



Network of Universities  
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University of  
Zagreb

## UNICA Rectors Seminar

### Digitalization and Education.

Can universities keep up with Industry 4.0?

University of Zagreb  
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# Biographies & abstracts



Organised in the  
framework of the 350<sup>th</sup>  
anniversary celebrations of  
the University of Zagreb



Presentations will be available at:  
<http://www.unica-network.eu/event/unica-rectors-seminar-university-zagreb>

## Biographies & abstracts



### **Miloš JUDAŠ (Overall Chair)**

Vice-Rector for Science, Inter-Institutional Cooperation and International Relations, University of Zagreb

Miloš Judaš was born on May 1, 1961. He is currently employed at the University of Zagreb School of Medicine as full professor of neuroscience and anatomy as well as director of the Croatian Institute for Brain Research and director of the Center of Excellence in Neuroscience. He also serves as the Vice-rector for Science, Inter-institutional cooperation and International relations at the University of Zagreb.

His research fields of interest are: developmental neuroscience, human brain neuroanatomy, developmental and evolutionary neurobiology of cognitive functions and language, and the history of neuroscience.

Miloš Judaš has published 169 publications, which have been cited (until the end of 2018) as follows: Web of Science 2.025 times (h-index 22); Scopus 2.324 times (h-index 22); Google Scholar 3.104 times (h-index 24). He also published two books and 12 chapters in leading international handbooks and textbooks. He was invited lecturer at many international meetings and schools. With Professor Ivica Kostović, he founded the Croatian Institute for Brain Research and the Croatian Society of Neuroscience, as well as the first Doctoral (Ph.D.) Program in Neuroscience in Croatia.

## OPENING SESSION



### **Damir BORAS (Keynote speaker)**

Rector, University of Zagreb

Damir BORAS, Rector of the University of Zagreb (since 2014, re-elected in 2018 with mandate until 2022), university professor with tenure, information specialist, and lexicographer (Zagreb, October 25, 1951).

He graduated from the Classical Grammar School in Zagreb (1970) and obtained master degree from the Faculty of Electrical Engineering in Zagreb (1974). He obtained Ph.D. at the Faculty of Humanities and Social Sciences in Zagreb with the dissertation "Theory and rules of text segmentation in Croatian language" (1998).

He is also professor with tenure at the Faculty of Graphic Arts (since 2017) and at the Faculty of Teacher Education (since 2017) at the University of Zagreb.

Last seven years he is also guest professor at the Information science study of the Faculty of Humanities, University of Mostar in Bosnia and Herzegovina.

He worked as a computer and information specialist at the Referral Centre of the University of Zagreb (1975-1984), then from 1984 to 2014 as a research assistant, assistant professor (1999), associate professor (2003) full professor (2006) and full professor with tenure (2011-2014) at the Department of information science of the University of Zagreb Faculty of Humanities and Social Sciences where he was the head and founder of the Chair of natural language processing, lexicography and encyclopaedic science (2004-2017).

His former or present duties include:

- Assistant Director for Science and Computerisation at the Miroslav Krleža Institute of Lexicography in Zagreb (2000-2006).
- Head of the international scientific project "Croatian Dictionary Heritage and the Dictionary Knowledge Presentation" (2002-2006) and the head of the project "Sources for Croatian Heritage and Croatian European Identity" (2007-2012). He has led or participated in several other Croatian and international scientific projects (since 2002).
- Vice-dean for science and international cooperation at the Faculty of Humanities and Social Sciences (2004-2009)
- Member of the Senate of the University of Zagreb (since 2007); Member of the Rector's Advisory board of the University of Zagreb (since 2009).
- Dean of the Faculty of Humanities and Social Sciences of the University of Zagreb (2009-2014)
- Member of two committees of the Croatian Parliament — Committee on Information, Computerisation and the Media (2004-2007, 2008-2012); Education, Science and Culture Committee (2012-2015, and again since 2017).
- President of the Executive Board of HINA — Croatian News Agency (2011-2012)
- President of the Executive Board of NCVVO — National Centre for External Evaluation of Education (2009-2012).
- Member of the Working Group of the Republic of Croatia for EU Accession Negotiations for Chapter 25 "Science and Research" (2005-2007).
- Editor-in-chief of the international scientific journal "Studia Lexicographica" (since 2007) and the member of the editorial board of several international scientific journals (e.g. the Springer Open journal "Video journal of Education and Pedagogy", since 2015).
- Rector of the University of Zagreb, elected in 2014 for the mandate 2014-2018 and re-elected in 2018 for the mandate 2018-2022.
- Vice Chair of the Executive Committee of the Inter-University Center (IUC) in Dubrovnik (since 2014).
- President of the Croatian Rector's Conference (2015-2016).
- President of the Executive board of the Regional Platform for Benchmarking and Cooperation in Higher Education and Research (since 2015). The Regional Platform is association of universities, ministries of science and higher education, agencies and parliamentary committees for education and science (Albania, Bosnia and Herzegovina, Croatia, Kosovo, Macedonia, Montenegro, Serbia and Slovenia).
- Member of the Council of the Croatian Government for Croats outside the Republic of Croatia (since 2017).
- Member of European Academy of Sciences and Arts (since 2019.)

In more than a hundred and forty published scientific and professional papers and several scientific books, textbooks and encyclopaedias, he deals with computer processing of the Croatian language, natural language processing, e-education, knowledge organization, computer lexicography and encyclopaedic science.

He has led or participated in several professional projects for the application and introduction of IT technologies in higher education, secondary and primary education, libraries, publishing houses and judiciary.

### **Abstract: "Industry 4.0: Challenges and opportunities for Higher Education and labour market"**

We are currently preparing students for jobs that don't yet exist, using technologies that haven't been invented, in order to solve problems, we don't even know are problems yet." This famous insight of former U.S. Secretary of Education, Richard Riley, that was delivered already in 2014, about the state of education, is a good "scene setter" of the times we live in. The time in which ripple effects of innovation in the industry with support of technologies are transforming our everyday lives, the so-called world's 4th industrial revolution or I4.0. Thus, what impact the I4.0 is having, with in mind even stronger implications in the future, at our education and labour market? Are we going to educate followers or change makers? What are the measures and policies that European Union is endorsing? What are the best practices already in place and what can we do to support their "spill-over" effect at respective national levels?



**Stefaan HERMANS (Keynote speaker)**

Director of Policy Strategy and Evaluation, Directorate - General for Education, Youth, Sport and Culture, European Commission

Stefaan HERMANS is Director of Policy Strategy and Evaluation in the Directorate-General for Education, Youth, Sport and Culture at the European Commission.

He was Head of Cabinet of the Commissioner for Employment, Social Affairs, Skills and Labour Mobility Marianne Thyssen in the Juncker Commission.

Previous posts include Head of the 'Universities and Researchers', 'Skills', and 'Reflective Societies' Units in DG Research and Innovation, and Secretary of the Employment Committee of the European Union. He also lectures on EU Affairs at the KU Leuven.

**Abstract: "Towards a European Education Area by 2025"**

The rapid technological change in the world around us will have a profound effect on European societies and universities. It will change both how we deliver education and what education can bring to the societies. Despite these challenges, Europe is still falling short in mobilising its human capacities to address its digital skills gap. The universities have a key role in moving from the status quo, but success will depend on working together, both inside local communities and across borders. Efforts must likewise be strongly supported by the governments and by the European Union. The upcoming European Universities initiative and the education and training cooperation framework will form key elements of these responses. The speech will address how we can work together to make sure that Europe and its universities can make the most of what the future holds in stock, and how the European Union can help.

## SESSION 1. COOPERATION BETWEEN UNIVERSITIES



**Luciano SASO (Chair)**

UNICA President

Prof. Luciano Saso (Faculty of Pharmacy and Medicine, Sapienza University of Rome, Italy) received his PhD in Pharmaceutical Sciences from Sapienza University in 1992. He is author of more than 190 scientific articles published in peer reviewed international journals with impact factor (SASO-L in [www.pubmed.com](http://www.pubmed.com), total impact factor > 500, H-index Google Scholar 37, Scopus 30). He coordinated several research projects in the field of pharmacology and has been referee for many national and international funding agencies and international scientific journals in the last 25 years.

Prof. Saso has extensive experience in international relations and he is currently Vice-Rector for European University Networks at Sapienza University of Rome. In the last 15 years, he participated in several projects including IMS2020, EGRACONS, IMOTION, BUCUM, UZDOC, TRAIN and has been speaker and chair at many international conferences organised by UNICA, SGroup European Universities' Network, EAIE and the European Association of Erasmus Coordinators.

Prof. Saso assumed the role of Member of the Steering Committee of UNICA for two mandates (2011-2015) and he was elected President for the period 2016-2019 during the UNICA General Assembly in October 2015.



Photo: JANA Kay, JGU

**Georg KRAUSCH (Speaker)**  
President, University of Mainz

Georg Krausch was born in 1961 and studied physics at the University of Konstanz. After completing his doctorate and acquiring his post-doctoral lecturing qualification, he was a Professor of Physical Chemistry at Ludwig-Maximilians-Universität München / LMU Munich from 1996 to 1998. In 1998, he was assigned to the Chair of Physical Chemistry at Bayreuth University.

Krausch has published more than 160 research papers, which have been cited over 8,000 times.

In recognition of his research work, he was appointed a Fellow of the American Physical Society (APS) in 2009.

Professor Georg Krausch has been the President of Johannes Gutenberg University Mainz (JGU) since 2007. In December 2017, he was re-elected by the Senate for a third term in office. Since 2013, he has been a member of the German National Academy of Science and Engineering (acatech). In 2014, he was awarded the Leibniz Medal of the Mainz Academy of Sciences and Literature. As President of Johannes Gutenberg University Mainz, Krausch was a member of the extended circle of coordinators of the university member group of the German Rectors' Conference (HRK), Chairman of the State University Presidents' Conference for Rhineland-Palatinate, and one of the founding directors of the Mainz Research Alliance. Since 2014, he has been Deputy Chairman of the German U15 association of 15 large, research-oriented universities.

**Abstract: "University networks - opportunities and limits of cooperation: the example of the Rhine-Main Universities (RMU) and the German U15 universities"**

The importance of university networks in Germany continues to grow. During the last German excellence competition - the so-called Excellence Strategy - university consortia were allowed to participate in the competition and apply for the status 'University of Excellence' for the first time. The organization of university alliances, their goals and the level of their cooperation may vary significantly from case to case. Using the examples of the Rhine-Main Universities Alliance (RMU) and the German U15 alliance, Prof. Georg Krausch will highlight these differences and explain the possibilities and also the limitations of university alliances in Germany.



**Jan HAARHUIS (Speaker)**  
Chair of the LERU Thematic group 'Digital Education' and  
Director Education & Innovation and programme leader  
'Educate-it' of Utrecht University

Jan Haarhus chairs the thematic group *Digital Education* of the League of European Research Intensive Universities ([LERU](#)), which brings together experts from across the LERU network to discuss and work together on topics on an Institutional level (digital assessment, virtual exchange); Future and Immersive Technologies (AR, VR, AI), Academic Development and Collaborative Research. The thematic group organized a successful blended [Digital Higher Education Summit](#) in November 2018.

Jan is an Educationalist and a teacher in Mathematics and Physics. Since 2014 he is leading the University-wide programme *Educate-it* (education, innovation and technology) that supports teachers as they future-proof and enhance their teaching practice. Educate-it helps teachers to innovate their teaching practice by incorporating Blended Learning and using the available IT tools to engage students and clear the logjams that obstruct effective teaching. A big part of the Educate-it goal is to increase awareness and acknowledgement of *cultural and organizational change* and gives specific attention to *quality and research* as a driver for educational change.

In 2016, Jan received the *Dutch Change maker SURF education award* in the category ICT and Education Professionals. In 2013 Jan became programme manager Education and ICT at Utrecht University. In this role he was responsible for several projects: E-assessment; E-lectures; Learning Management System and was also leading a report committee on the Vision for Education and ICT for Utrecht University. In 2007 and 2014 he was a member of the steering committee responsible for the Self-Study report and preparation of the site visit to Utrecht University of the American Veterinary Medical Association (AVMA), the Canadian Veterinary Medical Association (CVMA) and the European Association of Establishments of Veterinary Education (EAEVA). From 2009 until 2013 he was responsible for the implementation of a new three-year Master programme in Veterinary Medicine, part of which included the implementation of programmatic/longitudinal assessment. In 2005 he became Head of the Department of Education and Student Affairs of Veterinary Medicine and first participated in the EU-project NOVICE (Network of Veterinarians in Continuing Education) and later took chair of this EU-project.

### **Abstract: "Change is the Challenge! Lessons learned from Utrecht University. How cooperation within and between universities contribute to future education"**

Many universities in Europe are long existing institutes with old traditions. For decades we have seen our education offered in mode classroom 1.0. Most of the educational changes to classroom 2.0 stay with the innovators and early adopters and do not reach the majority of teachers. With his innovation curve Rogers explains why it is so difficult to reach the majority of teachers and encourage them to change their education.

The educational model of Utrecht University is one of small-scale and engaged learning. It aims to stimulate students to be responsible for their personal development and academic progress. To innovate education and further improve the quality of education, Utrecht University launched the programme Educate-it in 2014. Educate-it is a university wide programme which facilitates teachers in realizing the learning outcomes by innovating and enhancing their teaching practices by incorporating blended learning and using new and innovative IT tools to engage students. In order to implement sustainable educational innovation that reaches beyond the innovators and early adopters, a cultural and organizational change is needed. This is the overall goal of the Educate-it programme. But how do we realize this change?

Essential parts of the transformation from Classroom 1.0 to Classroom 2.0 are strong leadership; a university broad comprehensive collaboration; a hybrid strategy (bottom-up approach with a top down support); autonomy of teachers and a broad offer of (technical and didactical) support. In summary this is what the programme Educate-it entails. The multidisciplinary collaboration of researchers in the Utrecht University School of Governance, the departments Educational Science and Information and Computing Science share their expertise and give support to the programme.

The programme Educate-it is incrementally executed to overcome the difficult 'Chasm' in the Rogers innovation curve and reach the majority of teachers to reshape their education. Educational change is a gradual process starting with pilots towards default implementations which will finally be embraced by the majority. But we aren't there yet! With the exponential growth of technology and possibilities of augmented and virtual reality, learning analytics, personalized and customized learning and innovations like the Virtual Teaching Assistant we need to collaborate between and beyond institutes to keep up with sustainable change of technology. We have to acknowledge the importance of sharing good practices and collaborate in longitudinal research of educational innovation programmes to develop new tools and share our data and content. We have to stress the necessity of collaboration between universities if we want to change our education from classroom 2.0 up to 4.0 and stay in pace with technological changes and Industry 4.0. The evidence that technology improves quality of education is essential to convince the majority in permanently changing their education. Change will be the default!

Within the network of LERU we already collaborate on several topics of digital education and last year we also opened up our experience to the world by organizing a blended conference 'Digital Higher Education Summit'. During this blended conference all online activities organized by LERU partner institutes were available for other institutes and the world. Furthermore, collaboration in the new alliances of the European Union Networks and the development of new European Universities is also an opportunity to thrive educational change.

#### *References:*

- <https://educate-it.uu.nl/en/results/>
- <https://youtu.be/CdyVom4kZMY> (explanation of the programme Educate-it and results)
- <https://educate-it.uu.nl/en/project-kwaliteit-en-onderzoek/> (quality and research)
- <https://www.uu.nl/en/news/jan-haarhuis-receives-surf-education-award>
- <https://leru.educate-it.nl/> (LERU blended conference "Digital Higher Education Summit")



**Nikola MIŠKOVIĆ (Speaker)**

Vice-Dean for Research, Faculty of Electrical Engineering and Computing, University of Zagreb

Nikola Mišković is an Associate Professor at University of Zagreb, Faculty of Electrical Engineering and Computing where he has been elected Vice Dean for Research for academic years 2018/2019 and 2019/2020.

His research activities are conducted within the Laboratory for Underwater Systems and Technologies (LABUST, <https://labust.fer.hr/>). He participated in 14 European projects (H2020, FP7, DG-ECHO, INTERREG) out of which he coordinated FP7 CADDY, focussing on the development of the first underwater robot for interaction with divers; H2020 aPad, devoted to commercialization of an autonomous surface vehicles developed in LABUST, and H2020 EXCELLABUST devoted to increasing LABUST excellence in marine robotics.

He also participated in 4 Office of Naval Research Global (ONR-G) projects (coordinated 3), 2 NATO projects, and 7 national projects (coordinated 3). He published more than 70 papers in journals and conference proceedings in the area of navigation, guidance and control, as well as cooperative control in marine robotics.

Assoc. Prof. Mišković is a senior member of IEEE (president of Chapter for Robotics and Automation of the Croatian Section from 2016 to 2019), IFAC (member of the Technical Committee on Marine Systems) and Centre for Underwater Systems and Technologies (vice-president since 2010). He participated in 8 conference international programs committees, he is member of 2 journal editorial boards and he serves as a technical reviewer for various international journals. In 2013 he received the young scientist award "Vera Johanides" of the Croatian Academy of Engineering (HATZ) for scientific achievements, and he received the annual State science award for 2015, awarded by the Croatian Parliament.

**Abstract: "Best practices in inter-university cooperation, with emphasis on multilateral projects"**

Faculty of Electrical Engineering and Computing of the University of Zagreb (UNIZG-FER) is one of the most successful research institutions in Croatia in terms of numbers of running national and international projects. Out of many partnerships with academic and industrial partners, UNIZG-FER has participated in projects with more than 20 UNICA member institutions in 40 projects. This talk will focus on best practices in inter-university cooperation from UNIZG-FER point of view, with emphasis on multilateral projects conducted together with UNICA members.

**SESSION 2. ARE EDUCATION AND EU MEMBER STATES  
READY FOR INDUSTRY 4.0?**



**Marko DELIMAR (Chair)**

Professor, Faculty of Electrical Engineering and Computing, University of Zagreb

Marko Delimar is an electrical engineer, educator and researcher. He holds BSc, MSc and PhD degrees in Electrical Engineering and a Diploma in Management. He is a professor at the University of Zagreb Faculty of Electrical Engineering and Computing, where he has been with the Department of Energy and Power Systems since 1997. He is also a head-of-studies at the University of Zagreb Study Programme of Energy Efficiency and Renewable Energy Sources in Šibenik.

His interests include electric power and energy systems, simulations and modelling, intelligent systems, and engineering education. His current research focuses on analysis and design of smart grid architectures and large-scale integration of renewable energy sources.



**Marko PAVIĆ (Speaker)**

Minister of Labour and Pension System of the Republic of Croatia

Marko Pavić was born on 18 June 1979 in Zagreb. He graduated in Natural Science and Mathematics at the Geophysics Department of the University of Zagreb, where he became a physics engineer, meteorology and oceanography. He worked with the National Oceanography Center in Southampton, UK where he completed a Chevening scholarship in 2005, and spent four months in the United States in the framework of the International Leadership Visitors Program, US State Department Program.

He is currently at the final year of the PhD program in Environmental Protection at the University of Osijek and is also attending a postgraduate program in "Leadership" at the Faculty of Economics of the University of Zagreb. Before being appointed as Minister in 2017, Marko Pavić was the State Secretary at the same Ministry and previously he worked at the Institute for Professional Development of Youth.

**Title: Opportunities and challenges of Industry 4.0 in Croatia and South Eastern Europe – How to capitalize on the progress and minimise the damage?**



**Mario ANTONIĆ (Speaker)**

State Secretary, Ministry of Economy, Entrepreneurship and Crafts of the Republic of Croatia

Mario Antonić graduated in 1996 in Mechanical Engineering at the Faculty of Mechanical Engineering Maribor, Slovenia, and in 2004 obtained the MBA in Marketing Management, Faculty of Economics and Business Maribor, Slovenia.

Before assuming the position of State Secretary at the Ministry of Economy, Entrepreneurship and Crafts of the Republic of Croatia in October 2016, he was Assistant Minister for Investments and Innovation. Previously, he was entrepreneur, partner and investor in several private companies in Croatia and Slovenia.

**Title: Digital skills for digital economy**



**Zuzana KOVACICOVA (Speaker)**

Vice-Rector for Education, Comenius University in Bratislava

Zuzana Kovacicova graduated from the Faculty of Natural Sciences and obtained her Ph.D. at the Faculty of Management, Comenius University in Bratislava.

She is serving as the Vice-Rector for Education of Comenius University in Bratislava since February 2015. Previously, she was the Vice-Dean for Legal Affairs, Information Technologies and PR at the Faculty of Management.

She is a member of the Department of Information Technologies at the Faculty of Management. She is developing, and teaching information technology courses specialized on Business Intelligence, SAP R/3, Information Systems and Application Software, and business process aspects of information technologies.

She is serving as a key user for Controlling and Business Intelligence/Business Warehouse modules in the SAP/R3 ERP information system University project. She is a team member of the National Coordinator of Global Entrepreneurship Monitor and a team member of Project INCLUENT - Development of Inclusive Entrepreneurship of Selected Disadvantaged Groups in Slovakia. By leading in Project of Complex Information Support of Housing and Dining at Comenius University, she is applying her knowledge for practical benefits of the university.

### Title: Challenges of Education Related to Industry 4.0 and Digital Transformation



#### Nedeljko ŠTEFANIĆ (Speaker)

Professor, Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb

PhD Nedeljko Štefanić was born on 17 August in 1958 in Osijek. He graduated at the Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb in 1985. He became a full professor in 2010. He is the Head of the Postgraduate studies in (Industrial engineering and management, where he teaches four courses. His main fields of interest are Production management and Operational research.

Previously, he spent two months in Toyota Motor Company in Japan (2005). In 2008, he attended seminars at the Massachusetts Institute of Technology in the field of lean management. From 2014, he is full member of the European Academy for Industrial Management. Since 2016, he is the Head of the Working Group for developing National Platform for Digitalization of the Industry of the Republic of Croatia, which was presented in Brussels on 20 September 2016. Since then, he has also become a member of the Working Group for the Digitization European Industry. He was invited by the German government to participate in the conference about Digitising manufacturing in G20, Berlin, 16-17 April 2017.

He is currently working on the implementation of the National Platform for Digitalization of Industry, Services and Public Sector in the Republic of Croatia. He is the main organizer of two conferences: GALP (Green and Lean Production) and LSS (Lean Spring summit), in which participate representatives of more than one hundred manufacturing and services companies from Croatia and region.

#### Abstract: "University, an important factor in the process of digital transformation of Industry"

The emergence of new disruptive technologies has triggered a powerful and irreversible process of digital transformation of industry. One of the most important factor in enterprises transitioning to Industry 4.0 is University, which needs to prepare new generation of engineers and scientists for the new digital era. Universities also need to start with digital transformation and modernize themselves. The paper proposes an innovative methodology for the digital transformation of the University.



#### Pol BESENIUS (Speaker)

Professor, Institute of Organic Chemistry, University of Mainz  
[www.besenius-lab.com](http://www.besenius-lab.com)

Pol Besenius was born in Wiltz, Luxembourg in 1981, where he grew up and completed secondary school education. In 2000 Pol started his Chemistry studies at the Vienna University of Technology, being awarded a '1. Diplomprüfung' in 2003. As an exchange student he spent a year at the University of Strathclyde in Glasgow, Scotland, and graduated as a BSc with 1st Class Honours in 2004.

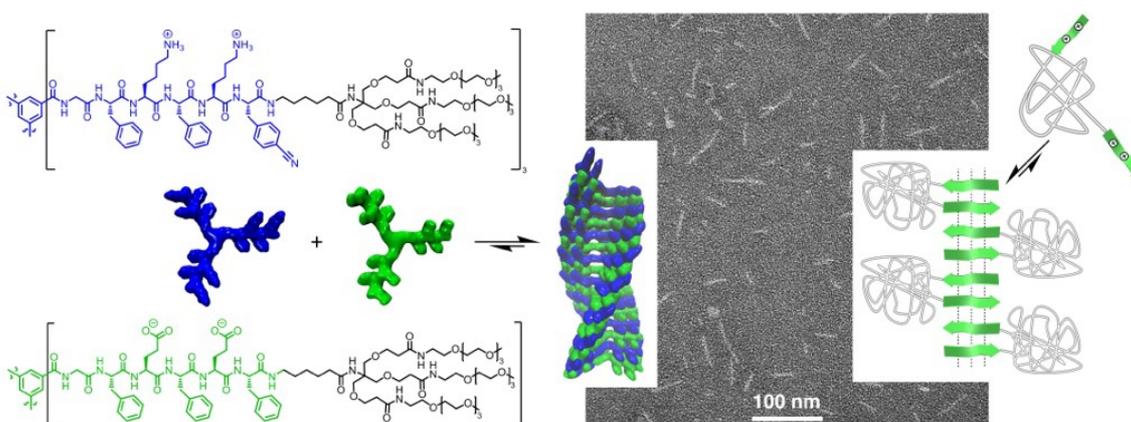
From autumn 2004 until early 2008 Pol completed his PhD studies at the University of Strathclyde and WestCHEM Research School in Glasgow, under the supervision of Prof. Peter Cormack and the late Prof. David C. Sherrington FRS, in collaboration with Prof. Sijbren Otto and Prof. Jeremy K. M. Sanders FRS at the University of Cambridge. In 2008 Pol took up a Postdoctoral Research Assistant position at the Eindhoven University of Technology with Prof. Anja Palmans and Prof. E. W. "Bert" Meijer, being awarded a Marie-Curie Fellowship in the Laboratory for Macromolecular and Organic Chemistry and the Institute for Complex Molecular Systems. From 2011 to 2014 Pol was as Group Leader (Habilitation), in the Organic Chemistry Institute at the University of Münster and the Center for Nanotechnology under the mentorship of Prof. Bart Jan Ravoo, and supported by a Liebig Fellowship from the 'Fonds der Chemischen Industrie' (FCI). In December 2015 Pol completed the Habilitation and received the *venia legendi* in Organic Chemistry. In January 2015 Pol was appointed as Professor (W2) for Macromolecular Chemistry in the Institute of Organic Chemistry at the University of Mainz.

### Awards and Honours

- ERC Consolidator Grant 2018
- Materials Today EPJ Award 2018, 2nd Prize
- Fudan University State Key Laboratory Senior Visiting Scholar, 2017-2018
- JSP Fellow, 48th Bürgenstock Conference, 2013
- Member (2013-2014) and deputy speaker (2014) of the 'Junges Kolleg der Nordrhein-Westfälischen Akademie der Wissenschaften und der Künste'
- Thieme Chemistry Journal Award, 2013
- Liebig-Fellow, Fonds der Chemischen Industrie (FCI), 2011-2014
- Marie Curie Intra-European Fellow (IEF), 2009-2011
- Hamilton-Barrett Prize, 2006
- JLS Allan Memorial Prize, 2004

### Abstract: "Nature Inspired Strategies for the Design of Next Generation Smart Materials"

The Besenius laboratory develops biomimetic – nature inspired – concepts to produce dynamic materials in water. These are based on the spontaneous or guided arrangement of molecular building blocks into polymeric supramolecular structures (Figure 1). The components are able to self-assemble to form nanoscale particles and are used in the development of adaptive materials and biomedical carriers. For example, by attaching disease-specific antigens and immune stimulators, we produce tailor-made fully synthetic vaccines that are evaluated in collaboration with collaboration partners in the Immunology department and University Medical Center. In my lecture, I will discuss our strategy to develop a modular synthetic vaccine platform, which aims to overcome the problems of poor stability and short shelf life of current generation of glycoconjugate vaccines. I will further present my groups efforts in the development of thermoresponsive hydrogels, which operate in a biomedically relevant temperature range of 30 - 40 °C. These are able to mimic key properties of natural proteins of the extracellular matrix, and will be explored in bioprinting and tissue engineering applications.



**Figure 1.** Smart supramolecular materials mediated by adaptive building blocks.

## SESSION 3. EU REGULATIONS AND ETHICS FOR INDUSTRY 4.0 vs. DIGITALIZATION



### **Iris GOLDNER LANG (Chair)**

Jean Monnet professor of European Union law and holder of the UNESCO Chair on Free Movement of People, Migration and Inter-Cultural Dialogue, Faculty of Law, University of Zagreb

Iris Goldner Lang, LL.M. (LSE), Ph.D. (Zagreb), is a Jean Monnet professor and the holder of the UNESCO Chair on Free Movement of People, Migration and Inter-Cultural Dialogue at the University of Zagreb – Faculty of Law. She works at the Department of European Public Law, which she chaired from 2013 until 2015.

She was a John Harvey Gregory Visiting Professor of Law and World Organization and a Fulbright Visiting Researcher at Harvard Law School in 2015/16. She visited Harvard Law School again, as a Visiting Researcher, in June/July 2017, when she held a series of lectures at Harvard Law School Immigration and Refugee Clinic. In June/July 2018, she was a Visiting Academic at University College London (UCL). She has held a number of visiting lectures (Harvard, Boston University, Temple University, LSE, University of Stockholm, University of Vienna, University of Lisbon, Court of Justice of the EU, European Parliament, Vrije Universiteit Brussels, Alpbach Forum Summer School, etc.). As a British Government Chevening Scholar, she earned her LL.M. degree at the London School of Economics. She did part of her doctoral research at the LSE and as an Ernst-Mach Scholar at the Johannes Kepler University in Linz.

Prof. Goldner Lang is one of the academic coordinators of the Jean Monnet Centre of Excellence "EU's Global Leadership in the Rule of Law". "She has been the leader of two Jean Monnet Modules "EU Migration Law and Policy" and "EU Internal Market Law", which she regularly teaches at the University of Zagreb. She is the president of the Croatian Society for European Law (FIDE branch) and the Croatian representative in the Odysseus Monnet Network for Immigration and Asylum. She is the Editor-In-Chief of the Croatian Yearbook of European Law and Policy. She is the editor of three books and the author of a number of articles, chapters in books and a book entitled From Association to Accession: How Free is the Free Movement of Persons in the EU?.



### **Tamara ČAPETA (Speaker)**

Professor of European Public Law and Coordinator of the Jean Monnet Centre of Excellence, Faculty of Law, University of Zagreb

Prof. Dr. Tamara Čapeta is Jean Monnet Professor at the Faculty of Law of the University of Zagreb. She has earned her Ph.D. degree from the Faculty of Law in Zagreb in 2001, and her LL.M. degree from the College of Europe, Bruges in 1993. She was Fulbright visiting scholar at the University of Michigan Law School, and taught at different American (Pittsburgh, Cornell, Michigan) European (Sheffield, Linz), and Chinese Universities (China University of Political Science and Law - CUPL). She has spent a year as the Head of Unit at the Court of Justice of the EU. She is currently Head of the Department for EU public law and the postgraduate studies in EU law at the Faculty of Law in Zagreb and coordinator of the Jean Monnet Centre of Excellence.

Tamara Čapeta has authored or co-authored seven books and published numerous articles. Many of her publications focused on the role of courts in the EU legal order. She has participated in education of generations of students and judges in interpretation and argumentation of EU law in courts. Her research interests are the functioning of the judicial system in the EU, theories of adjudication in the EU and legitimacy of judicial decision-making as well as constitutional aspects of European integration. Since recently, she developed and interest in the field of AI and law, especially of the question of the employability of AI in judicial process.

### Abstract: "Who's Afraid of Smart Machines?"

New technologies, especially artificial intelligence, promise, on the one hand, a better future for humanity, and on the other, raise fears, of their unethical abuse. There is nothing new in the hopes and fears of new technologies in relation to previous technological advancement, except for the level of complexity the AI rises, as well as the possibility that for the first time, humans might create intelligence greater than theirs and possibly uncontrollable by them. It is, therefore, clear, why different societies have engaged in regulating the emergence of artificial intelligence. In my address, I will look into the EU approach to AI by assessing in which way the EU policies are being developed. Out of the way how Europeans see the promise and threat of smart machines, I will try to extrapolate the messages for academia and support the cause for real interdisciplinarity in both research and teaching at the University level.



#### Mirjana PEJIĆ BACH (Speaker)

Full Professor, Faculty of Economics and Business, University of Zagreb

Mirjana Pejić Bach is a Full Professor at the Department of Informatics at the Faculty of Economics & Business. She graduated at the Faculty of Economics & Business – Zagreb, where she also received her PhD degree in Business, submitting a thesis on "System Dynamics Applications in Business Modelling" in 2003. She is the recipient of the Emerald Literati Network Awards for Excellence 2013 for the paper Influence of strategic approach to BPM on financial and non-financial performance published in Baltic Journal of Management.

Mirjana was also educated at MIT Sloan School of Management in the field of System Dynamics Modelling, and at OliviaGroup in the field of data mining.

She participates in a number of EU FP7 projects and is an Expert for Horizon 2020. Mirjana Pejić Bach is editor in chief of two journals, and serves as the Associate editor and member of Editorial Board in several other journals, in the field of Information and Management, as well as conferences.

### Abstract: "Social Responsibility and Ethical Issues about Smart Technology Usage"

Smart technology has become pervasive and abundant, and it has become evident that it impacts various aspects of human well-being. In order to assure the economic, societal and environmental sustainability, ethical principles need to be implemented in relation to smart technology. Diamandis and Bouras (2018) in their paper „Hubris and science" indicate that „Responsible leaders, including acclaimed scientists, should exercise greater humility to the complexity and inherent uncertainty of their activities and strive to seek out and challenge hubristic behaviors." This humility should take into account the economic, societal and environmental sustainability as one of the most important aspects of smart technology research. In order to explore the current role of ethics in smart technology research, the literature review has been conducted, with the goal to reveal the time trend, the main financing institutions, and the main topics, using bibliometrics and text mining analysis. Research results indicate that various and scattered efforts have been conducted in relation to smart technologies' ethics, which indicates the need for a coordinated and unified approach.



#### Isaac PANTE (Speaker)

Senior Lecturer in Digital Culture and Digital Publishing, Language and Information Sciences Department, Faculty of Arts, University of Lausanne

Isaac Pante is Senior Lecturer in Digital Culture and Digital Publishing in the Language and Information Sciences Department (Faculty of Arts, UNIL) which he presided from 2016 to 2018. Writer and programmer, member of several committees devoted to digital education, he promotes disciplinary hybridization and contributes to the digital empowerment of HSS students. Since April 2019, he is Scientific Adviser on Digital Transition for the UNIL Rectorate.

As such, he regularly collaborates with local Swiss political authorities to create interinstitutional partnerships in digital education.

**Abstract: "Heritage Safeguarding: an area for fruitful partnerships between Humanities and Industry"**

The rise of computing power and the increased availability of digital data have paved the way for a new technological positivism. According to this view, it should soon be possible to take advantage of algorithms to get rid of concepts and methods crafted by humanities and social sciences.

On the contrary, this talk demonstrates that HSS can be the key players of fruitful partnerships between universities and major industries. We will see how and why the "Collart-Palmyre" project, dedicated to the digitization and subsequent 3D reconstruction of Syrian cultural heritage elements, provides a fine and successful case study of those new ethical, cultural and economic challenges.



**José Júlio ALFERES (Speaker)**

Pro-Rector for Digital Transformation, Universidade NOVA de Lisboa

José Júlio Alferes is Pro-Rector for Digital Transformation of NOVA University, Lisbon. He has joined NOVA's Faculty of Sciences and Technology as Associate Professor in 2000, having become Full Professor of Computer Science in 2010. At NOVA, he has served as coordinator of the Informatics Engineering programme (2005-2007), coordinator of the European MSc in Computational Logics (2008-2009), head of the Computer Science Department (2009-2011), director of the research centre CENTRIA - Centre for Artificial Intelligence (2012-2013), and vice-dean of the Faculty of Sciences and Technology (2011-2018).

He has a PhD in Computer Science - Artificial Intelligence (1993) and has mostly focused his research work in this scientific area, where he has published over 100 papers in journal and scientific conferences including in venues such as Artificial Intelligence, ACM Transactions on Computational Logic, Theoretical Computer Science, Int. Joint Conf. on Artificial Intelligence, Int. Semantic Web Conf., etc.

José Júlio Alferes is, since 2012, Fellow of the European Society for Artificial Intelligence - EurAI.

**Abstract: "Artificial Intelligence and ethical problems"**

Artificial Intelligence (AI) is arguably one of the most ambitious scientific and technological projects of humanity. It aims at building systems that display intelligent behaviour and are capable of learning. An AI system is given complex goals and decides and acts, possibly autonomously, in the physical and/or digital world by perceiving its environment, by learning about it and by reasoning over the learnt knowledge.

Though this scientific project already started over half a century ago, only in recent years we have witness a clear impact of AI in the economy and the society as a whole. This increasing impact is mostly due to the huge increase in the data available for AI systems (the fuel of AI), and in the cheap computational power available for processing this data (the engine of AI).

Even without considering somewhat futuristic general AI systems replicating human intelligence, AI applications of today already hold the potential to greatly improve society, e.g. by improving the accuracy of medical diagnosis and intervention, or the safety of travel with autonomous vehicles, or by facilitating the communication among humans with the help of machine translation. But this great potential comes with great risks that raise several ethical issues. To start, AI systems of today use the available data and its current human-made classification. By learning based on this data and classification, AI systems may be encoding existing unethical bias and, by acting based on what it learns, may unwilling magnify unethical human biases.

Moreover, the existence of AI systems requires that we expand the scope of how we think of ethics. Besides dealing with the behaviour of humans, ethics must start to deal with the behaviour of human-designed artefacts, as these are also capable of making their own decisions, based on their own perceptions. We may need to come up with an ethics for machines, besides the ethics for humans - and we may also need ethics for the interaction of humans and machines.

Finally, the impact that AI systems foreseeably have in the society, in the way it is organised, in the role of humans in the society, in the job market, raises new ethical issues and challenges in ensuring equality of opportunity and inclusiveness.

In this presentation, we will go through several of these ethical issues raised by AI, with concrete examples of existing problems, and discuss the role Universities should play in the development of a Humane Trustworthy AI that enhances human capabilities and empowers individuals and the society as a whole to develop systems, with ethical principles, that extend rather than replace human intelligence.