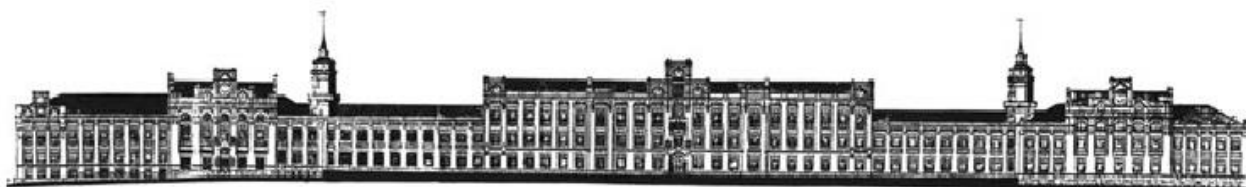




UNITWIN/UNESCO CHAIRS PROGRAMME

PROGRESS REPORT 2021-2022

UNESCO CHAIR
**Higher Technical Education, Applied System
Analysis and Informatics**
at the National Technical University of Ukraine
'Igor Sikorsky Kyiv Polytechnic Institute' and
Educational and Scientific Institute for
Applied System Analysis



**Igor Sikorsky Kyiv Polytechnic Institute –
Kyiv – Ukraine
2022**

UNITWIN/UNESCO Chairs Programme Progress Report

Period of Activity: 1.06.2021 – 31.05.2022

Title of UNESCO Chair:

Higher Technical Education, System Analysis and Informatics

Institution/Country: National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’, Ukraine

Report established by: Prof. Dr. Mykhailo Zgurovsky

Function/Title: Chairholder of the UNESCO Chair in Higher Technical Education, System Analysis and Informatics at the National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’ and Educational and Scientific Institute for Applied System Analysis, Academician of the National Academy of Sciences of Ukraine

Summary

In the progress report of the UNESCO Chair in Higher Technical Education, Applied System Analysis and Informatics at the National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’ and Educational and Scientific Institute for Applied System Analysis the basic information on the results of chair activities in 2021-2022 is presented.

The most significant actions and events in the field of academic activity connected with organization and holding of information days, conferences, festivals at national and international level, implementation of international projects are illustrated. Thus, during the reporting period two international conferences, one national festival of innovation projects were carried out and five international projects were implemented with the participation of the UNESCO Chair.

The interuniversity exchange within the subject matter of the UNESCO Chair activities was developing.

The UNESCO Chair activities were widely covered in periodicals, scientific publications and at the UNESCO Chair site <http://www.unesco.kpi.ua>.

| C O N T E N T S | |
|---|------|
| | Page |
| Summary | 3 |
| I. Address and Contact | 4 |
| II. Available Resources | 5 |
| 1. Human Resources | 5 |
| 2. Material Resources | 5 |
| III. Activities | 6 |
| 1. Academic activities | 6 |
| Education/Seminars/Training/Research | 6 |
| 2. Conferences/Forums/Festivals | 7 |
| 3. Interuniversity Exchanges/Partnerships | 10 |
| 4. Publications and multimedia materials | 11 |
| IV. Outcomes | 14 |
| V. Forthcoming Activities | 17 |
| VI. Development Prospects | 18 |

I. Address and Contact

| | Address of the Chairholder (or Coordinator). Other contact person |
|--------------------------------|--|
| Name | Mykhailo Zgurovsky |
| Function/ Title | Rector |
| University/ Institution | National Technical University of Ukraine 'Igor Sikorsky Kyiv Polytechnic Institute' (Igor Sikorsky Kyiv Polytechnic Institute) |
| Street | 37, Peremohy ave. |
| Postal Code | 03056 |
| City | Kyiv |
| Country | Ukraine |
| Phone | +380 44-236 69 13 |
| Fax | +380 44-204 85 57 |
| E-mail | mzz@kpi.ua , sidorenko@kpi.ua |
| Web Site | http://www.unesco.kpi.ua |

II. Available Resources

1. Human Resources

1. Administration of the UNESCO Chair

| | |
|-------------------------------------|------------------------|
| Coordinator | Prof. Sergiy Sidorenko |
| Executive Secretary | Olena Poptsova |
| Academic Secretary | Prof. Sergiy Shukayev |
| Assistant to the Academic Secretary | Olena Kizub |

2. Teaching/training/research activities

The UNESCO Chair has the following sections:

- **HIGHER TECHNICAL EDUCATION,**
headed by member of the National Academy of Sciences of Ukraine, Prof. Yuriy Yakymenko, First Vice Rector of the National Technical University of Ukraine 'Igor Sikorsky Kyiv Polytechnic Institute'
- **APPLIED SYSTEM ANALYSIS,**
headed by Prof. Natalia Pankratova, Deputy Director of the Institute for Applied System Analysis (IASA)
- **INFORMATICS,**
headed by Prof. Sergiy Telenyk, Dean of the Faculty of Informatics and Computer Engineering of Igor Sikorsky Kyiv Polytechnic Institute
- **ORGANIZATIONAL BRANCH,**
headed by Prof. Sergiy Shukayev, Head of the International Projects Office of International Collaboration Department, Igor Sikorsky Kyiv Polytechnic Institute

3. Officer in charge of information activities and documentation:

Academic Secretary Prof. Sergiy Shukayev

2. Material Resources

Sources: Host Institution, Governmental body

- **FOR ADMINISTRATIVE WORK:** computers, copiers, printers, and storage systems.
- **FOR TEACHING/TRAINING/RESEARCH ACTIVITIES:** classrooms, videos, projector, printed matter and electronic publications, papers, e-learning.
- **FOR INFORMATION ACTIVITIES AND DOCUMENTATION:** web site, posters, brochures, papers, printed matter and electronic publications.
- **FOR OTHER ACTIVITIES:** conference hall

III. Activities

1. Academic Activities

Education/Seminars/Training/Research

Project ‘NTNU-KPI Collaboration within Industry 4.0 Education’ Eurasia Programme

Duration of the project: 2018-2021

Partnership: National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’, Norwegian University of Science and Technology

Main purpose of the project: to provide attractive education within Sustainable Manufacturing through the exchange of knowledge between NTNU and Igor Sikorsky Kyiv Polytechnic Institute.

Participants:

- Undergraduate students
- Graduate students
- Academics
- Public administrators
- Employees from industry, or other private sector
- Teachers from primary education
- Teachers from secondary education
- Teachers from technical and vocational education
- Other groups
-

Geographical coverage for participants and partners:

- National
- Regional/Interregional/International

| Regions | Countries |
|----------------------------|-----------|
| Africa | |
| Asia/Pacific | |
| Eastern and Central Europe | Ukraine |
| Northern Europe | Norway |
| Latin America | |

Publications:

Title: International HE cooperation ‘vital to post-war recovery’

Publishers: University World News
(<https://www.universityworldnews.com/post.php?story=20220712115810785>).

Year of Publication: July 17, 2022

Type of document/material:

- Book
- Periodical (Newspaper)
- Others – Proceedings of the Conference

Language(s): English

Keywords: global higher education system; COVID-19 pandemic; post-war reconstruction; innovative laboratory for distance learning.

2. Conferences/Forums/Festivals

The 7th International Scientific and Technical Conference “Pure Water. Fundamental, Applied and Industrial Aspects” (online)

Date and place: November 25-26, 2021, National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’, Kyiv, Ukraine

Partnerships: National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, National Academy of Sciences of Ukraine, UNESCO Chair in Higher Technical Education, Applied System Analysis and Informatics at Igor Sikorsky Kyiv Polytechnic Institute and Institute for Applied System Analysis, Corporation “Science Park “Kyivska Polytechnika”, Ukrainian-Polish Center of Igor Sikorsky Kyiv Polytechnic Institute, Technologies of Nature LLC (Ukraine), Representative Office of the Polish Academy of Sciences in Kyiv, Lublin University of Technology (Republic of Poland), Society of Ecological Chemistry and Engineering (Republic of Poland).

Participants: 170

- Undergraduate students
- Graduate students
- Academics
- Public administrators
- Employees from industry, or other private sector
- Teachers from primary education
- Teachers from secondary education
- Teachers from technical and vocational education
- Other groups

Regional Coverage

- National
- Regional/Interregional/International

| Regions | Countries |
|----------------------------------|--|
| Asia/Pacific | |
| Eastern and Central Europe | Ukraine, Poland, Czech Republic, Belarus |
| North Europe | |
| Western Europe and North America | |

Publications:

Title: Pure Water 2021– opening, plenary session"

Video hosting: ‘YouTube’ (youtube.com/watch?v=UOIH1bSUmE&t=932s).

Year of Publication: 2021

Type of document/material:

- Book
- Periodical (Newspaper)
- Other – Proceedings of the Conference

Language(s): Ukrainian, English, Polish

Keywords: technologies of purification of natural waters; technical aspects of water supply; the impact of wastewater on the environment; technologies of wastewater treatment.

The 23rd International Scientific and Practical Conference 'Renewable Energy and Energy Efficiency of the 21st Century' (online)

Date and place: May 19-20, 2022, National Technical University of Ukraine 'Igor Sikorsky Kyiv Polytechnic Institute', Kyiv, Ukraine

Partnership: National Technical University of Ukraine 'Igor Sikorsky Kyiv Polytechnic Institute', Warsaw University of Technology, Representative Office of the Polish Academy of Sciences in Kyiv, Institute of Renewable Energy at National Academy of Sciences of Ukraine, Junior Academy of Sciences of Ukraine, Inter-Branch Scientific and Technical Center for Wind Power Engineering at NASU, Ukrainian Hydrogen Council, UNESCO Chair in Higher Technical Education, Applied System Analysis and Informatics at Igor Sikorsky Kyiv Polytechnic Institute and Institute for Applied System Analysis.

Participants: 200

- Undergraduate students
- Graduate students
- Academics
- Public administrators
- Employees from industry, or other private sector
- Teachers from primary education
- Teachers from secondary education
- Teachers from technical and vocational education
- Other groups
-

Regional Coverage

- National
- Regional/Interregional/International

| Regions | Countries |
|----------------------------------|---------------------------------|
| Asia/Pacific | Uzbekistan |
| Eastern and Central Europe | Ukraine, Poland, Czech Republic |
| Northern Europe | Norway |
| Western Europe and North America | USA |

Publications:

Title: Renewable Energy: Course for Accelerated Development

Publishers: Kyivsky Polytechnic, No. 19-20 (<https://kpi.ua/files/2022-kp19.pdf>).

Year of Publication: June 9, 2022

Type of document/material:

- Book
- Periodical (Newspaper)
- Others – Proceedings of the Conference

Language(s): Ukrainian

Keywords: hydrogen energy; problems and prospects of the development of use of renewable energy sources, electric and bioenergy resources, heat of the earth and heat supply of the country at the expense of energy of the sun, wind, hydropower resources; energy saving and energy efficiency measures.

The 10th Festival of Innovation Projects ‘Sikorsky Challenge 2021: Ukraine and the World’

Date and venue: August 12-14, 2021, National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’, Kyiv, Ukraine

Organizers: National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’, Ministry of Education and Science of Ukraine, Ministry of Strategic Industries of Ukraine, Ukroboronprom State Concern, Ministry of Digital Transformation of Ukraine.

Participants: 800

- Undergraduate students
- Graduate students
- Academics
- Public administrators
- Employees from industry, or other private sector
- Teachers from primary education
- Teachers from secondary education
- Teachers from technical and vocational education
- Other groups

Regional Coverage

- National
- Regional/Interregional/International

| Regions | Countries |
|----------------------------------|--|
| Australia | Australia |
| Arab states | United Arab Emirates, Saudi Arabia |
| Asia/Pacific | Israel, China, Uzbekistan, Azerbaijan, Turkey, Pakistan, Japan |
| Eastern and Central Europe | Ukraine, Poland, Switzerland, Georgia, Germany, Slovakia, Czech Republic |
| Southern Europe | Italy |
| North Europe | Great Britain, Lithuania |
| Western Europe and North America | France, USA, Canada |
| Latin America | Brazil |

Publications:

Title: Sikorsky Challenge 2021 Festival: anniversary, special

Publishers: Kyivsky Polytechnic, No. 26 (<https://kpi.ua/files/2021-kp26.pdf>).

Year of Publication: August 26, 2021

Type of document/material:

- Book
- Periodical (Newspaper)
- Others – Proceedings of the Conference

Language(s): Ukrainian

Keywords: startup competition; anniversary festival; projects and scientific and technical developments.

3. Interuniversity Exchanges/Partnership

Visit of H.E. Mr. Etienne de Ponsen, Ambassador Extraordinary and Plenipotentiary of the French Republic to Ukraine

Date and place: June 2, 2021, Igor Sikorsky Kyiv Polytechnic Institute

Purpose: signing of the updated cooperation agreement between the university and the diplomatic missions of France.

Visit of H.E. Mr. Fan Xiangong, Ambassador Extraordinary and Plenipotentiary of the Republic of China to Ukraine

Date and place: June 15, 2021, Igor Sikorsky Kyiv Polytechnic Institute

Purpose: meeting with the leadership of the university, presentation of the newly appointed Counselor of the Chinese Embassy in Ukraine on Science, Miao Fei, discussing the issues of expanding cooperation in education, science, technology, joint innovation, and space projects.

Visit of H.E. Mr. Matsuda Kuninori, Ambassador Extraordinary and Plenipotentiary of Japan to Ukraine

Date and place: December 10, 2021, Igor Sikorsky Kyiv Polytechnic Institute

Purpose: meeting with the leadership of the university, discussion of urgent cooperation issues between Igor Sikorsky Kyiv Polytechnic Institutewith the Embassy of Japan in Ukraine, Japanese higher education institutions, as well as companies and enterprises.

Visit of the Extraordinary and Plenipotentiary Ambassador of the Israeli to Ukraine, Mr. Michael Brodsky

Date and place: January 21, 2022, Igor Sikorsky Kyiv Polytechnic Institute

Purpose: meeting with the leadership of the university, familiarization with the university, discussion of issues of expanding cooperation between Igor Sikorsky KPI and Israeli scientists, innovators and educators.

4. Publications and multimedia material

1. UNESCO Chair official web site <http://www.unesco.kpi.ua>.
2. Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko. – Cham, Switzerland : Springer International Publishing, 2021. – XV, 512 p. : ill. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN 978-3-030-48453-8 (eBook). –DOI: <https://doi.org/10.1007/978-3-030-48453-8>.
3. Classification and Analysis of Multicriteria Optimization Methods / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko // Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 2. – P. 50–174. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN 978-3-030-48453-8 (eBook). – DOI: https://doi.org/10.1007/978-3-030-48453-8_2.
4. Classification and Analysis Topologies Known Artificial Neurons and Neural Networks / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko // Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 1. – P. 1–58. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN978-3-030-48453-8 (eBook). – DOI: https://doi.org/10.1007/978-3-030-48453-8_1.
5. Development of Hybrid Neural Networks / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko // Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 4. – P. 233–312. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN978-3-030-48453-8 (eBook). – DOI: https://doi.org/10.1007/978-3-030-48453-8_4.
6. Fire Surveillance Information Systems / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko // Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 8. – P. 485–510. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN 978-3-030-48453-8 (eBook). – DOI: https://doi.org/10.1007/978-3-030-48453-8_8.

7. Formation of Hybrid Artificial Neural Networks Topologies / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko // Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 3. – P. 175–232. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN 978-3-030-48453-8 (eBook). – DOI: https://doi.org/10.1007/978-3-030-48453-8_3.

8. Intelligence Methods of Forecasting / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko // Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 5. – P. 313–361. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN 978-3-030-48453-8 (eBook). – DOI: https://doi.org/10.1007/978-3-030-48453-8_5.

9. Intelligent Automated Road Management Systems / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko // Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 7. – P. 461–484. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN 978-3-030-48453-8 (eBook). – DOI: https://doi.org/10.1007/978-3-030-48453-8_7.

10. Intelligent System of Thyroid Pathology Diagnostics / Michael Zgurovsky, Victor Sineglazov, Elena Chumachenko // Artificial Intelligence Systems Based on Hybrid Neural Networks : Theory and Applications. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 6. – P. 363–460. – (Studies in Computational Intelligence / Series Editor Janusz Kacprzyk, Polish Academy of Sciences, Warsaw, Poland ; ISSN 1860-949X ; ISSN 1860-9503 (Electronic) ; Volume 904). – ISBN 978-3-030-48452-1 (Hardcover). – ISBN 978-3-030-48453-8 (eBook). – DOI: https://doi.org/10.1007/978-3-030-48453-8_6.

11. Uniform Global Attractor for a Class of Nonautonomous Evolution Hemivariational Inequalities with Multidimensional “Reaction-Velocity” Law / Michael Z. Zgurovsky, Ciro D’Apice, Umberto De Maio, Nataliia V. Gorban, Pavlo O. Kasyanov, Oleksiy V. Kapustyan, Olha V. Khomenko, Jose Valero // Contemporary Approaches and Methods in Fundamental Mathematics and Mechanics / Editors: Victor A. Sadovnichiy, Michael Z. Zgurovsky. – Cham, Switzerland : Springer International Publishing, 2021. – Chapter 15. – P. 347–368 : ill. – (Understanding Complex Systems ; Series ISSN1860-0832). – ISBN 978-3-030-50301-7(Softcover). – ISBN 978-3-030-50302-4(eBook). – DOI:10.1007/978-3-030-50302-4_15.

12. Cybernetics and system analysis: an international scientific and theoretical journal / editor: I. V. Sergienko (chief editor), O. M. Khimich (deputy chief editor),

N. B. Shyshkina (deputy chief editor) ed.), ... M. Z. Zgurovsky, M. Yu. Ilchenko [and others] ; National Academy of Sciences of Ukraine, V.M. Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine. – 1965 – . – Kyiv: V.M. Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine, 2021. – Vol. 57, No. 1. – Founded in January 1965. - Until No. 4 in 1991, it was called "Kybernetics" (ISSN0023-1274); until No. 6 of 2020, it was published under the title "Cybernetics and System Analysis". – Issued 6 times a year. – ISSN1019-5262 (Print). – ISSN2522-9664 (Online).

13. Contemporary Approaches and Methods in Fundamental Mathematics and Mechanics / Editors: Victor A. Sadovnichiy, Michael Z. Zgurovsky. – Cham, Switzerland : Springer International Publishing, 2021. – XVIII, 522 p. : ill. – (Understanding Complex Systems ; Series ISSN1860-0832). – ISBN 978-3-030-50301-7(Softcover). – ISBN 978-3-030-50302-4(eBook). – DOI:10.1007/978-3-030-50302-4.

14. The priorities of KPI's international activity are to adapt the world experience and reach the leading positions / Sergii I. Sidorenko. – Kyiv Polytechnic. – # 5-6, 2022. – P. 1, 4-5.

IV. Outcomes

The international activity of Igor Sikorsky Kyiv Polytechnic Institute is one of the key directions of the university strategic development. It consists of such basic components as training of specialists, as well as research and educational personnel, including international personnel; participation in the international education organizations, funds and the calls that are opened for the purpose of getting grants; the exchange of information about scientific-methodological materials, participation in conferences, exhibitions, seminars, educational fairs; collaboration with foreign institutions of higher education, including academic and student exchanges.

UNESCO Chair in Higher Technical Education, Applied System Analysis and Informatics, which has become one of the brainpower centres of Ukrainian higher technical education, plays an important role in this process. The Chair takes the initiative in organizing international festivals, information days and conferences on various aspects of promoting higher education and understanding its importance in modern society.

Thanks to educational grants and programs, academics and students of Igor Sikorsky Kyiv Polytechnic Institute get opportunities to undergo practical training abroad. They carry out joint scientific projects in collaboration with the foreign partners. The results of these studies are published in the 'Kyiv Polytechnik' newspaper.

Among important activities of the UNESCO Chair, it is worth to point out its participation in the program 'UNESCO-UNITWIN OCW/OER INITIATIVE' (UUOOI). The purpose of this program is to advance the integrated research system, training of personnel, programs' development (education, natural sciences, social sciences, the humanities, culture, communications and information), as well as to encourage inter-university cooperation through the transfer of knowledge across borders.

Traditionally, UNESCO Chair in Higher Technical Education, Applied System Analysis and Informatics is actively engaged in facilitating the participation of Igor Sikorsky Kyiv Polytechnic Institute in the most prestigious world university rankings, such as QS World University Rankings, Times Higher Education World University Rankings, U-Multirank and Academic Ranking of World Universities (ARWU), etc.

In 2022 Igor Sikorsky Kyiv Polytechnic Institute was listed in the QS World University Rankings at 701-750 position.

It took 63rd place in the QS Emerging Europe and Central Asia (EECA) University Rankings.

In 2022 the University took part in the QS World University Rankings by Subject, in which under the educational programme – 'Computer Science and Information Systems' – took a position 401-450; under the educational programme 'Electrical Engineering and Electronic' – took 401-450th place; under the educational programme 'Engineering and Technology' – took a position 401-450; under the educational programme 'Engineering – Mechanical' – took 501-520th place.

In 2022 Igor Sikorsky Kyiv Polytechnic Institute took second place in the ranking 'Top 200 Ukraine'.

In January 2021 Igor Sikorsky Kyiv Polytechnic Institute was ranked second among Ukrainian universities in the ranking 'Webometrics'.

Another direction of activities of the Chair is comprehensive assistance to university researchers in their participation in the international research programmes (HORIZON EUROPE, ERASMUS+, EURASIA, NATO, etc.). Support of the international projects on technology transfer was significantly strengthened.

In 2021 Igor Sikorsky Kyiv Polytechnic Institute participated in one project within Erasmus+ Jean Monnet Actions; one project within NAWA; two projects within the EURASIA programme; two NATO projects; four projects within the Horizon 2020 programme and other international projects.

Currently, two National Contact Points of the EU Horizon 2020 Programme are operating at Igor Sikorsky Kyiv Polytechnic Institute in such areas or societal challenges as 'Information and Communication Technologies' and 'Climate Action, Environment, Resource Efficiency and Raw Materials'.

Supported by the Representative Office of the Polish Academy of Sciences in Kyiv, two international scientific and practical conferences were held online in cooperation with the UNESCO Chair at Igor Sikorsky Kyiv Polytechnic Institute in 2021-2022.

The work of the UNESCO Chair has received full media, newspaper coverage including the publication of reports made at the international conferences.

The Anniversary Festival of Innovative Projects 'Sikorsky Challenge 2021: Ukraine and the World' was held at Igor Sikorsky Kyiv Polytechnic Institute.

The purpose of the festival is to attract pupils and students, as well as scientists and entrepreneurs to participate in the research programmes and design activities for their further commercialization, creation of startups and launch of the innovative products on the international and national markets.

This year's tenth Anniversary Sikorsky Challenge Festival was held in a mixed format (face-to-face and synchronous online mode).

On June 14-16, 2022 in Bergen, Norway, two employees of Igor Sikorsky Kyiv Polytechnic Institute took part in the meeting on the discussion of the results of Eurasia Programme final conference with the project partners from Norwegian University of Science and Technology. Under Eurasia Programme partners have been working on the project 'NTNU-KPI Collaboration within Industry 4.0 Education'.

On July 17, 2022 an article 'International HE cooperation 'vital to post-war recovery' in University World News was published. During the conference in Bergen UNESCO representatives offered to publish this study.

With the outbreak of Russian military aggression against Ukraine international collaboration has undergone significant changes.

It is still difficult to believe that this nightmare is actually happening in the XXI century but this is how the present-day reality of Igor Sikorsky KPI's students, staff and the whole Ukraine looks like. However, in our courageous struggle we're not alone: since the first days of Russian invasion Ukraine has received substantial military, financial and humanitarian aid from international community. In particular, since the very outset of war, unleashed by Russia, Igor Sikorsky Kyiv Polytechnic Institute has

received multiple aid proposals from both foreign partner universities and separate private individuals. These proposals included opportunities for students, PhD students, academic and administrative staff to continue study, carry out research and work.

V. Forthcoming Activities

The 11th Festival of Innovation Projects ‘Sikorsky Challenge 2022’

Date and venue: October 26-28, 2020, Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine

Organizers: National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’, Innovation Ecosystem Sikorsky Challenge, Corporation ‘Science Park ‘Kyivska Polytechnika’, etc.

The 8th International Scientific and Practical Conference ‘Pure Water. Fundamental, Applied and Industrial Aspects’

Date and place: November, 2022, Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine

Partnerships: National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’, National Academy of Sciences of Ukraine, UNESCO Chair in Higher Technical Education, Applied System Analysis and Informatics at Igor Sikorsky Kyiv Polytechnic Institute and the Institute for Applied System Analysis, Corporation ‘Science Park ‘Kyivska Polytechnika’, Ukrainian-Polish Center of Igor Sikorsky Kyiv Polytechnic Institute, Technologies of Nature LLC (Ukraine), Representative Office of the Polish Academy of Sciences in Kyiv, Lublin University of Technology (Republic of Poland), Society of Ecological Chemistry and Engineering (Republic of Poland).

The 24th International Scientific and Practical Conference ‘Renewable Energy and Energy Efficiency of the XXI Century’

Date and venue: May 2023, Igor Sikorsky Kyiv Polytechnic Institute, Kyiv, Ukraine

Organizers: National Technical University of Ukraine ‘Igor Sikorsky Kyiv Polytechnic Institute’, Warsaw University of Technology, Representative office of the Polish Academy of Sciences in Kyiv, Institute of Renewable Energy at National Academy of Sciences of Ukraine, Junior Academy of Sciences of Ukraine, Inter-Branch Scientific and Technical Center for Wind Power Engineering at NASU, Ukrainian Hydrogen Council, UNESCO Chair in Higher Technical Education, Applied System Analysis and Informatics at Igor Sikorsky Kyiv Polytechnic Institute and Institute for Applied System Analysis.

VI. Development Prospects

Further activities of UNESCO Chair are focused on our country's reconstruction and its integration into world community.

Now Igor Sikorsky KPI, just as all educational institutions of Ukraine, has faced a harsh reality - the loss of educational and research capacity. According to UN, the total number of Ukrainian refugees is more than 12 million. We can only imagine the percentage of students and academic staff among these refugees. Obviously, it has a detrimental effect on the development of education, which may end up in stagnation because of war. Currently, the only effective way to prevent a total decline of Ukrainian education is international support, particularly, participation in international projects. Thus, Ukrainian higher education institutions will be able to continue their educational, research and innovative activity effectively as participation in international projects is, in the first place, the attraction of financial resources. This will be a significant financial support in these difficult times for Ukraine. This direction opens up opportunities for effective collaboration between Igor Sikorsky Kyiv Polytechnic Institute and UNESCO.

The activities will be geared to expand the cooperation between specialists and experts in the realm of education, science and culture at both national and international levels. The UNESCO Chair is supposed to assist employees and students of the University in receiving grants for educational, research and cultural projects.

UNESCO Chair plans to actively develop and implement the ranking system of the assessment of higher education institutions of Ukraine in accordance with the Memorandum about Cooperation with UNESCO-CEPES dated April 25, 2006.

The activity of the Ukrainian Gender Education Centre established at Igor Sikorsky Kyiv Polytechnic Institute in 2001 under the aegis of the UNESCO Chair, is aimed at creating the instruments for the introduction of new information technologies into gender education. The Center operates in conformity with the Memorandum signed by the UNDP in Ukraine and the National Technical University of Ukraine 'Igor Sikorsky Kyiv Polytechnic Institute'.

UNESCO Chair in Higher Technical Education, Applied Systems Analysis and Informatics at Igor Sikorsky Kyiv Polytechnic Institute plans to continue the development and collaboration within the framework of the UNITWIN/UNESCO Chairs Program established in 1992 by the UNESCO General Conference at its 26th session. Higher educational institutions of developing countries and emerging markets economies provide the basis for this program's charitable work. The UNITWIN/UNESCO Chairs projects deal with the preparation of studies and cover all main fields of UNESCO Chair in Higher Education, Applied Systems Analysis and Informatics: education, human rights, environmental protection, humanities and applied science, communication, etc.

UNESCO Chair in Higher Technical Education, Applied System Analysis and Informatics plans to widen the range of its activities in the field of innovation. Holding of the Festival of Innovative Projects 'Sikorsky Challenge' at Igor

Sikorsky Kyiv Polytechnic Institute serves as a striking example of this intention. The Festival unites people for whom the meaning of life is the opportunity to implement their ideas, which are meant to improve the world.

In 2022-2023 Igor Sikorsky Kyiv Polytechnic Institute is going to carry out the following projects:

- Boosting the Blue Economy in the Black Sea Region by Initiating a Business Collaboration Framework in the field of Fisheries and Aquaculture, Coastal and Maritime Tourism and Maritime Transport pursuance of the European Maritime, Fisheries and Aquacultures Fund;
- European Business Models: European Integration: legislation and the Internet of Things in pursuance of Erasmus+ Jean Monnet Actions;
- Knowledge at the Tip of Your fingers: Clinical Knowledge for Humanity in pursuance of the EU Framework Programme for Research and Innovation – Horizon 2020;
- Simultaneous transformation of ambient heat and undesired vibrations into electricity via nanotriboelectrification during non-wetting liquid intrusion-extrusion into-from nanopores in pursuance of the EU Framework Programme for Research and Innovation – Horizon 2020;
- Teaching Fuel Cell and Hydrogen Science and Engineering Across Europe within Horizon 2020;

UNESCO Chair 'Higher Technical Education, Applied Systems Analysis and Informatics' at Igor Sikorsky Kyiv Polytechnic Institute continues to carry out activities aiming to improve the quality of training by increasing the number of the international projects and programmes with the foreign partner universities, which will give students the opportunity to undergo training/internship at renowned foreign universities and gain experience of international education.

Activities of the UNESCO Chair 'Higher Technical Education, Applied System Analysis and Informatics' will be focused on solving the pressing problems of modern higher technical education, particularly the achievement of goals set in the 2030 Agenda for Sustainable Development.

Igor Sikorsky Kyiv Polytechnic Institute has become more open and susceptible to the experience of other universities, its interuniversity and international relations have substantially increased, the ample opportunity of spreading one's achievements and experience has arisen.