

THE BIOLOGICAL PHYSICIST

The Newsletter of the Division of Biological Physics of the American Physical Society

Vol 9 N° 6 February 2010

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Tom Chou
tomchou@ucla.edu

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pwyatt@wyatt.com

Newsletter Editor

Sonya Bahar
bahars@umsl.edu

Assistant Editor

Christopher Smith
csmith@ctbp.ucsd.edu

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This issue brings you the first of many interviews with some of the key players in federal funding of biological physics research initiatives. And of course, all the usual suspects – PRE & PRL Highlights, job ads, & conference announcements.

Finally, after editing *The Biological Physicist* since June 2001 (!) it is time for one of us (SB) to bid adieu. When politicians step down, they cite the desire to spend more time with family. In my case, I plan to spend more time with my graduate students. See you at future March Meetings! Please join me in welcoming the new Editor, Chris Smith.

– SB & CS

Federal Funding Opportunities and Perspectives on Biological Physics Research - A Series of TBP Features

Over the course of the next few issues of the Newsletter, we will be bringing you interviews with program directors at major federal funding agencies that oversee programs directly and/or indirectly involved in biological physics research.

In this issue, we will start with a summary of a conversation with Dr. Denise Caldwell, Deputy Director of the Physics Division, MPS/NSF, and interviews with Drs. Krastan Blagoev (Physics of Living Systems program, Physics Division, MPS Directorate) and Kamal Shukla (Biomolecular Systems Cluster program, Division of Molecular and Cellular Biosciences, BIO Directorate) at NSF, who oversee Biological Physics initiatives.

Biological Physics Frontiers at NSF: Insights from Dr. Denise Caldwell Deputy Director, Physics/MPS

Christopher M. Smith

Denise Caldwell, PhD, is the deputy director for the Physics Division of the Directorate of Mathematical and Physical Sciences (MPS) at the National Science Foundation (NSF). She is also the



Program Director for the Physics Frontiers Centers (PFC) program, that includes two

biological physics PFC's: the Center for Theoretical Biological Physics at the University of California, San Diego and the Center for the Physics of Living Cells at the University of Illinois at Urbana-Champaign. The editors had a chat with Dr. Caldwell on her perspectives related to current and future biological physics research initiatives at NSF. A summary of that conversation is presented here.

Dr. Caldwell has a PhD in Physics from Columbia University for research in atomic photoionization. After postdoctoral work at Bielefeld University (Germany), she accepted a faculty position at Yale University. Six years later, she joined the faculty of the University of Central Florida, where she became full professor. In 1995, she accepted a position at NSF as a rotator program director, where she helped manage the Optical Sciences

and Engineering initiative as part of the atomic, molecular, optical, and plasma physics (AMOP) program within MPS. Then in 1998, she was offered a permanent NSF position as program director for AMOP. In 2001, she assumed responsibility for developing a new Physics program, the Physics Frontiers Centers. Over the course of the next few years, Denise and her

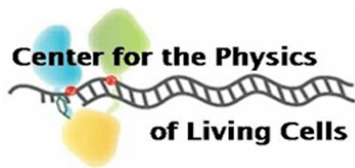


counterparts at NSF found that more physicists were engaging in research that was linked to biological processes. This was particularly true for junior and mid-career scientists, who were transitioning to the discipline of "biological physics". The Physics Division, and indeed the MPS Directorate as a whole, realized this represented a significant new research thrust for the community; thus they began to fund research proposals specifically at the physical-life sciences interface. The irony is that this new research area developed so quickly that the Physics Division did not have a dedicated funding source. So physics program officers got very creative and were able to seed

these initial “biological physics” activities under a variety of Physics programs. The successes of the initial funded research awards led to the development of a concerted biological physics research program in 2005. In 2007 Dr. Krastan Blagoev joined the Physics division as program director for the program. Over the course of the next few years, the breath of “biological physics” research grew significantly. The field was largely “ill-defined and unfocused” in terms of what the Physics Division funds. In response, the biological physics program was redefined and refocused, resulting in the replacement of that program by the Physics of Living Systems (PoLS) program in 2008. Under the direction of Dr. Blagoev, the PoLS program has grown considerably with program funding almost doubling (to \$6M) and the number of funded awards tripling (to 25) in 2009. Although the PoLS program represents a significant new thrust for the Physics Division, the recognition and acknowledgement of biological physics within NSF was initially codified by the funding of the first biological physics PFC, CTBP, in 2002. Then another PFC in biological physics, CPLC, was subsequently funded in 2008.



The genesis of the CPLC PFC resides in the open competition element of the PFC program (http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5305). Currently there are nine PFC's (<http://www.nsf.gov/mps/phy/facilities.jsp>), funded for 5 year periods. Every three years, there is an open competition in which any new institution can submit a PFC proposal. Existing PFC's are required to participate in this competition to continue funding past their initial 5 years. There is no guarantee of continued funding for current PFC's submitting a renewal. All proposals are reviewed for originality – “are the planned activities pushing the envelope in physics research?” So current Centers essentially must re-invent themselves every 5 years. In the last PFC competition (2008) approximately 20% of all proposals were for PFC's focusing on some aspect of biological physics. For those who want to submit a PFC proposal for the 2011 competition; pre-proposals are due August 2010, and if you are



invited to submit a full proposal, it will be due in January 2011.

Successful proposals are the product of a novel research idea and a well articulated research proposal. A successful proposal writer will need to understand what the program officers and the external reviewers are looking for when they review their proposal. Generally, this insight is gained after many years of experience, failures and successes, in proposal writing. According to Dr. Caldwell, junior investigators can gain such first-hand knowledge and experience in the grant review processes by becoming a part of that process. She recommends that junior investigators seek out programs within NSF that best match their particular research area, then contact the program officer. Send her/him an email introducing yourself, including perhaps an abbreviated *curriculum vitae*, and ask that you be considered for proposal review or panel service. In terms of gaining significant insight, panel service is best. In a panel, you engage in active discussions with peers on the merits of proposals; strengths and weaknesses, innovation, etc., and you also gain invaluable exposure on how colleagues (potential reviewers of your proposals) approach the review process; what they think is important, what is mundane, etc. in a proposal. Panels are also an excellent mechanism to expand your professional network of colleagues. Becoming involved in the review process will definitely advance your proposal writing skills.

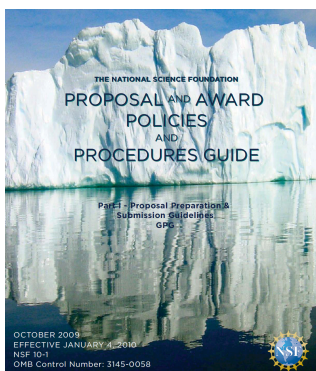
On the subject of writing and submitting proposals, according to Dr. Caldwell, amongst the three most important things you can do are:

- i) research the appropriate NSF program and contact the program officer.
- ii) read the NSF Grant Proposal Guide (GPG), including updates.
- iii) have someone else read/review your proposal prior to submission.

If you feel you have a great research idea, search for an appropriate program within NSF. If you are a physicist, the best program may not always be in the Physics Division, so thoroughly check all funding opportunities throughout the various NSF directorates. This can easily be done through an awards search on the NSF web page at <http://www.nsf.gov>. Once you have identified what you feel is a good program match, contact the program officer. Email or call her/him to discuss your research idea. In many cases, the program officer may provide general advice about NSF procedures, and details about a program or the goals of a solicitation, that you can use to help you

better formulate your proposal, The program officer may also suggest multiple funding streams. As much of our modern research has become interdisciplinary in nature, so has NSF funding. It is not uncommon today for innovative research proposals to be funded from disparate NSF divisions and directorates, e.g., a research idea in biological physics may be funded by physics (MPS/PHY) and molecular biophysics (BIO) programs. In fact, most NSF directorates work closely together today, especially with regard to funding research projects at interdisciplinary interfaces.

A program officer will likely discuss additional and alternative funding opportunities, provided you contact them. This is insight you will not get from a written proposal solicitation document. Other positive aspects of the conversation are; you'll develop a rapport with someone at NSF, and they will become aware that you are interested in and will likely be submitting a proposal.



Often, researchers will read the "Request for Proposal" (RFP), but not the NSF Grant Proposal Guide (GPG). Dr. Caldwell highly recommends that you read the Grant Proposal Guide (GPG), including the latest updates. This is especially true if you are new to writing

proposals; and if you are an experienced proposal writer, the updates can be critical. For example, proposals submitted after April 2009 that do not specifically address how postdoctoral fellows will be mentored will not be reviewed. (Incidentally, the current GPG (NSF 10-1; http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg) was issued October 2009 and is effective January 4, 2010.) Ensuring that your proposal is in the correct format is also important, especially for multi-investigator proposals. Proper formatting can convey consistency in a proposal, e.g., "if a team of investigators can't work together to ensure proper formatting of the seemingly insignificant elements of their proposal, it doesn't speak well for their ability to work together on complex issues, e.g., the research!"

For beginning writers, Dr. Caldwell cannot stress enough the importance of having someone else

read your proposal. This person, a colleague, need not be someone who is intimately versed in your research area, but they should have experience writing or reviewing proposals. Your "personal" reviewer needn't necessarily focus on the content of the proposal, but on how the proposal reads. Did you state your research question clearly? Did you articulate concisely your approach to addressing the research question? If someone outside of your immediate research area can understand your "message", then there is a better chance that all your reviewers will also see your message and rate your proposal favorably.

The proposal review process; once submitted, your proposal is evaluated for formatting (page limits, etc.), critical elements, e.g., scientific merit and broader impacts statements, and completeness. If any of the critical elements are missing and/or formatting is such that it is difficult to read, the proposal may be summarily rejected. Properly formatted proposals are then forwarded to the program officer. S/he will subsequently send your proposal out for independent review by 3-4 scientists in the field, and/or assemble a panel of reviewers (who meet at one site for 2-3 days to review, discuss proposals) to evaluate your proposal in concert with as many as possibly 100 other proposals submitted to the same program. The reviewers (independent or panel) will then document the merits (or lack thereof) of your proposal and make recommendations as to the priority for funding among the proposals that are being reviewed by the panel. These reviewer recommendations are then studied by the program officer, who subsequently relies on and uses the reviewer comments in order to select those projects that are most deserving of funding. S/he then submits a written document to the Division Director justifying funding for each selected project. It is the Division Director who has final funding authority. The program officer has flexibility in the projects s/he recommends for funding, but they also shoulder tremendous responsibility. The quality of their portfolios best serves the community and the taxpayer when they pick research ideas (proposals!) that will be very successful.

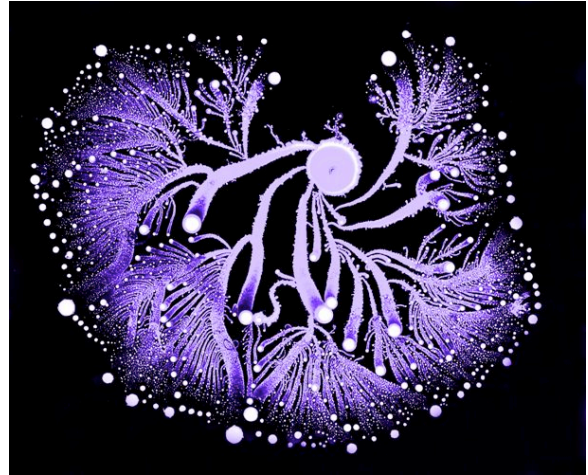
Regarding research successes; if you have an award, it is very



important that you submit to your program officer annual **research highlights**; this is in addition to the annual progress report that you submit to NSF

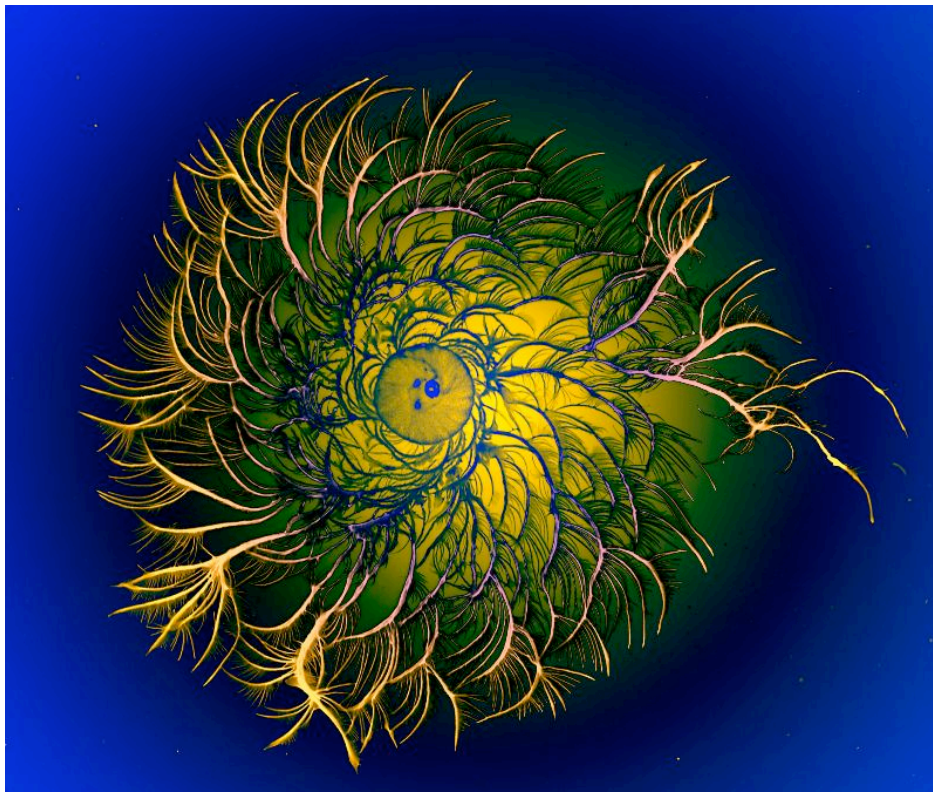
(through FastLane). Your research highlight is typically a one-page summary (with colorful images, tables, figures, etc.) outlining the purpose of your research and the significance of your findings in layman's terms. Your research highlight is the public face of your research and what NSF accomplishes. So some good advice: "help your program officer and NSF with engaging and meaningful highlights".

In closing, Dr. Caldwell would like us to keep in mind that although the NSF is one of our major federal agencies with an inherent bureaucracy; program directors and officers are all scientists – whose goal is to advance the cause and frontiers of science. In this vein, they want to assist researchers in the trenches. But they cannot assist you unless you contact them and engage in conversation. This is not to say that they fund everything that comes down the pipeline. They are very selective, and they rely on your peers to help them decide on innovative, promising research projects. And although you may have a great research idea, it usually takes mentoring, advice, input and feedback from colleagues to transform your idea into an innovative, promising research proposal. So take advantage of all the support resources available to you at your home institution and at NSF.



Images (above & below) from the "Bacteria Art" Gallery of Prof Eshel Ben Jacob (Tel Aviv University, Israel).

<http://star.tau.ac.il/~eshel/image-flow.html>



The Physics of Living Systems

Perspectives on Biological Physics research initiatives from

Dr. Kratan Blagoev

(Program Director, Physics of Living Systems program, PHY Division, MPS/NSF)

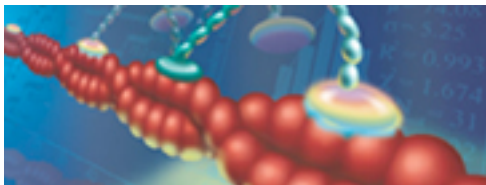
Dr. Kamal Shukla

(Program Director, Molecular Biophysics, MCB Division, BIO/NSF)

Sonya Bahar

The program in Biological Physics at NSF was recently renamed "Physics of Living Systems". What is the motivation behind the name change? How would you define the focus shift that correlated with the name change? Or was the name changed to fit with a focus that was "already there"? Have you seen a difference in the type of submissions over the past few years as a result in the transition?

Kratan Blagoev: The main motivation to change the name from Biological Physics to Physics of Living Systems was to avoid substantial overlap that Biological Physics program had with the already existing Molecular Biophysics Program in the Division of Molecular and Cellular Biosciences (MCB) in the Biological Sciences directorate. Physics of Living Systems Program focuses on questions at cellular and higher levels whereas the focus of Molecular Biophysics program is at the Molecular level. These two programs now act synergistically and cover broader areas biological questions.



How does the PoLS program relate to other NSF programs, such as Mathematical Biology and Molecular Biophysics? What types of proposals might typically fall into a grey area between these different categories?

Kratan Blagoev: There is little overlap between PoLS and Mathematical Biology. One of the requirements of Mathematical Biology program is that the proposals need to bring some new mathematics. Phenomenological approaches strongly rooted in experiment do particularly well in PoLS. This naturally separates the two programs, but we work closely with Mary Ann Horn in mathematics on program development and we discuss proposals that are overlapping. Interaction between PoLS and Molecular Biophysics and more generally MCB is strong. Many PoLS proposals address problems in molecular cell biology and naturally we discuss them for joint funding. Trends in the biological physics field are jointly discussed all the time and proposals of mutual interest are shared for joint consideration. The grey area is populated by proposals that bridge in vitro and in vivo studies.

Could you describe how NSF handles proposals in a "grey area"? Could you walk us through the process of what happens when a very interdisciplinary proposal comes in the door -- one that is potentially very good, but hard to categorize?

Kratan Blagoev: For proposals that are highly interdisciplinary and are hard to classify, we try to identify a program at NSF that might be focused on the proposed research. Then we get in touch with the corresponding Program Director and discuss possible sharing. Sometimes such proposals are reviewed by two independent panels. In previous years, we had a joint MPS/MCB panel to discuss

interdisciplinary CAREER proposals. Last year, we decided to include all interdisciplinary proposals that are at the interface between PoLS and MCB and a new joint Physics/MCB panel discussed approximately 50 proposals that were at the interface. These were CAREER as well as regular proposals. We plan to continue this year with the same joint panel. In addition PoLS has a second panel to discuss the rest of the proposals.

In some cases a proposal may not be appropriate to NSF at all. This is usually the case with proposals that are motivated by biomedical applications targeting a specific disease. In such cases, we discuss with the PI and advise them to withdraw their proposal and resubmit to an appropriate agency. In some cases, we return the proposal without review, because it is not responsive to the program

Kamal Shukla: Current trend is toward interdisciplinary proposals, both in scientific questions and tools to address them. In recent years, we have been receiving many interdisciplinary proposals that address broad questions, from molecular to higher levels, using a variety of theoretical and experimental approaches. NSF is in unique position to handle such proposals. We use both mail reviews that are from scientists working directly in these areas and panel reviews. Although it is hard to assemble a panel that will have expertise on all aspects of proposals, the combination of mail reviews and panel works quite well.

The economic downturn has had a significant impact throughout the country. How has it affected NSF in general, and interdisciplinary scientific programs at NSF in particular?

Krastan Blagoev: Well, so far we have been lucky that the current administration recognizes that economic growth is tied to science discovery and technological innovation and NSF has had substantial increase in budget. Last year, for example, PoLS had an additional \$4.5 million from the recovery act. The Physics Division recognizes the importance of PoLS and added an additional \$1 million to the base of the program. So last year the program's base was close to six million and I expect this year to be close to seven million. We think everyone recognizes the importance of interdisciplinary research and is supportive and we hope that this trend will continue in the future.

Where do you see the various interdisciplinary programs at NSF heading over the next five to ten years?

Krastan Blagoev: We think interdisciplinary research has a bright future, because its importance is recognized at all levels at NSF. We strongly believe that the community should determine the future directions and our programs should reflect and respond to the trends in the community.

Kamal Shukla: I agree with Krastan that future research will be increasingly interdisciplinary and new integrative disciplines will emerge from such endeavors. I also strongly believe that scientific community should be the gatekeeper for the future direction of science.

What role have the Physics Frontiers Centers played in the development of interdisciplinary sciences over the past years? What role do you see for Physics Frontiers Centers in the future growth of interdisciplinary science?

Krastan Blagoev: We think that Denise Caldwell has done a tremendous job with the PFC program. The centers at UCSD and UIUC, which were jointly supported by MPS and Biology Directorates, are laying the foundations of quantitative biology and are serving as International Centers for interdisciplinary research. They are also involved in educating the next generation of scientists.

Kamal Shukla: Two Physics Frontier centers, at the interface of Physics and Biology, are excellent demonstrations of interaction between physics and biology directorates at NSF and also for the support of interdisciplinary research. Both scientific communities will benefit from these activities.

What steps do you see NSF taking to encourage direct collaboration between biologists and physicists?

Krastan Blagoev: A number of initiatives are under development and if these initiatives are successful we could see a substantial increase of funding for interdisciplinary research. One open question pertains to the most optimal mechanism for funding interdisciplinary research. Last year, Pat Dennis (MCB) and I co-chaired an international US/UK Sandpit on Synthetic Biology. A number of scientists were invited for a week to develop innovative projects. Many of them were funded at the end of the sandpit. This was a new mechanism

at NSF and others are also possible. So NSF is exploring different ways to stimulate interdisciplinary collaborations.

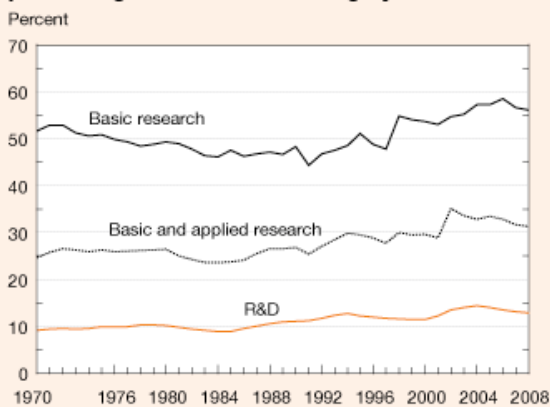
Kamal Shukla: Two recently funded Physics Frontier Centers at the interface of biology and physics amply demonstrate the NSF's commitment to support interdisciplinary research. As mentioned above by Krastan, this trend will continue.

When *The Biological Physicist* spoke with you two years ago (April 2008 issue), we asked you about your advice for interdisciplinary scientist attempting to fund new laboratories. Would your advice be any different today, based on changes in interdisciplinary research itself, or based on the different economic situation we face today?

Krastan Blagoev: My advice for these scientists is to identify as many sources of funding as possible. In addition, there is the Major Research Instrumentation (MRI) program in MPS, which can be a source for laboratory funding.

Kamal Shukla: As we noted above, the future for interdisciplinary research is bright. We cannot prosper economically unless our scientific endeavor remains at the forefront. The way things are, science is becoming more interdisciplinary and I agree with Krastan that scientists should explore all possible avenues to support their interdisciplinary research.

Figure 5-1
Academic R&D, basic and applied research, and basic research as share of U.S. total from all performing sectors in each category: 1970-2008

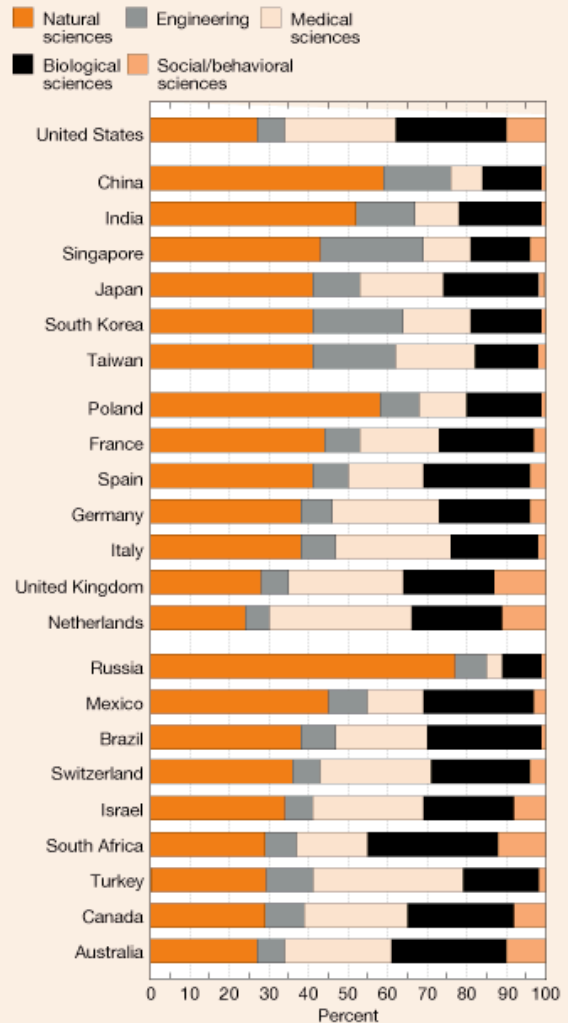


NOTES: Preliminary data for 2008. Because of changes in estimation procedures, character of work data before FY 1998 not comparable with later years. Data based on annual reports by performers.

SOURCE: National Science Foundation, Division of Science Resources Statistics, National Patterns of R&D Resources (annual series). See appendix table 5-1. Also see appendix tables 4-3, 4-7, 4-11, and 4-15 for data underlying percentages.

Science and Engineering Indicators 2010

Figure O-14
Field shares of research articles for selected countries/economies: 2007



NOTE: Natural sciences include astronomy, chemistry, physics, geosciences, mathematics, and computer sciences.

SOURCES: Thomson Reuters, Science Citation Index and Social Sciences Citation Index, http://thomsonreuters.com/products_services/science/; The Patent Board™; and National Science Foundation, Division of Science Resources Statistics, special tabulations.

Science and Engineering Indicators 2010

Food for Thought!— Recent research funding and publications data from the NSF [Science and Engineering Indicators: 2010](#) report.

DBP ANNOUNCEMENT

Award for Outstanding Doctoral Thesis Research in Biological Physics

Background

At this year's March Meeting, the first DBP Outstanding Doctoral Thesis awards will be presented. The competition is now open for next year's awards!

Description

To recognize doctoral thesis research of outstanding quality and achievement in any area of experimental, computational, engineering, or theoretical Biological Physics, broadly construed, and to encourage effective written and oral presentation of research results, the Division of Biological Physics will present an award, to be given annually, consisting of \$1,500, a certificate citing the contribution made by the Awardee, and a \$500 travel allowance (\$1000 international) and fee waiver to attend the subsequent March meeting and to present an invited talk based on the thesis work or an extension of that work. Award and travel monies will be presented following the talk. The two runners-up will receive certificates of merit citing their contributions.

Establishment & Support

The award was established in 2009 by the Division of Biological Physics and is sponsored by members and friends of the Division of Biological Physics.

Rules & Eligibility

Doctoral students at any university in the United States or abroad who have passed their thesis defense for the Ph.D. in any areas of experimental, computational, engineering, or theoretical Biological Physics, broadly construed, any time from October 1st two years before the year in which the award is to be presented until September 30th in the year before the award is to be presented, are eligible for the award, except for those whose thesis advisors serve on the current Selection Committee. To recognize the fundamentally interdisciplinary nature of biological physics, the applicant, advisor and degree awarded need not be in Physics, but may also be in any appropriate related area, including, but not limited to, Biomedical Engineering, Applied Mathematics, Applied Physics or Biological Physics, Biophysics, Biology, Mathematics, Biochemistry, Chemistry or Chemical Engineering. In the event that the Committee judges no submitted theses to be of sufficient quality, the Committee may elect not to present the award.

Nomination & Selection Process

Nominations must be received by the Chair of the 2009 Biological Physics Thesis Award Selection Committee prior to the deadline for nominations: **the first Monday in October**

each year (October 4th, 2010). Nominations **must** be submitted as a single PDF file to the Chair of the Selection Committee in an email attachment.

The nomination process is initiated by the thesis advisor. The nomination package consists of the following materials:

1. A letter from the thesis advisor citing the specific contributions of the nominee and the significance of those contributions.
2. A letter from the department chair and/or relevant program director certifying the date of the thesis defense.
3. Two letters seconding the nomination.
4. A manuscript prepared by the nominee describing the thesis research; the manuscript may not exceed 1,500 words (excluding figures and references).
5. An abstract prepared by the nominee suitable for publication in the Bulletin of the American Physical Society; the abstract may not exceed 1,300 characters. The name of the

thesis supervisor and the institution should be indicated in a footnote.

6. A full curriculum vitae of the nominee including a publication list.

Nominations are limited to one per year per nominator. Writers of seconding letters may only submit one seconding letter per year.

Timeline

September 30th—Deadline for thesis defenses for consideration by the Selection Committee.

First Monday in October (October 4th, 2010)—Deadline for nominations.

November 10th—Selection of Awardee and runners up.

November 17th—Notification of Awardee and invitation to March Meeting.

December 2nd—Deadline for acceptance of invitation by Awardee.

March Meeting—Awarding of Prize.

For the 2010/2011 Award, Nominations must be sent to:

Chair: Prof. Stephen Quake
quake@stanford.edu

PRL HIGHLIGHTS

Soft Matter, Biological, &
Inter-disciplinary Physics Articles from
Physical Review Letters

4 December 2009

Volume 103, Number 23, Articles (23xxxx)
<http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=103&Issue=23>

Phase Diagram of Janus Particles

Francesco Sciortino, Achille Giacometti, and
Giorgio Pastore
Published 30 November 2009 // 237801

Chiral Selection by Interfacial Shearing of Self-Assembled Achiral Molecules

Núria Petit-Garrido, Jordi Ignés-Mullol, Josep
Claret, and Francesc Sagués
Published 30 November 2009 // 237802

Large Flow Birefringence of Nematogenic Bent-Core Liquid Crystals

C. Bailey, K. Fodor-Csorba, R. Verduzco, J. T.
Gleeson, S. Sprunt, and A. Jákl
Published 4 December 2009 // 237803

Booming Dune Instability

B. Andreotti and L. Bonneau
Published 1 December 2009 // 238001

Three-Dimensional Characterization of Active Membrane Waves on Living Cells

Chien-Hong Chen, Feng-Ching Tsai, Chun-Chieh
Wang, and Chau-Hwang Lee
Published 30 November 2009 // 238101

Cooperativity and Frustration in Protein-Mediated Parallel Actin Bundles

Homin Shin, Kirstin R. Purdy Drew, James R.
Bartles, Gerard C. L. Wong, and Gregory M.
Grason
Published 30 November 2009 // 238102

Intrinsic Contact Angle of Aqueous Phases at Membranes and Vesicles

Halim Kusumaatmaja, Yanhong Li, Rumiana
Dimova, and Reinhard Lipowsky
Published 2 December 2009 // 238103

Origin of Power Laws for Reactions at Metal Surfaces Mediated by Hot Electrons

Thomas Olsen and Jakob Schiøtz
Published 30 November 2009 // 238301

Concerted Hydrogen-Bond Dynamics in the Transport Mechanism of the Hydrated Proton: A First-Principles Molecular Dynamics Study

Timothy C. Berkelbach, Hee-Seung Lee, and Mark
E. Tuckerman
Published 30 November 2009 // 238302

Shape-Induced Dispersion of Colloids in Anisotropic Fluids

F. Mondiot, S. Prathap Chandran, O. Mondain-
Monval, and J.-C. Loudet
Published 4 December 2009 // 238303

Granger Causality and Transfer Entropy Are Equivalent for Gaussian Variables

Lionel Barnett, Adam B. Barrett, and Anil K. Seth
Published 4 December 2009 // 238701

11 December 2009

Volume 103, Number 24, Articles (24xxxx)
<http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=103&Issue=24>

Reduced Interfacial Entanglement Density Affects the Boundary Conditions of Polymer Flow

O. Bäumchen, R. Fetzer, and K. Jacobs
Published 8 December 2009 // 247801

Topological Phonon Modes and Their Role in Dynamic Instability of Microtubules

Emil Prodan and Camelia Prodan
Published 7 December 2009 // 248101

Modeling Torque Versus Speed, Shot Noise, and Rotational Diffusion of the Bacterial Flagellar Motor

Thierry Mora, Howard Yu, and Ned S. Wingreen
Published 8 December 2009 // 248102

Dynamics of Vesicle Unbinding under Axisymmetric Flow

Sunita Chatkaew, Marc Georgelin, Marc Jaeger,
and Marc Leonetti
Published 8 December 2009 // 248103

Nonequilibrium 1/f Noise in Rectifying Nanopores

Matthew R. Powell, Ivan Vlassioug, Craig Martens, and Zuzanna S. Siwy
Published 9 December 2009 // 248104

Coding of Information in Limit Cycle Oscillators

Jan-Hendrik Schleimer and Martin Stemmler
Published 9 December 2009 // 248105

Statistical Properties of Metastable Intermediates in DNA Unzipping

J. M. Huguet, N. Forns, and F. Ritort
Published 10 December 2009 // 248106

Self-Organized Criticality in Sheared Suspensions

L. Corté, S. J. Gerbode, W. Man, and D. J. Pine
Published 7 December 2009 // 248301

Competition between Shear Banding and Wall Slip in Wormlike Micelles

M. Paul Lettinga and Sébastien Manneville
Published 8 December 2009 // 248302

Hydrodynamic Mobility of an Optically Trapped Colloidal Particle near Fluid-Fluid Interfaces

G. M. Wang, R. Prabhakar, and E. M. Sevick
Published 8 December 2009 // 248303

Stringlike Clusters and Cooperative Interlayer Permeation in Smectic Liquid Crystals Formed by Colloidal Rods

Alessandro Patti, Djamel El Masri, René van Roij, and Marjolein Dijkstra
Published 9 December 2009 // 248304

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Employment Opportunities



UPPSALA
UNIVERSITET

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Assistant professor/Research Associate in Computational Structural Biology

at the Department of Cell and Molecular Biology.

A full advertisement with information about how to apply can be found at www.uu.se/job

Closing date for acceptance of application is 25 March, 2010.
UFV-PA 2010/372.

The Biocomplexity Institute

Indiana University, Bloomington

Multiple positions available:

Computational/Developmental Biology Scientist

Language Development Specialist

Software Developer

Developmental Biology-Cell Biology-Biochemistry Experimentalist

Send CV, research summary and 2 papers or projects, along with a brief statement of relevance of background to position applied for, to Prof. James A. Glazier, glazier@indiana.edu. Please arrange to have three letters of reference sent separately. Searches will begin immediately and will continue until positions are filled. For more information, please see www.biocomplexity.indiana.edu and www.compuccell3d.org or contact Prof. Glazier by e-mail. Indiana University is an EOAAE.



The Bruno H. Zimm Biological Physics Postdoctoral Fellowship

The Center for Theoretical Biological Physics (CTBP) at the University of California, San Diego invites applications for the Bruno H. Zimm Postdoctoral Fellowship

Applications are due November 15, 2010

For additional information and application instructions, visit:

http://ctbp.ucsd.edu/zimm_fellowship.html

CTBP is a consortium of researchers from UCSD, the Salk Institute for Biological Studies, and the University of Michigan, involved in research on fundamental problems at the interface between physics and biology. Research encompasses three synergy themes – ***Cellular Tectonics***, the dynamic mesoscale structure of the intracellular milieu; ***Computational Approaches to Intracellular and Intercellular Communication***, chemical-based reaction-diffusion governed communication across complex spaces; and ***Gene Regulatory Networks***, genetic/signaling networks that exhibit specificity and robustness in the face of intrinsic stochasticity, and yet retain evolvability. The Zimm fellowship is for recent graduates who have demonstrated exceptional research aptitude and are interested in pursuing more independent, semi-autonomous research than is available in a traditional postdoctoral position. Zimm fellows will be expected to pursue intensive research in any area of biological physics related to the CTBP research synergies.

CTBP Faculty include:

Henry Abarbanel, Physics, UCSD
Olga Dudko, Physics, UCSD
Terence Hwa, Physics, UCSD
Bo Li, Mathematics, UCSD
José Onuchic, Physics, UCSD
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Michael Holst, Mathematics, UCSD
Herbert Levine, Physics, UCSD
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Tatyana Sharpee, Salk Institute

For more information contact Christopher Smith, PhD., CTBP, Department of Physics, 9500 Gilman Drive, MC0374, University of California, San Diego, CA 92093, csmith@ctbp.ucsd.edu (858) 534-8370

CTBP is a Physics Frontiers Center of the National Science Foundation

Conferences, Meetings, Workshops, Summer Schools

If you would like to post an announcement for a workshop or conference in this Newsletter, send your notice (text) or a PDF document (resized to a maximum size of 7 inches x 10 inches) to the editors.

The APS March Meeting

March 15-19, 2010
Oregon Convention Center
Portland, Oregon



<http://www.aps.org/meetings/march/index.cfm>

The Physics of Evolution

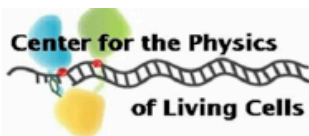
Center for Theoretical Biological Physics
August 30 – September 3, 2010
University of California San Diego

For Information and/or To Apply :

<http://ctbp.ucsd.edu/workshops/index.php?id=29>

Deadline: June 15

CTBP is currently accepting applications for our annual Summer School/Workshop. Applications will be reviewed on or before June 15, and invitations sent no later than June 30. Invited applicants will be provided housing, meals, and registration. Travel awards may be provided to graduate student and post-doctoral invitees. For additional information, contact: Christopher M. Smith, PhD, CTBP/UCSD, cmsmith@ctbp.ucsd.edu, 858-534-8370.

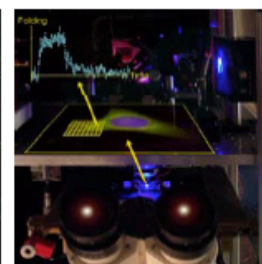
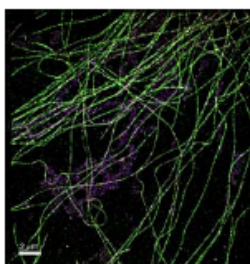
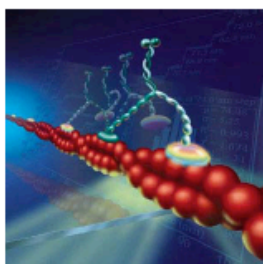
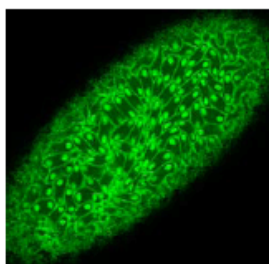
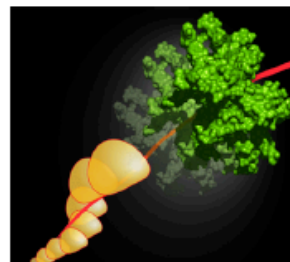
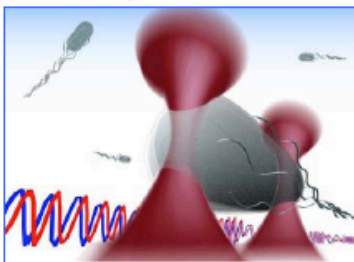
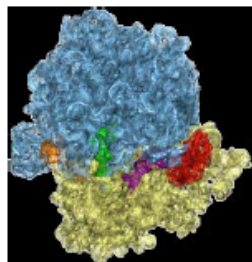


Welcome to the

PHYSICS OF LIVING CELLS SUMMER SCHOOL

An NSF Physics Frontier Center at the
University of Illinois at Urbana-Champaign (UIUC)

July 19 – 24, 2010



The Center for the Physics of Living Cells (CPLC) laboratories at the University of Illinois are using the latest single-molecule, live-cell experimental and computational biophysical tools to investigate biological processes such as mechanisms of protein motor translocation, mechanics of genome maintenance and translation machinery, and dynamics of protein folding and gene expression in living cells.

The 2010 CPLC Summer School will offer training in the following areas:

- ❖ *Single-molecule Fluorescence: TIR-FRET & FIONA*
- ❖ *Single-molecule Force: Optical Traps*
- ❖ *Fast Relaxation Imaging (FRel): protein folding dynamics in living cells*
- ❖ *Single-event detection in living cells*
- ❖ *Super-resolution fluorescence microscopy (PALM/STORM)*
- ❖ *Tracking cell surface growth in living fruit fly embryos*
- ❖ *Molecular dynamics simulations of single molecule sensors*
- ❖ *Observing biomolecular interactions with atomic resolution*
- ❖ *Dynamical networks in protein:RNA assemblies*

This summer school is designed for graduate students, postdoctoral fellows, and researchers in chemical and life sciences, biophysics, physics and engineering who would like to expand their research skills into these areas. The workshop will consist of an initial period of 'basic training' on technique fundamentals followed by a four day 'advanced laboratory module' on a selected topic which integrates both experimental and theoretical components.

Registration Fee*: \$75 students; \$150 non-student academics; \$250 all others
Housing and all course materials will be provided.

Application Deadline: April 1, 2010

Selection and notification of Participants to be completed by April 15, 2010

*Registration Fee is due from Selected Participants by May 1, 2010.

PARTICIPATING FACULTY

UIUC

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Paul Selvin
Yann Chemia
Martin Gruebele
Klaus Schulten
Zan Luthey-Schulten
Aleks Aksimentiev

Baylor College of Medicine

Ido Golding
Anna Sokac

CONTACTS

Center for the Physics
of Living Cells
Department of Physics, UIUC
Urbana, Illinois
Phone: 217/333-3393;
<http://www.cplc.illinois.edu/>

Questions:

summerschool@cplc.illinois.edu

... and a very hearty

THANK YOU

to our outgoing Newsletter Editor:

Dr. Sonya Bahar, PhD
Center for Neurodynamics
University of Missouri, St Louis



for her enduring efforts on our behalf for the past
10 years.

