Special Issue of *Biophysical Reviews* dedicated to the 19th IUPAB Conference in Edinburgh, Scotland (July 2017).

Damien Hall^{1,2} • Cristobal G. dos Remedios³

Received: 29 July 2017 / Accepted: 1 August 2017 / Published online: 12 August 2017
© International Union for Pure and Applied Biophysics (IUPAB) and Springer-Verlag GmbH Germany 2017

Abstract From the 16th to the 20th of July 2017, the 19th IUPAB (International Union of Pure and Applied Biophysics) world congress was held in Edinburgh, Scotland. Organized in conjunction with the 11th EBSA (European Biophysical Societies' Association) the meeting attracted over 1430 participants, had 35 scientific sessions and 10 plenary speakers. Each invited speaker was invited to contribute either a short review or a letter article that summarized the contents of their session. This special issue of *Biophysical Reviews* is dedicated to providing contextual background to some of the many talks presented at the meeting in Edinburgh. The reader is referred to supplementary issue 1 of volume 46 of the *European Biophysics Journal* for a complete listing of abstracts for all presented talks and posters.

Biophysical reviews and IUPAB

Although existing as an organized body under the auspices of the International Organization of Pure and Applied Biophysics (IOPAB) since 1961, the International Union of Pure and Applied Biophysics (IUPAB) came into being as an admitted member of the International Council of Scientific Unions (ICSU) in 1966 (Solomon 1968). The current President and Secretary General¹ of IUPAB are Professor Zihe Rao (Tsinghua University) and Professor Cris dos Remedios (University of Sydney), respectively. The principal functions of IUPAB are to support research and teaching in biophysics. It carries out these aims by funding special initiatives centred on lecturing and outreach education along with facilitating the publication of scholarly works within the discipline of biophysics. Another important IUPAB activity is the organization of a world congress every three years that helps to showcase and disseminate biophysical research activities to a global scientific audience. At the time of its formal admission to the ICSU, the IUPAB Governing Council established a single journal, *Quarterly Reviews in Biophysics* (Tigyi 1997), tasked with the publication of substantial review articles across the entire spectrum of biophysical research. In 2008, the need for a new short reviews journal format was realized and the *Biophysical Reviews* journal was born (Garnier 2009). Formed as a commercial partnership with the Springer-Nature group, the

This article is part of a Special Issue on 'IUPAB Edinburgh Congress' edited by Damien Hall and Cristobal dos Remedios.

✉ Damien Hall
damien.hall@anu.edu.au; damien.hall@protein.osaka-u.ac.jp

✉ Cristobal G. dos Remedios
cris.dosremedios@sydney.edu.au

- ¹ Institute for Protein Research, Osaka University, 3-1- Yamada-oka, Osaka, Suita 565-0871, Japan
- ² Research School of Chemistry, Australian National University, Acton, ACT 2601, Australia
- ³ Bosch Institute, Department of Anatomy, University of Sydney, Room S468 Anderson Stuart Building (F13), Sydney 2006, Australia

¹ Co-author of the current editorial. During the publishing of this Editorial the results of the IUPAB election were released. Our congratulations to all newly elected members of the IUPAB Council and the Executive. The new IUPAB President is Prof. Marcelo Morales, the new Secretary General is Dr. Juan C. Gómez-Fernández and the new IUPAB Treasurer is Dr. John Baenziger.

Table 1 Thematic sessions at the 19th IUPAB World Congress, Edinburgh, Scotland, July 16–20, 2017

Session title	Session chair(s)
S01 Multiscale biophysics of membranes	Claudio M. Soares John Seddon
S02 Molecular machinery	Robert Cross Claudia Veigel
S03 Quantitative approaches to gene regulation	Pietro Cicuta Mike Tyers
S04 Synthetic biology	Justin Gallivan Petra Oyston
S05 Protein-nucleic acid interactions	Brian Smith Maria Spies
S06 Protein structure to function	Jacqueline Cherfils Malcolm Walkinshaw
S07 Nanobiophysics	Hagan Bayley Jesús Pérez-Gill
S08 Forces in and between cells: filaments, membranes and walls	Jamie Hobbs Michael Sheetz
S09 Systems biology	Robert Endres Franziska Matthäus
S10 Quantum biology	Jim Al-Khalili Greg Engel
S11 Computational biophysics	Helmut Grubmüller Jeremy Craven
S12 Protein misfolding	Tuomas Knowles Ronald Melki
S13 Mechanosensing and mechanoregulation	Kristian Franze Henk Granzier
S14 Correlative, multiscale and functional imaging	Alberto Diaspro Paul Verkade
S15 Evolution, ecology, collective and emergent behaviour	Rosalind Allen Stanislas Leibler
S16 Molecular and cellular processes of energy transduction	Edmund Kunji Leonid Sazanov
S17 Membrane permeation: channels	Mauro Dalla Serra Mark Wallace
S18 Modelling, inference and big data	Guy Grant Joshua Ho
S19 Experimental and computational approaches to protein design	Beth Bromley Yechiel Shai
S20 Active matter	Andreas Bausch Julia Yeomans
S21 Membrane permeation: transporters	Peter Henderson Robert Tampé
S22 Imaging the cell	José Carrascosa Mark Leake
S23 Biomimetic structures and systems	Adam Perriman William M Shih
S24 Drug discovery and delivery	Rob Cooke Natalie Strynadka
S25 Motility and migration	Alexander D Bershadsky Rhoda Hawkins

Table 1 (continued)

Session title	Session chair(s)
Special Session: 3Rs and Biophysics	Cris dos Remedios Michelle Peckham
S26 Applications in biomedical and materials science	Tony Cass Viola Vogel
S27 Protein folding and assembly	Jane Clarke André Matagne
S28 Morphogenesis and development	Siobhan Braybrook Pierre-Francois Lenne
S29 Optogenetics and neural systems	Ernst Bamberg Frank Gunn-Moore
S30 Ionic liquids meet biomolecules	Antonio Benedetto Hans-Joachim Galla
S31 Imaging molecules of life	Richard Henderson Chikashi Toyoshima
S32 Receptors and signalling	Simon Davis Laszlo Mátyus
S33 Membrane-active peptides	John Sanderson Frances Separovic
S34 Why disorder matters	Martin Blackledge Cait MacPhee
S35 Physics of cancer	Robert H Austin Tim Newman

aims of *Biophysical Reviews* were clearly described by the former President of IUPAB and first Chief Editor of *Biophysical Reviews*, Prof. Jean Garnier (INRA - Institut national de la recherche agronomique) in his opening Editorial,

‘*Biophysical Reviews* is dedicated to publishing short and critical reviews written by key figures in the field. The aim of the Editorial board is that the subjects covered in these reviews will—over the long term—be representative of the entire field of biophysics, generally defined as the science of describing and understanding biological phenomenon using the concepts and techniques of physics. In other words, biophysics is to physics as biochemistry is to chemistry.’ (Jean Garnier 2009)

With a new Chief Editor (Cris dos Remedios) taking over in 2014, *Biophysical Reviews* has continued to go from strength to strength (dos Remedios 2017). As of 2017, *Biophysical Reviews* is fully indexed in PubMed and will most likely receive the much coveted impact factor from Thomsons-Reuters in 2018. *Biophysical Reviews* is currently publishing 6 issues a year with the current special issue dedicated to the IUPAB congress being issue 4.

Table 2 Plenary lectures of the 19th IUPAB World Congress, Edinburgh, Scotland, July 16–20, 2017

Seminar Title	Plenary Speaker
Public Lecture Alzheimer's Disease: Addressing a twenty-first century plague.	Christopher M. Dobson
IUPAB Ramachandran Lecture The termination of translation in bacteria and eukaryotes	Venkatraman Ramakrishnan
Plenary Lecture Towards a mechanistic understanding of ribosomal function	Helmut Grubmüller
Bei Lecture Single cell genomics: stochasticity meets precision in biology and medicine	Xiaoliang Sunney Xie
EBSA Young Investigator Award Towards mass spectrometry of single molecules with light	Philipp Kukura
Plenary Lecture The challenges and opportunities of understanding protein folding and misfolding in health and disease.	Sheena Radford
Plenary Lecture Resource allocation theory of bacterial physiology	Terry Hwa
Plenary Lecture A novel cross-talk mechanism between membrane lipids and the innate system is mediated by toll-like receptors.	Jean-marie Ruysschaert
IUPAB Engström Lecture Biophysics with minimal biological systems	Petra Schwill
IUPAB Katchalski Lecture Seven transmembrane receptors	Robert J Lefkowitz

Features of the conference

In our respective roles² we were both lucky enough to participate in the 19th IUPAB Edinburgh Congress. Co-chaired by Professor Anthony Watts (University of Oxford) and Professor Andrew Turberfield (University of Oxford), the conference was very efficiently managed. Meeting Co-chairs received excellent support from the IUPAB Council and Executive, EBSA, the British Biophysical Society, a specially composed local organizing committee and the Institute of Physics Biological Physics Group. Each full day of the conference featured two plenary speakers and ten separate scientific sessions held in parallel (with five running in the morning and five held in the afternoon). Also featuring nearly 1100 presented posters, the meeting was literally packed full of science and somewhat impossible to take it all in (one consideration, with respect to future meetings, may be the prospect of making each presentation accessible online). Tables 1 and 2 describe the disparate range of topics covered in the plenary and individually themed sessions.

² Cris dos Remedios is both the current Chief Editor of the *Biophysical Reviews* and the immediate past Secretary General of IUPAB. Damien Hall is the Deputy Editor of the *Biophysical Reviews* Journal.

Selection of articles for this special issue

The process for selection of each article in this special issue was as follows. One of us (CdR) wrote to each long format selected speaker with the invitation to publish a short review article in *Biophysical Reviews* on the background of their IUPAB Congress presentation topic. The other of us (DH) wrote to each session chair (Table 2) with a request to submit a short letter describing the themes and aims of their individual session along with a short description of their reasons for selecting the scientists chosen to give oral contributions. From the 35 separate scientific sessions, we received over 20 contributions to this Special Issue. We would like to thank all authors for their kind efforts in meeting the issue deadline.

Concluding remarks

In closing, we would like to highlight the point that exposure to different scientific viewpoints, through first-hand person-to-person discussion of the most up-to-date scientific discoveries, is essential to the development of well-rounded scientists. The ability to make new friendships and organically initiate collaborative ventures is also vital to a healthy global scientific enterprise. The 19th IUPAB Congress certainly provided a host of opportunities to fulfil these roles.³ At *Biophysical Reviews*, we look forward to such future IUPAB events with the 20th and 21st IUPAB Congresses to be respectively held in Rio de Janeiro, Brazil, in 2020 and Kyoto, Japan, in 2023.

Compliance with ethical standards

Conflicts of interest Damien Hall declares that he has no conflicts of interest. Cristobal G. dos Remedios declares that he has no conflicts of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

References

- dos Remedios C (2017) A review and summary of the contents of biophysical reviews volume 8, 2016. *Biophys Rev* 9:1–4
- Garnier J (2009) Editorial. *Biophys Rev* 1:1–2
- Solomon AK (1968) A short history of the foundation of the international union for pure and applied biophysics. *Q Rev Biophys* 1:107–124
- Tigyi J (1997) Activity of the International Union for Pure and Applied Biophysics (IUPAB) 1976–1996 (an historical overview). *Q Rev Biophys* 30:113–120

³ We would like to note the excellent introduction to Scottish whiskys provided by the conference organizers and staff on the second evening of the conference.