The 4th Rijeka Forum on Neurodegenerative Diseases: „Neurodegenerative Diseases and COVID-19 Pandemic“

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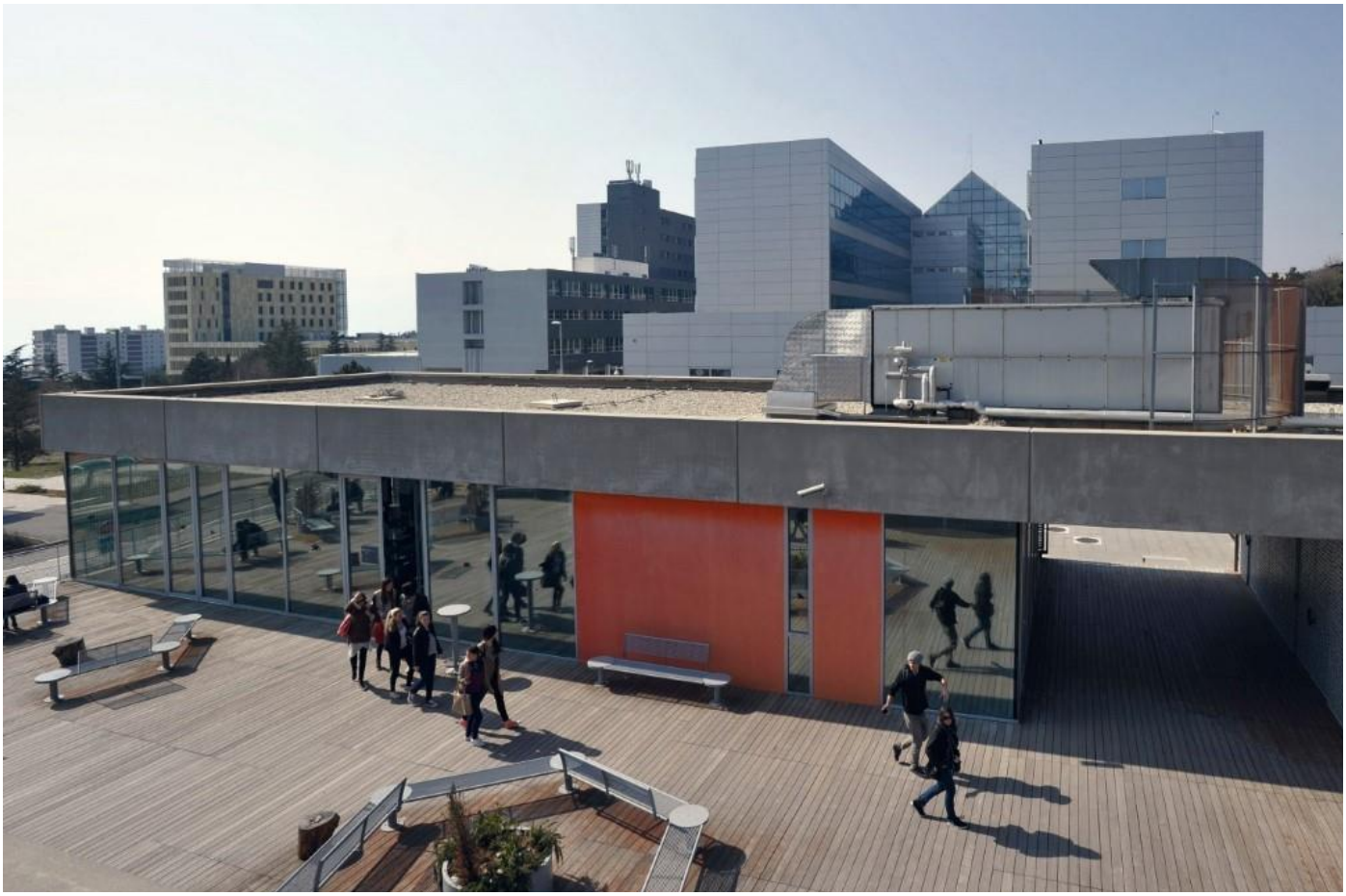
The traditional symposium 4th Rijeka Forum on Neurodegenerative Diseases titled “**Neurodegenerative Diseases and COVID-19 pandemic**” was held online on the 10th and 11th of December under the patronage of the Department of Biomedical Sciences in Rijeka of the Croatian Academy of Sciences and Arts, the Clinical Hospital Center Rijeka, the Medical Faculty of the University of Rijeka, the Croatian Neurological Society and the Rijeka branch of the Croatian Medical Association. The symposium has also gained a full endorsement by the European Academy of Neurology (EAN). It has proven that the Rijeka forums, now held annually, have become a tradition, and was not stopped by the current challenges we face from the pandemic of COVID-19. Moreover, the Program of the 4th Rijeka Forum attracted attention of participants from many countries.
This year thirteen lecturers from six countries, experts in the field of neurodegenerative diseases, delivered timely lectures focusing on the effect of COVID-19 pandemic on the neurodegenerative diseases, as well as some new findings in general regarding the diagnosis and biomarkers of neurodegenerative diseases. The symposium had free registration online and attracted a wide audience (more than 200 registered participants) from graduate and postgraduate students, to basic and clinical medicine scientists.

The symposium was opened with introductory talks of the president of the scientific committee, Daniel Rukavina, full member of Croatian Academy of Sciences and Arts and the Head of the Department of Biomedical Sciences in Rijeka of the Croatian Academy of Sciences and Arts and president of the organizing committee Vladimira Vuletić, Head of the Department of Neurology at the Faculty of Medicine Rijeka and Head of the Clinic of Neurology at the Clinical Hospital Center Rijeka. Furthermore, welcome addresses to all lecturers and participants were given by Zdravka Poljaković, President of the Croatian Neurological Society, Alen Ružić, Head of the Clinical Hospital Centre Rijeka and Goran Hauser, Dean of the Medical Faculty of the University of Rijeka.
The symposium was split into two main topics, first encompassed current knowledge we have about the effects of COVID-19 in neurodegenerative diseases. This was followed by the clinical experience and state of art on the 2nd day of the symposium. The opening lecture of the first topic was held by the esteemed professor Elena Moro, director of the Movement disorders unit at the University Hospital of Grenoble, who spoke about the neurological manifestations in patients with COVID-19. Although the most severe symptoms of SARS-CoV-2 virus (COVID-19) are respiratory and are the most important cause of death, neurological symptoms and more severe neurological disorders are frequent and present in all the stages of the infection. Nenad Bogdanović (Karolinska Institutet) following the broad discussion on various potential pathways of virus entry in nervous system concluded that it is a high possibility that SARS-CoV-2 infection could promote or enhance susceptibility to different forms of CNS changes that may lead to neurodegeneration as a long-term effect. Zvezdan Pirtošek (University Medical Centre, Ljubljana) gave very interesting historical talk comparing Spanish flu to COVID-19 from a neurologist perspective. The SARS-CoV-2 virus of the ongoing COVID-19 pandemics and the A/H1N1 influenza virus of the 1918–19 pandemics share several common properties but also some essential differences. Fundamental differences between the biology of both viruses and very different medical and technological settings make it hard to chart the future of COVID-19 based on what happened a hundred years ago. An update on current blood biomarkers for A/T/N pathophysiology in Alzheimer’s disease was given by Kaj Blennow (Gothenburg University). The lectures of the first day and main topic were finished by interesting talks of Maja Trošt (University Medical Centre Ljubljana), who spoke about the current knowledge about the effect of COVID-19 on Parkinson’s disease, and by Tomislav Babić (Neuroscience Franchise Worldwide Clinical Trials, London), who spoke about the management of clinical trials on neurodegenerative diseases in the COVID-19 pandemic.

The second day of the symposium was reserved for the lectures covering the clinical experience and state of the art regarding neurodegenerative diseases and COVID-19 pandemic. The opening lecture by John Hardy (UCL Institute of Neurology, London, UK) was very interesting showing the results of early genetic findings in covid disease analyses and postencephalitic
diseases. Robert Živadinov (Clinical Translational Science Institute, Buffalo, USA) covered the imaging biomarkers for disease progression in patients with multiple sclerosis. The influence of the COVID-19 pandemic on multiple sclerosis was the topic of the lecture by Mario Habek (University Hospital Centre Zagreb). Multiple disease-modifying therapies (DMT) have been approved for the treatment of relapsing-remitting form of MS (RRMS). However, any decision to initiate DMTs during the COVID-19 pandemic will need to be carefully made and will depend on the state of the COVID-19 pandemic. In doing so, care should be taken to take a proactive approach to MS treatment, focus on the person with MS at all stages of the disease in order to minimize the effects of the disease and maximize quality of life. Paolo Manganotti (Ospedali di Cattinara, Trieste) contributed with his lecture on peripheral neurological complications in the COVID-19 pandemic. Furthermore, Nataša Klepac (University Hospital Centre Zagreb) spoke about cognitive training in the COVID-19 pandemic time. To be effective, cognitive training programs must be intensive and prolonged over time. However, the current COVID-19 containment measures are hampering their implementation. Vladimira Vuletić held a lecture on the management

of deep brain stimulation patients in movement disorders during the COVID-19 pandemic. Deep brain stimulation (DBS) is a well-established, safe and effective treatment for the management of patients with advanced Parkinson's disease and other movement disorders. In the lecture Vladimira Vuletić gave an overview of challenging experiences on management of DBS implanted patients for movement disorders in COVID-19 pandemic time. At the end of the Program Slavica Kovačić (Clinical Hospital Center, Rijeka) spoke about the management of neuroimaging for movement disorders and dementia in the current pandemic. The symposium was finished by an interesting round table discussion moderated by Vladimira Vuletić.

Overall, the 4th Rijeka Forum on Neurodegenerative Diseases had very interesting and timely talks, which were valuable for all participants. Importantly, it presented as a great occasion for young students and researchers to discuss these important topics with the leading international experts in an online setting and opened the door for next Forums. The fifth Symposium will be held next year in a similar period, hopefully in Rijeka when the current pandemic subsides.



Covid-19 messages: on the pandemic from five perspectives

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The scientific community, alongside other social stakeholders, is currently centered on finding the solution for the global crisis caused by the COVID-19 coronavirus pandemic. Current research focuses primarily on biomedicine, healthcare, and the natural sciences, where scientists endeavor not only to understand the nature of the virus, and to develop a vaccine but to explore public healthcare's value and future role of in preventing disease and protecting citizens. No less mobilized are researchers in other branches of science. Experts in the social sciences are examining the social consequences of this global shock, especially concerning the field of education, which has undergone an unprecedented technological transformation. Comparable activities can be observed in the areas of legal, economic, and sociological scholarship, in political science, and in the humanities, which are now reflecting upon the threats, challenges, and opportunities linked with building the new world order. For experts in the technical sciences, this crisis has posed the critical questions of the future development of informational-communication technologies, artificial intelligence, and cybernetic security. Research in energetics and sustainable development is pushing new frontiers. Emergency communication in the world of social networks, and trust in experts, institutions, and leaders, have emerged as the most important of topics. It seems as if the absolute social shock that has struck the world requires new and exhaustive research that transcends strict disciplinary boundaries, and, more urgently than ever, demands a multi-disciplinary or inter-disciplinary approach, alongside intense global collaboration.

Inspired by these opinions and controversies, the University of Rijeka and the Academy Department of Biomedical Sciences in Rijeka decided to organize a cycle of five one-day international conferences under the common title **COVID-19 MESSAGES I–V,** which were held from September to November 2020. The conferences were held in a hybrid form, including onsite and online lectures, and the working language was English. The concept

Figure 1. Co-chairmen of the Program Committee of COVID-19 MESSAGES symposia Daniel Rukavina and Snježana Prijić Samaržija

of the program and profiles of the symposia were carefully discussed and prepared by the **Program committee**, consisting of Co-chairmen Snježana Prijić Smaržija and Daniel Rukavina and members Alen Ružić, Marta Žuvić, Senka Mačešić, Elvio Baccarini, and Tea Dimnjašević.

Each meeting was dedicated to scientific research from one of four different areas – biomedicine, education, technology, and social sciences and humanities – as well as students' perspective on the pandemic's consequences. Finally, following the end of the cycle, we prepared a document titled **COVID-19 UNIRI MESSAGES**, which contain our conclusions about the direction and importance of further scientific research and social agency. By publishing COVID-19 UNIRI MESSAGES we wish to contribute to the exchange of ideas that aims to make us more apt to tackle the COVID-19 pandemic, and to stress the University's and the whole academic community devotion to our public mission of social responsibility.

COVID-19 MESSAGES I

Advancement in Virology Research – an Opportunity to Improve the University of Rijeka's International Impact

In the Introduction, Daniel Rukavina (Scientific committee, president) pointed out that the epidemiological dynamics of COVID 19 are fascinating. In a brief period, it became a pandemic and spread all across the world. This rapid spread should be understood as an example of how fast any new type of virus of unknown characteristics (like SARS-Cov2) could travel in the future. Present scientific knowledge should prepare us to react immediately, not only epidemiologically but also by detecting their viral biology characteristics, finding their weak points, and working on vaccines. This potential could be of enormous value for the country and the University's future development and international recognition.

The symposium, organized by Stipan Jonjić from the Faculty of Medicine, attracted a broad audience of more than 330 registered participants, ranging from graduate and postgraduate students to basic and clinical medical scientists from across Croatia. Organizers devoted the first conference on virology as the University of Rijeka is home to Croatia's leading group of virologists and immunologists. This fact is of enormous value not only for responding to the present SARS-COV2 pandemic but particularly for future activities. The keynote speaker was Ivan Đikić, our prominent scientist working in Germany (Goethe University and Max-Planck Institute for Biophysics. Frankfurt) and a member of the University of Rijeka›s International council. Đikić, whose recent achievements in SARS-CoV-2 research are broadly recognized, presented results showing that papain-like protease regulates SARS–COV-2›s viral spread and innate immunity, and explained how a therapeutic targeting of COV-2 ‹s papain-like protease could suppress the infection and promote antiviral immunity. Stipan Jonjić presented the Faculty of Medicine›s recent scientific achievements and global impact regarding virology and viral immunology. These impressive results attracted considerable international recognition and opened a door for broad international collaboration. Bojan Polić from the Faculty of Medicine described their efforts to develop and build the Center for translational medical research (TransMedRi) as a prerequisite for virology and immunology›s successful development in Croatia. TransMedRi is conceived as a joint research institute shared by the University of Rijeka, the Faculty of Medicine, and the Clinical Hospital Center Rijeka. Its research will focus on mechanisms of surveilling dangerous pathogens (i.e., SARS-CoV-2) and developing vaccines, cancer immunotherapy, inflammation mechanisms, and the development of different immunotherapeutics. While Pero Lučin from the Faculty of Medicine explained the cellular physiology of viral infection, Igor Jurak from the Department of Biotechnology dis-

Figure 2. Daniel Rukavina, Snježana Prijić Samaržija, Ivan Đikić and Stipan Jonjić

Figure 3. Participants of the Meeting at the Lecture Hall in the Campus of the University of Rijeka

cussed his constituency›s emergency response to the COVID-19 pandemic. Also from the Faculty of Medicine, Tomislav Rukavina spoke about the epidemiological features of the SARS-CoV-2 infection, Vanda Juranić Lisnić presented their efforts on promptly transforming their research laboratory into a clinic in the early days of SARS-CoV-2. Đurđica Cekinović Grbeša from the Faculty of Medicine presented clinical experience in the disease›s development and outcome at the Clinical Hospital Center Rijeka. The previous period›s achievements and accumulated knowledge were instrumental in opening new avenues of research into SARS-Cov-2 and Covid 19 in Rijeka when the pandemic had started. This feat was also recognized by the Croatian Science Foundation, which decided to financially support the University of Rijeka›s five research projects, from the eleven accepted for financing altogether. Those five projects were presented shortly at this conference by Principal investigators: Ilija Brizić, Astrid Krmpotić and Felix M. Wensveen from the Faculty of Medicine, Ana Meštrović from the Department of Informatics, and Dalida Ritossa from the Faculty of Law.

COVID-19 MESSAGES II
Higher Education in the COVID-19 Crisis: Challenges and Opportunities

The second conference was organized by Marta Žuvić, vice-rector for studies and students at the University of Rijeka, here acting as the Scientific committee president. The invited speakers were Wim Van Petegem from Catholic University Leuven, Michael Gaebel from the European University Association, Higher Education Policy Unit, Sandra Kučina Softić from the University Computing Centre – SRCE, and Ulf-Daniel Ehlers from Baden-Wurttemberg State University, while the remaining six speakers and participants at the panel were from the University of Rijeka and University Pompeu Fabra, Barcelona, Spain: Nataša Hoić Božić (Department for Informatics), Vanja Smokvina (Faculty of Law), Nelide Črnjarić – Žic (Faculty of Engineering), Vedrana Mikulić Crnković (Department of Mathematics), Manel Jimenez Morales (University Pompeu Fabra, Barcelona, Spain) and Snježana Prijić Samaržija, rector of the University of Rijeka.
The participants concluded that the COVID-19 crisis has transformed the educational space almost overnight. While it has brought up diverse challenges in adapting to the organizational and logistic issues of online delivery, it has also provided an opportunity to rethink the future of higher education and act upon it. The conference's central message is that the change we underwent along the transformation of higher education facilitated by the COVID-19 crisis is irreversible. In this sense, change is not only an opportunity but a necessity. In designing the future of higher education, we should consider a combination of bottom-up and top-down approaches, aiming to develop agile digital scholars, equipped and competent for teaching in the digital age. While bottom-up approaches should value and use 'learn-from-colleagues' principles, top-down approaches should continuously oversee human resources' professional development in the academic environment. We should promote the values which the digital transformation of higher education has brought to society. They are significant both for rethinking and designing the future of higher education and for ensuring the future quality of life. While university managements should be farsighted, they should act on a short-term basis; after all, COVID-19 has taught us conditions can change rapidly. Our systems, therefore, must become far more flexible. Universities of the future are institutions that are continually learning how to adapt and plan for the future. Likewise, the student journey of tomorrow should be a personalized study experience. Through physical and virtual mobility, we should allow students to build networks and communities of practice. With the support of their academic environment and by assuming responsibility for their personal development, students should acquire the basic set of skills needed for the future: autonomous learning, self-organization, creativity, and innovation, as well as intercultural competencies.

COVID-19 MESSAGES III
STEM for human species survival

The third conference was organized and moderated by Senka Maćešić, vice-rector for organization and informatization at the University of Rijeka, acting as Scientific committee president. Igor Mezić from University of California, Santa Barbara was invited speaker. The remaining ten participants were the most prominent scientists in the domain of computing sciences, informatics, physics, and energy systems from the University of Rijeka, University of Trieste, and University of Zagreb: Marin Karuza (Department of Physics), Ana Meštrović (Depertment of Informatics), Igor Štajduhar (Faculty of Engineering), Jonatan Lerga (Faculty of Engineering), Kristijan Lenac (Faculty of Engineering), Goran Mauša (Faculty of Engineering), Edgar Roldan (University of Trieste, International Centre for Theoretical Physics), and Neven Duić, (Faculty of Mechanical Engineering and Naval Architecture, University of Zagreb), as well as representatives of the stakeholders from the private Information and Communication Technology sector: Mislav Malenica (Mindsmiths, Zagreb) and Mladen Pejković (Atlantic group, Zagreb).
COVID – 19 Messages III's primary task was to find answers to how STEM has helped us confront the pandemic, what scientists and engineers can do in the future, and how science and technology will evolve under new challenges. Their deeper intention was to offer a much broader perspective. Rather than only from the STEM standpoint, Messages III took an anthropological perspective and stressed that science and technology are our most powerful survival tools – tools for manipulating whatever conditions we get into, and tools that allow us to improve our existence and ensure our survival through millennia. Messages III's lecturers and participants surpassed even this broader intention, giving us

encouraging information and ideas. One of them is that we must transform our industry and economy to preserve our precious planet. As sustainable energy is already cheaper than fossil fuels, we need economic and political measures to help the petroleum industry transform into a sector that builds its power plants on renewable energy sources. Other paths for preserving the Earth, like pauperizing the population or slowing down technological development, are not acceptable. Also, we learned that AI could be used in many ways that significantly improve our everyday life: Artificial Intelligence can act as health assistants, blockchain technologies provide greater security, Machine Learning algorithms separate accurate from false news, and Information Technology tools can free us from repetitive and tedious jobs. Real threats lie in possible violations of human rights and privacy and the unequal availability of innovations, not in some army of superintelligent enemy robots that still exist only in movies. STEM is vital because it enhances our ultimate survival skill - prediction. The brain is essentially a prediction machine, and science only improves that skill. Today, new mathematical and computational algorithms and increased computer power bring those skills to an entirely new level. Applications of new algorithms in virology and epidemiology help us fight COVID-19 and similar challenges in remarkable new ways. Computer simulations of possible realities and outcomes give us the answers needed to make the right decisions for a better future.

COVID-19 MESSAGES IV

Brave New World: Democracy, Rights, and Justice in COVID-19 Era

The Scientific committee presidents of the fourth conference were Snježana Prijić Samaržija, rector of the University of Rijeka, Alen Ružić, director of the Clinical Hospital Centre and deputy rector for science and arts at the University of Rijeka, and Elvio Baccarini, deputy rector for ethics and academic integrity at the University of Rijeka. The keynote speaker was the rector Snježana Prijić Samaržija, while the two invited speakers were Massimo Reichlin from University San Raffaele, Milan, Italy and John MacMillan from the University of Otago, New Zealand. Five speakers from the University of Rijeka discussed the topics of public health-care management, law, economics, ethics and politics: Alen Ružić (Medical Faculty and Clinical Hospital Centre), Sanja Barić (Faculty of Law), Saša Drezgić (Faculty of Economics), Elvio Baccarini (Faculty of Humanities and Social Sciences), and Nabojša Zelič (Faculty of Humanities and Social Sciences). The final session's seven participants, scientific journalists and scientists, discussed the specificity and efficacy of scientific communication during the COVID-19 crisis: Vedrana Simičević (science journalist, University of Rijeka), Luca Nicotra, (data analyst at Avaaz, New York, United States), Mićo Tatalović (news editor at Research Fortnight, London, United Kingdom), Tanja Rudež (science journalist at Jutarnji list), Nenad Jarić Dauenhauer (science journalist at Index) and Alen Protić (Head of the Clinic of Anaesthesiology and Intensive Care, Vice-dean at the Medical Faculty, University of Rijeka). Scientists in the social sciences and humanities are equally engaged in reflecting the global shock caused by the pandemic, the ways it has struck society, and its possible consequences. Although the pandemic caused by the coronavirus has emerged as an unprecedented biomedical challenge to public health, the conference›s main conclusion is that scientists in the social sciences and humanities must be actively involved in reflecting upon the crisis and avenues of recovery. Namely, we are confronted by many ethical, political, economic, legal, sociological, psychological, and communicational challenges. The pandemic has proven to be a reagent that has sped up changes that were already underway, such as the digital transformation of education and healthcare, the energy transition, artificial intelligence, and algorithmic predictions derived from big data. Far removed from the futuristic concerns, these topics have become urgent challenges of the new normal. Simultaneously, the pandemic has cast light on social problems that have been eroding democratic values for decades, threatening long acquired freedoms and human rights, and jeopardizing the rule of law. Economic consequences in the form of an expected recession and psychological traumas related to existential uncertainty make the situation more complex and solutions more challenging. The participants concluded that times of crisis that accentuate society›s fragility must also be times when those who know the most have a particular duty to divulge valuable long-time solutions and create a genuinely brave new world. However, scientists, confronted with a crisis further encouraged by a culture of ignorance, have found themselves in circumstances of increasing distrust towards science, scientists, and the scientific method. We concluded that there is no alternative to science and education, that universities must promote the idea of enlightenment. Scientists› main task is to rebuild trust in science, strengthen responsible scientific communication, and encourage an interdisciplinary, problem-oriented scientific approach that supports civic wellbeing.

COVID-19 MESSAGES V

From the Student Perspective: Impact, Analysis, and Recommendations

The final fifth conference was organized by Tea Dimnjašević, University of Rijeka's representative in the YUFE (Young Universities for Future of Europe) Student Forum. The invited speakers were Blaženka Divjak (Faculty of Organization and Informatics, University of Zagreb) and Ivanka Živčić – Bećirević (University of Rijeka Student Counselling Centre and Faculty of Humanities and Social Sciences). The following students' representatives participated at the conference with presentations: Jessica Winter (YUFE, The University of Bremen, Germany), Jens Matthens (YUFE, The University of Antwerp, Belgium), Sven Sušanj (YUFE, The University of Rijeka), Nina de Winter (European Student Union, Brussels), Luka Delak (Student Council of University of Rijeka),

Tea Dimnjašević (YUFE, Student Council of University of Rijeka) and Leopold Mandić, (Student Council of University of Rijeka). At the final panel, rector Snježana Prijić Samaržija and former minister Blaženka Divjak joined the discussion about student perspective.

The goal of COVID-19 Messages› fifth part was to provide a broader student perspective and introduce students throughout Europe, emphasizing students from the YUFE (Young Universities for Future of Europe) Alliance. Society has recently faced challenging and unprecedented times, and history teaches us that one can overcome difficult and tasking circumstances only when cooperating and respecting others. We aimed to single out various positive practices carried out by students and staff during the pandemic and highlight the most significant challenges we face. The hybrid model of teaching or the blended teaching and learning process proved to answer our search for a future model of high-quality and innovative education. Although e-learning or distance learning cannot wholly replace onsite interactive teaching, further development and investment in e-infrastructure and virtual campuses would provide students with numerous opportunities to individualize their study program and to experience virtual international mobility. During the pandemic, students engaged in volunteer activities to help those in need and those most affected by the pandemic: health professionals, vulnerable and at-risk groups, and citizens who sought precise information about epidemiological procedures. At universities and beyond, we should encourage and nurture various forms of community engagement as irreplaceable tools for cultivating humanity, solidarity, and inclusion and developing democratic competencies. Finally, research conducted during the COVID-19 pandemic indicated that existential uncertainty intensified students› mental health challenges, such as anxiety, depression, and panic. Regular and structured communication between students› representatives and university decision-making bodies, alongside appropriate support by university counseling services, have proven to be of utmost importance for students› perception of wellbeing.