



Biophysical reviews: call for nominations for the 2023 Michèle Auger Award

Damien Hall^{1,2}

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Abstract

This Editorial for Issue 3 (Vol. 14 2022) of *Biophysical Reviews* first describes the Issue's contents (five commentaries/ editorials within the front matter and seven review/letter articles appearing within the main body) before going on to discuss a number of matters of potential importance to the journal and its readers. Amongst this second tranche of content is the opening of the call for nominations for the 2023 Michèle Auger Award for Young Scientists' Independent Research.

Created in 2009, *Biophysical Reviews* is the flagship journal of IUPAB, the International Union for Pure and Applied Biophysics (IUPAB 2022). Each of the journal's six issues per year are divided into a front section, dealing with journal process and points of interest to biophysicists and IUPAB society members, and a main section, that presents scientific Letters and Reviews that are written by recognized experts in the field and are selected with an eye to providing an as wide as possible level of international participation. The first duty of each Issue's editorial is to provide a precis of both the non-scientific and scientific articles appearing within, and we carry this out forthwith.

Precis of Issue contents

Immediately following this editorial is the latest installment of the 'Biophysical Reviews–Meet the Editors' series, contributed by Executive Editor Prof. Stephen Harding (University of Nottingham, UK) (Harding 2022). Describing an academic career, starting from his time as an undergraduate physics student at Cambridge University, a switch to biophysics investigating the solution properties of proteins, nucleic acids and carbohydrates, and his eventual

establishment of the National Center for Macromolecular Hydrodynamics (NCMH), Steve's story provides an interesting glimpse into a very English academic experience. Prof. Stephen Harding has had a long and productive association with *Biophysical Reviews*, publishing five diverse review articles (García de la Torre and Harding 2013; Harding et al. 2016; Phillips-Jones and Harding 2018; Winzor et al. 2021; Bazhenova et al. 2021) and leading a special issue on quantitative and analytical relations used in biochemistry (Hall and Harding 2016). Stemming from his keen interest in scientific history, Steve established a science museum at the NCMH¹ that contains many original pieces of equipment along with letters and manuscripts from famous scientists in the field (e.g., Svedberg, Perrin, Einstein). With a range of theoretical knowledge and practical experimental experience spanning physics to biology, the journal is indeed fortunate to have Prof. Stephen Harding as one of its Executive Editors (Harding 2022).

Next, within the front section are three non-scientific commentaries. The first of these (Aradhyam and Jagannathan 2022) is an announcement describing a call for contributions to an Issue Focus on the life and works of Prof. Har Gobind Khorana—the joint winner of the 1968 Nobel Prize for Physiology and Medicine, given for his work on deducing the codon basis of the genetic code. Guest edited by Profs. Aradhyam and Jagannathan (who is also an Executive Editor) this Issue Focus is timed to coincide with what would have been the 100th year of his birth (Aradhyam and

✉ Damien Hall
hall.damien@staff.kanazawa-u.ac.jp;
damienhall30@gmail.com

¹ WPI Nano Life Science Institute, Kanazawa University, Ishikawa 920-1164 Kakumamachi, Kanazawa, Japan

² Department of Applied Physics, Aalto University, FI-00076 Aalto, Finland

¹ I genuinely enjoyed and appreciated this historical aspect of Steve's approach to science and can highly recommend a visit for any scientists travelling to Nottingham.

Jagannathan 2022). Those interested in contributing are requested to contact the guest editors directly.

The next commentary is an invited contribution derived from the IUPAB Women in Science Symposium (Crossman and Nonato 2021). Over the coming year, we will hear the life story of three of the speakers featured in this symposium, with the first of these contributed from Pimchai Chaiyen, a Thai scientist, who is both a professor and group leader at the School of Biomolecular Science and Engineering (BSE) at Vidyasirimedhi Institute of Science and Technology in Rayong, Thailand (Chaiyen 2022). Weaving her career as a molecular enzymologist into her life story, Prof. Chaiyen's commentary is a very interesting read.

The final front-section Commentary in Issue 3 is the multi-author Editors' Roundup piece (Nagayama et al. 2022). Meant to provide an open forum for Editorial Board Members of any journal that is recognized for publishing biophysical content, contributors are asked to describe up to five recent articles that they have personally found interesting, giving a short justification of their recommendation. The current Editors' Roundup contains contributions from four different journals, namely Biophysics and Physicobiology, Cell Biochemistry and Biophysics, the European Biophysics Journal and Biophysical Reviews (Nagayama et al. 2022). Meant to facilitate promotion of diverse biophysical content on an international stage, potentially interested contributors are requested to contact the professional officers of the journal or a senior member of the editorial board for information relating to deadlines and procedure for participation (Shearwin et al. 2022).

The main body of this Issue contains one scientific letter and six review articles. Contributed by members of the Laboratory of Applied Biomedical Physics (University of Rio de Janeiro), the scientific letter describes the use of synchrotron X-ray radiation to conduct phase contrast microtomography (PhC-SR- μ CT) of small tissue samples such as insects and amphibian larvae (Sena et al. 2022). Describing practical aspects of the experiment and its subsequent computational analysis, the authors raise the point that PhC-SR- μ CT methods have, in many situations, the potential to outperform thin section histology-based reconstruction approaches (Sena et al. 2022).

Contributed by Assistant Professor Vanessa Meier-Stephenson from the Department of Infectious Diseases (Faculty of Medicine and Dentistry) University of Alberta, Canada, the first of the six review articles within this Issue discusses what is known of the structure–function relationships associated with a special nucleic acid secondary structural state, known as the G4 quadruplex, that is frequently adopted by DNA sequences located within regulatory regions (Meier-Stephenson 2022). Formed from planar stacks of four series of guanine nucleotides held together by metal ion stabilized Hoogsteen bonds, the G4 quadruplex

is defined by the generic sequence $G_xN_yG_xN_yG_xN_yG_x$, where G indicates a guanine ribo/deoxyribo-nucleotide, N is any other residue and the subscripts indicate number of sequential nucleotides such that $x \geq 2$ and $1 \leq y \leq 7$. This Review provides an excellent overview of a relatively new topic in structural biology and discusses what is known about the role of G4 quadruplexes in disease via disruption of their normal action in DNA replication, gene expression, and telomere maintenance ([Meier-Stephenson 2022).

The next review article, contributed by a team of four senior scientists located in Japan and the USA, treats the topic of lipid membrane phase separation into micro and nanodomains—a concept in biology often termed the lipid raft model (Murata et al. 2022). In this work, the authors discuss results generated from ternary component membrane model systems consisting of sphingomyelin (SM), an unsaturated phospholipid (PL), and cholesterol (Cho). Reviewing a wide array of computer simulation results (molecular dynamics) and experiments (including nuclear magnetic resonance, optical microscopy data (gained from single particle tracking, Raman, and fluorescence experiments), electron microscopy and calorimetry), the authors argue that nanodomain formation is primarily driven by attractive homotypic interactions between SM head group moieties with Cho positioned at the interface of the ordered-to-disordered nanodomain phase boundary. This review article is comprehensive in its scope with many pertinent parallels drawn to biological situations (Murata et al. 2022).

The third article in the review section is a contribution from three scientists, based between Turkey and the USA, that discusses the role in neurodegenerative disease of intrinsically disordered proteins (IDPs) and proteins containing intrinsically disordered protein regions (IDPRs) (Coskuner-Weber et al. 2022). Employing a range of analytical tools useful for defining structurally constant/ disordered regions within a sequence and predicting the identity and likelihood of protein interacting partners, the authors discuss the heretofore largely anathematic possibility of exploiting IDPs/IDPRs as potential drug targets. Initially describing diseases associated with both well-known IDPs (e.g., Alzheimer's disease and A β peptide; Parkinson's Disease and α -synuclein) and less well known IDPs (e.g., mitochondrial myopathy and CHCHD10 protein; Alzheimer's disease and CHCHD2), the authors then introduce the wide spectrum associative effects seen between neurodegenerative disease and a range of G-Protein Coupled Receptors (GPCRs) which are IDPRs involved with intracellular signaling. Quite wide in its aims (disease etiology, brain anatomy, protein–protein association, protein conformational flexibility), the authors provide a new take on this subject, which is often restricted to rather simple considerations of the amyloid cascade hypothesis that relate extents of protein aggregation to disease outcome) (Coskuner-Weber et al. 2022).

The fourth article, contributed by a team from the National University of Singapore, is a short and focused review concerned with the effects of small ligands on the nucleic acid driven liquid–liquid phase separation (LLPS) of the SARS Corona Virus Nucleocapsid N protein (Dang and Song 2022). With LLPS having been previously identified as a potentially important step in virus packaging (prior to its lytic egress from an infected cell) the authors have concentrated on reviewing recent nuclear magnetic resonance studies of the effects of the small molecules, ATP and hydroxychloroquine, on the SARS CoV-2 virus LLPS process. The authors suggest that changes in intracellular ATP concentrations throughout the infection process may act to both facilitate the required unpackaging and repackaging of the SARS CoV-2 virus through weak competitive interactions for the N-protein between ATP and viral nucleic acid. However, based on evidence indicating stronger affinity for the N-protein by hydroxychloroquine the authors suggest a mechanism through which it may exert an overall negative effect on the viral repackaging process (Dang and Song 2022).

The fifth review article, contributed by Dr. Saleem You-suf Bhat (Indian Institute of Science located in Bengaluru, India), is concerned with the promiscuity of metal ion cofactors on the function of aminopeptidase enzymes (Bhat 2022). Aminopeptidases are an important class of protein hydrolyzing enzymes that sequentially remove amino acids from the N-terminus. As different aminopeptidase subclasses show specific involvement with certain disease-causing parasitic organisms (such as plasmodium associated with malaria) the aminopeptidases have begun to be explored as potential drug targets. In this review, the author discusses evidence showing the dramatic (multiple order of magnitude) effects exerted by the extent and type of metal ion occupancy on aminopeptidase structural stability, its potential inhibition by drug candidates, and its nascent enzymatic activity. The author raises this point as a warning to both computational and experimental scientists seeking to screen anti-aminopeptidase ligands as potential drug candidates (Bhat 2022).

The final review article provides an overview of bio-piezoelectricity (Kamel 2022). Submitted by a researcher from the Microwave Physics and Dielectrics Department (Physics Research Institute, National Research Centre, Cairo, Egypt), this review traces the historical discovery of piezoelectricity in inorganic crystals and the establishment of the phenomena in organic crystals and biological tissues like collagen and bone. The author provides a straightforward description of methods for quantifying the piezoelectric phenomenon and then speculates about the use of bio-piezoelectric materials for use as sensors within the body (Kamel 2022). The present article provides some additional perspective to a recent review article (appearing within the journal) that dealt with

a different aspect of bio-piezoelectricity (Poillot et al. 2021). Importantly, the present article also represents the first primary submission to Biophysical Reviews from Egypt!²

Open call for the 2023 Michèle Auger Award

Each year, the journal runs a single competition known as the ‘Michèle Auger Award for Young Scientists’ Independent Research’. This award has two important purposes. Firstly, it acts as a commemorative for Prof. Michèle Auger, an active (Fillion and Auger 2015; Martial et al. 2018) and much-admired member of the Biophysical Review’s editorial board who sadly passed away in late 2018 (IUPAB 2019). Secondly, it acts as an instrument for recognizing and promoting the careers of talented young biophysical scientists. Now in its fourth year, the Michèle Auger Award for Young Scientists’ Independent Research is open to anyone who is actively engaging in biophysical research and is under the age of 40 at the close of the application deadline (October 31st, 2022). The winner receives a plaque, a free personal subscription to the journal (courtesy of Springer-Nature) and an invitation to submit a single author review article to Biophysical Reviews to be published with gold open access (at the expense of the journal). Each winner’s published review carries a short foreword about the life of Professor Michèle Auger, along with a description of her work associated with teaching and training the next generation of biophysical scientists.

First run in 2020, the three previous winners are listed below along with details about their public research profile and published award review article.

- Assoc. Prof. Miho Yanagisawa (winner 2022) Web: <https://sites.google.com/g.ecc.u-tokyo.ac.jp/yanagisawa-lab/>
- Assoc. Prof. Jorge Alegre-Cebollada (winner 2021) Web: <https://www.cnice.es/en/jorge-alegre-cebollada> (Alegre-Cebollada 2021).
- Assoc. Prof. Alexandra Zidovska (winner 2020) Web: <https://www.physics.nyu.edu> (Zidovska 2020).

The most recent winner of the 2022 Michèle Auger Award for Young Scientists’ Independent Research, Assoc. Prof. Miho Yanagisawa (Fig. 1), is scheduled to submit her

² In closing this precis of Issue contents, I would like to offer my apologies to the group of Prof. Manouchehr Vossoughi. In describing their review article on microfluidic approaches to the study of cancer biology (Hall 2022b; Hakim et al. 2022), I incorrectly described their affiliation as Shiraz University whereas their actual affiliation is the Department of Chemical and Petroleum Engineering, Sharif University of Technology, Tehran, Iran.

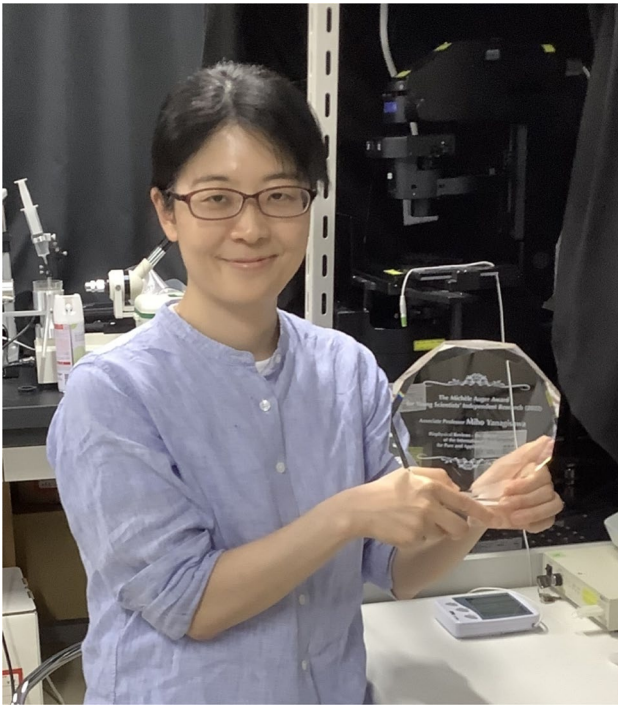


Fig. 1 Associate Professor Miho Yanagisawa, the 2022 recipient of the Michèle Auger Award for Young Scientists' Independent Research, receiving her winning plaque in her laboratory. Web: <https://sites.google.com/g.ecc.u-tokyo.ac.jp/yanagisawa-lab/>

review article in an upcoming 2022 Issue of *Biophysical Reviews* (Issue 5–October).

Making an application for the 2023 award is simple — it requires nomination (either self-nomination or nomination by a colleague) and submission of a one-page curriculum vitae and five of the nominee's best research papers. Nominations and document submission should be made to any of the *Biophysical Reviews* senior editors via email, with all documents requested to be submitted as pdf files. The deadline, list of required documents and senior editors available for inquiry and document submission are as follows.

Details of the 2023 Michèle Auger Award.

Nomination deadline—31st October 2022.

Required documents (pdf format).

- 1 page c.v.
- 5 representative papers

Submissions/inquiries may be directed to
 D. Hall: hall.damien@staff.kanazawa-u.ac.jp
 N. Jagannathan: jagan1954@hotmail.com
 W. Olson: wilma.olson@rutgers.edu
 K. Nagayama: nagayama@nips.ac.jp
 R. Itri: itri@if.usp.br
 J. Ho: jwkh@hku.hk
 S. Harding: steve.harding@nottingham.ac.uk

G. Rivas: grivas@cib.csic.es

Additional details about the design of the award along with the particulars of each of the previous years' competitions (announcement, rules, and judging process) can be found in the following references (Hall 2019; Hall 2020a, b, c; 2021a, b, c Hall 2022a, b).

Concluding remarks

More can be learnt about the journal at its official Springer-Nature website and also from its social media pages on Twitter and YouTube (Hall 2017; Hall 2020c).

Web: <https://www.springer.com/journal/12551>

Twitter: @BiophysicalRev1.

YouTube: www.youtube.com/channel/UCzG_5MWmnrB2UBibtxs2DuA

Potential authors interested in submitting an article to *Biophysical Reviews* are encouraged to first raise the matter with either the Chief Editor or their local Executive or Editorial Board Member. After discussion on the suitability of their article, a timetable for their submission will be arranged in conjunction with the professional officers of the journal.

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Declarations

Human and animal rights No humans or animals were harmed during the writing of this article.

Conflict of interest D.H. reports no conflict of interest.

References

- Alegre-Cebollada J (2021) Protein nanomechanics in biological context. *Biophys Rev* 13(4):435–454. <https://doi.org/10.1007/s12551-021-00822-9>
- Aradhyam GK, Jagannathan NR (2022) *Biophysical Reviews* contribution call: an issue focus on the life and works of Prof. Har Gobind Khorana on the occasion of the 100th anniversary of the year of his birth. *Biophys Rev* 14(3). <https://doi.org/10.1007/s12551-022-00958-2>. Current Issue
- Bazhenova A, Gao F, Bolgiano B, Harding SE (2021) Glycoconjugate vaccines against *Salmonella enterica* serovars and *Shigella* species: existing and emerging methods for their analysis. *Biophys Rev* 13(2):221–246. <https://doi.org/10.1007/s12551-021-00791-z>

- Bhat SY (2022) Drug targeting of aminopeptidases: Importance of deploying a right metal cofactor. *Biophysical Reviews*, 14(3). <https://doi.org/10.1007/s12551-022-00956-4>. Current Issue.
- Chaiyen P (2022) Pimchai Chaiyen's biography. *Biophysical Reviews*, 14(3). <https://doi.org/10.1007/s12551-022-00965-3>. Current Issue.
- Coskuner-Weber O, Mirzanli O, Uversky VN (2022) Intrinsically Disordered Proteins and Proteins with Intrinsically Disordered Regions in Neurodegenerative Diseases. *Biophysical Reviews*, 14(3). <https://doi.org/10.1007/s12551-022-00968-0>. Current Issue.
- Crossman DJ, Nonato MC (2021) Women in science symposium. *Biophys Rev* 13(6):1–3. <https://doi.org/10.1007/s12551-021-00881-y>
- Dang M, Song J (2022) A review of the effects of ATP and hydroxy-chloroquine on the phase separation of the SARS-CoV-2 nucleocapsid protein. *Biophysical Reviews*, 14(3). <https://doi.org/10.1007/s12551-022-00957-3>. Current Issue.
- Fillion M, Auger M (2015) Oriented samples: a tool for determining the membrane topology and the mechanism of action of cationic antimicrobial peptides by solid-state NMR. *Biophys Rev* 7(3):311–320. <https://doi.org/10.1007/s12551-015-0167-5>
- García de la Torre J, Harding SE (2013) Hydrodynamic modelling of protein conformation in solution: ELLIPS and HYDRO. *Biophys Rev* 5(2):195–206. <https://doi.org/10.1007/s12551-013-0102-6>
- Hakim M, Kermanshah L, Abouali H, Hashemi HM, Yari A, Khorasheh F, Alemzadeh I, Vossoughi M (2022) Unravelling cancer metastatic cascade using microfluidics-based technologies. *Biophys Rev* 14(2). <https://doi.org/10.1007/s12551-022-00944-8>
- Hall D, Harding SE (2016) Foreword to 'Quantitative and analytical relations in biochemistry'—a special issue in honour of Donald J. Winzor's 80th birthday. *Biophys Rev* 8(4):269–277. <https://doi.org/10.1007/s12551-016-0227-5>
- Hall D (2017) Innovations in publication: free sharing of all *Biophysical Reviews*' content. *Biophys Rev* 9(2):67–68. <https://doi.org/10.1007/s12551-017-0253-y>
- Hall D (2019) *Biophysical Reviews* enters the online world, provides a focus on biophysics in Asia. *Biophys Rev* 11(3):249–250. <https://doi.org/10.1007/s12551-019-00544-z>
- Hall D (2020a) A new decade for *Biophysical Reviews* and a look into the future of biophysics. *Biophys Rev* 12:1–7. <https://doi.org/10.1007/s12551-020-00622-7>
- Hall D (2020b) *Biophysical Reviews*—Quantitative analysis of biological phenomenon. *Biophys Rev* 12:601–605. <https://doi.org/10.1007/s12551-020-00702-8>
- Hall D (2020c) *Biophysical Reviews*: a Q1 ranked journal in biophysics and structural biology. *Biophys Rev* 12:1085–1089. <https://doi.org/10.1007/s12551-020-00764-8>
- Hall D (2021a) *Biophysical Reviews* – A call to young biophysicists. *Biophys Rev* 13(3):289–294. <https://doi.org/10.1007/s12551-021-00810-z>
- Hall D (2021b) *Biophysical Reviews*: slowly getting back to 'normal'? *Biophys Rev* 13(2):161–165. <https://doi.org/10.1007/s12551-021-00797-7>
- Hall D (2022a). *Biophysical Reviews*: from the umbra of 2020–2021 into the antumbra of 2022a. *Biophysical Reviews*, pp.1–10. <https://doi.org/10.1007/s12551-022-00938-6>
- Hall D (2021c) *Biophysical Reviews*—the IUPAB journal tasked with advancing biophysics. *Biophys Rev* 13(1):1–6. <https://doi.org/10.1007/s12551-021-00788-8>
- Hall D (2022b) *Biophysical Reviews*: focusing on an issue. *Biophys Rev* 14:413–416. <https://doi.org/10.1007/s12551-022-00953-7>
- Harding SE (2022) *Biophysical Reviews*' "Meet the Editors Series"—a profile of Steve Harding's career in Macromolecular Hydrodynamics. *Biophys Rev* 14. <https://doi.org/10.1007/s12551-022-00963-5>. Current Issue
- Harding SE, Gillis RB, Adams GG (2016) Assessing sedimentation equilibrium profiles in analytical ultracentrifugation experiments on macromolecules: from simple average molecular weight analysis to molecular weight distribution and interaction analysis. *Biophys Rev* 8(4):299–308. <https://doi.org/10.1007/s12551-016-0232-8>
- IUPAB (2019) Newsletter, issue 70 (February). <http://iupab.org/2018/11/06/obituary-Michèle-auger-former-iupab-councilor/> (accessed 7th of June 2022)
- IUPAB (2022) <http://iupab.org/>. Accessed 5/4/2022
- Kamel NA (2022) Bio-piezoelectricity: fundamentals and applications in tissue engineering and regenerative medicine. *Biophysical Reviews*, 14(3). <https://doi.org/10.1007/s12551-022-00969-z>. Current Issue.
- Martial B, Lefèvre T, Auger M (2018) Understanding amyloid fibril formation using protein fragments: structural investigations via vibrational spectroscopy and solid-state NMR. *Biophys Rev* 10(4):1133–1149. <https://doi.org/10.1007/s12551-018-0427-2>
- Meier-Stephenson V (2022). G4-quadruplex-binding proteins: review and insights into selectivity. *Biophysical Reviews*, 14(3). <https://doi.org/10.1007/s12551-022-00952-8>. Current Issue.
- Murata M., Matsumori N., Kinoshita M. and London E. (2022) Molecular substructure of the liquid-ordered phase formed by sphingomyelin and cholesterol: Sphingomyelin clusters forming nano-subdomains are a characteristic feature. *Biophysical Reviews*, 14(3). <https://doi.org/10.1007/s12551-022-00967-1>. Current Issue.
- Nagayama K., Patel T., Nakamura H., Berliner L., and Hall D. (2022) Editors' Roundup: June 2022. *Biophysical Reviews*, 14(3). <https://doi.org/10.1007/s12551-022-00970-6>. Current Issue.
- Phillips-Jones MK, Harding SE (2018) Antimicrobial resistance (AMR) nanomachines—mechanisms for fluoroquinolone and glycopeptide recognition, efflux and/or deactivation. *Biophys Rev* 10:347–362. <https://doi.org/10.1007/s12551-018-0404-9>
- Poillot P, Le Maitre CL, Huyghe JM (2021) The strain-generated electrical potential in cartilaginous tissues: a role for piezoelectricity. *Biophys Rev* 13(1):91–100. <https://doi.org/10.1007/s12551-021-00779-9>
- Sena G, Fidalgo G, Paiva K, Barcelos R, Nogueira LP, Colaço MV, Gonzalez MS, Azambuja P, Colaço G, da Silva HR, de Moura Meneses AA, Cély Barroso R (2022) Synchrotron X-ray biosample imaging: opportunities and challenges. *Biophys Rev*, 14(3). <https://doi.org/10.1007/s12551-022-00964-4>. Current Issue.
- Shearwin K, Nakamura H, Berliner L, Hall D (2022) Editors' roundup: April 2022. *Biophys Rev* 14:423–425. <https://doi.org/10.1007/s12551-022-00954-6>
- Winzor DJ, Dinu V, Scott DJ, Harding SE (2021) Quantifying the concentration dependence of sedimentation coefficients for globular macromolecules: a continuing age-old problem. *Biophys Rev* 13(2):273–288. <https://doi.org/10.1007/s12551-021-00793-x>
- Zidovska A (2020) The rich inner life of the cell nucleus: dynamic organization, active flows, and emergent rheology. *Biophys Rev* 12(5):1093–1106. <https://doi.org/10.1007/s12551-020-00761-x>