

Newsletter

Biophysical Society

SEPTEMBER 2015

DEADLINES

Meetings

Biophysics of Proteins at Surfaces: Assembly, Activation, Signaling

October 13-15
Madrid, Spain

October 5
Registration

Polymers and Self-Assembly: From Biology to Nanomaterials

October 25-30
Rio de Janeiro, Brazil

October 19
Registration

Biophysics in the Understanding, Diagnosis and Treatment of Infectious Diseases

November 16-20
Stellenbosch, South Africa

September 14
Late Abstract Submission

60th Annual Meeting
February 27-March 2
Los Angeles

October 1
Abstract Submission

January 13
Early Registration

Congressional Fellowship

December 15
Application

2015 Society Election Results



Lukas Tamm, University of Virginia

Lukas Tamm of the University of Virginia was elected President-Elect of the Biophysical Society in the 2015 Society elections. He will assume that office at the 2016 Annual Business Meeting in Los Angeles, California. His term as President will begin at the 2017 Annual Business Meeting in New Orleans, Louisiana.

Four Society members were elected to Council, each for a three-year term that will begin at the 2016 Annual Meeting. They are:



Jane Clarke, University of Cambridge, United Kingdom



Bertrand García-Moreno, Johns Hopkins University



Arthur G. Palmer, III, Columbia University



Joanna F. Swain, Bristol-Meyers Squibb

The Society is indebted to all of the candidates who agreed to run in these elections and to the Society members eligible to vote who participated in the selection process by casting their votes.

Apply to be the 2016-2017 BPS Congressional Fellow!

Interested in using your science skills to inform science policy?

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Application deadline: December 15, 2015

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Publisher's Forum

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Message from the President



In June, I used this column to write about efforts underway to increase transparency and reproducibility in research, and my desire for the Society to take a leadership role in catalyzing specific research communities to tackle the issue head on and encourage them to develop standards for data sharing that work for them. A small subcommittee made up of members of the Society's Public Affairs Committee and Council identified research communities within biophysics that could/should be galvanized to develop such standards. Cryo-EM, an area where I have worked for many years, one where the Society has just formed a subgroup, and an area that is the focus of an upcoming issue of *Biophysical Journal*, was one of the identified communities and one the Committee felt was ready to have a conversation about standards for data sharing.

As BPS President and a scientist working in Cryo-EM, I arranged for a workshop to take place at the June 2015 Three-Dimensional Electron Microscopy Gordon Research Conference, which is the main Cryo-EM meeting in the world, to focus on this issue. I am happy to report that the workshop produced a statement of standards for sharing Cryo-EM data that was unanimously approved by meeting attendees. The statement says:

As a community of researchers using Cryo-EM to understand biological systems, we support moves to make science more transparent and to assess data quality at the time of peer review. For manuscripts reporting Cryo-EM density maps and fitted coordinates, we urge journals to encourage authors to either include maps and coordinates with the submission or to include a movie that shows an interactive session describing the map and the fit of the model in sufficient detail. We also call upon journals to require that the images and relevant metadata needed to reproduce a published reconstruction be made available upon reasonable request following publication.

The Society is pleased with this first effort, and has incorporated the requirements into the *Biophysical Journal's* guidelines for authors. We have also shared the standards with officials at the National Institutes of Health involved with Cryo-EM research and with data reproducibility and sharing initiatives. I have also contacted the editors of other scientific journals that publish Cryo-EM research to encourage them to adopt these guidelines.

The Society plans to use the statement as a model for other research communities. As we move forward, we will share additional standards development with you as well. I also ask that if you are part of a community that you think is ready and willing to tackle developing its own protocol for data sharing, please let me know. The Society would be happy to assist, facilitate, or do whatever else we can to help!

— *Edward Egelman*, President

International Affairs

The Biophysical Society participated in the 10th European Biophysical Societies Association (EBSA) Conference, held in Dresden, Germany, July 18-22, by sponsoring a poster competition open to all students. This was the fourth EBSA meeting where the Biophysical Society held this competition, and nearly 300 students participated this year.

The Society is indebted to the work of the judging committee: *László Mátyus*, Chair, *Helmut Grubmüller*, *Antoinette Killian*, *André Matagne*, *Daumantas Matulis*, and *Manuel Prieto*.

Twelve winners, listed below, were selected to receive a \$500 travel award and a complimentary membership to the Biophysical Society.



Alejandra Aguado Martinez
University of the Basque Country, Spain
Clpb Dynamics Is Driven by its ATPase Cycle and Regulated by the Dnak System and Substrate Proteins



Andreas Kraemer
University of Applied Science, Germany
Crystal Structure of a Class IIb Histone Deacetylase Homologue from Pseudomonas aeruginosa



Simeon Carstens
Institut Pasteur, France
Bayesian Determination of Chromatin Structure from HiC Data



Christian Nehls
Research Center Borstel, Germany
Investigation of the Mode of Action of the Protein VapA of Rhodococcus equi on Phagosome Membranes



Jonas Dörr
Utrecht University, The Netherlands
Detergent-Free Isolation, Characterization and Functional Reconstitution of a K⁺ Channel



Nicolas Schierbaum
University of Tübingen, Germany
Imaging Viscoelastic Properties of Live Cancer Cells with Atomic Force Microscopy



André Faustino
University of Lisbon, Portugal
Conformational Changes Governing Dengue Virus Capsid Protein Function and its Inhibition by pep14-23



Shima Tavvildar Khazaneh
University of Freiburg, Germany
Single Molecule Analysis of erbB1 Activation



Andrew Howe
Medical Research Council, United Kingdom
Structure and Dynamics of Filopodia by Electron Cryo-Tomography and Single Molecule Fluorescence



Chao Yu
CNRS, France
Membrane Cytoskeleton Interactions Investigated by NP Labeling and Hydrodynamic Force Application



Raphael Hubrich
University of Göttingen, Germany
Synapse on a Chip: SNARE-Mediated Fusion in Planar Pore-Spanning Membranes



Pavel Zakharov
University of Pennsylvania, United States
Accumulation of Reversible Destabilizing Events Drives Microtubule Catastrophe



Biophysicist in Profile

KATSUMI MATSUZAKI

Katsumi Matsuzaki grew up in Osaka, Japan. His father worked for an appliances manufacturer and his mother for Nippon Telegraph and Telephone. As a young person, he was interested in a career as a medical doctor, and became interested in chemistry once he had been exposed to the subject in school. When he began his undergraduate career at Kyoto University, he decided to study in the pharmaceutical sciences department: “something between medical science and chemistry,” he says. “When I was a fourth-year student at Kyoto University, I joined Professor *Masayuki Nakagaki*’s lab, in which people investigated colloid and surface chemistry. The project I was involved in was a very basic one on interaction between fluorescent dyes and micelles or liposomes. I studied spectroscopy and membranes.” From then on, Matsuzaki has worked primarily on membrane biophysics, except during his time working for a pharmaceutical company.

Matsuzaki received his Bachelor of Science degree in biophysical chemistry in 1982 and remained at Kyoto University to pursue his master of science degree in biophysical chemistry in Nakagaki’s lab. After this, he worked at Takeda Chemical Industries Company for several years before returning

to Kyoto University in 1987 as an assistant professor and began work on his PhD. “Luckily the antimicrobial peptide magainin was discovered in that year,” he says. “So, I decided to study interaction of this peptide with membranes, because it was suggested to perturb bacterial membranes.”

He earned his PhD in biophysical chemistry in 1992 for his thesis “Physicochemical Studies on Interactions of Antimicrobial Peptides, Hypelcin A, Trichopolyn I, and Magainins, with Lipid Bilayers.” He stayed at the Biocenter of the Uni-

versity of Basel, Switzerland, for ten months as a visiting scientist in 1993, working with *Joachim Seelig*.

When he began working on magainins, Matsuzaki says, “few scientists were (and still are) interested in peptide-lipid interaction in Japan. Therefore, it was difficult to get grants.” He was able to find funding by applying for as many grants as he could, and remained at Kyoto University. He became an associate professor in 1997 and then a full professor in 2003, the position he holds today.

Matsuzaki’s lab works on several projects. “We have investigated interaction of antimicrobial peptides with membranes for almost 30 years and proposed the concept of ‘torpidal pore’ for the first time in 1996,” he explains. “My current interest is their interaction with human cells and how to improve the therapeutic index for future clinical application.” The lab is also studying the mechanism of amyloid β -protein on membranes. “We have struggled with this project for more than 15 years, and found that clusters of gangliosides on neuronal cells facilitate the formation of ‘toxic amyloids,’ in contrast to ‘less toxic’ amyloids formed in aqueous solution,” he says. “An ongoing project is to solve the structure of this unique amyloid and to elucidate the molecular mechanism of its formation.”

Matsuzaki’s lab also works on thermodynamics of interaction between transmembrane helices. “Our 15-year work elucidated that a basic driving force of association of transmembrane helices is interaction between helical macrodipoles, which is significantly modulated by surrounding lipids,” he explains. “Recently, we succeeded in real-time monitoring of association-dissociation dynamics using a single-molecule FRET technique.” The lab also studies interaction between membrane proteins in living cells “We developed a coiled-coil tag-probe labeling method in 2008. This method combined with a spectral imaging technique enabled stoichiometric analysis of oligomerization of membrane proteins on living cells,” Matsuzaki says.



The Matsuzaki Lab

His favorite aspect of biophysics, he notes, is that “in contrast to cell biology and biochemistry, biophysics can monitor biological phenomena in real time and in a non-disruptive fashion. Biophysics also tells us their driving forces.”

Going forward in his career, he hopes to monitor conformational changes of membrane proteins in living cells in real time, with minimal perturbation.

Matsuzaki’s friend and colleague *Ayyalusamy Ramamoorthy*, University of Michigan, recalls meeting him at a Biophysical Society Annual Meeting. “He was one of the speakers of a special session on antimicrobial peptides. Graduate students from my laboratory and myself were in the audience, as we were investigating the high-resolution structure and mechanism of action of several different antimicrobial peptides” he says. “His inspiring talk further motivated us to dedicate ourselves to research in this area. He also showed great enthusiasm for our research and he came to our posters to talk with my research group. [...] Katsumi is a brilliant and honest scientist. He thinks about a chosen research problem very deeply and goes about completing the investigation thoroughly. He is also very kind and an extremely nice person.”

Richard Epanand, McMaster University, Canada, also met Matsuzaki at a Biophysical Society Annual Meeting, and the pair went on to collaborate. “We have two joint publications on the role of membrane curvature in pore formation by antimicrobial peptides,” Epanand says. “However, our scientific interactions were greater than this, and we exchanged ideas about scientific matters on many occasions. [...] There were many useful exchanges that we had that advanced my thinking about scientific problems. During a visit to Kyoto, I saw the book *Microbial Lipids* by [*Colin Ratledge* and *S.G. Wilkinson*] in Matsuzaki’s office. It contributed to my appreciation of the diverse lipid composition of different microorganisms.”

“Discard all prejudices. Look at your data carefully with profound knowledge of biophysics. Then let the data tell their own story.”

—Katsumi Matsuzaki

Epanand recalls, “He is a loyal friend and is a generous person. Matsuzaki was a hospitable and helpful host on our visits to Japan. [...] Against our better judgment, my wife, Raquel, and I joined

Katsumi for dinner and had some fugu (blowfish). We all survived, thanks to the chef’s careful removal of all the neurotoxins.”

Matsuzaki himself enjoys traveling, and has another, more

unusual hobby. “I collect model trains in various scales from various countries: Japan, Switzerland, United States, and Canada,” he says. “I have built a couple of layouts of the Swiss prototype.” One of his model trains is pictured below.



A model train built by Matsuzaki.

Matsuzaki would advise biophysicists who are starting out in their careers to, “keep in mind that molecular interactions in membranes are dynamic and change with time,” he says. “Therefore, it is difficult to understand their nature only from ‘snap shot’ results.” He considers this one of the most challenging parts of working as a biophysicist. Matsuzaki also reminds early career scientists, “Discard all prejudices. Look at your data carefully with profound knowledge of biophysics. Then let the data tell their own story. If lucky, you will discover a novel mechanism!”

Profilee-at-a-Glance

Katsumi Matsuzaki

Institution

Kyoto University

Research Area

Membranes

Public Affairs



Get Involved!

On September 17, representatives from the Biophysical Society's Public Affairs Committee will join individuals from dozens of other research, health, and patient advocacy organizations to advocate for federal funding for medical research on Capitol Hill. Society members are encouraged to participate in the advocacy efforts on the 17th by calling, tweeting, or writing their congressional representatives. Follow along online using the hashtag #RallyMedRes. Information on how you can participate from home will be available on the front page of the Biophysical Society website.

Fiscal Year 2016 Will Start with a Continuing Resolution

While the House passed all 12 appropriations bills that fund federal agencies, and the Senate Appropriations Committee has done the same, prior to the August recess the full Senate had yet to pass any. With Republicans and Democrats in disagreement on overall spending levels and time running out prior to the new fiscal year starting on October 1, House Majority Leader Boehner (OH-R) announced that when Congress returned from its August recess, it would work on a continuing resolution (CR) to keep the federal government operating. He said it was unknown how long a CR would fund the government for or at what level; details would be worked out in September.

A CR usually funds federal programs at the same level as the prior year. Without the certainty of knowing what the actual funding level may be,

agencies are usually very conservative in spending under a CR, and often new grants are delayed and continuing grants are funded at less than 100 percent. Expect NIH, NSF, and other agencies to put out their plans for operating under a CR in late September or early October.

Enhancing the Effectiveness of Team Science



As scientific research has grown in complexity, so has the amount of research conducted in teams. In response to this shift, the National Academy of Sciences put together a group to determine what the challenges of “team science” are, how the team

approach can best work, and how universities and research institutions can best support teams. The result of this study is a new report, *Enhancing the Effectiveness of Team Science*, which provides guidance on assembling the science team; leadership, education, and professional development for science teams and groups. It also examines the institutions role. The report is available at <http://bit.ly/NAPTeamScience>.

House Passes American Cures Act but Senate Still at the Drawing Board

On July 10, the US House of Representatives approved the 21st Century Cures Act (HR 6). A total of 170 Republicans and 174 Democrats voted for the bill while 70 Republicans and 7 Democrats voted against it. The bill reauthorizes the NIH for three years at funding levels that represent an increase of \$1.5 billion per year, and creates an NIH Innovation Fund supported by \$1.75 billion a year in mandatory funding for five years.

With companion legislation not yet introduced in the Senate, the Biophysical Society joined nearly 100 members of the Ad Hoc Group for Medical Research, a coalition representing patient groups, scientific societies, and research institutions to which the Society belongs, in sending a letter to the Senate Health, Education, Labor and Pensions (HELP) Committee Chair Lamar Alexander (TN-R) and Ranking Member Patty Murray (WA-D) commending them for their leadership and vision in undertaking a bipartisan initiative to examine the role of NIH in getting safe treatments, devices, and cures to patients. The letter also offered a number of recommendations for the HELP Committee to consider as it begins to draft legislation to enhance the role of NIH, including:

- Stabilize the NIH budget through sustained increases in appropriations;
- Affirm existing NIH support for interdisciplinary scientific research;
- Grant NIH “carry-over” budget authority; which would allow NIH to use unspent funds in the next fiscal year
- Ease the burdensome travel restrictions for federal researchers; and
- Address regulatory burden.

With very few days left in the fiscal year that ends September 30, it is unlikely that this legislation will move forward before 2016. If the Senate were to pass its own bill, the House and Senate would have to come together to conference the two pieces of legislation and work out a compromise bill. That bill would then need to be approved by both bodies before going to the President for his signature.

White House Looking Ahead to 2017

Even though Congress has yet to pass a budget for the fiscal year (FY) that starts October 1, the White House Office of Science and Technology Policy (OSTP) is already working on the FY 2017 budget. In July, OSTP Director John Holdren posted a memorandum outlining the administration’s multi-agency science and technology priorities for the FY 2017 budget. This guidance is intended to help federal agencies in developing their budget requests for that fiscal year. The priorities included in the document included innovation in life sciences, biology, and neuroscience; clean energy; information technology and high-performance computing; and research and development (R&D) for informed policy-making and management.

In regards to the life sciences, the memorandum states, “Agencies should give priority to programs that support fundamental biological discovery research that could generate unexpected, high-impact scientific and technological advances in health, energy, and food security, particularly in the President’s BRAIN Initiative, the National Strategy for Combating Antibiotic Resistance, and the National Strategy for Biosurveillance (e.g., infectious-disease forecasting capabilities).” The memorandum also notes, “Agencies should support investments on improving interoperability of health records, addressing privacy concerns, and launching research that will enable discoveries derived from Big Data.”

Other areas highlighted include support for R&D infrastructure and STEM education.

Agencies will send their proposed budgets to the Office of Management in Budget in the fall, and after some back and forth, the President will send his 2017 budget request to Congress in February 2016.

Read the complete memorandum here: <https://www.whitehouse.gov/sites/default/files/omb/memoranda/2015/m-15-16.pdf>.

Biophysical Journal

Know the Editors



David Odde

University of Minnesota
Editor for the Systems
Biophysics Section

Q: What is your area of research?

My lab group focuses on the mechanics of fundamental cellular processes, such as cell division, cell migration, and cell polarization. Underlying each of these processes is a complex interplay of cytoskeletal self-assembly dynamics, molecular-motor driven forces, and signaling dynamics in space and time. We develop mathematical and computational models for these systems, constrained by physical principles, to simulate and predict cellular behavior and then we test these models experimentally. Typically our simulations use stochastic (Monte Carlo) approaches, or, in some cases we are solving partial or ordinary differential equations. Our approach is multiscale, ranging from the individual molecular encounters, to the completion of a cellular process, such as mitosis. To practically achieve this multiscale modeling, we use the results from the shorter length-time scales to inform and guide the modeling at the longer length-time scales.

We test our models experimentally using fluorescence microscopy of living cells grown in vitro, typically in environments with engineered mechanical-chemical-architectural properties, or in living tissue ex vivo. For example, for in vitro assays, we use polymer-based hydrogels containing fluorescent nanoparticles to directly observe the traction force dynamics as cells migrate along a surface of controlled Young's modulus and exert deformational forces on their environment. In some cases, we apply forces directly, for example via calibrated magnetic beads. In ex vivo assays,

we directly observe cell migration dynamics in live tissue slices using confocal fluorescence microscopy. Because aberrant cell division and migration drive cancer progression, a major application area for us is in oncology, especially high-grade brain cancers, such as glioblastoma. We are now developing, and experimentally testing, computer-based simulators for cell migration and division, in the hope that they will help us identify novel therapeutic strategies to treating these devastating diseases.

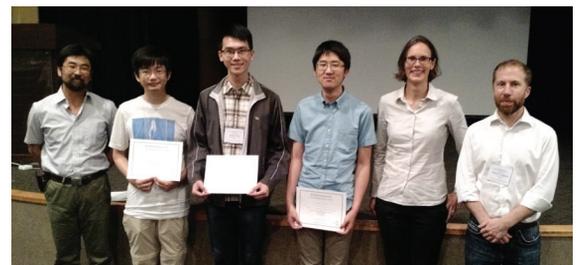
Biophysical Journal Poster Awards

The Biophysical Society is pleased to announce winners of the *Biophysical Journal* Outstanding Poster Awards given at the *New Biological Frontiers Illuminated by Molecular Sensors and Actuators* meeting on July 1. The meeting was organized by the Biophysical Society and the National Taiwan University. Three students were selected for their outstanding poster presentations. The student winners are:

Hsin-Ya Lou, Stanford University
Vertical Nanopillar for In Situ Probe of Nuclear Mechanotransduction;

Maohan Su, National University of Singapore
Curvature-Generating Proteins and Subcellular Pattern Formation; and

Hung-Yi Wu, National Taiwan University
RecA E38K Mutant Displaces SSB without Apparent ssDNA Length Dependence.



Poster Awardees with judges Takanari Inoue (far left), Katharina Gaus (second from right), and Robert Campbell (far right).

Author Appreciation

This editorial, by Editor-in-Chief *Les Loew*, is reproduced from the August 4, 2015, issue of *The Biophysical Journal* (BJ).

The *Biophysical Journal* editors and staff realize that our authors deserve full support as they seek to publish their research in BJ. Over the last year, we have developed several new policies, procedures, and initiatives that are designed to support our authors at every stage of the publication process: submission, peer review, and post-publication dissemination. I am pleased to report on some of these new innovations, some of which have been introduced already and others that will be coming very soon.

Simplified formats for initial paper submission

We recognize that it can be cumbersome to conform to the editorial style of a particular journal at the point of initial submission. Therefore, the following has been placed in our Author Guidelines:

"At the initial submission stage, BJ will accept for review well-prepared manuscripts in any format. However, the title page should contain only the article title and the list of authors, using only initials for the authors' given names as well as their full surnames; do not include author affiliations or email addresses. You are encouraged to provide your figures in line with the manuscript text so that the editors and reviewers can more easily read through the paper and match the figures with their associated textual description."

Of course, submissions should be complete and include all text, figures, citations, and supporting material in a form that will be easy to read and evaluate by editors and reviewers.

Addressing bias in peer review

Several recent high-profile studies have called attention to the issue of unconscious bias linked to gender, age, or nationality affecting evaluation of scholarly manuscripts. This has led some prominent scientific journals to establish double-blind

peer review policies or to offer a double-blind peer review option, whereby the identities of authors are not provided to reviewers. Editor Miriam B. Goodman has spearheaded a yearlong discussion of this issue for BJ, in close collaboration with the Biophysical Society. We have decided that a comprehensive double-blind peer review policy would not be the best approach for BJ. However, it was felt that the use of initials instead of full given names and the omission of institutional affiliations and addresses on manuscript title pages could reduce the impact of unconscious bias. This is what prompted the revision to our title page requirements for submitted manuscripts, as noted above. Of course, authors and their institutions would be fully identified once a paper is accepted and published.

Collaborative review

A set of reviews that have conflicting evaluations or revision suggestions can be a source of frustration to authors. While such an outcome is infrequent, it happens often enough that some scientific journals have adopted a policy of producing consolidated reviews. This approach results in a single review that reflects a consensus of the individual reviewers and the editor. Reaching such a consensus, however, can add significant time to the overall review process and place a great burden on volunteer reviewers and editors. To address this issue, very soon BJ will institute a simple procedure that will minimally impact the turnaround time for handling a submitted manuscript. After all the reviews are received by the BJ editorial office, the reviewers will be given 48 hours in which they can read their colleagues' evaluations and edit their own reviews. Reviewer anonymity will be preserved during this process, which will be automated through the BJ manuscript tracking database.

Assuring proper attribution for reused data

As a key component of our *Guidelines for the Reproducibility of Biophysics Research* (<http://www.cell.com/pb/assets/raw/journals/society/biophysj/PDFs/reproducibility-guidelines.pdf>); see also the Editorial by myself and the Biophysical Society

(Continued on next page)

leadership [1]) authors are required to share data and materials whenever possible through public databases or repositories. By the same token, however, authors who deposit their data deserve to have their work cited when that data is reused in a new study. Indeed, our earlier Editorial (1) prompted some members of the structural biology community to raise a concern that authors occasionally refer to a PDB structure without properly citing the original source of the structure. Accordingly, BJ has added the following explicit policy to its author guidelines:

“Manuscripts that refer to information in a public database (such as structures in the RCSB Protein Data Bank) must cite the publication, if available, in which the original information was reported. If the data is not derived from a publication, the authors and Digital Object Identifier (DOI) of the data should be cited.”

BJ Classics

The measures outlined above reflect BJ's responsibility and commitment to serve our author community at all stages from submission through review and publication (even if the science is disseminated through a public database). But what

about BJ papers of 10, 20, or 50 years ago that have made an especially strong and continuing impact on the field of biophysics? How should we appreciate them and their authors? I am delighted to announce that an upcoming issue of BJ will inaugurate the first BJ Classic feature. The Journal will periodically highlight a paper chosen by the BJ Editorial Board that has made an especially important and lasting contribution. BJ Classic highlights will be written by the original authors, their colleagues, or their students to review how the paper has influenced the field and how it is still relevant today. These articles should be accessible to scientists outside the field and, preferably, also to students. Our first BJ Classic will discuss the paper that appeared in Volume 1, page 1 of BJ, 65 years ago (2).

1. *Loew, L. M., D. Beckett, E. H. Egelman, and S. Scarlata.* 2015. Reproducibility of research in biophysics. *Biophysical Journal* 108:E1.
2. *Cole, K. S., and J. W. Moore.* 1960. Potassium ion current in the squid giant axon: dynamic characteristic. *Biophysical Journal* 1:1-14.

—*Leslie M. Loew*, Editor-in-Chief

Biophysical Society

Guidelines for the Reproducibility of Biophysics Research

Read today at www.biophysics.org/researchguidelines

Thematic Meetings

New Biological Frontiers Illuminated by Molecular Sensors and Actuators

In late June 2015, over 100 participants met at the GIS Convention Center at National Taiwan University in the culturally rich (but so hot and humid!) city of Taipei, Taiwan, to attend the Biophysical Society's thematic meeting on *New Biological Frontiers Illuminated by Molecular Sensors and Actuators*. A number of additional sponsors, including Academia Sinica, National Taiwan University, and the Taiwanese Ministry of Science and Technology, helped to make this meeting a resounding success.

The meeting started on Sunday evening with a welcome address by one of the organizers, *Takanari Inoue* of Johns Hopkins University, who spent a few minutes paying tribute to the late *David T. Yue* of Johns Hopkins University who passed away in December 2014. Yue is well known to members of the Biophysical Society due to his almost three decades of service, his role as a *Biophysical Journal* editor, and his service as a member of the Society Council. He was also a driving force behind the inception of this thematic meeting and one of its strongest advocates.

Inoue's introduction was followed by a presentation from Keynote speaker *Atsushi Miyawaki* of RIKEN, Japan. In a talk that set the tone for the remainder of the meeting, Miyawaki gave a "colorful" talk in which he described the many fluorescent protein-based sensors that he had discovered and invented, and that solved many mysteries in biology. One theme that consistently emerged during the meeting was the importance of looking to nature for inspiration, or even fully formed solutions, to the problems that we face. One particularly elegant example was a novel type of fluorescent protein from the Japanese eel that most readers will be familiar with as grilled unagi served on a bed of rice. The cleverly named UnaG fluorescent protein could develop into a diagnostic tool for childhood jaundice in the near future.

The four-day conference schedule was packed full of great talks and amazing science, with 25 invited speakers, 18 short talks from submitted abstracts, and 56 posters. However, it was during the sessions on *Harnessing and Manipulating Cellular Processes* that the coherent theme of learning from nature was most evident. Several speakers described how they were using naturally occurring proteins, or engineered versions thereof, to control biological processes ranging from mechanotransduction to phagocytosis to kinase activities. Yet other speakers explained how they were exploiting naturally bioluminescent and fluorescent proteins to visualize biochemical activities as they occurred in live cells.



Over 100 meeting attendees representing 16 countries met at the GIS NTU Convention Center to share their research.

As the conference went on, the primary focus of the talks shifted from the development of new tools, to the application of new tools during sessions titled *Seeing the Unseen In Vivo* and *Making the Invisible Visible*. These sessions saw speakers describing their cutting-edge efforts to use molecular tools to dissect the molecular processes behind a wide range of biological processes. Topic areas ranged from fundamental neuroscience, to cardiovascular research, immunology, diabetes, and even microbiology. An unexpected commonality to emerge from many of these talks was the critical need for improved methods for generating

(Continued on page 16)

Biophysical Society **60TH** ANNUAL MEETING

LOS ANGELES, CALIFORNIA • FEBRUARY 27 – MARCH 2, 2016



Michael Ostap

How the Scientific Programming was Developed

The 60th Annual Meeting of the Biophysical Society will soon be upon us, and the Program Committee has been hard at work since fall of 2014 to assemble the topics and speakers to represent some of the most exciting areas of Biophysics. To understand how the scientific meeting sessions are developed and programmed, we asked the 2016 Co-chairs, *Michael Ostap* (University of Pennsylvania) and *Vasanthi Jayaraman* (University of Texas) questions about what goes on behind-the-scenes.



Vasanthi Jayaraman

Who is in charge of assembling the scientific program for the Annual Meeting?

The Program Committee develops the scientific program for the Annual Meeting. Their job is to assemble a diverse program that represents the scientific interests and expertise of the Society, while trying to identify emerging areas that are of interest to our members. Given the breadth of biophysics research and how biophysics continuously grows and evolves, the Program Committee faces a daunting task each year!

Who is on the Program Committee and how are its members selected?

The Committee is co-chaired by two Biophysical Society members selected by the incoming President two years in advance of the meeting they will chair. To learn the ropes, these individuals serve as members of the Program Committee for the Annual Meeting that precedes their chairmanship. The Program Committee consists of three members of the Biophysical Society Council elected on a rotating basis to serve one three-year term, co-chairs from the preceding

year, and additional Biophysical Society Members recruited by co-chairs to fill-in missing expertise. This structure ensures a conservation of expertise over a three-year span while providing a yearly turnover of the members. The Committee for the 60th Annual Meeting includes, *Michael Ostap* (co-chair), *Vasanthi Jayaraman* (co-chair), *Olga Boudker*, *Enrique De La Cruz*, *Karen Fleming*, *Samantha Harris*, *Antoine Van Oijen*, *David Piston*, *Cathy Royer*, *David Rueda*, and *Claudia Veigel*.

How are the topics for the symposia and workshops selected?

Many of the Symposia and Workshop topics are proposed by the Biophysical Society membership. In August of every year, the Society sends a “Call for Topics” email to current and past members asking for proposed research topics and appropriate speakers. We received 58 proposals from members for the 2016 meeting, and seven of the 2016 Symposia and Workshops grew from these suggestions. As a general guideline, 70-80% of the Symposia are directly related to the research interests of the members as determined from the number of abstract submissions in past years. The remaining 20-30% represents emerging topics or areas to attract new constituencies. These areas are determined by discussions among the Committee Members and from ideas provided by the Society Council. Care is given to select topics that showcase new developments and that have not recently been presented at the Meeting or in recent BPS thematic meetings.

How are the symposia and workshop speakers selected?

Speakers are selected by the Program Committee. First and foremost, the Committee selects outstanding scientists who are leaders in their research area. Every effort is taken to ensure that the speakers reflect diversity in terms of gender, geography, ethnicity, and institution. To promote additional diversity, Symposia and Work-

COMMUNITIES, SCIENTIFIC DISCOVERIES, AND LEARNING

shop speakers must not have spoken in invited Symposia or Workshops in the prior two years. Also, the Committee tries to prevent overlap with individuals who speak in Subgroup sessions by communicating the preliminary program to Subgroup chairs before they develop their programs.

How is the number of platform talks determined, and how are abstracts selected for talks?

The topics and number of Platform sessions are determined by the number of abstracts submitted. Abstracts within each topic are distributed to the members of the Program Committee and Council with relevant expertise, and they make recommendations regarding appropriateness for oral presentations. Most importantly, the Committee and Biophysical Society Council members work to select abstracts of high scientific impact. As in selection of Symposium and Workshop speakers, efforts are also made to ensure the speakers within each Platform session reflect the diversity of our membership, and preference is given to younger researchers. It might surprise most members to learn that ~30% of the eligible abstracts submitted to the 2015 Annual Meeting were selected for Platform talks!

It seems like there aren't enough platform talks in my area of interest. Why is this?

If your research area receives very few abstract submissions, it is not eligible for its own Platform session. In these cases, the Program Committee works to combine related abstract categories to create a Platform session that can accommodate these oral presentations. For example, there were not enough submissions for stand-alone *Myosin* or *Cytoskeletal Assemblies & Dynamics* Platform sessions at the 2015 Meeting, so the Committee took the opportunity to combine these to create a *Cytoskeletal Mechanics, Dynamics, Motility, and Myosins* Platform.

How does the Society oversee the Program Committee?

Before the program is set and speakers are invited, the Committee co-chairs present the proposed scientific program to the Biophysical Society Council. Council, which is elected by the membership, represents a wide range of biophysics research areas. Although the speakers and topics are ultimately chosen by the Program Committee, they receive heaps of advice from Council regarding overall content, focus areas, and speaker diversity. The Council approves the program before any speakers are invited.

Arghh... Why is my poster always on Wednesday?!?

The Program Committee meets at the Biophysical Society office in November to schedule the meeting sessions. They do their best to distribute the Symposia, Platforms, and Workshops throughout the meeting, while trying to avoid conflicts and overlap. They also try to fairly balance the programming of Platforms and Poster Sessions on dreaded Wednesday by looking at the schedule from the previous year. Sessions that were scheduled on Wednesday the prior year are rotated and scheduled on earlier days. However, if your research focus is super-popular with an abundance of abstract submissions, requiring sessions each day of the meeting, your individual poster may fall within the Wednesday session again.

I have a great symposium idea for the 2017 Annual Meeting. Who do I contact?

Most importantly, keep on alert for the "Call for Topics" email from the Society office. As we mentioned above, the Program Committee takes these suggestions seriously, and they frequently incorporate these ideas into the program. The Co-Chairs for the 2017 Annual Meeting are *David Piston* (Washington University) and *Cathy Royer* (RPI).



Student Research Achievement Awards (SRAA)

The Student Research Achievement Award (SRAA) competition gives students the opportunity to present their poster to senior researchers in their field. If you are a student presenting a poster, this is an excellent opportunity to hone your presentation skills. If you are a faculty member, please encourage your students attending the Annual Meeting to register for the competition. The deadline for registration is October 5, 2015.

Travel Awards

Are you in need of supplemental funding so that you or your students can attend the Annual Meeting? The Biophysical Society provides Travel Awards to the Annual Meeting for students and scientists of all career levels, to recognize excellence in biophysics and promote greater interaction among biophysicists throughout the world. There are several categories of awards; please visit the Annual Meeting site for eligibility and application information. The deadline to apply is October 5, 2015.



Abstract Submission

Top Reasons to Submit an Abstract before the October 1 Deadline:

1. Be considered for one of the 500 oral platform session speaking slots;
2. Have your accepted abstracts published and included in a supplement to *Biophysical Journal*;
3. Enrich the experience of attendees and contribute to the sharing of ideas that is the basis of the biophysics community;
4. Increase confidence and personal development while enhancing your CV; and
5. Collaborate and network in this interdisciplinary environment.

Industry/Agency Opportunities Fair

Tuesday, March 1, 1:00–3:00 PM

Looking for opportunities available to scientists in industry and government? The Society is hosting an industry/agency opportunities fair where exhibitors, companies, and agencies will be participating and talking about career opportunities at their organizations. Whether you are currently seeking your next opportunity, considering future options, or just curious, plan to attend and learn more about working outside academia.

The World Outside the Lab: Many Ways to Use Your PhD Skills in Industry

Sunday, February 28, 1:00–2:30 PM

Have you ever wondered how you can apply the skills learned while working on your PhD in a career away from the bench? The Early Careers Committee is sponsoring a panel to discuss the plethora of career options that exist beyond the bench, such as publishing, science writing, patent law, policy, marketing, etc. Panelists involved in a wide variety of careers will share their personal experiences.

Industry Panel

Monday, February 29, 1:30–3:00 PM

Interested in pursuing a career in industry? Stop by to hear from a panel of experts who work in bio-related industries. The panel, sponsored by the Membership Committee, will discuss how to find, select, and apply for industry internships, providing attendees with useful tools and resources.

Extend Your Stay

Los Angeles, the City of Angels, has so many things to see and do! Here are just a few:

- Griffith Park Observatory
- The Getty Center
- Los Angeles County Museum of Art (LACMA)
- California Science Center
- Walt Disney Concert Center
- Los Angeles Zoo
- Disneyland
- Hollywood Walk of Fame
- Natural History Museum
- Runyon Canyon
- Santa Monica Pier



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molecular gradients inside and outside of cells. Whether it is a migrating eukaryotic cell, or a bacterial cell trying to maintain its normal shape, it appears as though the mechanisms behind the establishment and maintenance of dynamic intracellular gradients is emerging as one of the hottest areas in biophysical research. The meeting concluded with sessions focusing on sensors and actuators elaborated by physical disciplines such as nanotechnology, materials science, optics, and physics.

Given the great breadth of talks, it is no surprise that many attendees and speakers started their talks by commenting on how educational they found this particular conference to be. The organizers clearly succeeded in bringing together a group of researchers who are from disparate disciplines, yet share a common interest in using molecular sensors and actuators to address biological problems.

Although the schedule did not leave much time during the daylight hours for sightseeing, attendees seemed quite happy to spend the hottest hours of the day in air-conditioned comfort. Attendees sampled many tasty Chinese foods to their stomachs' content at local restaurants conveniently housed in the same building as the seminar room. Fortunately, many learned that there was still much to see and do in the pleasantly warm evenings in Taipei. Many attendees took the opportunity to visit Taipei's famous night markets where a wide range of exotic and delicious food was available. For those who did venture out during the heat of the day, bubble tea was the drink of choice for staying cool and well hydrated. The city offered a wonderful range of sites, from the ultramodern Taipei 101, to the impressive Chiang Kai-shek Memorial Hall, to the historic Chinese artifacts housed at the National Palace Museum. An organized tour on the afternoon of the last day brought conference attendees to some of these sites and others in the air-conditioned comfort of a tour bus.

In addition to Inoue, the meeting's organizing committee included *Robert E. Campbell*, University of Alberta, Canada; *Chia-Fu Chou*, Institute of Physics, Academia Sinica, Taiwan; and *Jin-Der Wen*, National Taiwan University, Taiwan.

Grants and Opportunities

Clinical and Translational Science Award U54

Objective: To support high quality translational and clinical research locally, regionally, and nationally and to foster innovation in research methods, training, and career development.

Deadline: September 25, 2015 (Standard NIH Dates through May 26, 2018)

Website: <http://grants.nih.gov/grants/guide/pa-files/PAR-15-304.html>

2016 Vannevar Bush Award

Objective: To honor truly exceptional lifelong leaders in science and technology who have made substantial contributions to the welfare of the United States through public service activities in science, technology, and public policy.

Who Can Apply: Non-profit, non-academic organizations, universities and colleges

Deadline: October 1, 2015

Website: <https://www.nsf.gov/nsb/awards/bush.jsp>

Members in the News

Robert Griffin, Massachusetts Institute of Technology and Society member since 1989, has been named a fellow of the International Electron Paramagnetic Resonance Society.

Subgroups

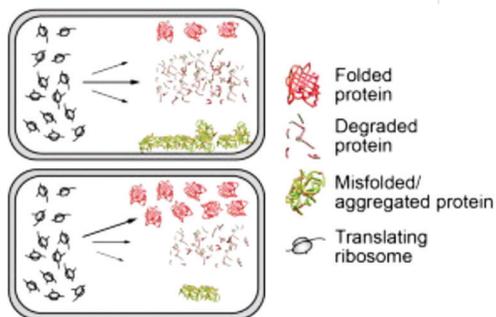
BIV

Dear All,

Come out in strength to celebrate the Diamond Anniversary of the Society's first Annual Meeting! It's only one month to the October 1 abstract submission deadline for the 60th Annual Meeting. Biopolymers In Vivo meets on Saturday, February 27. Our Program Chairs, *Christian Kaiser* and *Ed O'Brien*, will be selecting postdoc and student speakers from among the poster abstract submissions, so be sure to sign up on time and online at www.biophysics.org.

While we're on the subject of meetings, here are some upcoming small meetings that touch on topics near and dear to BIV:

- Workshop in Advanced Fluorescence Imaging and Dynamics (LFD Oct 26–30, 2015)
- Protein Folding Dynamics (GRC Jan 10–15, 2016)
- Origins of Life (GRC Jan 16–22, 2016)
- Mitochondrial Dynamics (Keystone Symposium Apr 3–7, 2016);
- The Texas Protein Folders and Function Meeting (Apr 8–10, 2016)



For this newsletter, I want to highlight a recent BIV-themed paper by one of our former Chairs, *Lila Gierasch*, together with the *Jeff Kelly* and *Evan Powers* groups: *Individual and Collective Contribu-*

tions of Chaperoning and Degradation to Protein Homeostasis in *E. coli* in *Cell Reports* (11(2), 321, 2015). In this paper, they use three test proteins inside *E. coli* cells to investigate the balance of a good fraction of the bacteria's homeostasis networks, including chaperones such as DnaK, GroEL, and sigma32, which regulated expression of heat shock proteins. It's a nice combination of biochemical techniques and in-cell studies unraveling to what extent different proteins go to the folding, degradation, and aggregation pathways inside a prototypical organism.

I would be remiss not to remind you about showing your BIV spirit with a T-shirt available at www.zazzle.com/biopolymers_in_vivo. Ten percent of proceeds go toward BIV activities such as student awards and the BIV dinner.

Make sure your membership is active at www.biophysics.org/BIV.

Have a happy and productive fall!

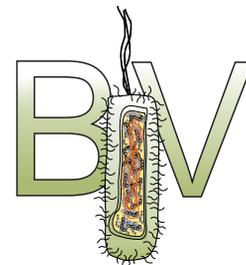
— *Martin Gruebele*, Subgroup Chair

New Cryo-EM Subgroup Formed

The Biophysical Society is proud to announce the formation of a new subgroup. The Cryo-EM subgroup was approved at the recent Council meeting, bringing the total number of Society subgroups to 13.

Over 100 regular Society members signed the petition in support of the subgroup, which was spearheaded by *Ed Egelman* of the University of Virginia, *Da-Neng Wang* of New York University, *Bridget Carragher* of the New York Structural Biology Center, *Yifan Cheng* of the University of California, San Francisco, and *Irina Serysheva* of the University of Texas Medical School.

The new subgroup will hold its inaugural business meeting and symposium on Saturday, February



(Continued on next page)

28, 2016, at the Biophysical Society 60th Annual Meeting in Los Angeles, California.

To learn more about the Society's subgroups, their programs, and how to join them, visit www.biophysics.org/subgroups

Membrane Biophysics

We look forward to another exciting Membrane Biophysics subgroup symposium on Saturday, February 27 in Los Angeles. This year our 2016 Chair, *Alessio Accardi*, has assembled a great troupe of speakers on the topic *Unusual Mechanisms in Membrane Transport*. We hope that you will be able to attend.

As you submit your abstracts for the Biophysical Society 2016 meeting we also ask that you please renew or consider becoming a member of the Membrane Biophysics subgroup. Subgroup membership dues go to support our subgroup and to facilitate new trainee fellowships in 2016 that are geared to promote the attendance of new members and to keep the subgroup vital. Also, the subgroup has officially gone digital for the upcoming Chair elections, so the business meeting can be dedicated to your unmitigated enjoyment of coffee and refreshments, which also require support. If you enjoy the symposium, please consider becoming a member or renewing your membership. Thanks!

Call for Nominations for the 2016 Kenneth S. Cole Award

The Membrane Biophysics subgroup is soliciting nominations for the Kenneth S. Cole Award. This is an annual award given to an investigator who has made a substantial contribution to the understanding of membrane biophysics. The award will be presented at the subgroup dinner directly following the Saturday afternoon symposium at the 2016 Annual Meeting in Los Angeles. This year's dinner will be held in conjunction with the Permeation and Transport subgroup. Preregistration for the dinner is encouraged and can be completed along with the meeting registration.

Any member of the Membrane Biophysics subgroup may be a nominator. Additional details are on the subgroup website: <http://www.biophysics.org/MembershipSubgroups/Subgroups/MembraneBiophysics/KennethSColeAward/tabid/2333/Default.aspx>.

For a listing of previous awardees, visit the membrane biophysics subgroup page on the biophysics webpage.

The recipient will be determined by the Selection Committee, consisting of the subgroup Chair, the Chair-elect, the past Chair, the past past Chair, and the Secretary-Treasurer. Nominations should contain a brief statement summarizing the qualifications of the nominee and a CV.

The deadline for nominations is October 30, 2015. Please email nominations to the subgroup Secretary-Treasurer, *Chris Ahern* (christopher-ahern@uiowa.edu).

Announcement of the 2016 Cole Awardee and additional details about the dinner will be posted on the website, announced by email, and included in the newsletter when available.

New Bioengineering Subgroup Forming... Sign in Support!

BPS Members *Chris Yip* and *Jonathan Rocheleau*, University of Toronto, are in the process of forming a Society subgroup that focuses on bioengineering. To become an official Society subgroup, they need 100 current (2015) Regular, Emeritus, or Early Career members to sign their petition. Once the petition is completed and approved, the subgroup will hold an organizational meeting during the Society's Annual Meeting in Los Angeles, February 2016.

Interested in supporting the effort?

To sign the petition, simply send an email to subgroups@biophysics.org.

Eighth Summer Research Program in Biophysics Comes to a Close

For the 13 students who participated in the Biophysical Society Summer Research Program in Biophysics, this past summer provided an opportunity to immerse themselves in biophysics and get a taste for what life is like as a graduate student. In addition to structured coursework, the students spent much of their summer in the labs of faculty members at the University of North Carolina, Chapel Hill, working to develop independent research projects. Their preliminary research findings were recently showcased during the program's closing symposium, held at the Rizzo Conference Center in Chapel Hill on July 29, 2015.

In addition to working in labs, Summer Program participants attended regular lectures given by UNC faculty. While these lectures provided a foundation in biophysics, seminars by visiting faculty members provided students with a more in-depth look at specific research topics. Students were able to network with visiting lecturers over lunch, asking questions about graduate school and

gaining invaluable career advice. Participants also took part in professional development sessions, featuring topics such as writing a personal statement and ethics in science.

Despite the busy schedule of classes and lab work, there was still time for the students to enjoy social outings, including a trip to the beach and attending a Durham Bulls baseball game. Additionally, during the program's alumni weekend, current students were able to connect with past students, learning about the steps they took to get into graduate school, as well as alternative career paths.

During the final symposium, students presented their individual summer research projects to their peers, teaching assistants, mentors, and Program Co-Directors, Barry Lentz and Mike Jarfster. Many students hope to present their projects at the upcoming 2016 Annual Meeting. The Biophysical Society thanks NIGMS for funding the 2015 Summer Research Program in Biophysics.

2015 BPS Summer Course Student Research

Shan Ahmad

Single Cell Array for Functional Analysis of Parathyroid Adenoma Cells

Edwin Alvarado

Using NMR to Elucidate the Structure and Dynamics of the MicroRNA Pre-Element Loop

Nicole Boone

Fabrication of Adhesive Protein Micropatterns in Application of Studying Cell Motility and Frustrated Phagocytosis

Manuel Castro

PaaA: A Structural Approach Towards Understanding the Biosynthesis of Antibiotics

Don Cundy III

Computer Simulation: Thermal Diffusion and Interactions of Actomyosin Particles

Ana De La Cruz

*Crystallization of the Tandem Calponin Homology Domain of the Spectraplaklin Protein from the Short Stop *Drosophila Melanogaster* Gene*

Kathryn Goodreau

*Phylogenetic Tree Reconstruction: A Look at Alternative Splicing in *Serpina1* mRNA*

Natalie Hewitt

Not All Ras Mutations are Created Equal

Socheata Lim

Influence of the First Amino Acid on Peptide Ion Rearrangements in a Quadrupole Ion Trap Mass Spectrometer

Destiny McDuffie

Autoinhibitory Regulation in Guanine Nucleotide Exchange Factor H1 (GEF-H1)

Danarubini Ramanan

Using Blue Light-Activated Adenylate Cyclase for Spatio-Temporal Control of Subcellular cAMP/PKA Pathway

Devin Rodriguez

Expression, Purification and Biophysical Characterization of Computationally Designed $\alpha+\beta$ Proteins

Matthew Sorrells

Optimization of Magnetic Nanoparticles for Quality Control, Drug Loading, and MRI Contrast Capability



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UPCOMING EVENTS

BIOPHYSICAL SOCIETY NEWSLETTER SEPTEMBER 2015

November

November 18-19

Electro-activity of Biological Systems

Paris, France

eabs2015.sciencesconf.org

November 22-25

40th Anniversary Conference of the Australian Society for Biophysics

Armidale, Australia

www.biophysics.org.au/2015/asb2015_index.html

December

December 2-5

2nd Zing Neurodegeneration Conference

Cancun, Mexico

www.zingconferences.com/conferences/2nd-zing-neurodegeneration-conference/

January

January 10-14

Systems Immunology: From Molecular Networks to Human Biology (A1)

Big Sky, Montana

<https://www.keystonesymposia.org/index.cfm?e=web.Meeting.Program&meetingid=1431>

January 28-31

Bioinorganic Chemistry (GRS)

Ventura, CA

<https://www.grc.org/programs.aspx?id=14173>

February

February 7-11

Fibrosis: From Basic Mechanisms to Targeted Therapies (Q3)

Keystone, CO

<https://www.keystonesymposia.org/index.cfm?e=web.Meeting.Program&meetingid=1407>

February 21-26

Biology of Acute Respiratory Infection

Galveston, TX

<https://www.grc.org/programs.aspx?id=13837>