

IUPAP Commission on Biological Physics (C6)

Report on Activities from January 2015 to September 2017

Aihua Xie, C6 Chair

1. C6 Membership (2014-2017)

Name	Country	Roles	Terms
Aihua Xie	USA	Chair	(2014) (2011)
Helmut Grubmuller	Germany	Vice Chair	(2014) (2011)(2008)
Rita Maria Cunha de Almeida	Brazil	Secretary	(2014) (2011)
Melanie Campbell	Canada	Member	(2014)
Imre Derenyi	Hungary	Member	(2014) (2011)
Ramin Golestanian	UK	Member	(2014) (2011)
Ming Li	China	Member	(2014)
Silvia Morante	Italy	Member	(2014) (2011)
Madan Rao	India	Member	(2014)
Paolo de los Rios	Switzerland	Member	(2014) (2011)
Galina Riznichenko	Russia	Member	(2014) (2011)
Masaki Sasai	Japan	Member	(2014)
Bryan Trevor Sewell	South Africa	Member	(2014)
Francoise Brochard Wyart	France	Member	(2014)
Fridtjof Nusslin	Germany	Associate Member AC4 Medical Physics	(2013-2017)

2. The IUPAP C6 Newsletter

The main purpose of the Newsletters is to promote and facilitate communications among biological physics communities worldwide and to foster international cooperation in biological physics. The first IUPAP C6 e-Newsletter was launched in March 2017. The founding editors are Masaki Sasai (Japan) and Aihua Xie (US). A copy of the first Newsletter is attached. A special article was on “The Birth of IUPAP Commission on Biological Physics” written by the C6 Founding Chair Dr. Hans Frauenfelder who turned 95 in June 2017.

3. IUPAP Young Scientist Prize Winners

The selection process for IUPAP Young Scientist Prize (YSP) was led by the C6 Vice Chair Helmut Grubmuller and his Associate Petra Kellers. The three winners are:

The 2015 winner: Dr. Jiajie Diao, University of Cincinnati, USA

“For his significant contributions to the area of single-molecule biophysics. He pioneered the development of single vesicle fusion assays based on FRET, which enables addressing many fundamental questions about biological systems involving membranes.”

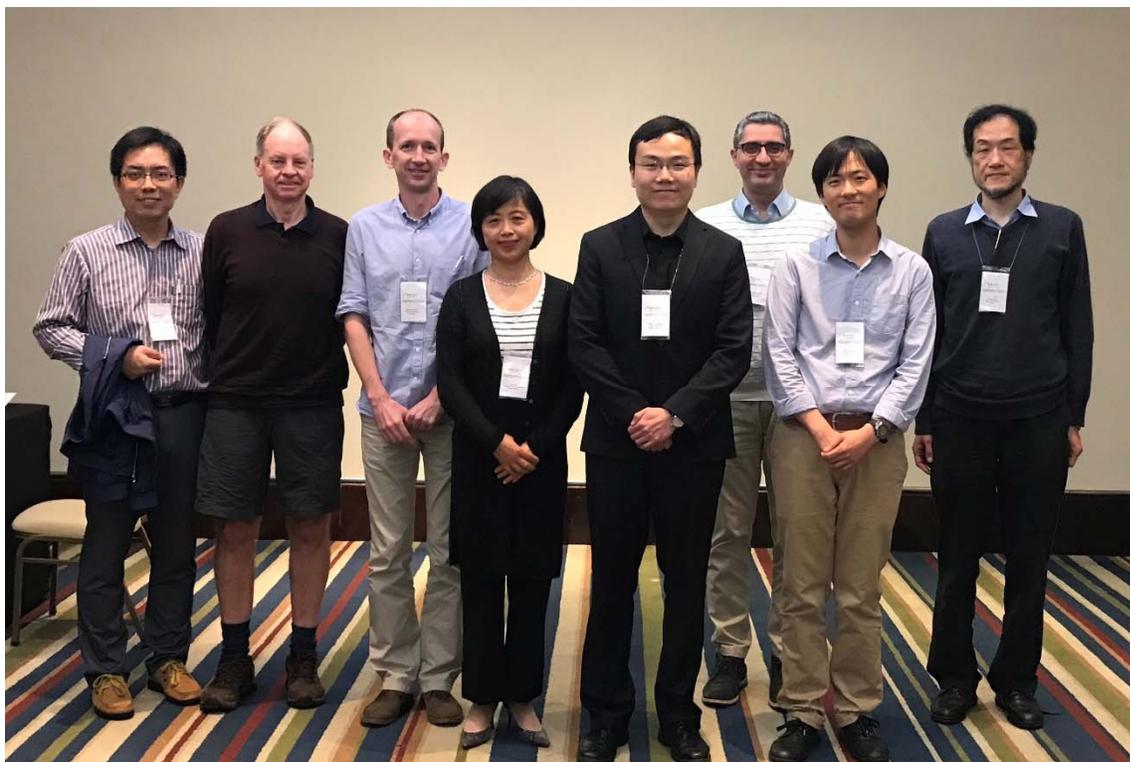
The 2016 Winner: Dr. Siyuan Steven Wang, Harvard University, USA

“For his significant contributions to the development of novel methods for imaging the spatial organization of chromatin and to advancing the understanding of chromosome organization using these methods and for his significant contributions to bacterial cytoskeleton and cell wall research.”

The 2017 Winner: Prof. Dr. Hyun Youk, Delft University of Technology, the Netherlands

“For his elegant demonstration of how statistical physics, dynamical systems theory and experiments can be combined to address fundamental questions in cell biology, and his recent work that shows how cell-cell communication can shape the spatio-temporal dynamics of living cells.”

A YSP Award Ceremony was held on June 8, 2017 at the 9th International Conference on Biological Physics (ICBP2017) in Rio de Janeiro. Below is a group photo of two YSP winners with six C6 members: Ming Li (China), Trevor Sewell (South Africa), Imre Derenyi (Hungary), Aihua Xie (USA), Siyuan S Wang (2016 YSP winner), Ramin Glostania (UK), Hyun Youk (2017 YSP winner, NL), and Masaki Sasai (Japan).



4. ICBP2017 in Rio de Janeiro, Brazil and its satellite conferences

The 9th IUPAP International Conference on Biological Physics (ICBP2017) was held in Rio de Janeiro, Brazil, June 5 to 9, 2017, <http://www.if.ufrgs.br/icbp2017/>. The leading organizer was Dr. Rita R.C. de Almeida, the C6 Secretary.

Five training workshops were offered in the first two days (June 5-6): Protein Physics, Physical Aspects of Active Matter, Frontiers in Neurobiology and Systems Biology at Brazilian Center for Research in Physics (CBPF) in Rio de Janeiro.

The main program (June 7-9) included 7 plenary lectures, 12 research symposia, one poster session, and one special session honoring the winners of the IUPAP C6 Young Scientist Prize.

Four satellite Conferences were organized, including Systems Biology (May 31-June 3) in Natal (Rodrigo Dalmolin), Physical Approaches to Biological Active Matter (June 1-3) in Porto de Galinhas (Raul Montagne, Leonardo G. Brunnet, Hugues Chaté), Intrinsically Disordered Proteins in Health & Diseases (June 6) in Rio de Janeiro (Jerson Silve, Aihua Xie) at Universidade Federal do Rio de Janeiro, and Cell Migration (June 12-14) in Porto Alegre (Gilberto L. Thomas).

5. ICBP2019 in Madrid, Spain

ICBP is the major event of the Commission on Biological Physics, often attracting 500 participants and covering a broad range of subfields in Biological Physics. Traditionally ICBP conferences were held in the last year of each 3 year term which made the Commission relatively inactive in year 1 when the new commission members are eager to contribute. Plus, ICBP offers a great opportunity for C6 members to meet each other in person. So the C6 chair proposed to move ICBP to the second year of the 3 year term. This proposal was well received by the C6 members. So the next ICBP will be in 2 years, namely ICBP2019.

The ICBP2019 will be jointly organized with the European Biophysical Societies' Association (EBSA) in July 2019 in Madrid, Spain. The C6 Vice Chair Helmut Grubmuller was the past president of EBSA and had facilitated the cooperation between IUPAP C6 and EBSA.

Selection of the organizer for ICBP2019 is an important step toward the success of ICBP2019. Professor Juan Manuel Rodríguez Parrondo from Universidad Complutense in Madrid has been selected to organize ICBP2019. This was accomplished through collaborative efforts of VC Helmut Grubmuller, C6 Chair Aihua Xie, C6 member Ramin Golestanian (recommended as the next C6 Chair), and EBSA Vice President Prof. Jesus Perez-Gil.

6. Women in C6

Currently there are six women in C6, including 4 members, secretary and chair. Four of them are expected to finish their last terms in 2017. For the next C6 Commission, only three eligible women nominees were received. In order to ensure the adequate representation from women in biological physics, the C6 commission has nominated three additional outstanding women candidates. We are in the process of finalizing our recommendations.

IUPAP

Commission on Biological Physics Newsletter

Editors: Masaki Sasai, Aihua Xie
Guest Editor: Bramwell G. Lambrus

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International Union of Pure and Applied Physics (IUPAP) Commission on Biological Physics

IUPAP C6 Young Scientist Prize Call for Nominations

by Helmut Grubmüller and Petra Kellers

Each IUPAP Commission has the opportunity to award a Young Scientist Prize (YSP) to excellent young researchers in their respective fields. The C6 commission “Biological Physics” will award three prizes over three years (2015-2017), which will collectively be presented during the 9th IUPAP International Conference of Biological Physics (ICBP2017).

The conference will take place June 5-9, 2017 in Rio de Janeiro and the prize winners are invited to give an oral presentation. Further, the scientific achievements of the winners will be honored during a prize ceremony in which they receive the 1000 EUR award money, a medal, and a certificate.

The current call for IUPAP C6 YSP candidates is open until **March 15, 2017** (deadline extended) and we invite you to email your nomination package to the chair of the award committee Helmut Grubmüller (hgrubmu@gwdg.de) and his colleagues Aihua Xie (aihua.xie@okstate.edu), Chair of C6 and Rita Maria Cunha de Almeida (rita@if.ufrgs.br), Secretary of C6.

Please follow the link to the IUPAP C6 Website for further details on the call:
<http://iupap.org/commissions/c6-biological-physics/c6-news/>

ICBP2017 in beautiful Rio de Janeiro Brazil

Early registration due: April 15, 2017
Abstract submission deadline: April 15, 2017
Registration deadline: May 25, 2017



<https://stock.adobe.com>

ICBP2017, Rio de Janeiro, Brazil

by Rita Almeida and Aihua Xie

The 9th IUPAP International Conference on Biological Physics (ICBP2017) will be held in Rio de Janeiro, Brazil, June 5 to 9, 2017, <http://www.if.ufrgs.br/icbp2017/>.

The first two days (June 5-6) will encompass training workshops, and the remaining three days (June 7-9) will include 7 plenary lectures, 12 research symposia, one poster session, and one special session honoring the winner/winners of the IUPAP C6 Young Scientist Prize.

The topics of workshops are: Physics of Proteins, Physical Aspects of Active Matter, Multiscale Models of Organs and Tissues, and Systems Biology.

All workshops will be held at Centro Brasileiro de Pesquisas Físicas - CBPF (<http://portal.cbpf.br/>).

The main conference will be held in Centro de Convenções Sul América.

Early registration due: April 15, 2017
Abstract submission deadline: April 15, 2017
Registration deadline: May 25, 2017

Three satellite conferences have been organized (see box at right).

Symposium Topics

- Structural dynamics on protein function and malfunction
- Intrinsically disordered proteins in biological signaling
- Single molecule biophysics
- The physics of cancer
- Neural biology and networks
- Active matter
- Cell migration
- Multiscale models for organs and tissues
- The physics of living cells
- Genome structure and non-coding RNA
- Systems biology and networks

Satellite Conferences

Systems Biology

May 31 - 3 June 3, 2017. Natal, RN

Chairperson: Rodrigo Dalmolin dalmolin_r@yahoo.com.br

Physical Approaches to Biological Active Matter

June 1-3, 2017. Porto de Galinhas, PE

Chairpersons: Raul Montagne montagne57@gmail.com

Leonardo G. Brunnet leon@if.ufrgs.br

Hugues Chaté hugues.chate@cea.fr

Cell migration

June 12-14, 2017. Porto Alegre, RS

Chairperson: Gilberto L. Thomas glt@if.ufrgs.br

The Birth of IUPAP C6 Commission on Biological Physics

by Hans Frauenfelder, the founding chair of the IUPAP Commission on Biological Physics

The origin of the Commission C6 of the International Union of Pure and Applied Physics (IUPAP) goes back to 1987. IUPAP held its 19th General Assembly in Washington DC (USA), jointly with the Governing Board of the American Institute of Physics (AIP). I attended because I was Chairman of the AIP Governing Board. Also attending the meeting was Kai Siegbahn. He had been IUPAP President from 1981 to 1984. He had received the Physics Nobel Prize in 1981. We had known each other since about 1950, because we worked both in nuclear spectroscopy. I had also written some reviews for his excellent book on nuclear spectroscopy. In Washington Kai told me that he wanted to create a new commission for Biophysics. I told him that it was a great idea, but that it would be better if it were called “Biological Physics”, because there was already an International Union of Biophysics. Kai agreed and thus the name was adopted by IUPAP. The commission C6 was formally created at the 20th General IUPAP Assembly, held in Dresden in 1990. I had been asked to suggest members and the initial C6 list was as follows: Chairman: Frauenfelder, H., USA. Vice-Chairman: Goldanskii, V. I., USSR. Secretary: Go, N., Japan. Members: Careri, G., Italy. Ehrenberg, A., Sweden. Joliot, P., France. Keszthelyi, L., Hungary. Sackmann, E., FRG. I remained chairman till 1993 and a member for another three years.



Prof. Hans Frauenfelder, the founding chair of the IUPAP Commission on Biological Physics

As I remember, there was little discussion what “Biological Physics” should cover. My opinion was based on the idea that complex systems, such as biosystems, could yield new concepts for physics. This idea was most clearly characterized later by Stan Ulam, the great mathematician. When I explained my own work and goal to him, he said: “Aha. Ask not what physics can do for biology, ask what biology can do for physics.” I believe that this goal should still be a guiding principle for C6. Experimental and theoretical work in biological physics should be driven with this goal in mind. C6 can probably help by stimulating meetings and workshops where the topic is dominated by physics, not biology.

Current and Past Chairs of IUPAP Commission C6 on Biological Physics

Aihua Xie (USA, 2014-2017)

Kenichi Yoshikawa (Japan, 2011-2014)

José N Onuchic (USA, 2008-2011)

Gerd Ulrich Nienhaus (Germany, 2005-2008)

Pál Ormos (Hungary, 2002-2005)

Fritz G Parak (Germany, 1999-2002)

Nobuhiro Go (Japan, 1996-1999)

Vitalii I Goldanskii (Russia, 1993-1996)

Hans Frauenfelder (USA, 1990-1993)

New Honorees in Biological Physics from American Physical Society

by Ilya Nemenman, Chair of APS Division of Biological Physics

2016 Max Delbruck Prize in Biological Physics.

The winner of 2016 Max Delbruck Prize in Biological Physics is **Alan Perelson**, Los Alamos National Laboratory. The Prize was awarded "For profound contributions to theoretical immunology, which bring insight and save lives."

New Fellows of American Physical Society.

Ten new fellows were recently elected from Division of Biological Physics:

Aaron Dinner, University of Chicago. Citation: For the development of nonequilibrium statistical mechanics theories that reveal general quantitative principles governing the behavior of living systems, and applications to understanding molecular, cell, and organismal scale experiments.

Robert Endres, Imperial College London. Citation: For outstanding contributions to the understanding of the physical principles underlying sensing and signaling in biological cells.

Kalina Hristova, Johns Hopkins University. Citation: For the development of quantitative methods to probe membrane protein interactions and to reveal the mechanism of activation of membrane receptors.

Ilya Nemenman, Emory University. Citation: For his contributions to theoretical biological physics, especially information processing in a variety of living systems, and for the development of coarse-grained modeling methods of such systems.

Keir Neuman, National Institutes of Health. Citation: For his contributions to the development of single molecule manipulation techniques and the elucidation of the nucleic acid enzyme function enabled by these techniques.

Sean Sun, Johns Hopkins University. Citation: For his contributions in understanding the mechanisms of biological force generation at the molecular and cellular levels, and the development of mathematical models of cell shape, cell volume, and cell motility.

Jay X Tang, Brown University. Citation: For applying polyelectrolyte theories to lateral association and aggregation of protein filaments and filamentous viruses, and for his research in bacterial motility, adhesion, and statistical properties of flagella motor switches.

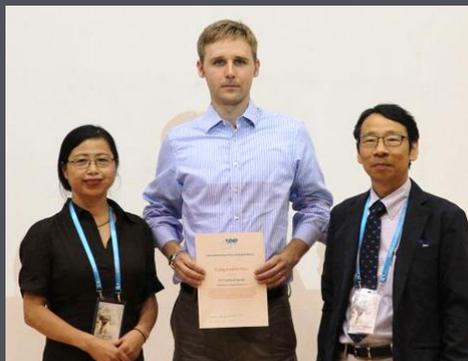
Massimo Vergassola, University of California, San Diego. Citation: For seminal contributions to lattice simulations of fluids and turbulent mixing, and for the application of statistical mechanics to biological problems including the "infotaxis" search strategy in turbulent environments, gene regulation, T-cell activation, and signal transduction.

Mingming Wu, Cornell University. Citation: For her research into the biophysical and biochemical drivers that guide bacterial and animal cell migration, and the creation of single cell analysis tools

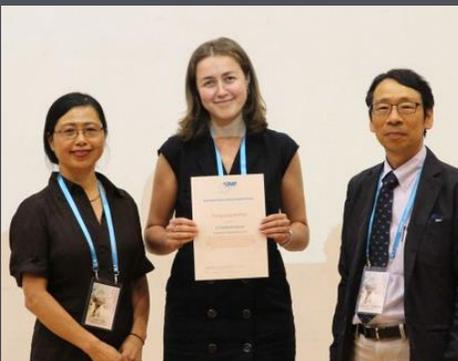
Edward Yu, Iowa State University. Citation: For his distinguished contributions to the field of efflux transporters, which mediate resistance to a variety of antimicrobials in bacteria, and his research into the crystallography of integral membrane proteins.

IUPAP Young Scientist Prize Winners 2012-2014

Recipients of the IUPAP Young Scientist Prize in Biological Physics 2012-2014, Dr. Tuomas Knowles (University of Cambridge, UK), Dr. Marina Kuimova (Imperial College London, UK), and Dr. Yi Cao (Nanjing University, China), are in photos with Aihua Xie (Vice-Chair, IUPAP Commission C6, left) and Kenichi Yoshikawa (Chair, IUPAP Commission C6, right) at the 8th International Conference on Biological Physics (ICBP2014) in Beijing, China, 18-22 June 2014.



2012 recipient - Dr Tuomas Knowles



2013 recipient - Dr Marina Kuimova



2014 recipient - Dr Yi Cao

International and Multinational Conferences in Biological Physics

The 9th IUPAP International Conference on Biological Physics (ICBP2017)

Rio de Janeiro, Brazil, June 5-9, 2017.

<http://www.if.ufrgs.br/icbp2017/>

ICBP2017 Satellite Workshop on Systems Biology

Natal, Brazil, May 31-June 3 2017.

<http://bioinfo.imd.ufrn.br/systemsbiology2017/>

ICBP2017 Satellite Workshop on Physical Approaches to Biological Active Matter

Porto de Galinhas, Brazil, 1-3 June 2017.

<http://www.if.ufrgs.br/activematter/>

ICBP2017 Satellite Workshop on Cell Migration

Porto Alegre, Brazil, June 12-14 2017.

<http://www.if.ufrgs.br/cellmig2017/>

19th IUPAB and 11th European Biophysical Societies' Association (EBSA) Congress

Edinburgh, Scotland. July 16-20, 2017.

<http://ebsa.org/portal/node/332>

The 55th Annual Meeting of the Biophysical Society Japan (all talks in English)

Kumamoto, Japan. September 19-21, 2017.

<http://www.aeplan.co.jp/bsj2017/en/index.html>

The 62nd Annual Meeting of Biophysical Society (USA)

San Francisco, USA. February 17-21, 2018.

<http://www.biophysics.org/2018meeting/BiophysicalSociety62ndAnnualMeeting/tabid/7302/Default.aspx>

The 2018 American Physical Society March Meeting (with a broad range of programs in biological physics)

Los Angeles, USA, March 5-9, 2018.

The IUPAP Commission C6 on Biological Physics

Chair: Aihua Xie (USA)

Vice Chair: Helmut Grubmuller (Germany)

Secretary: Rita M.C. de Almeida (Brazil)

Members:

Melanie Campbell (Canada)

Imre Derényi (Hungary)

Ramin Golestanian (UK)

Ming Li (China)

Silvia Morante (Italy)

Madan Rao (India)

Paolo de los Rios (Switzerland)

Galina Riznichenko (Russia)

Masaki Sasai (Japan)

Bryan Trevor Sewell (South Africa)

Francoise Brochard Wyart (France)