



2019—A year in Biophysical Reviews

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This editorial first discusses the set of reviews appearing in the current issue (2019 volume 11, issue 6) and then highlights some notable journal activities for the year of 2019.

Each year, Biophysical Reviews publishes six Issues. Of these, roughly half are Special Issues (which gather articles focused on a specific theme) with the remainder being regular Issues, having an open format. The present Issue (Issue 6) is a regular Issue, composed of a topical Commentary and a diverse set of Reviews. The first goal of this Editorial (Hall 2019a) is to introduce the articles constituting Issue 6.

Issue 6—description of contents

Written by Professor Juan Carmelo Gomez-Fernandez, the Commentary following this Editorial deals with the European Union's Plan S proposal that will require publication of all EU funded research to be in open access journals (Gómez-Fernández 2019). This Commentary was commissioned to inform readers about this major change affecting both the funding of science and its dissemination via publication. As the General Secretary of IUPAB (International Union of Pure and Applied Biophysics), Juan Carmelo is particularly able to provide an informed opinion on this subject. The observant reader will spot the underlying ramifications of Plan S for Biophysical Reviews, which currently operates on a hybrid open access model (Hall 2019b).

Following this Commentary on the Plan S proposal is a set of nine Reviews. The first two Reviews are contributed by an

Australian-based medical doctor/scientist, Dr. Vangelis Kanellis, and together they form a related pairing on the subject of skin cancer (Kanellis 2019a, 2019b). The first of these contributions discusses the light absorbing properties of melanin present within human skin, alongside quantitative techniques for its measurement (Kanellis 2019a). The second Review describes various techniques and devices for measuring UV radiation at the skin level (Kanellis 2019b). Taken together, these Reviews provide a biophysical viewpoint on some of the predominant factors associated with skin cancer. The third Review by Yeo et al. (2019) is a detailed biological description of the kinetics of red blood cell generation within the human body. With over 2 billion new blood cells generated each day, the scope of red cell production is quite literally breathtaking (Yeo et al. 2019). Submitted by researchers collaborating between the USA and India, the next Review by Basak and colleagues deals with the subject of quantifying molecular diffusion in complex solutions, such as those found inside the cell (Basak et al. 2019). Providing an introductory background to diffusion and reaction rate theory, this Review goes on to treat theory useful for analyzing fluorescence correlation spectroscopy (FCS) measurements and so should prove helpful to scientists seeking to use FCS in their own studies. The fifth Review is a contribution from Iran that examines rational design strategies for pharmaceutical development of drugs to combat Alzheimer's disease (AD) (Jokar et al. 2019). As an age-related phenomenon AD is becoming more prevalent with increasing human longevity and so this topic is becoming increasingly germane. Beginning with a summary of the major AD mechanistic hypotheses, this Review goes on to summarize recent drug development approaches discussed in the light of clinical trial results (Jokar et al. 2019). The sixth Review in this Issue by US-based Park and Horton (2019) discusses the tendency for a subset of enzymes to form filamentous regular repeating structures from the natively folded monomer state. With over twenty-five examples given this Review is perhaps the longest ever published by the journal and potentially presages a paradigm shift in the manner in which we consider quaternary and “quinary” levels of organization within the cell (Park and Horton 2019). The seventh

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Review originates from Argentina and discusses experimental procedures for measuring ion generated membrane potential differences in erythrocytes (Balach et al. 2019). Covering a range of methods that vary from the use of fluorescent dye proxies to nuclear magnetic resonance active markers, the authors provide an in depth description of analytical techniques—with nearly all couched within the Nernst equation formalism for quantifying the selective electrostatic potential difference across cell membranes (Balach et al. 2019). The eighth Review is a collaboration between research groups in Canada and South Africa (Seraphim et al. 2019). This Review highlights what is known about the interactions between the Hsp90s (Hsp, heat shock protein) and the four protein sub-complex RT2P occurring within the *Plasmodium falciparum* protozoan. Aside from providing a clear summation of an interesting area of biochemistry this Review also holds importance for outlining the behavior of a novel set of drug targets in the protozoan agent responsible for malaria—a disease estimated to have infected over 200 million people worldwide, killing approximately half a million each year (W.H.O World Malaria Report 2019). Rounding out the Issue is a Review contributed from Israel on the subject of continuous blood glucose measurement in patients at risk for diabetes, based on dielectric spectroscopy (Caduff et al. 2019). This Review first discusses why the technique can indeed be successful for measuring changes in the concentration of an uncharged molecule such as glucose (within the blood). By way of review, Caduff and coworkers outline the relevant theory and discuss potential experimental improvements for maximizing signal response (Caduff et al. 2019).

In closing this Issue description it is perhaps appropriate to re-emphasize the two main aims of the IUPAB Biophysical Reviews journal,

- (i). To publish high quality topical Reviews in biophysics-related subject areas that are written by leading experts in the field.
- (ii). To encourage the development and publication of biophysics-related research across all areas of the world.

As can be noted from this summary of contents, the contributions to Issue 6 meet both of these criteria relating to excellence and international origin. With due attention paid to highlighting the contents of the present Issue, I now take the opportunity, with this last Issue of the year, to reflect on some of the events and articles that have featured in Biophysical Reviews during 2019.

2019—a year in review

Issue 6 caps off an eventful year for the journal. In what follows I first highlight some of the articles featured in each

of the five previous Issues. Following this I then describe events of note related to the journal's progress in 2019.

Issue 1—Special Issue on 'Big Data': Released in mid-February the first Issue of the year was a Special Issue concerned with the rise of data driven bioinformatics-based science. Edited by Assoc. Prof. Joshua Ho and Dr. Eleni Giannoulatou (Ho and Giannoulatou 2019) the Big Data Issue contained 16 contributions dealing with subjects as diverse as Bayesian statistical analysis (Yau and Campbell 2019), the dangers of using statistical tests rooted in the assumption of a normal distribution (Mar 2019), Hi-C analysis of interactions between genomic loci (Pal et al. 2019), bioinformatics-based discovery of cancer causing mutations (Nussinov et al. 2019), and machine learning in predicting cancer patient treatment outcomes (Mehreen and Aittokallio 2019).

Issue 2—Regular Issue: Following the Editorials (dos Remedios 2019; Hall 2019c) Issue 2 began with a pair of topical Commentaries describing two careers, one written from the perspective of someone at the beginning of the academic mountain climb (Li 2019) with the other written from the point of view of someone enjoying the warmth of the sunlight at the research summit (dos Remedios 2019). Aside from saying goodbye and thank you to the outgoing Chief Editor, Issue 2 also contained a bevy of very interesting review articles. Among the articles included in Issue 2 I highlight the following concerned with, novel localization technologies in high resolution transmission and cryo-electron microscopy (Brown and Takagi 2019), structure-based drug development against proteases found in the deadly dengue, Zika and West Nile viruses (Nitsche 2019), the use of *in situ* photo-irradiation as a structural probe in solid state nuclear magnetic resonance studies (Naito et al. 2019), assessments of the roles played by non-specific aggregation in amyloid formation (Hirota et al. 2019) and the development of differential equation-based mathematical models of thyroid cancer (da Silva et al. 2019).

Issue 3—Focus on the ABA/ASB Meeting: With content drawn from the joint meeting of the Asian Biophysics Association (ABA) and the Australian Society for Biophysics (ASB), Issue 3 was the second Special Issue of the year and the largest Issue overall in terms of contributions (38 articles). The six Special Issue Editors (Prof. Kuniaki Nagayama, Prof. Hiroyuki Noji, Prof. Kyeong Kyu Kim, Prof. Raymond Norton, Associate Professor Till Böcking and Dr. Andrew Battle, performed a remarkable job in inviting and assessing the contributions—a precis of which can be found in the two Issue Editorials (Battle et al. 2019; Hall 2019d). Some of the standout contributions to this Issue include the informative Commentaries describing the individual national and regional biophysical organizations making up the ABA (Hatters and

Noji 2019) (with specific examples including Australia (Hill 2019); China (Xu 2019); Japan (Kandori et al. 2019); Hong Kong (Zhu 2019); Taiwan (Lyu 2019); Korea (Lim et al. 2019) and India (Jagannathan 2019)). To get a feel for the science presented in the Issue (from the very many interesting contributions), I recommend the following review articles on the topics of functional amyloids (Shanmugam et al. 2019); cellular sensing of compression (Chen et al. 2019); mechanical control of disulfide bond formation (Passam and Chiu 2019); and the performance of efficient molecular dynamic simulations using multi-baric and multi-thermal sampling procedures (Yamauchi et al. 2019).

Issue 4—Structural Biology in South Africa: Issue 4 was based on presentations made at an IUPAB sponsored meeting on Structural Biology held in Cape Town, South Africa. The lone Special Issue Editor, Prof. Trevor Sewell, performed a remarkable job, both in organizing the Meeting and in assembling the nineteen contributions to the Issue (Sewell 2019; Hall 2019a). One of the standout features of this Issue was the well-argued Letter contributed by Connell and coworkers making the case for investment in an African Synchrotron (Connell et al. 2019). As described within that Letter, such a proposal could potentially produce positive developments in ways not just relating to scientific research, by helping to build infrastructure capable of supporting industrial and societal improvements for all within the continent. These opening remarks were complemented by series of excellent Commentaries describing areas of structural biology as diverse as protein production (Owens and Gileadi, 2019), x-ray crystallography (Garman 2019), cryo-electron microscopy (Bhella 2019) and soft x-ray tomography (Pereiro 2019). These Commentaries were followed by an array of equally high-quality review articles as evidenced from the few following examples describing; synchrotron x-ray radiation (Iwamoto 2019); structural studies of protein-protein interaction modulating factors (Mabonga and Kappo, 2019); angiotensin drug discovery (Lubbe and Sturrock 2019); structural analysis of virus capsids (Conley and Bhella 2019); heat shock protein structure and function (Chakafana et al. 2019); small wavelength cellular tomography (Groen et al. 2019); structural analysis based on combined usage of electron paramagnetic resonance (EPR)/nuclear magnetic resonance techniques (Kachooei et al. 2019) and mesoscopic structural analysis and inference based on fluorescence and optical microscopies (Mueller et al. 2019; Nishizaka et al. 2019).

Issue 5—Mechanobiology in Italy: The penultimate Issue for the year was a Special Issue based on the Nanoengineering for Mechanobiology (N4M) conference held in Genoa, Italy. The four Special Issue Editors, Prof. Boris Martinac, Prof. Aldo Ferrari, Associate Prof. Marco Capitanio and Associate Prof. Massimo Vasalli were also responsible for organizing the

Meeting. As described in the Editorials (Ferrari et al. 2019; Hall 2019e) the Issue discussed how mechanical environments can determine the function of cells and tissues, alongside presenting a range of suitable techniques for the measurement of such mechanical effects and responses. Features of the Issue included a number of interesting Commentaries written by senior (Guck 2019; Verheyen et al. 2019) and junior investigators (Steward Jr. 2019) as well as Presidents of relevant Societies (Pérez 2019). The 13 contributed Letters and Reviews address fundamental basic science questions such as the reasons for heterogeneity in cell populations (Vishwakarma and Di Russo 2019) and mechanotransduction principles in neurons and other cell types (Chighizola et al. 2019; Ridone et al. 2019). The review articles also present latest technological developments relating to high speed atomic force microscopy (Valotteau et al. 2019) and optical trapping and microscopy techniques (Boeri et al. 2019; Arbore et al. 2019) along with relevant nanofabrication approaches (De Masi et al. 2019).

Establishment of a social media promotion: The year of 2019 saw Biophysical Reviews take the leap into the social media world of Twitter™ and YouTube™. With an eye towards keeping things relatively friendly and free of controversy the Biophysical Reviews media accounts are follower only (for Twitter™) and comment disabled (for YouTube™). These post-publication promotional tools have proved quite popular with authors, their institutions and third party agencies such as local news publications and television channels. Based around the Springer SharedIt™ online posting tool (Hall, 2017) the Biophysical Reviews social media arm has allowed complex scientific principles to be discussed around the world in 280 characters or less and the latest issue content abstracts enjoyed with a varying musical accompaniment. While some may question whether these are positive (or necessary) developments the wheels of progress continue to roll on. The Biophysical Reviews' social media channels can be found at the following links and we encourage readers of the journal to follow/subscribe to these accounts to receive relevant Issue updates.

Twitter: @BiophysicalRev1.

YouTube: https://www.youtube.com/channel/UCzG_5MWmnrB2UBibtxs2DuA

New Chief Editor for Biophysical Reviews: After having performed the role with distinction for five years, at the beginning of the 2019 the longtime Chief Editor of Biophysical Reviews Prof. Cristobal dos Remedios signaled his intention to stand down (dos Remedios 2019). I was asked by IUPAB President to take over in January of 2019 and Cris and I together effected a relatively smooth changeover under the pressures of closing Issue deadlines. With genuine pleasure, my first official duty as the new Chief Editor at the Biophysical Reviews annual February board meeting was to nominate Cristobal dos Remedios to the position of Chief Editor Emeritus. The vote

Table 1 2019 Biophysical Reviews Editorial Board**Chief Editor**

Damien Hall NIDDK National Institutes of Health (USA)/IPR Osaka University (Japan)

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W. Olson Department of Chemistry and Chemical Biology, Rutgers University, USA

SI Editors 2019

E. Giannoulatou Issue 1—Big Data

J.W.K. Ho

Issue 3—Asian Biophysical Association/Australian Society for Biophysics Meeting

Kyeong Kyu Kim

Kuniaki Nagayama

Hiroyuki Noji

Ray Norton

Till Böcking

Andrew Battle,

B.T. Sewell

Issue 4—Structural Biology at Synchrotrons - South African Workshop

Boris Martinac

Issue 5—Nanoengineering for Mechanobiology

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Marco Capitanio

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Table 1 (continued)**Chief Editor**

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M. Vassalli	<i>University of Glasgow, Scotland</i>
M. Williams	Massey University, New Zealand
G.J.L. Wuite	VU University Amsterdam, The Netherlands
K. Yasuda	Waseda University, Tokyo, Japan
G. Zucchelli	Università degli Studi di Milano, Italy

was carried unanimously whereupon Cris joined with the Founding Chief Editor Jean Garnier in this role. This was later followed up with a note thanking Cris for his efforts in advancing the cause of Biophysical Reviews (Hall 2019c).

New Editorial Board Members: This year has seen some changes to the Editorial Board due to retirements and new additions. The journal depends heavily on the good will of its Editorial Board Members and as such I would like to thank those who have served the journal in the past and who presently continue to act in service of the journal (Table 1) for their time and effort in both inviting appropriate authors to contribute review articles as well as their efforts in acting as expert reviewers of submitted manuscripts for the journal. In particular I would like to welcome three new Executive Editors, Prof. Kuniaki Nagayama (Japan), Prof. Rosangela Itri (Brazil) and Assoc. Prof. Joshua Ho (China) who have joined with Prof. Wilma Olson (USA) and Prof. Naranamangalam Jagannathan (India) to make up the senior advisory Executive. I would also welcome some very recent additions to the Editorial Board from Scotland (Prof. Massimo Vassalli) and South Africa (Prof. Addmore Shonhai).

Michele Auger Award: Finally I would like to note the permanent memorial organized for Prof. Michèle Auger—a well-liked and diligent Member of the Biophysical Reviews

Editorial Board who sadly passed away in late 2018. As a mark of our respect for Michèle, the Biophysical Reviews' Board announced a perpetual award in honor of her life and service. The, "Michèle Auger Award for Young Scientists' Independent Research" will be granted each year to a single candidate performing biophysical research who, at the time of application, is under 40 years of age. The award consists of a plaque and a free personal subscription to the journal along with an invitation to submit a single author Review article to Biophysical Reviews. The winner's published Review will carry a short foreword about the life of Professor Michèle Auger, along with her work associated with teaching and training the next generation of biophysical scientists. A call for nominations in the form of a candidate's one page curriculum vitae, along with five original manuscripts, were requested to be submitted prior to 2019, October 31 (Hall 2019a). Judging is currently being carried out by a special committee assembled from the Biophysical Reviews Editorial Board and selected external experts. Results will be announced in late December, with the winner's single author Review to be published in 2020.

Concluding remarks

A genuinely fun aspect of being Chief Editor of Biophysical Reviews is that this duty requires careful reading of a lot of

good review articles that cover a diverse range of topics. In this, “Year in Biophysical Reviews,” summary I have described a relatively small fraction of the total articles published in the journal this year. The articles I have selected were both memorable and interesting however there were many more of similar quality and interest, that due to reasons of continuity and flow, I could not include in such a summary report. I hope that this ‘highlight reel’ might encourage the reader to re-visit some of the Issues published in Biophysical Reviews during 2019 for a second look. I also hope that this summary might encourage the Review-curious scientist to think about submitting their own Review for consideration. As always, prospective topics should be discussed with the Chief Editor or a Member of the Editorial Board prior to submission to determine relevance and establish realistic submission timetables. However with this point noted, the Biophysical Reviews Editorial Board, in alignment with the aims of IUPAB, is genuinely interested in helping to facilitate the publication of topical and excellent Reviews by scientists from all over the world. As 2019 draws to a close, it is in this spirit that, on behalf of the journal, I would like to wish all readers, authors, reviewers of manuscripts and journal editorial and production staff the very best for the holidays and peace and good health for the coming 2020.

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