



***Biophysical Reviews'* national biophysical society partnership program**

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Received: 6 March 2020 / Accepted: 6 March 2020 / Published online: 29 April 2020

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Abstract

This Special Issue is focused on the Biophysical Society of Japan. It represents the first in a series tasked with introducing an individual national biophysical society to the wider biophysical community. In this Editorial for Volume 12 Issue 2, I first outline the nature and goals of this program before going on to describe the contents of the Special Issue that relate to the activities organized by the Biophysical Society of Japan and the scope of the research performed by its members.

The principal role of *Biophysical Reviews* is the publication of high-quality topical review articles by experts in the field. However, due to its association with IUPAB (see note), this journal also has a fundamental interest in helping to foster international development and collaboration in the general field of biophysical research. As a practical way of combining these two goals, the journal has initiated (with this Issue) a partnership program with various national biophysical societies aimed at presenting the work of these societies on a world stage. In this first such national society-focused effort, I would like to sincerely thank the Special Issue editors (Komatsuzaki et al. 2020) and the members of the Biophysical Society of Japan (BSJ) for their wholehearted support and participation with this endeavor. In this Editorial, I first describe the goals of this partnership program in general, before exploring the contents of this Special Issue focused on the BSJ in the particular.

Biophysical Reviews is the official publishing instrument of IUPAB (International Union for Pure and Applied Biophysics (IUPAB 2020)). In turn IUPAB is the biophysics affiliate of the ISC (International Science Council (ISC 2020))

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National society partnership program

At their best, national biophysical societies act as important resources for their affiliated members through their activities in organizing national meetings, advocating for research funding, and fostering training and education initiatives. National societies can also provide an important social framework in support of members, constituting a forum for recognizing individual contributions made at various career stages. Each national society is shaped by the unique research strengths and personal characteristics of its membership. Cultivation of new members is vital for building a self-perpetuating organization. With each new generation building on the progress made by the last, the institutional age of the society can often reflect the sophistication of the instruments developed by the society on behalf of their membership. A national language (other than the current common scientific tongue of English) can also play a role in influencing how a society develops and the strategies it employs for successful interfacing with the international community. For these reasons, each national group is unique in terms of the research they specialize in and the manner in which they collectively organize their scientific societies. Although these differences make for an interesting story in themselves, achieving an understanding of these differences can provide the reader with real insight (and possibly empathy) into the challenges faced, and progress made, by others pursuing their scientific endeavor. In this spirit, the major goal of this national biophysical society program series is threefold:

(i) Facilitate international collaboration by making the biophysical societies of particular countries both more familiar and more accessible to the international readership of the journal, with the hope that such information may effectively lessen

barriers impeding successful interaction between different research groups.

(ii) Provide a platform for promoting and advertising both the activities of the national biophysical society and the research performed by its members, thereby allowing this Special Issue program to collectively showcase the work of a national biophysical society.

(iii) Provide both incentive and instruction to other societies that may be in the process of just forming, or operating soon after establishment. In this role, the journal may be particularly helpful by offering its assistance to the society in organizing and structuring their Special Issue and, further to this, provide a low-cost mechanism for generating quality publications for its members.

In working with a national biophysical society to achieve these goals, *Biophysical Reviews* can bring some rather large organizational guns to bear. First within its formidable armamentarium is the reputation and resources of the journal. Due to its association with both IUPAB and the Springer Nature group, *Biophysical Reviews* has arguably the finest academic pedigree and professional resources available to any specialist biophysics-related journal (including an expert support staff). The journal is Q1-ranked within the biophysics category (Scimago 2019). *Biophysical Reviews* has risen in the Elsevier SCImago rankings, moving from 40th to 13th in class from 2017 to 2018 (with the 2019 results soon to be released) and credited by the same group with an effective impact factor of over 4.

The second advantage provided by the journal is its equitable costing structure. In my working life as a scientist, I have often been asked to contribute to a themed Special Issue only to later find myself lumped with a non-negotiable obligatory two to four thousand Euro page charge fee. As a joint initiative between nonprofit (IUPAB) and commercial (Springer Nature) organizations, *Biophysical Reviews* operates on a hybrid open access fee model (Hall 2019). In this system, authors may elect to proceed with either a zero cost option (in which case their article appears behind a paywall for 6 to 12 months¹) or alternatively pay an open access fee allowing their article to be freely downloaded by readers anywhere in the world. This hybrid fee costing system makes a joint ventureship with *Biophysical Reviews* a genuine partnership in which the national society is not in any danger of being financially exploited by the journal.²

¹ As discussed previously (Hall 2019), the firewall is not particularly an inconvenience for most due to most major academic institutions carrying the Springer publication package (for instance, all institutions in Germany) the journal being carried within PubMed Central and the fact that every article is issued a free sharing license through the SharedIt™ program (Hall, 2017).

² Indeed the principal benefit to the journal is that it allows it to fulfill its mandated role of helping to promote biophysical research around the world.

The third (and possibly most important) force-multiplying resource offered by the journal is the exceptional scientific and personal caliber of the *Biophysical Reviews* Editorial Board Members. The scientists constituting this group are accomplished experts in their field as well as being conscientious research citizens willing to assist authors to maximize the quality and usefulness of their submitted review. In practice, this pairing of attributes means that review articles submitted to *Biophysical Reviews* benefit from both high-level reviewing and practical assistance in structuring, framing, and expression (when required) that goes above and beyond that experienced when submitting one's work to a different journal. A general idea of the *rara avis* nature of the *Biophysical Reviews* editorial team can be gotten from the recently established "Meet the Editors Series" (Olson 2020; Nagayama 2020).

Exploring biophysics in Japan

The Biophysical Society of Japan (BSJ) is the first national body to participate in the journal's partnership program. This Special Issue (SI) began with a meeting in August between officers of the *Biophysical Reviews* journal and a select committee from the BSJ that included the BSJ President, Prof. Yoshie Harada. Members at that meeting decided upon the scope of the SI and created a plan of action for its production. Six SI Editors were nominated, Prof. Tamiki Komatsuzaki (SI lead editor and current BSJ vice president), Prof. Takeharu Nagai (2019 BSJ Annual Meeting Conference chair), Assist. Prof. Saeko Yanaka (winner of the 2016 Inoue Research Award for Young Scientists), Prof. Jeremy Tame (*Biophysical Reviews* Editorial Board Member), Prof. Haruki Nakamura (former BSJ president, former *Biophysical Reviews* Executive Editor, and current Chief Editor of the BSJ journal *Biophysics and Physicobiology*), and Prof. Kuniaki Nagayama (current *Biophysical Reviews* Executive Editor, former Asian Biophysics Association President, and former IUPAB President).

The format of this SI was designed around two basic foundations which involved:

- (i). *Descriptive Commentaries*: A set of Commentaries were commissioned from key members of the BSJ. These invited articles are meant to inform about the workings of the society and describe the activities which it sponsors for the benefit of its members. The opening Commentary is a short history of the BSJ written by its current president (Harada 2020). This is followed by a pair of personal recollections, written by a junior and a senior scientist, that describe the BSJ activities from a forward and rearward facing perspective (Okamoto 2020; Kataoka 2020). Next are two Commentaries outlining the financial

Table 1 Contributed session commentaries

Session topic	Reference
1SBA Integrative approaches towards understanding of gene expression	Mori and Sekine 2020
1SCA Utilization of soft compartments/interfaces from nano to macroscale: Exploring the potential of living systems	Sato et al. 2020
1SEA Physics of chromatin dynamics—towards understanding the regulation of gene expression	Ito and Kimura 2020
1SGA Frontiers in multi-scale mechanobiology of muscle and vascular system	Iwaki and Hara 2020
1SBP ASB-BSJ Joint Symposium: Current challenges in biophysics centering on biomolecular interactions and the underlying forces	Kvansakul and Nishizaka 2020
1SCP Cutting-edge brain research from a biophysical perspective	Tominaga and Kuhn 2020
1SDP Current status and issues of protein solution biophysics	Yanaka and Uchiyama 2020
1SEP What is “Single-cell PRESTO” doing?	Suzuki and Shiroguchi 2020
1SHP Frontier of structure-function studies to unveil diverse GPCR signaling	Katayama and Suno 2020
2SCA Challenges of bioinformatics for the era of molecular structure big-data	Shirai and Terada 2020
2SDA Nonequilibrium Energetics of Biological Molecular Machines	Toyabe et al. 2020
2SEA Frontiers of Synchrotron Radiation Biophysics	Iwamoto and Sekiguchi 2020
2SFA Elucidation of biological functions by optical control	Tsukamoto and Shichida 2020
2SBP Measure x Analyze Metabolic Adaptation of Biological Systems	Okada and Bamba 2020
2SDP Taiwan-Japan joint symposium on structural biology using X-ray crystallography and cryo-EM	Murata 2020
2SHP Decoding intracellular architecture using visualizing device development and mathematical modeling	Kitamura and Kabayama 2020
3SBA Structure, Dynamics and Energy Flow that Govern Heme Protein Functions: Theory and Experiments	Yamatoa and Leitner 2020
3SCA Diversity and universality of motile mechanism of living things: From intracellular dynamics to collective motion	Nakamura and Kage 2020
3SDA Optogenetics: Applying photoreceptor for understanding biological phenomena	Tsunoda and Inoue 2020
3SFA Biophysics in Nano-space	Tadakuma and Kitagawa 2020

position and the internet presence of the BSJ, respectively, written by the BSJ Treasurer (Akiyama 2020) and website Liaison officer (Miyata 2020). The BSJ runs two international journals—the Japanese language *Seibutsu Butsuri*³ and the English language *Biophysics* and *Physicobiology*—their respective Chief Editors provide very informative Commentaries describing how to both access and publish within them (Sako 2020; Ishiwata 2020). Next is a Commentary on a new government program known as the AMED BINDS initiative (promoting the use of biophysics to develop novel drugs) which provides significant insight into how the Japanese government identifies and targets specific biophysical programs for funding (Nakamura 2020). When researchers outside of Japan think about Japanese research centers, they are most likely to mention RIKEN, University of Tokyo, and Kyoto University. To round

out this set of Commentaries, the SI Editors have commissioned articles describing the biophysical research performed at institutes that may be less well known to the casual observer but which are nevertheless important powerhouses of biophysical research within Japan. These include Kanazawa University (Ando 2020), Hokkaido University (Aizawa et al. 2020), Waseda University (Takano et al. 2020), Kyushu University (Akiyama et al. 2020a), and the Okazaki National Institutes of Natural Sciences (Akiyama et al. 2020b). In toto, this set of Commentaries should provide those interested in learning about biophysics in Japan with an insight into the makeup of the BSJ, along with some potentially new places and people to collaborate with and new platforms to communicate one's science.

(ii). *Scientific contributions*: Commissioned from speakers at the 57th Annual Meeting of the BSJ held in Miyazaki, Japan, the scientific contributions were of two types, descriptive session commentaries and

³ *Seibutsu Butsuri* literally translates as *Biophysics*.

Table 2 Review articles commissioned by the SI editors

Review title	Reference
Opto-thermal diffusiophoresis of soft biological matters: From physical principle to molecular manipulation	Fukuyama and Maeda 2020
Methods and application of coherent X-ray diffraction imaging of noncrystalline particles	Nakasako et al. 2020
Dominant rule of community effect in synchronized beating behavior of cardiomyocyte networks	Yasuda 2020
Neural networks for protein structure and function prediction and dynamics analysis	Tsuchiya and Tomii 2020
Microfluidic approaches for the analysis of protein–protein interactions	Arter et al. 2020
Effect of additives on liquid droplets and aggregates of proteins	Shiraki et al. 2020
The challenge of intracellular temperature	Suzuki and Plakhotnik 2020
Biological phase separation: cell biology meets biophysics	Yoshizawa et al. 2020
Role of atomic contacts in vibrational energy transfer in myoglobin	Mizuno and Mizutani 2020
Experimental and theoretical energetics of walking molecular motors under fluctuating environments	Ariga et al. 2020
Theoretical identification of thermostabilizing amino-acid mutations for G protein-coupled receptors	Murata et al. 2020
Heterogeneous fluid-like movements of chromatin and their implications to transcription	Ashwin et al. 2020
Novel optogenetics tool: Gt_CCR4 A light-gated cation channel with high-reactivity to weak light	Hososhima et al. 2020
Efficiencies of molecular motors: A comprehensive overview	Li and Toyabe 2020
Nonspecific characteristics of macromolecules create specific effects in living cells	Tsumoto et al. 2020
Development of a deep-learning-based method to identify “good” regions of a cryo-electron microscopy grid	Yokoyama et al. 2020
Recent advances in bioimaging with high-speed atomic force microscopy	Uchihashi and Ganser 2020
Application of information theory in systems biology	Uda 2020
Allosteric communication in molecular machines via information exchange: what can be learned from dynamical modeling	Loutschko and Flechsig 2020
Correlation between the numbers of rotation steps in the ATPase and proton conducting domains of F- and V-ATPases	Noji et al. 2020
Recent progress of in-cell NMR of nucleic acids in living human cells	Yamaoki et al. 2020
Recent developments in the computational study of protein structural and vibrational energy dynamics	Leitner and Yamato 2020
Action of antimicrobial peptides and cell-penetrating peptides on membrane potential revealed by the single GUV method	Moghal et al. 2020
Metabolic features of cancer cells in NRF2 addiction status	Okazaki et al. 2020
Unique phase behavior in cell size space: Synergetic effect of molecular crowding and confinement	Watanabe and Yanagisawa 2020
Unexpected molecular diversity of vertebrate non-visual opsin Opn5	Yamashita 2020
The biological structure model archive: An archive for in silico models and simulations	Bekker et al. 2020
Biophysics of rhodopsins and optogenetics	Kandori 2020
Heterochromatin protein 1 (HP1): interactions with itself and chromatin components	Kumar and Kono 2020
Synchronous operation of biomolecular engines	Keya et al. 2020
Accurate and rapid calculation of hydration free energy and its physical implication for biomolecular functions	Kinoshita and Hayashi 2020

scientific reviews. Session commentaries were requested from the chairpersons of each of the 35 scientific sessions held at the meeting (Table 1). The

scientific review contributions were collectively decided upon by the SI editors after witnessing talks at the meeting, with a best effort made for inclusion of

a representative selection of meeting topics. In all there were 31 commissioned reviews on topics that spanned the 35 scientific sessions. These review articles are shown in Table 2.

Conclusions

A constant feature of human development has been the creation of organizational structures that (ideally) help to plan and coordinate the effort of their members for the overall benefit of the collective. This Special Issue represents the confluence of three such structures—IUPAB, *Biophysical Reviews*, and the Biophysical Society of Japan (BSJ). The reason for this union was the commencement of a partnership program that is aimed at highlighting biophysical research within a single country and presenting it on a world stage. As the official IUPAB journal *Biophysical Reviews* is uniquely suited to promoting research work conducted and funded at the national level. We hope that this SI on the Biophysical Society of Japan has provided readers with a greater insight and understanding of biophysical research in Japan. We look forward to working with other national societies to further promulgate such activities.

Acknowledgments I would again like to thank Dr. Meran Lloyd-Owen for comments on an early draft of the current manuscript. I would like to acknowledge the Institute for Protein Research at Osaka University for the remarkable support they have provided to me over the last 5 years. I also gratefully acknowledge the support provided by the US Government over the last year in the way of funds for an ORISE Established Scientist Position carried out at the NIDDK. All opinions expressed in this paper are the author's and do not necessarily reflect the policies and views of NLM, DOE, or ORAU/ORISE.

Funding information This research was supported in part by an appointment to the National Library of Medicine (NLM) Research Participation Program. This program is administered by the Oak Ridge Institute for Science and Education through an interagency agreement between the US Department of Energy (DOE) and the National Library of Medicine (NLM). ORISE is managed by ORAU under DOE contract number DE-SC0014664.

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