Newsletter
Biophysical Society MAY 2017

DEADLINES

Meetings 2017

Conformational Ensembles from Experimental Data and Computer Simulations
August 25–29
Berlin, Germany

May 22
Late Abstract Submission

Emerging Concepts in Ion Channel Biophysics
October 10–13
Mexico City, Mexico

May 26
Abstract Submission

June 23
Early Registration

Biophysics Week 2017 in the Books

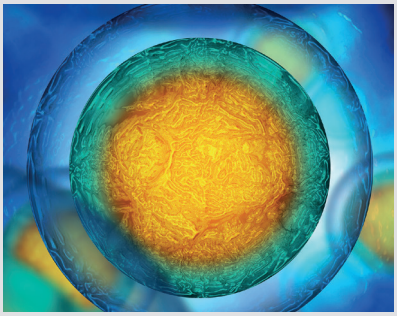
Forty-three events. More than 82,000 people reached via social media. Three webinars. Eight new profiles. Spanish language lesson plans. Guidelines for starting an undergraduate biophysics program. A congressional briefing with Nobel Laureate *Peter Agre*. That was Biophysics Week 2017.

Thanks to everyone who participated and made it a success! You know all the amazing things that biophysicists do, and the week was a chance to share tham with others.

The Society released several new resources, mentioned above, during the week, and we encourage you to use and share them throughout the year. They can be found on the Society website under Education/Biophysics Week.

Save the date for Biophysics Week 2018: March 12–16, 2018!

Universities in, left to right, Bridgewater, Massachusetts; Bogota, Columbia; and La Laguna, Spain, held Biophysics Week activities.



The Biophysical Society and IOP Publishing form new partnership to create ebooks program for the biophysics community.

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Biophysicist in Profile

MICHEL LAFLEUR

Michel Lafleur

Michel Lafleur describes himself as, "one of those kids who got interested very early in science. When I was about 10, I spent incalculable hours in our basement playing with my chemistry kit, amazed by the change of color of a flame when different salts were sprinkled, trying to make my rocket lift as high as possible with a mixture of vinegar and baking soda." His father was a welder and quite a handy man, fixing anything in the house that needed repair. His mother worked at home, raising Lafleur and his two brothers and managing much of the household labor. "I inherited their enjoyment of work well done," he says, "but there is no science gene."

He followed a science track in high school and then entered the chemistry program at Université de Sherbrooke in the Eastern Townships of Québec without hesitation. When he started at university, he did not plan on pursuing a PhD, but an undergraduate research opportunity opened his eyes to that idea. "The department has a co-op program and I had the opportunity to spend a summer in a research laboratory with Professor *Jean-Pierre Caillé*," he shares. "I studied the variation of sarcomere length as a function of the ionic strength using a diffraction method. This project was in collaboration with Professor *Michel Pézolet*, at Université Laval, in Québec City; Michel was looking at the change in protein secondary structure during muscle contraction by Raman spectroscopy. This is how I met him and decided to join his group for a PhD."

Lafleur's doctoral project was to examine whether melittin, a peptide from bee venom, could induce a phase separation in lipid bilayers, using mainly Raman spectroscopy. "It was at a time when there was a big debate about boundary lipids around transmembrane peptides, a controversy that was essentially due to the timescale that people were considering," he says.

Following his PhD studies, he went to the University of British Columbia to join a project with *Myer Bloom* and *Pieter Cullis*. "Myer was a leader in the development of deuterium solid state NMR for soft materials such a lipid bilayers while Pieter pioneered the use of phosphorus NMR to study lipid polymorphism," he says. Lafleur's project was to find out any information about lipid polymorphic propensities that could be obtained by deuterium NMR. "The great thing was that we got an agreement with Avanti Polar Lipids so I prepared a batch of deuterated palmitic acid and they made POPC and POPE with deuterated palmitoyl chain," he shares. "In those days, deuterated phospholipids were not commercially available and getting this valuable material put us in an enviable position." They were able to detail the impact of various parameters on the order profile of lipid acyl chains. At the end of his postdoc appointment, putting together the NMR data and x-ray diffraction measurements from *Sol Gruner's* group, then at Princeton, they were able to propose a model that bridged the dimension of inverted hexagonal phase and acyl chain order.

Following his postdoc, Lafleur was offered a position at Université de Montréal, so he returned to his hometown. "Currently, I am a full professor in the chemistry department of the Université de Montréal. I am happy with this position. Montréal has just been identified last February as the best university student city in the world by the Quacquarelli Symonds Institute. It is a stimulating environment to carry out research," he shares. "Soft materials science is a well-established field in our university so there is an exciting momentum: several great colleagues, a good bunch of enthusiastic students, and a great instrumental infrastructure."

Lafleur's lab is currently conducting research in three areas. First, they are working at gaining a better understanding of the relationship between the structure and the function of skin lipids. "Skin involves several lipids that are unusual for biological membranes; these provide a rather unique structure, including a high level of crystallinity, and a rather unusual impermeability, determining both the rate of water loss through the skin, and absorption of exogenous molecules into the body," he explains. Second, they are studying proteins and peptides that have the ability to extract lipids from membranes. In some systems, such as those involving some toxins, it leads to cell death. In other systems, this process is vital. "We are trying to define the mechanisms of lipid extraction induced by peptides and proteins with a special focus on its lipid specificity," Lafleur says. Finally, they are working on translating knowledge about lipid physical chemistry to contribute to the development of liposomes as drug nanovectors. "We have recently participated in the development of a very innovative platform for drug delivery, in a project led by Professor *Sylvain Martel* from École Polytechnique, in Montréal. We have trapped a drug in liposomes and attached these drug-loaded liposomes to a magnetotactic bacteria. About one million of these bacteria were injected near cancer tumors in mice and were concentrated in the core of the tumors, using magnetic field gradients to guide them," he says. "This directed drug delivery by 'nanorobots' enabled us to obtain remarkable therapeutic effects with relatively small amounts of drug. This exciting project involves engineers, microbiologists, chemists, biochemists, oncologists, surgeons, and pathologists and is a perfect example of multidisciplinary research."

An ongoing challenge for Lafleur has been keeping a sensible pace and balance among the many aspects of a faculty member's job. "Research is a very gripping activity. It is also essentially endless," he notes. Balancing research with a teaching load is not the full picture, given additional commitments that scientists undertake. "The university system and the science system are both functioning based on the considerable involvement of their members. I believe it is our responsibility to get involved so things run well," says Lafleur. "It can be reviewing manuscripts, grant applications, evaluating theses, sitting on various committees, managing instrumental platforms; I would say that every faculty member can make her/his own list. These add up and a big challenge I find is to avoid packing too many things with tight deadlines as these enjoyable activities can become less pleasurable under time stress."

Lafleur finds time to bike whenever possible, both around Montreal and on cycling holidays with his wife. "My wife and I spent our last summer holidays cycling about 600 km on the rolling hills of Nova Scotia, in the Atlantic part of Canada. Previously, we cycled around Champlain Lake, on Prince-Edward Island, and around St-Jean Lake in Québec," he says. "We carry our camping supplies, clothes, food. We find this is one of the best ways to explore an area."

He also enjoys visiting art museums and galleries, especially those with contemporary art collections. "I can confess that I took advantage of most of the Biophysical Society annual meetings to visit local art museums," he shares. "Maybe a few people are not so thrilled when the meeting is in Baltimore but, besides the exciting meeting, the Matisse collection of the Baltimore Museum of Art is superb!"

Lafleur in front of The Broad museum during the 2016 Annual Meeting.

Profilee-at-a-Glance

Institution
Université de Montréal

Area of Research
Physical chemistry of lipid self-assembled systems

Public Affairs

Things Are Changing Fast

Since inauguration day, executive orders, budget proposals, and policy preferences have been popping up constantly in Washington, DC. While many of these announcements only indicate a preference and don't result in any actual changes, many are also alarming in that if they are adopted as law, they will have a very negative impact on the scientific research enterprise in the United States.

One of the areas of concern has been the federal budget. Congress had passed a continuing resolution funding the government through April 28, 2017. They needed to pass new legislation to fund the government through the rest of the fiscal year (FY), which ends on September 30, 2017. To throw a wrench into the mix, President Trump submitted a proposal to Congress in late March asking Congress to slash spending at several agencies in order to increase defense spending and pay for the wall along the border with Mexico. His proposal included suggested cuts of $1.2 billion to the National Institute of Health (NIH), $37 million to the Department of Energy Office of Science, and $330 million to the National Science Foundation (NSF). Several members of Congress on both sides of the aisle expressed their opposition to these cuts.

In the meantime, the Society has signed several community letters calling on Congress to disregard these suggested cuts and to pass a FY 2017 bill that includes increases for the science agencies agreed to by the appropriations committees last fall. The Society also sent a call to action to members asking them to write as constituents; over 800 letters were sent doing just that.

At the time of publication, it is unclear what will happen with the 2017 budget come April 28. The Society will have an update on its website. In May, the 2018 budget process will be in full swing when President Trump is expected to release his complete budget proposal and Congress is expected to begin the appropriations process.

The Society will be advocating for steady, sustainable, and predictable increases for scientific research, as well as relief from the sequestration caps that are set to be in effect in 2018 and will tie Congress's hands in making these needed investments. Stay tuned.

March for Science

The Biophysical Society officially endorsed the March for Science that took place at locations around the globe on April 22. Members were encouraged to join the effort to show their support for science, including evidence-based decision making, education, and research. Now that the event has passed, members are encouraged to stay involved and active in engaging the public and elected leaders on science issues. The Society will be launching a Six Weeks, Six Activities Campaign to help members do just that. An activity will be suggested each week, including:

- Write letters to your members of Congress and Senators (using the BPS advocacy and action center on the website makes this easy!)
- Tweet at your elected representatives.
- Set up a meeting with other scientists to visit with your representatives at their local office and explain what you do and how federal dollars are spent right there in their district.
- Update Wikipedia in your area of expertise. This is a great way to share your knowledge with the public.
- Talk to a non-scientist about your research.

Whichever actions you decide to take, be sure to share your passion for what you do. It is a great way to make the case for fundamental research.

Be sure to check the Society website for each week's action item!

Where Biophysics Proposals are Considered Across the National Science Foundation

Due to the interdisciplinary nature of biophysics, proposals for biophysics research may be relevant to several different NSF programs. Specific funding opportunities change year to year and may not be appropriate for all proposals. For more information on each funding opportunity and to find out where your research best fits, visit nsf.gov or contact a Program Officer. To find contact information visit the program website or nsf.gov/staff.

	Molecular Biophysics	Cellular and Biochemical Engineering	Chemical and Biological Separations	Chemistry of Life Processes	Physics of Living Systems
Directorate	Biology (BIO)	Engineering (ENG)	Engineering (ENG)	Math & Physical Sciences (MPS)	Math & Physical Sciences (MPS)
Program	Molecular and Cellular Biosciences (MCB)	Chemical, Bioengineering, Environmental, and Transport Systems (CBET)	Chemical, Bioengineering, Environmental, and Transport Systems (CBET)	Chemistry (CHE)	Physics (PHY)
Medical Research	Proposals that are medically motivated are returned without review.	Disease relevant projects are welcome.	No prohibition on medically motivated projects.	Medical proposals are considered not appropriate for review.	Potential impacts on human health are considered good examples of broader impacts.
Program Officer(s)	Engin Serpersu Wilson Francisco Jarolsaw Majewski	Steve Peretti	Angela Lueking	David Rockcliffe	Krastan Blagoev
Areas of Interest	General principles of the relationship between structure, dynamics, and function of biomolecules Computation Combined theory and experiment Function and dynamics in crowded in vivo systems Supramolecular assemblies Structure Fundamental principles governing biomolecular interactions	Metabolic engineering and synthetic biology for biomanufacturing Quantitative systems biotechnology Tissue engineering and stem cell culture technologies Protein engineering, biocatalysis, and enzyme technologies Single cell dynamics and modeling Development of novel 'omics' tools for biotechnology applications	Protein-Protein interactions Nanostructured materials for separation Biorenewable resource separation processes Purification of water and wastewater via membranes, adsorption, solvents, or other interfacial processes Field induced separations Alternative or 'green' separations that demonstrate a significant reduction in energy and/or materials requirements	The development of bio-orthogonal chemistry for probing cellular function The quantitative understanding of thermodynamics as applied to a cellular system Biomolecular design, syntheses and engineering aimed at understanding biological function The uses of theory, computation, modeling and/or simulation as applied to the chemical aspects of biological systems	Physics applied to biological systems as they relate to cells or larger scale living systems Exploration of artificial life forms and how life began A broad spectrum of physics approaches in biology (however projects which simply use physics equipment only as a tool to study biological questions are of very low priority)
Solicitation Number	13-510	17-1491	16-1417	09-6883	14-576
Types of Submissions	Each program receives applications both through their annual program solicitations (see solicitation number or program announcement for more information and annual deadlines) as well as through additional mechanisms for which applications are accepted on a varied, sometimes rolling, basis. Applications in response to the annual program solicitation or announcement (see individual solicitation number or program announcement) do not require letters of intent or preliminary proposals. Applications can be completed through FastLane or Grants.gov Additional funding mechanisms differ between program and year, and some may require contacting a program officer. For more information see the program solicitation, program website, or contact a program officer.				
Categories of Funding	Programs may accept proposals in the following categories: Faculty Early Career Development Program (CAREER), Research Coordination Networks (RCN), Research at Undergraduate Institutions (RUI), Grants for Rapid Response Research (RAPID), Early-concept Grants for Exploratory Research (EAGER), Proposals for Creative Research Awards for Transformative Interdisciplinary Ventures (CREATIV), Science Across Virtual Institutes (SAVI), Grant Opportunities for Academic Liaison with Industry (GOALI), Sustainable Chemistry, Engineering, and Materials Funding Opportunity (SusChEM), and special meetings and workshops. Visit nsf.gov/funding for more information and the most up to date list of opportunities.				

All information was current as of March 31, 2017. Annual grants in response to program solicitations can be completed via FastLane or Grants.gov. Any proposal submitted to NSF must be submitted in accordance with the revised NSF 17-1 Proposal & Award Policies & Procedures Guide (PAPPG), which is effective for proposal submitted, or due, on or after January 30, 2017.

Biophysical Journal

New Comprehensive Reviews

Tropomodulins and Leiomodins: Actin Pointed End Caps and Nucleators in Muscles by Velia M. Fowler and Roberto Dominguez is the first article to be published in BJ under the category Comprehensive Review. This is a new category of articles that will appear only once or twice a year, each invited by the Journal Editorial Board. They differ from Perspectives in Biophysics — short articles on the current state and future of a field — in that they are longer, more traditional reviews. In this review, the authors propose a model of Leiomodins function that attempts to reconcile the in vitro and in vivo data, whereby Leiomodins nucleate actin filaments that are subsequently capped by Tropomodulins during sarcomere assembly, turnover, and repair. See all that the May 9 issue of BJ has to offer at http://www.cell.com/biophysj/.

Highlights from *Biophysical Journal*

May 9 Issue

Visualizing Calcium Flux in Freely Moving Nematode Embryos

A. Kumar et al.

Mechanotransduction Dynamics at the Cell-Matrix Interface

S. Weinberg et al.

Biophysical Letter - *Multiplexed Dynamic Imaging of Genomic Loci in Single Cells by Combined CRISPR Imaging and DNA Sequential FISH*

Y. Takei et al.

Computational Tool - *AESOP: A Python Library for Investigating Electrostatics in Protein Interactions*

R. Harrison et al.

Update to Reproducibility Guidelines

The *Biophysical Journal* has added new language to the Guidelines for Reproducibility of Biophysics Research to encompass the guidelines for reporting enzymology data. This new language is reproduced below. To find the complete guidelines, visit http://www.cell.com/pb/assets/raw/journals/society/biophysj/PDFs/reproducibility-guidelines.pdf.

Enzyme activity and kinetics data

When reporting kinetic and equilibrium binding data, authors should consult the Standards for Reporting Enzymology Data (STRENDA) commission guidelines. See the Beilstein Institut STRENDA Commission Guidelines website (http://www.beilstein-institut.de/en/projects/strenda/guidelines) for details. Manuscripts reporting kinetic and binding data must include a description of the identity of the catalytic or binding entity (enzyme, protein, nucleic acid or other molecule). This information should include the origin or source of the molecule, its purity, composition, and other characteristics such as post-translational modifications, mutations, and any modifications made to facilitate expression or purification. The assay methods and exact experimental conditions of the assay must be fully described, if it is a new assay, or provided as a reference to previously published work, with or without modifications (where any modifications must be specified). The temperature, pH and pressure (if other than atmospheric) of the assay must be included, even if previously published.

By the Numbers

Over the past five years, the Biophysical Society's Twitter following has increased 483%.

IOP Partnership

The Biophysical Society and IOP Publishing have forged a new publishing partnership to support the development and dissemination of knowledge in biophysics, through the creation of a comprehensive collection of ebooks.

The collaboration will bring the expertise and domain knowledge of the Biophysical Society into the IOP ebooks program, in order to build a library of content that defines biophysics and serves this growing and diverse research community.

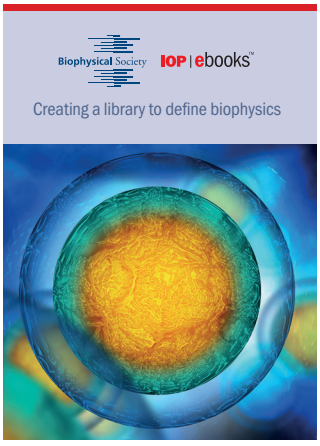
The program will publish textbooks, monographs, reviews, and handbooks covering all areas of biophysics research, applications, education, methods, computational tools, and techniques. Subjects of the collection will include: bioenergetics; bioengineering; biological fluorescence; biopolymers in vivo; cryo-electron microscopy; exocytosis and endocytosis; intrinsically disordered proteins; mechanobiology; membrane biophysics; membrane structure and assembly; molecular biophysics; motility and cytoskeleton; nanoscale biophysics; and permeation and transport.

The new books will be available in multiple formats, including HTML, PDF, EPUB 3, and MOBI for Kindle so that books will be available to read on different devices and with options for multimedia and mathML. Print on demand will also be available. Unlimited concurrent usage is another feature the IOP offers and that attracted the Society to this partnership. The new book series will be hosted on IOPscience, which will maximize discoverability by providing journals and books content to readers on a single platform.

Rosalba Kampman, Executive Officer of the Biophysical Society, said: "The Society leads the development and dissemination of knowledge in biophysics, and this vision for a new collection of books developed and written by the community, for the community, absolutely supports our core mission. And collaborating closely with IOP Publishing, a society publisher that holds values in common with our own, will be an effective way to deliver this initiative to our members and the broader biophysics community."

Commissioning of the new series is already underway, and the first titles will be published in 2019. The program is supported by a specially selected editorial advisory board, comprising experts from the biophysics community who will identify key areas of interest for the Biophysical Society's members and the wider community.

We welcome you to join us in the development of this program. If you would like to submit a book proposal, please contact us at ebooks@iop.org.



Biophysical Society Webinars

Career Planning and Job Searching for Entrepreneurial-Focused Science Professionals

May 25, 2:00 PM EDT

Biophysical Society Members: FREE
Non-members: $15

Register Today at biophysics.org/webinars

Publications

How to Write a Biophysics Article Worthy of Publication:

Part 1- From Lab Notebook to First Draft

William O. Hancock
Pennsylvania State University

This is the first part of a three-part series, How to Write a Biophysics Article. Although the suggestions herein are geared toward a *Biophysical Journal* paper and are targeted for graduate students and postdocs, they apply generally to all scientific writing and all levels of scientists and engineers. In this first paper, I will discuss the hardest part of writing a manuscript — writing the first full draft. The important tasks of polishing your writing and figures to achieve publication quality will be tackled in the second paper, and the third paper will cover navigating peer review and getting your manuscript published.

Although many students and postdocs put off writing until they absolutely have to, there are important reasons why you should tackle the first draft of your manuscript earlier rather than later. The most important is that writing up your work in manuscript form is the best way to clarify which experiments are essential and which are less essential or even superfluous. Although it may seem that you are losing productivity by stepping away from the bench to write, in the end you will save a lot of time by avoiding unnecessary experiments, and you will have an added focus for those experiments that you realize are needed to complete your story. The second reason for starting early is the unavoidable truth that good writing requires extensive revising, and revising takes time. So, do not wait, start writing now!

Telling your story

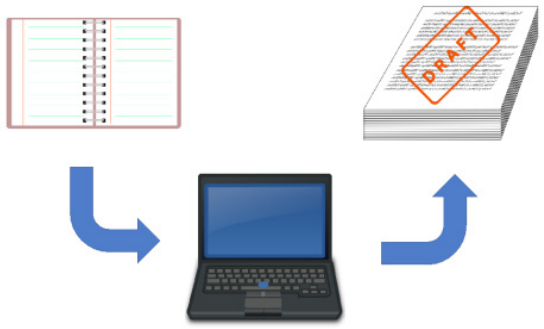
A good paper is one that addresses an important question and changes the way that the reader thinks about a problem. When you write a manuscript, it is important that you remember that you are writing for an audience. For this reason, it is often helpful to think of your paper as a story that you are telling the reader. The story is broken down into four sections: Introduction, Methods, Results, and Discussion. In writing your story you should aim to fulfill four goals:

- Explain why the question you have chosen to work on is important — guide your reader's thinking and get them excited about your work;
- Explain how you did the experiments — help your reader evaluate whether the methods are appropriate for the problem at hand;
- Clearly describe the results you obtained and the control experiments you did to substantiate your conclusions;
- Discuss how these results change the way in which we should think about the question at hand — educate your readers and convince them of the impact of your findings.

No bones about it, writing is hard. To minimize writers' block and the intimidation of a blank page, I lay out a series of steps here to help you build a first draft. It is assumed that you have a collection of data in your notebook, and you may even have an important breakthrough to report, which motivated you to write up your work. But writing is a very different activity from carrying out experiments or doing theoretical work, so having a clear game plan is vital.

Step 1: Define your story

What is the point you are trying to get across to your reader? This story is in the context of specific questions in your field, and you have a set of data that you want to present to try to tell this story. Defining the story early on is important because it will help you decide how you want to organize the presentation of your results. Defining the story is also important because it streamlines the Introduction and defines the specific background points you'll need to get the reader up to speed. Finally, the Discussion will hammer home the narrative of the story you presented in the Results — reiterating it, extending it, putting



it in the context of what has been done before, and pointing to where the story will go in the future. You should be able to summarize this story in a sentence or two and, in fact, it is a good idea to write these sentences at the top of your document that will grow into the first draft of your manuscript.

It is important to point out here that the narrative you present in your manuscript need not follow the historical sequence of your actual experiments. In fact, because research often takes a circuitous path, the ordering of the results in the manuscript generally should not follow the timeline of your experiments (and no, this is not cheating). Remember that you are writing a science story and not a science diary; hence, the trials and tribulations you encountered along the way (even though they took up a lot of your time) are not important to the reader. A related point is that you should avoid the urge to include all of your experimental data in your paper. The more threads you try to weave into the story, the more risk there is that you'll detract from the main storyline. To sum up: Think about how to create the best narrative that presents the work in a logical and memorable manner.

Step 2: Organize your figures

Your figures are the most important part of your manuscript. A good rule of thumb is that a reader should be able to look through your figures and the associated figure legends and get the gist of your story.

Hence, deciding how you organize the various plots, images, and diagrams into discrete multipanel figures is a key task. The Results section will be written around these figures, so a helpful approach is to "divide and conquer." Many journals (like the *Biophysical Journal*) allow the Results section to be broken into subsections, each with its own subhead, which makes your job much easier. Just as you wrote down the main point of your story above, write down a series of active statements that describe the data you are presenting, and use these statements to organize your figures. Then you can think of your Results as a series of chunks, each of which has an actively worded subhead that states a result (e.g., "Protein X activates complex Y"), has a figure and legend that present the data, and has one or more paragraphs that describe the data presented in the figure. These are the bullets that make up the key points of your paper.

This step is key, so here are a few pointers: (1) A good way to build your manuscript over time is to assemble your notes and data into a PowerPoint presentation that you can present at lab meetings and easily modify and reorganize. (2) For the first draft, don't worry too much about finalizing formatting of the panels in your figures, you can do this later; if some data are missing at this point, that's okay, put in a mock figure and keep pushing forward. (3) For journals that don't allow section headings, this type of organization is still helpful; just delete the headings.

Step 3. Write the Results section

Now that you have your figures together and have divided your Results into subsections, it is time to write. Each subsection should describe: (1) the specific question being addressed, (2) the methods employed, and (3) the results obtained. Each section should logically connect to and set up the next section. One good way to achieve a logical flow and a compelling narrative is to organize the sections of the Results as a series of questions. Another useful approach is to organize each section around a specific hypothesis that is being tested.

For the methods, be brief because full details are in the Materials and Methods section, but give suf-

(Continued on next page.)

ficient information for a reader to understand the essentials of what you did. And for the results, as you proceed logically from one figure panel to the next, you should describe the key result contained in each panel, perhaps provide additional details that are not in the plot or legend, and summarize the "take-home point" before moving on to the next result. For your initial draft, include all details (err on the side of verbosity) and distill down to essentials in later drafts.

Writing the Methods in parallel with the Results makes sense because you can progress through the same sequence (for each Results section you write, write the corresponding Methods section).

A note on verb tense. It is generally accepted that your narrative should be in the past tense when you are discussing what you did and what you found. In contrast, when discussing data that are in the literature, we typically use the present tense — which may seem surprising. But most importantly try not to mix past and present tense in your manuscript.

Step 4. Write the Discussion

For writing the Discussion you need to step back a bit. Whereas the Results section is very specific and detailed, the Discussion needs to put your work into a larger context. It is good to start the Discussion with a paragraph that reiterates the question set up in the Introduction and then reiterates the key results in a concise way. An added benefit of summing things up here is that it provides a running start for your Discussion. You then need to relate your work to previous work that has been done and put it in the context of the field overall. You should also critically evaluate your methods and results — what are the strengths and limitations of your approach, and how do they compare to previous or related work? You should extract as much meaning from your results as possible (without going overboard). What results amplify and confirm others? What subtleties in the data suggest other phenomena beyond what you're looking at specifically?

Step 5. Write the Introduction

Now that you've written most of the manuscript, it's time to write the Introduction. Return to the story you defined at the start (maybe you need to revise it somewhat after laying out all of the results?), and think about the points you've made in the Discussion. In the Introduction you want to lay out the basic logic and motivation for your study — build a framework that makes the reader excited and hungry to see your results. To achieve this, you need to provide the key background material that enables the reader to understand the state of knowledge in the field. Avoid a comprehensive review of the field, and instead focus on the important open questions and why they are important. Build a convincing argument for why you did what you did.

In setting up the background, you should write with the literature that you reference close at hand, and be checking that what you think is in the papers is actually written in the papers. Beware of boldly stating what you assume to be true — provide evidence and references when stating any "fact." Also, avoid referencing review articles whenever possible, and instead reference the original papers where key observations were made — if you make an important discovery wouldn't you rather have people reference your hard work rather than a review article written by someone else?

The last paragraph of the Introduction is key. It should briefly describe what you did and what you found, and it should set up the Results section. In this way, the Introduction creates tension and intrigue, and this last paragraph gives a sneak preview of what is to come. Ideally this last paragraph of the Introduction should also link to the first paragraph of the Discussion, providing two bookends of the Results.

Step 6. Write the Abstract, Title, and Reference List

Now that you have your complete text, you should write the Abstract. Be brief and to the point (check word limit for the journal). Minimize background, clearly state your results and include any methodological details you need.

Finish with the implications of the work. You will hone your abstract later.

If you haven't settled on your title yet, this is the time. Be specific and be precise. Also, finishing your first complete draft means that you have a complete reference list with proper formatting. Bibliographic software is essential. Suitable packages include EndNote, Mendeley, and Zotero; use whatever works best for you. One consideration in choosing software is that editing subsequent drafts is much easier if you and your coauthors use the same package.

Final notes

The key task to remember here is to get all of your results and all of your thoughts down on paper — the honing and polishing will come later. Remember: it is better to start writing earlier rather than later. Your next step is to refine your writing. It has been said that the last 10 percent of the work takes 90 percent of the time, which is a bit extreme but not too far from the truth where writing is concerned.

Revising your draft will be the subject of Part 2, which will appear in the June issue of the Newsletter.

On the Move

Jean Chin, a member of the Society since 1996, has retired after 23 years of service as a program official at the National Institute of General Medical Sciences (NIGMS), National Institutes of Health. Chin managed research grants in membrane biochemistry and biophysics, transport and lipid metabolism, and served as the NIGMS contact for Academic Research Enhancement Awards (R15).

Steve Goldstein, a member of the Society since 1990, has been appointed dean of the Stritch School of Medicine, Loyola University Chicago, effective May 1, 2017. He has most recently been a professor of biochemistry at Brandeis University and prior to that provost and senior vice president for academic affairs.

Grants and Opportunities

Science and SciLifeLab Prize for Young Scientists

Objective: The prize is to incent the best and brightest to continue in their chosen fields of research. Four total winners will be selected, one from each of the following categories: Cell and Molecular Biology, Ecology and Environment, Genomics and Proteomics, and Translational Medicine. Each year the grand prize winner will receive US $30,000; each of the three other category winners will receive US $10,000. The grand prize winning essay will be published in *Science*. The winners will also be honored in Stockholm, Sweden, during Nobel week.

Deadline: July 15, 2017

Website: http://www.sciencemag.org/prizes/scilifelab?et_rid=49219874&et_cid=1213128

Discovery of In Vivo Chemical Probes (R01)

Objective: To support investigators who have interest and capability to join efforts for the discovery of in vivo chemical probes. It is expected that applicants will have in hand the starting compounds ("validated hits") for chemical optimization and bioassays for testing new analog compounds. Emphasis will be placed on projects that provide new insight into important disease targets and processes.

Deadline: June 5, 2017

Website: https://grants.nih.gov/grants/guide/pa-files/PAR-14-279.html

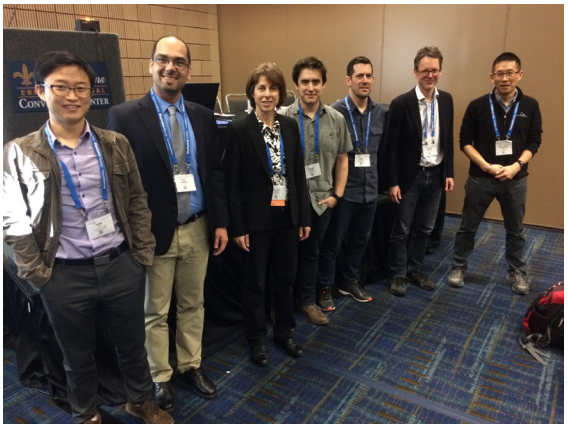
Members in the News

Padmini Rangamani, University of California, San Diego, and Society member since 2011, was recently named an Office of Naval Research Young Investigator for 2017.

Subgroups

Bioengineering

The Bioengineering Subgroup had a successful inaugural meeting in New Orleans and the house was packed. The program, organized by *Isaac Li*, University of British Columbia, Okanagan, and *Amir Farnoud*, Ohio University, highlighted the diverse work being done at the interface between biophysics and bioengineering. Li started by describing his work developing a label-free method to determine the spatial distribution of adhesive properties on rolling cell surfaces. Farnoud next reported on his work engineering nanomaterials at the lipid interface. *Marjorie Longo*, University of California, Davis, finished by providing a broad perspective of her work in biomembrane-inspired engineering.



Left to right: Isaac Li, Amir Farnoud, Marjorie Longo, Andrew Pelling, Clemens Kaminski, James Wilking, Christopher Yip.

The second session featured talks by *Andrew Pelling*, University of Ottawa, *Clemens Kaminski*, Cambridge University, and *James Wilking*, Montana State University. Pelling, a Senior Ted Fellow, described a number of his lab's biohacks to understand cellular function at the tissue level. Kaminski presented his work on optical imaging of protein aggregation related to Alzheimer's disease. Wilking finished the session describing the mechanics and flow of microbial biofilms.

—*Jonathan V. Rocheleau*, Bioengineering Subgroup President

IDP

The Intrinsically Disordered Proteins (IDP) Subgroup held its 11th Annual Symposium Intrinsic Protein Disorder in Cellular Signaling in New Orleans.

The opening keynote speaker, *Susan Taylor*, provided an overview of how the dynamics of disordered regions allosterically regulate diverse kinases. *Mart Loog* described mechanisms for multisite phosphorylation and highlighted how post-translational modifications within disordered regions can integrate signalling inputs and act as a "timing device" during cell cycle. The molecular anatomy and evolutionary plasticity of linear motifs in proteins of the MAPK signalling system were explored by *Atilla Remenyi*. *Birthe Kragelund* highlighted the role of motifs in disordered tails of membrane proteins (NHE1 and Class 1 cytokine receptors) in regulating the ordering of interactions during signaling.

Jennifer Hurley showed how the half-life of the disordered protein frequency is critical to the circadian rhythm. *Ofer Yifrach* discussed the importance of splice variants within disordered regions of the Kv channel for the generation of differences in action potential in neurons. The role of disorder in the formation of liquid droplets by Ddx4 and their function as molecular filters was discussed by *Andrew Baldwin*. The closing keynote lecture was delivered by *Richard Kriwacki*, who presented an historical overview of the IDP field. He highlighted the importance of IDPs in allosteric regulation, phase separation, and reported the discovery of small molecules that inhibit p27 by narrowing the conformational landscape.

In addition, two outstanding postdoctoral award winners, *Franzeska Zosel* and *Erik Martin*, presented studies on the dynamics, conformations, and binding properties of IDP systems.

—*M. Madan Babu* and *Joerg Gsponer*, Program Co-Chairs, IDP Subgroup

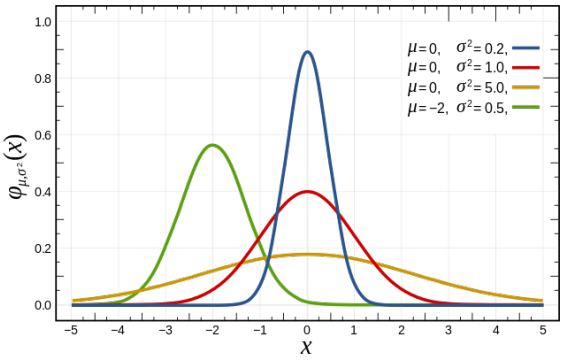
Molly Cule

Dealing with Non-constructive Criticisms from a Person in Power

Throughout our careers, there is always a hierarchical power structure in the workplace. Even if you rise to the top of the ladder, there is still feedback that you encounter about your performance each day. This can come from a scientific advisor, board of directors, grant reviewers, journal editors, etc. Too often, people who perceive themselves to be in a position of power offer non-constructive criticism — and somehow think that this kind of feedback is acceptable. We all deserve the highest level of respect in the workplace. Criticism of this nature is unprofessional and is never excusable. Unfortunately, there is often little recourse unless there is an egregious offense or exchange. Therefore, the best response is to manage what you can control, because you are only in charge of your own actions. Try to maintain your composure when receiving criticism, take a deep breath, and don't overreact to the situation. Take as much of the feedback as you can, mull it over, and revisit the criticisms after some time passes so that you can try to make a measured decision about what might actually be useful feedback. It is possible that this person didn't mean to blow you away with non-constructive feedback, rather they poorly communicated an actual shortcoming of your grant, paper, or study that can be improved upon. Before completely dismissing the comments, consider if there is a kernel of useful feedback within a poorly communicated package. Focus on what is useful for you as you navigate your project and what you might want to do next in your study, manuscript revisions, or career path, and disregard the rest. By all means, you must disregard any explicit or implicit inferences that you personally are flawed as a scientist! You control your future, not those who incorrectly perceive that they might.

From the BPS Blog

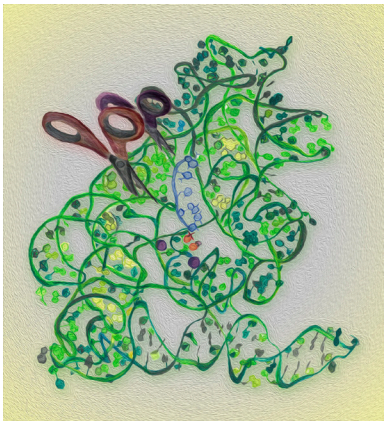
http://biophysicalsociety.wordpress.com



Pi helps us describe almost everything, not just circles

This Pi Day post from BPS member *Sonya Hanson*, Memorial Sloan Kettering Cancer Center, explains how pi has utility far beyond allowing us to calculate the area of a circle. https://biophysicalsociety.wordpress.com/2017/03/13/pi-helps-us-describe-almost-everything-not-just-circles/.

The Science Behind the Image Contest Winners: Group II Intron Ribozyme



Read about the science behind the winning image from the 2017 Art of Science Image Contest. The first place image is a digitally manipulated painting depicting self-splicing reactions in group II intron ribozymes. Read more about the research behind the image and how it was created: https://biophysicalsociety.wordpress.com/2017/03/07/the-science-behind-the-image-contest-winners-group-ii-intron-ribozyme/.

Announcing the 2018 Thematic Meetings

Genome Biophysics: Integrating Genomics and Biophysics to Understand Structural and Functional Aspects of Genomes

Santa Cruz, California
August 19–23, 2018

Genomic tools are becoming essential in molecular and personalized medicine by virtue of their capacity to analyze diversity within the human genome. Whereas genomic variability at the sequence level is manifestly involved in health and diseases of organisms, little is known about the roles that such variability plays in the physical organization of genomes. The theme of this meeting is an exploration of the long-overdue application of biophysical methods in genomics, emphasizing structural and functional aspects of genome and transcriptome dynamics.

Proposed topic areas include extremophile genomes, highly compact genomes, extrachromosomal circular DNAs, circular and micro RNAs, DNA viruses and viroids, and other nucleic-acid and chromatin structures having potential roles in genome regulation.

The Heart by Numbers: Integrating Theory, Computation, and Experiment to Advance Cardiology

Berlin, Germany
September 4–7, 2018

The focus on mathematical and biophysical models in dialogue with experiments sets this meeting apart from cardiological and biological meetings. The meeting will be highly interdisciplinary with contributions from medicine, biology, physics, bioengineering, and mathematics. Specifically, topics will include:

- Cell level: modelling of excitation contraction coupling, sarcomere models, metabolic modelling, ROS signalling, spatially resolved models, and subcellular structures;
- Hemodynamics: flow in atria and ventricles, aortic flow, valve stenosis replacement, stenting;
- Organ level: electrophysiology, mechanics, total heart function, personalization; and Modelling diseases: arrhythmia, antitachypacing and defibrillation, Cardiac Resynchronization Therapy.

Coming in June:

Call for proposals for the 2019 Thematic Meetings

Obituary

William Knox Chandler

William Knox Chandler, an eminent American physiologist, died on March 20, 2017, at the age of 83. Chandler was a member of the Yale University Department of Physiology from 1966 until his retirement in 2010. He was a leading figure in the fields of nerve and muscle physiology.

Chandler's work was recognized by his election to the U.S. National Academy of Sciences in 1990. The citation described him as "the world's leading investigator of excitation-contraction coupling" (ECC), also noting that he "opened new areas of research in the cellular physiology of nerve and muscle." His 1973 article with *Martin F. Schneider* reported the first measurement of muscle "charge movement," and described an essential link in the chain of events that allows a muscle cell to contract in response to an action potential on its surface membrane.

Chandler was born on October 13, 1933, in Chicago. Following his father's death during World War II, Chandler (still a child) moved with his mother and brother to Brownwood, Texas, where he graduated from high school at age 16. He attended college at William and Mary and then the University of Louisville, graduating in 1953 with a major in pre-medical sciences. He received his M.D. degree from Louisville in 1959. While in medical school, he realized that he was not attracted to clinical practice but rather to the experiments that he carried out in the basement laboratory of *Warren Rehm*, a membrane transport physiologist. After medical school, Chandler worked at the National Institutes of Health in the laboratory of *K. S. Cole*, an inventor of the voltage-clamp technique. This was followed by a year-long fellowship at Brown University, where he studied mathematical methods of science. He then moved with his family to Cambridge, England, for three years to work in the laboratory of Nobel Laureate *Sir Alan Hodgkin*. During that time, he was involved in ground-breaking experiments on the electrical properties of nerve axons (with *Hans Meves*) and of muscle cells (with Hodgkin and *Richard Adrian*).

The muscle experiments were the first to use a three-micro-electrode technique that permitted measurements of currents across the surface and transverse-tubular membranes of a muscle cell. This technique was then adapted at Yale University by Chandler and Schneider to make the first measurements of muscle charge movement.

In 1977, Chandler turned his attention to later steps in the ECC process. With a number of coworkers, he developed and extended methods for using indicator dyes to measure accurately the rise and fall of the cytoplasmic calcium concentration in a muscle cell in response to membrane depolarization. These signals serve to trigger muscle contraction and relaxation, respectively. In the 1990s, Chandler returned to the measurement of muscle charge movement, which by then was known to involve two kinetic components (Q-beta and Q-gamma), the puzzle being which component was most directly related to initiating the release of calcium ions from the sarcoplasmic reticulum. Chandler's laboratory showed that there is a complex kinetic relationship between SR calcium release and the charge-movement components. A key finding was that, even in the virtual absence of SR calcium release, a Q-gamma component could be clearly measured; hence this component was likely not caused by calcium release but rather was essential in triggering release.

In 1998, Chandler joined *Stephen Hollingworth* and *Stephen Baylor* in Baylor's laboratory at the University of Pennsylvania to study "calcium sparks". They found that, during a typical spark in a frog twitch fiber under physiological conditions, about 45,000 calcium ions are released in about 4 ms, probably from 2-4 active channels (16°C).

In retirement, Knox returned to his first passion and "read physics," with a particular interest in quantum phenomena.

—*Stephen M. Baylor* and *Brian M. Salzberg*

William Knox Chandler

Biophysical Society

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UPCOMING EVENTS

June

June 5–9

8th Workshop on Neutron Scattering Applications in Structural Biology
Oak Ridge, TN
https://conference.sns.gov/event/66/

June 23–27

Quantitative Biology: Computational and Single-Molecule Biophysics
Beijing, China
http://indico.pku.edu.cn/event/4/

July

July 10–12

7th Euro Biosensors and Bioelectronics Conference
Berlin, Germany
http://biosensors.conferenceseries.com/europe/

July 16–20

Joint 19th IUPAB and 11th EBSA Congress
Edinburgh, UK
http://www.iupab2017.org/home

August

August 2–3

13th European Pathology Congress
Milan, Italy
http://worldpathology.conferenceseries.com/

August 7–9

World Stem Cell and Regenerative Medicine
Stockholm, Sweden
http://stemcell.thconferences.com/

September

September 10–14

42nd Federation of European Biochemical Societies Congress
Jerusalem, Israel
https://2017.febscongress.org/

September 21-22

International Conference on Osteoporosis, Arthritis and Musculoskeletal Disorders
Madrid, Spain
http://osteoporosis.cmesociety.com/

Please visit www.biophysics.org for a complete list of upcoming events.