IUPAB
CONNECTING THE WORLD OF BIOPHYSICS

INTERNATIONAL UNION for PURE and APPLIED BIOPHYSICS

IUPAB NEWS

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Activities of the INTERNATIONAL UNION for PURE and APPLIED BIOPHYSICS
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Editor's Note
December, 2013

Efforts continue at an increasing pace to ensure that the 18th International Biophysics Congress to be held in Brisbane in August is a spectacular success,

There is an outstanding scientific program in place, and the promise of an interesting and varied social program to appeal to all tastes.

Brisbane is a dynamic city with a tropical climate, and it also provides a gateway to other parts of Australia with many beautiful and unique attractions.

Work on the IUPAB website continues in an effort to make it both useful and easy to navigate. Please let me know what you think of the changes so far.

Also please make the young scientists in your countries aware of the opportunity to apply for an IUPAB grant for Travel Assistance to the 18th IBC. The Secretary-General's report on page 4 has more details on this.

The application form is available in "Forms" in the first column *About Us* on the IUPAB website.

I look forward to meeting many of you in Brisbane in August.

With best wishes,

Louise Matheson
Editor
mail@iupab.org

REPORT FROM THE SECRETARY-GENERAL

Planning for the 18th IBC: The Council has been active in suggesting topics and speakers for this Congress in Brisbane. All suggestions were forwarded to the local program committee and used to construct a short list. IUPAB was given the opportunity to comment before invitations are issued. Professor Brett Hambly, the principal convener of the Congress tells me the process is going smoothly thanks to many members of the IUPAB Council and the Adhering Bodies, particularly national biophysical societies.

Planning for this meeting is well advanced. Details of the program are available here: http://www.iupab2014.org/. This congress promises to be memorable. The plenary speakers are: Brian Kobilka, Eduardo Perozo, Carol Robinson, and Roger Tsien. All the chosen speakers have been invited and have accepted.

Congress Satellites: Several satellite meetings are planned for Queensland. In the week before the Congress (July 30-August 2) will be: (1) the *Biocontinuous Cubics Satellite* (Noosa) contact (www.cubicphase2014.org); (2) the *Mechanosensory Transduction* satellite (Gold Coast) contact: b.martinac@victorchang.edu.au; (3) the *Molecular Modelling Satellite* (Gold Coast) contact: http://compbio.chemistry.uq.edu.au/mm2014/index.htm; and (4) the *International Conference on Bioinformatics (InCoB)* to be held at Brighton Beach, Sydney (contact: http://incob2014.org/).

Following the Congress (August 8-12) a *Human Heart Forum* will be held on Heron Island on the Great Barrier Reef. This satellite meeting will bring together researchers who work with human heart tissue, mainly from failing and non-failing (donor) human hearts in the Sydney Heart Bank. The satellite will include participants from the USA, United Kingdom, Germany, Sweden, The Netherlands, New Zealand and Australia (details: www.humanhearttissue2014.org).

Students and Early Career Travel Grants: IUPAB will commit $100,000 to assist young biophysicists, especially from developing countries. Details are available at: http://www.iupab2014.org/travel-grants/and applications are now open. Applicants must present a poster or platform contribution to the Congress, they must attend the entire meeting and there is a requirement that student supervisors approve of their attendance.

IUPAB Website: Mrs. Louise Matheson (Editor of the IUPAB News) has put a lot of effort into improving our website. We are more than happy to promote your scientific meetings, symposia, workshops on the IUPAB website. We would like to receive suggestions for improvements and we welcome your feedback. Please address them to the Editor.

Funding of Regular (Annual) Schools/Workshops: The IUPAB provides a range of financial support for workshops and schools on biophysics, particularly those held in developing countries. In 2013 it supported meetings in Brazil, China, India, Portugal, Russia and Spain. The IUPAB will *only* consider requests for financial support when they are held in years that *do not coincide* with the triennial IUPAB Biophysics Congresses. In 2014 the Congress will be held in Brisbane, Australia (August 3-7) and IUPAB will focus its financial resources on making the congress a success. In 2013 I received several requests for financial assistance for workshops/schools to be held in 2014, and unfortunately they could not be supported. Thus, this year IUPAB welcomes applications for financial support for workshops/schools to commence in 2015. Applications will open in early July and close in late August. They will be assessed and funding decisions will be made in November 2014.

CODATA: All too often we take for granted the open and complete access to all forms of scientific data, but who ensures data are and remain available? And how do we know the data are reliable?

CODATA is the acronym for the Committee on Data for Science and Technology, a component of ICSU (International Science Council). Among the objectives of CODATA is the improvement of the quality and accessibility of data, and the methods by which data are acquired, managed, analysed and evaluated, with a particular emphasis on developing countries.

In January 2014 IUPAB nominated Professor **Cláudio Soares** for election to the CODATA Executive. Voting at the CODATA conference in New Delhi (November 2-5, 2014) will decide the outcome. Dr Soares is a member of the IUPAB Council and is an expert in biomolecular modelling and simulation and structural bioinformatics. He has a

strong record in research in this field and we trust this nomination will result in his election.

IUPAB Task Forces: At the 17th IBC in Beijing the Council of IUPAB moved to discontinue all existing support task forces and focus on only two.

Task Force on Education and Capacity-Building: Associate Professor M.A.K (Bill) Williams (a member of the IUPAB Council) has agreed to Chair this Task Force. Its objectives are to develop educational resources in biophysics and to promote the development of biophysics in scientifically less developed countries - Africa being an area of particular importance. Please contact Bill (M.Williams@massey.ac.nz) or the Editor if you wish to contribute to this important initiative.

*Task Force on Applications of Biophysics***:** This task force, under the Chairmanship of Professor Kuniaki Nagayama (plus nine other members of the IUPAB Council, and three non-Council members) has been active. Its objectives are to assemble a wide range of information that illustrates how biophysical tools and/or methodologies have been applied to various social fields such as clinics, engineering and agriculture. If you have expertise in these fields I urge you to participate in this project. Please contact Professor Nagayama (mailto: nagayama@nips.ac.jp) or the **IUPAB News** Editor if you wish to contribute to this task force.

Cris dos Remedios
Secretary-General

18th IUPAB Congress Brisbane, August 2014

On behalf of the Australian Society for Biophysics (ASB) and the International Union of Pure and Applied Biophysics (IUPAB) we cordially invite you to attend the **18th IUPAB Congress** being held in Brisbane, Australia from the 3rd – 8th August 2014 (www.iupab2014.org).

Abstract submission and registration has now opened. Abstracts and early bird registration closes 2 May 2014. The website includes extensive details and tips on how to save on your conference experience and gain the most from your visit to Australia. This information is being constantly updated, so visit the website periodically over the next few months.

Biophysics in Australia and New Zealand is a strong discipline, with world-leading research programmes and outstanding facilities. ASB and IUPAB are assembling an outstanding scientific program for IUPAB 2014. Plenary talks will be presented by four eminent biophysicists, including two Nobel Laureates, and approximately forty symposia speakers from around the world have been invited to lead discussions at the Congress. Several satellite workshops will complement the main Congress, and will be held at nearby destinations.

Early career and women researchers in the field are especially encouraged to submit abstracts. A number of travel grants are available, primarily for young scientists such as PhD students, or equivalent.

The Congress will be held at the Brisbane Convention and Exhibition Centre (BCEC) which is located in a unique urban cultural and entertainment precinct in the heart of Brisbane. All major art galleries, museum, and performing arts centre are located within 5-10 minute walking distance from the BCEC. A range of affordable accommodation is available near the centre (please see conference website for further details).

In addition to the IUPAB 2014 congress being scientifically rewarding, a stimulating social program featuring many unique aspects of Australia will be incorporated into the Congress to provide delegates with the opportunity to experience the best of Australia - from iconic beaches and rainforests to the Great Barrier Reef and World Heritage landmarks like Fraser Island, delegates can make the IUPAB 2014 Congress the trip of a lifetime.

CONFIRMED PLENARY SPEAKERS

Professor Brian Kobilka, Stanford University, United States

Professor Eduardo Perozo, University of Chicago, United States

Professor Carol Robinson, University of Oxford, United Kingdom

Professor Roger Tsien, University of California San Diego, United States

CONFERENCE THEMES

The Congress convenors have consulted widely with IUPAB member Societies to incorporate contemporary themes and the international flavour of biophysics into the Congress programme. The Congress will focus on seven major themes:

- Membrane proteins
- Electrophysiology, Muscle, Cardiac & Neurology
- Protein structure
- Imaging (from molecules to organisms)
- Bioenergetics
- Single molecule biophysics
- Computational Biophysics & Systems Biophysics

Thank you for considering travelling to Australia to attend the IUPAB 2014 Congress in Brisbane.

Visit WWW.IUPAB2014.ORG and register your interest to be kept informed.

Professor Brett Hambly
Congress Convenor

News from Biophysical Reviews (*BREV*):

The Editorial Board of Biophysical Reviews has continued the editing of special issues, one published early this year, “Biophysics of Protein-Protein/Protein-Ligand Interactions” with Damien Hall and Cristobal G. dos Remedios as Guest Editors and a second one is in preparation to be published in issue # 1, 2014, “ Advances in Biophysics in Latin America” with Marcelo Morales as Guest Editor. Another special issue is already in the pipeline for 2015. These issues are important, they add new insights for the Journal and represent a substantial complement to the other reviews. In addition to the efforts of each member of the Editorial Board to recruit new authors, they contribute to the popularity of the IUPAB Journal among the biophysicists.

Some Editorial board members met together this year on two occasions. One during the Biophysical Society meeting in Philadelphia on Feb. 4, 2013, I made a report of this meeting shortly after (*see IUPAB NEWS No. 60 page 10*). The second was in Paris between Cris dos Remedios and myself on Sept. 9, 2013 where we examined the possibility of extending the Editorial Board. Whilst attending the Biophysical Society meeting in Philadelphia, I noticed that this society appreciates our Journal because the Biophysical Journal has set up a new section named “Biophysical Reviews”. However the organization of this section is quite different from our Journal with no real overlap in number and size of the reviews.

The challenges for BREV are still the impact factor and the indexing of our Journal by PubMed. On this occasion I would like to address the Open Access issue for the reviews published in BREV. The authors can choose according to a certain fee to publish in Open Access, or if not, as with many Publishers, there is an embargo on making the manuscript available in Open Access. For Springer this embargo is one year.

When the authors receive a grant from NIH, Springer will put it automatically in PubMed Central at the end of the embargo, and the authors have just to click a box when they submit their paper to BREV. Once in PubMed Central, PubMed will automatically index the publication with a link to the PDF version deposited in PubMed Central.

For authors who are not receiving an NIH grant, depending of their grant Agency, their manuscript can be deposited at either PubMed Central Canada or PubMed Central Europe, but they have to do it themselves. Then PubMed will automatically index their paper with a link to the PDF version. For authors from these regional areas, please check if your grant Agency is listed in those PubMed Centrals. If not, you may come back to your Agency and request it to enlist itself.

To my knowledge there is no PubMed Central Asia nor PubMed Central Latin America: perhaps IUPAB could help in the creation of these. I would like to put this point for discussion at the IUPAB Council meeting in Brisbane.

Professor Jean Garnier

Editor-in-Chief

REPORT on International Workshop & School on "Computational and theoretical modeling of macromolecule interaction" at Dubna, Moscow Region in Russia, June 2013

Molecular modeling is one of the important directions of contemporary biophysics and includes modern methods of computer simulation at the atomic, molecular and sub-cellular level. Thanks to recent advances of molecular and cell biology, and the increased capabilities of information technology in the field of storing and processing large amounts of information this field of biophysics is rapidly developing. The goal of this research based on physical interactions of system elements is to describe biologically significant processes: conformational changes of biological macromolecules, the interaction of peptides and proteins with lipids in biological membranes, the process of ion transfer through membrane ion channel, operation of biomolecular motors ATPase and cyclase, etc. Molecular modeling capabilities have expanded with the development of GRID-technologies and graphics processors (GPU) in the computer clusters.

The International School-Conference "Computational and theoretical modeling of biomolecular interactions" was held 3-8 June 2013 at the International Conference Hall, Joint Institute for Nuclear Research (JINR) in Dubna, Russia. The organizers of the conference were the Department of Biophysics, School of Biology, Moscow State University (Head of Department Corresponding member of Russian Academy of Sciences A.B. Rubin), Laboratory of radiation biology (LRB) headed by Corresponding Member of the Russian Academy of Sciences E.A. Krasavin) and Information Technology Laboratory (LIT) headed by Prof. V.V.Korenkov, JINR.

The conference was organized with the financial support of the International Union of Pure and Applied Biophysics (IUPAB) and the Russian Foundation for Basic Research (RFBR).

The Chairman of the Organizing Committee of the Conference and the Chairman of the Russian National Council on biophysics, corresponding member of the Russian Academy of Sciences A.B. Rubin opened the conference. In his opening remarks he noted the important role of molecular modeling in basic research of physical and biological mechanisms regulating processes at the level of bionanostructures, as well as practical importance of these studies in biomedicine (drug design) and biophysical

education. Deputy LIT director Tatiana Strizh and the deputy dir. LRB JINR Oleg Belov talked about the latest developments in the work of their laboratories.

Board member of the IUPAB G.Yu. Riznichenko spoke about the general activities of the IUPAB in the field of international biophysicist cooperation, organizing international conferences, meetings and schools for the young participants, including those from developing countries. The organization of such meetings and publication of the journal "Biophysical review" and "Biophysical Newsletters" contribute to the promotion of biophysics in the world.

Leading international scientists gave lectures on current problems of molecular modeling. Prof. Siewert-Jan Marrink (University of Groningen, Netherlands) provided a brief introduction to the course-grain Martini force field and illustrated its power with recent applications in respiratory membrane self-assembly. Dr. Nathaniel Stanley (Universitat Pompeu Fabra, Barcelona, Spain) gave a presentation on simulation of lipid binding through membranes using molecular dynamics. Professors from the U.S.A. G. Papoian, (University of Maryland, College Park, USA), K. Marx and Dr. V. Barsegov (University of Massachusetts, Lowell, USA), J. Straub (Boston University, USA) discussed the problems of folding, protein self-assembly, protein interactions and their simulation. Dr. I. Plante (NASA Johnson Space Center, USA) presented a lecture on mathematical modeling and simulation of processes connected with DNA damage by high-energy particles. Prof. Changbong Hyeon (Korea Institute for Advanced Study) discussed mapping the intramolecular signal transductions of biomolecules.

Several lectures were presented by Russian scientists: Professor R.G. Efremov and V.I. Tsetlin (Shemyakin-Ovchinnikov Institute of Bioorganic Chemistry), K.V. Shaytan (Department of Bioengineering and Bioinformatics, School of Biology, Moscow State University), G. Yu. Riznichenko and I.B.Kovalenko (Department of Biophysics, Moscow State University), H. Holmurodov (LRB, JINR).

There were more than 30 reports of young scientists from Russia, Spain, Croatia, and Ukraine. Professors and students actively discussed contemporary situation in molecular modeling. Of particular interest was the discussion of the problems of molecular modeling in connection with the use of the "Coarse-Grain" approach. According to this approach only the processes in the active sites of the system are simulated on the atomic level, and the rest of the macromolecule is represented as a set of larger fragments that interact in an effective force field. This approach allows to

Famous scientists of Joint Institute of Nuclear Research and young participants of the Conference

simulate the processes at much longer time periods (with characteristic times of microseconds up to milliseconds) than conventional molecular dynamics approach, which simulates the motion of each atom. However, the question of the validity of the use of certain force fields remains open. There were also reports on the use of traditional approaches of molecular dynamics and Brownian dynamics simulation of processes in the photosynthetic and respiratory chain systems, hybrid nano objects containing biopolymers and structures of non-biological origin.

The conference and school was very useful scientific event for all participants and attracted the attention of young researchers to the biophysical problems of molecular modeling.

Professor Galina Riznichenko
Professor of Biophysics
Moscow State Lomonosov University

“Bionanotechnology- recent advances” An IUPAB/EBSA funded satellite workshop in Sesimbra, Portugal, July 2013

From the 10-13th of July 2013, a workshop entitled “Bionanotechnology – Recent Advances” took place in Sesimbra, Portugal as a satellite to subsequent 9th EBSA Congress 2013 in Lisbon. The workshop was organized by Anthony Watts (Oxford, UK) and Horst Vogel (EPFL Lausanne, CH) as a joint meeting between the British and Swiss Biophysical Societies.

About 60 participants from over 20 countries gathered in the Sesimbra Hotel & SPA, with a lovely view of the ocean, to discuss the latest discoveries in the rapidly evolving field of bionanotechnology – it was 10 years since the last satellite organized to an EBSA congress with a similar title, that time it was in Granada. Spain.

The programme featured eight well-respected academics from around Europe giving lectures on their recent work – most went on to the main congress to deliver keynote invited lectures. Topics covered included innovations in single molecule studies, structural biology from mass spec, nanoscale distance and dynamics, nanopores and nanoencapsulation. All the lecturers were asked to discuss methodologies and prepare

the students for the main congress, giving a more informed background to aid understanding of the following congress lectures. Questions were encouraged, and many sessions continued well after they formally finished in the lecture room.

Additionally, 15 younger participants gave short lectures on their own work, and many took advantage of this time to practise their talks ready for the main congress, but in a more informal environment, with feedback on their work and presentational skills from all participants. Patricia Dijkman won an award for best short research presentation, as judged by all participants.

Lastly, but not least, the social networking between participants ensured that when they all arrived in Lisbon by charter bus at the start of the main congress, they already knew a good nucleus of other younger participants – this social aspect continued well into the congress, and no doubt beyond.

IUPAB and EBSA offered generous support of the workshop with bursaries to young scientists as well as general support with accommodation, meals and organization costs.

After a delicious conference dinner at the seafront restaurant “O Canhão” on Friday, participants travelled onwards to Lisbon to join the main congress on Saturday 13th July.

A copy of abstracts and programme can be found at
http://bionanotechnology.weebly.com/programmme.html

Anthony Watts
Managing Editor, European Biophysical Journal
Biomembrane Structure Unit, Biochemistry Dept., Oxford University, U.K.

Marcelo Morales, MD, PhD
IUPAB member of Council
POSLATAM Coordinator
LAFeBS Past President

Report

VI POSLATAM Course, November 27th-30th, Córdoba Argentina

POSLATAM Coordinator Prof. Marcelo Morales and Co-Coordinator Prof. Silvia Alonso del Valle

Biophysical approaches to study systems of biological interest. http://sab2013.fcq.unc.edu.ar/

POSLATAM is the Latin America Postgraduate Program of Biophysics, a successful regional initiative of IUPAB in collaboration with Latin American Federation of Biophysical Societies (LAFeBS).

LAFeBS adhered countries are: Argentina, Brazil, Colombia, Portugal, Spain, Venezuela, Uruguay

POSLATAM has already 37 Postgraduate Programs adhered from different countries (Argentina 14, Brazil 17, Venezuela 4, Colombia1, Uruguay1) and 247 students participants from the 37 Postgraduate Programs.

The VI edition of POSLATAM course took place in the Department of Chemical Sciences Auditorium, UNC University Campus. Grants from IUPAB and MINCyT-Argentina

The course aimed to provide a solid background in some aspects of membrane and protein biophysics emphasizing theoretical concepts and the state of the art of technology and instrumentation often used for each particular subject.
Different topics were presented in lectures. The course was not intended to be merely descriptive or based on particular technique. The goal of this course was to provide the students, working in the field of biophysics, an updating knowledge and different technical approaches to help them to understand or how to apply this knowledge on different biological/biophysical problems.

In addition to the lectures developed in the course, participants were invited to attend the conferences associated to XLII Annual Meeting of the Argentinean Biophysical Society (SAB), where some of the professors of the course gave talks with more specific details of the topic discussed in the course (see below the list of participants to attend to the SAB Meeting).

The proposed VI POSLATAM prior to the XLII SAB Congress provided a relaxed atmosphere encouraging participants to exchange scientific views with different experts in the field of biophysics hand in hand. For the Latin-American students of biophysics, this was one of the best opportunities in the region to learn from recognized International researchers-professors.

Targeted audience
The course was designed to be taken by Ph.D. students of both life sciences and/or physical sciences, interested in the field of biophysics. It was designed to accommodate the different academic backgrounds of the students enrolled in the different programs. Applicants underwent a rigorous selection procedure.

To be considered by the Academic Committee: (Maximum number of participants: 50).
Lectures were open to all, but pre-registration was required. Some funds were provided for doctoral students with priority on those who have been particularly adhering students to the Latin American Program in Biophysics of Posgraduate (POSLATAM) from the Latin American Federation of Biophysical Society (see: http://www.lafebs.org).

In all 53 students participated of the course:

A) UNC, postgraduate Cordoba students: 9
B) Argentineans postgraduate students: 4
C) Argentineans Young researchers: 3
D) Argentineans POSLATAM postgraduate students: 13 (IUPAB fellows)
E) Colombian POSLATAM postgraduate students: 2 (IUPAB fellows)
F) Venezuelan POSLATAM postgraduate students: 1 (IUPAB fellow)
G) Brazilian POSLATAM postgraduate students: 9 (IUPAB fellows)

Grading

There was a written exam at the end of the course (take home modality, but worked on independently).

Professors in charge of the classes were:

a) Dr. Anibal Disalvo, UNSE, Santiago, Argentina
b) Dra. Natalia Wilke, UNC, Córdoba, Argentina
c) Dr. Luis Bagattolli, Southern University of Denmark, Denmark
d) Dr. Benoit Sorre, The Rockefeller University, NY, USA
e) Dr. Frederic Carriére, EIPL, CNRS, Marseille, France
f) Dra. Maria Elena Carrizo, UNC, Cordoba
g) Dr. Paulo Mascarello Bisch, UFRJ, Rio de Janeiro

Topic I) Membrane hydration and biological functions

Professor in charge: Dr. Aníbal Disalvo

Universidad Nacional de Santiago del Estero. Argentina

Estimated time: 7 hs . November 27th 2013

Thermodynamics of lipid self-assembly in water. Structural and physicochemical properties of water. Swelling processes: area, thickness and interlamellar space. Methods and criteria. Hydration Water. Excluded volume and hydration forces. Densities and distribution of water and hydration centers in membranes. Influence of the topology on hydration and water states.

The membrane-solution interphase. Criteria for a new model for membranes. Surface potentials. Determination of zeta potential. Limitations. Electrophoretic mobility. Isotherms of adsorption of charged amino acids and peptides. Synergism and cooperativity. Partition of amino acids and polyols: Corrections to the Wiener - White and Butler-Barclay rules in relation to the water content.

Water activity in membranes. Water activity and surface pressure. Defay-Prigogine model. Effect of hydrogen bonding compounds on water activity in membranes. Relationship between dipolar potential and hydration water. Aqueous domains. Hydration water and confined water. Water species and phase states. Effect of lipid composition. Lipidomics and aquaomics. Lyotropic phenomena. Expansion and contraction of lipid membranes. Water penetration and dielectric properties. Generation of defects by osmosis and electrical fields. Surface changes in hypertonic and hypotonic processes. Kinetics of dehydration and rehydration. Relaxation processes in the insertion of peptides.

Influence of the order parameter and fluctuations. Chemical potential of water and water activity by peptide insertion. Kinks and water species. Translocons and waterons.

Topic II) Membrane rheology and electrostatics.

Professor in charge: Dra. Natalia Wilke

Universidad Nacional de Córdoba. Argentina

Estimated time: 4 hs. November 28th 2013, 9-13 hs

Membranes with phase coexistence: Distribution of the phases at the plane of the membrane: domain size, domain shape, number of domains. Domain growth, Oswald ripening, equilibrium and non-equilibrium domain distributions and sizes. Line tension. Intra and inter-domains long-range interactions.

Membrane rheology and electrostatics: Shear in membranes: free diffusion, solid obstacles, interacting obstacles. Bending and compression of membranes.

Experimental approaches: Model membranes.
Active and passive methods in membrane rheology. Manipulation of membranes using electric fields and optical tweezers.

Topic III) Fluorescence Microscopy for Biophysical Studies in Biomembranes
Professor in charge: Dr. Luis Bagatolli
Membrane Biophysics and Biophotonics group/MEMPHYS - Center for Biomembrane Physics, Department of Biochemistry and Molecular Biology, University of Southern Denmark, Denmark.
Estimated time: 4 hs. November 28th 2013, 15- 17 hs

Modern Fluorescence microscopy instrumentation. Spectral properties of more popular probes. Epi-, confocal and two photon excitation fluorescence microscopy. Giant unilamellar vesicles (GUVs) as tool to study lateral lipid organization and membrane perturbation: lipid-lipid interaction, peptide, protein and lipolytic enzymes interacting with organized lipids.

Topic V) Interfacial Enzymology: the case study of lipolytic enzymes
Professor in charge: Dr. Frederic Carriére
Laboratory of Enzymology at Interfaces and Physiology of Lipolysis E.I.P.L C.N.R.S., MARSEILLE, France
Estimated time: 4 hs. November 29th 2013, 9-13 hs.

Fundamentals of interfacial enzymology. Modes of action of lipolytic enzymes (lipases and phospholipases) and kinetic models. Monomolecular films as model interfaces for

studying lipase-lipid interactions (adsorption/penetration) and interfacial activity (the "zero-order" trough and the barostat technique). Structure-function relationships deduced from X-ray crystallography. Probing conformational changes using site-directed spin-labeling coupled to EPR spectroscopy, kinectics. Surface spectroscopy for studying lipase adsorption at various interfaces (TIRF, ATR-FTIR).

Topic VI) BIOPHYSICS OF MEMBRANE CURVATURE

Professor in charge: Dr. Benoit Sorre
Center for Studies in Physics and Biology, The Rockefeller University, New York
Estimated time: 4 hs. November 29th 2013, 14-18 hs

Fundamentals of membrame curvature. The mean-field theoretical description of membrane mechanics (Helfrich Hamiltionian). Artificial systems to study membranes mechanical properties, (GUVs, micropipette aspiration, membrane fluctuations methods). Ways to pull membrane nanotubes (optical tweezers) to study biology inspired questions like lipid sorting and membrane deformation by proteins (amphiphysin, dynamin).

Topic VII) PROTEIN CRYSTALLOGRAPHY

Professor in charge: Dra. Maria Elena Carrizo
Universidad Nacional de Córdoba. Argentina
Estimated time: 4 hs. November 30th 2013, 9-13 hs

Protein crystallization. Principles and techniques. Diffraction data collection. Fundamentals of the theory of X-ray diffraction by a crystal. X-ray sources and detectors. Facilities at the Brazilian Synchrotron Light Laboratory. From diffraction data to electron density. Electron density as a function of intensities and phases. Phase determination and improvement. Electron density maps. From electron density maps to molecular models. Electron density map interpretation. Model building. Structure refinement. PDB files.

Topic VIII) PROTEIN FOLDING AND STRUCTURE MODELING

Professor in charge: Dr. Paulo Mascarello Bisch

Laboratório de Física Biológica, Unidade Multidisciplinar de Genômica, Instituto de Biofisica Carlos Chagas Filho, Universidade Federal do Rio de Janeiro, Brazil
Estimated time: 4 hs. November 30th 2013, 14-18 hs

1. Protein Folding – General Concepts; 2. Protein folding and misfolding, the funnel theory; 3. Molecular Dynamic Simulations of Protein folding; 4. Comparative Molecular Modeling.

MAIN CONFERENCES ASSOCIATED TO V POSLATAM COURSE (WITHIN THE XLII ARGENTINIAN BIOPHYSICAL SOCIETY MEETING) From 2nd-4th December 2013 attended by students from POSLATAM (Mandatory).

CONFERENCE 1: Dr. John Seddon: “Hydrostatic Pressure Effects on the Structure and Stability of Lipid Membranes and Lyotropic Mesophases”. Membrane Biophysics group, Department of Chemistry, Imperial College London, Imperial College, London. UK.

CONFERENCE 2. Frédéric Carrière, Tema: Interfacial enzymology: investigating the mode of action of lipases requires a combination of various biophysical approaches. Laboratory of Enzymology at Interfaces and Physiology of Lipolysis E.I.P.L, C.N.R.S. MARSEILLE Francia.

CONFERENCE 3: Dr. Benoit Sorre: "Dynamics of TGF-beta signaling: how positional information can be learned from a changing morphogen gradient". Center for Studies in Physics and Biology, The Rockefeller University, New York, NY

CONFERENCE 4 Aurélien Roux: "Physics of Endocytosis". Biochemistry Department. University of Geneva.

CONFERENCE 5: Tibor László Páli: "On the rotary mechanism of the vacuolar proton-ATPase". Institute of Biophysics, Biological Research Centre, P.O. Box 521, H-6701 Szeged, Hungary.

CONFERENCE 6: Manuel Prieto: “Ceramide and Glucosylceramide impact on

membrane biophysical properties: from model to cell membranes". Instituto Superior Técnico, Universidade Técnica de Lisboa, Lisboa, Portugal.

Ian C.P. Smith, O.C., Ph.D., D.Sc., F.R.S.(C)

Vice President Research, Innovative Biodiagnostics Inc.

Ian Smith was associated with IUPAB since the 1970s, and served as a member of Council, Vice-President and President. He was involved in planning and negotiation for the Biophysics Congresses in Vancouver (1990) and Beijing (2011).

Ian began his National Research Council career in Ottawa as a Research Officer specializing in magnetic resonance from 1967-92, and in Winnipeg from 1992-2013. In 1987, he became Director General of the NRC Institute for Biological Sciences, Ottawa.

In 1992, he founded the Institute for Biodiagnostics in Winnipeg as its first Director General. The Institute focuses on the development and commercialization of medical devices for the non-invasive diagnosis of disease. Ian is dedicated to early detection and treatment of disease and using this knowledge to advance the state of medicine and the economy. He is a passionate mover for the commercialization of the products of research, and has started ten companies with a present value of 300 M$.

During his terms as adjunct professor at Carlton University (Ottawa), Queens University (Kingston) and the Universities of Ottawa, Manitoba ad Winnipeg, Ian taught biophysics and molecular spectroscopy.

He was appointed Officer of the Order of Canada in 2008 for his leadership in the advancement, development and commercialization of Canada's diagnostic

technologies, notably magnetic resonance imaging, in the field of health care. In addition, Ian received the 2008 Outstanding Achievement Award of the Public Service of Canada, presented to individuals who have displayed long-term excellence throughout their career in Canada's public service. He was awarded the Queen's Gold (2002) and Diamond (2012) Jubilee Medals for his contributions. He holds a number of honorary degrees, including Phil.Dr. from Stockholm University.

In 2013 Ian retired from NRC to help build a spin-off company, *Innovative Biodiagnostics*, specializing in tests for colon cancer and breast cancer. His principal research interest is the application of biophysics in clinical medicine.

Although Ian no longer holds office in IUPAB, he retains an interest in its activities, and I have no doubt that all of those who worked with him over many years wish him well in his newest project.

Louise Matheson
Editor

Women in Science

Profile: Professor Anna Moroni
University of Milano, Italy

Anna Moroni was born in Varese, Italy in 1960. She is currently Professor of Plant Physiology in the Department of Biosciences at the University of Milano, an appointment which she has held since 2011.

Anna graduated Magna cum Laude with a Master's in Agronomy in 1986, and then received her PhD in Molecular and Cellular Biology in 1992, both from the Università degli Studi in Milan.

Between 1988 and 1993 Anna has worked in various research roles in Canada (University of Toronto) and the USA (Columbia University, NY) on membrane transplant in plant cells and photobiology.

In 1993 Anna was appointed a post-Doc Fellow at the University of Milan where she worked on Plant transport physiology, and from 1996-99 her research subject was Cardiac electrophysiology in the laboratory of Dario DiFrancesco.

Since 1999 Anna's work in Milan has focused on the structure-function of K+ channels, specifically the biochemical and biophysical analysis of potassium channel proteins.

Her experimental techniques have included cell electrophysiology (patch clamp and voltage clamp); standard molecular biology and biochemistry; structural biology, crystallography and NMR.

Another project concerns HCN channels, a class of channels regulated by voltage and cyclic nucleotides. The focus is mainly on understanding the allosteric pathway of cAMP regulation. This includes the study of the interaction with a regulatory protein TRIP8b which binds the CNBD of HCNs and competes allosterically with cAMP. Recently this has led to obtaining the structures of the bound forms of the CBND, the cyclic nucleotide binding domain, and to the discovery of a regulatory binding site that antagonizes the effect of cAMP in the pacemaker isoform HCN4.

Anna has been invited to present at eighteen conferences since 2010, including for example the Gordon Conference on Ion channels in 2012 and the Biophysical Society meeting in 2013.

She has also been responsible for the organization of three international symposia from 2002-08, she is a member of the Editorial Board of the Journal of Biological Chemistry. Also, she has been an active member of several scientific societies and a referee for prestigious journals including the Biophysical Journal, and a reviewer for various grant agencies including the European Research Council.

From 2006-2010 Anna was an external examiner for universities in Italy and Canada. She has enjoyed international collaborations in Germany and the USA.

The study of biophysics of ion channel proteins allowed Anna to move freely from plants to animals, and even to viruses. She began with K+ transport in plants, continued working on the pacemaker current of the human heart (the HCN channels) and has long worked on a class of K+ channels found in viruses (Kcv channels).

Whilst she was a PhD student Anna met Professor Jack Dainty, an English biophysicist and a prominent figure in plant water transport. He became an important mentor to her, and she recognizes that his example, his friendship and appreciation were invaluable to her in her career.

At a scientific meeting Anna met her husband, Gerhard Thiel, a German biophysicist and they are a true “European Union” couple. Gerhard runs a lab on ion channel biophysics in Darmstadt, Germany and they have collaborated scientifically for more than fifteen years.

Whilst Gerhard does the hard work of commuting between Germany and Milan on a weekly basis, Anna has had the day-to-day care of their son Giulio, who is now 21 and a student of Philosophy of Science at the University of Milan.

Among her friends Anna counts her scientific collaborators, particularly Jim Van Etten (a virologist at U. of Nebraska USA who discovered the viral K+ channels) and Dan Minor who is a structural biologist at UCSF. She considers her job a privilege, especially for the extraordinary people she meets.

Milan is ideally situated between the Alps and the Mediterranean, about two hours' drive from each, so Anna is able to balance her life and to indulge her loves of both ski mountaineering and open water swimming.

I believe Anna is a great example to young women scientists in the achievement of success in both her professional and personal lives.

Louise Matheson
Editor

Australian Science Prize Winner wants to see more women staying in science

In October 2013 Professor Terry Speed, a Melbourne mathematician and statistician, was awarded the Prime Minister's Science Prize for his work using maths to help treat illnesses like cancer.

Prof. Speed has announced that he wants to use his half of the prize to get more women into science, and to retain them.

Terry Speed: "….it's not as though it's a unique Australian aberration, it's true worldwide that Australia is, if you like, just there with everybody else and far from fully utilising, fully encouraging women to stay on in the scientific workforce.

There's lots of barriers. Some artificial, some are attitudes - so trying to get more inclusive, trying to remove barriers, trying to make it easier, for example, with childcare onsite. That's one of our goals at the Walter and Eliza Hall Institute, to get childcare facilities onsite so that women can drop off their kids but be near them. Lots of things like that."

Prof. Speed credits his wife with being one of the reasons this cause is so important to him. She was very active in the early days of the women's movement in Australia. Strong, assertive women have been among his acquaintance for a long time, and he feels that when you get used to women who are trying to overcome such barriers, you tend to join the cause.

Maths and statistics have been applied by Prof. Speed in a novel way to biological and medical research – not just doctors but, for example, plants and animals. The application has been in analysing molecular data associated with different organisms, which is becoming increasingly important.

One potential outcome of work like his is that in due course the genomes of cells from patients with diseases such as cancer will be sequenced, and the data will be analysed to improve the treatment of the disease. This could well apply also to such diseases as diabetes.

When asked his plans to use his $300,000 prize, Terry Speed said that his wife will get half. His first choice for his half would be to put it towards something to address the gender equity issue, or otherwise generally supporting younger researchers.

The above is taken from an ABC Radio interview with Prof. Terry Speed from the Walter and Eliza Hall Institute by Lucy Carter, broadcast on October 31, 2013.

Louise Matheson

Editor