

# Proverbial Opinions of Selected Experts: From Past Experiences to Future Directions

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**Abstract:** *This article is an opinion article on topics of importance for various aspects of research and development in science, engineering, social studies, and humanities. It is meant to consist of a number of contributions of proverbial nature, short in wording, so the expert opinions of the contributors are easier to be remembered by future scientists or practitioners in the related fields.*

**Index Terms:** *Science, Engineering, Health, Social studies, Humanities*

## 1. INTRODUCTION

The IPSI Transactions on Advanced Research is a journal with a tradition of publishing opinion articles on different aspects of science and engineering. Previous articles of that sort include ten different contributions from Nobel Laureates, as well as the contributions of the highest-reputation experts in fields not covered by Nobel Prize. The rationale behind such an editing policy is to create a database of heritage items of interest for young professionals in generations to follow.

This article is focused around proverbial opinions of selected researchers in Science, Engineering, Health, Social studies, and Humanities. The stress is on social responsibility, aesthetics, art, and vision. It follows the recommendations of [Bankovic2020] and focuses on creativity behind the expert opinions, as elaborated in [Blagojevic2017]. Each contribution was intentionally requested to be short (from about 100 to about 400 words), so that the contributions, over the time to follow, could generate a proverbial value for interested readers.

The contributors were selected from Europe, Asia, Canada, and the USA. Most of them are members of Academia Europaea, with affiliations and/or origins in Serbia or Montenegro, or are members of the Board of Academia Europaea who visited Serbia and/or Montenegro in 2019 and 2020, to hold there their Strategy Development Meetings and to attend related conferences. Some of the contributors are young researchers who share the values of Academia Europaea, and have presented their research results at recent meetings in South East Europe, that were organized in order to promote the values of Academia Europaea (The MECO 2019 and 2020 and the IPSI 2019 and 2020 conferences, both in Budva, Montenegro). The co-authors are listed in the alphabetical order.

The entire structure of the article was set to satisfy the two types of wishes that some of the contributing authors had expressed:

A. To create a contribution of a strictly "proverbial" nature, meaning short messages, that stick into the memory of readers and act from there in a way which is similar to how proverbs act in our lives.

B. To create an article of an "elaborative" proverbial nature meaning longer messages, with elements of a scientific methodology, which acts in our brains in a way similar to how scientific articles act.

These two formats of expression could be described as follows:

A. The word count of 100 was set as a minimum, and some of the authors have decided to stick to that number, in a short one-paragraph contribution, without references, to generate a proverbial message, which is easier to be remembered by interested readers. Of course, if one liked to add up to 4 references into the 100-word proverbial contribution - that was considered fine as well (as it could help the reader to get more insight).

B. If a more elaborated opinion or advice was preferred, to have a touch of a scientific article, one was more than welcome to expand to the maximum of about 400 words, organized in as many paragraphs as wished. In this later case, also up to 4 references could be added. All references have been requested to be written Harvard style, and listed at the end of the entire article in the alphabetical order. Of course, it is clear who contributed what reference to the final list, by comparing the references in the final list and those in the paragraphs written.

The Editorial Board is thankful to all contributing authors for finding time in their busy schedule to join this effort for which the Editorial Board strongly believes, will be of interest to a wider audience of younger researchers.

## **2. OPINIONS DRIVEN BY EXPERIENCES**

Our education sets initial foundations for our research. Our research experiences set foundations for our opinions. Our opinions set grounds for our future research. Our past research forms our beliefs about the directions for future educational missions related to generations yet to come.

### **2. 1. Science**

**Alexei Verkhatsky,**  
**The University of Manchester and Academia Europaea, UK**

**How to cure the disturbed brain: The renaissance of neuroglial research promises new therapeutic strategies?** Despite tremendous progress of medicine in the last 100 years, there are no curative remedies for diseases of the brain, especially diseases of cognition such as neuropsychiatric and neurodegenerative disorders; contemporary medication at its best alleviates symptoms but does not halt the pathological process. How to cure the troubled brain? Without doubt this is the main challenge to the medical research and clinical practice in the 21 century. The common and prevailing set of neurological thoughts considers neurones as the primary substrate of pathological progression; consequently, pharmacology developed drugs targeting neurones.

Recent decades however witness a dramatic change of this "neurone-centric" concept. Since the early days of brain research prominent neuropathologists such as Rudolf Virchow, Santiago Ramón y Cajal, Alois Alzheimer or Pio Del Rio Hortega regarded the homeostatic cells of the brain, the neuroglia as the main component of neuropathological evolution. Neuroglial cells maintain brain homeostasis and brain connectivity; they also provide defence to the nervous tissue. Consequently, malfunction, pathological remodelling or atrophy of neuroglia underlies many, if not all, neurological disorders including genetic (e.g. Alexander disease, which is a primary sporadic astrogliaopathy), environmentally caused (e.g. heavy metal encephalopathies, hepatic encephalopathies or neuroinfections), neurodevelopmental (e.g. different forms of autistic spectrum disorder), neuropsychiatric (various forms of depression, bipolar syndromes and schizophrenia) and neurodegenerative (e.g. amyotrophic lateral sclerosis, Alzheimer's and Huntington's diseases).

Targeting neuroglia may hopefully be the critical step in developing new therapeutic strategies that can arrest and reverse pathological disturbances of the brain.

**Borko Furht**  
**Florida Atlantic University, Boca Raton, Florida, USA and Academia Europaea, London, UK**

**Can one be at the same time a successful researcher, academician, administrator, and businessman in the field of computer science?** Usually not! Successful researchers are typically lousy administrators. Successful academicians and administrators are usually not good businessmen. I also witnessed that university administrations turn into successful researchers rather than researchers turn to rich businessmen.

However, there are exceptions. One is Dr. John Hennessy and this is a story about him. He is my idol and should be an idol for all computer scientists. I met John in mid 1980s at a computer architecture conference; this was the field of research of both of us. He is six years younger than me. We were both young associate professors, he at Stanford University, and I at University of Miami. We were briefly introduced and I have never met him again; however, I closely followed his career. I remember him as a young, blond, baby-face, very pleasant person. It will take many pages to describe John's contributions, so I will briefly mention a few.

As researcher, he, jointly with David Patterson from Berkeley, invented RISC processor that revolutionized computing and had a great impact on the microprocessor industry. He co-authored two books, which were used for more than twenty years at many universities as textbooks in the field of computer architecture. In 1984, he co-founded a successful company MIPS Computing Systems, which was later acquired by Silicon Graphics. As a university administrator, he was appointed as the Chair of the Electrical Engineering and Computer Science at Stanford, then as the Dean of School of Engineering, University Provost, and from 2000 to 2016 as the President of Stanford.

He received many awards including the 2012 IEEE Medal of Honor and the 2017 ACM Turing Award. He is a member of the National Academy of Science, the Royal Academy of Engineering and several other academies. Presently John is the Chair of Board of Directors of Alphabet Inc. (Google), and on the board of several other high-tech companies. He is considered as "The Godfather of Silicon Valley!" In summary, John proved that a computer-scientist can be a successful researcher, academician, administrator, businessman, and much more!

**Berislav Zloković,**  
**University of Southern California, Los Angeles, USA and Academia Europaea, London, UK**

**Challenges of the Alzheimer's disease research.** The field of Alzheimer's disease pathogenesis and treatment has begun focusing on understanding the role of innate immune system and vascular system in cognitive impairment and dementia besides classical amyloid-beta peptide (A $\beta$ ) and tau pathways. Particularly, recent studies from our group in the living human brain and animal models have shown that blood-brain barrier breakdown is an early biomarker of human cognitive dysfunction and leads to neuronal dysfunction in both synapses and nerve cells preceding neurodegenerative changes. Future studies should include measures on brain vascular functions in individuals at risk for Alzheimer's. Healthy blood vessels are needed for healthy brain!

**Eva Kondorosi,**  
**University of Szeged, Hungary and Academia Europaea, London, UK**

**Alleviating the global nitrogen crisis.** Explosion of the human population is largely due to the use of nitrogen fertilizers and antibiotics, which increased the agricultural productivity and saved lives of millions, respectively. However, the nitrogen fertilizers polluted the environment and microbes developed antimicrobial resistance. For the human population growth, more food is required by a sustainable, eco-friendly agriculture and new antibiotics capable of killing the antibiotic resistant microbes. Biological nitrogen fixation in rhizobium-legume symbiosis does not harm the environment and provides powerful plant antimicrobial agents. This process is of fundamental importance to alleviating the global nitrogen crisis and plant-based antibiotics might save many lives.

**Fedor Mesinger,**  
**Serbian Academy of Sciences and Arts, Belgrade and Academia Europaea, London, UK**

**The accuracy of atmospheric models.** The atmosphere being chaotic and impacted by several interacting systems, demonstrating increased forecasting skill of models is a challenge. We address this by driving a limited area model (LAM) using initial and lateral boundary conditions of ensemble members of the European Centre for Medium-Range Weather Forecasts (EC) global model. Our objective is to test impact of numerical representation of topography different from that used in major global models. In situation of an upper tropospheric system crossing Rocky Mountains, in the range of 2 to 10 days, our Eta LAM shows jet stream level wind accuracy improved compared to its EC driver members, to the extent that at least ones, according to each of the several accuracy measures we use, all 21 Eta members had jet stream level winds more accurate than their EC driver members [Mesinger2017].

Running the same experiment, but with the Eta code switched to use traditional terrain-following coordinate “sigma,” this advantage of the Eta is considerably reduced, pointing to the treatment of topography as a major reason for the accuracy of the Eta. But even so, the Eta/sigma mostly does better than the EC, which is generally considered the most accurate among major global atmospheric models. In addition to the verifications using a number of skill scores, these results are supported also by standard synoptic-type plots, and candidate reasons for the advantage of the Eta/sigma over the EC are suggested [Mesinger2018, Veljovic2019]. Overall, tests referred to offer encouragement for additional progress in the accuracy of atmospheric models, additional to that generally expected from an increase in computing power.

**Gordana Vunjak-Novaković,**  
**Columbia University, New York, USA, US Academies of Arts & Sciences, Engineering, and Medicine; Serbian Academy of Arts and Sciences; Academia Europaea, London, UK**

**Tissue engineering.** Tissue engineering was established only 30 years ago, with a goal to prolong life and improve its quality by providing biological substitutes for our failing organs. The concept is remarkably simple: we are enabling the cells to regenerate tissues, *ex vivo* and in the body, by using bioengineering tools [Ronaldson-Bouchard2018a]. The field is increasingly successful in the implementation of patient-tailored approaches, through the use of patient’s cells and the ability to reproduce anatomically correct tissues. Two major advances in recent years are the bioengineering of whole organs (with the lung as a notable example, [Dorrello2017]) and predictive modeling of human disease and effects of drugs, using “organs on a chip” where micro-sized human tissues engineered from the patient’s cells are connected by vascular flow into functional physiological units [Ronaldson-Bouchard2018b, Marturano-Kruik2018].

**Ivan Božović,**  
**Brookhaven National Laboratory and Yale University, USA and Academia Europaea, London, UK**

**Superconductivity in the next decade.** My main research field is superconductivity. Within the next decade, I expect the following breakthroughs: (A) The mechanism of high-temperature superconductivity (HTS) in cuprates - one of the central open problems in contemporary physics - will be unraveled. (B) This new insight will trigger discovery of new HTS materials. For the first time, superconductivity will be observed at room temperature. (C) Major advances will be made in superconducting electronics. Viable technology will emerge to fabricate large circuits of Josephson junctions and SQUIDs. (E) Quantum computers based on superconducting qubits will solve various problems intractable by any classical supercomputers. (F) Artificial Intelligence will be used routinely and pervasively.

**Paolo Papale,**  
**Istituto Nazionale di Geofisica e Vulcanologia, Pisa, Italy and Academia Europaea, London, UK**

**On relationships between pre-eruptive observations and measurements, and eruption impacts.** Understanding the behaviour of systems as complex as the Earth system is an incredibly challenging endeavour, and one that forces us to severely question the same nature of the world around us. As natural scientists, we have learned a lot on forces and dynamics. Science giants in the 18th and 19th century have placed the fundamentals of the deterministic approach that led us to the moon and next, likely, to the planets. Although exceptions emerged when the observations were brought to their limits [Michelson1903], in late 19th century it was generally accepted that the fundamentals of nature had been disclosed, and that any system, no matter how complex, could be exactly described by a bunch of equations embedding the laws of Nature. That attitude largely continues today, in spite of new revolutions that have revealed a world much more complex and less intuitive than imagined only 150 years ago.

We now know that our reality at its smallest scales is fundamentally uncertain [Heisenberg1927]; similarly, we know that uncertainties are a fundamental component of many natural systems, and they cannot be eliminated in practice (chaos) and often not even in theory (randomness). Uncertainties dominate our daily life (e.g., we are uncertain about whether our boss will give us that salary increase, whether our partner will still love us in ten years, etc.), but fully recognizing that science itself, which laymen regard as a world of certainty and determinism, can be inherently uncertain, is a step that even scientists sometimes struggle to take. When dealing with highly non-linear processes governing the Earth system or parts of it (like the atmosphere, the volcanoes, etc.), treating uncertainties is a substantial element of scientific understanding.

The deterministic approach is fundamental to disclose the relationships between physical quantities and understand the system dynamics and its possible evolutions, but a growing number of methods and techniques allow us to best exploit deterministic science within a probabilistic framework, as well as to approach complex problems with a pure probabilistic approach. In volcano science, recent discoveries [Papale2018] suggest that deterministic predictions about the size of an impending eruption may be unrealistic, possibly explaining why to-date we still lack generally accepted, robust relationships between pre-eruptive observations and measurements, and eruption impacts.

**Sierd Cloetingh,**  
**University of Utrecht, Netherlands and Academia Europaea, London, UK**

**The mission of TOPO-EUROPE.** Linking different spatial and temporal scales in coupled deep Earth and surface processes is a prime objective integrated solid Earth science. The research approach of TOPO-EUROPE integrates active collection of new data, reconstruction of the geological record and numerical and analog modeling. The results of the program focus on closely interrelated topics: Deep Earth, lithospheric structure, mantle-lithosphere interactions and sedimentary basins and georesources.

Quantitative understanding of topographic evolution in space and time requires study of processes from the upper mantle through the lithosphere and crust and acting on the Earth's surface. Results demonstrate the opportunities for further understanding of topography through integrated studies of the full Earth system across space and timescales.

**Vaso Antunović,**  
**Montenegrin Academy of Sciences and Arts, Podgorica, Montenegro**

**About a possibility to decrease morbidity and mortality.** The development of the non-invasive diagnostic procedures like MRI and CT angiography enables revealing nonruptured aneurysms of cerebral blood vessels. A consequence of this fact is the possibility of screening the population with a higher risk of presence of these malformations, including the appearance of the polycystic kidney disease. On the other hand, the diagnosis could be made collaterally also for patients sent to MRI or CT for other reasons. Because of this, surgical or endovascular treatment could be performed before the potentially catastrophic rupture, resulting in a decrease of morbidity and mortality of such a serious clinical entity.

## ***2.2 Engineering***

**Aleksandar Kavčić,**  
**Carnegie Mellon University, Pittsburg, Pennsylvania, USA**

**The next 20 years of data-science development should be watched carefully.** By and large, the way we use data is dictated by the way we store them. For example, when Johannes Gutenberg invented the printing press (i.e., when he figured out how to efficiently and safely store data in books), mankind was set on a revolutionary path of massive data and knowledge distribution. Similarly, when IBM addressed the data storage issue on a personal computer (PC) by incorporating an internal disk drive (hard disk), the PC finally gained mass popularity in the 1980s.

Today, to use data in ever-popular hand-held devices, we go through the "cloud", a collection of magnetic disk drives held in distributed and remote locations. Most of the research today revolves around methods and devices that efficiently move data to and from the cloud. But our data usage will inevitably undergo an evolution. Or perhaps even a revolution? There is certainly a need to store more data on the hand-held devices themselves. Presently, electronic flash memories seem to be the technology of choice in various smart phones and tablets, and it may happen that flash memories retain that status as they evolve to hold ever more data. However, if a revolutionary technology emerges that allows us to store entire libraries in small hand-held devices, we are bound to experience another data revolution. The next 20 years will be exciting to watch.

**Dejan Mirčevski,**  
**Toronto, Ontario, Canada**

**Living in the age of unreliable software.** Few would dispute that we live in an age of unreliable software. Bugs, glitches, exploits, and meltdowns regularly affect our experience with software. The fundamental

cause of this unreliability is economic: Making software reliable is often costly (in developers' time, hardware resources, schedule predictability, etc.), while its benefits (in additional vendor revenue) are modest in many markets. In other words, software unreliability comes as an economic advantage to many software vendors today.

Software companies tend to win by adding features quickly, not by improving existing code. The result is shoddy software we all know too well. If, however, this economic equation can be changed -- if the cost of making software reliable could be drastically reduced, then unreliability will turn from an economic advantage to an economic disadvantage. This will alter the market forces shaping the software business, and the age of unreliable software will inevitably come to an end. If we make it cheap to build reliable software, all software will eventually be reliable.

**Milena Djukanović,  
University of Montenegro, Podgorica**

**The ACT in Montenegro in the following decade.** History remembers walking and using animals for transportation, as well as 19th century discoveries with fuel-based machines that lead us to self-driven vehicles nowadays. There are significant benefits from exploiting Autonomous and Connected Transport (ACT) which represents one of the most interesting innovations of 21st century. The primary benefits of ACT are transport costs and CO2 reductions, as well as road safety. Europe has a key role in the development of relevant technology for future mobility vehicles and our task is to provide answers where Montenegro stands with these new transport trends. Through scientific and administrative engagement at a local, national, and international level, we hope to live the wider impact of ACT in Montenegro in the following decade.

**Miodrag J. Mihaljević,  
MISANU, Belgrade, Serbia, University of Tokyo, Japan, and Academia Europaea, London, UK**

**Challenges of Cyber Security and Privacy.** Cyber security and privacy have been well recognized as the issues of top priority in order that all the benefits of cyber space would not be compromised by a lot of possible malicious actions. On the other hand, widespread employment of the mechanisms for cyber security and privacy imply significant cumulative overheads regarding implementation complexity, energy consumption, and the overall expenses. Consequently, an open challenge, which significance grows in time, is to minimize the overheads: Accordingly, one of the top priorities is development of the so-called lightweight components for cyber security and privacy mechanisms. These components are substantially based on cryptography, and so we face the challenges of developing lightweight and, at the same time, highly secure cryptographic primitives, which is far from an easy challenge. One interesting approach for enhancing security of the lightweight cryptographic primitives is to combine approaches of the traditional cryptology with the ones from the coding and information theory (as an illustration, see [Mihaljevic2019b] [Mihaljevic2019a] [Oggier2014] [Mihaljevic2009], for example). New technologies employed in cyber space, like the blockchain technology, also require lightweight and secure cryptographic components and open additional challenges regarding minimization of the overheads.

**Oskar Mencer,  
Maxeler Technologies, Imperial College, and Academia Europaea, London, Great Britain**

**About possible and impossible.** Early on, my interest was always in differentiation. Rather than worry about experience which I would get anyway, I was focused on retaining the untainted reasoning of a fully developed brain without the pollution of individual experience. Even today, when faced with hard questions, I ask myself how my 15-year-old self would analyze and respond to the challenge. Of course, I now also know many of the shortcomings of my past self, but I also remember the shortcomings I observed of people with particular experiences. In this way, with advice from myself with and without experiences, I usually get a much better picture. To succeed does not have to mean to accomplish a goal, but rather to do the best one can, and summoning one's thoughts from different parts of one's life, can lead to a much richer understanding of a problem, beyond the confines of experience.

Remember that some of the greatest things were invented by people who did not know that something is impossible. Let us remember Arthur C. Clark: "When a distinguished, but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong."

**Roberto Giorgi,  
University of Siena, Italy**

**The DF-Threads: Let new blood flow through your computer.** Data Flow Threads (DF-Threads) is both an execution paradigm and a low-level programming model, which permits a strong segmentation and isolation of portions of a program so that the communication is reduced to what is just necessary for other DF-Threads to perform their activity. Dataflow techniques have been explored successfully for the execution engine of the superscalar processor or at a coarser level, such as in the OmpSs/StarSs programming model (now converging into the next OpenMP). However, a proper hardware-software interface to support the parallelization of threads is yet to be defined: current proposals create too much communication or a continuous push-pull of data to/from memory and excessive synchronization. Moreover, the need of maintaining consistency and coherency of shared data typically prevents applications to scale up efficiently.

In the context of the AXIOM and TERAFLUX projects, DF-threads have been proposed as a possible solution to overcome the above limitations of current systems [Theodoropoulos2017]. The interesting concept is to imagine that thread-data could act like the blood in the human body, by carrying out a portion of information each and at the same time being able to move around where it is necessary. The thread-code could be launched in all the computational units of the system without code migration. However, the data is the information that is processed and should be able to move around asynchronously in the system and sent exactly once, where it is needed [Verdoscia2014]. The data movement could be orchestrated by existing hardware components such as DMA and schedulers [Giorgi2009a] [Giorgi2009b].

**Veljko Milutinović,  
Indiana University, Bloomington, USA and Academia Europaea, London, UK**

**Lessons learned from two R&D projects.** If I would be asked to share my most impressive professional experiences with junior researchers, I would stress the lessons learned from two different projects that I was involved with in the past: namely, the design of the world's first GaAs microprocessor for DARPA [Milutinovic1996], where I was helping the mission and vision of Wayne Moyers and Walter Helbig (in 1980's), and the design of the world's first MultiScale DataFlow SuperComputer for BigData DeepAnalytics of MAXELER [Milutinovic2015], where I was helping the mission and vision of Oskar Mencer and Michael Flynn (in 1990's).

The major lessons I have learned from these two projects are: (A) Do not take the well beaten paths of others; instead, create your own paths that would be better suited for the given moment, due to the fact that the conditions of the real environment keep changing, and what were the best paths before, may not be the best paths any more [c], which implies that you are fully aware of the possible changings in the environment around you, and (B) Do not get discouraged by big mouths that keep telling around that what you do in research (taking your own paths) makes no sense, because if each step of your research was well-thought ahead of time [Bankovic2020], based on deep professional knowledge (vertical), wide general education (horizontal), a focused look-ahead (perpendicular), and your own intuition (metadimension) - you will, most likely, win at the end (if you are living with healthy habits). So, do not forget that the inventivity has four dimensions: Vertical, Horizontal, Perpendicular, and Intuitive!

## **2.3 Social Studies**

**Luiz Moutinho,  
University of Suffolk, Great Britain**

**Paradigm shifts in artificial intelligence (AI) and marketing evolution (ME).** The AI in marketing means using data science, natural language processing (NLP), and predictive analysis. Software using AI has become an essential tool, concerning huge amounts of data the industry produces daily. Chatbots and virtual personal assistants are prime implemented examples.

The AI enables marketers to pull insights from structured and unstructured data, giving the brands power to produce mass personalization through more meaningful interactions with customers and make the right offer with the right product and content in real time ...

The AI contributes to all marketing areas, from communications to customers' targeting (the rule of inference, a common AI method, can be used in targeted acquisition of new customers) ... and brand management (intelligence-driven product catalogues, social network optimization, future-oriented decision-wheels, digital media use for higher brand reputation ...; main tools: signal weighting and entropy pooling) ...

The future of AI and robotics in marketing ...? Conversations are shaping as the next major human-computer interface, delivering the human context by understanding human needs, bias in data and in users, limitations of algorithms, evaluating ethics ... Algorithms that organizations use today do not account for individual human objectives and marketing professionals need to prepare for a new target audience: the personal digital twin (PDT) - a groundbreaking technology - a digital replica of physical assets (physical twin), processes, people, places, systems and devices that can be used for various purposes.

**Mirjana Radović Marković,**  
**The Institute of Economics, Belgrade, Serbia and Academia Europaea, London, UK**

**What kind of education do we need in the future?** “Learning by doing” is a non-traditional approach in which students are actively engaged in experiences that will reinforce lessons and teach skills that will have a lasting impact and, thus, help them become better learners. So, the question is how can creative education be maximised through new technology, including in-depth use of digital tools in the formal and informal training programs. It is necessary to clarify the most relevant skills for the future that are related to human interaction and personal development. And to reply to five main questions [Radovic2012]: (A) What is the meaning of creativity in learning? (B) What does freedom in learning mean to students? (C) What should be done to foster individuality in learning? (D) How can we encourage the entrepreneurial abilities of students through education? and (F) In what direction should educational strategies be developed?

Regarding the OECD Learning Framework 2030 [OECD2018], new vision and principles for the future of education systems are required at a global level. It is expected that the three most important challenges in the next decade will be environmental, economic, and social. Because of these three new challenges and cyber age, there is a call for a new kind of managing the organizational change and visions of future possibilities. At the same time, successfully managing diversity is increasingly recognized as an imperative for the contemporary business world [RadovicTomas2019]. According to Radović-Marković and Tomaš working in diverse backgrounds, managers must obtain a “global mindset.” In this context, global managers and business people should know that diversity not only involves how people perceive themselves, but how they observe others.

They might find themselves in foreign assignments; managing a workforce that differs in needs and attitude [Radovic2019]. The foreign assignments require a broad set of knowledge, skills, and values in action. In other words, the global managers need to be familiar with the following elements, which are interconnected to the culture: language, legal environment, social setup, material culture, educational system and values, economic and political environment. These elements educators should incorporate in new curricula. Within new curriculum potential managers and entrepreneurial should develop abilities through education by raising entrepreneurial intentions after graduation [RadovicZivanovic2019]. In short, students work on real-life problems that are relevant and connected to business environment.

**Ole H Petersen CBE FRS, Cardiff University, British Royal Society, and Academia Europaea, London, UK**

**The most famous are not always the best.** Vasily Grossman's „Life and Fate“ is a MUCH more profound work than Boris Pasternak's more famous 'Doctor Zhivago'. It is a scandal that Vasily Grossman is so relatively unknown. The world would be a better place if more people read Grossman. The musical world provides other examples: The pianist Emil Gilels was greater than Sviatoslav Richter, the violinist Leonid Kogan even better than the great David Oistrach and the Leningrad conductor Kurt Sanderling more incisive and precise than Yevgeny Mravinsky. It may be better here not to mention examples from the sciences, but there are plenty!



## **2.4 Humanities**

**Hermann Maurer,**  
**Graz University of Technology, Austria and Academia Europaea, London, UK**

**The mission of Austria Forum.** Most everybody believes that "new " is "good". I think this not true in general. Digitization and WWW are new, and bring many advantages. But I believe it is high time that we also write/hear about disadvantages: Facts on the WWW cannot be believed, since one also finds immediately the opposite view; how come apps are not standardized to some extent, so we don't have to learn a new interface with every app? Why do we allow anonymous negative comments about persons or institution! Those are three of dozens of examples. Who is the first to write a summary of all negative effects?

**Mladen Lazić,**  
**University of Belgrade, Serbia and Academia Europaea, London, UK**

**About changes in humanities and social sciences.** The collapse of socialism, followed by the "End of History" thesis, radically changed socioeconomic, political, and ideological surroundings of social sciences. Lost utopian perspective removed radical scientific critique as their developmental basis, reducing them to technical services of politics or, alternatively, to research of problems reducible to interpersonal relations (interpretative sociology). Crucial social problems, like growing economic inequalities, are relinquished to other sciences (economy, e.g.), while other problems with socioeconomic background are relegated to the "cultural sphere" (studies of horizontal "conflicts of civilizations" suppressed research of vertical class conflicts), potentially conducive to the loss of specific research field and methodology traditionally characterizing social sciences.

**Namik Delilović,**  
**Graz University of Technology, Austria**

**The mission of Austria Forum.** Austria-Forum is a digital library containing over 1.2 million objects which include documents, books (Web-Books), pictures, sounds, discussion and such. The content inside Austria-Forum is reviewed by professionals and experts, and part of the content is manually interlinked meaning for example, that the text inside a document can link to another document, Web-Book or similar multimedia object. Currently, we are interested in implementing AI and Machine Learning in the context of Natural Language Processing. Applying different supervised, unsupervised and semi-supervised machine learning models, we aim to improve, automate and accelerate interlinking which is currently done by our editors, thus providing all users with new and interesting suggestions based on their interest.

We firmly believe that future digital libraries will not consist of isolated books in which only the reference list at the end points to content outside of the book, but will instead be interlinked parts of books and other materials providing a full view of all relevant information concerning a particular topic; for example, one chapter of a book directly links to a corresponding chapter in another book [Maurer2019]. Attempts to interlink digital books have also been made before (e.g. using hyperlinks) but adapting the recent development in artificial intelligence, machine learning and natural language processing could revitalize these attempts and lead to new evolutionary innovations [Blagojevic2017].

**Nevena Daković,**  
**University of Arts, Belgrade, Serbia and Academia Europaea, London, UK**

**Are Humanities in decline?** Humanities are in decline, all over the world – having been underfinanced and downsized for a long time – at all levels and in all institutions (from the biggest universities to the smallest institutes). Once we step out of the "North-Atlantic space", one can speak about educational, scientific or theoretical imperialism in much the same way as Edward Said speaks about cultural imperialism: The one grounded in the unshaken dominance of Ivy League and Oxbridge universities, cutting edge research projects, ample international funds and leading journals, where reviews and publishing in general are all oriented towards the "North-Atlantic space" and English as its self-imposed lingua franca. As a group, they comprise a sort of a circle – not necessarily vicious – but still a circle within which the "rest of the West" and various "others" are present individually rather than being visible as their collective identities. In the nominally globalised world, strict hegemony and sharp polarisation persist.

However, within the field, the most important trend involves a twofold move. On the one side, clustering under the wide umbrella of Cultural Studies is clearly evident, while on the other - as some sort of counterbalance - are fragmentation and narrowing down, most obvious in the flourishing of truly interdisciplinary areas such as Media Archaeology, Memory Studies, Affect Studies, Trauma Studies, and many more. Variety of “turns” such as spatial, narrative, performative, and the latest one digital – sustaining the digital humanities – explain persuasively and vividly the developments of and within the humanities.

Nevertheless, in both serious and lamentable state of the union, there are a few examples of great joint research and networking efforts. In my experience, two closely related COST actions *Writing Urban Places. New Narratives of the European City* [CA18126-2018] and *Dynamics of placemaking and digitization in Europe's cities* [CA18204-2019] represent such inspiring, transdisciplinary projects that interlace areas such as urban, identity, memory, European digital and media studies, architecture, art history and narratology. On local level, the project of the pilot course *Digital Competencies for Cultural Memory and Audio-Visual Heritage, Faculty of Dramatic Arts, Belgrade* [DANEV2018] was a truly outstanding experience in every respect. The project was focused on the ‘digital turn’ as a function of ‘memory and educational turn’, and promoted multipurpose digital narrativisation and representation of cultural memory, digital archiving, collective identities with the help of the newly created digital educational tools.

**Selma Rizvić,**  
**University of Sarajevo, Bosnia and Herzegovina**

**The mission of Bosnia Forum.** Digital technologies offer enormous possibilities in cultural heritage preservation and presentation. Cultural monuments are being digitized and virtually reconstructed and Mixed Reality applications are being developed to take the users to the time travel in the past. Sarajevo Graphics Group (SGG) has been presenting cultural monuments of Bosnia and Herzegovina for last 15 years. They have established Sarajevo Charter for interactive digital storytelling to offer guidelines for developing virtual heritage applications with highest level of edutainment. We will describe the work on virtual presentation of BH cultural monuments using Virtual Reality, as well as SGG contribution in H2020 iMARECULTURE project in underwater cultural heritage presentation. The recent projects on intangible heritage and war heritage presentations, such as the Mostar Bridge Diving VR and Sarajevo War Tunnel VR will be also mentioned. Work in progress on AR applications for virtual cultural heritage will show the potential of Augmented Reality technology in cultural tourism. Finally, we will talk about The Bosnia forum web platform, as the repository off all digital content created by Sarajevo Graphics Group.

**Zoran Ognjanović,**  
**Mathematical Institute of The Serbian Academy of Sciences and Arts**

**The mission of Serbia Forum.** After an interesting lecture at the Institute, an acquaintance who is familiar with the activities in the digitization of national heritage in Serbia asked me how it happened that Mathematical Institute of the Serbian Academy of Sciences and Arts was involved in this field. He told me that he had talked to some people and that those inclined to math reconcilably commented that digitization was not exactly mathematics, while some of the others even argued that mathematics had nothing to do with digitization. When I thought about it, I laconically told him that at least some mathematicians had at least some inclination for history and art. Moreover, if we approached the problem analytically, we could also answer by asking: What is the name of the intellectual activity in which we consider some (abstract) objects, define their structures and structures of sets of such objects, operations and relations over them? To clarify: the objects I mentioned were models of data obtained either by translating analog to digital artefacts, or from artefacts natively created in digital format. In the continuation of our discussion, the acquaintance objected that this really resembles math, but that the main difference between mathematics and other sciences concerns proving, and that there were no proofs in digitization. Well, I said, people proved, for example, the correctness of various protocols and XML-schemas, ontologies used in digitization were actually examples of descriptive logics, etc. Somehow, this was the conclusion of our little discussion, after which we, according to the old custom, went to enjoy refreshment that awaited us.

After an interesting lecture at the Institute, an acquaintance who is familiar with the activities in the digitization of national heritage in Serbia asked me how it happened that Mathematical Institute of the Serbian Academy of Sciences and Arts was involved in this field. He told me that he had talked to some people and that those inclined to math reconcilably commented that digitization was not exactly mathematics, while some of the others even argued that mathematics had nothing to do with digitization. When I thought about it, I laconically told him that at least some mathematicians had at least some inclination for history and art. Moreover, if we approached the problem analytically, we could also answer by asking: What is the name of the intellectual activity in which we consider some (abstract) objects, define their structures and structures of sets of such objects, operations and relations over them? To clarify: the objects I mentioned were models of data obtained either by translating analog to digital artifacts, or from artefacts natively created in digital format. In the continuation of our discussion, the acquaintance objected that this really resembles math, but that the main difference between mathematics and other sciences concerns proving, and that there were no proofs in digitization. Well, I said, people proved, for example, the correctness of various protocols and XML-schemas, ontologies used in digitization were actually examples of descriptive logics, etc. Somehow, this was the conclusion of our little discussion, after which we, according to the old custom, went to enjoy refreshment that awaited us.

### **3. CONCLUSION**

The goal of this article is to bring together and to synergize the experts active in four different aspects of creativity (Science, Engineering, Social studies, Humanities).

This goal is a part of a wider mission of IPSI Transactions journals, to create a database of expert opinion articles on various research and development fields, and to create conditions for a symbiosis among contributing authors.

The mission of IPSI Transactions is a product of the vision that was created about two decades ago, aimed at generating a vector of journals that focus onto renaissance-type of multi-, inter-, and trans-disciplinary research in science and engineering, tangential to ICT.

The vision that led to the above described structure and contents of IPSI Transactions was created by Hiro Fujii of Japan, Martin Perl of the USA, Veljko Milutinovic of Serbia and Montenegro, and Erich Neuhold of Germany and Austria, who was responsible both for the vision behind and for providing the seed money from the German Fraunhofer IPSI Institute in Darmstadt, which enabled the entire vision to get materialized.

### **ACKNOWLEDGMENT**

This article was inspired by the mission, vision, goals, and heritage of Academia Europaea.

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