

*In the name of ALLAH*



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

**The Laureates of the**  
**27<sup>th</sup> Khwarizmi**  
**International Award**  
**(KIA)**

---

**March, 2014**  
**Tehran - I.R. Iran**





Holy Prophet Mohammad (pbuh):

*« The closest people to the degree  
of prophethood are the people of  
Knowledge and Jihad»*





**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:**

Science, as a prominent element, should be, in any field, the dominant and major discourse of the society.





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  - **P.O.Box:** 33535-111
  - **Tel/Fax:** (+98 21) 56 27 63 21, 56 27 63 45
  - **Website:** <http://www.khwarizmi.ir>
  - **E-mail (Nationals):** [khwarizmi\\_intl@irost.org](mailto:khwarizmi_intl@irost.org)
  - **E-mail (Foreign & Iranian Resident Abroad):** [khwarizmi@irost.ir](mailto:khwarizmi@irost.ir)



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## National Sponsors

of the 27<sup>th</sup> Khwarizmi National Award



Ministry of Science, Research & Technology



National Elite Foundation



Tejarat Bank



Defense Industries Organization



Farhoud Cultural Foundation



Aviation Industries Organization



Emam's Executive Bureau



Aerospace Industry Organization



Defence Industries Education and Research Institute



Radio Danesh





## Internationale Sponsors

of the 27<sup>th</sup> Khwarizmi National Award



**APCTT**  
Asian and Pacific Centre  
for Transfer of Technology

Asian and Pacific Centre for Transfer of Technology (APCTT)



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



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



Developing 8 Countries



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)



کمیسیون ملی  
یونسکو - ایران  
Iranian National  
Commission for  
UNESCO



مقر منطقه‌ای یونسکو تهران  
UNESCO  
Tehran Cluster  
Office



United Nations Industrial Development Organization (UNIDO)



World Association of Industrial & Technological Research  
Organizations (WAITRO)



World Intellectual Property Organization (WIPO)







## International Sponsors Prizes

to the KIA Laureates

- Asian and Pacific Centre for Transfer of Technology (APCTT)  
2 Certificates
- 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
- Third World Academy of Sciences (TWAS)  
2 Cash Prizes
- 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
- UNESCO Tehran Cluster office  
3 Certificates







Messages



## IROST's President Message



It goes without saying that one of the main characteristics of a sustainable development is the development of invention and innovation and of course the crucial role of the researchers and technologists in this development.

Self-confidence and self-assurance generate capability in scientific, economic, social, political and cultural fields. To own a scientific and innovative capability not only contributes to the national proud but to make people, in a significantly positive way, more dynamic and motivational and incite scientists to work for the benefit of their country and maintain its international position.

This year, for the twenty seventh time, the Iranian Research Organization for Science and Technology has the honor to held the Khwarizmi International Award. This award ceremony, held at national and international level, is a valuable and dynamic institution and a precious opportunity for the evaluation, recognition and acknowledgement of the outstanding research achievements and distinguished researchers, in different field of science. Providing support to the KIA Laureates, assisting them in conducting their research projects and bringing innovation to the market have been one of the mission of IROST over the last past years.

We are grateful to Almighty Allah that we have the honor and privilege to celebrate, once again, this prestigious scientific event with the participation of hundreds of applied, development, and inventive national and foreign research works.

We praise our KIA Laureates and pray to Almighty Allah to bestow His blessings and grant success in the future endeavors of the scientific and industrial community of our Islamic nation.

**A. Akbari**  
**President of IROST**





## Message

from International Sponsors



### Message from TWAS



TWAS – The World Academy of Sciences for the advancement of science in developing countries – sends sincere congratulations to the latest winners of the prestigious Khwarizmi International Award. It is a great honour to win an award named for Abu Jafar Mohammad Ibn Mousa Khwarizmi, whose work in mathematics and other fields some 1200 years ago had such a profound and enduring influence on science. With this honor comes a responsibility to continue the expansion of scientific knowledge, while helping to prepare future generations to follow this legacy of research.

We send our congratulations as well to the Islamic Republic of Iran. These prizes represent the nation's longstanding support of global innovation and technology. The I.R. of Iran, as we know, is deeply committed to excellence in science and engineering. That is evident in the current work of the nation's Ministry of Science, Research and Technology and the Iranian Research Organization for Science and Technology (IROST). It is evident as well in the nation's increasing commitment to investment in research and development and building a knowledge-based economy. At the same time, the Islamic Republic of Iran is playing a positive role in building global knowledge networks based on science and international research cooperation.

These are laudable achievements, and the I.R. of Iran deserves much praise for work and commitment that serve as a model for other nations. We hope that TWAS contributes to this effort through its sponsorship of the TWAS/IROST prizes for young scientists. We share common goals, and it is certain that by working together, we can make a better world for the benefit of all people.

**Prof. Bai Chunli**  
**President of TWAS**





## Message

from International Sponsors



### Message from IESCO



The Islamic Educational, Scientific and Cultural Organization (ISESCO) is proud to celebrate this year the 27th magnificent ceremonial Festival of Khwarizmi International Award in the Islamic Republic of Iran in cooperation with the Iranian Research Organization for Science and Technology (IROST). The prestigious Khwarizmi International Award which commemorates the scientific and spiritual achievements of Muhammad ibnMūsā al-Khwārizmī, is a well recognized scientific prize for which many scientists and young researchers from all over the world compete each year. The 2014's session of KIA Award will highlight genuine contributions of scientists and researchers in four main fields of science namely: Applied Research, Fundamental Research, Research & Development, and Invention & Innovation.

ISESCO as one of outstanding sponsor of KIA Award over the last decade has witnessed a great deal of progress in its scientific programmes to assist its Member States achieving excellence in research and development. 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, technology and innovation. ISESCO has developed cooperation programmes with many specialized institutions at international and regional levels to fulfil its commitment towards capacity-building in science and technology. The cooperation of ISESCO and IROST remains one of successful endeavors for promotion of science, technology and innovation 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 27 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**





## Message

from International Sponsors



### Message from ICARDA

International Center for Agricultural Research in Dry Areas (ICARDA), with system oriented research, specifically in fragile ecosystems, has enormous challenges to serve science, society, and humanity in dry lands agriculture. Based on the diversity of culture and agriculture, and the strengths and opportunities for agricultural development, Iran is a key partner of ICARDA in the CWANA region. ICARDA is very honored of long standing extensive scientific collaboration with the Ministry of Jihad Agriculture. This strategic collaboration has been started since 1984 with an emphasis on enhancing the human resources and the research for development in agriculture sector of the dry areas of I.R. of Iran to enhance agricultural productivities and food security.

It is a great pleasure for ICARDA to support the superb scientific Khwarizmi International Award. As recognition of this genuine effort, it is a great privilege for me to present this message and extend my sincere congratulation to Iranian Research Organization for Science and Technology (IROST) for its continued success in organizing this remarkable 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. To recognize at least a small portion of scientists and researchers efforts, it is emphasized that the noble events, such as KIA, which encourages young scientists, should be supported.

Finally, I would like to offer my appreciation to all behind the scene working hard to make these outstanding attainable.

**Dr. Seyed Ata Rezaei**  
**ICARDA Office Manager/Coordinator**  
**Islamic Republic of Iran**





## Message

from International Sponsors



### Message from WAITRO

The Khwarizmi International Award (KIA), a prestigious annual event that celebrates top scientists, researchers, inventors and innovators from all over the globe is where representatives of international organizations gather to honour worldwide scientists, researchers, inventors and innovators for their exceptional contributions that help advance the economy, society and environment.

The KIA is a platform where distinguished individuals congregate to exchange and share ideas, thoughts, experience and successes in research. In this regard, the concept of KIA is analogous to that of the World Association of Industrial and Technological Research Organizations' (WAITRO) whereby WAITRO itself is a network of over 150 research technology organizations in 74 different countries that encourages collaboration amongst member organizations. Therefore, through its member organizations, WAITRO unites scientists and technological experts in numerous backgrounds globally. Successful scientific and technological organizations have proven that they stay competitive in today's knowledge-based society by networking.

In honouring women scientists, innovators and inventors for their accomplishments in science and technology, just like in previous years since 2008, WAITRO is honoured to sponsor the "Best Woman Scientist for Innovation" award once again to a deserving lady scientist who has made outstanding scientific and technological contributions to the advancement of the economy, society and environment at the 27<sup>th</sup> Khwarizmi International Award 2014. WAITRO is proud to say that it is going into the eighth consecutive year of playing a part in the KIA and it is looking forward to continue supporting the event.

WAITRO congratulates and applauds both award winners as well as those nominated in getting recognition for their priceless contributions. Congratulations also to our diligent WAITRO member, the Iranian Research Organization for Science and Technology (IROST), for tirelessly organizing the KIA over these 27 years. May there be many more successful KIA events in the coming years.

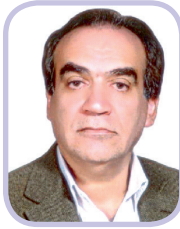
**Dr. Rohani Hashim**  
**Secretary-General**  
**WAITRO**





## Message

from International Sponsors



**IORA**  
Indian Ocean Rim Association

### Message from IORA

Scientific and technological advancement play a vital role in the economic development of any country. Today more than ever, innovation and invention are the keys to survival and long-term success. They dare us to dream the impossible, give us the courage to venture into the unknowns, and challenge us to be determined when we are doubtful. Those who have the aptitude for identifying opportunities, creative thinking and problem solving will elevate the economic base of their countries and bring hope for a vivid future.

The “better world” we envision will be created not solely by the achievements of science and technology in our own countries, but by the time when the technology will be transferred to those societies who need them. Therefore, a main key to creation of a “better world” is “science & technology transfer” which can be achieved by partnership and cooperation between all countries through networking, knowledge sharing, joint research activities and technology commercialization, all of which provide benefits for the humankind.

IORA Regional Centre for Science and Technology Transfer (RCSTT) is committed to disseminating scientific knowledge and findings with a selfless spirit supporting the creation, networking, transfer and commercialization of science and technology most particularly in the IORA region for the good of the world.

It is indeed a matter of great pleasure and pride for IORA RCSTT to be one of the supporters of the 27th Khwarizmi International Award (KIA) and I would like to extend my heartfelt congratulations to those best and brightest minds who won this Award on their praiseworthy contributions that change the way the world works. I would also like to express my deep gratitude to the organizers of the Khwarizmi International Award especially Iranian Research Organization for Science and Technology (IROST) on its immense endeavors to organize such a remarkable event for the last twenty seven years.

**Dr. M. Molanejad**  
Director  
IORA Regional Centre for  
Science and Technology Transfer







## Message

### Few words from KIA Laureates of previous sessions



Prof. Vyacheslav Ulyanovich Buko  
KIA Laureate of the 26<sup>th</sup> Session  
Institute of Biochemistry,  
National Academy of Sciences  
Biochemistry, pharmacology  
Belarus

Dear Chairman,  
At the first time a representation of  
Belarusian Science was awarded by the  
Khwarizmi International Award,. It is difficult  
to over-evaluate the importance of this  
awarding because it opens new perspectives  
in Iranian-Belarusian scientific cooperation in  
the near future.



Ayyappan pillai Ajayaghosh (Ph.D)  
KIA Laureate of the 26<sup>th</sup> Session  
CSIR-National Institute for  
Interdisciplinary Science and  
Technology, Chemistry  
India

Dear Chairman ,  
I feel very proud and honored being one of the  
KIA Laureate. By receiving this award,  
I understand that my responsibility to take up  
more challenging research work is increasing.  
I am very impressed by the scientific progress  
Iranian scientists are making. I thank the Iranian  
Government for its keen interests in supporting  
science internationally and motivating scientists  
all over the world. I thank the people of Iran for  
their excellent hospitality. I wish Iranian people,  
,particularly Iranian scientists, all success in their  
activities.  
I particularly wish to thank the IROST and KIA  
selection committee for choosing me for this  
prestigious award.







## KIA Jury & Scientific Specialised Committees





## Jury Members

27<sup>th</sup> Khwarizmi International Award

in Alphabetical order

- Entezari, M.H. Chairman of the 27<sup>th</sup> Khwarizmi International Award
- Prof. Akhlaghi, F. Tehran University
- Dr. Allahyari, A. Iranian Research Organization for Science and Technology
- Dr. Barkhordari Bafghi, M. A. Science & Industry University of Iran
- Prof. Farhoud, D. Genetic Clinic Tehran
- Dr. Fereydoon, A.
- Dr. Gharibi, H. Tarbiat Modaress University
- Dr. Ghezelayagh, M. H. Imam Hossein University
- Dr. Izadi, A. Tehran University
- Dr. Jahangirian, A. Amir Kabir University of Technology
- Prof. Mahamedpour, K. K. N. Toossi University of Technology
- Prof. Nasiri Geidari, S. Zanzan University
- Dr. Salar Amoli, H. Iranian Research Organization for Science and Technology
- Prof. Semnanian, S. Tarbiat Modaress University
- Prof. Sherafat A. Tarbiat Modaress University
- Prof. Sohrabpour, S. Sharif University of Technology
- Prof. Tehranchi, M.M. Shahid Beheshti University
- Prof. Tofighi, J. Tarbiat Modaress University
- Prof. Zali, A. Tehran University
- Dr. Zand, E. Agricultural Research, Education and Promotion Organization
- Neshagar, G. (B.Sc.) Secretery of Jury





## Scientific Committees

27<sup>th</sup> Khwarizmi International Award

### Aerospace

Head: Emami Khansari, M. H.

- Aghajani, A.
- Alikhani, A.
- Anvari, A.
- Bitarafan, A.
- Farahani Boghlani, F.
- Fazli, H.
- Karimi, D.
- Neshagar, G.
- Rezaie Gol, M.
- Salavatizadeh, A.

### Agricultural & Natural Resources

Head : Sanjabi, M.R.

- Abas Zadeh, R.
- Ali Madadi, A.
- Atapour, M.
- Azma, M.
- Bagheri, M.
- Boushehri, M. S.
- Darabi, P.
- Ghaem Maghami, S.A.
- Hossein Pour, B.
- Imani, B.
- Javanmard, M.
- Mahsoudian, M.
- Mirzaei, S.
- Mohammadi Bazargan, M.
- Norouzian, A.
- Rostamza, M.
- Sarami, S.
- Tafaghodinia, B.
- Yari, F.
- Zandi, M.
- Zonouzi, A.





## Scientific Committees

27<sup>th</sup> Khwarizmi International Award

### Art & Architecture

Head: Samanian, S

- Afshar Mohajer, K.
- Alemi, A.
- Ansari, M.
- Gharaei, F.
- Izadi, A.
- Khazaie, M.
- Partovi, P.
- Rahbarnia, Z.
- Soltan Kashefi, J.

### Basic Sciences

Head: Kouhian, A

- Abbasi, A. M.
- Abdi, Y.
- Dehghanpour, S.
- Elahi, E.
- Ghaemi, N.
- Hamed, J.
- Hoseini Nasab, S.E.
- Madanipour, K.
- Miri, M.F.
- Moradlou, O.
- Salemkar, A.
- Sepehr, S.
- Shiri, M.

### Biotechnology & Basic Medical Sciences

Head: Azin, M

- Amini Batat, Z.
- Aziz Mohsseni, F.
- Bakhtiari, M.R.
- Bakhtiari, N.
- Ehsani, P.
- Falahpour, M.
- Farazmand, A.
- Hadizadeh, M.
- Heidaryan, M.
- Hemat, J.
- Hosseini Pajou, K.
- Kiyani Rad, M.
- Mirdamadi, S.S.
- Ofoghi, H.
- Rostami, K.
- Saadatnia, G.
- Sohrabi, M.
- Tafreshi, S.H.
- Vaez, M.





## Scientific Committees

27<sup>th</sup> Khwarizmi International Award

### Chemical Technology

Head: Samimi, A.R.

- Abedi, M.
- Agha Arabi, H.
- Arman Mehr, M. H.
- Aroojzadeh, N.
- Ashouri, A.
- Bahreini, Z.
- Basiri, A.
- Bashiri, Z.
- Eikani, M. H.
- Elyasi, A.
- Ghafarpour, M.
- Goodarz Nia, E.
- Habibipour, R.
- Javanmard Dakheli, M.
- Kashi, E.
- Khandan, N.
- Latifi, S. M.
- Mahmoudi Najafi, S. H.
- Mohanazadeh, F.
- Mohammadi, Z.
- Mozzafari, S.A.
- Movassagh, B.
- Naseri, N.
- Nasri, Z.
- Omid, T.
- Rahmani, H.
- Rahimi Talebvandi, S.
- Ranjbar, M.
- Sadat Hosseini, S.S.
- Safarzadeh, S.
- Salar Amoli, H.
- Salehi Rad, A.
- Sadeghi Fateh, D.
- Sedrpoushan, A.
- Shalmashi, A.
- Shokrollah Zadeh, S.
- Shokouhi, H.
- Torabizade, H.

### Civil Engineering

Head : Mahmoudi Saebi, M.

- Arjmand, M.A.
- Arzani, H.
- Ghafarpour Jahromi, S.
- Mazloun, M.
- Mehrarah, A.
- Mirghassem pour, M.
- Tarighat, A.
- Vossough, S.





## Scientific Committees

27<sup>th</sup> Khwarizmi International Award

### Electronic & Computer

Head: Amiri.Sh

- Aghajani, A.
- Borghani Farahani, N.
- Bornaei, Z.T.
- Eghbal, M.
- Farahmand, S.
- Farahani, G.R.
- Firouzmand, M.
- Ghanbari Pour, A. A.
- Ghazanshahi, N.
- Gorgin, S.
- Mohamad Khani, G. R.
- Moshk Abadi, I.
- Nafisi, V.R.
- Nik Aeiin, Z.
- Pouryaei, N.
- Porkar, B.
- Rahmani, K.
- Seyf Mohadessi, M.
- Shojaodini, S.V.

### Information Technology

Head: Mohamad Khani, Gh. R.

- Alijani, R.
- Basseri, N.
- Bornaei, Z.T.
- Chizari, Z.
- Erfani, S.A.
- Ghanbaripour, A.
- Gorgin, S.
- Khosravi, A.A.
- Navidbakhsh, S.
- Sehati, S.
- Seyf Mohadessi, M.
- Tavasol Panahi, Z.
- Vahedi, A.

### Materials, Metallurgy & New Energies

Head: Esmaelian, M.

- Ahangarani, S.
- Azad, E.
- Aziminam, S.
- Dashtizad, V.
- Gholamipour, R.
- Hadavi, S.M.M.
- Kafilou, A.
- Motahedi, A.A.
- Rahaie, M.
- Rajabi, M.
- Sarpoulaki, H.
- Shahri, F.
- Shirvani, K.
- Zahrae, S. M.





## Scientific Committees

27<sup>th</sup> Khwarizmi International Award

### Mechanical Engineering

Head: Boghlani Farahani, F.

- Anvari, A.
- Amini, M.
- Bairami, M.
- Bakhtiari, H.
- Bitarafan, A.A.
- Elanlo, J.
- Emami Khansari, H.
- Gharashi, A. H.
- Ghayomi, A.H.
- Karami Alaviche, D.
- Khalili Matinzadeh, M.
- Khoshnevisan, S.
- Layeghi, M.
- Malekian, M.M.
- Neshagar, Gh.A.
- Salavatizadeh, A.
- Savadkouhi, L.
- Seyedi Niaki, K.
- Yassi, Y.
- Zarghami, J.

### Medical Sciences

Head: Vojjani, M.

- Karimian, S. M.
- Rashidi, M.R.
- Sabzevari, O.
- Semnanyan, S.

### Nanotechnology

Head: Dashtizad, V.

- Ahangarani, S.
- Azin, M.
- Bakhtiari, M.R.
- Dehghan Naieri, F.
- Esfahani Boland Ballahi, Z.
- Farahani Boghlani, F.
- Gholamipour, R.
- Hemat, J.
- Khandan, N.
- Kharazi, Sh.
- Kafrou, A.
- Mahmoudi Najafi, S.H.
- Mozafari, S.A.
- Rajabi, M.
- Ranjbar, M.
- Rostami, KH.
- Safarzadeh Matin, Sh.
- Seifvand Lighvani, N.
- Shahri, F.
- Shokrollah Zadeh, S.







## Scientific Committees

27<sup>th</sup> Khwarizmi International Award

### Industry & Technology Managment

Head: Haji Hosseini, H.

- Abbasi, F.
- Armaghan, N.
- Fakour, B.
- Ghaed Sharafi, H.
- Hossein Zadeh, H.
- Khani Jazani, J.
- Miremadi, T.
- Mojib, J.
- Ramezanpour Nargesi, G.
- Seraji, T.

### Mechatronics

Head: Shiri, S.

- Asadzadeh, S.
- Farahmand, F.
- Jamzad, M.
- Mahmoudi
- Mahzarnia, H.
- Nazemi, E.
- Sadegh Nejad, S.
- Shahri, M.
- Talebi, H. A.
- Tamiz, M.
- Tohidkhah, F.
- Zarei Nejad, M.

### Selected Applications with high impact on national production

Head: Allahyari, A.

- Poorsalehi, G.
- Hussein Kord, M.
- Orangian, A.
- Akhavan, A.





## Executive Committee Members

In alphabetical order

### ● President of IROST: A. Akbari

- |                   |                         |
|-------------------|-------------------------|
| ● Allahyari, A.   | ● Memari, J.            |
| ● Ansari, M. T.   | ● Mohamad Khani, G.     |
| ● Avar Zamani, F. | ● Molanejad, M.         |
| ● Bidar, M.       | ● Neshgar, G.           |
| ● Dehghan, A.     | ● Orangian, A.          |
| ● Darabian, M.T.  | ● Rahnama, H.           |
| ● Ghassemi, M.    | ● Rahimi, Z.            |
| ● Jask, F.        | ● Seifvand Lighvani, N. |
| ● Mahmoudi, M. A  | ● Soltani, H.           |

### Collaborators

- |              |             |
|--------------|-------------|
| ● Alinouri   | ● Kolahdouz |
| ● Baharifard | ● Mehraliei |
| ● Berangi    | ● Sadraei   |
| ● Hosseini   |             |

### The International Cooperation Bureau

- |          |          |
|----------|----------|
| ● Kabiri | ● Panahi |
| ● Moradi |          |







## Report of the KIA Secretariat

This year, the awarding ceremony of the Khwarizmi International Award is organized during the first week of March.

In spring 2013, the Khwarizmi International Award issued the 27<sup>th</sup> call for participation which has been sent all over the world. This call was at the same time channeled through the Iranian representations in different foreign countries, the KIA international sponsors and foreign scientific institutions.

In autumn 2013, a total of 787 self nominations and nominations including the National, Iranian Residing Abroad and Foreign sections, answered this call. In the foreign and Iranian Residing Abroad Sections, 38 different countries answered this call with a total of 126 candidatures.

Their applications were sent to 17 scientific committees for the screening process: Electronics and Computer, Mechanics, 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, Information Technology, Mechatronics and for the national section, Art & Architecture, Special Applications, KIA Laureate successful in national production. These scientific 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, 12 were declared finalists and for the national 44 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 27<sup>th</sup> KIA. The Jury finally selected after many deliberations 17 KIA Laureates for the KIA national section and 7 KIA Laureates for the foreign and Iranian Resident Abroad sections.

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 27<sup>th</sup> Khwarizmi International Award.

**27<sup>th</sup> Khwarizmi International Award Secretariat**





## KIA Table

No.	Scientific Committee Field	National Section - Total Entry	Foreign Section - Total Entry	Iranian Resident Abroad	Total Application Entry
1	Electronic & Computer	49	4	2	55
2	Biotechnology, Environment & Basic Medical Sciences	33	15	1	49
3	Chemical Technologies	29	13	4	46
4	Industry & Technology Management	6	3	1	10
5	Special Applications	187	-----	-----	187
6	Basic Sciences	19	19	3	41
7	Medical Sciences	-----	19	3	22
8	Civil Engineering	13	1	-----	14
9	Information Technology	21	3	1	25
10	Nanotechnology	15	9	3	27
11	Agriculture & Natural Resources	148	10	1	159
12	Mechanical Engineering	63	3	-----	66
13	Art & Architecture	20	-----	-----	20
14	Materials, Metallurgy & New Energies	13	5	2	20
15	Aerospace	9	1	-----	10
16	Mechatronics	9	-----	-----	9
17	Laureates with High Impact on National Production	27	-----	-----	27
TOTAL		661	105	21	787





## KIA Table

### • KIA Laureates of the 27<sup>th</sup> Khwarizmi International Award

KIA Laureates – National section - selected for the 27<sup>th</sup> session of the Khwarizmi International Award according to the field of research.

No.	Category	Scientific Committee	The Laureate Successful in National Production	First KIA Laureate	Second KIA Laureate	Third KIA Laureate	Total
1	Fundamental Research	Electrical & Computer	-	-	1	-	1
		Special Applications	-	-	1	-	1
		Basic Sciences & Medical Sciences	-	1	-	1	2
2	Applied Research	Electrical & Computer	-	-	1	1	2
		Special Applications	-	-	1	1	2
		Agriculture & Natural Resources	-	-	1	1	2
3	Research & Development	Special Applications	-	-	1	1	2
		Biotechnology, Environment & Basic Medical Sciences	-	-	-	1	1
		Mechanics	-	-	-	2	2
		Chemical Industries	-	-	-	1	1
4	The Laureate Successful in National Production	Mechanics	1	-	-	-	1
Total			1	1	6	9	17





## KIA Table

- **KIA Laureates of the 27<sup>th</sup> Khwarizmi International Award**  
Foreign Section - According to the field of research.

No.	Category	Scientific Committee	First KIA Laureate	Second KIA Laureate	Third KIA Laureate	Total
1	Fundamental Research	Chemical Industry	----	2	----	2
		Agriculture & Natural Resources	----	----	1	1
		Medical Sciences	----	----	1	1
2	Applied Research	Chemical Industry	1	----	----	1
Total			1	2	2	5

- **KIA Laureates of the 27<sup>th</sup> Khwarizmi International Award**  
Iranian Resident Abroad - According to the field of research

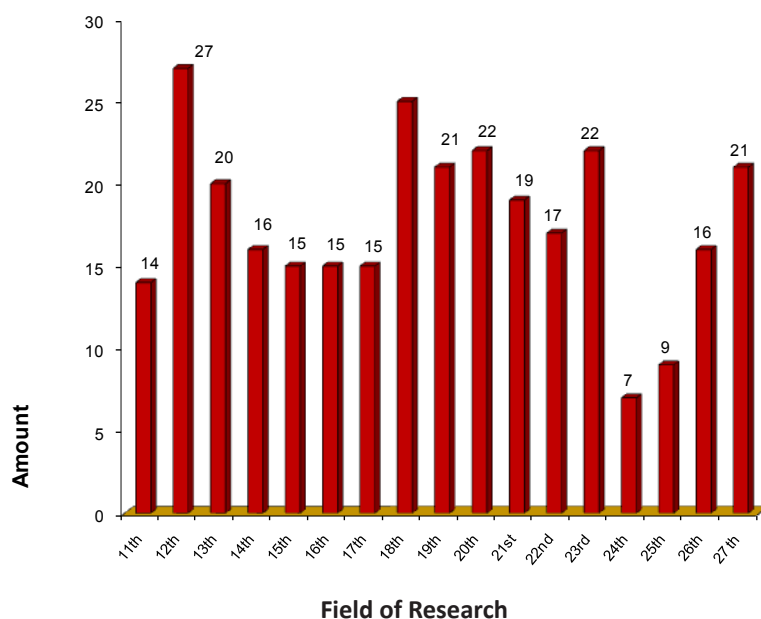
No.	Category	Scientific Committee	First KIA Laureate	Second KIA Laureate	Third KIA Laureate	Total
1	Fundamental Research	Medical Sciences	1	----	----	1
2	Applied Research	Electrical & Computer	1	----	----	1
Total			2	----	----	2



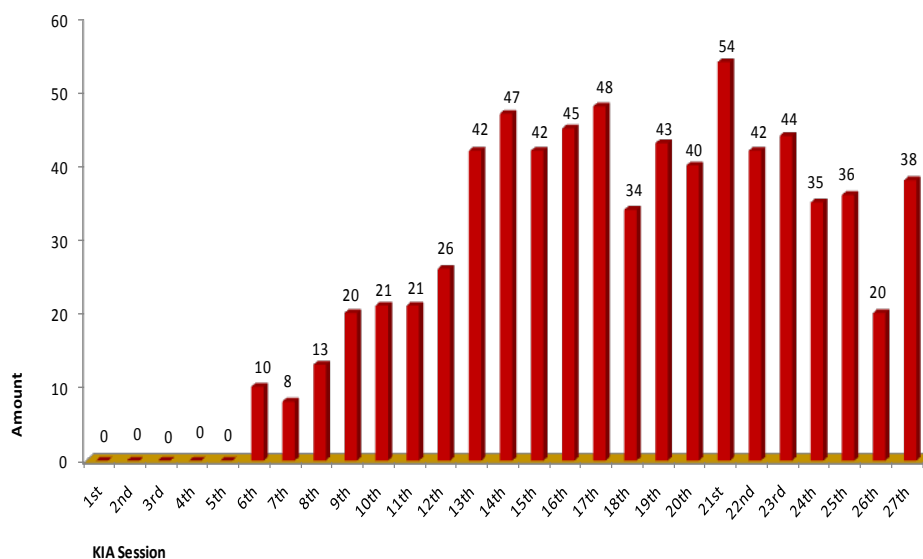


## KIA Charts

- Total application entry of Iranian researchers resident abroad during the 27 sessions of the KIA



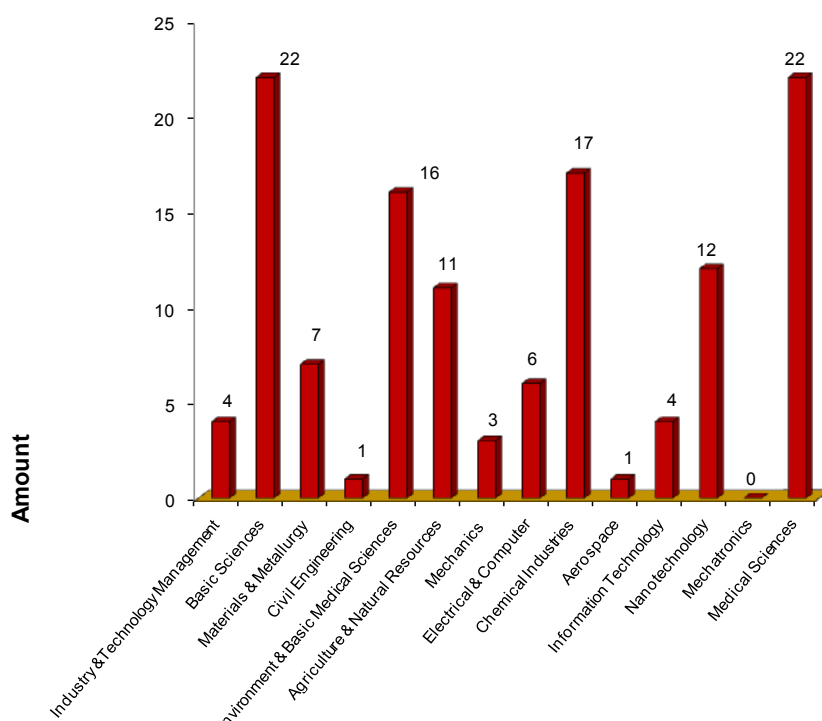
- Participating countries during the 27 sessions of the KIA



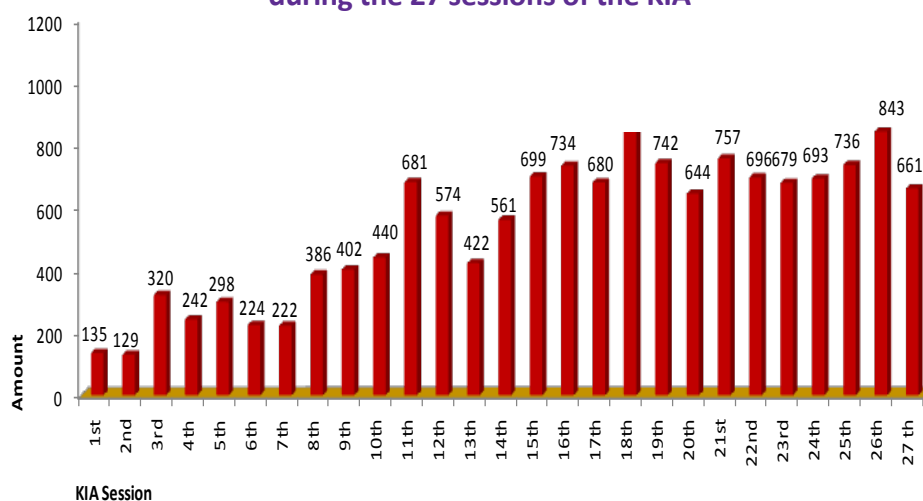


## KIA Charts

### • Application repartition according to the field of research - foreign section 27<sup>th</sup> KIA



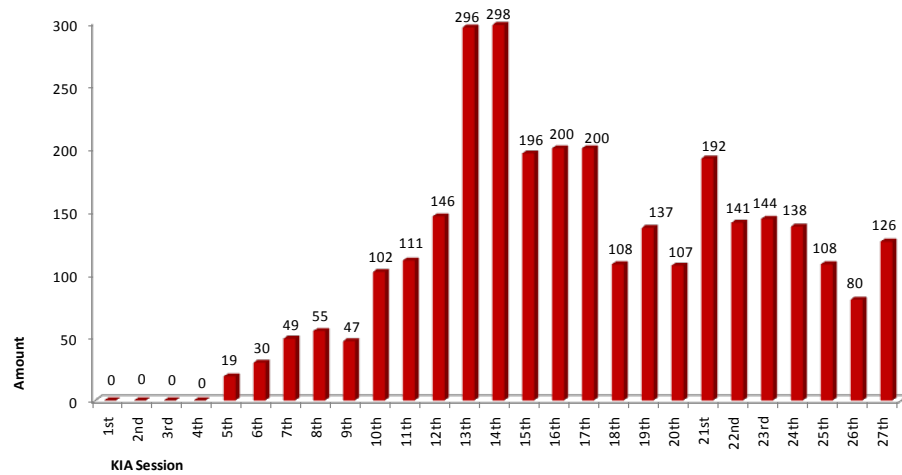
### • Total application entry during the 27 sessions of the KIA



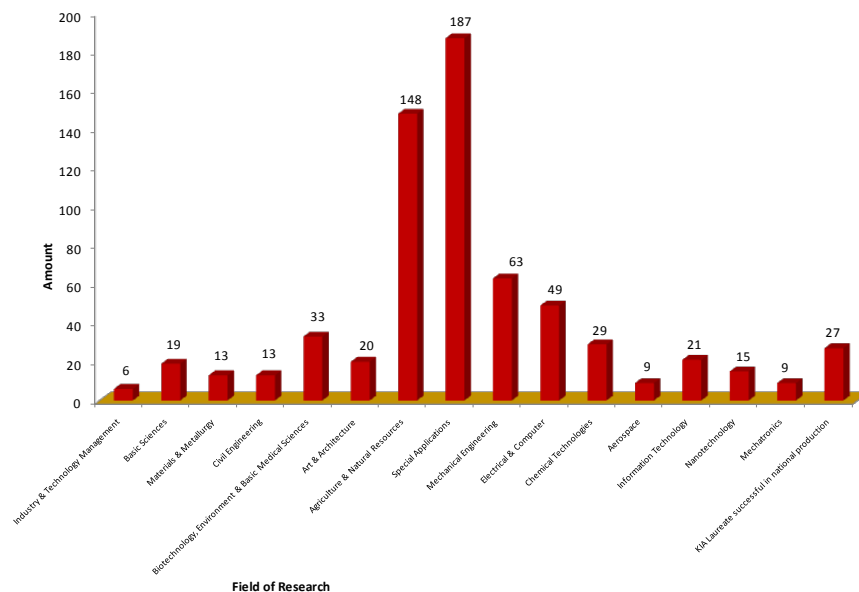


## KIA Charts

- Total application entry  
- foreign & Iranian resident abroad sections -  
during the 27 KIA sessions



- Application repartition according to the field of research  
- national section  
27<sup>th</sup> KIA







## **Biography of Islamic Scientists**

Muhammad ibn Musa al-Khwarizmi  
&  
Banu Musa



## Biography of Muhammad ibn Musa al-Khwarizmi

### Biography of Muhammad ibn Musa al-Khwarizmi



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.

Al-Khwarizmi was scholar in 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. 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.

#### Contributions

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

His book On the Calculation with Hindu Numerals, was principally responsible for the diffusion of the Indian system of numeration in the Middle-East and then Europe. This book also translated into Latin in the twelfth century, as Algoritmi de numero Indorum. From the name of the author, rendered in Latin as algoritmi, originated the term algorithm.

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-Ma'mun and participated in a project to determine the circumference of the Earth, supervising the work of 70 geographers to create the map of the then «known world». When his work was





## Biography of Muhammad ibn Musa al-Khwarizmi

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 830 CE.

### 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

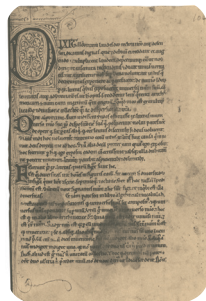
Al-Khwarizmi's third major work is his Kitab surat al-Ard «Book on the appearance of the Earth». It is a revised and completed version of Ptolemy's Geography, consisting of a list of 2402 coordinates of cities and other geographical features following a general introduction.

### Astronomy

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.

### Jewish calendar

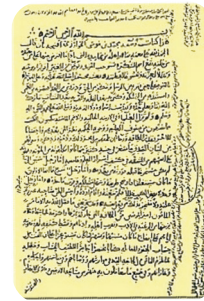
Al-Khwarizmi wrote several other works including a treatise on the Hebrew calendar. It describes the -19year intercalation cycle, the rules for determining on what day of the week the first day of the month Tishri shall fall; calculates the interval between the Jewish era (creation of Adam) and the Seleucid 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.



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



A page from al-Khwarizmi's Algebra



References: 1. Encyclopedia Britannica. al-Khwarizmi.





## Biography of Banu Musa

### Banu Musa



The Banu Musa brothers («Sons of Moses»), namely Abu Jafar, Mohammad ibn Musa ibn Shakir (before 803 – February 873), Abu alQasim, Ahmad ibn Musa ibn Shakir and Al-Hasan ibn Musa ibn Shakir , were three 9<sup>th</sup>-century Islamic scholars of Baghdad who are known for their Book of Ingenious Devices on automata (automatic machines) and mechanical devices. Another of their important work is the Book on the Measurement of Plane and Spherical Figures, a foundational work on geometry that was frequently quoted by both Islamic and European mathematicians.

The Banu Musa worked in astronomical observatories established in Baghdad by the Abbasid Caliph al-Maṣṣūn as well as doing research in the House of Wisdom. They also participated in a 9th-century expedition to make geodesic measurements to determine the length of a degree.

The Banu Musa were the three sons of Musa ibn Shakir, who earlier in life had been a highwayman and astronomer in Khorasan of unknown pedigree. After befriending al-Mamun, who was then a governor of Khorasan and staying in Marw, Musa was employed as an astrologer and astronomer. After his death, his young sons were looked after by the court of al-Mamun. Al-Mamun recognized the abilities of the three brothers and enrolled them in the famous House of Wisdom, a library and a translation center in Baghdad.

Studying in the House of Wisdom under Yahya ibn Abi Mansur, they participated in the efforts to translate ancient Greek works into Arabic by sending for Greek texts from the Byzantines, paying large sums for their translation, and learning Greek themselves. On such trips, Muhammad met and recruited the famous mathematician and translator Thabit ibn Qurra. At some point Hunayn ibn Ishaq was also part of their team.

After the death of al-Mamun, the Banu Musa continued to work under others Caliphs. Under the direction of al-Mutawkkil they constructed a canal for the new city of al-Jafariyya.





## Biography of Banu Musa

### Works

The Banu Musa wrote almost 20 books the majority of which are now lost.

### Automata

Most notable among their achievements is their work in the field of automation, utilized in toys and other entertaining creations. They have shown important advances over those of their Greek predecessors.

- The Book of Ingenious Devices describes 100 inventions; the ones which have been reconstructed work as designed. While designed primarily for amusement purposes, they employ innovative engineering technologies such as one-way and two-way valves able to open and close automatically mechanical memories, devices to respond to feedback, and delays. Most of these devices were operated by water pressure.



- Qarastun, a treatise on weight balance.
- On Mechanical Devices, a work on pneumatic devices, written by Ahmad.
- A Book on the Description of the Instrument Which Sounds by Itself, about musical theory.

### Astronomy

- Book on the First Motion of the Celestial Sphere (Kitab Ḥarakat al-falak al-ula), containing a critique of the Ptolemaic system. Muhammad in this book denied the existence of the Ptolemaic 9<sup>th</sup> sphere which Ptolemy thought was responsible for the motion

- Book on the Mathematical Proof by Geometry That There Is Not a Ninth Sphere Outside the Sphere of the Fixed Stars, by Ahmad.

- Book on The Construction of the Astrolabe, quoted by al-Biruni.
- Book on the Solar Year, was traditionally attributed to Thabit ibn Qurra, but recent research has shown that it was actually by the Bani Musa.

- On the Visibility of the Crescent, by Muhammad.
- Book on the Beginning of the World, by Muhammad.
- Book on the Motion of Celestial Spheres (Kitab Ḥarakat al-aflak), by Muhammad.
- Book of Astronomy (Kitab al-Haya), by Muhammad.
- A book of zij, by Ahmad
- Another book of zij, listed under the Banu Musa, mentioned by Ibn Yunus.





## Biography of Banu Musa

### Astrology

Cover of Kitab al-Daraj (The book of degrees), by Ahmad, as found in the Saladin library, from before 1193 AD.

- A translation of a Chinese work called (A Book of Degrees on the Nature of Zodiacal Signs).

- Kitab al-Daraj (The book of degrees), by Ahmad.

### Mathematics

- Book on the Measurement of Plane and Spherical Figures, later edited by Nasir al- Din Tusi in the 13<sup>th</sup> century. A Latin translation by Gerard of Cremona appeared the 12<sup>th</sup> century under the titles Liber (trium fratrum de geometria) and (Verba filiorum Moysi filii Sekir). This treatise on geometry was used extensively in the Middle Age, quoted by authors such as Thabit ibn Qurra, Ibn al Haytham, Leonardo Fibonacci (in his Practica geometriae), Jordanus de Nemore, and Roger Bacon. Some theorems included in this book are not found in any work of the Greek mathematicians.

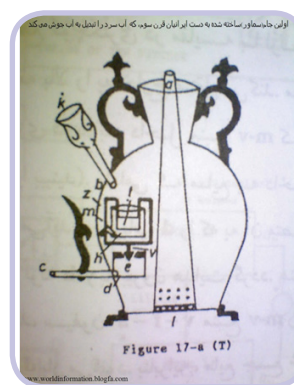
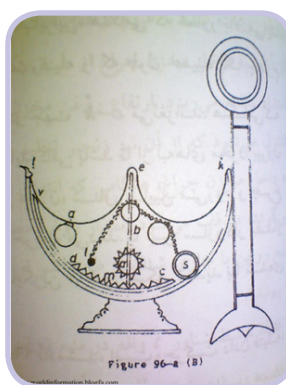
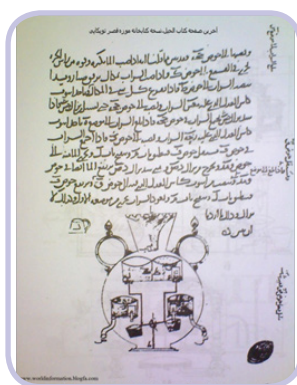
- Conic Sections of Apollonius of Perga, a recension of the Greek work, which was first translated to Arabic by Hilal al-ħimṣi and Thabit ibn Qurra.

- Book on an Oblong Round Figure, which contains a description of procedure for drawing an ellipse using a string, now called the gardeners construction.

- Reasoning on the Trisection of an Angle, by Aḥmad.

- A treatise containing a discussion between Ahmad and Sanad ibn 'Ali.

- Book on a Geometric Proposition Proved by Galen.







Laureates of the  
27<sup>th</sup> Khwarizmi  
International Award  
**National Section**



## First Laureate Fundamental Outstanding Researcher

**Project Title:** : Prominent role in taking «Global Knowledge border on neurosurgery» Forward and continuing in improving the quality of neurosurgery in Iran

**Researcher:** Prof. Madjid Samii

**Country:** Iran

**Field:** Neurosurgery

**Scientific Affiliation:** Emeritus Director of the Neurosurgical Department of Medical School, Hannover



### Biography:

Professor Madjid Samii was born in 1937, in Teheran, Iran. In 1957, he started his studies in Germany, at the Johannes Gutenberg University of Mainz, where he did his residency at the department of neurosurgery. In 1971 he received the title of professor in neurosurgery at the University of Mainz. From 1970, he received many positions such as vice director at the department of neurosurgery, President of the international skull base society, Director of the department of neurosurgery at the Nordstadt Hospital in Hannover, the Chair of neurosurgery at the Hannover Medical School, President of the International Neuroscience Institute, in Hannover, President of China-International Neuroscience Institute in Beijing. President of the German Society of Plastic-and Reconstructive Surgery, President of the German Society of Neurosurgery, President of the World Federation of Neurosurgical Societies.

Madjid Samii Society of International Neurosurgeons (MASSIN) was founded by his pupils and friends.

For his worldwide contribution in neurosurgery, Professor Madjid Samii has received many honors worldwide, from Iran, Poland, China, Spain, Sweden, England, Greece, Germany, USA, Czech Republic, Colombia, Italy, and Argentina. He also received many titles «the Ambassador for Africa» and «the Neurosurgeon of the year» in 2013, by the Journal of World Neurosurgery.

In recognition of Madjid Samii's outstanding achievements, the World Federation of Neurosurgical Societies (WFNS) created in 2010, the Madjid Samii Medal of Honor, which is delivered every two years to an outstanding neurosurgeon. He published more than 510 papers and wrote 17 books.

Madjid Samii is a pioneer of skull base surgery; he has focused his early scientific interest in peripheral and cranial nerves as well as skull base surgery. He educated hundreds of young neurosurgeons throughout the world in micro-neurosurgery and influenced the interdisciplinary cooperation in these field and motivated many nations to establish skull base societies.





## Second Laureate Fundamental Research

**Project Title:** Spintronics microwave nano-oscillator with anisotropic materials

**Researcher:** Seyed Majid Mohseni Armaki (Ph.D.)

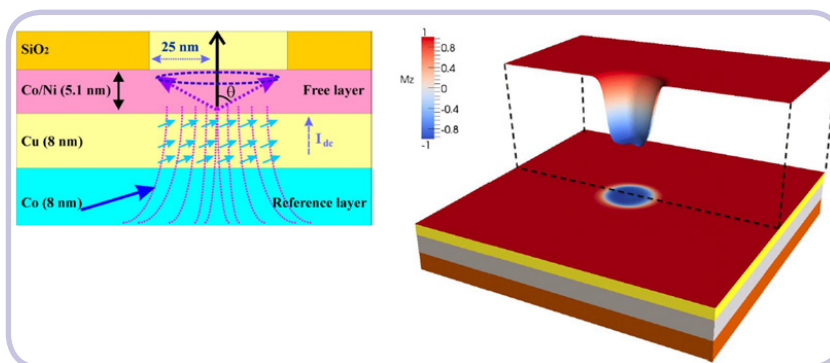
**Collaborators:** Sohrab R. Sani, & Johan Akerman

**Collaborators Organization:** Shahid Beheshti University & KTH-Royal Institute of Technology, NanOsc AB (Sweden) & MACALO



### Abstract:

Spin-transfer-torque (STT) is established in a three layers spin valve (left figure) made of two magnetic layers separated via a metallic/insulator spacer. While a high current crosses over the structure, a spin polarized current from one magnetic layer (reference layer) passes through the spacer and impinges on another magnetic layer (free layer) and then changes the resistance of the whole structure, causes an unstable equilibrium between damping and STT resulting in precession of the free layer and finally revealing a time variable voltage with nanosecond rate. Finally, this device is able to transfer dc current to ac voltage, with sub-micron size, is able to be integrated in microelectronics beside other semiconductors, has a wide band frequency operation tunable with current and magnetic field. In this application, results of spin-torque oscillator (STO) fabricated with high perpendicular magnetic anisotropy from ultrathin Co and Ni multilayers (as free layer) are presented. We first achieved an STO with high frequency output (12 GHz at 0 T and 40 GHz at 1 T), tunable with current and magnetic field. As featured scientific achievement, dynamical magnetic droplet as a spintronics soliton object (right figure) is observed. Such droplet soliton was already predicted in 1977 with Russian scientists, and however, with high amount of scientific reports after the first prediction, it has yet remained demanding for experimental evidence. Our observations and measurements reflect nonlinear dynamical droplet including, periodical droplet un-centering and droplet deformation and droplet spinning. Such droplet can produce field and current frequency shifter; and is able to increase the output power of STOs, shows step resistant changes, all new in nonlinear physics, spintronics, and also opened new horizon in observable mathematical object for future studies.



Right: The middle region (from simulation) of the above spin valve shows droplet soliton, with magnetization against the environmental region and precessing around the boundary. Left: three layers spin valve.





## Second Laureate Fundamental Research

**Project Title:** Fabrication technique and implementation of soliton devices based on Josephson junction

**Executive Organization:** Malek Ashtar University of Technology

**Researcher:** Dr. Farshid Raeesi

**Collaborators Organization:** Khawja Nasir al- Din Tusi University of Technology & Yar-Nikan Saleh

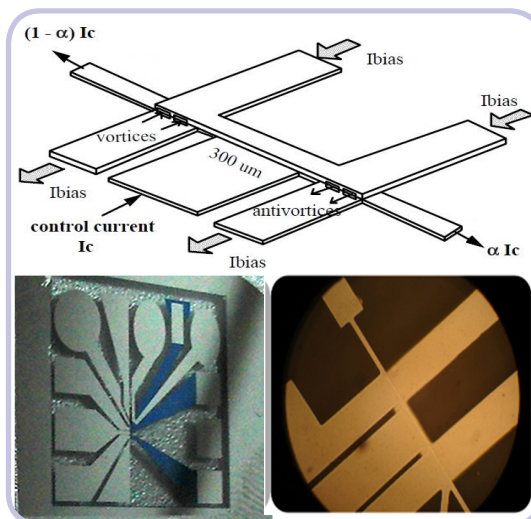


### Abstract:

Soliton devices are new category of electronic devices based on superconductive Josephson junction. In these devices, solitons and anti-solitons are carriers, such as electrons and holes in semiconductor devices. These electromagnetic waves velocity is in the scale of speed of light in the media and much faster in comparison to electrons movements. High speed digital circuits, high frequency communication systems, millimeter and sub-millimeter waves imaging can be implemented by these devices.

Soliton diode is the basic building block element for Josephson fluxonic devices and it is fabricated in this project by two technologies. These devices have been successfully tested for detection of high frequency electromagnetic waves.

Native development of fabrication of soliton devices from the idea, design and native fabrication process equipments such as lithography, deposition, dry etching systems in addition to achieving very low temperature technology, are some achievements of this project.





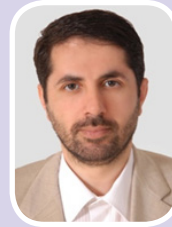
## Second Laureate Applied Research

**Project Title:** Design and Production of Optical Transmission Systems STM

**Executive Organization:** PartowTamas Novin (Parman)

**Researcher:** Mohammad Reza Pakravan (Ph.D.)

**Collaborators:** Hadi Emami, Saeed Bakhshi, Meysam Peykanu, Mohammad Mahdi Pakravan, Seyyed Arash Majd, Kiarash Kiamarz Bojnourdi, Shahram Moradi, Reza Azad Disafani, Seyyed Hamid Nazari Hashemi, Alireza Barati



### Abstract:

Optical transmission systems play an important role in expansion of data communication networks. Synchronous Digital Hierarchy (SDH) technology is the primary technology used to expand optical networks. SDH systems operating from STM1- to STM4- and higher speeds have enabled rapid expansion of optical transport networks. Most SDH optical systems used in our country are supplied by foreign vendors. Our country can achieve a lot of benefits from local design and production capability for SDH optical transmission systems. Providing better services, increasing the stability and reliability of the network and creation of long lasting high value jobs for local talent is among those benefits.

In this project, a system has been developed that can be used to create carrier level SDH networks at STM1- and STM4- rates and it can provide E1 and Ethernet services to various types of customers. It has used advanced technological concepts such as SDH mapping, Virtual Concatenation, GFP, LCAS and Layer 2 Switching to provide the desired services. The system has been used in operational networks and has passed its tests based on international standards. It has received official approval from Iran Communication Regulatory Agency.





## Second Laureate Applied Research

**Project Title:** IRAN - 140 Full Flight Simulator

**Executive Organization:** Iran Aviation Industries Co. - Iran  
Aircraft Manufacturing Ind. Co.

**Collaborator Organization:** Yar-Nikan Saleh



### Abstract:

IRAN - 140 Full Flight Simulator construction based on the experience in aircraft simulation technology and it meets all technical requirements for Level C Simulators described in JAR-FSTD-A European Standard.

IRAN - 140 Full Flight Simulator is an advanced training unit for IRAN - 140 pilots for all flight conditions and situations and is based on the latest technology in the world. This simulator enjoys 6 DOF motion system and integrated cross collimated visual system, electric control loading, main simulation software and advanced console for pilot instructor. This IRAN - 140 A/C simulator pioneers the simulators of IRAN - 140 type in the world. IRAN - 140 simulator is the first of its own type designed and developed for pilots training purposes based on JAR-FCL. Ease of maintenance and real cockpit instruments are other advantages of the simulator.





## Second Laureate Applied Research

**Project Title:** Comprehensive Study of Witches Broom Disease of Lime in Southern Iran

**Executive Organization:** Plant Virology Research Center, College of Agriculture, Shiraz University

**Researcher:** Mohammad Salehi Abarghouei (Ph.D.)

**Collaborators:** Abdolnabee Bagheri, Mohammad Mehdi Faghihi and Hamed Hassanzadeh



### Abstract:

Mexican lime is one of the most economically important horticultural crops in southern Iran. Phytoplasmal witches'-broom disease of lime (WBDL) is the most serious threat to Mexican lime industry and to other susceptible citrus species in this region. In the present study the leafhopper *Hishimonus phycitis* was proved for the first time as the vector of WBDL phytoplasma. It was also found that *H. phycitis* preferred witches'-broom affected branches for reproduction. This leafhopper disappears from lime orchards of southern Iran from late spring to early fall but reaches the highest population during late winter to early spring. *Solanum nigrum* and *Catharanthus roseus* were found as natural herbaceous hosts of WBDL agent. Resistance of 150 citrus germplasms to WBDL phytoplasma was evaluated. Among resistant species Persian lime was found as a suitable alternative to devastated Mexican lime. The mode of WBDL phytoplasma spread through Mexican lime trees was studied. The results showed that this phytoplasma spreads sequentially from inoculation point to main stem, root, young leaves and then to other parts of the lime seedling. This study also showed non-propagative passage of WBDL phytoplasma through the phloem of resistant citrus species.





## Second Laureate Research & Development

**Project Title:** Design and Build Jamaran Class Destroyer

**Executive Organization:** Islamic republic of Iran Navy -Independent research and development office (JAHAD)

**Representatives:** Admiral Dr. Habibollah-Sayari; Rear Admiral Ali-Gholamzadeh; Captain, Mostafa Shahkaram

**Collaborators Organization:** Universities and Industrial Resources in Iran



### Abstract:

Jamarn is a class of destroyer, produced domestically and launched in early 2010 in Persian Gulf waters. The ship is designed for a crew of 140. The Jamaran class combines anti-submarine assets with other weapons systems capable of dealing with surface, sub-surface and air threats as well. Jamaran is also fitted with a helicopter landing platform and includes chaff and flare systems and electronic warfare capabilities.

The Jamaran-class can reach a maximum speed of 50 knots and can also run a helicopter in-flight refueling (HIFR) operation.





## Third Laureate Fundamental Research

**Project Title:** Thermodynamic nature of gravity

**Executive Organization:** Shiraz University

**Researcher:** Ahmad Sheykhi (Ph.D.)



### Abstract:

In this project, we show that the thermodynamic laws of nature including Newtonian law of gravity and Einstein field equations of gravity, as well as its extensions in other theories such as braneworld scenarios, are not fundamental laws and can be obtained from various thermodynamic approaches. We have studied three approaches for extracting the laws of gravity from thermodynamics arguments: Using the first law of thermodynamics, applying the concept of entropic force, and considering the difference between the bulk and boundary degrees of freedom. Applying these three approaches, we show that the field equations of gravity for different gravitational systems, in particular for the whole universe can be derived from thermodynamic arguments. The results of this project which have been published in 25 decent ISI journals, imply that gravity is nothing but a manifestation of thermodynamic for the spacetime on large scales. Our results help to understand the nature of gravity as a fundamental law of nature which is governing the evolution, motions as well as the stability and of stars, galaxies and our Universe.





## Third Laureate Applied Research

**Project Title:** Design and implementation of gamma probe and small field gamma camera for using in sentinel lymph nodes surgery

**Executive Organizations:** Research Center for Molecular and Cellular Imaging and Parto Neghar Persia Co., Tehran University of Medical Sciences

**Researcher:** Mohammad Reza Ay (Ph.D.)

**Collaborators:** M. H. Farahani, S. Sarkar, M. E. Akbari, N. Zeratkar, S. Sajedi, B. Teymorian, N. Naderi, N. Zanjani, V. Moji, P. Ghafarian and A. Akbarzadeh

**Collaborators Organization:** Presidential Center for Innovation and Technology Cooperation & Cancer Research Center, Shohae Tajrish Hospital & Technology Incubation Center of Alzahra University & Persian Daro Alborz Research and Technology Fund.



### Abstract:

The cancer metastasis, originating from the tumors, usually begins from the nearest lymph nodes. So, mapping and removal of cancerous lymph nodes especially the sentinel lymph node is of importance in cancer surgeries. The novel techniques in this field include Radio-Guided Surgeries in which the location of high concentration of the administered radiopharmaceutical in the patient body corresponds to the cancerous lymph nodes. After the injection of radiopharmaceutical, the surgeon first looks for presence or absence and the position of the cancerous lymph nodes using small-field-of-view gamma camera in the operation room. Then for precisely finding and removal of the lymph nodes, he/she uses gamma probe during the operation.

In this project, all steps of design and implementation of Hand-Held Gamma Camera and Gamma Probe performed in Iran. The systems passed clinical investigations together with getting ISO13485, ISO9001, IEC1-60601, and Manufacturing License. In addition, the innovation used in Hand-Held Gamma Camera was registered as US Patent.





## Third Laureate Applied Research

**Project Title:** Development of new technologies in propagation and growing walnut trees in Iran

**Executive Organization:** Abureyhan Pardis Tehran Uneversity

**Researcher:** Kourosh Vahdati (Ph.D.)

**Collaborators Organization:** Seed and Plant Improvement Institute, Iran National Science Foundation, Council of Scientific Poles



### Abstract:

Iran is the second producer and the most important source of walnut genetic in the world. Besides high nutritional value of walnut, it also has a high potential for export. This project is the results of “20 years research on walnut in Iran” which were carried out aiming “to improve growing and export of walnut using new technologies” in this county. Some of the most important achievements of this project include: commercial propagation of walnut grafting under greenhouse and moist bed conditions, commercial propagation of walnut topworking for changing inferior walnut genotypes; refining walnut micropropagation methods and commercialization of this method by private companies; identification and evaluation of walnut genotypes in Iran; selection of dwarf rootstocks of walnut; introducing a protocol for propagation of walnut by stool layering; improving seed germination methods of walnut; selection of drought tolerant rootstocks of walnut; genetic engineering of walnut for tolerance to drought and salt stresses; production of haploid plants in walnut; measuring of chilling requirement and cold tolerance in walnut cultivars; finding reasons of walnut kernel browning; collaboration in design and construction of post-harvest machineries such as walnut dryer, sorter, huller and sheller.



Topworking of a walnut genotype with superior cultivars





## Third Laureate Applied Research

**Project Title:** Know-how and production line development of tungsten powder

**Executive Organization:** Defense Industries Organization, Ammunition Production and Metallurgy group, Maham Research Center for Sciences and Technology

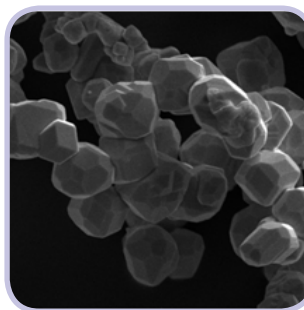
**Collaborators Organization:** Universities, private sector and goverment institutions



### Abstract:

As a major refractory metal, Tungsten powder is widely used in advanced industries. Major uses include high-voltage contactors, balance scale weights, perforation devices of oil wells and the production of special steels. In this project, a totally native method is used to recycle scrap containing tungsten to produce tungsten powder with desirable purity and dimensional quality, according to the customers' needs. Some of the major achievements of the proposed method are:

- Production of high-purity Ammonium Para-Tungstate (APT) as intermediate products,
- Production of 99.8% Tungsten powder with grain size of less than 10  $\mu\text{m}$ ,
- Establishment of an industrial production line.





## Third Laureate Research & Development

**Project Title:** Production of live infectious bursal disease (Gumboro) vaccine

**Executive Organization:** Razi Vaccine & Serum Research Institute

**Researcher:** Mohammad Majid Ebrahimi (Ph.D.)

**Collaborators Organization:** Iran veterinary organization & Vice Presidencies for S & T

**Collaborators:** H. Famil-Ghadakchi, S. Masoudi, S. Shahsavandi, N. Ghodsian, M. Kianizadeh



### Abstract:

Infectious bursal disease (IBD) is an acute contagious viral disease of birds. Vaccination is the main strategy for prevention of the disease. Because all of two and half milliard doses of IBD vaccine are imported, it is decided to produce it in Iran. In this regard, the virus seed was propagated in SPF egg according to international standards (OIE, FAO, EP). Diagnostic serological tests and molecular examinations were done. Then, the bacteriology, purity, titration, reversion to virulence, bursa-body index, immunosuppression and efficacy tests were performed on this sample. The results indicated that the vaccine virus is an intermediate strain. Dose of the IBD vaccine was set up on SPF chickens. The laboratory trial was scaled and the clinical trial was done three times with different ways. These results were compared with an imported intermediate IBD vaccine. According to serological assays and challenge, the developed IBD vaccine induces an adequate immunity in both SPF and commercial chickens and had no adverse effects. Also, it is found there is no significant difference between the developed IBD vaccine and an imported one. The IBD vaccine is licensed, produced in large scales and marketed.





## Third Laureate Research & Development

**Project Title:** Production of medical grade TNG raw material

**Executive Organization:** Pars Banaye Sadr Co.

**Researcher:** Korosh Shafiei (M.Sc.)

**Collaborators:** S.Soltanabadi- H.Momenizadeh Pendas- A.R.Sharifi- A.Behrouzi- M.Mirzaei- M.Bazian- M.Rezaei- H.Kachoei- A.Hasanzadeh- R.A.Aghamohammadi- M.Abbasi.

**Collaborators Organization:** Parchin Chemical Industries & Dorsa Daru Co.

### Abstract:

Production of the most administered heart drug namely Nitroglycerine (TNG) tablets is limited to few specific countries because of safety and process limitations of its raw material. Drug manufacturer companies, based on the need of the country were only importing the required amount.

In this project, studies and research in production of pure medical grade nitroglycerine and the know-how of its dilution was produced in a safe environment in laboratory, pilot and industrial scales. The needs of drug manufacturer companies to raw materials were met according to the international pharmacopeia standards. The final product is now available in industrial scale by many national companies.





## Third Laureate Research & Development

**Project Title:** Innovative method in production of low-weight wax models in investment casting process of turbine blades

**Executive Organizations:** Eng. & Manufacturing Turbine Blade MAPNA (Parto) & Tarbiat Modares University

**Researcher:** Amir Hossein Behravesht

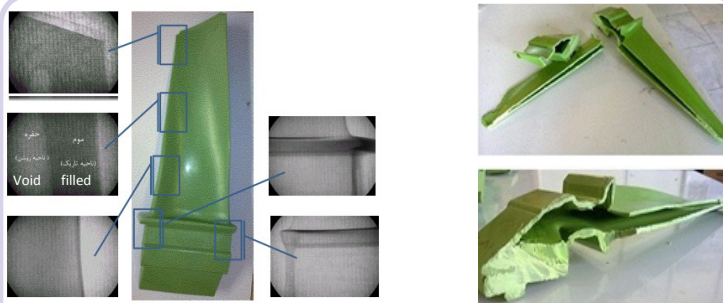
**Collaborators:** N. Salarvand, R. Kiasati, H. Khayyat Jafari, M. Ahmadi Zahrani, M. Mohamadi Moghaddam

**Collaborator Organization:** MAPNA Group



### Abstract:

This invention presents an innovative method to produce low-weight wax models used in investment casting process, for instance, for producing gas turbine blades. The method consists of creating a hollow space inside the molded wax part during the molding process. An inert gas is injected into the wax melt in a partially or fully filled mold. A reduction of weight up to %40 has been obtained. Reduction in production time and shrinkage, warpage and sink marks are followed due to the significant reduction in part wall thickness. Time reduction in calibration stage or complete elimination is another prospect using the innovative process. The primary challenge in carrying the process is too low a viscosity of the wax material in the molten state which is the main obstacle in forming a stable bubble created by injecting the inert gas. A fundamental revision in process concept, sequence, and arrangement was required. No similar method, for producing low-weight wax models with hollow section, has been reported in the published documents worldwide.



produced blade with X-Ray examination indicating hollow section- and the part destructed to show the hollow section





## Third Laureate Research & Development

**Project Title:** Anti-armored weapon launcher  
Zolfaghar

**Executive Organization:** Iran Electronics  
Industries (IEI)- Shiraz Electronics Industries (SEI)



### Abstract:

The portable ground based launcher is capable of guiding the third generation anti-armored weapons in all weather conditions during daylight or at night. The guidance method is «Laser Beam Rider (LBR)». The weapon and its launcher are protected against laser and electromagnetic jamming.





## Third Laureate Research & Development

**Project Title:** Design and manufacturing of Bulked Continuous Filament (BCF) yarn machine

**Researcher:** Mohammad Ali Zare Tezerjani



### Abstract:

Polypropylene (PP) is the third largest textile material consumed in the world, after polyester and cotton. PP yarns are used in carpet, BCF rug, upholstery and others. These yarns are made in a continuous process (dosing, spinning, texturizing and winding). However, the majority of BCF yarns are produced today in a vertical operation in which nylon or polypropylene granules are melted and spun and then both drawn and textured, all in one continuous sequence. This is partly a result of the development of the original stuffer-box texturing process to become what is now a jet-driven process. This research developed a new pilot structure such as dosing (application of servo motor) and integrated hot fluid jet that made uniform and stable high bulk yarns with highest color matching ability. This machine was sold in several domestic and foreign companies and they are working right now.





The Scientific Committee  
for KIA Laureate Successful  
in National Production

It cannot be denied that the need to domesticate technology, strengthen the foundations of production and industry and use a creative manpower are a necessity for a sustainable development. The Iranian Research Organization for Science and Technology during the last twenty seven years, by annually organizing the Khwarizmi International Award, has kept its promise and fulfilled its mission by supporting and assisting researchers in the area of science and industry. From the last session, after a quarter of a century and selection of more than eight hundred outstanding research works, the steering commission of the KIA considered the KIA Laureates of the last sessions with a new look and new criteria.

For the 27<sup>th</sup> session, the second year of activity of this committee, in addition to the KIA Laureates of the National Section, the Laureates of Khwarizmi Youth Award (KYA) (students and non-students) participated in this competition.

This specialized scientific committee has been primarily designed to study the research works of the KIA 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, the committee selects the KIA Laureates who have worked steadfastly and effectively for the national industrialization and national commercialization of their research product.

The evaluation of the participants is made according different criteria and specified indicators such as: industrialization, quality product, entrepreneurship, investment, capital, market, stability, standardization, level of commercial transactions, science development, customer satisfaction and product export.



*Trophy of the Khwarizmi  
International Award for  
KIA Laureates Successful in  
National Production.*





## The Laureate Successful in National Production

**Project Title:** Know- How and Production of Positive Displacement Flowmeters

**Managing Directors:** Masoud Farghadani & Mojtaba Tavassoli Naieni

**Company:** Naft Abzar Co.



Laureat of the 14<sup>th</sup> Session of KIA (2001), Third Laureate - Innovation

### Abstract:

Meter is the main device for measuring fluid flow in a Fuel Pump or dispenser. This device has a wide range of application in food and chemical industries. In measuring fluid flow, the accuracy of this meter is high.

### Naft Abzar Co. successful in developing national production:

The main success factors of this knowledge base company are:  
Company stability & research and development dept. that offered diversity in company products.



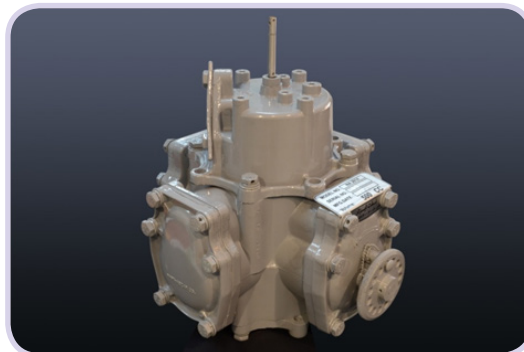
The new products developed by the company R&D are: Mini Fuel Station, Mobile Fuel Station, Solar Water Heater, Solar Water desalination, innovations and inventions, personal investing for commercialization of ideas.

Precision market analysis and tight competition with foreign competitors to offer best quality and price are the characteristics of this entrepreneurship company.

Mass production and sale of different products by Naft Abzar Co. in the field of fuel dispensing created a wide range of jobs which is a national success.

All of the Naft Abzar products recived a certificate from Ministry of Petroleum and a production licence from the Ministry of Industry, Mine and Commerce.

The after sale services network of Naft Abzar Co. is active all over the country.





*The Scientific Committee  
for KIA Laureate Successful  
in National Production*



*The following photos belong to the award ceremony of the 26<sup>th</sup> Khwarizmi International award. The KIA Laureate «Mr. Sheikhha» from «Poosh Company» has been selected as the KIA Laureate Successful in National Production in 1391 for producing vacuum pump in Iran.*



*The ceremony of 26<sup>th</sup> Khwarizmi International award*



*The Laureates of 26<sup>th</sup> Khwarizmi International award*







KIA Laureates of the  
27<sup>th</sup> Khwarizmi  
International Award

**Iranian Resident Abroad**

**Section**



## First Laureate Fundamental Research

**Project Title:** Novel histocompatibility genes in man (from discovery to clinical application)

**Researcher:** Prof. Seiamak Bahram

**Country:** Iran (Iranian resident in France)

**Field:** Medical Sciences

**Scientific Affiliation:** School of Medicine Strasbourg University



### Abstract:

Prof. Seiamak Bahram has made key contributions to the field of human immunogenetics and specifically with respect to the Major Histocompatibility Complex (also known as HLA). He is regarded as an unanimous leader in the field internationally. His important contributions include (1) involvement in the identification of Transporter associated with Antigen Processing (TAP) genes; key molecules in antigen processing, (2) discovery of the MHC class I chain-related (MIC) gene family ; which encode ligands for the activatory immune receptor NKG2D; a key element in defense against infection and cancer (3) characterisation, including the generation of KO models for MR1, HFE and ZAG; key nonconventional MHC class I genes and (4) the conduct of several large scale studies with respect to the genetics of HLA-linked pathologies; especially Behçet' s disease. His current work is focused on MIC genes and their primordial role in human transplantation, tumor biology as well as MHC-linked diseases.

### Biography:

Seiamak Bahram, is Professor of Medicine (Immunology), and head, department of immunology, at the Strasbourg University School of Medicine, France. He is a senior member of the «Institut Universitaire de France» (IUF) and Dean of Research at the Strasbourg medical school. He graduated with highest honors from high school in Tehran. He then enrolled in medical school in Strasbourg, he graduated from the Strasbourg School of Medicine upon which he did his Ph.D. at the Dana-Farber Cancer Institute – Harvard Medical School (Boston). Upon returning to Europe, he accepted a position as member of the Basel Institute for Immunology (Basel). He then moved back to Strasbourg, first as an Associate and then full professor. His research aims at understanding the genetic basis of the immune response.





## First Laureate Applied Research

**Project Title:** Design and analysis of high performance and low power computer architecture based on the nation of Network-on-Chip (NoC)

**Researcher:** Prof. Nader Bagherzadeh

**Country:** Iran (Iranian resident in USA)

**Field:** Computer Engineering

**Scientific Affiliation:** University of California, Irvine



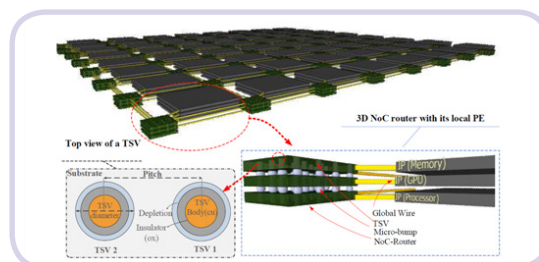
### Abstract:

As the number of cores for a System-on-Chip (SoC) increase to hundreds of units, it will be much harder to use the same old techniques based on the bus central architecture to develop the next generation SoCs. Long wires due to bus central designs result in wire delays that require multiple clock cycles to traverse across the chip. These designs tend to be slow and require power consumption levels that are not acceptable for embedded systems as well as high performance machines. In this work we are investigating the notion of Network-on-Chip (NoC) for the design of future generation SoCs. We have developed efficient new routers for managing packets, devised new mapping and scheduling algorithms for executing tasks on multiple cores, and introduced new modeling approaches for evaluating the behavior of NoC architectures under realistic work load conditions. We also plan to extend our work to 3D NoCs.

### Biography:

Nader Bagherzadeh is a professor of computer engineering in the department of electrical engineering and computer science at the University of California, Irvine, where he served as a chair from 1998 to 2003. Prof. Bagherzadeh has been involved in research and development in the areas of: computer architecture, reconfigurable computing, VLSI chip design, network-on-chip, 3D chips, sensor networks, and computer graphics since 1987.

Professor Bagherzadeh has published more than 200 articles in peer-reviewed journals and conferences. He has trained hundreds of students who have assumed key positions in software and computer systems design companies in the past twenty years.











Laureates of the  
27<sup>th</sup> Khwarizmi  
International Award  
**Foreign Section**



## First Laureate Applied Research

**Project Title:** Nanoelectrochemistry  
**Researcher:** Prof. Richard Guy Compton  
**Country:** England  
**Field:** Chemistry - Nanotechnology  
**Scientific Affiliation:** University of Oxford



### Abstract:

Professor Compton's work seeks to identify and utilize changed chemistry at the nanoscale. He has pioneered 'nano-impact experiments' to allow the characterization of nanoparticles (size, state of adsorption, concentration) and to study electron transfer processes occurring at single nanoparticles. He has also explained how nanotoxicity effects might be understood by considering mass transport effects at the nanoscale. Further the significant change of acid/base behavior on molecules anchored to the surface of nanomaterials such as multiwalled carbon nanotubes has been measured and is the basis of the world's first calibration-free pH meter now developed commercially by Senova.

### Biography:

Richard G Compton is Professor of Chemistry and Aldrichian Praelector at the University of Oxford, United Kingdom. He has broad interests in both fundamental and applied electrochemistry including nanoelectrochemistry.

He has published more than 1200 papers and seven books. The graduate textbook 'Understanding Voltammetry' was published in 2011 by Imperial College Press.

Patents have been filed on 24 different topics including drug detection, gas sensing and analytical food science. The Senova pHit Scanner based on Compton group patents – the world's first calibration-free pH meter – won the prestigious 'best new product' award at PITTCON 2013.

Compton is CAS Visiting Professor at the Institute of Physical Sciences, Hefei and a Lifelong Honorary Professor at Sichuan University. He holds Honorary Doctorates from Estonia and Ukraine and is a Fellow of the RSC and of the ISE. He is the Founder and Editor-in-Chief of the journal Electrochemistry Communications.





## Second Laureate Applied Research

**Project Title:** Antiaromaticity proved by the anisotropic effect in  $^1\text{H}$  NMR spectra

**Researcher:** Prof. Erich Kleinpeter

**Country:** Germany

**Field:** Chemistry

**Scientific Affiliation:** University of Potsdam



### Abstract:

The spatial magnetic properties (through-space NMR shieldings, or TSNMRSs) of the antiaromatic -9oxaanthracene anion  $12^-$  and of the corresponding -9dimeric dianion  $11^{2-}$  have been calculated by the gauge-invariant atomic orbitals (GIAO) perturbation method employing the nucleus independent chemical shift (NICS) concept and visualized as iso-chemical-shielding surfaces (ICSSs) of various size and direction. The TSNMRS values, thus obtained, can be employed to indicate antiaromaticity by paratropic ring currents of the anionic compounds of  $11^{2-}$  and  $12^-$  studied and other neutral and ionic antiaromatic molecules from previous studies because anisotropic effects of functional groups in  $^1\text{H}$  NMR spectra have quantitatively proven to be the molecular response property of theoretical spatial nucleus independent chemical shieldings (NICS).

### Biography:

70-1965 studied Chemistry at the University of Leipzig; diploma thesis: "NMR spectroscopic characterization of azaindolizines"

74-1970 Assistant at the same Department of Chemistry; Dr. rer. nat. thesis: "Investigation of the electronic state of dyes and dye intermediates by NMR and quantum-chemical calculations"

82-1974 Senior assistant at the same Department of Chemistry

1981 Habilitation: "Determination of configuration, conformation and intramolecular flexibility of organic compounds by NMR and quantum-chemical calculations"

85-1982 Associated Professor of Organic Chemistry, Addis-Ababa University, Ethiopia

92-1985 Docent of Spectroscopy (from 1988 on Professor of Chemistry), Martin-Luther-University Halle-Wittenberg; from 92-1989 Head of the Department of Analytical Chemistry

Since 1993 Professor of Analytical Chemistry; University of Potsdam; Head of the Department of Chemistry

2011 Honorary Doctor of the University of Szeged (SZTE), Hungary

Publication: over 400 papers, reviews, full books; more than 80 invited lectures.





## Second Laureate Fundamental Research

**Project Title:** Aggregation-Induced Emission

**Researcher:** Prof. Ben Zhong TANG

**Country:** China

**Field:** Chemistry

**Scientific Affiliation:** The Hong Kong University of Science and Technology



### Abstract:

It has been generally recognized that chromophore aggregation usually weakens or quenches light emission. This notorious photophysical effect is practically harmful, as luminophores are commonly used for real-world applications in solid state or aqueous media, where chromophores tend to form aggregates. Prof. Ben Zhong Tang's team has discovered a diametrically opposite phenomenon, in which non-emissive molecules are induced to luminesce by aggregate formation. He coined the term of aggregation-induced emission (AIE) to describe this unusual process and identified the restriction of intramolecular motion (RIM) as the main cause for the AIE effect. Based on the RIM mechanism, his group has developed a wide variety of AIE luminogens with emission colours covering visible and near-IR region and luminescence quantum yields up to unity. His laboratories have demonstrated the great utility of the AIE systems and explored their high-tech applications in such areas as optoelectronic devices, chemical sensing and biological imaging.

### Biography:

Prof. Ben Zhong Tang obtained his B.S. and Ph.D. degrees from South China University of Technology and Kyoto University, respectively. He conducted his postdoctoral research at University of Toronto. He joined the Department of Chemistry at the Hong Kong University of Science & Technology in 1994 and was promoted to Chair Professor in 2008. He was elected to fellowships of the Royal Society of Chemistry (2013) and the Chinese Academy of Sciences (2009). He was awarded a number of prizes, such as State Natural Science Award (Chinese Government), MACRO2012 Lecture Award (ACS PMSE Division), and Senior Research Fellowship (Croucher Foundation). He has published more than 500 papers. He has delivered more than 200 invited lectures, at international conferences.





## Third Laureate Fundamental Research

**Project Title:** Characterising crop genomes  
**Researcher:** Prof. David Edwards  
**Country:** Australia  
**Field:** Agriculture & Natural Resources  
**Scientific Affiliation:** University of Queensland, Australia



### Abstract:

DNA sequencing technology has revolutionised medical research and crop improvement. I have established a unique capability in analysis of the latest DNA sequence data and applied this to sequence the genomes of wheat, canola and chickpea. Each of these crops is important for global food security. Building on this research, I have characterised genome structure and diversity in these crops and associate genome variation with heritable agronomic traits. Understanding the impact of domestication and breeding on genome variation will accelerate crop improvement through the development of new genomic breeding approaches.

### Biography:

David Edwards gained an Honours degree in agriculture from the University of Nottingham and PhD from the Department of Plant Sciences, University of Cambridge. He has held positions within academia (University of Adelaide, Australia; University of Cambridge, UK; and McGill University, Canada), government (Long Ashton Research Centre, UK, Department of Primary Industries, Victoria, Australia) and industry (ICI seeds, UK). David moved to The University of Queensland, Australia in 2007 as an Associate Professor and was promoted to Professor in 2012. He is a Principal Research Fellow and supports bioinformatics for the Australian Centre for Plant Functional Genomics. His research interests include applied agricultural biotechnology, the structure and expression of plant genomes, the discovery and application of molecular genetic markers and applied bioinformatics, with a focus on crop plants.





## Third Laureate Fundamental Research

**Project Title:** New and Unique Mechanism of GFR Regulation

**Researcher:** Prof. Laszlo Rosivall

**Country:** Hungary

**Field:** Medical Sciences

**Scientific Affiliation:** Semmelweis University



### Abstract:

We pioneered recognizing and characterizing intrarenal renin-angiotensin system (RAS). Utilizing cutting edge technics, for the first time, and demonstrated the existence of fenestration in endothelium of distal portion of renal afferent arteriole (AA). Using nanotechnology and visualized in vivo the GFR and demonstrated that fenestration: 1) allows filtration of fluid prior to glomerular filtration, which can be as high as about %30 of GFR, 2) correlates with activity of RAS, 3) may change by age, in response to some stimuli such as thirst and in some diseases. Consequently, AA is not a uniform vessel and presents new functions. Also demonstrated a new mechanism in regulation of GFR (short loop feedback mechanism). This unique JGA morphology and the high filtration volume in AA is one of the most striking recent observations of renal microcirculation, and questions several basic renal physiological issues and opens new pathway in alteration of RAS.

### Biography:

Prof. László Rosivall, Széchenyi prize laureate, is the head of Department of Pathophysiology, International Nephrology Research and Training Center and School of Basic Medical Sciences at Semmelweis University. He is the member of European Academy of Sciences and Arts, Honorary Doctor of Tirgu-Mures University and Honorary Member of Polish Nephrological Society. He served as: President of Semmelweis University; President of Worldwide Hungarian Medical Academy; Treasurer of International Society for Pathophysiology; Council Member of International Society of Nephrology, Founder and President of Hungarian Kidney Foundation, President of Budapest Nephrology School and Roma Medical Education Program. He has published 166 articles, 75 chapters, 4 textbooks, 1 monograph and 2 patents.

