

In the Name of God

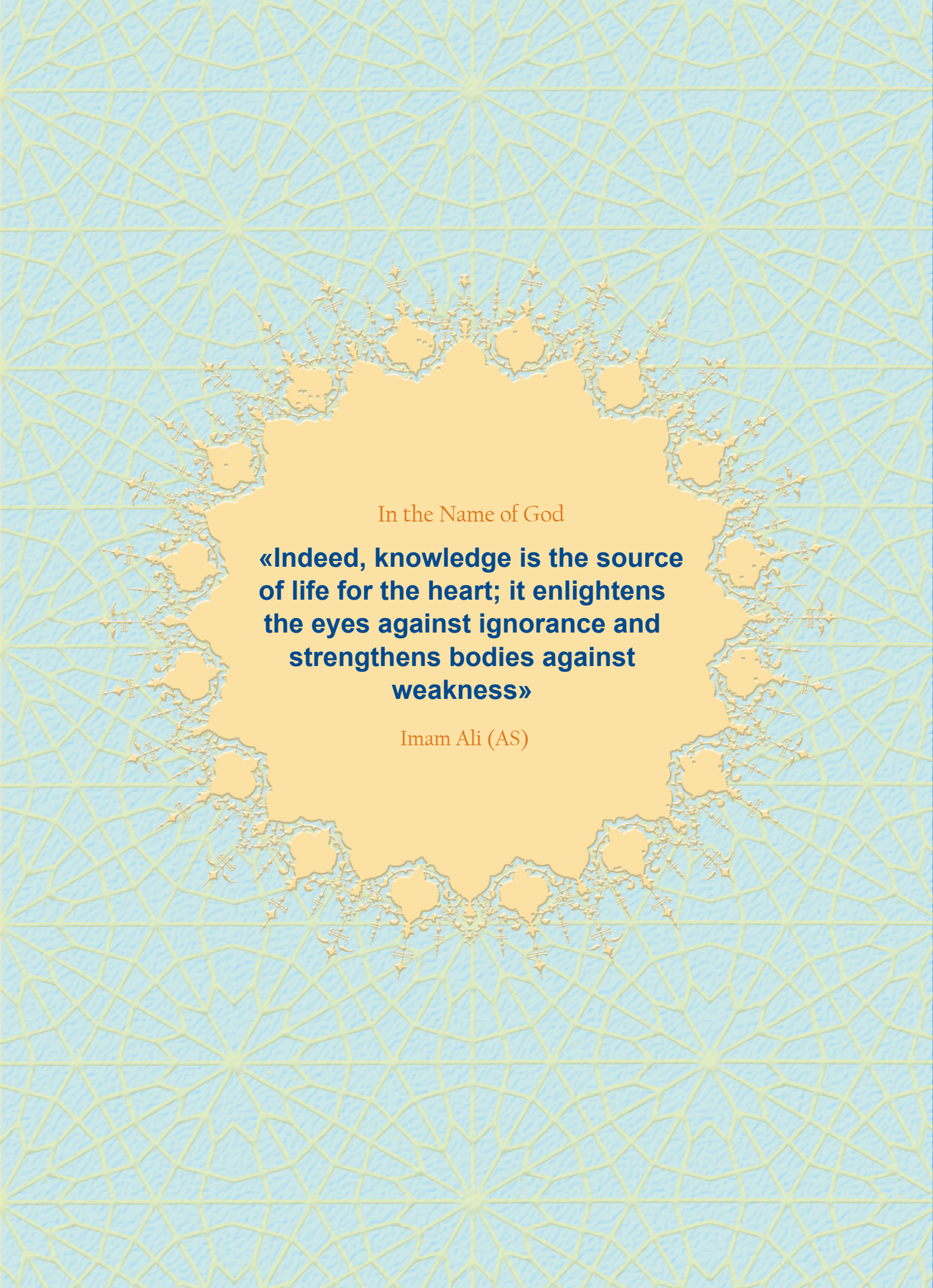


Ministry of Science, Research and Technology
Iranian Research Organization for Science and Technology
(IROST)

**The Laureates of the
26th Khwarizmi
International Award
(KIA)**

February 2013, Tehran, I. R. Iran

Organizer: Ministry of Science, Research and Technology
- Iranian Research Organization for Science and Technology (IROST)
- General Directorate for Science and Technology Competitions and Awards



In the Name of God

**«Indeed, knowledge is the source
of life for the heart; it enlightens
the eyes against ignorance and
strengthens bodies against
weakness»**

Imam Ali (AS)



Imam Khomeini (r.a.):

With determination and high resolution turn yourself toward Science, Action, Knowledge and Intelligence because life under the protection of Science and Knowledge is so sweet and the familiarity and special connection with the Book and Pen and what we learned is so memorable and constant that all the bitterness and frustrations are forgotten.

Supreme Leader
Ayatollah Seyed Ali Khamenei:

It is with the power of Science that a nation can make its word spreads all over the world and it is with the power of Science that a nation can determine a premiere policy and distinguish itself in the political world.



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National Sponsors

26th Khwarizmi International Award (KIA)



Ministry of Science, Research & Technology



Vice Presidency Bureau for Science & Technology



National Elite Foundation



Ministry of Defence



Cultural Works & Eminent Figures Association



Tejarat Bank



Farhoud Cultural Foundation



The Research Center of the Police Drug Control of the Islamic Republic of Iran



Aerospace Industry Organization



Executive Steering Committee of Imam



Academy of Art of the I.R. of Iran



Research and Education Institute of Defence Industry



Golrang Industrial Group



Interational Sponsors

26th Khwarizmi International Award (KIA)

In alphabetical order



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



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



ECO Cultural Institute (ECI)



Economic Cooperation Organization (ECO)



Food & Agriculture Organization of the United Nations (FAO)



International Center for Agricultural Research in the Dry Areas (ICARDA)



IOR-ARC Regional Centre for Science and Technology Transfer (IOR-ARC RCSTT)



Islamic Educational, Scientific & Cultural Organization (ISESCO)



The Academy of Sciences for the Developing World (TWAS)



United Nations Industrial Development Organization (UNIDO)



World Association of Industrial & Technological Research Organizations (WAITRO)



World Intellectual Property Organization (WIPO)

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26th Khwarizmi International Award (KIA)

International Sponsors Prizes to the KIA Laureates

26th Khwarizmi International Award (KIA)

- Islamic Educational, Scientific & Cultural Organization (ISESCO)
3 Cash prizes and Certificates
- Organization of Islamic Conference Standing Committee on Scientific & Technological Cooperation (COMSTECH)
Funds for Khwarizmi International Award
- Commission on Science & Technology for Sustainable Development in the South (COMSATS)
2 Cash prizes and Certificates
- The Academy of Sciences for the Developing World (TWAS)
Cash Prize
- World Intellectual Property Organization (WIPO)
3 Medals and Certificates
- Food & Agriculture Organization of the United Nations (FAO)
Medal and Certificate
- World Association of Industrial & Technological Research Organizations (WAITRO)
Cash prize, Trophy and Certificate
- Economic Cooperation Organization (ECO)
5 Certificates
- IOR-ARC Regional Centre for Science and Technology Transfer (IOR-ARC RCSTT)
2 Cash prizes and Certificates
- ECO Cultural Institute (ECI)
3 Medals and Certificates
- International Center for Agricultural Research in the Dry Areas (ICARDA)
Medal and Certificate
- United Nations Industrial Development Organization (UNIDO)
2 Trophies and Certificates



Chairman's Foreword Welcome to the

26th Khwarizmi International Award (KIA)



In the Name of God

Thanks to God Almighty, we have been given the opportunity to run the 26th International Khwarizmi Award in the year that has been named “The Year of National Production: Supporting the Iranian Labor and Capital”. We believe that with the help of God and support of creative and empowered human resources, science, and research as one of the most important elements of reinforcing national production and fortifying technological foundation will lead us in achieving this objective.

Maintaining independence against the invasion of the international colonial regime and resistance against the wide-ranging scientific and economic embargo, targeting our cultural identity and national freedom from colonization and exploitation, is the responsibility of scholars and elites at this historical milestone.

As a top level and pioneer award in the world, the Khwarizmi International Award with more than 26 years of experience and history is the most important institution in identifying and introducing active and creative individuals in the realm of science and technology. This prestigious award has increased the participation and interaction of creative scholars and elites at national and international arenas and has paved the ground for introducing their capabilities in this great scientific and technological holy endeavor (Jihad). It is a must for the policy-makers and practitioners to provide for the higher utilization and exploitation of this elite and pioneer social resource in developing the country.

M. H. Entezari
Chairman of the 26th Khwarizmi International Award



Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from COMSTECH



I would like to congratulate the Islamic Republic of Iran as well as the Iranian Research Organization for Science and Technology (IROST), Ministry of Science, Research and Technology for the 26th Khwarizmi International Award (KIA), February, 2013. The Islamic Republic of Iran has made tremendous progress in Science and Technology in recent years and has become a leader in a number of Scientific disciplines within the OIC countries.

COMSTECH has supported the Islamic Republic of Iran in many projects, and a number of scientists have been given COMSTECH Awards at the COMSTECH General Assemblies. COMSTECH will continue to support the Islamic Republic of Iran for the promotion of science and technology in universities and research centres. The 3 COMSTECH Inter – Islamic Networks in Iran on Virtual Universities (INVU), Science and Technology Parks (INSTP) and Nanotechnology (INN) are performing well and are an asset to the development of these disciplines and other areas of scientific development in other OIC member states.

Dr. Javaid R. Laghari
Coordinator General COMSTECH



Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from COMSATS



I compliment Iranian Research Organization for Science and Technology (IROST) for its consistent efforts towards promotion of Science and Technology (S&T) in addressing developmental challenges and building strong scientific culture and technological foundation in the Islamic Countries. On behalf of COMSATS, I congratulate IROST for institutionalizing the Award and holding the distribution ceremony regularly for the last twenty six years. The Khwarizmi International Award is laudable commitment to inculcate the spirit of enquiry and innovation among researchers and scientists, encouraging them to make research contributions in their respective areas of interest. I feel honoured to offer my heartfelt felicitations to the winners of this international award for making outstanding contributions to their fields of specialization.

It has always been a matter of pride for COMSATS to be a part of this Award which gives recognition and appreciation to the efforts of well-deserved researchers, innovators and inventors from the developing world. COMSATS has always supported and encouraged the efforts geared towards promoting indigenous scientific research and technological innovations. We believe that the encouragement of these activities is necessary in order to promote science and technology and its applications throughout the developing countries. COMSATS shares IROST's vision reflected through its association with KIA for over a decade.

COMSATS, having 22 Member Countries and a Network of 18 renowned International Science and Technology Centres of Excellence, is committed to develop and strengthen linkages among the countries of the South for sharing and exchange of knowledge, resources, and technology. In this regard, an initiative of COMSATS is the establishment of International Thematic Research Groups in the 8 emerging areas of science and technology, comprising researchers/scientists belonging to various developing/developed countries. In addition, COMSATS has made strenuous efforts towards capacity-building of scientific organizations in its member countries by convening and financially supporting over 165 seminars, workshops, conferences and meetings, in the areas most relevant to their scientific needs.

COMSATS' major initiatives for achieving science-led socio-economic development in its Member Countries include: establishing multi-disciplinary academic/research institutions; providing internet and tele-health services; establishing Thematic Research Groups; providing opportunities of scholarships, short-term trainings, experts exchange and laboratory resources sharing; and disseminating knowledge through websites, web-portals, newsletters and S&T publications.

We feel honored to have IROST as one of our Centres of Excellence, which officially joined the Network in the year 2004. IROST is also Lead Centre of COMSATS' International Thematic Group on 'Space Technology and its Applications', which will hopefully initiate its Thematic Research Group activity soon.

Once again, I would like to acknowledge Khwarizmi International Award as an admirable way to develop the tradition of investigation and innovation among scientists and researchers and hope that prizes won by young researchers provide them a strong motivation for continuing scientific achievements. I assure IROST of COMSATS' full support in achieving the objectives of employing science and technology for elevating the socio-economic status of developing countries.

Dr. Imtinan Elahi Qureshi,
Executive Director
COMSATS

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26th Khwarizmi International Award (KIA)

Messages from International Sponsors

26th Khwarizmi International Award (KIA)

Message from ISESCO



It is indeed a great pleasure and pride that the Islamic Educational, Scientific and Cultural Organization (ISESCO) has been co-sponsoring this magnificent ceremonial Festival of Khwarizmi International Award in the Islamic Republic of Iran since 2003. The prestigious Khwarizmi International Award which owes its name after one of the most distinguished Muslim scholars and mathematicians, Muhammad ibn Musa al-Khwarizmi, is well recognized and globally appreciated scientific prize for which many renowned scientists and researchers from the region and from various parts of the world compete to win each year. The Award is a genuine recognition of the contributions of scientists, researchers, innovators and inventors in the realms of engineering, basic and social sciences, agriculture and arts. This Award has succeeded in promoting self-confidence, talent and excellence among young female and male scientists from developing countries.

After completion of its 30th year of service last year, now ISESCO is coming up with innovation in its new Three Year Action Plan 2015-2013 entailing new approaches in light of regional and international events and changing scenarios. Since its establishment, ISESCO has adopted a working methodology which is reflected in the scientific strategic planning for the future of the Islamic world in the areas of education, science, culture and communication. Today, ISESCO is operating within the framework of various strategies along with their implementation mechanisms, an outstanding of which has been devised to promote science and technology. ISESCO has developed cooperation programmes with specialized institutions in the Islamic world to fulfil its commitment towards capacity-building in science and technology. ISESCO is proud of its cooperation with the Iranian Research Organization for Science and Technology (IROST) in the organization of the Khwarizmi International Award (KIA) through which ISESCO's Prizes are awarded to young researchers, each year. I trust that the 26th international festival would further add to the promotion of science and technology across the world.

I, therefore, would like to take this opportunity to congratulate the IROST for continued achievement in organizing this international festival over the past 26 years. I also wish to thank the Ministry of Science, Research and Technology of the Islamic Republic of Iran for promoting international cooperation and upgrading sciences and innovations, and extend my felicitation to the winners of this year's KIA Awards particularly those winning ISESCO's prizes.

H.E. Dr. Abdulaziz Othman Altwaijri,
Director General
ISESCO



Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from ECO



It is indeed a great pleasure for me to congratulate the winners of “the 26th Khwarizmi International Award, 2013”. We believe that the scientific contributions of these award-winners are truly praiseworthy. On the other hand, we wish to see these human achievements could help and support people and make more prosperous communities around the world.

In point of fact, our today world is the world of technology and achievements and through the efforts of the humankind to explore the unknown for a better life, nowadays we are enjoying enormous new facilities which were never been touched by our ancestors. Nevertheless, these achievements and inventions are still developing everyday and we are still aware of the fact that there is a lot to be explored yet.

Countries which are located in the ECO region enjoy shining background on human civilization and have served a lot to the world communities through their scientists who were the source of inspiration to others in other regions and lands. In view of this fact, we believe and insist that in this region we need to speed up our efforts to bring the ECO region to its historical and precious stature.

On this auspicious occasion, I would also like to express my sincere appreciation to the organizers of this ceremony especially to the Iranian Research Organization for Science and Technology (IROST) for hosting this event to acknowledge the creativity and rich potential of these young and talented people in the field of science and technology. Such events not only provide encouragement but also promote a spirit of healthy competition among the young generation.

The ECO is committed to promoting the regional potential of human resource in the field of science and technology. Efforts are being made to utilize the knowledge and talent of this region to enhance the indigenous scientific capabilities to accelerate growth and development.

I wish every success for the winners and sincerely hope that they would continue to show high standards of notable achievements in the respective fields.

Dr. Shamil Aleskerov
Secretary General
ECO

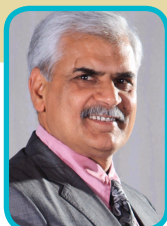
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26th Khwarizmi International Award (KIA)

Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from WAITRO



The Khwarizmi International Award (KIA) is a prestigious event where the crème de la crème of scientists, researchers, inventors and innovators from the world over are celebrated. Representatives of international organizations once again congregate in Tehran to celebrate exceptional scientists, inventors and innovators from all over the world for their brilliant scientific and technological accomplishments and contributions that help advance the economy, society and environment.

The KIA's exclusiveness lies in it serving as a platform where eminent individuals gather to exchange and share ideas, thoughts, experience and successes in research. The concept of KIA in this regard is analogous to that of the World Association of Industrial and Technological Research Organizations' (WAITRO) whereby WAITRO itself is a network of about 150 research technology organizations in 74 different countries to initiate collaborations. Therefore, through its member organizations, WAITRO unites scientists and technological experts in numerous backgrounds worldwide. As we are all aware of, to stay competitive in today's knowledge-based society, networking among individuals involved in science and technology is of utmost importance.

In 2008, for the first time in the KIA history, a proposal for an award to specifically be given to honour women scientists was made by WAITRO. WAITRO is proud to continue sponsoring this exclusive award in 2013 and this year marks the sixth year of WAITRO proudly sponsoring "The Best Woman Scientist for Innovation" award. It is indeed a great honour for WAITRO to be part of the 26th Khwarizmi International Award 2013.

On behalf of WAITRO, I congratulate not just award winners but all nominees as well because being nominated itself is a sign of recognition. My heartfelt congratulations also go to the Iranian Research Organization for Science and Technology (IROST), a member of WAITRO, for the tireless effort in continually organizing the KIA for over two and a half decades. Their diligence is the key to the success of these KIA events, of which I look forward to many more in the years ahead.

Dr. R. K. Khandal
President
WAITRO



Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from FAO



Build a World without Hunger

It is an established fact that today a strong scientific and technological base is quite essential for the economic development of a country. After the victory of the Islamic Revolution, there was a growing concern about the development of Science and Technology in the country. The Constitution of the Islamic Republic of Iran supports scientists and educators in science and technology and strengthens the spirit of investigation, research and innovation in all fields of scientific, technical, cultural and Islamic scholars.

The 26th Khwarizmi International Award (KIA) organized by the Iranian Research Organization for Science and Technology (IROST) aims to recognize the efforts made by researchers, innovators and inventors from all over the world and to appreciate their invaluable achievements and contributions to various fields of science and technology.

As a knowledge organization, FAO creates and shares critical information about food, agriculture and natural resources in the form of global public goods. But this is not a one-way flow. FAO plays a connector role, through identifying and working with different partners with established expertise, and facilitating a dialogue between those who have the knowledge and those who need it. By turning knowledge into action, FAO links the field to national, regional and global initiatives in a mutually reinforcing cycle.

It is a great pleasure and privilege that this is the fifth consequent year Khwarizmi Award receives support from FAO. Its medal and certificate of merit is awarded to the scientist, researcher or practitioner in the field of agriculture, to recognize and encourage the pursuit of excellence in the agriculture related field.

On behalf of FAO, I wish to felicitate all the winners, in particular, the winner in the field of agriculture, for their outstanding contributions to their respective fields. I also take this opportunity to thank the Iranian Research Organization for Science and Technology (IROST), Ministry of Science, Research and Technology for their endeavors to organize this outstanding event.

Nouredin Mona
FAO Representative in
Islamic Republic of Iran

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26th Khwarizmi International Award (KIA)

Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from UNIDO



This year marks the 26th anniversary of the Khwarizmi International Award and I'm glad to see that after a quarter of century of steady work, promoting science and sustainable development, the passion for innovation is still solid.

Last year, on my address to this audience I spoke about "GDP growth" versus "Human Capital growth" and the demarcation that these two indicators mark between leaders and followers.

In 2012, the worldwide GDP growth has been modest, a number of countries have seen their GDP shrinking or no growth however, looking at the enthusiastic participation of so many scientists from Iran and abroad at this 26th Khwarizmi International Award we can state with confidence that the "Human Capital growth" has registered, once again, a plus. This constant contribution of brilliant thinking minds, able to generate so much innovation and development, is indeed the best sign of hope for a vivid future.

The Khwarizmi International Award is remarkable initiatives, not only to promote and cultivate science but also peaceful relationship among human being and regardless of geographical and cultural borders. On behalf of UNIDO I wish to congratulate all the winners, the Iranian Research Organization for Science and Technology, and the Ministry of Science Research and Technology for their commitment to support science and development.

Alessandro Amadio
UNIDO Representative in
Islamic Republic of Iran



Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from IOR-ARC RCSTT



During recent decades people witnessed the sudden emergence of science and technology (S&T) achievements in different fields and in various societies. However, all the people need in terms of science and technology can not be brought up only in one society even if ultimately powerful. Thus, what can ensure all the scientific and technological needs and necessities of the people are the effective channels for disseminating science and technology throughout the world. Establishment of the IOR-ARC Regional Centre for Science and Technology Transfer can be considered among those channels which may pave the way for flourishing the science and publicize it primarily in the region and next in the world. This Centre can effectively fill the gap between the owners of scientific achievements, technologies, inventions and innovations and the societies which need them most particularly those in the IOR-ARC region.

I am highly privileged to be as one of the supporters of the 26th Khwarizmi International Award and I would like to express my heartiest congratulations to the outstanding winners of this award on their amazing achievements. And also, I would like to express my deepest thanks and appreciation to the organizers of the Khwarizmi International Award for such an immense scientific endeavour and all the breathtaking job that has been done.

Dr. M. Molanejad
Director
IOR-ARC Regional Centre for
Science and Technology Transfer

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26th Khwarizmi International Award (KIA)

Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from ECI



It is indeed a matter of great pleasure and honor for ECO Cultural Institute (ECI) to be a part of this outstanding ceremony of the 26th Khwarizmi International Award (KIA) named after Khwarizmi, one of the most distinguished Muslim mathematician, astronomer, astrologer and geographer of the ECO territory.

ECO region as the stronghold of the great Islamic civilization has a shining history in the development of knowledge-based society with multiple styles and diversity of cultures as well as scientific traditions. Its mathematicians created the algebra and algorithms that would enable the building of computers, and the creation of encryption. Its doctors examined the human body, and found new cures for various diseases. Its astronomers looked into the heavens, named the stars, and paved the way for space travel and exploration. When other nations were afraid of ideas, this civilization thrived on them, and kept them alive.

The need for promotion of events such as the Khwarizmi International Award which encourages the spirit of innovation and research among dedicated young scientists has never been greater than today. KIA is unique as a platform where these distinguished individuals assemble to exchange and share ideas, thoughts, experience and research accomplishments.

As always, I wish the Khwarizmi International Award continued success in its valuable and worthy endeavor.

Dr. Hojatollah Ayyoubui
President
ECO Cultural Institute



Messages from International Sponsors

26th Khwarizmi International Award (KIA)



Message from ICARDA



International Center for Agricultural Research in Dry Areas (ICARDA) as a member of the Consultative Group of International Agricultural Research (CGIAR) plays an important role in economic growth and sustainable agricultural development using advances in science and technology. In this regard, our specific goal is to offer new directions to promote food security and livelihoods in dry areas. ICARDA is very pleased of long standing and extensive scientific collaboration with many agricultural research institutes and executive organizations of I.R. Iran to enhance quality and quantity of agricultural products, food security, productivity of land and water, and to develop agricultural innovation systems, while sustainably using natural resources across the country.

It is a great pleasure for ICARDA to support the magnificent scientific Khwarizmi International Award. As recognition of this genuine effort, it is a great honor for me to present this message and extend my heartfelt congratulation to Iranian Research Organization for Science and Technology (IROST) for its continued success in organizing this international event. Also, I would like to express my deepest felicitations to the laureates of this year's Award for their outstanding achievements. This Award is indeed a genuine recognition of the efforts of researchers, inventors, and innovators for their outstanding contribution to science and knowledge. We are quite sure that noble events such as KIA which encourages young scientists should be supported to recognize at least a small portion of scientists and researchers efforts.

Finally, I would like to present my appreciation to all behind the scene working hard to make this outstanding event achievable.

Dr. Seyed Ata Rezaei
Coordinator Iran/ICARDA collaborative program
ICARDA Tehran Office

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26th Khwarizmi International Award (KIA)

Members of the Jury

26th Khwarizmi International Award (KIA)

In alphabetical order

- Dr. A. Akbari: President of IROST
- Entezari, M.H. (M. Sc.): Chairman of the 26th Khwarizmi International Award

- Dr. Abdollahzadeh, A. - Tarbiat Modaress University
- Dr. Farhoud, D. - Genetic Clinic Tehran
- Dr. Ghezelayagh, M. H.-Malek Ashtar University of Technology
- Dr. Jahangirian, A. R. - Amir Kabir University of Technology
- Dr. Matkan, A.A. -Shahid Beheshti University
- Dr. Mirdamadi, Sh, - Science & Industry University
- Dr. Mahamed-pour, K. - K. N. Toossi University of Technology
- Dr. Mozafari Nia, R. - Malek Ashtar University of Technology
- Dr. Porhemmat, J. - Agricultural Research, Education and Promotion Organization
- Dr. Sadati Nejad, S. J. - Shahre Kord University
- Dr. Saheb Ghadam Lotfi, A. -Tarbiat Modaress University
- Dr. Salar Amoli, H. -Iranian Research Organization for Science and Technology
- Dr. Sherafat, A. -Tarbiat Modaress University
- Dr. Shiri, S. -Amir Kabir University of Technology
- Dr. Sohrabpour, S - Sharif University of Technology
- Dr. Tehranchi, M.M. - Shahid Beheshti University
- Dr. Tofigh, A.A -Amir Kabir University of Technology
- Dr. Zali, A. A Tehran University

Neshagar, Gh.A. (B. Sc.): Secretary of Jury



Scientific Specialized Committees

26th Khwarizmi International Award (KIA)

• Aerospace

- **Head:** Emami Khansari, M. H.
- Aghajani, A.
- Bitarafan, A.A.
- Farahani Boghlani, F.
- Fazli, H.
- Neshagar, Gh.
- Safahi Gol, M.

• Agricultural & Natural Resources

- **Head:** Sanjabi, M.R.
- Abas Zadeh, R.
- Ahadi, A.H.
- Ali Madadi, A.
- Atapour, M.
- Azma, M.
- Bagheri, M.
- Ghaem Maghami, S.A.
- Hossein Pour, B.
- Hussein Salkadi, Gh.
- Imani, B.
- Javadi, A.
- Javanmard, M.
- Kamali, K.
- Kyani Rad, M.
- Labafi, Y.
- Mahsournian, M.
- Mashayekhi, M.
- Minaei, S.
- Mirabzadeh, A.
- Mirzaei, S.
- Mohammadi Bazargan, M.
- Mola Nejad, M.
- Nezam Abadi, S.M.
- Norouzian, A.
- Rostamza, M.
- Sarami, Sh.
- Sarasht, S.
- Shetab Boushehri, S.M.
- Tafaghodinia, B.
- Towhidi, A.
- Vahdati, K.
- Zandi, M.
- Zonouzi, A.



Scientific Specialized Committees

26th Khwarizmi International Award (KIA)

In alphabetical order

● Art & Architecture

- Head: Mazaherian, H.
- Azizi, M.M.
- Choupankareh, W.
- Fadavi, M.
- Fatemi, S.
- Ghahremani, M.B.
- Kiyani, M.

● Basic Sciences

- Head: Tehranchi, M.M.
- Ali Yousefi, S.
- Ghasem Pour, A.R.
- Masoudi, F.
- Sharifi, M.J.
- Yazdi, M.

● Biotechnology, Environment & Basic Medical Sciences

- Head: Mazaheri Assadi, M.
- Azin, M.
- Aziz Mohsseni, F.
- Bakhtiari, M.R.
- Ehsani, P.
- Farazmand, A.
- Heidaryan, M.
- Hemat, J.
- Hosseini Pajou, Kh.
- Keyani Rad, M.
- Mirdamadi, S.S.
- Ofoghi, H.
- Rostami, Kh.
- Tafreshi, S.H.

● Chemical Technologies

- Head: Bahrayni, Z.
- Abedi, M.
- Arabi, H.
- Elyasi, A.
- Goodarz Nia, E.
- Madadlou, I.
- Movassagh, B.
- Rahmani, H.
- Ranjbar, M.
- Sadat Hosseini, S.S.
- Shokrollah Zadeh, S.



Scientific Specialized Committees

26th Khwarizmi International Award (KIA)

In alphabetical order

● Civil Engineering:

- Head: Mahmoudi Saebi, M.
- Afshar, M.H.
- Arjmand, M.A.
- Arzani, H.
- Ghafarpour Jahromi, S.
- Goudarzi, R.
- Mazloun, M.
- Mehrarah, A.
- Mirghassem pour, M.
- Rezaian, H.
- Tarighat, A.
- Vatani Oskoui, A.
- Vossough, Sh.

● Electronic & Computer:

- Head: Farahani, Gh.
- Aghajani, A.
- Basseri, N.
- Borghani Farahani, N.
- Bornaei, Z.T.
- Eghbal, M.
- Farahmand, F.
- Fayazi, M.
- Fazlali, M.
- Firouzabadi, M.
- Firouzmand, M.
- Ghanbari Pour, A. A.
- Gharagzlou, H.
- Gharat, M.
- Ghazanshahi, N.
- Gorgin, S.
- Kheradmand, M.
- Khosravi A.A.
- Mansouri, A.
- Mahmoudi Aznaveh, A.
- Mohamad Khani, Gh. R.
- Moshk Abadi, E.
- Nafisi, V.R.
- Navid Bakhsh, M.
- Nik Aeiin, Z.
- Nik Nami, M.
- Pouryaei, N.
- Porkar, B.
- Porkar, S.
- Rahmani, K.
- Seyf Mohadessi, M.
- Shojaodini, S.V.
- Tavasol Panahi, Z.
- Timarchi, S.
- Vosoughi Vahdat, B.



Scientific Specialized Committees

26th Khwarizmi International Award (KIA)

In alphabetical order

● Information Technology

- Head: Mohamad Khani, Gh. R.
- Basseri, N.
- Bornaei, Z.T.
- Ghanbaripour, A.
- Gorgin, S.
- Khosravi, A.A.
- Navidbakhsh, S.
- Seyf Mohadessi, M.
- Tavasol Panahi, Z.

● Materials, Metallurgy & New Energies

- Head: Esmaelian, M.
- Ahangarani, Sh.
- Azad, E.
- Aziminam, S.
- Dashtizad, V.
- Doroudian, M.
- Esmaelian, M.
- Gholamipour, R.
- Hadavi, S.M.M.
- Koflou, A.
- Motahedi, A.A.
- Rajabi, M.
- Sarpoulaki, H.
- Shirvani, K.
- Zahrae, S. M.

● Mechanics

- Head: Boghlani Farahani, F.
- Anvari, A.
- Akbarnya, A.
- Allahyari, A.
- Ardakani, M.A.
- Bairami, M.
- Bakhtiari, H.
- Bitarafan, A.A.
- Elanlo, J.
- Ghayomi, A.H.
- Khansari Emami, M.H.
- Khoshnevisan, S.
- Malekian, M.M.
- Neshagar, Gh.A.
- Seyedi Niaki, K.
- Yassi, Y.
- Zarghami, J.



Scientific Specialized Committees

26th Khwarizmi International Award (KIA)

In alphabetical order

● Medical Sciences

- Head: Vojgani, M.
- Karimian, S. M.
- Rashidi, M.R.
- Sabzevari, O.
- Semnanyan, S.

● Nanotechnology

- Head: Dashtizad, V.
- Ahangarani, Sh.
- Azin, M.
- Bakhatiari, M.R.
- Esfahani Boland Ballahi, Z.
- Farahani Boghlani, F.
- Gholamipour, R.
- Hemat, J.
- Khandan, N.
- Kharazi, Sh.
- Koflou, A.
- Mahmoudi Najafi, S.H.
- Mozafari, S.A.
- Rajabi, M.
- Ranjbar, M.
- Rostami, KH.
- Safarzadeh Matin, SH.
- Shahri, F.
- Shokrollah Zadeh, S.

● Industry & Technology Management

- Head: Haji Hosseini, H.
- Abbasi, F.
- Amid, A.
- Ansari, M.T.
- Armaghan, N.
- Elahi, Sh.
- Eshghi, K.
- Fakour, B.
- Ghaed Sharafi, H.
- Gholamian, M.R.
- Hossein Zadeh, H.
- Jazani Khani, J.
- Kangavar, M.R.
- Kazerouni, A.
- Kazerouni, M.
- Mahssoumzadeh, S. M.
- Miremadi, T.
- Moheini, E.
- Mojib, J.
- Ramezanpour Nargesi, GH.
- Seyed Sajadi, S.J.
- Seraji, T.
- Shavandi, H.
- Tayebi, S.K.
- Teymouri, E.
- Tavakolibinam, A.



Scientific Specialized Committees

26th Khwarizmi International Award (KIA)

In alphabetical order

● Mechatronics

- Head: Shiri, S.
- Farahmand, F.
- Zarei Nejad, M.
- Sadegh Nejad, S.

● The Laureate Successful in National Production

- Head: Allahyari, A.
- Akhavan, A.N.
- Hussein Kord, M.
- Hejazi, S.R.
- Orangian, A.



Executive Committee Members

26th Khwarizmi International Award (KIA)

In alphabetical order

- President of IROST: Dr. A. Akbari
- Chairman of the 26th Khwarizmi International Award Entezari, M.H.
- Vice President of the Khwarizmi International Award: Neshagar, Gh. A.

● Executive Committee Members

- | | |
|----------------------|------------------------|
| ● Ahadi, A.H. | ● Khoubani, Z. |
| ● Allahyari, A. | ● Memari, J. |
| ● Ansari, M. T. | ● Mohamad Khani, Gh.R. |
| ● Avar Zamani, F. | ● Molanejad, M. |
| ● Bidar, M. | ● Orangian, A. |
| ● Deghhan, A. | ● Rahimi, Z. |
| ● Darabian, M.T. | ● Sanjabi, M.R. |
| ● Ghassemi, M. | ● Soltani, H. |
| ● Kazemi Nejad, M.A. | |

● Khwarizmi International Award Team

- Alinouri, E. ● Baharifard, A. ● Berangi, A. ● Harirbafan, Z. ● Hosseini, M.
● Kolahdouz, F. ● Mehraliei, M.R. ● Sadraei, H.

● The International Cooperation Bureau

- Jask, F. ● Kabiri, Z. ● Torabi, T.

We wish to thank and congratulate all those involved in the organization of the Khwarizmi International Award. IROST staff, Public Relations, Welfare & Support Department, Financial Affairs, Scientific National Network Division, Administrative and Human Resources Affairs, Information Technology Bureau, Security Department, Entrepreneurship Bureau.



Report of the KIA Secretariat

26th Khwarizmi International Award (KIA)

As a tradition, the awarding ceremony of the Khwarizmi International is organized during the first week of February when the Islamic Republic of Iran celebrates the 34th anniversary of the victory of the Islamic Revolution.

In spring 2012, the Khwarizmi International Award issued the 26th call for participation which has been sent all over the world. This call was at the same time channeled through the Iranian representations in foreign countries, the KIA international sponsors and foreign scientific institutions.

In autumn 2012, a total of 1625 self nominations and nominations including the National, Iranian Residing Abroad and Foreign sections, answered this call. In the foreign and Iranian Residing Abroad Sections, 40 different countries answered this call with a total of 127 candidatures.

Their applications were sent to 17 scientific specialized committees for the screening process: Electronics and Computer, Mechanics, Art & Architecture, Agriculture & Natural Resources, Basic Sciences, Aerospace, Chemical Industries, Biotechnology, Environment and Basic Medical Sciences, Materials & Metallurgy and New Energies, Civil Engineering, Industry & Technology Management, Medical Sciences, Special Applications, Information Technology and to the new committees Mechatronics and «selected applications with high impact on national production». These scientific specialized committees, consisting for this session of around two hundred experts, are in charge of carrying out the preliminary selection of the registered applications. For the foreign section, of the total of the candidatures received, 10 were declared finalists and for the national section 72 recommended candidatures were forwarded to the KIA Jury for final selection.

The KIA Jury, whose members are prominent national researchers and professors in their respective disciplines, is presided over by the Vice Minister for Science, Research and Technology who held also the position of President of IROST and the chairman of the 26th KIA finally selected after many deliberations 27 KIA Laureates for the KIA national section and 7 for the Foreign section.

The secretariat members deem it necessary to sincerely thank all the scientific community who donated its valuable time as well as those who actively played a role in organizing the 26th Khwarizmi International Award.

26th Khwarizmi International Award
Secretariat



KIA Tables

26th Khwarizmi International Award (KIA)

• Application Entry of the 26th Khwarizmi International Award

No.	Scientific Committee Field	National Section - Total Entry	National Section - Applications Sent to Scientific Committees	Foreign Section - Total Entry	Foreign Section - Applications Sent to Scientific Committees	Total Application Entry
1	Electronic & Computer	95	95	9	6	104
2	Biotechnology, Environment & Basic Medical Sciences	103	36	25	14	128
3	Chemical Technologies	85	58	15	10	100
4	Industry & Technology Management	41	21	3	1	44
5	Special Applications	406	227	////	////	406
6	Basic Sciences	72	27	20	14	92
7	Medical Sciences	////	////	11	8	11
8	Civil Engineering	45	23	////	////	45
9	Information Technology	49	19	3	1	52
10	Nanotechnology	46	22	7	5	53
11	Agriculture & Natural Resources	105	55	15	8	120
12	Mechanical Engineering	152	75	10	7	162
13	Art & Architecture	78	35	////	////	78
14	Materials, Metallurgy & New Energies	71	38	8	6	79
15	Aerospace	38	20	1	////	39
16	Mechatronics	32	12	////	////	32
17	The laureate successful in national production	80	80	////	////	80
TOTAL		1498	843	127	80	1625

بیست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

KIA Tables

26th Khwarizmi International Award (KIA)

No.	Category	Scientific Specialized Committee	The successful laureate in national production	First KIA Laureate	Second KIA Laureate	Third KIA Laureate	Total
1	Fundamental Research	Biotechnology, Environment & Basic Medical Sciences	-	-	-	1	1
		Basic Sciences	-	-	-	2	2
2	Applied Research	Special Applications	-	1	2	5	8
		Electrical & Computer	-	-	1	1	2
		Mechanical Engineering	-	-	1	-	1
		Mechatronics	-	-	1	-	1
		Materials, Metallurgy & New Energies	-	-	-	1	1
		Basic Sciences	-	-	-	1	1
3	Development & Research	Special Applications	-	-	-	1	1
		Electrical & Computer	-	-	-	1	1
		Materials, Metallurgy & New Energies	-	-	-	1	1
		Information Technology	-	-	-	1	1
		Industry & Technology Management	-	-	-	1	1
4	Invention	Special Applications	-	-	-	2	2
		Electrical & Computer	-	-	-	1	1
		Mechanics	-	-	-	1	1
5	The laureate successful in national production	The laureate successful in national production	1	-	-	-	1
Total			1	1	5	20	27

● KIA Laureates – National candidates - selected for the 26th Session of the Khwarizmi International Award according to the field of research.

No.	Category	Scientific Committee	First KIA Laureate	Second KIA Laureate	Third KIA Laureate	Total
1	Fundamental Research	Information Technology	1	-	-	1
		Basic Sciences	-	1	-	1
		Biotechnology, Environment & Basic Medical Sciences	-	-	1	1
		Chemical Industries	-	-	1	1
2	Applied Research	Biotechnology, Environment & Basic Medical Sciences	-	-	1	1
		Mechanics	-	-	1	1
		Chemical Industries	-	-	1	1
Total			1	1	5	7

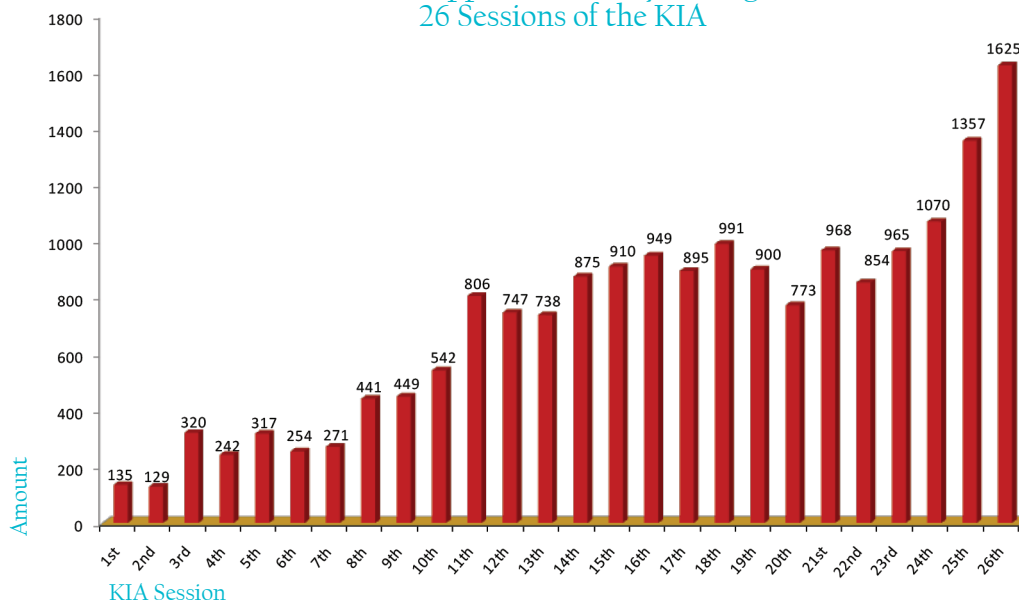
● KIA Laureates – Foreign candidates - selected for the 26th Session of the Khwarizmi International Award according to the field of research.



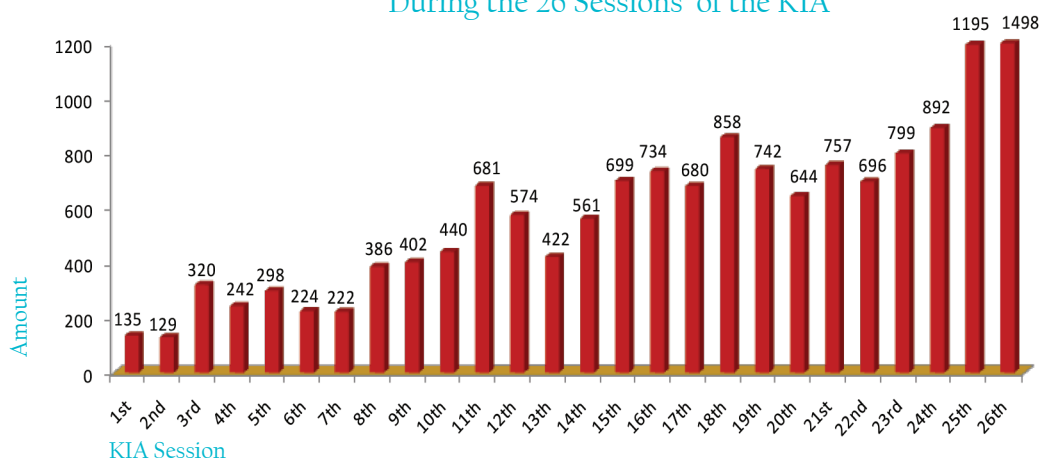
KIA Charts

26th Khwarizmi International Award (KIA)

- Total Application Entry During the 26 Sessions of the KIA



- Total Application Entry - National Section - During the 26 Sessions of the KIA



KIA Charts

26th Khwarizmi International Award (KIA)

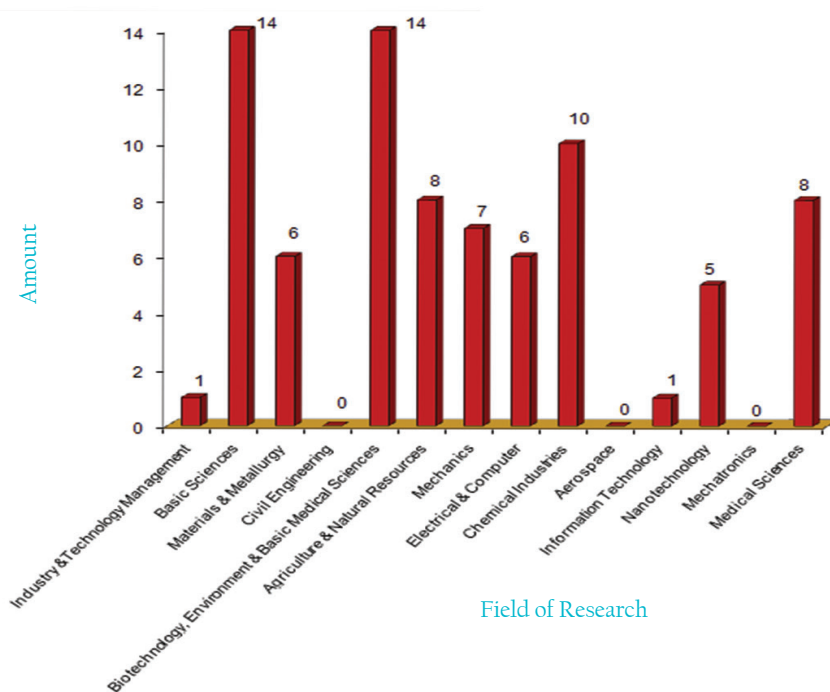
- Total Application Entry - Foreign & Iranian Residing Abroad Sections - During the 26 KIA Sessions



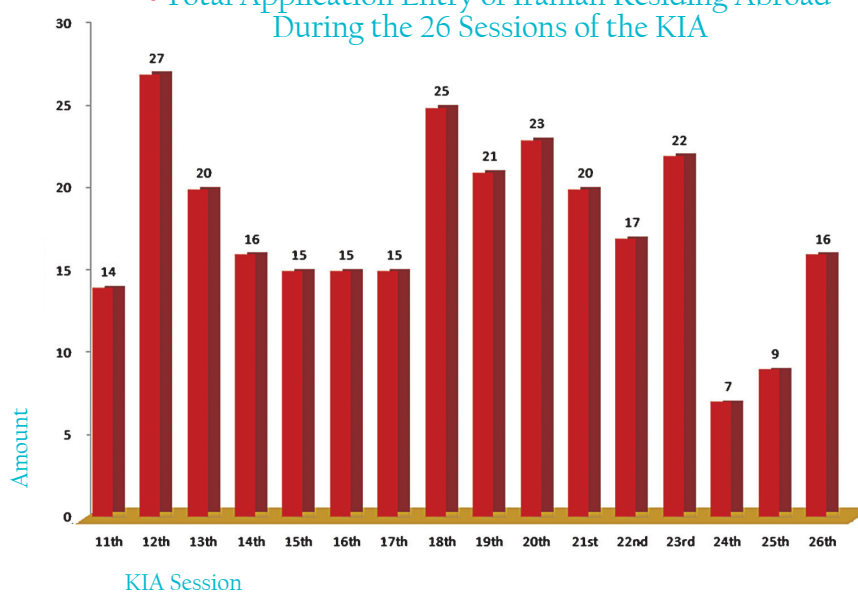
KIA Charts

26th Khwarizmi International Award (KIA)

• Application repartition according to the field of research - National Section 26th KIA



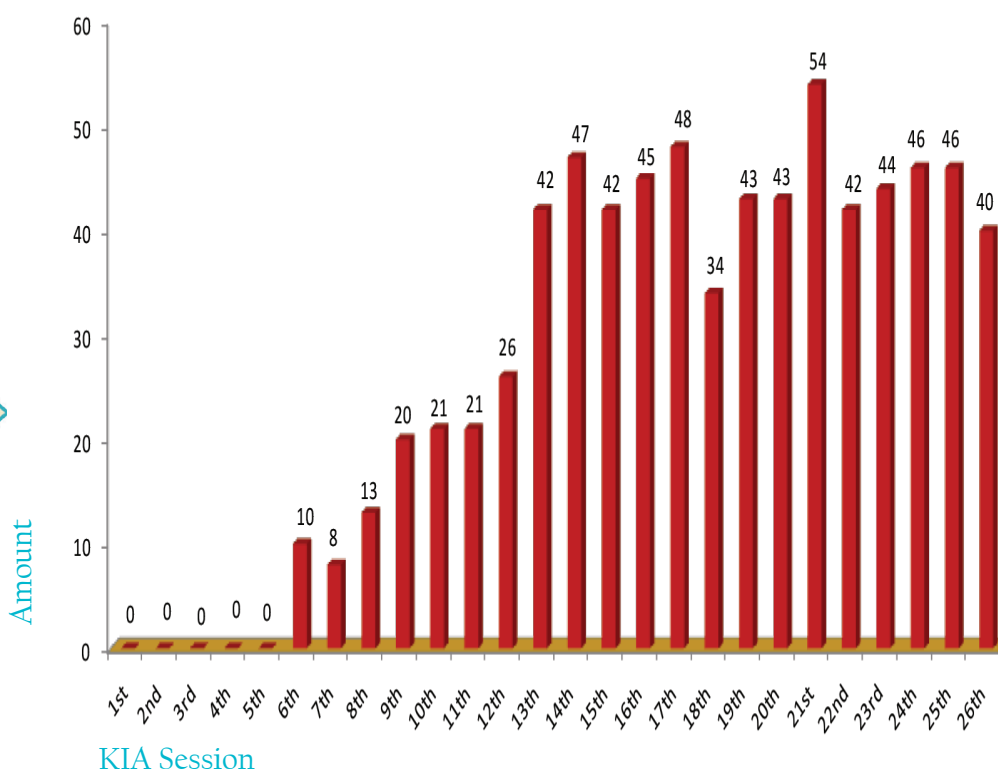
• Total Application Entry of Iranian Residing Abroad During the 26 Sessions of the KIA



KIA Charts

26th Khwarizmi International Award (KIA)

• Participating Countries
During the 26 Sessions of the KIA



26th Khwarizmi International Award (KIA)



پست و ششمین جشنواره بین المللی خوارزمی



Ministry of Science, Research and Technology
Iranian Research Organization for Science and Technology (IROST)
Khwarizmi International Award (KIA)



Biography of Muhammad ibn Musa al-Khwarizmi & Khawaja Muhammad ibn Hasan Tūsī

Biography of the Muhammad ibn Musa al-Khwarizmi

26th Khwarizmi International Award (KIA)

Biography of Muhammad ibn Musa al-Khwarizmi



● Biography:

Muhammad ibn Musa al-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 Al-Khwarizmi.

On that time, the son of Harun al-Rashid, Al Mamun became the Caliph of the Abbasid dynasty and ruled the empire from Baghdad. He continued the patronage of learning of his father and founded an academy called the House of Wisdom where Greek philosophical and scientific works were translated. He built up a library of manuscripts, the first major library to be set up, collecting important works from Byzantium. Al-Khwarizmi was scholar in this House of Wisdom in Baghdad. His task was the translation of Greek scientific manuscripts. He also studied and wrote many books and treatises.

His Algebra was the first book on the systematic solution of linear and quadratic equations. Consequently Al-Khwarizmi is to be considered to be the father of algebra, [a title he shares with Diophantus. Latin translations of his Arithmetic, on the Indian numerals, introduced the decimal positional number system to the Western world in the 12th century. He revised and updated Ptolemy's Geography as well as writing several works on astronomy and astrology.

His contributions not only made a great impact on mathematics, but on language as well. The word algebra is derived from al-jabr, 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. His name is also the origin of the Spanish word guarismo and of the Portuguese word algarismo, both meaning digit.



Biography of Muhammad ibn Musa al-Khwarizmi

26th Khwarizmi International Award (KIA)

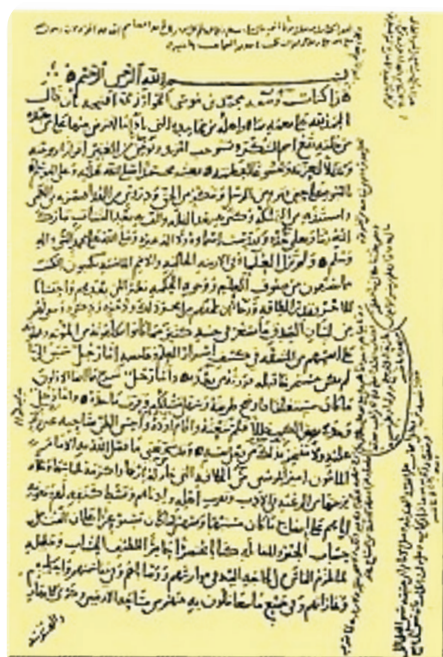
• Contributions:

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 830 book on the subject, *al-Kitab al-mukhtasar fi hisab al-jabr wa'l-muqabala* or: «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*.

Al-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-Mamun and participated in a project to determine the circumference of the Earth,

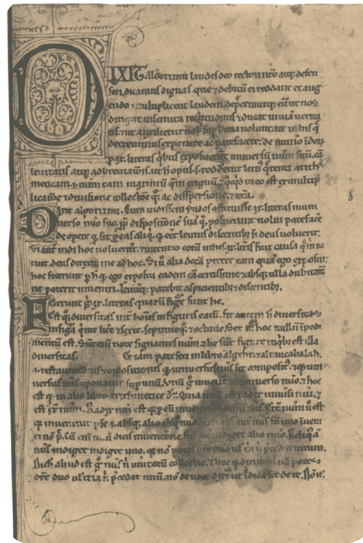


• A page from al-Khwarizmi's Algebra



Biography of Muhammad ibn Musa al-Khwarizmi

26th Khwarizmi International Award (KIA)



● Page from a Latin translation, beginning with «Dixit algorizmi»

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:

al-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 in 830 CE. The word algebra is derived from the name of one of the basic operations with equations (al-jabr) described in this book. A Latin translation is kept in Cambridge.

● Arithmetic:

Al-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:

Al-Khwarizmi's third major work is his Kitab surat al-Ard «Book on the appearance of the Earth» or «The image of the Earth» translated as Geography), which was finished in 833. 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.

There is only one surviving copy of Kitab surat al-Ard, which is kept at the



Biography of Muhammad ibn Musa al-Khwarizmi

26th Khwarizmi International Award (KIA)



- Hubert Daunicht's reconstruction of al-Khwarizmi's planisphere



- A 15th century map based on Ptolemy's Geography for comparison.

Strasbourg University Library. A Latin translation is kept at the Biblioteca Nacional de España in Madrid. The book opens with the list of latitudes and longitudes, in order of «weather zones»,

that is to say in blocks of latitudes and, in each weather zone, by order of longitude.

- **Astronomy:**

Al-Khwarizmi's *Zij al-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 tables of sine values. This is one of many Arabic zijes based on the Indian astronomical methods known as the *sindhind*. The four surviving manuscripts of the Latin translation are kept at the Bibliothèque publique in Chartres, the Bibliothèque Mazarine in



Biography of Muhammad ibn Musa al-Khwarizmi

26th Khwarizmi International Award (KIA)

Paris, the Bibliotheca Nacional (Madrid) and the Bodleian Library (Oxford).

- **Jewish calendar:**

Al-Khwarizmi wrote several other works including a treatise on the Hebrew calendar (Risala fi istikhraj tarikh al-yahud «Extraction of the Jewish Era»). 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 al-Biruni and Maimonides.



- Statue of al-Khwarizmi in front of the Faculty of Mathematics of Amir Kabir University of Technology in Tehran, I.R. of Iran.

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2. L. C. Karpinski (1912). «History of Mathematics in the Recent Edition of the Encyclopædia Britannica». American Association for the Advancement of Science.
3. Ruska 1917
 - Reference from Wikipedia, the free encyclopedia
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Biography of Khawaja Muhammad ibn Hasan Tūsī

26th Khwarizmi International Award (KIA)

Biography of Khawaja Muhammad ibn Hasan Tūsī (653-581 Hijri or 1274-1202)



● Biography:

Muhammad Ibn Hassan Johrudi Tusi, known as Nasir al-Din Tusi, was born on 15 Jumada Al-Awwal in 598 AH (according to lunar calendar) in Tus. He had a keen interest in education and excelled in mathematics and astronomy in his youth and became one of well-known scientists of his time. Tusi is one of the most notable and influential figures in Islamic history. He learned religious and applied sciences from his father; and his uncle, Baba Afzal Kashani Ayoubi, taught him logic and wisdom. He completed his education in Nishapur and became well-known as an outstanding scientist. Allama Helli, who is one of his students, has written: “Nasir al-Din Tusi was the best scientist in our era and had lots of written works of rational and Quranic science.

Prior to Mogul invasion in 611 AH, Nasir al-Din took refuge in one of the fortresses of Nasser al-Din Mohtasham, one of the then Esmaili rulers. This allowed him to write some of important ethical, logical and mathematical works including his most famous book “Nasirean Ethics”. Tusi is most well-known as a mathematician and astronomer and his observatory is considered as an academic institution in the history of science. When Hulagu Khan ended Ismailis rule in 635, he kept Tusi in his service and allowed him to build an observatory, in Maragheh, which started to work in 638. The expenses of the observatory were supplied by the government funds and donations of the people all over the country.

بیست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Biography of Khawaja Muhammad ibn Hasan Tūsī

26th Khwarizmi International Award (KIA)

Tusi used one tenth of people's donations for purchasing equipments, books and other necessities of the observatory. A large library, with nearly four hundred thousand books, had been built near the observatory to be used by scientists and scholars. The books had been gathered from Baqdad, Shaam, Beirut and Aljazira. A perfect abode had been built at the vicinity of the observatory for Tusi and astronomers. A school had also been built there for the students. Construction of the observatory and its premises took 13 years; then Ilkhan Holakoys passed away at 663AH. Tusi managed to run the observatory and did not let anyone destroy the observatory and the library until the last minute of his life.

Majority of his works (150 essays and books) is in Arabic. Breadth and depth of his knowledge is analogous with Avicenna; except that, Avicenna was a better physician and Tusi was a superior mathematician. Among his five books written on logic, Assasoleghtebas is the most important. In mathematics, he had some writings on the works of Autolycus, Aristarchus, Euclide, Apollonios, Archimedes, Hypsicles, Theodosius, Menelaus, and Ptolemy, Javame Alhesab Bel takht va torab and Alshafiye Resalah are among his most important works on geometry and trigonometry. His famous book, Sheklogheta, inspired Regiomontanus. His popular works on astronomy are "Treatise on Astronomy", and Zij-i ilkhani (Ilkhanic Tables) which was written in 650. "Treatise on Astronomy" is perhaps the most comprehensive review on Ptolemaic astronomy and represents the only new mathematical model of planetary motion in the middle ages. In 672 AH, Tusi and a group of his students went to Baghdad to collect the remains of the stolen books ; but his end had come and he passed away in al-Kāzimiyyah (district of metropolitan Baghdad), on 18th Zihajje 672 AH.



Biography of Khawaja Muhammad ibn Hasan Tūsī

26th Khwarizmi International Award (KIA)

Tusi is one of the foremost Islamic philosophers who revitalized Ibn Sina's peripatetic theory after two centuries of interlunar "theology". He is the first philosopher who believed in gradual combination of illuminationism and peripatetism.

Ibn Shakir, one of the Islamic historians, has described his behaviors: he was well-mannered, generous, tolerant, polite, clever and perceptive, and was considered one of the most brilliant politicians of his time.

Jurji Zaydan writes: "Knowledge and wisdom entered the Mogul to the furthest points with the hands of this Iranian scholar; he was like a light in the dark."

Ro Colmann, in the book of "Literature History", writes on scholars of the seventh century: "The most well-known scientists and writers of this century, absolutely and undoubtedly, is Nassir al-Din Tussi. He was a shining star in the dark horizon of Mongol; whichever city he stepped in, he lightened there with wisdom, knowledge and ethics. The presence of such a scholar in that dark era is itself a wonder and miracle. Despite the passage of seven centuries, people still talk highly of him, his behavior and knowledge."



Biography of Khawaja Muhammad ibn Hasan Tūsī

26th Khwarizmi International Award (KIA)

- Some of his works:
- Kitāb al-Shakl al-qattā' Book on the complete quadrilateral. A five volume summary of trigonometry.
- Akhlaq-i-Nasri – A work on ethics.
- al-Risalah al-Asturlabiyah – A Treatise on astrolabe.
- Zij-i ilkhani (Ilkhanic Tables) – A major astronomical treatise, completed in 1272.
- sharh al-isharat (Commentary on Avicenna's Isharat)
- Awsaf al-Ashraf a short mystical-ethical work in Persian
- Tajrīd al-i-'tiqād (Summation of Belief) – A commentary on Shia doctrines.





Ministry of Science, Research and Technology
Iranian Research Organization for Science and Technology (IROST)
Khwarizmi International Award (KIA)



Laureates
of the
26th Khwarizmi International Award
National Section

First Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Project Title:** Design and Fabrication of KARRAR jet powered UAV
- **Executive Organization:** Aviation Industries Organization

● Abstract:

Jet powered UAV, KARRAR, is the first Iranian UAV-jet which is designed and developed by Iranian specialist. It passed test phases and it is in serial production now. Zero length launcher and booster rocket enable this UAV to start missions in different places without run ways and in lowest time.

Significant achievements:

- Increase offensive and defensive power of the Islamic republic of Iran
- know-how achivment for Jet-UAV design
- Achievement of an strategic System



Second Laureate Applied Research

26th Khwarizmi International Award (KIA)



● **Project Title:** Design and Implementation of MFL Intelligent PIG for Oil and Gas Pipeline Inspection

● **Executive Organizations:** University of Tehran (College of Engineering), Segal Pardazesh Engineering Company (SegalTech)

● **Executives:** Dr. M. Kamarei, Dr. M. Mansub Bassiri

● **Collaborator Organizations:** National Iranian Gas Company (NIGC) as main Financial Sponsor and Supplier -Middle East Petrogas Company (MPG)

● **Abstract:**

MFL intelligent PIG is a smart tool that travels inside the oil and gas pipeline in association with the fluid stream and inspects the pipe wall carefully and extracts all anomalies, corruptions and defects of the pipeline. This method is one of the best and most common methods in oil pipeline inspection in the world. Intelligent PIG passes through the pipeline using the pressure of fluid while it magnetizes the pipe wall intensively. In this circumstance, when an anomaly or corrosion exists in the pipeline, the magnetic flux leakage occurs near the defect. The pattern and intensity of the flux leakage are measured by the different sensors mounted on all around the MFL PIG. The acquired data are stored in special solid-state memories and logged into the powerful workstation after the completion of pipeline inspection. Obtained signals are processed and recognized using advanced pattern recognition algorithms and the features of pipeline defects are extracted. These features are length, width, depth, shape, kind and exact location of all defects. Since the pressure of the fluid is very high in the pipeline (about 100 bar), the design and implementation of electronic and mechanic parts of the MFL tool is hard and challenging work. This project was accomplished in 3 years with collaboration of large number of expert people in the industry and universities.



Second Laureate Applied Research

26th Khwarizmi International Award (KIA)



● **Project Title:** Implementation of a complete DRM transmission chain on domestic high-power analog transmitters

● **Executive Organization:** Nasir System Gostar Corporation

● **Representative:** Mr. Mahdi Khorsha

● **Collaborators:** Abbas Fazel Zakeri, Ahmad Safae Arshi, Ghader Shokrollahi, Arash Ahmadi, Mostafa Jafarzadeh

● **Collaborator Organization:** Islamic Republic of Iran Broadcasting

● Abstract:

In this project a complete digital audio transmission chain on MW and SW is implemented based on the DRM Standard. This system includes a content server, an OFDM modulator, and a linearizer for domestic high-power transmitters. In this design, a content server in the production studio compresses and multiplexes audio, teletext, and stationary visual contents using the IP Protocol. Then the stream will be transferred to the transmission sites using a communication network (optical fiber infrastructure or DVB-S satellite channel).

In the transmission site, a modulator receives data from the communication network and after applying the channel coding and OFDM modulation hands it over to the linearizer unit. Linearizer unit provides DRM Standard requirements for transmission through domestic MW transmitters (which many of them are currently in operation throughout Iran).

Using this product, it is possible to transmit digital quality audio on MW and SW (with expanded coverage) along with additional information including teletext, image, and data. On the other hand, with this design it is possible to upgrade current analog transmitters to transmit digital content with minimum effort and cost.



Second Laureate Applied Research

26th Khwarizmi International Award (KIA)



● Project Title: Design and Development of Hybrid Electric Bus

● **Executive Organization:** Vehicle, Fuel and Environment Research Institute of University of Tehran - Road and Railway Vehicles Research Group of Isfahan University of Technology
-Tose'e, Khodro Kar Co.

● **Representative:** Dr. Mohsen Esfahanian

● **Collaborator Organizations:** - Automobile Parts Quality Improvement and Standardization Support Organization of Ministry of Industry, Mines and Trade - Iran Fuel Conservation Co.- Iran Khodro Industrial Group- Industrial Development and Renovation Organization- Technology Cooperation Office - Saba Battery Co.- Gita Battery Co.- Super Pipe Co.-Safae Arshi, Ghader Shokrollahi, Arash Ahmadi, Mostafa Jafarzadeh.

● **Collaborators:** Vahid Esfahanian Hassan -Nehzati Paghale -Alireza Jafari Reza-Kolaei-Seyed-Mojtaba Mirsoheil -Meisam Amiri Bavandpour- Yadollah Zakeri Hossain-Abadi- Masoud Masih -Tehrani -Hossain Sagha -Manouchehr Manteghi- Damoon Bazargan -Zeinab Pour -Bafarani- Kamran Mahoutchi -Saeed -Ali Safaei -Mohammad Javad Najafian - Ali Mahmoudian - Ramin Farnia -Ali Manteghi -Farhad Sangtarash -Mohammad Esmaeilzadeh- Masoud Besharat -Ahmad Javaheri -Mehdi Soufi -Hesam Akbarian -Parisa Amiri Bavandpour -Pooya Malekinejad Dezfooli -Mehdi Abolghasem -Sina Porsa -Ehsan Ghasemi -Mazdak Gorji -Hadi Rahemi -Ali Nabi Bidhendi -Amir Fazeli -Arash Akhgari.

● Abstract:

Hybrid technology has become the main solution for the reduction of fuel consumption and emission in vehicles in recent years. In this project, the series hybrid system is implemented on the O457 City bus. Two traction motors controlled by the drivers exclusively designed are the providers of the traction effort needed to operate the bus. The electric energy is produced either by the engine-generator set, or by the 168 lithium-polymer 3.7V40-Ah batteries. These batteries are packed in 12 boxes that are equipped by contactor, fuse, cooling system and Battery Management System (BMS). One of the main improvements this system provides is that the braking energy is also regenerated preventing the energy loss in conventional vehicles. The engine may be off in some parts of driving cycle, thus, the auxiliary motor has to drive all accessory loads such as compressors, alternator, etc. Due to deference in their working temperature, three sets of cooling systems for the engine, electric machines and the battery packs are provided in the hybrid electric bus.

In the electric energy distribution system, each device is protected by a contactor-fuse set. The Hybrid control system software consists of four subsystems implemented on micro-controllers of the drives, the main controller and BMS. Drive control software controls the drivers, and therefore the electric motors can provide suitable speed and torque. Switch management is performed by Vehicle Control Software (VCS) which turns off/on the battery and power contactors with respect to the vehicle switch position. DMMS software connects driver and traction motors and applies proper protections for motors and batteries. HCS software determines the operation conditions of the engine and the generator. For the traction motors and the generator drives, vector control algorithm is used. Communication of all components are done by CAN protocol.



بیست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Second Joint Laureate Applied Research

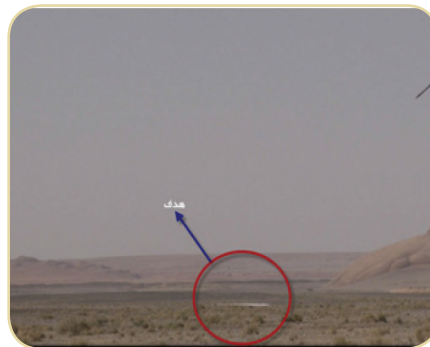
26th Khwarizmi International Award (KIA)



- **Project Title:** fourth generation ballistic missiles
- **Executive Organization:** Aerospace Industries Organization
- **Collaborator Organizations:** IEI, Research and Academic Center of Iran

- **Abstract:**

Emerging the fourth generation ballistic missiles in the armed forces battle unit of Islamic Republic of Iran with unique abilities and specialties created a serious development in Islamic Republic defense doctrine. The operational speed promotion, tactical power, reliability and pointing accuracy of the current generation of the strategic and tactical weapons cause increase of deterrence ability and meeting the armed forces operational needs. Special achievements of the project include pointing accuracy, high operational ability, and research creativity in scientific, technical and industrial power of the country.



Second Joint Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Project Title:** Athermalized Imaging Infrared Seeker set
- **Executive Organization:** Iran Electronics Industries (IEI) Co, Isfahan Optics Industries (IOI)

● **Abstract:**

This System is an Athermalized Imaging Seeker set, with small diameter that is used to detect and track the targets.

This system includes the main subsystem such as camera, window, gyroscope, accurate two degrees of freedom set, image processing and control unit.

Referring to imaging systems, temperature change causes reduction in image quality and miss the image data. Athermalized camera can solve this problem and automatically make proper images from the target in different temperatures. Image processing and control unit do some special processes on images and make proper control commands to track the target and give this commands to torque motors on the seeker.

In order to protect against the environmental conditions (such as moist) a special nose is used to cover the system and completely seal the Unit.



Third Laureate Fundamental Research

26th Khwarizmi International Award (KIA)



● **Project Title:** Production of Neural Lineage Cells: From Pluripotent Stem Cells to Transplantation in Animal Models

● **Executive Organization:** Royan

● **Researcher:** Hossein Baharvand, PhD

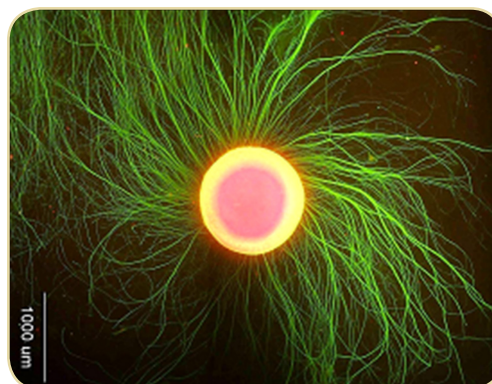
● **Collaborators:** Adeleh Taei, Mohammad Pakzad, Sepideh Mollamohammadi, Nasser Aghdami, Ghasem Hosseini Salekdeh, Abdolhossein Shahverdi, Sahar Kiani, Hamid Gourabi, Mohammad Nasr-Esfahani, Ahmad Vosough

● **Abstract:**

Pluripotent stem cells are a source of renewable cells, which possess a phenomenal potential to differentiate into a myriad of cell types. Thus, they offer a potentially unlimited supply of cells, which can be deployed in developing cell-based therapies and mammalian neural development. In this study, to establish neural lineage cells, different types of mouse and human pluripotent stem cells were initially generated and characterized. In second step, the in vitro differentiation capacity of them into derivatives of the neuronal lineage cells e.g., neural progenitor cells, types of mature neurons, astrocytes, oligodendrocytes, and photoreceptors has been demonstrated using various approaches. Next, the functional recovery of the pluripotent stem cell-derived neural lineage cells, upon transplantation into in vivo models of spinal cord injury, Alzheimer, retinal injury, and multiple sclerosis has been investigated. Our findings have demonstrated the potential issues related to the transition to the clinic.

The specific results of this study include: the publication of 67 ISI papers, three chapter books, 23 presentation in national and international meetings as invited speaker, more than 1270 citation in ISI, h index 20, cover page of five international journals, establishment of a pluripotent stem cell bank, and a proof of principle for therapeutic application of pluripotent stem cell-derived neural lineage cells by treating neural diseases in animal models.

Symbol of project: Fluorescence-microscopic view of a cluster of neuronal cells derived from human embryonic stem cells. Outgrowing processes are labeled by beta-Tubulin III (green) and aggregate of Nuclei by propidium iodide (red).



Third Laureate Fundamental Research

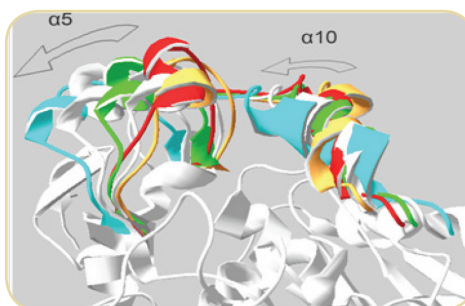
26th Khwarizmi International Award (KIA)



- **Project Title:** Study of improvement and increasing biological macromolecules stability and function
- **Executive Organization:** Tarbiat Modares University
- **Researcher:** Dr. Bijan Ranjbar
- **Collaborator Organizations:** Ministry of Science, Research & Technology, Vice-Presidency for Science & Technology, Management & Planning Organization.

• Abstract:

Study of the stability-function relationships of proteins and nucleic acids is of great interest for researchers of biophysics, biochemistry and biotechnology, which leads to understanding of the molecular dynamics and kinetic-thermodynamic fundamentals of folding process, for design and engineering of novel peptides, proteins and nucleic acid structures. This research has been conducted on determination of functions based on structure, gene identification/discovery and their protein products for development of novel drugs, prevention of incurable diseases, production of microorganisms with new capabilities and biological products such as peptides, recombinant proteins, design and fabrication of nucleic acid structures with specific characteristics, and development of protein/ nucleic acid based biosensors. In these investigations, stability and function of various spherical and non spherical proteins such as lysozyme, peroxidase, luciferase (two types), lipase (mesophile, psychrophile), α -amylase (BAA, BLA), savinase, metaloprotease, lacase, human and cow serum albumin, Interleukin2-, peptides from long-chain snake neurotoxin Naja naja oxiana, nucleic acid nanostructures (cauliflower-like DNA and DNazymes) and complexes of protein-gold nanorod systems have been studied via different spectroscopic, calorimetric and microscopic techniques, theoretical calculations and site-directed mutagenesis methods. Each designed/fabricated system has its own specific application. Complexes of lysozyme-gold nanorods for targeted drug delivery systems and detection purposes, identification of physicochemical properties of luciferase for biosensors, different lipases esp. HR59 strain extracted from burn infections (*pseudomonas aeruginosa*) and other peptides/proteins in pharmaceuticals and biotechnology, cauliflower-like DNA with new characteristics for nanoelectronics and other DNA nanostructures, are a number of examples that have been studied so far. The most important outcomes of such efforts with promising applications in pharmaceutical, food and biotechnology industries, detection of cancer, infectious diseases and environmental pollutions, could be summarized as publication of international and national full scientific papers, 2 registered patents, registration of 9 sequenced local genes.



Third Laureate Fundamental Research

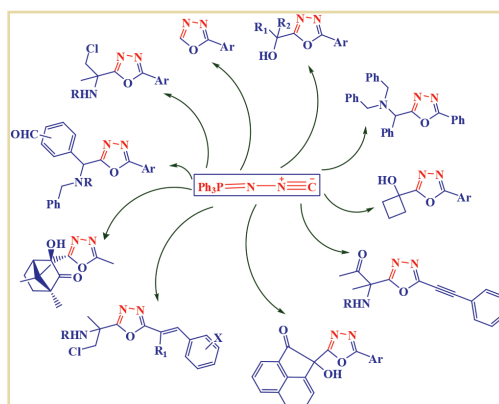
26th Khwarizmi International Award (KIA)



- **Project Title:** New and efficient methods for the synthesis of 1,3,4-oxadiazole derivatives
- **Executive Organization:** University of Zanjan
- **Researcher:** Professor Dr. Ali Ramazani – University of Zanjan
- **Collaborator Organizations:** Iran National Science Foundation: INSF

● Abstract:

1,3,4- Oxadiazole is a heterocyclic compound containing an oxygen atom and two nitrogen atoms in a five-membered ring. Among heterocyclic compounds, 1,3,4- Oxadiazole has become an important construction motif for the development of new drugs. Compounds containing 1,3,4-oxadiazole cores have a broad biological activity spectrum including antibacterial, antifungal, analgesic, anti-inflammatory, antiviral, anticancer, antihypertensive, anticonvulsant, and anti-diabetic properties. They have also attracted interest in medicinal chemistry as surrogates for carboxylic acids, esters and carboxamides. The ability of 1,3,4- Oxadiazole heterocyclic compounds to undergo various chemical reactions has made them important for molecule planning because of their privileged structure, which has enormous biological potential. The synthesis of novel 1,3,4- Oxadiazole derivatives, and investigation of their chemical properties and biological behavior has accelerated in the last two decades. Taking into account the importance of these compounds to both heterocyclic and medicinal chemistry, we have decided to offer the simple and one-pot synthesis approaches for obtaining the 1,3,4- Oxadiazoles using N-isocyaniminotriphenylphosphorane (Ph₃PNNC) via multicomponent reactions.



Third Laureate Applied Research

26th Khwarizmi International Award (KIA)



- Project Title: **Electro optical seeker**
- Executive Organizations: Iran Electronics Industries (IEI) Co, Isfahan Optics Industries (IOI)

●Abstarct:

Passive target detection is the main purpose of electro-optical searcher system. This system scans the sky and on detection of an object, sends an alarm along the position of the target.

Transmission of images with its angular position is done through a fiber optic rotary joint. Highly accurate servo –motor driver has been designed and produced natively.

Capabilities of the system includes:

- real time image processing
- panoramic image display
- small dimension and low contrast targets are detected.
- false alarm rate due to clutter is very low.



Third Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Project Title:** Design and Production of Digital RadioSonde System (DigiSonde)
- **Executive Organizations:** Iranian Research Organization for Science & Technology (IROST) and I.R. of Iran Meteorological Organization (IRIMO)
- **Researcher:** Shervin Amiri (Ph.D.)
- **Collaborators:** M. Zoljoodi, K.Kaki, M.Rezapour, F.Mirzapoor, A.Bitrafan, H.Akbar

● Abstract:

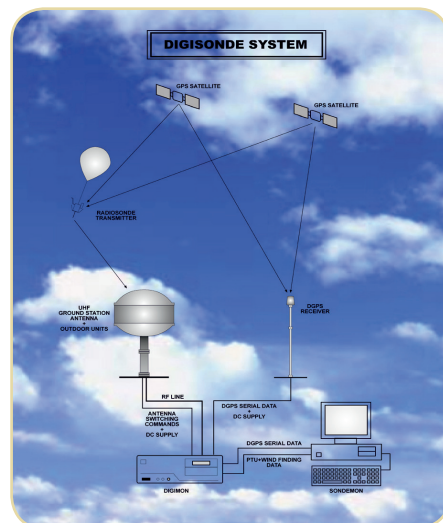
DigiSonde is an upper air observation system for measuring it's parameters like pressure, temperature, humidity, dew point, wind speed and wind direction from ground surface up to 30 Km altitude. Digisonde system is used in meteorological stations at airports every day.

This system has two section: Ground Section and Ascending Section.

The ground section includes some subsystems like outdoor units (Antenna, RF box, Antenna Positioner, Balloon Tracker, ...) and indoor units (RF Reciever, Antenna Control Unit & DigiMon Software).

Also the ascending section includes some subsystems like RF transmitter, GPS reciever, environmental sensors, spool winch and balloon.

The analysis, design, production and calibration methods of DigiSonde System was done in this project. The field test results of the system in different days and it's comparison with foreign system show that Digisonde system is a suitable candidate for situating in meteorological stations.



Third Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Project Title:** Prostate Surgery laser
- **Executive Organizations:** Iranian National center for laser science and Technology.
- **Representative:** Bazyar, hossein
- **Collaborators:** Modiri, Ali – Nazemi, Siamak – Mirnezami, S. Abbas – Bagherzadeh, Seyed Morteza – Rajaei Jafarabadi, Mahdi – Aghaie, Mohammad – Moslehian, Mojtaba – Ghaedzadeh, Amir – Naghibzadeh, Amir – Majidof, Mohammad Mahdi – Esmaeili Erami, Masoud – Ghasemi, Seyed Hamed – Bagherian, Saeed.
- **Collaborators Organization:** Nasr Pardazan koosha Co.

● Abstract:

This project aimed at designing and manufacturing a frequency-doubled solid state laser for urologic surgeries. The main plan is divided into three sub projects: laser resonator, which is the main part of the whole project, mechanics and electronics. All procedure of producing the laser e.g. simulations, cavity design (including pumping module and opto-mechanics) and stability optimization were carried out by the team. Mechanics of the system is comprised of design and develop of the mechanical structure and package of the machine and also cooling system. The machine has a user friendly control interface. Its smart self-control design guarantees accurate power stability as well as safety of both the system and the user. Adjustable output power of (30-80) Watt at 532 nanometer wavelength is delivered in the form of pulses with repetition rated of (10-15) KHz and (100-150) nanosecond duration, requiring 220 VAC, single phase 25A electrical input



بیست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Third Joint Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Project Title:** Gel Propulsion System
- **Executive Organization:** Malek- ashtar University of Technology
- **Researcher:** A. Saberi Moghaddam
- **Collaborators:** M. Sheikhi- A. Bagher vand

● Abstract:

Liquid and solid propellants are sufficiently developed; however, they suffer from some disadvantages. In order to overcome these defects, many attempts has been carried out to find new generation of propellants. In this way, gel engines (propellants) possess advantages of liquid and solid propellants and show a better performance than liquid propellants while do not have their disadvantages. These systems behave like solids when they are at rest and like liquids in propulsion state. In this project, gel propellants were successfully produced and gel propulsion system designed and constructed, and the related performance experiments have successfully been carried out.



Third Joint Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Project Title:** Design, Manufacturing, Installation and Operating Industrial Production Plant of UDMH Fuel
- **Executive Organization:** Aerospace Industries Organization
- **Collaborator Organizations:** Many Universities, Public & Private Companies

- **Abstract:**

Having some excellent physical and chemical properties such as high energy content, high durability, low freezing point, favorable autoignition, etc.; DM-NT is a liquid propellant that is widely used in military and space industries.

Some of the most important advantages of using this liquid propellant are increased operation velocity, survivability (life time) and improved effectiveness of weapon system.



پست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Third Joint Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Project Title:** Open Loop Fiber Optic Gyroscope
- **Executive Organizations:** Iran Electronics Industries (IEI) Co, Isfahan Optics Industries (IOI)

● **Abstract:**

This system is an interferometric fiber-optic sensor for measurement of angular velocity of an object. It is used extensively for stabilization and short term navigation in applications such as imaging and tracking platforms, robotics and guided projectiles.

Its principle of operation is based on the phase difference of optical beams which is produced by the optical path difference in the length of the light propagation i.e. the fiber-optic coil (Sagnac interferometry). After passing through an optical coupler, the generated light of the optical source is fed into the optical polarizer. At this point, after applying a specific polarization, the light is transferred to the second coupler which sends it to the fiber-optic coil. After passing through the coil in clockwise (CW) and counter clockwise (CCW) directions, the exit beams of light return to the entrance path and enter the photodetector by passing through the first coupler.

As a consequence of the rotation around the perpendicular axis of the coil, a phase difference is produced between the CW and CCW propagating beams. This phase difference is converted to the intensity variations by means of the detection circuitry.

In order to extend the ability of the sensor for sensing the direction of the rotation, a modulator is used in the path toward the coil. In this design, a piezoelectric cell is used as a modulator. Stimulated by a sinusoidal signal, the cell inserts the optical path difference between the CW and CCW paths. In this way, the resulted signal in the detector is a Bessel signal which is expandable to different harmonics of the modulator frequency. By multiplying this signal by the applied signal to the modulator, the first harmonic is extracted and the angular speed information is obtained.



Third Joint Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Project Title:** Research, Design and build- an optical gyroscope (FOG)
- **Executive Organization:** Aerospace Industries Organization,
- **Collaborator Organizations:** Many Universities, Public & Private Companies

● **Abstract:**

Optical gyroscopes are one of the main assemblies in navigation subsystems used commonly in military and space industries. Up to now, mechanical gyroscopes are used just in startup process for system launching. Due to a necessity in increasing the system precision and the trajectory guidance, replacing mechanical gyroscopes with the optical ones is critical.

the reliability, lang life, more precision and ease of desing and manufactory are som of important advantags of FOG'S



پست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Third Laureate Applied Research

26th Khwarizmi International Award (KIA)



● **Project Title:** Design and manufacturing of Spark Plasma Sintering (SPS)

● **Executive Organizations:** Malek Ashtar University of technology & IEI electro-optic industries

● **Representative:** Mazaher Ramazani

● **Collaborators:** Mahmood Minootan, Mohammad Rezazadeh, Saadat malekzadeh, Ahmad Ahmadi Bani, Saeid Reza Bakhshi

● Abstract:

Spark plasma sintering (SPS) is a high-rate powder consolidation/sintering technology capable of processing metallic, ceramic and composite materials. Theories on the SPS process vary, but most commonly accepted is the micro-spark/plasma concept, which is based on the electrical spark discharge phenomenon wherein a high-energy, low-voltage pulse current momentarily generates spark plasma at high temperatures (many thousands of °C) in fine local areas between particles. SPS' operational or "monitored" temperatures (°2400-200C) are commonly 200 to °500C lower than with conventional sintering, classifying SPS as a lower-temperature sintering technology. Material processing (pressure and temperature rise and hold time) is completed in short periods of approximately 5 to 30 minutes. The relatively low temperatures combined with fast processing times ensure tight control over grain growth and microstructure.

In this project, Materials Engineering Department of Malek Ashtar University in cooperation with SaIran electro-optic industries (Sapa) have designed and built the Spark Plasma Sintering machine. In this research project the technical knowledge required to designing and manufacturing of SPS systems is obtained and a semi-industrial prototype SPS machine was built.



Third Laureate Research & Development

26th Khwarizmi International Award (KIA)



- **Project Title:** Perforation Systems for Oil & Gas Wells
- **Executive Organization:** Aerospace Industries Organization,
- **Collaborator Organizations:** Many Universities, Public & Private Companies

• Abstract:

Perforating is a critical part in Oil & Gas well completion process and is regarded as a system for perforating the wall of Oil & Gas Wells to relate between Store and Inner Part of Casing to Extract Oil & Gas. This Foundation, Including Automated Manufacturing Lines as Regarded as one of the World's Modern Organizations That produce Perforating Shaped Charges and Provide Complete Systems Such as Wire Lines and TCP Operations for Customers.

Metallic Powder Cones are used for Producing High Penetration Perforating Shaped Charges.

These Shaped Charges Resist harsh environment of Oil & Gas Wells. A shaped charge consist of four parts including: 1-The outer case 2- main explosion charge 3- primer charge 4- metallic liner.



بیست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Third Laureate Research & Development

26th Khwarizmi International Award (KIA)



● **Project Title:** An achievement to technology and fabrication ceramic cores production line for advanced aeroparts

● **Executive Organization:** Aerospace Industries Organization,

● **Collaborator Organizations:** Many Universities, Public & Private Companies

● **Abstract:**

Ceramic cores are widely used in precision casting process. Some important applications of these cores are causing cavities and pores in manufacturing complicated parts of air turbines. In this scheme with a completely innovative method, ceramic cores of critical aeronautics parts are produced by changing the use of plastic injection machine. In this process, a mixture of different ceramic materials along with an organic binder is injected in desired mold. Crude ceramics, after removing from module, are subject to thermal operations of debinding and sintering. After placing into wax mold, cores are prepared for casting. After precision casting process and solidification of the desired part; ceramic core removed through a mechanical or chemical method and necessary pores are finally created.

Special achievements:

- 1- Production line implementation and overall production of different ceramic parts;
- 2- Production possibility of thin parts
- 3- Reduction of thermal operation cycle to a third in comparison with conventional thermal operation cycle



Third Laureate Research & Development

26th Khwarizmi International Award (KIA)



- **Project Title:** Iran Electronic National Identity Card Program (IRAN ID)
- **Executive Organizations:** Matiran Company - Iran National Organization for Civil Registration (NOCR)
- **Representatives:** Hamid Shoaibi, Dr. Mohammad Nazemi Ardakani
- **Researcher:** Abbas Khodaverdi

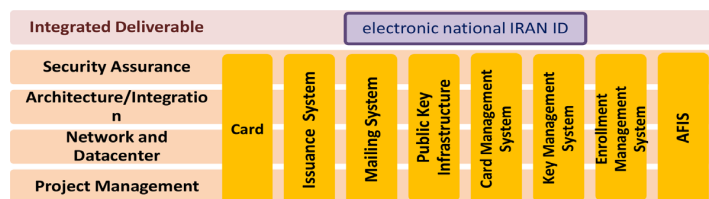
● Abstract:

Electronic National ID program is one of the infrastructures for a country in order to develop a comprehensive electronic government scheme. One of the most important objectives of running such programs is to introduce Digital Identity Management System in cyberspace. Electronic National ID card (Smart Card) provides the possibility of one to one mapping between physical identities and digital ones.

Due to the nature of the program, it has certain levels of complexity in terms of requirement engineering, architecture, design and implementation. Such programs are multi-disciplinary, so not only the technological aspect but also, Legal, Social, Economical and Security aspects should be dealt with very carefully. The program makes up of eight systems including: Smart Card, Card Management System, Enrollment Management System, Public Key Infrastructure (PKI), Automatic Fingerprint Identification System (AFIS), Issuance system and Mailing System.

Three main applications of the electronic national ID card are: Identification, Authentication and Digital Signature called IAS. These applications provide an appropriate infrastructure for e-Services such as: e-Voting, e-Subsidy, e-Health, e-Banking and generally a comprehensive infrastructure for many and any other e-Services.

The program has been started about five years ago. The customer of the program is National Organization of Civil Registration. Matiran has the honor of being one of the first Iranian companies developed such complex and multi-disciplinary programs based on internal brain resources.



"Matrix view of Program's subsystems and Parts"



Third Laureate Research & Development

26th Khwarizmi International Award (KIA)



- **Project Title:** 3D printing
- **Executive:** Hamid Alikhani
- **Collaborator:** Saeed Reza Alikhani

● **Abstract:**

This 3D printing makes solid object with ABS plastic and high accuracy 34 micron by means of 3d software.

All data will be transferred via SD memory and the device will handle all processing steps during whole procedure without any need to be connected to PC Computer.

Consuming parts of this device is one filament from ABS plastic with diameter 3 mm.

At first, this filament will be melted in tank of device and then 3d model will be formed as layer by layer gradually.

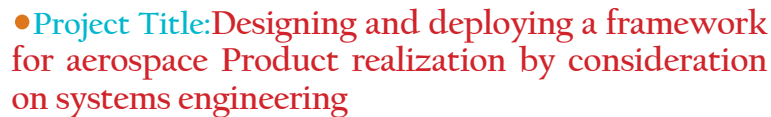
Thanks to the device which it will make it possible to make any kind of complicated models.

This device has many applications in different areas as follows.

- **Robotic:** Making any objects with any different kinds of forms and dimensions.
- **Arciture:** Making any model.
- **Cultural heritage:** Making any sample from historical objects.
- **Chemistry:** Making laboratory equipment.
- **Industries:** Making industrial complicated parts.
- **Animation:** Making characters and location.
- **Statue:** Building memorial statue for country's national heroes and famous people.
- **Medical:** Making artificial limbs.



26th Khwarizmi International Award (KIA)



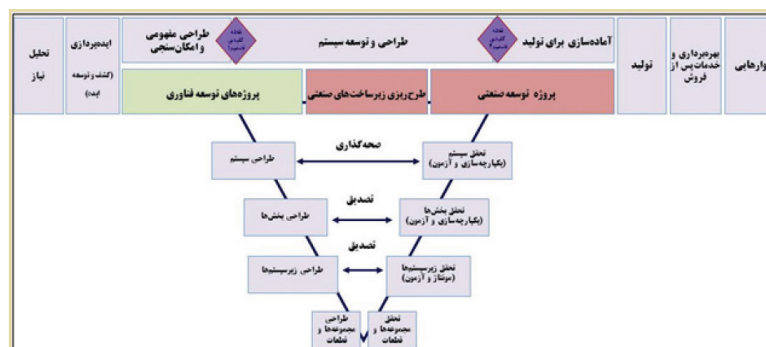
- **Executive Organization:** Aerospace Industries Organization,
- **Collaborator Organizations:** Many Universities, Public & Private Companies

With respect to complexity of aerospace product, the design process and technical management of these projects need to a systematic insight. In this project in relation to conducted assessment in design and development of aerospace Complex product, we introduce and deploy a Product realization framework on the aerospace product life cycle by consideration on systems engineering.

In aerospace design project, there are many designers with different skills in different discipline, and there are different technical requirement must be considered. Systems engineering Let to integration in design and development and assures requirement satisfaction in an effective way. For the first time in this extensive scale, we introduce a customized and adapted national systems engineering approach in aerospace product development.

Integration of technical activities, product design teams and design functions, design procedures, holistic controlling of requirements (e.g., operational functional, interface, reliability, maintenance), technical reviews and decision gates, technical data interchange software (Configuration management software) and validation and verification procedures (e.g., test and evaluation master plan, quality plan) are the main process of this approach.

Some of The most important features and results of deploying of this approach are: decrease the average time of aerospace projects, decrease change of design in accordance with customer requirements, decrease the time and cost of tests, increase the number of concurrent projects in one design office, increase accuracy of design and better control of design changes.



Third Laureate Innovation

26th Khwarizmi International Award (KIA)



- **Project Title:** Design and manufacturing of automation system for interlock and launching test of missile
- **Executive Organization:** Aerospace Industries Organization,
- **Collaborator Organizations:** Many Universities, Public & Private Companies

- **Abstract:**

Before space vehicles launch, it is necessary to test, evaluate and control all electronic and electromechanical subsystems. This critical, accurate and somehow complicated process is done by interlock & launching tester. Previously, this process has been done by electromechanical logics (relay), but now; while using digital logics, significant evolution accomplished in test equipment manufacturing technology and space vehicle launch.

These equipments are some automation systems that control the space vehicle through 2 software layers along with related hardware, and its launch.

For the first time in this project, the space vehicle test language logics are converted and translated to a digital language and processor.

26th Khwarizmi International Award (KIA)



پست و شششین چشواره بین المللی خوارزمی



Third Laureate Innovation

26th Khwarizmi International Award (KIA)



- **Project Title:** Rehabilitation of hydromechanical equipment of Golpayegan dam
- **Executive :** Ghasem Rast
- **Collaborator organizations:** Vestabod energy co., Iran Water, Resources Management Co. & Isfahan Regional Water Co.

● Abstract:

A wide range of technical problems, including failures in the dam structure and its auxiliary equipment arises when the regulatory dam's lifespan reaches to the end. Therefore, dam rehabilitation and improvement should be implemented for all local dams within the next few years. Golpayegan Dam - first modern Iranian dam- project is one of the successful examples of rehabilitation of hydro-mechanical equipment of the dams in Iran.

Fifty years after the completion of Golpayegan Dam, controlling and maintaining water in the dam reservoir had become possible by using only two Howell Bunger valves due to the existing complications such as high volume of sedimentation, gate jamming in embedded guides and malfunctioning of butterfly valves located at the discharge lines. A dysfunction in any of these two valves could have lead to complete discharge of the dam reservoir. The Gopayegan rehabilitation project was completed without diverging and/or discharging water from the dam reservoir. Construction and installation of gates, trashracks, branches, and pipes (900 mm and 1400 mm) in a depth of 18 meter, as well as concrete pouring in water from barges and boats were completed as the water level in the reservoir was constantly rising. Regardless of difficult working conditions and lack of proper knowledge of the equipment, innovative methods and precise engineering designs were implemented to complete the Golpayegan rehabilitation project.



بیست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Third Laureate Innovation

26th Khwarizmi International Award (KIA)



- **Project Title:** Designing and manufacturing of the 120mm high explosive extended – range (rocket-assisted) mortar round system
- **Executive Organization:** Defense Industrial Organization (DIO)
- **Collaborator Organizations:** Many Universities, Public & Private Companies

- **Abstract:**

This System has acquired the technology and technical knowledge needed for designing and manufacturing extended range ammunition and its Launcher. This product has been systematically designed and produced includes the design and production of the mortar tube, propelling charge, and the round. All of the assemblies and sub-assemblies of the system along with intersection points were conducted through system engineering processes. The round is unique in the world, and all the technology and design are domestically developed. The required simulation and designing soft-wares were provided and confirmed by domestic scientific institutes and universities. In comparison with conventional ammunition of the same caliber, this product enjoys many advantages over similar products.

The results of the plan:

- Acquiring the technology and technical knowledge needed for designing and manufacturing an extended range ammunition and its Launcher
- Indigenizing the required technology for mass production of the product
- Upgrading the capabilities needed for producing designing and simulation software>s used for this kind of munitions
- Acquiring the algorithms systematic designing of various kinds of ammunitions.



26th Khwarizmi International Award (KIA)



Third Laureate Innovation

26th Khwarizmi International Award (KIA)



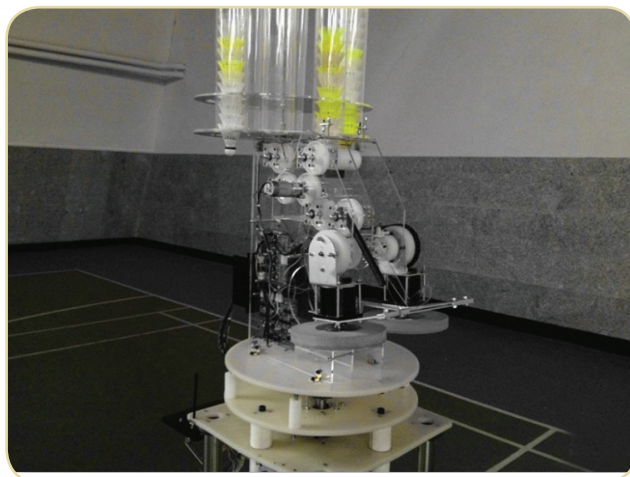
- **Project Title:** Fully Automatic Badminton Shuttlecock Launcher Robot
- **Executive:** Ashkan Amirkhani
- **Collaborator:** Arash Amirkhani , Hossein Mansuori

- **Abstract:**

Success in Badminton need an appropriate coach and opponent game. However, most of the time it is not available for players. Therefore, designing a robot with mentioned features and also could cause an increase in the physical and mental potential of professional and amateur players.

After creation of a new exercise program in touch screen panel of robot, it would be able to apply all badminton specialized hits with high accuracy and precision.

Design of this robot including mechanical, electronical and software is quiet unique in the world.



Scientific
Specialized Committee of the Laureate
successful in national production

26th Khwarizmi International Award (KIA)

Introduction to Specialized
Committee

The economic world is under a great evolution. The nature and form of the markets, supply and demand methods are rapidly changing.

This amazing transformation has changed many economic methods. Most of them were referred yesterday as new methods and today they have become obsolete. It is true that the economy of the developing countries endures high pressures.

This year has been named the year of «National production and support to the Iranian work and investment». The twenty sixth session of the Khwarizmi International Award decided to answer the call of the year and creates a specialized scientific specialized committee dedicated to the evaluation of KIA Laureates' research works of previous sessions with high impact on the national production.

This scientific specialized committee has been primarily designed to study the research works of Laureates of previous sessions and select those who have been successful in converting science into national wealth. After a very closed and final scrutinization of the research works, and this in different categories; fundamental and applied research, invention and innovation research, the committee selected the Laureates who have worked steadfastly and effectively for the national industrialization and national commercialization of their research product.

As an assigned KIA Laureate, the research work has already been submitted to the scientific evaluation of the related scientific committee. This committee evaluates, in a second step, the research work according to its own criteria such as entrepreneurship, innovation, business development, market competition, national production increasing rate, stability, conversion of science into wealth,



Scientific
Specialized Committee of the Laureate
successful in national production

26th Khwarizmi International Award (KIA)

customer's appreciation, quality control, standards, scientific development, commercial interactions and exportation.

In another side, the evaluation of the companies is made according different criteria such as: industrialization, quality product, entrepreneurship, investment, capital, market, documentation and management.

An on-site visit is organized to determine according specified indicators the production performance of the research product.

The complete evaluation with all the necessary documentation is then submitted to the KIA Jury who will finally select and honour the Laureate of the «**Laureate Successful in National Production**».

To celebrate the slogan of the year, this committee will honor any research work that spreads the word about national production. It will serve to recognize the outcomes of the KIA Laureates and evaluate their performance in converting successfully an idea into an industrial and commercial product.

It recognizes the KIA Laureates who distinguished themselves in the industrial and commercial market and who became leaders in expanding the prevalence of national production and Iranian investment.



The laureate successful in national production

26th Khwarizmi International Award (KIA)



- Name of Company: **Push**
- Managing Director: **Nasser Sheikhha** (M. Sc.)
- Project title: **Rotary Vane Vacuum pump**

Laureate of sixteenth session of KIA(2003)
Third Laureate, Innovation



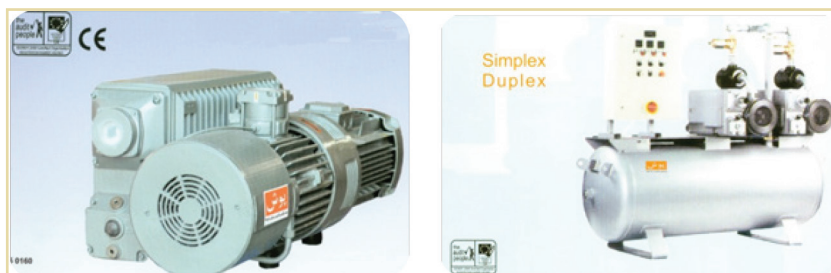
Push company successful in national production:

Identify market needs, private investment and success on mass production, corporate sustainability, innovation in new technologies with the economic justification in ten years, currency savings and variation produced are the specifications of this knowledge bases company. These products used in hospitals, machine industries, packing, ceramic and tile detergent print and glass.

Stability in the market, innovation in the production process and profit in past ten years, and producing wealth from knowledge are the key success in this company. The company have operation license, standard, quality control, R&D services and customer evaluation. The product does not have domestic rival and have better quality than foreign similar products. Scientific and technical documentation, brochures and product manuals, certificates from domestic and foreign technical authoritative show the success of the company's management and commitment to keep the standards of high quality to achieve customer satisfaction .

• Abstract:

Rotary Vane Vacuum Pump works eccentricity in rotary and have blades that rotating eccentricity from tracks to out and attached to cylinder wall. In that case collected air inside the cylinder and out through the internal valve and put it in the air oil separator filters. In the carter oil, the air separated from oil and clean air without oil and smoke out from exhaust and oil come back to pump.





Ministry of Science, Research and Technology
Iranian Research Organization for Science and Technology (IROST)
Khwarizmi International Award (KIA)



Laureates
of the
26th Khwarizmi International Award
Foreign Section

First Laureate Fundamental Research

26th Khwarizmi International Award (KIA)



- **Research Work Title:** Algorithm Engineering
- **Researcher:** Prof. Kurt Mehlhorn
- **Nationality:** German
- **Date of Birth:** 1949
- **Field:** Information Technology
- **Position:** Researcher and Director
- **Scientific Affiliation:** Max Planck Institute for Informatics Germany

● Abstract:

Kurt Mehlhorn has made fundamental contributions to a wealth of algorithmic topics: Data structures, computational geometry, geometric computing and computer algebra, parallel computing, VLSI-design, complexity theory, combinatorial optimization, and graph algorithms. One outstanding contribution is his shaping of the field of algorithm engineering, most prominently represented by LEDA, the Library of Efficient Data Types and Algorithms, which was initiated and originally written by Kurt Mehlhorn and Stefan Naher. The LEDA book is a shining example of theory meets practice with its interweaving of theoretical analysis and careful software engineering. Besides efficiency, the library impresses by the treatment of correctness, let it be in the direction of robust, consistent and at the same time efficient geometric computation or in the direction of the employment of certificates which allow checking of results independent of the correctness of algorithms and their implementation. Nowadays, LEDA is used extensively both in academia and industry and it has stimulated the development of numerous other more specialized libraries for combinatorial algorithms.

● Biography:

Kurt Mehlhorn received a PhD in Computer Science from Cornell in 1974. One year later, he was appointed full professor for Computer Science at the Universitat des Saarlandes. Since 1990, he is one of the directors of the Max-Planck-Institut for Computer Science in Saarbrücken, in Germany. He is co-founder of Algorithmic Solutions GMBH.

Kurt Mehlhorn combines theoretical work and systems building in a most successful way. He and his former student Stefan Naher designed and implemented the LEDA platform for combinatorial and geometric computing. LEDA is intimately connected to his theoretical work and would have been impossible without it. LEDA is a breakthrough in the construction of an efficient and correct platform for combinatorial and geometric computing. The main features of LEDA are scope, efficiency, correctness and ease of use. Correctness and hence security is achieved by building on exact geometry kernels and the extensive use of program checking. The LEDA system is by now used in more than 1500 academic and research sites world-wide for a wide variety of applications ranging from computer-aided design, and computational biology to transportation planning and VLSI-design; it is also licensed to more than 300 companies through Algorithmic Solutions Software GmbH, of which Kurt and Stefan are co-founders.

LEDA is not only a widely used. It is also a model for later efforts, e.g., for CGAL (Computational Geometry Algorithms Library).

Kurt Mehlhorn has published more than 100 journal articles and he has written five books. The three-volume book Data Structures and Algorithms (Vol I: Sorting and Searching, Vol II: Graph Algorithms and NP-Completeness, Vol III: Multi-dimensional Searching and Computational Geometry) was particularly influential.



Second Laureate Fundamental Research

26th Khwarizmi International Award (KIA)



- **Researcher:** Prof. Muhammad Ashraf
- **Nationality:** Pakistani
- **Date of Birth:** 1953
- **Field:** Stress Biology
- **Position:** Professor
- **Scientific Affiliation:** Department of Botany, University of Agriculture, Faisalabad, Pakistan
- **Research Work Title:** Plant Stress Physiology and Molecular Biology

● Abstract:

For the successful achievement of salinity problem, Dr. M. Ashraf has proposed various reclamative and curative measures which are highly cost-effective that can be contemplated particularly in developing countries. Dr. M. Ashraf devised a number of new techniques for screening large numbers of individuals (30,000 – 20,000) at high selection pressure after just 2-3 weeks growth, because the greater the number of genotypes screened, the greater would be the possibility of selecting some highly salt tolerant individuals. The selection lines of various crops such as canola, cotton, maize, pearl millet, different pulse crops, different forage grasses, oil-seed crops, developed so far are highly salt tolerant in comparison with their respective base populations, and most thrived well on salt affected soils after substantial amendments. It is imperative to note that a cultivars of spring wheat “S24” (USDA-ARS National Centre for Genetic Resources Preservation PI No. 652453; Plant Genetic Resource Institute, National Agricultural Research Centre, Islamabad, Pakistan Acc22864; recently published in Journal of Plant Registration USA; 37-34 :4) developed by Dr. M. Ashraf after rigorous selection procedure using physiological, molecular and genetic means, is currently being used as a promising salt tolerant cultivar at different national and international institutions.



Wheat cultivar S24 developed by Prof. Muhammad Ashraf

● Biography:

Prof. M. Ashraf did his PhD from University of Liverpool, UK in 1986. In 1993, he earned Fulbright Award and proceeded to University of Arizona Tucson (USA) for postdoctoral work. Owing to his considerable scientific attainment, he was awarded D.Sc in 2011 by the University of Liverpool. Dr. Ashraf has produced 64 PhDs (30 as major supervisor +34 as member). Recently, Pakistan Council for Science and Technology has ranked him First in Agriculture and Biological sciences. He was selected as a Honorary scientist in 2005 and later on an advisor by the Republic of South Korea. He earned the title of HEC Distinguished National Professor by the Higher Education Commission in 2005. Dr. Ashraf earned the First Position in Biosciences in the COMSTECH ranking of scientists of OIC countries done 4 years ago. His journal impact factor is 490, h-index 33 and citation index 5500, the latter two being highest in Pakistan among all experimental scientists.



Third Laureate Fundamental Research

26th Khwarizmi International Award (KIA)



- **Research Work Title:** Enhancement of the human immune response
- **Researcher:** Dr. Rebecca Emma Asquith
- **Nationality:** UK
- **Date of Birth:** 1971
- **Field:** Mathematical Immunology
- **Position:** Senior Lecturer
- **Scientific Affiliation:** Imperial College London, UK

● Abstract:

For the last 100 years immunity has been investigated in animal models and in vitro. These approaches have yielded great insight. However, to understand human immunity we ultimately need to study humans.

The work that can be performed in humans is limited. I am developing alternative approaches that use mathematics to extrapolate from the experiments we can do -experiments of nature or minimally-invasive experiments- to address central questions about human immunology. My goal is to develop a predictive, quantitative understanding of the human T cell response.

● Biography:

Dr Asquith is Senior Lecturer in within-host dynamics at Imperial College London where she heads the Theoretical Immunology Group. Her contribution includes the identification of the determinants of immune protection in HTLV1- infection; discovery of an enhancing role for innate receptors (KIR) in adaptive immunity; quantification of the role of CD+8T cells in HIV1- and the development of novel techniques to measure CD+8T cell efficiency. These techniques include the only non-invasive method to quantify CD+8T cell pressure in humans in vivo. They have been adopted by the National Centre for Human Retrovirology, applied in clinical trials and adopted by the CHAVI consortia. She has also worked extensively on the use of labelling to quantify in vivo lymphocyte dynamics in health and disease. This includes development of the "kinetic heterogeneity model". The principle that this model encapsulates is now widely accepted and applied



Third Laureate Fundamental Research

26th Khwarizmi International Award (KIA)



- **Research Work Title:** Fluorescent Supramolecular Architectures for Sensing and Imaging
- **Researcher:** Dr. Ayyappan Pillai Ajayaghosh
- **Nationality:** Indian
- **Date of Birth:** 1962
- **Field:** Chemistry
- **Position:** CSIR Outstanding Scientist/ Professor and Dean
- **Scientific Affiliation:** CSIR-National Institute for Interdisciplinary Science and Technology

● Abstract:

Ajayaghosh's research group has been focusing on the self-assembly of fluorescent linear π -systems. A variety of supramolecular architectures of different size, shape and properties have been investigated. The fundamental understanding gathered from these studies has lead to design of soft materials with tunable fluorescent properties which are useful for imaging and sensing applications. For example, fluorescent self-assembly has been developed for the thermal imaging and self-erasable writing using water as an ink which are useful as security labels for preventing fake documents and currency (patent applied). Thus, from the fundamental understanding molecular self assembly a variety functional material with exotic structures and their application to imaging and sensing have been demonstrated. These studies are not only important in terms of high quality science, as evident by the large number of high impact publications and citations, but also have great potential for practical applications.



● Biography:

Professor A. Ajayaghosh is a CSIR-Outstanding Scientist at CSIR-NIIST, Trivandrum, India since 1988. He obtained his M. Sc. (1984) and a Ph. D (1988) from Calicut University. He was the Alexander von Humboldt Fellow at the Max Plank Institute for Strahlen Chemie, Germany (96-1994). He has received several awards such as the Thomson Reuters Research Excellence Award (2009), the Outstanding Researcher Award of the Department of Atomic Energy (DAE) (2009), the Ramanna Fellowship of the Department of Science and Technology, India (DST) (2007), the Shanti Swarup Bhatnagar Prize for Chemical Sciences (2007) and Infosys Prize for physical science (2012). He is a Fellow of all the three Science Academies of India, an advisory board of Chemistry-An Asian Journal and is an Associate Editor of the Royal Society Journal PCCP. He is also the Dean of Chemical Sciences, Academy of Scientific and Innovative Research (AcSIR), CSIR, New Delhi.

بیست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Third Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Research Work Title:** Basic approaches for pharmacological correction of liver pathology and associated extrahepatic diseases
- **Researcher:** Prof. Vyacheslav U. Buko
- **Nationality:** Belarus
- **Date of Birth:** 1942
- **Field:** Biochemistry, pharmacology
- **Position:** Head, Division of Biochemical Pharmacology
- **Scientific Affiliation:** Institute of Biochemistry, National Academy of Sciences

● Abstract:

The aim of the presented research work is to substantiate modern approaches in treatment of experimental liver pathology and diseases either stipulated by liver abnormalities (atherosclerosis) or caused by these abnormalities (diabetes, metabolic syndrome, and obesity). We proposed two original hypotheses: prostaglandin deficiency in alcoholic liver damage and antioxidant defense by non-structural lipids.

We investigated and described the following phenomena:

- molecular mechanisms of liver damage by aldehydes;
- hepatoprotective, anti-diabetic and anti-fibrotic properties of prostaglandins;
- the role of nitric oxide in liver fibrosis;
- ursodeoxycholic acid: mechanisms of protection in diabetes and liver pathology;
- mechanisms of anti-atherogenic activities of estrogen and testosterone derivatives;
- pharmacological mechanisms of genistein-8-C-glycoside, panthenol, melatonin, and statins in different experimental pathology.

Therefore, this research forms a fundamental basis for pharmacological correction of experimental liver pathology and extrahepatic diseases by using known medicines for new prescription and for creation of new drugs.



● Biography:

Presently, Prof. Vyacheslav Buko is the Head of the Department of Biochemical and Pharmacology at the Institute of Biochemistry (in 2012-2006 – Institute of Pharmacology and Biochemistry), National Academy of Sciences. He studied medicine at Grodno Medical University (1964 – 1958) and worked as physician in clinics of Brest (Belarus). Since 1971 he works at the Institute of Biochemistry in Grodno. Doctoral thesis in 1976, habilitation – in 1990, full Professor since 2000. His research fields are molecular mechanisms and pharmacological correction of liver diseases and extrahepatic pathology; biochemistry of lipids, oxidative stress, microsomes- and mitochondria-related processes. Prof. V. Buko collaborates with Belarussian pharmaceutical industry. He is a member of the European Association on the Study of the Liver, the European (ESBRA) and International Societies on Biochemical Research of Alcoholism, symposium organizer and chairman at a number of ESBRA Congresses. Prof. V. Buko collaborates with a number of European universities and industries.



Third Laureate Applied Research

26th Khwarizmi International Award (KIA)



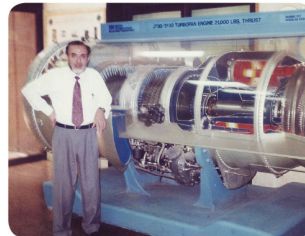
- **Research Work Title:** Some Novel Cycles of Gas Turbine Cogeneration Systems
- **Researcher:** Professor Yousef Salameh Hussein Najjar
- **Nationality:** Jordanian
- **Date of Birth:** 1946
- **Field:** Mechanics
- **Position:** Professor
- **Scientific Affiliation:** Jordan University of Science and Technology Irbid -Jordan

● **Abstract:**

The gas turbine engine has some attractive features, principally: low capital cost, compact size, short delivery, high flexibility and reliability, fast starting and loading, lower manpower, and better environmental performance, compared with other prime movers especially the steam turbine plant. However, it suffers from limited efficiency, especially at part load.

Cogeneration, on the other hand, is a simultaneous production of power and thermal energy when the otherwise wasted energy in the exhaust gases are utilised. Hence, cogeneration with gas turbines utilises the engine's relative merits and boosts its thermal efficiency. Thereby, the worldwide concern about the cost and efficient use of energy is going to provide continuing opportunities, for gas turbine cogeneration systems in power and industry.

In this work, ten novel research investigations carried out by the author and associates during the last ten years in the field of gas turbine cogeneration in power and industry are discussed briefly.



● **Biography:**

Najjar, Yousef S.H., Founding Director of the Energy Center, Fellow ASME (USA), Fellow the Institute of Energy (UK), Professional Engineer P.E., Chartered Engineer C.Eng., Professor of Mechanical Engineering. B.Sc., Mech. Eng. (Power) Cairo University (1969); M.Sc. & Ph.D. Mech. Eng. (Thermal Power), Cranfield Institute of Technology (U.K) 1976 1979 & respectively. Chief Power Engineer (75-1969); Training with General Electric (GEC) (U.K) (74-1973). Yarmouk University (86-1980); King Abdulaziz University-Jeddah (-1986 2001), Published 143 international journal papers, granted a patent by British Patent Office (1988); Two Patent Publications; Lectured in 33 international conferences; Member of the «Editorial Advisory Board» for some International Journals.

Awards: Won the International Arab Creativity Award- 2011 in Sciences; KIA International Award-Scientific Research in 2012; The 1995 and 2007 Awards for excellence for outstanding papers.

Research: Energy-Thermal Power including Gas Turbines: Fuels, Combustion, Turbomachines & Renewable and Alternative Energy Systems; ICE; Hydrogen and Fuel Cells; Authored three books & manuals.

بیست و ششمین جشنواره بین المللی خوارزمی



26th Khwarizmi International Award (KIA)

Third Laureate Applied Research

26th Khwarizmi International Award (KIA)



- **Research Work Title:** Preparation and characterization of kenaf reinforced thermoplastic composites
- **Researcher:** Prof. Mohd Sapuan Salit
- **Nationality:** Malaysian
- **Date of Birth:** 1965
- **Field:** Composite Materials
- **Position:** Professor
- **Scientific Affiliation:** Department of Mechanical and Manufacturing Engineering, Universiti Putra Malaysia, Malaysia

● Abstract:

This research was carried out to produce a new composite material from kenaf bast fiber and thermoplastic polyurethane (TPU/KF). Different fiber sizes; namely, <125, 125-300 and 300-425 μm were characterized using tensile, flexural, and impact strengths. Fibers shown to be optimum are between 125 and 300 μm . Fiber loading was characterized using tensile and flexural properties and impact strength. A 30% fiber loading was optimum for these properties. Fiber loading was also characterized using thermogravimetric analysis (TGA). Increase of fiber loading showed decrease of thermal stability of TPU/KF. The effect of sodium hydroxide (NaOH) treatment on mechanical properties with different concentrations was studied. Treatment with NaOH showed deterioration in mechanical properties. Scanning electron microscope showed that fiber-matrix adhesion was poor for the treated composites. TGA also proved the deterioration of properties of TPU/KF after treatment with NaOH, where it showed that thermal stability decreased after treatment.

● Biography:

Professor Mohd Sapuan Salit is currently a professor of composite materials in Department of Mechanical and Manufacturing Engineering, Universiti Putra Malaysia (UPM). He is also the head of Engineering Composites Research Program at Faculty of Engineering, UPM. Professor Mohd Sapuan is the Vice President and Honorary Member of Asian Polymer Association. He is also a fellow of Plastics and Rubber Institute, Malaysia (PRIM), Institute of Materials Malaysia (IMM), and Malaysian Scientific Association (FMSA). He has successfully supervised 32 PhD and 45 MS students. To date he has authored or co-authored more than 350 journal papers and 400 seminar and conference papers. He has edited a book titled 'Composite Materials Technology: Neural Network Applications published by CRC Press. Professor Mohd Sapuan was the recipient of ISESCO Science Award, Rotary Research Award, PRIM Fellowship Award, Forest Research Institute, Malaysia Publication Award, Vice Chancellor Fellowship Prize, UPM, and Excellence Research Award, UPM.





Ministry of Science, Research and Technology
Iranian Research Organization for Science and Technology (IROST)
Khwarizmi International Award (KIA)



Introduction to one of the national sponsors of the 26th KIA

Introduction to one of the national sponsors of the

26th Khwarizmi International Award (KIA)



The Research Center of the Police Drug Control of the Islamic Republic of Iran

Nowadays, it is necessary to be aware of the new trends in science and their applications in related research. In the last past years, the Police Drug Control oriented itself toward research and social matters and in parallel to the worldwide scientific changes, it tried, through new methods and scientific management to reach its goals and respond to its responsibilities.

The research center of the Police Drug Control is one the most advanced unit. Its scientific and study activities are connected to the police missions, support, scientific assistance and information regarding research results.

Its mission is as follows:

- Research and study
- Guidance and support
- Organizing platforms and gatherings
- Scientific cooperation with national, international universities and research organizations
- Publication; books and scientific papers
- Creating scientific data bases
- Supporting MA thesis with related subjects
- Set up laboratories on drug control in the country
- Presenting research achievements through workshops

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