



## ***Biophysical Reviews*: promoting the African synchrotron facility, partnering with national biophysical societies, highlighting advances in structural biology**

Damien Hall<sup>1,2</sup>

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As the official journal of the International Union of Pure and Applied Biophysics (IUPAB), *Biophysical Reviews* has a mandate to (i) publish topical reviews in biophysics by leading experts in the field, and (ii) help develop and promote biophysical research around the world. Guest Edited by Prof. Trevor Sewell, the current Special Issue of *Biophysical Reviews* (dedicated to the 2019 Cape Town Meeting on Structural Biology—Issue 4 of Volume 11 Sewell 2019) does an excellent job of fulfilling these two roles by both, reviewing latest advances in structural biology and advocating for the construction of an African synchrotron facility. On a related note, this Editorial describes details of a *Biophysical Reviews*' partnership program, beginning in 2020, to showcase activities of national biophysical societies.

A particularly fun and fulfilling aspect of an association with *Biophysical Reviews* comes from its IUPAB mandated role to promote biophysical research and education in all areas of the world. In this Editorial, I describe some of the interesting ways in which the journal is approaching this advocacy task. I then go on to introduce the Review articles assembled within this Issue.

The current Special Issue is based around a 2019 Structural Biology Meeting held in South Africa. Edited by Prof. Trevor Sewell of the University of Cape Town (Sewell 2019), the Issue features a series of perspectives describing the basic

research, industrial, medical, and societal advantages associated with the establishment of national (and international) facilities for high-resolution structural biology. Central to this set of perspectives is a passionate scientific advocacy piece by Prof. Simon Connell and co-workers, outlining the case for construction of a synchrotron facility within Africa (Connell et al. 2019). Further elucidated upon by the Issue Editorial (Sewell 2019), these two articles are a must-read for those wanting to understand the preparations made to date, along with the remaining steps left to take, in the campaign for an African-based synchrotron light source. This push for a large ticket (billion Euro) scientific investment is a project worthy of international support, and *Biophysical Reviews* is proud to stand firmly behind this potentially transformative project for Africa. We will continue to lend support, updating readers on its progress in the future.

Continuing with the scientific advocacy theme, *Biophysical Reviews* has begun a new yearly partnership program. Starting in 2020, one issue each year will be dedicated to highlighting the activities of a different national biophysical society. To be built on a foundation of Reviews of topics presented at the yearly national society meeting, these Special Issues will also provide a detailed look at the history of the featured national society, the roles of the society executive, and the planning associated with preparation of the national meeting. Aside from the increased exposure that comes from association with the IUPAB *Biophysical Reviews* journal, it is hoped that such a partnering mechanism can provide an incentive to countries in the process of developing and consolidating their national societies. *Biophysical Reviews* thanks the Executive Committees of the Biophysical Society of Japan (BSJ) and the *Biophysics and Physicobiology* (BPPB) journal for permitting the BSJ to be the inaugural Society feature in 2020, based on its September 2019 Meeting (BSJ 2019). We encourage interested readers to

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✉ Damien Hall  
damien.hall@nih.gov; damien.hall@protein.osaka-u.ac.jp;  
damienhall30@gmail.com

<sup>1</sup> Laboratory of Biochemistry and Genetics, NIDDK, NIH, Bld. 8, Bethesda, MD 20892-0830, USA

<sup>2</sup> Institute for Protein Research, Osaka University, 3-1- Yamada-oka, Suita, Osaka 565-0871, Japan

register and attend the BSJ Meeting and participate in this initiative.

An important consideration for all active researchers is the cost associated with publishing and acquiring journal articles. This subject is particularly germane when research funds are tight or when the research is carried out in regions of the world facing funding strictures. From the author's side, depending on the journal, publication fees can range from two to three thousand Euros per article. From the readers' perspective, if their research institution does not hold an agreement with the publisher, then the reader may additionally have to pay between twenty and sixty Euros to purchase an individual article. *Biophysical Reviews* exists as a 50:50 ownership arrangement between IUPAB and Springer Nature. By operating a hybrid-fee arrangement featuring a two-track payment system of publication costs, the journal has found a fair and equitable solution for satisfying both its philanthropic and commercial aims. The first payment track is completely free to the author with the only limitation being that the article remains behind a payment firewall (for institutions not carrying the Springer Nature catalog agreement) before becoming freely available in PubMed Central within one year of publication. The second (alternative) track involves payment of an open access charge, providing the author with perpetual copyright and making the article immediately free for download by any reader, anywhere in the world. Open access articles additionally benefit from Springer Nature promotional campaigns that help to increase article online visibility and uptake.

While this Editorial has so far dealt with the issue of science advocacy, the principal *raison d'être* of the journal (the publication of topical reviews by experts in the field) is extremely well served by the collection of articles, assembled within this Issue, on the theme of structural biology. The first Review written by Dr. Hiroyuki Iwamoto, a lead researcher at the famous Japan Synchrotron Radiation Research Institute, located (SPring-8) in Japan, provides a very digestible introduction to synchrotron science along with a series of examples that use synchrotron radiation to solve fundamental problems in the field of muscle biology (Iwamoto 2019). The next Review article by Dr. Lloyd Mabonga and Assoc. Prof. Abidemi Paul Kappo of the University of Zululand is a fascinating description of structure-function-based investigations aimed at providing small molecule inhibitors of an elusive drug target—that of the protein-protein interaction interface (Mabonga and Kappo 2019). Continuing on with the structure-function theme, the next Review, by Dr. Lizelle Lubbe and Prof. Edward Sturrock of the University of Cape Town, provides latest insight into the search for improved inhibitors of angiotensin-converting enzyme (ACE-Inhibitors)—the major drug target in studies of hypertension (Lubbe and Sturrock 2019). Exploring an interesting aspect of comparative structural biology, Mr. Graham Chakafana, Dr. Tawanda Zininga, and Prof. Addmore Shohnai of the

University of Venda review potentially exploitable drug targets associated with differences in the composition and structure of the Hsp 70 class of heat shock proteins found in humans and the parasite responsible for malaria - *Plasmodium falciparum* (Chakafana et al. 2019). The next Review by Dr. Michaela Conley and Prof. Graham Bhella of the University of Glasgow examine methods for cryo-electron microscopy-based structural analysis of viruses that are not dependent on an assumed symmetry of the viral capsid (Conley and Bhella 2019). Moving up a rung on the multi-scaling ladder, Mr. Johannes Groen, Dr. Javier Conesa, Dr. Ricardo Valcarcel, and Dr. Eva Pereiro from the Alba Synchrotron Facility in Spain review the use of synchrotron radiation in soft X-ray cell tomography studies, detailing how it provides a vital link between resolution scales ranging from cryo-electron tomography to confocal light microscopy imaging studies (Groen et al. 2019). Continuing with this structural biology tour de force, Mr. Ehsan Kachooei, Dr. Nicole Cordina, and Assoc. Prof. Louise Brown of Macquarie University review structural information of the muscle protein troponin provided by using site-specific paramagnetic spin labels in electron paramagnetic resonance (EPR) studies (Kachooei et al. 2019). Approaching the subject from the mesoscopic level of structural characterization, Mr. Stefan Mueller, Dr. Lisanne Spenkelink, and Prof. Antoine van Oijen of the University of Wollongong review the latest information on the structure and mechanism of the DNA replication machinery, with particular regard to data provided by single-molecule studies (Mueller et al. 2019). Last (but not least) is a Review by Prof. Takayuki Nishizaka, Assoc. Prof. Tomoko Masaike, and Assist. Prof. Daisuke Nakane of Gakushuin University, on the structure and mechanism of (the relatively) recently discovered set of rotary motor proteins found in *archaea* domain motile organisms. The authors describe studies into these so-called *archaellar* biological machines synthesizing a united model of their mechanical action (Nishizaka et al. 2019).

In closing I would like to thank the Issue contributors for the good character they have demonstrated in meeting the Issue deadline and the Special Issue Editor for his remarkable efforts in assembling these articles.

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