2010

ISOBC NEWSLETTER

Volume 5, Number 1

ISOBC Newsletter

March / 2010

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Iran Society of Biophysical Chemistry

2010

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News

- **9th Iran Biophysical Chemistry Conference** was held at Tarbiat Modares University, Tehran, Iran, 24-25 February 2010. In the 9th Iran Biophysical Chemistry Conference 26 talks and 159 posters were presented. The abstracts were published in Journal of the Iranian Chemical Society, Vol. 7, Suppl. 1, February 2010.

- The Iran Society of Biophysical Chemistry (ISOBC) has conferred the Worldwide Science Contribution ISOBC award to Professor Mohsen Nemat-Gorgani, Professor of Biochemistry at Institute of Biochemistry and Biophysics, University of Tehran. His award was conferred by the president of the society, Professor Ali Akbar Moosavi-Movahedi, during the inauguration ceremony of the 9th Conference of Iran Biophysical Chemistry that was held in the Tarbiat Modares University on 25 February 2010.

- In order to encourage young scientists, the jury of professionals conferred the ISOBC award to four young scientists under the age of 35 years. The winner's names are introduced as follows:

  1-Dr.Hossein Heli, first rank

  Department of Chemistry, IAU, Fars Science and Research Branch, Iran

  2- Pooria Gill, PhD student, second rank.

  Department of Nanobiotechnology, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran

  3- Dr.Maryam Salami, third rank.

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Institute of Biochemistry and Biophysics, University of Tehran, Tehran, Iran,
4-Marzieh Ghollasi, third rank
Department of Biochemistry, Faculty of Biological Sciences, Tarbiat Modares University, Tehran, Iran,

Biophysical Chemists in Profile:

The Biophysical Chemistry laboratory (BCL) holds a celebration for three graduated PhD students (Seyed Jafar Mousavy, Maryam Salami, Jalil badraghi) from this laboratory on Feb. 2010. They published the prestigious papers from their theses as follow:

- S. J. Mousavy, G. H. Riazi, M. Kamarei, H. Aliakbarian, N. Sattarahmady, A. Sharifizadeh, S. Safarian, F. Ahmad, A. A. Moosavi–Movahedi "Effects of mobile phone radiofrequency on the structure and function of the normal Human Hemoglobin" International Journal of Biological Macromolecule 44, 278-285 (2009)
- A. Moosavi-Movahedi, S. J. Mousavy, A. Divsalar, A. Babaahmadi, K. Karimian, A. Shafiee, M. Kamarie, N. Poursasan, B. Farzami, G. H. Riazi, G. H. Hakimelahi, F.-Y. Tsai, F. Ahmad, M. Amani and A. A. Saboury "The Effects of Deferiprone and Deferasirox on the Structure and Function of b-Thalassemia Hemoglobin" Journal of Biomolecular Structure &Dynamics 27(3), 319-339(2009)
- M. Salami, R. Yousefi, M. R. Ehsani , M. Dalgalarrondoc, Jean-Marc Chobert, T. Haertlé, S. H. Razavi, A. A. Saboury, A.Niasari-Naslaji, and A. A.Moosavi-Movahedi" Kinetic characterization of camel and bovine milk proteins hydrolysis using pancreatic enzymes" International Dairy Journal 18, 1097-1102 (2008)
- M. Salami, R. Yousefi, M. R. Ehsani, S. H. Razavi; Jean-Marc Chobert, T. Haertlé, A. A. Saboury; M. S. Atri; A. Niasari-Naslaji, F. Ahmad and A. A. Moosavi-Movahedi "Enzymatic digestion and antioxidant activity of native

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and MG state of camel α-Lactalbumin:possible use in infant formula" International Dairy Journal 19, 518-523 (2009)

- M.Salami, A.A.Moosavi-Movahedi, M.R.Ehsani, R.Yousefi, T.Haertle, J. M. Chobert, S.H. Razavi, R.Henrich, S.Balalaie, S.A. Ebadi, S.Pourtakdoost and A.Niasari-Naslaji" Improvement of the antimicrobial and antioxidant activities of camel and bovine whey proteins by limited proteolysis" J of Agricultural and Food Chemistry (2010) In Press
- J. Badraghi , R. Yousefi, A. A. Saboury , A. Sharifzadeh, T. Haertlé , F. Ahmad and A. A. Moosavi-Movahedi "Effect of salts and sodium dodecyl sulfate on chaperone activity of camel αS1-CN: Insulin as the target protein" Colloids and Surfaces B: Biointerfaces 71, 300-305 (2009)
- J Badraghi , A. A. Moosavi-Movahedi, A. A. Saboury, R. Yousefi, A. Sharifzadeh, Jun Hong, T.Haertlé, N. Sheibani and A. Niasari-Naslaji " Dual Behavior of Sodium Dodecyl Sulfate as Enhancer or Suppressor of Insulin Aggregation and Chaperone-Like Activity of Camel αS1-Casein" International Journal of Biological Macromolecules 45 (2009) 511–517

In order to have a delicious celebration very unique cake were ordered.
Special thanks to Prof Saboury and Prof Moosavi-Movahedi and all the students participated in this celebration.

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News:

The Biophysical Chemistry laboratory (BCL) is selected as an equipped and top lab of University of Tehran and awarded in University of Tehran Research Festival 2010.

SCANNING TUNNELING MICROSCOPE

NAMA-STM

The acronym STM can mean either scanning tunneling microscope or scanning tunneling microscopy. This microscope has an extremely sharp stylus that scans the surface. The stylus is so sharp that its tip consists only of one atom. Strictly, as the tunneling current is such a short ranged phenomenon (which is what gives STM its impressive resolution), tunneling normally only occurs through the furthest extremity of the stylus - which might itself appear to be rather blunt on a larger scale. The STM is a non-

optical microscopy technique which employs principles of quantum mechanics. A sharp probe (the tip), whose end is as sharp as a single atom, moves over the surface of the material under study, and a voltage is applied between the probe and the sample surface. Depending on the voltage applied, electrons will tunnel through the potential barrier between the surface and probe, resulting in a weak electric current. The direction of the tunneling depends on the polarity of the electric field. The magnitude of this current is exponentially dependent on the distance between probe and the surface. For tunneling to occur, the substance being scanned must be conductive (or semi- conductive). Insulators cannot be scanned by STM, as the electron has no available energy state to tunnel into or out of due to the band gap structure in insulators. In one scanning mode, a servo loop (feedback loop) keeps the tunneling current constant by adjusting the distance between the tip and the surface (constant current mode). This adjustment (and adjustments in any spatial direction) is accomplished by placing an electric field across a piezoelectric element, which deforms relative to the voltage of the electric field. By scanning the tip over the surface and measuring the height (which is directly related to the voltage applied to the piezo element), one can thus model the surface structure of the material under study. STMs can reach sufficiently detailed resolution to resolve single atoms. The STM tip will come within one nanometers of the sample surface. If the tip makes contact with the surface, the tip "crashes" into the surface and must be replaced. So the Scanning Tunneling Microscope (STM) is a non-optical microscope that scans an electrical probe over a surface to be imaged to detect a weak electric current flowing between the tip and the surface. The NAMA-STM (not to be confused with the scanning electron microscope;SEM;) can obtain images of conductive surfaces at an atomic scale and also later will be used to manipulate individual atoms (If be used in ultra high vacuum systems not in air, trigger chemical reactions, or reversibly produce ions by removing or adding individual electrons from atoms or molecules).

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Some of NAMA-STM Features: are as below:

Mechanical Stability

Rigid Structural components accompanied almost by zero-backlash mechanisms result in significant mechanical stability.

Thermal Drift Balance

Almost absolute thermal drift balance is achieved by appropriate material and dimensional selection.

Low Electric noise

Very low noise signal amplification is achieved due to the advanced transmission and filtering techniques employed.

Ergonomic Design

Ergonomic considerations are implemented for easy and fast sample and tip replacement.

Windows-Based Powerfull Software

A user friendly windows-based software provides full control over the hardware and a wide range of image processing facilities.

Easy Maintenance

Modular design allows easy maintenance and repair.

Some of NAMA-STM Soft ware Features:

- Scan in both constant hight and constant current modes.
- Ability to show various views of different images simultaneously.
- View images in 2D and 3D.
- View each scan line in the image.
- Flexible coloring.

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- Different filters.
- Show image as icons
- Automatic and manual tip approach
- Live display of tip during approach
- Select scan area
- Scan with selectable resolution
- Scan with selectable frequency
- Different PID configurations
- Zoom capability
- WWW.NATSYCO.COM

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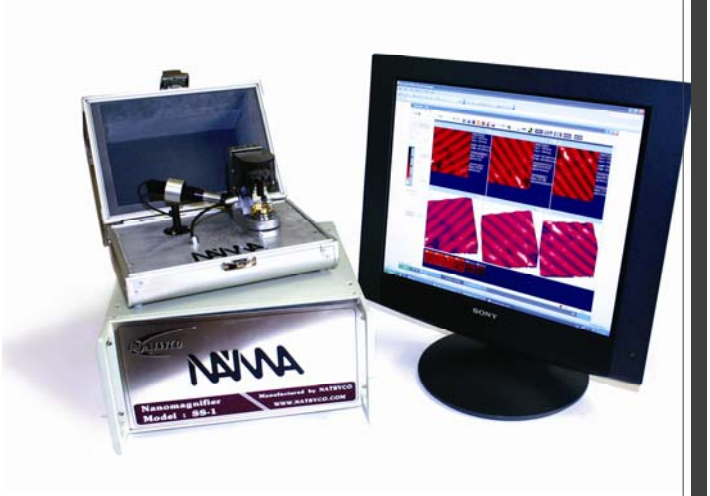

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New Conferences

-Synthetic Biology in Pharma 2010 taking place from: March 30-31, 2010, Cambridge, UK.

For more information please visit: www.synthetic-biology.info

-First World Conference on Nanomedicine and Drug Delivery (WCN-2010)

April 16, 17 and 18, 2010, Kottayam, Kerala, India

Conference website: www.nanomedicine.macromol.in

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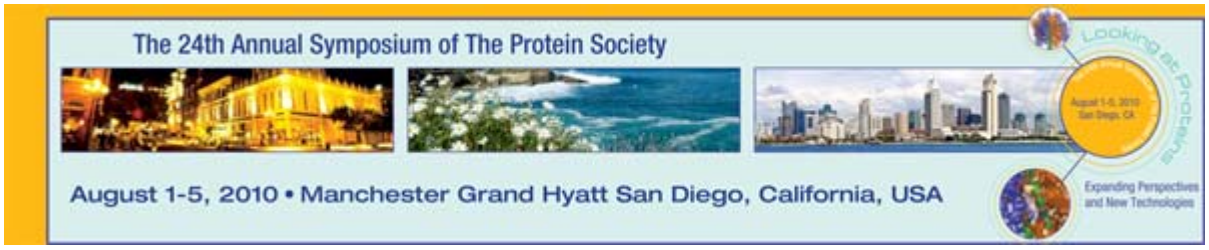
INTERNATIONAL CONFERENCE ON NANOTECHNOLOGY: FUNDAMENTALS AND APPLICATIONS

AUGUST 4 - 6, 2010 OTTAWA, CANADA

Conference website: International ASET Webmaster

24th Annual Symposium of The Protein Society



For more information please visit:
www.proteinsociety.org/symposium24th

April 19-21, 2010, Shiraz (Iran)

SEE WEBSITE FOR UPDATED INFORMATION and to download the first announcement: **http://imaps2010.com/**

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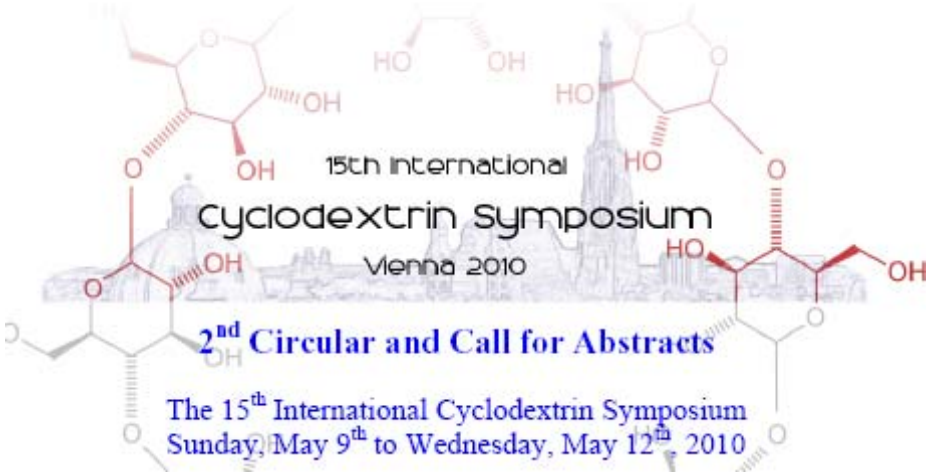

For more information please visit**: http://www.cyclodextrin.at/**

THE INTERNATIONAL CAMEL SYMPOSIUM

"Linking Camel Science and Development for Sustainable Livelihoods"

From 7th to 10th JUNE 2010 in GARISSA / KENYA

website**: http://www.kari.org/thekenyacamelsymposium2010.htm**

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2010 MEETINGS & CONFERENCES

Computational Cell Biology [Hinxton, UK]
February 10 - 14 abstracts due Dec 4, 2009

April 27 – May 1 abstracts due Feb 5 Molecular Chaperones and Stress Responses

August 11 - 15 abstracts due May 21 Mechanisms & Models of Cancer

COLD SPRING HARBOR ASIA CONFERENCES (CHINA)

New Books & New Journals

Cold Spring Harbor Perspectives in Biology

A new type of online review journal

• Spanning the complete spectrum of the molecular life sciences

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• Written and commissioned by experts in each field

Cold Spring Harbor Perspectives in Biology
www.cshperspectives.org
The Authoritative View

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Current Bestsellers

Genetics of Complex Human Diseases: A Laboratory Manual

Lab Dynamics: Management Skills for Scientists

Lab Ref, Volume 2: A Handbook of Recipes, Reagents, and Other Reference Tools for Use at the Bench

Lab Ref, Volume 1: A Handbook of Recipes, Reagents, and Other Reference Tools for Use at the Bench

Lab Math: A Handbook of Measurements, Calculations, and Other Quantitative Skills for Use at the Bench

Bioinformatics, Sequence and Genome Analysis, Second Edition

At the Helm: A Laboratory Navigator

Untangling the Double Helix: DNA Entanglement and the Action of the DNA Topoisomerases

Fly Pushing: The Theory and Practice of *Drosophila* Genetics, Second Edition

Francis Crick: Hunter of Life's Secrets

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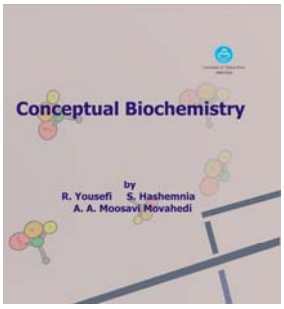
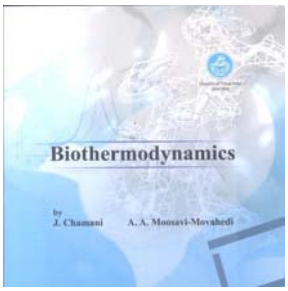


Conceptual Biochemistry

University of Tehran Press 2009

By: R.Yousefi, S.Hashemnia and A.A.Moosavi-Movahedi



Biothermodynamic

University of Tehran Press 2009

By: J. Chamani and A.A.Moosavi-Movahedi

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Interview I

Name: Pooria Gill

Pooria Gill is awardee of ISOBC prize at 9th Iran Biophysical Chemistry Conference

1-Please tell us about yourself and your relationship with ISOBC:

I am a Ph.D. Student of Nanobiotechnology in Tarbiat Modares University. 9th ISOBC was the first relationship of mine with ISOBC, directly. However, my supervisor (Dr Ranjbar) had previously introduced ISOBC to me, and I knew Dr Moosavi-Movahedi as the chief of ISOBC, too.

2-Could you please explain your biography sketch and your CV?

I obtained my B.S. in Laboratory Sciences from Tehran University of Medical Sciences at 2001. Then I graduated in M.Sc. of Medical Biotechnology from Tarbiat Modares University at 2005. Although, I had admission from Center of Nanoscience (München Üniversitate) for Ph.D. of Nanobiotechnology, but I preferred to stay in homeland and continue my Ph.D. program in Tarbiat Modares University in its Nanobiotechnology department. I am working on my thesis entitled: "Design and Fabrication of DNA Nanowire using Isothermal Amplification Technology and Its Biophysical Studies", under supervision of Dr Bijan Ranjbar and advising of Dr Reza Saber.

3-Are you satisfied with your participation at 9th ISOBC conference? How is your achievement in this conference?

Yes. The most important aspect of this conference was related to the programs and its time sequences. Particularly, the lectures were very valuable, and the final session with presence of Nama-STM was wonderful.

4-Have you presented any research work in this conference? If yes, please explain briefly about your abstract.

I had a lecture in last session about "Fabrication of Cauliflower-like DNAs using LAMP Technology". Design and fabrication of such DNAs was introduced for the first time in the world of Nanotechnology and could be candidate for various kinds of biophysical studies in future. For instance, such DNAs can be used in design and synthesis of DNAzymes. Also, the nanostructures can be applied as nanomachines and nanomotors. These types of DNA can be employed for generation of novel types of nanofilters with special approaches in industries. In addition, cauliflower-like DNAs can be used as nanowires in nanoelectronics and DNA computers. In this study, we characterized the DNA nanostructures using scanning tunneling microscopy (STM) for the first time in the world. Key nanostructures such as stem-loops, nanojunctions, and micron length of DNAs were fabricated by LAMP isothermal technology and confirmed by STM.

5-What is your suggestion for promotion of ISOBC conferences in future?

I hope the program to be repeated with such a quality in the next year.

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Interview II

Name: Hassan Tavakoli, PhD in Biophysics

He participated in 9th Iran Biophysical Chemistry Conference

1-Please tell us about yourself and your relationship with ISOBC:

I'm an academic member at Faculty of Medicine, Department of Physiology and Biophysics, Baqiyatollah University of Medical Sciences, Tehran, Iran. I am a member of ISOBC.

2-Could you please explain your biography sketch and your CV?

I have obtained my PhD from Institute of Biochemistry and Biophysics, University of Tehran. My thesis was on the area of Biophysical Chemistry entitled " Effect of paraoxon and ethylparathion on choline oxidase". We have published a few papers that related to my thesis such as:

H. Tavakoli, H. Ghourchian, A.A. Moosavi-Movahedi and F.C. Chilaka, "Effect of paraoxon and ethylparathion on choline oxidase from Alcaligenes species: Inhibition and denaturation" International Journal of Biological Macromolecule 36,318-323 (2005)

H. Tavakoli, H. Ghourchian, A.A. Moosavi-Movahedi and A.A. Saboury, "Histidine and serine roles in catalytic activity of choline oxidase from Alcaligenes species studied by chemical modifications" Process Biochemistry 41, 477-482 (2006)

At present, two subjects are my research interests. The first subject is the application of biosensor in ionizing or non-ionizing radiation detection and dosimetry. Second, the radiation effects on DNA (gene expression and structure) and protein (structure and function). The radiation detection and dosimetry are important in medical diagnosis (nuclear medicine sections) and radiotherapy. So far, some papers and abstracts are published based on these subjects by our research team. This point must be noted that the Radiation Biophysics and Bioelectrochemistry courses are very important for entrance to these research subjects, but, unfortunately these courses are alien in biophysics departments.

3-Are you satisfied with your participation at 9th ISOBC conference? How are your achievements in this conference?

Yes, I was acquainted with new colleagues, new M.Sc and Ph.D students, new research subjects and instruments, all of these were good achievements for me.

4-Have you presented any research work in this conference? If yes please explain briefly about your abstract?

Yes, I have presented four research works in this conference which their titles were as follows:

-Possibility of Gamma Ray Detection and Dosimetry through Reduction of Cytochrome C in Presence of Superoxide Radical Anion (O-2)

-Detection of Gamma Rays Emitted by Cobalt-60 Using a Modified Horseradish Peroxidase Based Biosensor

-The Role of GADD45A Expression in Repair of Gamma Ray–Induced DNA Damage of Human Lymphocyte

-Using of Modified Horseradish Peroxidase for Evaluation the Cottrell Equation Validity in Presence of Gamma Ray Radioisotopes

Abstracts 1 and 2 were about detection and dosimetry of gamma ray using electrochemical biosensor. It must be mention that the biosensors was designed, fabricated and calibrated by our research team. Abstract 3 describes the up regulation (over expression) of GADD45A (Growth Arrest DNA Damage gene) in human lymphocytes after gamma irradiation of human lymphocytes. The study of gene expression was carried out by RT. PCR using Cyber Green. Finally, in abstract 4 the electrical charge exchanges at the electrode surface of biosensor working electrode was discussed based on Fick's first and second laws about diffusion process and Cottrell equation. In fact, the physical and mathematical basis of fabricated electrodes (by our research team) was made.

5-What is your suggestion for promotion of ISOBC conferences in future?

I have two suggestions:

The ISOBC and future organizers of conference can invite the foreign lecturers and researchers.

Should schedule a session for discussion about scientific and research achievements of Iranian scientists, the application of biophysics especially biophysical chemistry in medical and industrial research.

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Interview III

Name: **Kaveh Kavousi, Artificial Intelligence and Robotics Ph.D. candidate**

He has presented oral talk in 9th Iran Biophysical Chemistry Conference

1-Please tell us about yourself and your relationship with ISOBC:

I am an Artificial Intelligence and Robotics Ph.D. candidate in school of electrical and computer engineering, faculty of engineering, University of Tehran. The title of my Ph.D. thesis is "Automated Protein Domain Classification Based on Information Fusion". I am interested in ISOBC activities as a Computational Biology researcher. I am a member of ISOBC through guidance and suggestion of Professor Moosavi-Movahedi.

2-Could you please explain your biography sketch and your CV?

I was born in Tehran, Iran, on March. 4th, 1974. I received my B.Sc degree in computer, hardware engineering and my M.Sc. in Artificial intelligence and Robotics. My research interests include Protein Bioinformatics, Phylogenetic Networks, Generalized Information Theory, Uncertainty Handling, Data/Information Fusion, Machine Learning, and Multi Agent Systems.

3-Are you satisfied with your participation at 9th ISOBC conference? How are your achievements in this conference?

In my opinion, the conference was possessed of a good variety and level. As a person with different scientific background I met very interesting issues.

4-Have you presented any research work in this conference? if yes please explain briefly about your abstract?

Yes. In first day of the conference I presented my research work entitled "A Protein Fold Combined Classifier Based on Information Content of Sequence Extracted Features and PSSM". In this research work a combined classifier based on information content of extracted features from protein primary structure has been introduced in facing protein fold classification problem. In the first stage of our proposed two tier architecture, there are several classifiers each of them is trained with a different sequence based feature vector. In comparison with previous works, besides the predicted secondary structure, hydrophobicity, van der Waals volume, polarity, polarizability, and different dimensions of pseudo-amino acid composition vectors, the position specific scoring matrix (PSSM) has been used to improve correct classification rate. Using K-fold cross validation on training dataset related to 27 famous folds of scop, the 28 dimensional probability output vector from each evidence theoretic K-NN classifier is used to determine the information content or expertness of corresponding feature for discrimination in each fold class. In the second stage, the output of classifiers for test dataset will be fused using Choquet fuzzy integral operator to make better decision for target fold class. The expertness factor of each classifier in each fold class has been used to calculate the fuzzy integral operator weights. Results make it possible to provide deeper interpretation about the effectiveness of each feature for discrimination in target classes for query proteins. Results show considerable improvement.

5-What is your suggestion for promotion of ISOBC conferences in future?

I think the presence of well-known and leading international famous scientists in related fields helps the conference to improve its level and it will be very useful for young participants.

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Happy NowRooz, Happy New Year

In harmony with the rebirth of nature, the Iranian New Year Celebration, or NOWROOZ, always begins on the first day of spring (21th March). Happy new year to all

ISOBC Greetings

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