

Contributions

His major contributions to mathematics, astronomy, astrology, geography and cartography provided foundations for later and even more widespread innovation in algebra, trigonometry, and his other areas of interest. His systematic and logical approach to solving linear and quadratic equations gave shape to the discipline of algebra, a word that is derived from the name of his book on the subject. «The Compendious Book on Calculation by Completion and Balancing». The book was first translated into Latin in the twelfth century.

His book on the Calculation with Hindu Numerals, was principally responsible for the diffusion of the Indian system of numeration in the Middle-East and then Europe. This book also translated into Latin in the twelfth century, as *Algoritmi de numero Indorum*. From the name of the author, rendered in Latin as *algoritmi*, originated the term algorithm. Khwarizmi systematized and corrected Ptolemy's data in geography as regards to Africa and the Middle east. Another major book was his *Kitab surat al-ard* («The Image of the Earth»; translated as *Geography*). He also assisted in the construction of a world map for the caliph al-Ma'mun and participated in a project to determine the circumference of the Earth, supervising the work of 70 geographers to create the map of the then «known world». When his work was copied and transferred to Europe through Latin translations, it had a profound impact on the advancement of basic mathematics in Europe. He also wrote on mechanical devices like the astrolabe and sundial.

Algebra

Kitab al-mukhtar fi hisab al-jabr wa-l-muqabala «The Compendious Book on Calculation by Completion and Balancing» is a mathematical book written approximately 830 CE.

Arithmetic

Khwarizmi's second major work was on the subject of arithmetic, which survived in a Latin translation but was lost in the original Arabic.

Geography

Khwarizmi's third major work is his *Kitab surat al-Ard* «Book on the appearance of the Earth». It is a revised and completed version of Ptolemy's *Geography*, consisting of a list of 2402 coordinates of cities and other geographical features following a general introduction.

Astronomy

Khwarizmi's *Zijal-sindhind* (astronomical tables) is a work consisting of approximately 37 chapters on calendrical and astronomical calculations and 116 tables with calendrical, astronomical and astrological data, as well as a table of sine values. This is one of many Arabic *zijes* based on the Indian astronomical methods known as the *sindhind*.

Jewish calendar

Khwarizmi wrote several other works including a treatise on the Hebrew calendar. It describes the -19 year intercalation cycle, the rules for determining on what day of the week the first day of the month Tishri shall fall; calculates the interval between the Jewish era (creation of Adam) and the Seleucid era; and gives rules for determining the mean longitude of the sun and the moon using the Jewish calendar. Similar material is found in the works of Biruni and Maimonides.



Muhammad ibn Musa Khwarizmi



Muhammad ibn Musa Khwarizmi was a Persian Muslim mathematician, astronomer, astrologer and geographer. He was born in Persia of that time and died around 850. Historians have different interpretations on his life and the origin of his name Khwarizmi.

He studied and wrote many books and treatises. His Algebra was the first book on the systematic solution of linear and quadratic equations. Consequently Khwarizmi is to be considered to be the father of algebra. His contributions not only made a great impact on mathematics, but on language as well. The word algebra is derived from al-*_abr*, one of the two operations used to solve quadratic equations, as described in his book. The words algorism and algorithm stem from *algoritmi*, the Latinization of his name.



وزارت علوم، تحقیقات و فناوری
سازمان پژوهش‌های
علمی و صنعتی ایران



Muhammad ibn Musa Khwarizmi



TAZMINCHI

Javid Consulting Group



As global outbreak of Covid-19 pandemic threatens the entire world, the fight against it has been a very public one. This pandemic has taught us that how crucial scientific discovery is to human flourishing. It also taught us that science is a collaboration. We're seeing that now, as thousands of scientists collaborate across borders, no matter how far they are from each other, to find solutions for this problem collectively. This collaboration is a good example of what the great Iranian poet-Saadi Shirazi- said:

Human being are a member of a whole
In creation of one essence and soul
If one member is afflicted with pain
Other members uneasy will remain

The pandemic has impacted our lives, our economy and nearly every corner of the globe. It has altered the science and business world in historic way and it has rapidly changed our behavior toward online channels. While many companies are challenged to survive, bold companies that are interested in their online business emerged as market leaders. The pandemic also presented opportunity; many new online businesses were set up.

In these difficult times of Covid-19, we, at Javid great family saw it as our public responsibility to be in service to others, especially to new businesses and small and medium enterprises by developing a new online business, called Tazminchi.

Tazminchi is a leading online service in Iran which guarantees the fast and safe delivery of goods to consumers.

We are deeply honored to be a sponsor of the Khwarizmi International Award (KIA) for the second consecutive year.

Dr. Hossein Moradi
General Manager
Javid Consulting Group



ECO Cultural Institute (ECI)



The growing success of science, research and innovation and the application of scientific knowledge have profoundly changed everyday life. Life expectancy has increased strikingly and cures are available for many diseases; agricultural productivity has increased to match demographic developments; and technology has freed humankind from arduous labour. New methods of communication and information handling have brought unprecedented opportunities and challenges. These discoveries or inventions have radically altered the way we view and describe our world, and thereby, have influenced our everyday life.

Obviously, scientific developments never cease, therefore, promotion of science along with the growth of moral values is vital for human enhancement. This calls for the need of culture. It is a misconception to view science and culture as discrete phenomena. Culture requires us to deal with science primarily as a value. Many of the cultural traditions have scientific underpinnings. Societal culture is the combination of beliefs, customs, religions, etc., that exist in a constant state of flux in a society. So, the culture of one society values knowledge, education, research and innovation above all else. In that culture, the more knowledgeable the individuals are the more likely the society is to thrive.

Hence, culture can foster scientific thinking. There are certain moral values, such as empathy, kindness, and philanthropy that are important in setting research priorities in science and in determining the uses of science. There is a need to incorporate these humanitarian values into the science and technology spheres, while maintaining and reinforcing the intrinsic values of science.

Scientific achievement portrays the dignity of the human being and his unique role in the world. A great number of scientists have been at the service of mankind mainly because of their belief in ethical values. Such scientists have saved the lives of countless people. A scientist, who is dedicated his/her life on investigation to relieve human sufferings, deserves honor and reward.

ECO Cultural Institute, as an international organization that has always been committed to fulfill the goals and to enhance national interests of ECO member states, recognizes and rewards the great efforts of all the experts and, in particular, the organizers of this important event which is an effective step in promoting scientific achievements.

I would like to welcome such measures that are carried out to enhance the synergy of actions in favor of humanity and congratulate the distinguished scholars and intellectuals on their great achievement and express much appreciation to the organizers of this prestigious event. I wish them prosperity and all the very best for many years to come.

Sarvar Bakhti
President
ECO Cultural Institute (ECI)



Economic Cooperation Organization (ECO)



Science and technology are crucially important in today's world of Knowledge Economy. In this period of time where we are approaching to Fourth Industrial Revolution, the COVID-19 pandemic has enhanced the importance of already well recognized need for swift scientific research in order to meet the challenges of the existing situation and sustainable development in the post COVID-19 era.

Apart from creating many challenges, the COVID-19 has also opened up many opportunities for developing regions such as ECO region. For centuries, our region had been the epicentre of great scientific research and undeniably enjoyed a position of eminence due to its notable contributions to scientific advancements. The region still possesses vast potential in terms of both human and material resources to regain the lead role. We must draw on our achievements of the past to build a strong legacy for the generations to come and the glowing history of our region must inspire us to regain the status of eminence in research and science, we once enjoyed.

In view of speedy developments in science and emerging trends in technology at global level, encouragement and motivation to our researchers and scientists is essentially required to catch the present world in science and technology. In this regard, the efforts of the Iranian Research Organization for Science and Technology (IROST) in curtailing R&D gap between the developed and developing countries by promoting scientific research and technological development are deeply acknowledged. In this regard, awards like the Khwarizmi International Award are instrumental to inspire brilliant and promising minds in scientific research and innovations.

Established in 1987, in the memory of Abu Jafar Mohammad Ibn Mousa Khwarizmi, the great Iranian Mathematician and Astronomer (770-840 C.E), the Khwarizmi International Award is a true manifestation of the endeavour of IROST to encourage researchers, scientists, engineers and for their valuable achievements and contributions in the field of science and technology. I would like to avail this opportunity to congratulate IROST for institutionalizing and supporting this prestigious international award.

I would also like to offer my felicitations to the winners of the 34th Khwarizmi International Award. I take this opportunity to wish them the best in their future endeavours and I am confident that this prestigious award will provide them a strong encouragement and motivation for continuing their hard work in the respective fields of science and technology.

Dr. Hadi Soleimanpour
ECO Secretary General



Commission on Science and Technology for Sustainable Development in the South (COMSATS)



On behalf of the Secretariat of the Commission on Science and Technology for Sustainable Development in the South (COMSATS), I extend my heartiest felicitations to the winners of 34th Khwarizmi International Award (KIA) for their contributions that hold considerable significance in the realm of science, technology and innovation. COMSATS greatly acknowledges the efforts of the Iranian Research Organization for Science and Technology (IROST) for successfully organizing this prestigious Award since 2000 and COMSATS has the honour of supporting the same.

The world today is facing an unprecedented challenge of COVID-19 that has shaken the economies across the world irrespective of their socio-economic status. The pandemic has also exacerbated the existing challenges relating to healthcare, food security, poverty, etc., as the resources and attention are shifted towards combating the pandemic. Fighting such pandemics demands collective efforts through pooling of human, technological and financial resources to help address negative fallouts on various sectors of the economy. The pandemic has further emphasized the need for countries to invest in science, technology and innovation as the post-COVID19 world would be much different from what it was earlier. Science and technology, particularly IT, is expected to play an increasingly important role in our daily lives through e-learning, e-health, e-agriculture, artificial intelligence, etc., to cope with the post COVID-19 challenges. COMSATS is willing and ready to play its role in this regard.

COMSATS is an international/intergovernmental organization established in 1994. It stands committed to bring sustainability in the South by sensitizing it to the centrality of Science and Technology in socio-economic development. Presently, COMSATS has 27 Member States across three continents, Africa, Asia and Latin America. COMSATS' scientific and technological strength comes from its Network of 24 International S&T Centres of Excellence that are reputed centres/universities of science and technology in the developing world, including IROST, Iran, which regularly participate in the exchange of scientific know-how and sharing of technologies / resources.

IROST is one of the most active Centres of Excellence of COMSATS. In collaboration with IROST, COMSATS has been organizing various capacity building programmes in Iran, with the aim of building indigenous capacities of the scientists and institutions of Member Countries. COMSATS is also collaborating with various international organizations and development agencies to facilitate South-South and Triangular Cooperation in the fields of science and technology.

Once again, I would like to acknowledge IROST for organizing the Khwarizmi International Award as a meaningful way to promote the tradition of innovation and modernization and encouraging the scientists and researchers to continue their scientific achievements.

DR. S. M. JUNAID ZAIDI
Hilal-i-Imtiaz, Sitara-i-Imtiaz
Executive Director
COMSATS



World Intellectual Property Organization (WIPO)



On behalf of the World Intellectual Property Organization (WIPO), I should like to congratulate the laureates of this year's Khwarizmi International Award, which recognizes outstanding scientific achievements made by innovators from all over the world.

The Iranian Research Organization for Science and Technology (IROST) is at the forefront of efforts to encourage innovation in Islamic Republic of Iran. WIPO has supported the prestigious Khwarizmi International Award since 1987. WIPO's support is in the form of a gold medal and a certificate presented to the first laureate in the innovation category. The WIPO Awards program fosters a culture in which innovation and creativity are encouraged and recognized at every level of society. It celebrates and acknowledges the achievements of inventors and creators around the world.

This is of paramount importance given WIPO's mandate to promote innovation and creativity through the use of intellectual property. WIPO is the world's innovation agency. We are actively engaged in collaborating with our Member States to promote a better understanding of the many benefits of an efficient and dynamic intellectual property system. The intellectual property system exists to incentivize innovation and creativity. It is a key tool in helping innovators to navigate the journey from a simple idea to a marketable asset.

The Khwarizmi International Award is named in memory of the scholar Muḥammad ibn Mūsā al-Khwārizmī, who made outstanding contributions to mathematics, geography, astronomy and cartography. Al-Khwārizmī, who established the foundations of algebra and trigonometry, is one of a line of many notable Iranian innovators in fields ranging from agriculture to music.

Human progress hinges on our ability to continue to innovate. As such, we must continue to celebrate and incentivize innovators everywhere. I salute the organizers of the Khwarizmi International Award and once again congratulate all participants – not just the laureates – and the important contribution they are making in pushing the boundaries of knowledge.

Daren Tang
Director General
WIPO



National Sponsors

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(MSRT)



National Elite Foundation

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International Sponsors

World Intellectual Property Organization
(WIPO)



Iranian National Commission for UNESCO

Islamic World Educational, Scientific and Cultural Organization
(ICESCO)



Commission on Science and Technology for Sustainable
Development in the South (COMSATS)

Organization of Islamic Cooperation Standing Committee on
Scientific and Technological Cooperation (COMSTECH)



Economic Cooperation Organization
(ECO)

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International Sponsors Prizes

The World Intellectual Property Organization (WIPO)

Medals and certificates



The Iranian National Commission for UNESCO

Certificates



Commission on Science and Technology for Sustainable Development in the South (COMSATS)

Certificates



Islamic World Educational, Scientific and Cultural Organization (ICESCO)

Certificates



ECO Cultural Institute (ECI)

Certificates





وزارت علوم، تحقیقات و فناوری
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علمی و صنعتی ایران



34th Khwarizmi International Award Valuable Prizes, Certificates and KIA Amber Trophy



Outstanding Researchers



Prof. Madjid Samii

Session: **27th KIA**

March 2, 2014

Research Work Title: Prominent role in taking "Global knowledge border on neurosurgery" forward and continuing in improving the quality of neurosurgery in Iran.

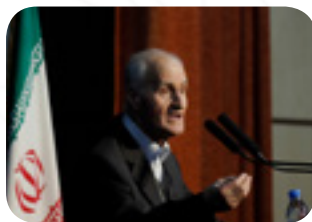


Prof. Hasan Tajbakhsh, D.M.V., Ph.D

Session: **28th KIA**

March 3, 2015

Research Work Title: Revival of traditional Iranian Medicine and a glance at history of human and veterinary surgery in Iran.



Prof. Seyed Mohammad Bolourchian Tabrizi

Session: **30th KIA**

February 13, 2017

Research Work Title: Developing knowledge of organosilicon compounds in Iran.



Prof. Hosein Zomorshidi

Session: **31st KIA**

February 24, 2018

Research Work Title: Iranian traditional architecture systematization with drawing design approach to sacred arts.



Prof. Parviz Davami

Session: **32nd KIA**

March 4, 2019

Research Work Title: The effective role in theoretical and applied development of materials and metallurgy engineering in Iran.



Prof. Mahmoud Yaghoubi

Session: **33rd KIA**

February 17, 2020

Research Work Title: Development of solar thermal power plant technology in Iran.



Outstanding Researcher Section



Over the past thirty -four years, the Khwarizmi International Award smoothly pursued its evolution at a sustained pace. Both scientific and executive boards built further on what has already been established and acquired, they made the Khwarizmi International Award grows and flourishes, with the view to promoting the country's development, with the recognition and celebration of outstanding scientists. The Khwarizmi International Award has become a solid institution among researchers, academics and industrials.

On the eve of the 27th session, a new idea begun to blossom into reality, with the creation of a new section "Outstanding Researcher". This new section will recognize, at each session, a national outstanding researcher. With the creation of this new section, the KIA engaged itself to celebrate, each year, the intellectual capital of this country, to honour outstanding scientists for their prestigious research career, their significant role in science and culture, with the purpose of enhancing the sustainable development of the country. Recognized scientists are recommended. "The Outstanding Researcher" is also selected according her/his academic rank, publications, academic and research career.

She/he should have played, during her/his life, a significant role in the development of science and technology, promoted the national and Islamic culture, defended fundamental social values, and presented the Iranian wealth to Iranian people and across the globe.



Quotes from the KIA laureates of the 33rd Session



**Prof. Seyed Mohammad
SHAHIDEHPOUR**

Institute

Illinois Institute of Technology

Country

Iranian resident in the U.S.A

Dear Chairman,
I have been granted many awards in my 40 year career as distinguished professor of electrical engineering. However, KIA has a special place in my technical portfolio, and is manifested as a significant recognition of my contributions to engineering and science, which I will cherish for the rest of my life. I have attached a one page bio of my activities.



Prof. Se-Kwon KIM

Institute

**College of Science and
Technology**

Country

South Korea

Dear Chairman,
I am honored and humbled to receive this prestigious Khwarizmi International Award which is organized by the Iranian Organization for Science and Technology (IROST). This award will motivate senior researchers like me to perform and work for innovation and invention throughout my life to solve several issues for better human kind.
Admired about your organization's conduction of event and hospitality for the researcher. I wish all the best for the organization and all the awardees.



The Laureate Successful in National Production

Head

Allahyari, A.

Members

Anvari, A.

Moradi, A.

Falah Haghighi Seighalani, N.

Safavi, S.M.

Executive Committee Members

Eliassi, A.

Allahyari, A.

Mahmoudi Najafi, S.H.

Labafi, Y.

Farahmand Nejad, M.R.

Gorgin, S.

Maleknia, M.

Khosh Kholgh, R.

Avarzamani, F.

Bidar, M.

Hoseini, M.

Jask, F.

Memari, J.

Moradi, A.

Rahimi, Z.

Rezaei, M.

Sadraei, H.

Shokri, Z.

Vahedi, A.

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Dehghan, A.

Habib Pour, R.

Hoseiny, H.

Ghanbary, Z.

Nouredini, A.

Ozgoli, H.A.

Rajabi, M.



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Bagheri, A.	Mahjouri Majd, N.
Beheshti Aval, S.B.	Masoudi, M.
Fakhri, M.	Mousavi, S.M.
Kalantari, F.	Ostad Tehrani, M.J.
Karami Mohammadi, R.	Rahim Zadegan, M.
Khalifehlou, S.A.	

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Fatemi, S.	Mahmoudi Bakhtiari, B.
Khaghani, S.	Mohammad Kari, B.

Materials, Metallurgy & New Energies

Head

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Esmaelian, M.	Shahri, F.
Gholamipour, R.	Shirvani, K.

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Arasti, M.R.	Khani Jazani, J.
Armaghan, N.	Manteghi, M.
Falah Haghighi, N.	Seraji, T.

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Safavi, S.M.

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Aziz Mohseni, F.	Ofoghi, H.
Bakhtiari, N.	Saadatnia, G.
Ghobad Nejad, M.	Tekade, R.
Hadi Zadeh, M.	Zare, D.
Jafari, S.	



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Zandi, M.

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Akbari Eidgahi, M.R.	Majazi Amiri, B.
Atapour, M.	Mirvaghefi, A.
Bagheri Varzaneh, M.	Mirzaei, S.
Boushehri, S.M.Sh.	Mohammadi Bazargan, M.
Choukhachi Zadeh Moghadam, M.	Norouzian, A.
Hashemi Garmdareh, S.E.	Panahi, R.
Hossein Pour, B.	Rezaei Tavabea, K.
Ikdari, S.	Sanjabi, M.R.
Javadi, S.	Soltani, J.
Kiani Rad, M.	Tafaghodinia, B.
Labbafi, Y.	Zonouzi, A.

Basic Sciences

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Haj Esmail Beigi, F.

Members

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Khakshournia, S.	Sheibani, Sh.
Mahjour Shafiei, M.	Soleymani Damane, M.
Rahim Pour Bonab, H.	

Biotechnology, Environment & Basic Medical Sciences

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Farazmand, A.

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Amini Bayat, Z.	Kiyani Rad, M.
Azin, M.	Mirdamadi, S.S.
Aziz Mohsseni, F.	Ofoghi, H.
Bakhtiari, M.R.	Rostami, Kh.
Bakhtiari, N.	Saadatnia, G.
Esfehani Boland Balaei, Z.	Safavi, M.
Ghobad Nejad, M.	Salami, F.
Hadizadeh, M.	Sheikhinejad, A.
Hemmat, J.	Sohrabi, M.
Hosseini Pajouh, Kh.	Vaez, M.
Jafari, S.	Zare, D.



Specialized Scientific Committees

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Amiri, Sh.	Khorasani, M.T.
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Chizari, Z.	Mohamad Khani, G. R.
Davarpanah, M.	Moradi, L.
Farahani, G.R.	Nafisi, V.R.
Eghbal, M.	Shojaodini, S.V.

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Farhani Baghlani, F.

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Amini, M.	Malekian, M. M.
Anvari, A.	Mobini, A.
Bakhtiari, H.	Ozgoli, H.A.
Fazli, H.	Salavati Zadeh, A.
Ghadamian, H.	Seyedi Niaki, K.
Gharashi, H.	Tahaani, M.

Chemical Technologies/ Nanotechnology

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Khandan, N.

Members

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Bahreini, Z.	Ranjbar, M.
Habib Pour, R.	Saffar Zadeh Matin, Sh.
Javanmard, M.	Sadeghi, D.
Latifi, S.M.	Sedrpooshan, A.R.
Mahmoudi Najafi, S.H.	Shalmashi, A.
Mozafari, S.A.	Shokrollah Zadeh, S.
Omidi, T.	Torabi Zadeh, H.
Orouz Zadeh, N.	



Grand Jury Members

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Chairman of the 34th Khwarizmi International Award

Prof. Akhlaghi, F.

University of Tehran

Dr. Abdollah, A.

Amir Kabir University of Technology

Prof. Zand, E.

Agricultural Research, Education and Extension Organization

Prof. Semnianian, S.

Tarbiat Modares University

Prof. Sherafat, S. A.

Tarbiat Modares University

Dr. Ghezelayagh, M. H.

Malek Ashtar University of Technology

Prof. Latifi, H.

Shahid Beheshti University

Prof. Faraji Dana, R.

University of Tehran

Prof. Abdkhodaie, M. J.

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Iranian Research Organization for Science and Technology

Prof. Joghataie, M. T.

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Prof. Mohannazadeh, F.

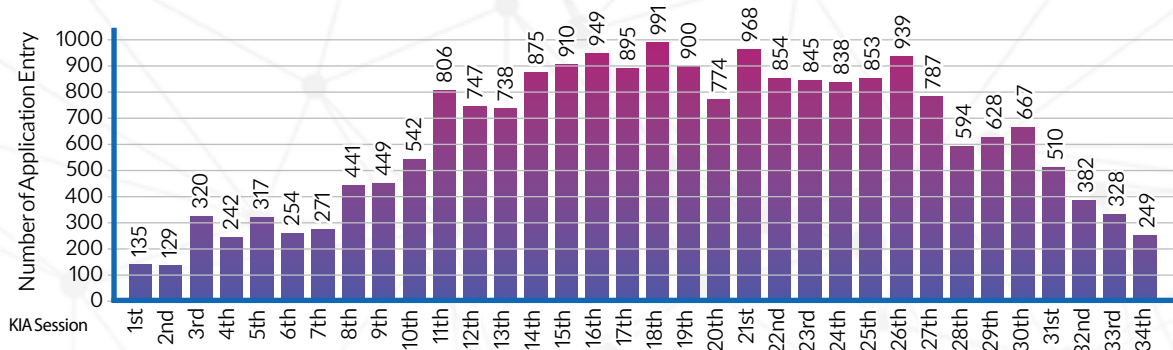
Iranian Research Organization for Science and Technology

Dr. Allahyari, A.

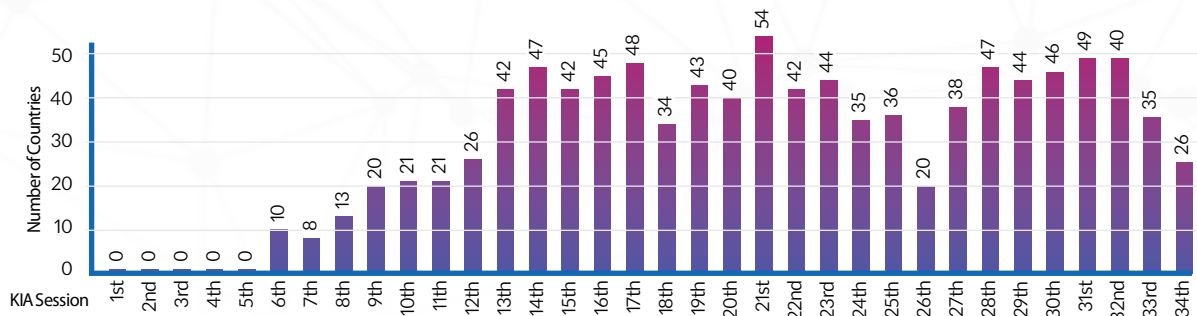
Executive Chairman of the 34th Khwarizmi International Award



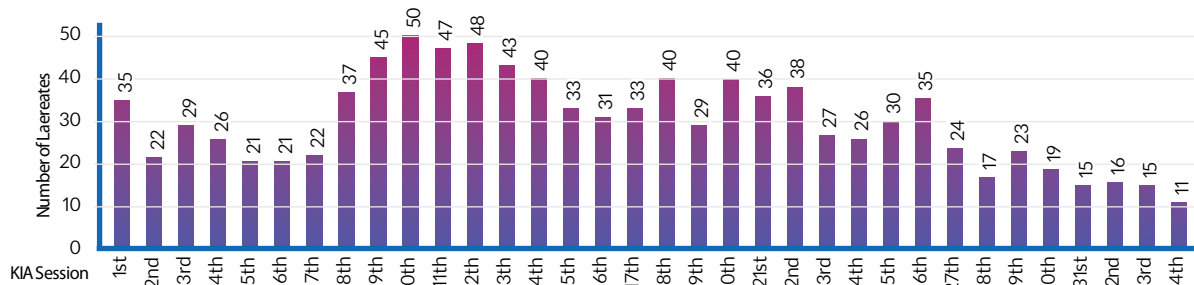
Total application entry during the 34 sessions of the KIA



Participating countries during the 34 sessions of the KIA



Total Laureates during the 34 sessions of the KIA





KIA Laureates - National Section, 34th session

No.	Category	Scientific Committee	First KIA Laureate	Second KIA Laureate	Third KIA Laureate	Total
1	Outstanding Researcher	Basic Sciences	1			1
2	Applied Research	Mechanics	1		1	2
3	Research & Development	Electronics & Computer		2	1	3
		Mechanics		1		1
		Materials, Metallurgy & New Energies			1	1
4	Invention & Innovation	Electronics & Computer			1	1
Total			2	3	4	9

KIA Laureates – Foreign Section, 34th session

No.	Category	Scientific Committee	Country	KIA Laureate	Total
1	Fundamental Research	Materials, Metallurgy & New Energies	Switzerland	1	1
		Chemical Technologies	The People's Republic of China	1	1
Total					2

Application Entry of the 34th Khwarizmi International Award According to the Field of Participation

No.	Scientific Committee Field	National Section	Foreign and Iranian Residing Abroad Section	Total Application Entry
1	Electronics & Computer	34	7	41
2	Biotechnology & Basic Medical Sciences	11	2	13
3	Chemical Technologies	13	9	22
4	KIA Laureate successful in national production	7	-	7
5	Industry & Technology Management	6	1	7
6	Basic Sciences	11	3	14
7	Medical Sciences	-	9	9
8	Civil Engineering	7	-	7
9	Nanotechnology	10	-	10
10	Agriculture & Natural Resources	16	7	23
11	Environment	5	-	5
12	Mechatronics	11	-	11
13	Mechanics	16	4	20
14	Materials, Metallurgy & New Energies	16	5	21
15	Software & Information Technology	18	-	18
16	Architecture & Urban Planning	8	-	8
17	Arts	6	-	6
18	Aerospace	7	-	7
TOTAL		202	47	249



Procedure

The Khwarizmi International Award includes five sections, national section, foreign section and the Iranian researchers residing abroad section, the KIA Laureate who has impact on the national production section and at last another section dedicated to the Outstanding Researcher.

The call for participation of the 34th Khwarizmi International Award has been launched in April, 2020, in four languages: English, German, French and Spanish. The Khwarizmi International Award deals with four categories of research, fundamental research, applied research, development research, invention and innovation.

The candidates are allowed to participate in different scientific fields, electrical and computer engineering, mechanics, mechatronics, chemical technologies, nanotechnology, materials, metallurgy and new technologies, information technology, industry and technology management, biotechnology and basic sciences, medicine, agriculture and natural resources, environment, basic sciences, civil engineering, aerospace, architecture and urbanization, arts, medical sciences.

The deadline of submission was end of October, 2020 for the national section and first of November, 2020 for the Foreign Section. The applications submitted on-line were forwarded on-line to eighteen scientific committees. These scientific committees, each composed of different scientific groups, examined each application according to determined criteria. At the end, the head of each scientific committee presented the names of the finalists to the Grand Jury of the KIA.

Regarding this session, 202 applications for the national section and 47 for the foreign section, from 26 different foreign countries, reached the secretariat. Of the total of the candidatures received, 18 were declared finalists by the eighteen scientific committees; their recommended candidatures were forwarded to the KIA Grand Jury for final selection.

The KIA Grand Jury, whose members are prominent national researchers in their respective disciplines, is presided over by the President of IROST and the Chairman of the 34th session of the KIA. After hours of presentation, and deliberations, the Grand Jury finally selected 9 KIA Laureates for the KIA national section and 2 KIA Laureates for the Foreign Section, the foreign KIA Laureates come from the People's Republic of China and Switzerland.

The thirty-fourth session of the Khwarizmi International Award

Like for many other international events, the COVID-19 pandemic has caused many events around the world to be cancelled or postponed due to the international imposed restrictions. But the KIA, as an international institution did not have to stop, it faced the COVID-19 outbreak as a challenge and still monitored, in an accurate manner, all the procedure with a maximum safety precautions.

The directory of the KIA Laureates including National, International and Youth sections has been reviewed. Indeed emphasis has been laid on the reviewing and editing of this directory because the development of this database is an evolutionary process. This database will serve a dynamic community of scientists and deciders during its lifetime and obviously will need to change to meet their changing requirements.

This unprecedented data bank contains more than 2000 records in English and Persian, KIA Laureates are searchable by research work title, name, keywords, and field of research, year and session.

This directory is accessible at the following address: <https://Kia-kahroba.ir/laureates>

The 34th session would not have become a success without the huge commitment and active contribution from our sponsors and partners. The KIA team wishes to express its gratitude for their continued support.

The permanent secretariat deems it necessary to also sincerely thank all the participants who presented their candidature, all the IROST colleagues who proudly serve this event, scientific committees' members, the Grand Jury's members, the executive committee's members, the chairman, H.E. the President of IROST and his deputies, and H.E. the Minister of Science, Research and Technology whom with their strong support and trust contributed to the excellence and success of the 34th session.

**Khwarizmi International Award
Permanent Secretariat
February, 2021**



A mirror reflecting the country's scientific achievements

The Khwarizmi International Award is a tested approach for introducing outstanding national and international scientists to a wider audience and for recognizing scientists who through their scientific knowledge and innovations, make the today's world, brighter and more secure. These people with exceptional scientific achievements have an excellent knowledge about the world, and particularly about the increasing scientific development in health, agriculture, environment, engineering, communications, materials, water and soil and cosmos, they all work for the betterment of their people and other nations.

The Khwarizmi International Award has been founded in 1987, after the victory of the Islamic Revolution of Iran. Three decades of success have passed, and this scientific contest is today recognized as the oldest and unique regular scientific event.

From the first sessions, the importance for organizing such event was perceived by the national authorities, particularly the Ministry of Culture and Higher Education. From its birth date, authorities believed in this event and were completely aware of its promising and vibrant future. From the beginning, due to its primary importance, it has become a tradition that the Khwarizmi Award is presented by H.E. the President of the I. Rep. of Iran.

Today, it is gratifying to see that, thanks to all the great efforts of the executive and scientific organizers, in the Iranian Research Organization for Science and Technology and the strong support of all the consecutive ministers and deputies of the Ministry of Science, Research and Technology, the Khwarizmi Award has become a sustainable, fruitful, national and international event.

The KIA is aware that a team research is the source of some of the great scientific breakthroughs of all time, it comprises a group of people working together in a committed way towards a common research goal. All these researchers knew how to tackle complex and important problems and consequently produced better work because they took on more ambitious projects. These are those who entered the KIA competition. The KIA recognize them and traditionally mention all the team members and its documents.

Laureates are selected through a strict procedure. The most important criterion is scientific excellence. Since the inception of the KIA, the number of KIA Laureates today, reach the number of thousand.

The KIA Laureate must have an outstanding research and publication record in her or his field, the same for her or his influence on the field of research. The KIA Laureates are all key figures in their fields and made major contributions in their research field.

The unique KIA data base is very well structured. Browsing and searching through the long list of the Laureates, KIA Jury members, KIA scientific committees' members is an unique experience for each scientist or expert, many familiar names of scientists who are playing a crucial role in the scientific world are listed. This demonstrates the value, the impact and dynamism of the Khwarizmi Awards.

The archive of the secretariat carefully keeps and treasures all the participants' records, photos, films, newsletters, special editions, all the regulations, the hard and electronic copies of published documents and reports.

This rich archive is today providing us with a valuable database that may allow the monitoring and observation of the national scientific development trend during the last past forty years but moreover, if we add the names of more than 200 foreign scientists and Iranian scientists residing abroad who participated in this scientific contest, from 50 different countries, we realize that the Khwarizmi International award is not only a simple event, a ministerial policy, or just an international platform. Indeed, the Khwarizmi International Award aside from reflecting the dynamism and the self-esteem of the Iranian scholars, it shows the ongoing efforts of the Islamic Republic of Iran to guide the youth and researchers along the pursuit of a sustainable development.

Sponsorship

After 34 years, the number of sponsors, who has offered their sponsorship to the KIA through all these years, increased to ninety seven, which include governmental, private, scientific, economic, national and international organizations. This increasing number of sponsors serves illustrates the fact that KIA is a sought-after event.



وزارت علوم، تحقیقات و فناوری
سازمان پژوهش‌های
علمی و صنعتی ایران



Secretariat Report 34th Khwarizmi International Award

Fundamental Research

Scientific Committee

Materials, Metallurgy and New Energies

Research
Work Title

Perovskite Solar Cells

Researcher

Prof. Mohammad Khaja Nazeeruddin

Country

Switzerland

Field

Solar Energy Conversion

Scientific Affiliation

École Polytechnique Fédérale de Lausanne
(EPFL)

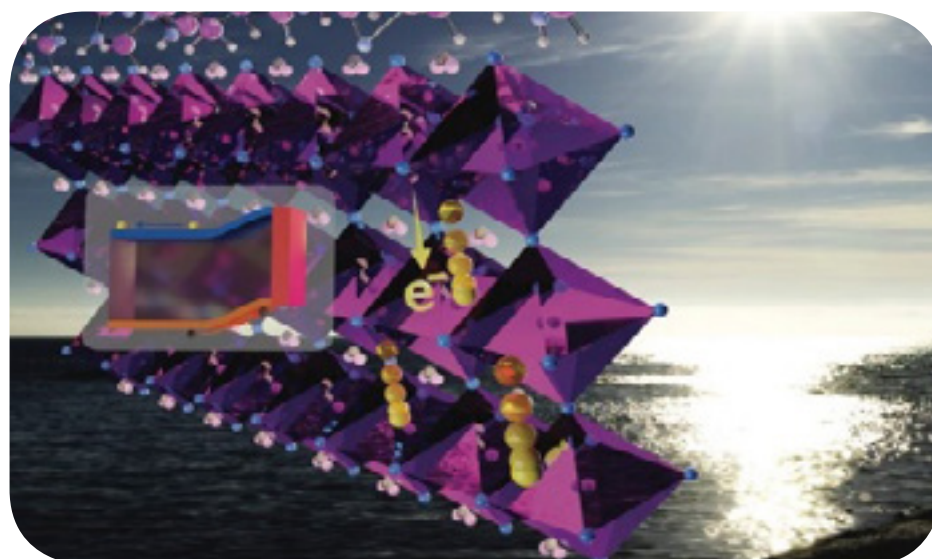


Abstract

Perovskite Solar Cells (PSC) are a new paradigm in renewable energy because of their high efficiency reaching over 25%. The Perovskite Solar Cells' high efficiency is due to their excellent optoelectronic properties, which were optimized by various cations and anions with different ratios. Another advantage of Perovskite Solar Cells is their simple fabrication through solution-processing methods, either in n-i-p or p-i-n configurations. However, the PSCs' long-term stability is still a significant concern and is the bottleneck to commercialization. We have developed strategies to enhance the stability by using functionalized ionic liquids as additives and interface engineering by hydrophobic 2-Dimensional perovskite materials, preventing ion migration and protecting the perovskite absorber. The long-term stability of unencapsulated devices under one sun illumination retains >95% of their original efficiencies after 1000 h aging.

Biography

Prof. Nazeeruddin's current research at EPFL focuses on Perovskite Solar Cells and Light-emitting diodes. He has published over 725 papers, with an h-index of 147 and inventor of 90 patents. According to the Web of Science in 2016, he is the 5th most cited chemist in the world and is one of the 19 scientists identified by Thomson Reuters as the World's Most Influential Scientific Minds in 2015. He has been named Thomson Reuters "Highly Cited Researcher" from 2014 to 2020 and listed among the Top 10 researchers in the Perovskite Solar Cell research field by the Times Higher Education. He has been appointed as World Class University professor by the Korea University, elected to the European Academy of Sciences, Fellow of The Royal Society of Chemistry, and Fellow of Telangana Academy of Sciences.



Fundamental Research

Scientific Committee Chemical Technologies

Research Work Title | Discovering and Establishing Super-Wettability System: from Fundamental Understanding to Innovative Applications

Researcher

Prof. Lei Jiang

Country

The People's Republic of China

Field

Bioinspired Super-wettability System and Beyond

Scientific Affiliation

School of Chemistry and Environment, Beijing University of Aeronautics and Astronautics

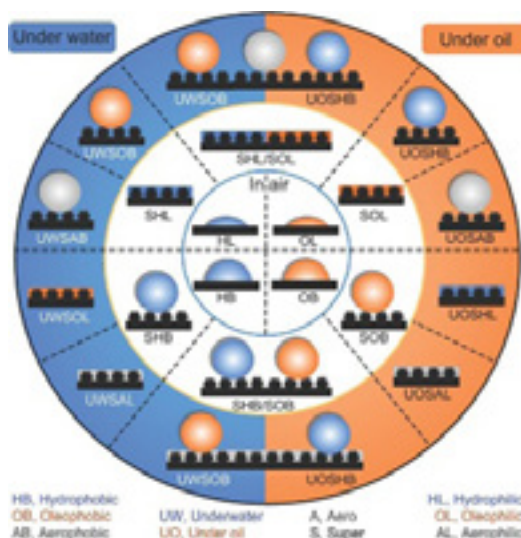


Abstract

Prof. Lei Jiang has refined and summarized various special wettability properties of the surface interface, and continuously deepened the understanding of the basic theory of interface chemistry, including superhydrophobicity, superhydrophilicity, superoleophobicity and superoleophilicity in air; superoleophilicity, superoleophobicity, superaerophilicity, and superaerophobicity under water; and superhydrophilicity, superhydrophobicity, superaerophilicity, and superaerophobicity under oil. In total, 64 wetting states are counted for the interface material system. He has discovered and summarized three basic principles of superwettability: (1) The static wetting is determined by the cooperative effect of micro/nano structure and surface energy; (2) The transition point of the superlyophilicity and superlyophobicity on the nanostructure is the lyophilicity-lyophobicity limitation; (3) The direction of liquid transport is regulated by chemical composition gradient, rough gradient, curvature gradient, etc. Based on these principles, his research team further extended the superwettability interfacial material systems to interfacial chemistry.

Biography

Lei Jiang received his B.S. degree in solid state physics (1987), and M.S. degree in physical chemistry (1990) from Jilin University in China. From 1992 to 1994, he studied at the University of Tokyo in Japan as a China-Japan joint course Ph.D. student and received his Ph.D. degree from Jilin University of China. In 1996, he worked as researcher in Kanagawa Academy of Sciences and Technology. In 1999, he joined the Institute of Chemistry, Chinese Academy of Sciences (CAS). In 2015, he moved to the Technical Institute of Physics and Chemistry, CAS. Since 2008, he has also served as the dean of the School of Chemistry and Environment at Beihang University. He was elected as a member of the Chinese Academy of Sciences and The World Academy of Sciences in 2009 and 2012. In 2016, he was also elected as a foreign member of the US National Academy of Engineering. He also published more than 700 SCI journal articles, with an H index of 163. He has been recognized for his accomplishments with the Humboldt Research Award (Germany, 2017), Nikkei Asia Prize (Japan, 2016), MRS Mid-Career Researcher Award (USA, 2014), National Natural Science Award (China, 2005).



Third Laureate Invention & Innovation

Scientific Committee
Electronics & Computer

Research
Work Title

The Method and Device for High Frequency Movement Recording
Based on Multi-Positioning in a Single Frame (AFRA system)

Executive Organization

International Institute of
Earthquake Engineering and
Seismology (IIEES)

Representative

Hossein Jahankhah

Collaborator Organization

Mohammad Ali Goudarzi, Mohammad Mahdi
Kabiri



Abstract

AFRA system is an innovation in the field of image processing for recording data in laboratory tests and dynamic displacement measurements. This system is based on the new method of multi-position recording in a single frame and provides the possibility of recording the history of object movements with high frequency and high speed for ordinary cameras. This system consists of three parts: an ordinary camera, an AFRA light marker and an AFRA software. By installing the AFRA marker on a moving object, capturing its motions by a simple camera and analysing the film by the AFRA software, the history of the object's motions can be estimated. The idea developed in this invention improves the existing capabilities in the field of image processing and provide the possibility of recording spatial positions at frequencies much higher than the camera is filming frequency. The operation of this system is based on the timing and spatial-temporal control of the AFRA light marker. AFRA optical marker is a hardware that, with the help of an encoded microcontroller, assigns different times of a target point to different spatial positions in the image space. The main achievement of this system is the conversion of an ordinary camera into a high-speed one to record the dynamic movements of the target points. If the main advantages of this system over high-speed cameras are considered, it should be noted that the AFRA system allows video recording for much longer durations of time while maintaining the quality, speed and volume of data storage. In addition, the speed of data analysis in the AFRA system is much higher than that of the videos obtained from high-speed cameras. Other advantages of this system compared to LVDTs, as a well-known tool for recording movement, are also notable; this system does not need a data logger and provides a non-contact motion capturing basis; it has the ability to record the movements of several points simultaneously. Also, its maximum amplitude of recordable displacement can be adjusted; In addition to the ability to record rotational movements, unlike LVDTs, which should touch the body directly, it does not have negative sensitivity to simultaneous displacement in orthogonal directions. The frequency range that can be covered by this system is also much wider than LVDTs.



Third Laureate

Research & Development



Scientific Committee
Electronic & Computer

Research
Work Title

Satellite Platform and Imaging Payload Software Simulation System

Executive Organization

Iranian Space Research
Centre, Satellite Systems
Institute

Representative

Aboulfazl Dayyani

Collaborators

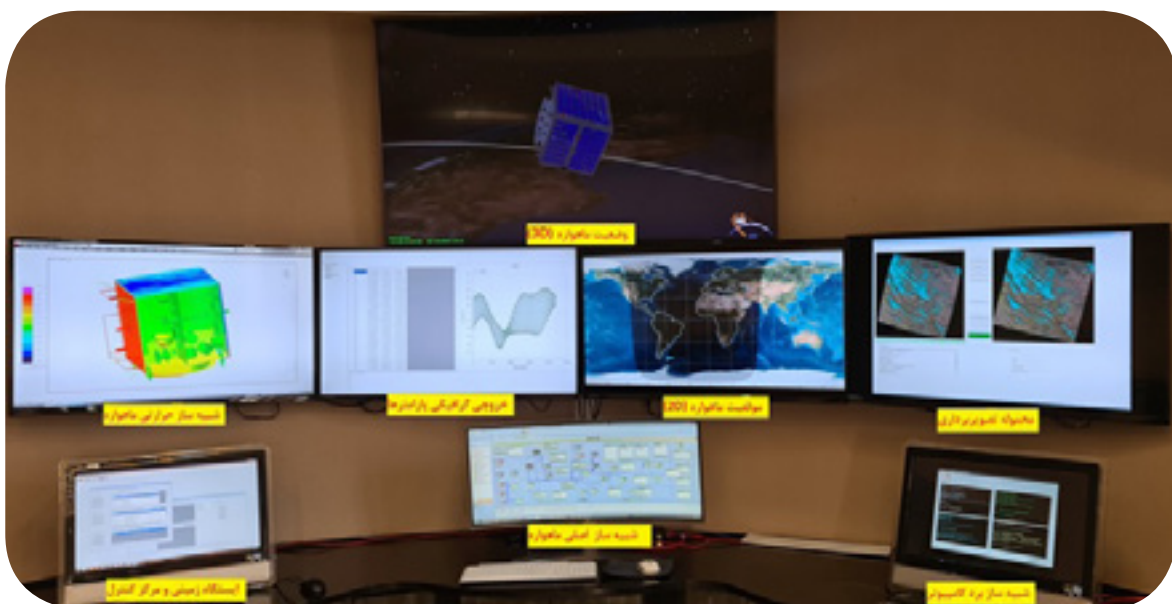
Mansour Rajaei, Farhad Bagher Oskoei, Hossein Sohanian Haghighi, Mohsen Abedi, Javad Hagh Shenas, Tahereh Boromand Nejad, Elham Hoseini, Masoud Khoshsima, Fatemeh Salar Kaleji, Nafiseh Namazipour, Behzad Mohasel Afshari, Shirin Ranjbaran, Saed Salehi, Mojtaba Talezari, Hamideh Daneshvar, Nazanin Shafaei, Mostafa Soury Baba Kamali, Ali Haji Khalouei, Peyman Nikpey, Behzad Hakim Elahi, Amaj Chamankar



Abstract

Satellite platform and imaging payload software simulation system is a software system using WPF and plug-in technology in the Satellite Systems Institute of Iranian Space Research Centre. This system develops the satellite subsystems software and allows the developers to verify and validate it at a higher speed, lower cost and better reliability. The system also makes it possible to use it in ground operations to train the operations team, simulate flight operations and evaluate mission scenarios before they are actually carried out. In addition to the possibility of developing satellite platform subsystems, this system can be evaluated and validated in interaction with the space environment and other subsystems as well as imaging payload parameters. Significant features of this system are:

- Independent from the mission and class of satellites
- Scalable (from one subsystem to all subsystems as plug-ins can be used in closed-loop software)
- The computer board is modelled using QEMU open source software, which is a new technology for computer on the board simulation, and runs executable software on a personal computer without the need to change the code.
- It has system capabilities such as visualization facility, imaging payload, space environment and the possibility of connecting to the ground control centre.
- It has multi-purpose applications: software development, functional tests, ground operations (training / analysis) and imaging payload assessment.





Third Laureate Research & Development

Scientific Committee

Materials, Metallurgy and New Energies

Research
Work Title

Producing Internal Silencer for Gas Pressure Reduction Lines

Executive Organization

Academic Centre for Education,
Culture and Research (ACECR) -
Mashhad Branch

Representative

Ahmad Moloodi

Collaborators

Ahmad Moloodi, Akram Salehi, Faezeh Barzegar,
Morteza Amirabadi, Mansooreh Jafari Esfad,
Masoud Golestanipour, Hossein Amini
Mashhadi



Abstract

Flow control regulators are used to control consumption as well as reducing pressure in fluid pressure reducing stations such as gas. This leads to turbulence and increased noise pollution. The silencer produced in ACECR is used as a sound absorber in fluid pressure reducing stations due to its porous structure. The unique feature of this product is that the silencer produced in ACECR is installed directly inside the closure of the axial flow valve in the gas pressure reducing regulator and does not require any accessories. Further, it does not cut the gas pipe without any pressure loss.

With the help of the branching method, the fluid flow passes through several small pores (silencer pores) instead of passing through a large hole in the control valve. In this route, as the number of pores increases, the sound decreases. This is because the smaller pores produce the sound at a higher frequency, and the high-frequency sound has higher levels of attenuation while passing through the pipe wall and control valve.



Second Laureate Research & Development

Scientific Committee
Mechanics



Research
Work Title

Design and Manufacture of a Waterjet Propulsion System

Executive Organization

Marine Industries Organization

Representative

Ali Asghar Pashaee



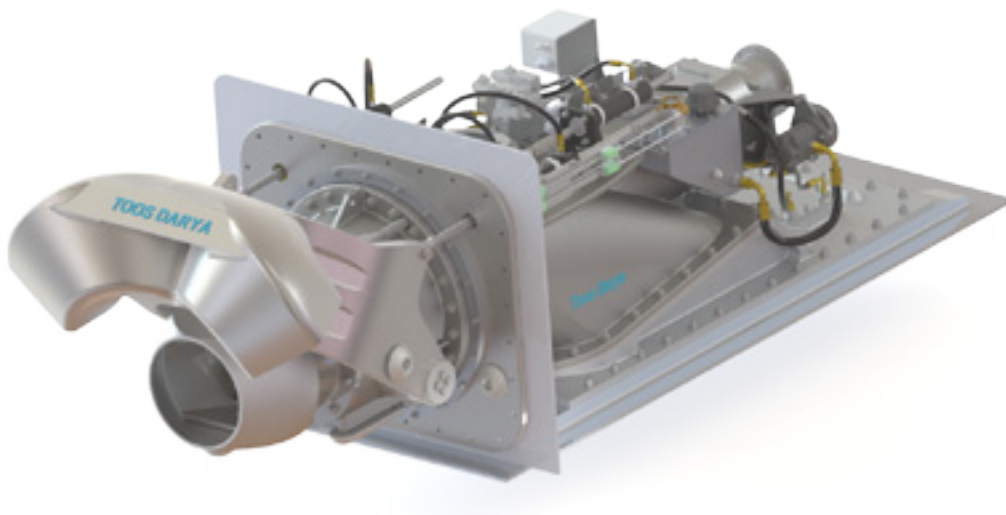
Abstract

Waterjet as a propulsion system consists of a pump installed at the transom of marine vessels. A prime mover (diesel, 4 stroke engine, turbine, etc.) is used to revolve a waterjet axis. Sea water enters the waterjet at the bottom of the vessel. When the pressure increases, water is expelled by huge velocity by a nozzle. This causes a thrusting force.

The advantages of the waterjet propulsion are as below:

- Excellent manoeuvring, especially at low speeds, with the ability of turning and berthing
- A good choice for rescue operations in marine environment due to injuries
- Sailing in shallow waters (shallow water sailing) lower injury rates
- No appendages under the hull
- The ability of passing over fishing nets, which leads to slighter damage of the impeller
- Protection of the marine environment, and therefore, less harm to the sea creatures
- No need for reversing gearbox
- Enhancing crash stop abilities at high speeds

The need of marine organizations to be equipped with waterjet propelled vessels as well as lack of appropriate instruments due to foreign sanctions led to the design and manufacture of this waterjet.





Second Laureate Research & Development

Scientific Committee
Electronics & Computer

Research
Work Title

Ear Born Imaging Based on Combine Aperture

Executive Organization

Shiraz Electronic Industries – Shahid Khoshro Industries Group

Collaborator Organization

Research Institute of Defence Ministry, Research and Development Institute of Iran Electronics Industries, Shiraz Electronics Antenna Development Center, Shiraz Electronics Environmental Test Laboratory



Representative

Saeid Badiie

Collaborators

Seyed Mahdi Golshan, Ali Imaifar, Emad Jalali, Mahdi Ostovan, Sajad Sepahvand, Mohammad Hosein Fallahzadeh, Hamid Reza Hashempour, Ali Karami, Reza Hallaj, Marjan Zahir Salehi, Zahra Shahvaran, Mohammad Hasan Sokhandani, Peyman Dehghanpour, Mohammad Amrollahzadeh, Vali Allah Tahmasbizadeh, Abouzar Nikounejad, Majid Khosravanian, Siyamak Hozhabri, Alireza Mohammadi, Masoumeh Bahrami, Seyed Mahdi Shafaatian, Mohammad Ali Zerfatpisheh, Mina Esmaili, Iman talezadeh, Omid Sarvi, Ahmad Reza Motafaf, Mojtaba Simrouni, Seyed Mahdi Mirkamali

Abstract

Synthetic Aperture Radar systems are used for imaging. Although they are originally designed for unmanned aircrafts but they can be used for manned aircrafts as well. These systems are capable of strip-map imaging of different regions, including plains, agricultural lands mountains, mountainous, and forests, manmade structures and stationary ground as well as being capable to detect and perform a reconnaissance maritime (ship, boat) targets. The sensitivity of radar images related to manmade structures, rough surfaces, camouflaged targets hidden in the environment, metal materials and sharp-edged objects allow more information to be gathered by this system than visible/IR sensors. SAR is capable of working all day and night even in bad weather conditions, including in cloudy and dusty weather.



Second Laureate Research & Development

Scientific Committee
Electronic & Computer



Research
Work Title

ICU Ventilator, Adult and Pediatric

Executive Organization

Pooyandegan Rah Saadat

Representative

Abdolreza Yaghoubzadeh Tari

Collaborators

Hamid Azizzadeh, Mahmoud Reza Merati, Reza Shalbaf, Amir Hosein Mehrnam, Keyvan Baghestani, Mojtaba Rezaei Ashtiani, Abdolkarim Eshraghi, Hamid komeyzi Farahani, Alireza Asgari, Mohsen Saffar, Zahra Khalili, Mohammad Hesam Ekhtiar, Zohreh Kohan, Mohammad Seifali, Hamid Vaghari Niyaragh, Reza Amiri, Nazanin Mirshekari, Nazanin Rahmati, Kourosh Eskandari



Abstract

The ventilator is intended for use in adult patients and children weighing more than 5 kg in the intensive care unit (ICU). This device is designed to provide mechanical breathing to patients in need. Many diseases and conditions, such as COPD, ARDS, lung infections, brain injuries, and lung injuries from the coronavirus, affect lung functions. In such cases, the Respina-P1 ventilator can improve the patient's breathing. Mechanical breathing in this ventilator can be performed both invasively and non-invasively.

The ventilator supports the patient's breathing with a regulated combination of air and oxygen, using a positive pressure strategy. Based on the adjustable modes, providing ventilator outlet to the patient is mandatory, supportive or an intelligent combination of them. The device is designed in an integrated body and a two-way communication is established between the device and the user by using keys, a rotary touch screen, as well as screen and light indicators.

The ventilator has separate high-pressure oxygen and air inlets. Appropriate control commands are produced and applied to the actuators in pneumatic circuit using suitable sensors and electric power. The device has several powerful processors and in addition to implementing intelligent software algorithms to control the device, it provides various capabilities in storing and retrieving information.

The ventilator is designed to meet all safety and performance requirements according to relevant standards, and to achieve this goal, a methodical risk management technique has been used.

Ventilator is a medical device with a relatively high risk class (Class C according to the Ministry of Health of the I.R.Iran equivalent to Class IIb according to the European Union) in which only qualified and trained personnel under the supervision of a physician are allowed to work with.





Scientific Committee
Mechanics

Research
Work Title

Design and Fabrication of a High Altitude Test Simulator for Solid Propellant Space Motors

Executive Organization

Iranian Space Research Centre

Representative

Nematollah Fouladi

Collaborator Organization

Space Transportation Research Institute

Collaborators

Alireza Mohammadi, Mehdi Khosroanjom,
Mohammad Farahani, Sina Afkhami, Hadi
Rezaei



Abstract

Design and construction of a reliable propulsion system is the most important part of a successful orbital transmission maneuver. In the process of developing this propulsion system, it is necessary to perform several performance tests and measurements on the ground such as testing the engine with the main nozzle and measuring its accurate thrust. This test requires a vacuum chamber around the body and the nozzle of the engine during its entire operation. In the present study, to test solid-fuel engines with a high expansion ratio nozzle, a high altitude simulation test-bed has been designed and manufactured. This technology is monopolized by a limited number of leading countries in the aerospace industry. In this test-bed, the kinetic energy of the combustion gases of the engine is used to create and maintain proper vacuum conditions in the test chamber. To achieve accurate ground tests of these engines, extensive research in design and performance analysis of high-altitude test simulators is performed in the Iranian space research centre. To conduct these tests, the design, and analysis of a water spray cooling system for a metal body diffuser have been produced and this system was built and installed accurately. Validation and repeatability of the performance of the mentioned system have been investigated by testing small- scale and large- scale solid-fuel engines successfully. By using this system, relatively low-cost ground testing replaces high-cost flight tests, reducing the overall cost in the process of developing space engines. Also, by increasing the ground performance tests, the reliability of safe operation of the engines is improved in the real mission during the orbital transmission maneuvers. The difference between the present design and the conventional one is in using a water spray cooling method to protect the metal body of the second throat exhaust diffuser. While this method shows high thermal efficiency, it has a lot of flexibility in the varying diffuser geometry for testing different engines with various dimensions.



First Laureate Applied Research

Scientific Committee
Mechanics



Research
Work Title

Design and Manufacture of Heavy Duty Diesel Engine

Executive Organization

DESA Company

Representative

Mostafa Namazi

Field

Astronomy and Astrophysics

Scientific Affiliation

Institute for Advanced Studies in Basic Sciences (IASBS)



Abstract

Owing to the complex engineering design, development and production of large-scale diesel engines covers a broad field in mechanical engineering science. Along with the final product, these engines have a state-of-art design and technology. Local high-tech diesel engines with higher efficiency and less pollution play a great role in upgrading the industrial indicators at international level. Pursuant to Iran Heavy Duty Diesel Engine (DESA) Company roadmap for design, development and production of large-scale diesel engines in the country, studies on development of native diesel engines began in the mid-2000s. This roadmap includes the design and development of an engine family from 500kW 6 in-line to 1800kW 20V engines. Furthermore, the engines of this family running on alternative fuel such as natural gas engines have been developed to reduce pollution and increase fuel options. Key features of this engine include the following:

- Utilization of a ladder frame design in order to increase the engine block stiffness
- Designing components with high safety factors for heavy-duty applications
- implementation of a high-pressure common-rail fuel system with multi-stage spraying capability
- Implementation of the engine control unit (ECU) for monitoring engine functions
- Utilization of lean-burn concept in order to increase efficiency and reduce pollution
- Applicable under different conditions such as stationary generators, rail applications, marine and industrial applications

- Conversion to dual fuel and natural gas engines with minimal changes on diesel engines

After the design and development phase, the production of the engines started in the early 2010s, in Iran. In this stage, main components such as engine blocks, cylinder heads, camshafts, valve train components, intake and exhaust systems etc. have been all manufactured for the first time in Iran. Today, 85% of engine components and sub-systems are domestically manufactured in Iran and mass production at DESA Co. has been started. With successful completion of various factory tests, this engine is in operation at Iran Railways Co.



Fundamental Research

Scientific Committee
Basic Sciences

Research
Work Title

A Lasting Role in the Development of Education and Research

Researcher

Prof. Yousef Sobouti

Field

Astronomy and Astrophysics

Scientific Affiliation

Institute for Advanced Studies in Basic Sciences (IASBS)



Biography

Yousef Sobouti was born in 1932 in Zanjan. He received his primary and secondary education in his hometown, and studied physics at the University of Tehran. Upon obtaining his B.Sc. degree, he became a high school physics teacher in Tabriz. In 1958, he went to the University of Toronto for a M.Sc. degree, and later in 1960 to the University of Chicago for a Ph.D. degree in astronomy and astrophysics.

In 1964, he returned to Iran and was appointed as an associate professor in Shiraz University. His employment in Shiraz coincided with some major developments in higher education in Iran, and Sobouti had a significant contribution to the formation of modern university system in Shiraz. He was instrumental in the establishment of M.Sc. and Ph.D. programs in Shiraz University. In 1972, he laid the foundations for the creation of the Biruni Observatory in Shiraz. The observatory was launched in 1977 and to date is the only functional centre of its kind in the whole of the country. Sobouti's commitment to education and research in basic sciences led him in 1991 to establish the Institute for Advanced Studies in Basic Sciences in Zanjan (IASBS). Today, IASBS is one of Iran's leading institutions in higher education and academic research.

In the past 15 years, Sobouti has involved himself in the topic of climate change and global warming. He has engaged in public education and teaches university courses on climate change and has written manuscripts and books on this topic.

Professor Sobouti has published more than 100 research articles in peer-reviewed international journals, and has authored and translated six books. He has supervised more than 50 graduate students.

Prof. Sobouti awards and honors

- The founder of the Abu Reyhan Birouni observatory, University of Shiraz, 1986
- A fellow of the Iranian Academy of Sciences, 1989
- The founder of the University for Advanced Studies in Basic Sciences in Zanjan, 1991
- Special Medal of the world Academy of Sciences for the advancement of science in developing countries (TWAS)
- Laureate of Khwarizmi International Award, 2001
- Member of the Scientific Council of the International Centre for Theoretical Physics (Trieste, Italy), appointed by UNESCO
- Member of the National Ethics Committee on Science and Technology of the National Commission for UNESCO
- Head of the Basic Sciences Department of the Academy of Sciences of the Islamic Republic of Iran, 2013-2019
- Member of the American Astronomical Society
- Member in the world Academy of Sciences (TWAS), 1987 up to now





وزارت علوم، تحقیقات و فناوری
سازمان پژوهش‌های
علمی و صنعتی ایران



Laureates of the 34th Khwarizmi International Award



Chairman's Foreword



In the name of ALLAH

We are honored that Iranian Research Organization for Science and Technology (IROST) has the opportunity to organize the Khwarizmi International Award (KIA) for the 34th consecutive year. Certainly, organization of KIA over three decades is regarded as a success for IROST and the great family of the Ministry of Science, Research and Technology of the Islamic Republic of Iran.

KIA- named in memory of Muhammad ibn Musa Khwarizmi- one of the most brilliant scientists of Iran and the Islamic world, has taken significant steps towards honoring the executors of research projects and scientists involved in different fields of science and technology as well as encouraging further dialogue between scientists at both national and international levels. This was achieved by introducing hundreds of research, technology development and innovative projects in fundamental, applied and research and development categories to the Iranian and global scientific community.

IROST takes proud in creating a dynamic and positive competitive environment for recognition, introduction and support of outstanding researchers and technologists. In line with scientific diplomacy, as the annual gathering of Iranian and foreign scientists provides the opportunity for exchanging noble ideas between them to advance research, knowledge, interaction and collaboration, it also promotes positive images of Iran in the global scientific community.

In this session of the KIA, 249 projects from Iranian and foreign researchers and technologists were accepted and went through an evaluation process carried out by eighteen KIA's Scientific Committees within several months. The Scientific Committees proposed eighteen national and two international projects to the KIA's Grand Jury and finally, nine national projects and two international projects from China and Switzerland were selected.

Finally, I would like to appreciate the KIA's Grand Jury, Scientific Committees, and Secretariat, and the many colleagues at IROST's different departments, including research departments, international cooperation, administrative and logistic affairs, public relations as well as other research institutes, universities and academics, industry experts and national and international sponsors who have contributed to successful organization of this session of the KIA.

Ali Eliassi
Chairman

33rd Khwarizmi International Award (KIA)



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سازمان پژوهش های علمی و صنعتی ایران
بهمن ۱۳۹۹

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
يَرْفَعُ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا
الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ

In the Name of Allah

"Allah will raise up in ranks those who believed among you and those who have been given knowledge. Allah is aware of what you do."

Mujadila,
Ayah 11



وزارت علوم، تحقیقات و فناوری
سازمان پژوهش‌های
علمی و صنعتی ایران



In the name of ALLAH

طرح‌های برگزیده
سی و چهارمین جشنواره
بین‌المللی خوارزمی

۱۹ بهمن ۱۳۹۹ تهران، ایران

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