activism in support of

globally competitive industries from one time choice of picking winners to a continuous experimentation: a process of step-by-step transformation of the private and public sectors. In such a process, open industrial policy creates its own context for efficient design and implementation. New public and private sectors emerge simultaneously. The key concept is the heterogeneity of institutions: it is almost always possible to find some that work. The challenge is to use the ones that work to improve those that do not.

If experimentation, making and correcting errors is the issue, the key question then is what is the locus of experimentation. The second part of the talk will introduce the notion of a Schumpeterian innovation agency: a public sector organization with a mandate and discretion to experiment and make mistakes. Reviewing a limited amount of such Schumpeterian agencies (from Finland, Israel, Chile, Russia and Argentina), the talk puts forward a sobering hypothesis that even in best cases (such as the Office of Chief Scientist of Israel), it is more realistic to expect Schumpeterian episodes in the agency's life cycle rather than expect it to remain experimental all the time.

The perspective of the talk is that of a practitioner – a “thinking doer” (rather than that of an academics): it intends to put forward an appreciative theory of new industrial policy.

Kavita Mehra

Chief Scientist, CSIR – NISTADS, New Delhi 110012, India

Role of Public Private Partnerships in Promoting Innovations in India

CONNECTIVITY AND COOPERATION, SESSION 1 (WEDNESDAY, 11:00, AULA)

Innovation is the key to economic development and connectivity of various stakeholders and their interaction is the requirement of for innovation process. The term ‘public-private partnership’ (PPP) describes a relationship in which public

and private resources are blended to achieve a goal or set of goals judged to be mutually beneficial both to the private entity and to the public. This mode of connectivity ensures participation of required critical desired actors in accomplishing the goal. PPP synergizes the expertise of the public, private and voluntary sectors to help solve intractable social or economic problems. In doing so, collaboration between the divergent sectors facilitates innovative and synergistic responses to policy problems that would not otherwise occur. It has several advantages to be discussed in the presentation of full paper.

Economy and development of social infrastructure is the first priority of government. PPP plays an important role in economic development as well as technology development for societal upliftment. Several departments of the Government of India are promoting public-private partnership programmes in R&D. The participation of private sector in R&D and technology development schemes facilitates and adds value in introducing and transferring new technologies. The paper explores the role of facilitating institutionalized mechanisms of the government S&T departments/agencies in building linkages between R&D agencies and industry in India, promoting technology development and techno-entrepreneurship in the country. Role of different schemes in promoting innovation shall be discussed with some data and cases. The paper will conclude by some policy suggestions for the ongoing activities of Indian Government in S&T based innovations.

Massimo Monteleone

STAR*Integrated Research Unit, Department of Agriculture,
Food and Environment, University of Foggia, Italy

Unlocking and developing research potentials: regional implications

KEYNOTE SPEAKERS (THURSDAY, 16:00, AULA)

The overall plan, the specific strategies and the activities carried out in the framework of the EU project STAR*AgroEnergy (FP7-REGPOT-2011) are presented as a reference study case in “capacity building”.

STAR is intended to significantly improve the research capacity of the University of Foggia (UniFG) and its ability to act as a “hub” for the promotion of bioenergy and bioeconomy, which implies the strengthening of research power, the bolstering of links with stakeholders and the fostering of capacity building activities. Three parallel pathways of investment in research capitals were applied: a) improving the research activities through an interdisciplinary approach (“bonding” by research integration inside UniFG); b) consolidating a critical mass of researchers (“bridging” by recruitment outside UniFG); c) expanding the research network through large and qualified scientific and non-scientific collaborations (“linking” through two-way secondment collaborations and institutional partnerships). Other, equally relevant, complementary actions were: the upgrading of the R&D facilities; dissemination and promotional activities; the application of research evaluation criteria and methodologies.

One major strength of the process put in action is its unusual, high level of integration between the two major drivers of scientific and technological innovation: “research community” and “local stakeholders”. On this view, research and technological development is conceived as an innovation opportunity for the region, closely linked with the regional economic trends and in-tune with its social needs. The world economy is currently undergoing a critical period of transition in technology, governance, social and economic values. An ecological transformation of the productive apparatus and new patterns of resource consumption are needed.

The transition from an economy exclusively centered on fossil fuels toward a mix of renewable energy sources is to be encouraged, thus eliminating all forms of waste (properly converted into useful resources) and increasing energy save and energy use efficiency. The other side of the same transition process is food security from a healthy agriculture, preserving natural resources (biodiversity, soil fertility, water, etc.) and approaching ecological equilibrium.

STAR aims at an integrated approach to renewable energy generation derived from agriculture and agro-food industries and to a knowledge based bio-economy, according to sustainability criteria. The target is to build up a methodology to reconcile bio-based production with nature and landscape conservation, the maintenance of ecological resources and the protection of cultural heritage of the most relevant rural areas of Southern Europe, working out models of viable, dispersed bioenergy generation and biorefining together with proximal energy consumption.

In order to target a sustainable bio-economy as a new development strategy for the Southern European regions, a Manifesto is also proposed to policy- and decision-makers for an immediate action to revitalize the economies of those regions and countries that are currently experiencing a deep and complex systemic crisis.

William J. Nuttall

Professor of Energy at The Open University,
Milton Keynes, United Kingdom

Smart Meters, Grids and Criminality

SMART CITIES/REGIONS, SESSION 1 (THURSDAY, 11:50, AULA)

Our paper draws attention to systemic risks arising from willful criminal activity associated with future energy distribution systems. We draw upon prior work by Eric Luijff and others concerning smart grid security. We also acknowledge the contribution of the seventh EC-Framework programme project “Sesame”.

The paper describes examples of risks of criminal behaviours emerging from future smart meters and smart grids, including:

1. Self-interested consumer criminals shifting use in space and time: A criminal might deliberately hack his/her electricity meter to make peak-time usage appear to be off-peak usage. In this way the criminal benefits from extra comfort at lower cost. Alternatively the criminal deliberately hacks his/her meter so that the electricity use is attributed to a neighbour (or even someone far away).
2. Micro combined heat and power (micro-CHP): Future northern European scenarios indicate a likelihood of greatly increased average electricity costs. In those countries many homes are heated with natural gas. Fuel poverty and concern for vulnerable consumers are major issues in energy policy, and politics. Those realities militate against aggressive rises in domestic gas prices. We further note global innovations that could make EU gas cheaper. Hence there could be a growing incentive for consumers to implement domestic gas-to-power micro CHP. However, it appears to be a technology that could not easily be retrofitted for carbon capture and storage. As such, a major growth of natural gas micro-CHP would appear to be inconsistent with the EU policy goal of 80% greenhouse gas emission reductions and micro CHP might need to be rendered illegal. That scenario (noting high electricity prices and relatively low gas prices) could favour illegal and dangerous behaviours in which householders buy a micro turbine and seek to install the system themselves.
3. Terrorist Attack on the Electricity System: Smart networks arguably increase vulnerability to terrorist attack. The smart grid future links long-standing energy and security risks to the more recent concerns of cyber-attack. We note the work of Tony Craig (Terrorism and National Security (2010)). If terrorists were to succeed in achieving a long-duration blackout to a major city, then the risks to the modern economy are substantial. We note the importance of information technology to retail commerce, transport, water distribution and telecoms (cellular and landline).
4. Flashmobs and Smart Meters: We have seen the transformative power of mobile communications and social media technology to traditional street protests. How might future attempts to combine “flashmob” ideas with a desire

to attack the smart grid challenge the resilience of future electricity supply? We note that in July 2009 Iranian protesters tried to cause power system collapse by simultaneously turning on appliances.

What do these and other threats mean for the future of our economy and our communities? The paper will close with targeted recommendations as to what must be done to militate against these new risks and are current institutions and powers fit for purpose?

Elin Merethe Oftedal (joined with Robert Hodgson, David Gibson)

Associate professor in University of Tromsø, Norway

Unlocking the Entrepreneurial Potential through University Context Impact of entrepreneurial education on entrepreneurial intentions

CONNECTIVITY AND COOPERATION, SESSION 3 (THURSDAY, 14:00, AULA)

Whether or not university context enhances a student's aptitude toward entrepreneurship is a highly debated topic. Although positive effects often are hypothesised, recent empirical studies provide quite contradicting results. The possible reason for the contradiction is that the studies are very fragmented, a-theoretical, and completed in different contexts that makes comparison a difficult task. In this study, we develop reliable measures to estimate the impact of university context on the start-up intentions of students. The university context (UC) in our study refers to legitimacy of the closest environment in which the students operate should be considered. There are other factors, like personal and behavioural traits of the individuals or characteristics of educational programs start up intentions and attitudes. However, estimating the effects of the latest lies beyond the scope of the present article.

Assuming an iterative role of the student, we use the Scotts three-dimensional institutional framework and suggest that universities must have formal rules in addition to promoting norms and knowledge supporting entrepreneurship. Using sample of 136 students, this study creates reliable measures of UC and test their association with entrepreneurial intentions and attitudes by using liner regression analysis. Result of the present study confirms that University Context have strong and direct impact on entrepreneurial intentions and attitudes.

Jan Polecha

Expert adviser in Department of Research and Development for Innovation Operational Programme at Ministry of Education, Youth and Sports

Technology and Knowledge Transfer by means of Support for Pre-seed Activities

PUBLIC POLICIES, SESSION 2 (THURSDAY, 11:20, S2)

Ministry of Education, Youth and Sports announced 3 cognate calls supporting knowledge and technology transfer from research organizations to application sphere. All calls were supported in Operational Program Research and Development for Innovation frame, Activities priority Axis 3 Commercialization and Popularization of R&D, Area of Support 3.1 Commercialization of Results of Research Institutions and Protection of Their Intellectual Property Rights.

Pre-seed activities support is a verified form provided to academic institutions to “push” promising technologies towards their commercialization. There was no such type of state intervention in CR. Global contribution of this project is creation of innovative products and companies including control system and IPR protection. The total asked budget in the both pre-seed calls was more than double of the available budget. Therefore, it was possible to select the best projects.

The calls respond to the general need of a stronger connection between academic sector and industry. The first call 3.3 supported a rise of technology transfer

centers, the following call 6.3 (announced in 2012) for support of pre-seed activities should help both to create sustainable commercialization structure and make easy to utilize results of research and development at research institutes. Call 7.3 announced in 2013 was combination of the both previous calls.

Call	Approved projects	Individual activities in approved projects	Total approved budget (mil. €)
3.3 CTT	9	N/A	13
6.3 pre-seed	9	41	11
7.3 pre-seed	22	114	23

Realization team in pre-seed call projects was created by both project realization team for technology transfer and teams for individual activities.

The following activities were supported in pre-seed calls:

- Founding of teams for commercialization of promising technologies within each individual activity.
- Founding (only in 7.3 call), development, or professional stabilization of implementation teams for technology transfer which prepares the commercialization of individual activities or searches and prepares other suitable R&D results for commercialization.
- Consulting, legal and financial services necessary to ensure the preparation of commercialization.
- Twinning with foreign and advanced domestic TT centers and research organizations.
- Verification of technical feasibility and commercial aspect.
- Preparation of commercialization
- In 7.3 call was added: Searching and identification of newly incoming R&D results produced in research institution suitable for commercialization and their preparation for commercialization.

Filip Procházka

CEO of software company MycroftMind, Brno, Czech Republic

Models and simulation of future energy grids

SMART CITIES/REGIONS, SESSION 1 (THURSDAY, 11:20, AULA)

Distribution grids need to react to new demands and trends. Implementing new technologies in a distribution grid is, however, an important matter. “Quick and dirty” attempts at smart metering and smart grids are dangerous and costly. Simulations help verify what steps make sense for a given grid and what are technical or economical nonsense.

Architects and decision makers in distribution companies do not have an easy life. They have to answer questions on how to comply with new legislative demands, how to handle new problems (for example, the safe integration of renewable sources) and which technology to use for this. For technology suppliers, everything always works perfectly on PowerPoint and nothing is impossible. Pilot projects, however, show that the situation is definitely not so rosy. What can we therefore rely on? Where can we take the necessary information from? How can we propose development paths, which will work, which will be economical and which will act together to support the development of energy supply companies? How would the tested technologies work on a large scale in the whole grid? A logical conclusion would be to use models and simulations of the possible options and scenarios.

We handle models and simulations using the GridMind tool, developed for this purpose. GridMind is built up on algorithms from the field of artificial intelligence, which is able to process very large and complex simulations. We cooperate with CERIT-SC Supercomputing Cloud at Masaryk University for this purposes.

Models consist of individual components of the energy and communications infrastructure. Taking smart metering as an example, they include millions of components communicating with each another. They further include the

processes of measurement, signaling and control as well as characteristics requested by individual users to meet their needs. All parameters can be set for the models – it is possible to simulate various different topologies, technologies and types of component behaviour. Models are created on the basis of the results of real pilot projects and tests. The resulting model can then be fleshed out over the longer term as the future development of your grid becomes clearer.

We will present results from projects made for ČEZ (the biggest Czech Energy company) and will demonstrate cooperation between public & private cooperation.

David M. S. Rodrigues

(joined with M. T. de Sampayo, C. Jimenez-Romero, J. H. Johnson)

Research Fellow at The Open University, Milton Keynes, United Kingdom

Peer Assessment in Architecture Education

EDUCATION, SESSION 2 (THURSDAY, 14:50, S2)

The role of peer assessment in education has become of particular interest in recent years, mainly because of its potential benefits in improving student's learning and benefits in time management by allowing teachers and tutors to use their time more efficiently to get the results of student's assessments quicker. Peer assessment has also relevant in the context of distance learning and massive open online courses (MOOCs).

The discipline of architecture is dominated by an artistic language that has its own way of being discussed and applied. The architecture project analysis and criticism goes beyond the technical components and programme requirements that need to be fulfilled. Dominating the architecture language is an essential tool in the architect's toolbox. In this context peer assessment activities can help them develop skills early in their undergraduate education. In this work we show

how peer assessment acts as a formative activity in architecture teaching. Peer assessment leads the students to develop critical and higher order thinking processes that are fundamental for the analysis of architecture projects. The applicability of this strategy to massive open online education systems has to be considered as the heterogeneous and unsupervised environment requires confidence in the usefulness of this approach. To study this we designed a local experiment to investigate the role of peer experiment in architecture teaching.

This experiment showed that students reacted positively to the peer assessment exercise and looked forward to participating when it was announced. Previously to the assessment students felt engaged by the responsibility of marking their colleagues. Subsequently to the first iteration of the peer assessment, professors registered that students used elements of the qualitative assessment in their architecture discourse, and tried to answer the criticisms pointed to their projects by their colleagues. This led their work in directions some hadn't considered before. The marks awarded by the students are in good agreement with the final scores awarded by the professors. Only in 5 cases the average score of the peer assessment differed more than 10% from marks given by the professors. It was also observed that the professor's marks were slightly higher than the average of the peer marking. No correlation was observed between the marks given by a student as marker and the final score given to that student by the professors.

The data produced in this experiment shows peer assessment as a feedback mechanism in the construction of a critical thought process and in the development of an architectural discourse. Also it shows that students tend to mark their colleagues with great accuracy. Both of these results are of great importance for possible application of peer assessment strategies to massive open online courses and distance education.

Jerzy Róžański

Full Professor, Management Faculty, University of Lodz, Poland

Barriers of Science and Business Cooperation – Polish Perspectives and The Region of Lodz Case Study

PUBLIC POLICIES, SESSION 1 (WEDNESDAY, 15:10, S2)

Cooperation between business and science is one of many factors that determine companies level of innovation. New technologies, products and organizational solutions are created in science centers, high schools especially.

The level of innovation in polish enterprises is still relatively low especially in the region of Lodz. That is the reason why this article tries to answer the question: why innovations in our region are so weak in terms of its amount and value. In 2011–2013, in the frame of Human Capital operation program there was a research conducted among 500 enterprises located in the region of Lodz. In cooperation with University of Manchester the science team from University of Lodz prepared also theoretical background with recommendation for business and science spheres.

The research results confirmed that there are a lot of barriers of such cooperation and its effects are not satisfying. Companies usually try to solve innovation issues on their own – they do not cooperate with science centers.

The research results indicates that business sphere has no information about science activities. In entrepreneurs opinion, solutions proposed by science are too expensive, too time consuming and do not include the specific of the industry. The enterprises know their own limitations: lack of financial sources for R&D activities, lack of knowledge about possibilities of cooperation with science sphere. In entrepreneurs opinion the rules of such cooperation are too difficult and complicated.

It is necessary to create the certain conditions to facilitate the business – science cooperation and encourage both sides to undertake such actions.

Juan M. Sanchez

Vice President for Research, The University of Texas, Austin. TX, U.S.A.

Research Centers and their Development at the University of Texas

KEYNOTE SPEAKERS (WEDNESDAY, 16:00, AULA)

Over the last several years there have been a number of reports and journal articles in which the words “crisis”, “changing” and “University” are mentioned in the same sentence with increasing frequency. Some of the writings on the topic are very scholarly; others aimed at the general public and, somewhat unfortunately, a few of them highly ideological.

The purpose of this presentation is to give an overview of the stage of research and development globally and of the Research University in particular in an attempt to distinguish between the challenges faced by higher education – typically grouped into access, affordability, quality, accountability and impact – and the unintended consequences of the success achieved by research focused universities. The development of two research centers at The University of Texas at Austin, the IC² Institute and the Institute for Computational Science and Engineering (ICES), will be used as examples aimed at promoting multidisciplinary, entrepreneurship and global outreach into the core mission of the Research University.

Carlos Scheel Mayenberger

Emeritus Professor EGADE, Monterrey Institute of Technology Mexico

Transition Beyond sustainability. Breaking the paradigm, reaching economic growth from the resilience of natural resources.

CONNECTIVITY AND COOPERATION, SESSION 2 (WEDNESDAY, 14:00, AULA)

In the 20th century, most modern industrial systems were built on a carbon based energy, an exaggerated non-sustainable exploitation of natural resources, a debt-based growth economy, an unprecedented consumerism, as well as an exhausted planet that may not recover the minimum resilience of most planetary boundaries (climate change, ocean acidification, biodiversity diminishing, nitrogen cycle, etc.). All these factors are creating enormous economic gaps and unequal societies, approaching to dangerous limits. Somehow we must reverse this perverse cycle and transform this ecological footprint into a “valuable increasing returns system” of a win-win for all sub-systems of the biosphere. We must innovate the industrial system, the firm structures, the cities, the citizens’ mind-sets, the governance, etc. We must think beyond economic factors, beyond social isolated assets, beyond individuals, beyond sustainability, we must design regional models that are able to create sustainable wealth, benefiting for all their residents. We must find creative mechanisms to recover environmental resilience and at the same time to create economic value added and social benefits, which looks impossible under current conventional economic models and social constraints.

Observing these situations, we arrive to a single purpose with a large-scale scope, “to create sustainable wealth that be resilient with regional natural resources, and at the same time be economically competitive and of important social benefits for all”.

Giorgio Sirilli

Research director (retired), Institute for Economic Research
on Firms and Growth, National Research Council, Rome, Italy

Research policy and evaluation in Italy

PUBLIC POLICIES, SESSION 2 (THURSDAY, 12:10, S2)

In democratic systems citizens need to know to what extent public policies achieve their objectives – and evaluation becomes a key instrument of transparency.

Evaluation in the field of research and higher education (R&D&E) became a quite relevant exercise in the 1980's in the UK with the Research Assessment Exercise. After five rounds of RAEs, a fifth exercise is due to be completed in 2014, the Research Excellence Framework.

In Italy R&D&E evaluation started in the 1990s, mostly spurred by an institutional change whereby universities and public research agencies were granted much more autonomy than in the past. This implied a new “pact” between the government and the public research and education system whereby the former provides to the latter objectives and resources and, at the end of the process, evaluates the results.

A quantum leap in the evaluation from the government occurred in 2011 when the National Agency for the Evaluation of Universities and Research (ANVUR) was established.

In the paper some of the most relevant lessons learned in the last few years in Italy are discussed:

- R&D&E evaluation has become a key instrument in S&T policy making;
- R&D&E evaluation was introduced in Italy later than other European countries, it raised some opposition but now, after a transition period, it is widely accepted;
- Evaluations carried out by ANVUR have been highly criticised from

a methodological point of view (bibliometrics vs peer review; classification of journals; scores; thresholds);

- The “philosophy” of R&D&E evaluation appears to be ideologically oriented;
- A new actor in the science policy making has come into the scene: the blog ROARS;
- The institutional setting put in place was conceived as an instrument for granting additional funding from the Ministry for universities and research to the best performing institutions in an expansion phase of the economic cycle: Nowadays, in a period of crisis, the top priority is survival of existing institutions (both well and less well performing ones). The policy issue is therefore a dilemma between excellence and survival;
- R&D&E evaluation is quite expensive and distorts researchers’ behavior.

The final part of the paper deals with policy implications of recent developments and sketches some possible scenarios.

Jan Slovák

Professor of Mathematics, Masaryk University, Czech Republic

The paradigm change in STEM Education – has it happened already?

EDUCATION, SESSION 1 (WEDNESDAY, 11:00, S2)

Over centuries, the development of the teaching and learning swapped repeatedly, roughly speaking, between two main phases: » “Teaching Facts” » “Engaging the Intellect” » “Teaching Facts” »...

Both can be done in a useful and practical way, or the opposite. But in recent decades the tendency to “Teaching Facts” was perhaps stronger than ever

before. Moreover, there were many other risk factors appearing in parallel – massification of Education, too much specialisation, fit for purpose training, unrealistic expectation from new web based technologies, etc.

The talk will concentrate on the role and position of the Mathematics part within STEM, in particular in the view of my own rich experience at the Masaryk University and our ongoing project “A Brisk Guide to Mathematics”. On the way, I want to pay particular attention to the potential of the new technologies including rich media, on-line learning and further web based communication techniques.

Much has been told about how to blend the more and less able learners within the massified Education process, but I will rather question the impact of the personal typologies of the teachers and learners within the STEM Education and mention the new horizons we might encounter with the help of the new technologies.

Miloš Šifalda

Director of the South Moravian Centre
for International Mobility, Czech Republic

Regional strategy for the development of human capital: the model of the South Moravian Region

EDUCATION, SESSION 2 (THURSDAY, 15:10, S2)

The long-term aim of the South Moravian Region is to focus its strategy towards support of science, research and innovation. One of the methods to reach this goal are programs supporting talented students and researchers. The presentation shows, how is the system for talents development in the South Moravian Region organized.

Dariusz Trzmielak

University of Lodz, Poland

The Science and Technology Commercialization, Financing, Cooperation – Empirical Analysis

CONNECTIVITY AND COOPERATION, SESSION 1 (WEDNESDAY, 11:50, AULA)

Many studies have identified commercialization as being significant activity of success organization. High-tech markets have different actors, regulations, the sources of ideas and organization development, research projects and businesses. The main goal of this article addresses the following key question: what do external and internal factors stimulate the technology commercialization?

In this paper, we empirically study the key elements affecting commercialization stages and process. Based on thorough analysis of empirical study, the author indicate important issues influencing on new technology development within three market segments: scientists, business and organization developing ideas and businesses. Data from a survey study of 600 respondents in 42 countries are used to analyze the significant determinants increasing managerial interest in commercialization.

The first section of the presentation shows a theoretical analysis concerning businesses and scientists factors that focus on the development of ideas as well as businesses' preferences as to the opportunity of the new technology developments on the world's markets.

The second and third sections describe the basis for research developed and conducted in scientific project by author in the European Union Member States and other countries. The fundamental factors affecting the results of the research on commercialization stimulants and the methods of new technology market potential assessment are opinion and suggestion given by the representatives of: national and international capital, micro, small and medium sized and big enterprises, private and public institutes, incubators, innovation centers, technology

transfer centers, research and development centers, research parks, science and technology parks and universities.

In the final part, Further investigations concentrates on consumption of funding from business angels, cooperation with scientific environment in seven selected regions, and in the segments declaring different innovative activities in the market or in the organization. Multidimensional scaling was used to conduct the above analysis. The MDS map was created to position the surveyed regions: USA and Canada, Asia, South America, Australia and New Zealand, countries from so called “old” European Union, countries from so called “new” European Union (excluding Poland), Poland, other European countries and Israel, and remaining surveyed countries, according to the level of consumption of business angel funds and cooperation of business with academia¹.

1 Artykuł został sfinansowany ze środków Narodowego Centrum Nauki przyznanych na podstawie decyzji numer DEC-2011/01/B/HS4/05200” – article has been prepared based on Polish National Scientific Agency project – DEC-2011/01/B/HS4/05200.

Charles Wessner

Global Innovation Policy, Georgetown University, Washington D.C., U.S.A.

U.S. Best Practices in Regional Policies for Innovation: Critical Mass and Cluster Development in New York State

KEYNOTE SPEAKERS (WEDNESDAY, 9:00, AULA)

Responding to the challenges of fostering regional growth and employment in an increasingly competitive global economy, many U.S. states and regions have developed programs to attract and grow companies while also drawing in the talent and resources necessary to develop dynamic innovation clusters. These state and regionally based initiatives have a broad range of goals and increasingly include significant resources, often with a sector focus and often in partnership with foundations and universities. They frequently take advantage of complementary national programs to support the development of regional centers of innovation, entrepreneurship, and commercialization of high-technology products, often through the use of public procurement.

A leading example of this trend is New York State's two-decade long effort to transform the upstate region into a leading center of nanotechnology research, development and manufacturing. Reflecting large-scale investments, particularly in university research infrastructure, and collaborative arrangements with the private sector and regional development organizations, New York has altered the competitive landscape in the semiconductor industry, drawing back in investments and jobs in this sector that has been a longstanding concern of policymakers and the U.S. semiconductor industry itself. While no individual model is directly replicable, the presentation will draw aspects of the New York experience that are noteworthy and relevant to other states and regions in Europe and North America.

Cliff Zintgraff

Program Manager, IC² Institute, The University of Texas at Austin

StemDev: Instrument Proposal to Assess Regional STEM-Economic Development Alignment

EDUCATION, SESSION 1 (WEDNESDAY, 11:20, S2)

The current paper proposes development of an instrument to help regions measure the integration of their STEM education efforts with their regional economic development goals. This paper uses the term *StemDev* to describe such efforts and systems. *The StemDev Actor Perceptions Instrument* will measure the degree to which regions are organizing across the secondary education, higher education, and employment sectors, from the perspective of actors within the system. In its first version, multiple provisional constructs will be measured, with constructs derived from a literature review and from the experience of the author running StemDev-type programs. Formal quantitative methods will be applied over time to derive insights and improve the construction of the instrument. The goal of this process will be improvement of the instrument as a tool for measuring the STEM-economic development integration of regions.

A review of the literature supports the areas of focus proposed in this paper. The important role of regions in economic development, and the dynamics that develop in regions, was discussed by Mills and Reynolds (2008), Kitson, Martin and Tyler (2004), Porter (1998), and Gibson, Kozmetsky and Smilor (1992). The importance of building early STEM foundations in students was discussed by the the U.S. National Academy of Science (2007). Partnerships for creating awareness of career pathways, and for learning of academic content in real-world context, was discussed by Edelson, Gordin and Pea (1999) and the U.S. Department of Education Office of Vocational and Adult Education (2012), grounded in the traditions of Piaget (1954), Vygotsky (1978) and Dewey (1997). The proposed instrument will be deployed with educators, policymakers,

community organizers, and especially employers including private industry. Instrument categories will include: How STEM is integrated in schools, integration between STEM teaching areas, integration with non-STEM disciplines, regional workforce concerns, relationship to broader education goals, methods of teaching and learning, community partnerships, formal alignment with regional development goals, industry support for STEM programs, and developing of counseling and other student support tools. Formal quantitative methods, such as factor analysis and instrument reliability measures, will be deployed to develop the instrument over time and establish a history of reliability and validity in different populations.
