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In this Issue

This issue of THE BIOLOGICAL PHYSICIST brings you an interview with Drs. Kamal Shukla and C. Denise Caldwell of the National Science Foundation about opportunities in biological physics funding from the NSF, a special announcement about a workshop on "Brain Physics and Mind Dynamics", and fall faculty job ads.

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FEATURE

An Interview with NSF's Kamal Shukla and C. Denise Caldwell

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By S. Bahar

At the DBP Business Meeting during the 2006 March Meeting, Dr. Kamal Shukla, the NSF Program Director for Molecular Biophysics, spoke to DBP members about funding opportunities for biological physicists from the National Science Foundation In a follow-up interview, THE BIOLOGICAL PHYSICIST *spoke with Dr. Shukla, and with Dr. C. Denise Caldwell, NSF Program Director for Biological Physics, about funding opportunities and recent developments in interdisciplinary science.*

How did you first get involved in interdisciplinary science? Describe your position at NSF and the work that you do.

Shukla: I got my PhD in Biophysics, after obtaining a Master's degree in Physics. This gave me a great opportunity to apply my knowledge of physics to biophysics, when I came to NSF as Program Director for Molecular Biophysics in the Division of Molecular and Cellular Biosciences (MCB). At MCB, I am responsible for proposals in the area of molecular biophysics. I select mail reviewers, assemble molecular biophysics advisory panels, chair the advisory panel meetings, and make funding recommendations based on the mail and panel reviews. I also coordinate activities at the interface of biology and physical sciences.

Caldwell: My original position was program director for the Atomic Molecular Optical & Plasma Physics (AMOP) program, which has connections to many other scientific disciplines, including chemistry, astronomy, materials research, and, increasingly, biology. As program director, I look at proposals that are submitted in my area, select reviewers, send the proposals out for review, and make funding recommendations based on reviews. In 2001 I added management of the Physics Frontiers Centers program to my portfolio. This involves conducting oversight visits to various sites funded by the program, to look at the value of funding a large group, or Center, rather than individual investigators. Part of the duties of the program director are also to make recommendations to the division of areas of research that are particularly exciting and appropriate for additional funding. In this role I recommended to the Director of the Physics Division the creation of the new program in Biological Physics, which was formally initiated in 2005.

How do you see interdisciplinary science as having changed over the past few decades?

Caldwell: I think that a lot more people are comfortable with interdisciplinary science. When I first came to the NSF in 1995, I represented the Physics Division in a special competition in Optical Science and Engineering. As I worked on the program, it became apparent that many people were working across fields, and I saw that some of the most interesting questions in science needed this sort of collaboration. Since that time I have tried to foster interactions among the disciplinary programs at NSF.

I think universities are becoming more comfortable with interdisciplinary science as well. Universities are traditionally vertically structured, but we are now starting to see the vertical structure crack in places as scientists begin to talk to each other because they really have to. NSF has fostered this with broad interdisciplinary activities such as the Nanoscale Science and Engineering program.

Biological Physics is an example of an interdisciplinary program, one that we are in the process of defining. We aren't really tied down to a specific biological question, we try to be broad in the types of problems we consider. We look for new approaches that have broad applicability, ideally to more than one more narrowly defined biological situation. We look for projects that ask "What are the physics kinds of things that appear in the problem? Is there something new here, a new general concept, for example?" We still try to understand specific problems, but we hope to learn something more general in the course of it.

Shukla: Biophysics is multidisciplinary to start with; it uses tools and techniques from Physics, Chemistry and other physical sciences to explore biological questions. Now, in the post-genomic era, with an explosion of new data that need to be analyzed and understood, knowledge from other disciplines is becoming an integral part of understanding biology. Biology is becoming more and more quantitative and it has accelerated in the post-genomic era. Huge amounts of information are available, but we know very little about it! This offers a huge opportunity for mathematicians, computer scientists, and physicists in 21st century biology.

What has been NSF's response to the changes and growth in interdisciplinary science?

Shukla: The way NSF is responding is essentially trying to create new opportunities – in biological sciences, for example, there is a program called Frontiers in Integrative Biological Research (FIBR). There is a program to foster collaborative research in chemistry, targeted to funding interdisciplinary projects. One of the unique things about NSF is that everything is under one roof: physics, chemistry, biology, engineering, and computer science. This gives a unique opportunity for program directors to interact with one another to foster interdisciplinary science.

Caldwell: Initiatives are one response. But NSF program directors do work together a lot, much more than most people think. When we co-review and co-fund proposals across the disciplinary programs, we foster multi-disciplinarity even in the absence of big NSF-wide initiatives. For biological physics, a major approach is a strong collaboration between Biological Physics and Molecular and Cellular Biosciences (MCB). Biological Physics supports research other than MCB, but a lot of what Biological Physics funds is co-reviewed and co-funded with MCB. For example, each year we conduct a special review panel for CAREER proposals at the interface between Biological Physics, Condensed Matter Physics, Chemistry, and MCB. Doing this has broadened what we can do, allowing us to do more than we could if we were just working alone.

Why do you think scientists do not take full advantage of the opportunities available for interdisciplinary researchers from NSF?

Shukla: I think it's cultural – physicists have to interact with biologists. Often, physicists approach biologists, rather than the other way around, so there have mainly been unidirectional interactions so far. Biologists must learn language of physics and vice versa. I think the asymmetry has been skewed toward that direction because biology has been always qualitative and observational, so many biologists now have to learn how to be quantitative. Training has to start at earlier stages, may be high school, earlier in the career than it used to be.

Caldwell: Scientists are trying, wherever they can, especially when they see special programs or when the science drives them to do it, to take advantage of the new emphasis on interdisciplinarity. But one of the problems is that the scientists don't really reach out for the breadth of interdisciplinarity that is important. Sometimes researchers from different sub-disciplines of the same discipline will submit a proposal, thinking the work is interdisciplinary, when the degree of multidisciplinarity is not persuasive. It takes effort to go across campus and talk to your colleagues in another field. And if you

want to write a persuasive multidisciplinary proposal, you have to do that. As a physicist, you need to talk to biologists, and vice versa.

What advice do you have for scientists looking for funding for their interdisciplinary research?

Caldwell: You have to develop a TRUE multidisciplinary activity. Here we do mean physics, chemistry, biology, and perhaps others; take each of those vertical silos that exist and build bridges between them.

What advice do you have for young assistant professors, writing their first grant?

Shukla: The first grant is difficult, no question. It takes good planning and time to prepare a good research proposal. The proposal has to be well thought out and well written on an exciting project. There is no substitute for a good proposal with a good idea that is well presented. The proposal should be internally consistent in all respects, including the scope of the project, the duration, and the budget. Both research and broader impacts should be adequately addressed. Your proposal should give the reviewer a clear impression that you have carefully thought about your research plans, that your research is exciting, and that you have the right credentials and all the necessary facilities to accomplish your goals. It is always very helpful to have some of your successful colleagues critique your proposal. Read the guidelines carefully and follow them. If you have questions, contact the NSF Program Director.

Caldwell: Decide what you want to do. Your proposal should be *an argument for what you want to do*. You should be excited about it, to convey that excitement to others. I often tell first-time proposal writers that your proposal should do two things: first, it has to make a strong argument for the science, and second, and you need to convince the reviewer that *you are the one to do it*. As far as NSF is concerned, your job is not to convince the program director. Your job is to *convince the reviewers to convince the program director*. Engender excitement in experts in the field.

One other piece of advice for advice for first-time proposal-writers: have other people read your draft! They can feed back to you *whether you have said what you think you think you've said*.

What advice do you have for people writing their second big grant?

Shukla: The first renewal is difficult. You have to prove that you have earned it based on your accomplishments during the prior award. If you didn't succeed in doing the work you promised, it is incumbent upon you to make a very convincing case *why* you didn't succeed. The reason should be solid and you have to demonstrate what the roadblocks were and how you are going to deal with them.

Caldwell: In general, I would give the same advice as for the first grant. The big difference between the first and the second is this: the first is difficult because you are asking the program director and reviewers to take a chance on you. There is a little bit of convincing that you're someone worth taking a chance on. In contrast, the second one is difficult because you've had a chance to prove yourself, and if you have failed to do so, the proposal could be in trouble. But, if you are successful in getting the first award and if the research is producing exciting results that suggest future effort, it's a strong argument for funding the second proposal.

What tips can you give on good proposal writing strategy?

Shukla: One thing to remember is that it is a long process. Start early, and present your research ideas in a well thought out and well written proposal. The reviewer community is overworked, and they will get understandably irritated if they can't discern what you have written! Have the reviewer in mind, imagine yourself reviewing the proposal. Make everything very clear on first page. No long digressions on background; get quickly to the question of why this research is important, what you want to do, what has already been done, what is the timeline, and what are your backup plans. Anticipate criticisms and provide a plan to tackle them.

Caldwell: Learn to write!!! Proposal writing is communication. It's always valuable to have

communication skills, whether you're teaching, writing a proposal, writing a paper, or giving a talk. Within your proposal you need to get across – in the proposal summary and the first few pages – what you are going to do, what the content of this proposal is going to be. A lot of reviewers read a lot of proposals these days; that means they are restricted in time. If they get excited in the first few pages, then they'll be well disposed to read the whole thing. Realize they are pressed for time.

Can you compare the types of interdisciplinary projects that NSF would be likely to fund vs. those that NIH would fund?

Shukla: Both agencies support interdisciplinary projects. NSF primarily supports basic research that is not driven by biomedical applications, except engineering directorate at the NSF. The NIH, on the other hand, supports research with its focus on biomedical applications.

Is it true that one should "never mention the name of a specific disease" in an NSF proposal?

Caldwell: No, this isn't true. You do have to address broader impact. One of the potential broader impacts may be potential application to disease treatment. The real question is whether what you are doing in your proposal is *directly* related to that disease. The NSF does not fund research directly related to diagnosis or treatment of a specific disease. But it does fund research on physical or engineering principles that may ultimately be operative in the case of some diseases.

What should scientists know about how NSF study sections work?

Shukla: NSF doesn't have study sections, we have advisory panels. Study sections are at NIH. NIH study sections are chaired by one of the members of the study section, whereas, at NSF, the Program Director chairs the panel and makes the final recommendation. Some NSF programs do not have advisory panels, they make recommendations based on mail reviews only. Many other programs use a combination of panel and mail reviews.

Caldwell: NSF doesn't have study sections! We use review panels that are merely advisory. Different programs handle these panels differently. A good practice, especially if you are submitting a proposal in an interdisciplinary area, is to contact the Program Director and find out how the program does its reviews. Some do a combination of mail review followed by panel review, some use only one of the two. Different programs use different mechanisms, so it can be useful to talk with the Program Director and find out how the review is done. An ad hoc mail reviewer is going to be looking just at that one proposal. In a panel review, your proposal review will be compared to other proposals. For a panel review, your proposal doesn't just have to be *good*, it has to be *good in comparison to everything else that is on the table*. It ups the ante a little bit. Something can look good in isolation, but in comparison with something else, the flaws can become more apparent. It is also helpful in the case of co-reviews among disciplinary programs to know that your proposal will be seen by experts in both areas.

How essential is it to have preliminary data?

Shukla: It is great, very helpful. But, *don't submit poor or unconvincing data.*

Some other tips are to remember that the first page tells it all. Figures and tables make it clearer, but make sure the reviewer doesn't have to search through pages of text to understand figure. Keep your budget realistic. Ask for what you need, not too little or too much. *If you don't know how much it costs, you haven't thought carefully enough about your research.*

Caldwell: Good preliminary data can help. If nothing else, it shows you have the facilities and a reasonable approach to the problem. Poor and unconvincing preliminary data can sink a proposal. But if you have a risky idea for which there is not a lot of preliminary data, you can address this by careful attention to detail in the proposal. You can show that you have thought of all the obvious major problems and have a plan to deal with them. It is also good, if it is a risky project, to have a plan B, something that shows that even if the grand plan doesn't succeed, a lot will be learned along the way.

Why do proposals fail to get funding?

Shukla: If the proposal is not well written, not well thought out, or too diffuse. If the proposal is too ambitious or too narrow in scope. If the PI's qualifications are not evident and adequate facilities are not available to carry out the work. If the broader impacts are not adequately discussed. Other factors include lack of new ideas, faulty logic, or faulty experimental design. Sometimes well-deserving proposals don't get funded because we don't have enough money.

What should you do when a grant is rejected?

Shukla: Don't despair! Try again, sometimes you might have to try two or three times before you get funded. Sometimes when you submit your proposal, there may be so many other equally high-impact proposals that they can't all be funded. Find a colleague who has been successful in obtaining a grant; ask him or her to critique the proposal. Having good ideas is great, but how you present or package them is equally important. Call the Program Director if you have questions.

What is the best thing a scientist can do to write a good proposal?

Caldwell: Volunteer to serve on a panel or act as a mail reviewer. When you see it from the other side, you know, when you write your own proposal, what the reviewers are going to be looking for.

What is the worst grant-writing mistake a scientist can make?

Caldwell: Being too general, not making it clear what you are actually going to do, is a major mistake. Reviewers want to feel that if they make a recommendation for funding, something is going to come out of it. The NSF doesn't typically go back and compare output point for point with exactly what was proposed. So if you do something a little different from what you had originally planned, that's OK, *as long as that something else is really good.* But the proposal should be written with the full intent of doing what you say you will do.

PRL HIGHLIGHTS

Soft Matter, Biological, & Interdisciplinary Physics Articles from

Physical Review Letters

2 June 2006

Vol. 96, Number 21, Articles (21xxxx)
Articles published 27 May - 2 June 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=96&Issue=21

LETTERS

Measurement of Elastic Forces between Iron Colloidal Particles in a Nematic Liquid Crystal
C. M. Noël, G. Bossis, A.-M. Chaze, F. Giulieri, and S. Lacis
Published 1 June 2006
217801

Parity-Breaking Bifurcation and Global Oscillation in Patterns of Ion Channels
Marc Leonetti, Johannes Nuebler, and Fabrice Homble
Published 2 June 2006
218101

Force-Dependent Fragility in RNA Hairpins
M. Manosas, D. Collin, and F. Ritort
Published 31 May 2006
218301

Efficient Computation of Transition State Resonances and Reaction Rates from a Quantum Normal Form
Roman Schubert, Holger Waalkens, and Stephen Wiggins
Published 2 June 2006
218302

Melting Kinetics in Polymers
D. R. Lippits, S. Rastogi, and G. W. H. Höhne
Published 2 June 2006
218303

Scale-Free Network Growth by Ranking
Santo Fortunato, Alessandro Flammini, and Filippo Menczer
Published 31 May 2006
218701

Scaling of Fluctuations in Traffic on Complex Networks
Jordi Duch and Alex Arenas
Published 2 June 2006
218702

9 June 2006

Vol. 96, Number 22, Articles (22xxxx)
Articles published 3 June - 9 June 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=96&Issue=22

LETTERS

Freezing of Random RNA
Michael Lässig and Kay Jörg Wiese
Published 5 June 2006
228101

Nyquist Noise of Cell Adhesion Detected in a Neuron-Silicon Transistor
Moritz Voelker and Peter Fromherz
Published 6 June 2006
228102

Lateral Diffusion and Percolation in Membranes
Bong June Sung and Arun Yethiraj
Published 7 June 2006
228103

Diffusive Model of Protein Folding Dynamics with Kramers Turnover in Rate
Robert B. Best and Gerhard Hummer
Published 7 June 2006
228104

How Long Does It Take to Pull an Ideal Polymer into a Small Hole?
A. Yu. Grosberg, S. Nechaev, M. Tamm, and O. Vasilyev
Published 9 June 2006
228105

Microscopic Dynamics of Recovery in Sheared Depletion Gels
B. Chung, S. Ramakrishnan, R. Bandyopadhyay, D. Liang, C. F. Zukoski, J. L. Harden, and R. L. Leheny
Published 6 June 2006
228301

Positronium Formed by Recombination of Positron-Electron Pairs in Polymers
K. Sato, D. Shanai, Y. Hotani, T. Ougizawa, K. Ito, K. Hirata, and Y. Kobayashi
Published 7 June 2006
228302

Single Molecular Anatomy of Solvophobic Effects in Host-Guest Interactions Based on Surface Tension Using Atomic Force Microscopy
Satoshi Yasuda, Iwao Suzuki, Ken-ichi Shinohara, and Hidemi Shigekawa
Published 8 June 2006
228303

16 June 2006

Vol. 96, Number 23, Articles (23xxxx)
Articles published 10 Jun - 16 Jun 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=96&Issue=23

LETTERS

Observation of the First-Order Transition in Ultrafiltration of Flexible Linear Polymer Chains
Fan Jin and Chi Wu
Published 12 June 2006
237801

Nonlinear Photoresponse of Disordered Elastomers

D. Corbett and M. Warner
Published 12 June 2006
237802

Reproducibility of Dynamical Heterogeneities and Metabasin Dynamics in Glass Forming Liquids: The Influence of Structure on Dynamics
G. A. Appignanesi, J. A. Rodríguez Fris, and M. A. Frechero
Published 15 June 2006
237803

Surface Plasmon Radiation Forces
Giovanni Volpe, Romain Quidant, Gonçal Badenes, and Dmitri Petrov
Published 13 June 2006
238101

Protein Folding Kinetics and Thermodynamics from Atomistic Simulations
David van der Spoel and M. Marvin Seibert
Published 15 June 2006
238102

Multiprotein DNA Looping
Jose M. G. Vilar and Leonor Saiz
Published 15 June 2006
238103

Confinement-Driven Translocation of a Flexible Polymer
Angelo Cacciuto and Erik Luijten
Published 15 June 2006
238104

Spatial Persistence of Angular Correlations in Amyloid Fibrils
Tuomas P. J. Knowles, Jeffrey F. Smith, Aidan Craig, Christopher M. Dobson, and Mark E. Welland
Published 12 June 2006
238301

Molecular Observation of Constraint Release in Polymer Melts
M. Zamponi, A. Wischnewski, M. Monkenbusch, L. Willner, D. Richter, A. E. Likhtman, G. Kali, and B. Farago
Published 13 June 2006
238302

Direct Observation of Anharmonic Coupling in the Time Domain with Femtosecond Stimulated Raman Scattering
Philipp Kukura, Renee Frontiera, and Richard A. Mathies
Published 15 June 2006
238303

Complex Network from Pseudoperiodic Time Series: Topology versus Dynamics
J. Zhang and M. Small
Published 14 June 2006
238701

COMMENTS

Comment on "Can One Predict DNA Transcription Start Sites by Studying Bubbles?"
C. H. Choi, A. Usheva, G. Kalosakas, K. Ø. Rasmussen, and A. R. Bishop
Published 14 June 2006
239801

van Erp *et al.* Reply:
Titus S. van Erp, Santiago Cuesta-Lopez, Johannes-Geert Hagmann, and Michel Peyrard
Published 14 June 2006
239802

23 June 2006

Vol. 96, Number 24, Articles (24xxxx)
Articles published 17 Jun - 23 Jun 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=96&Issue=24

LETTERS

Counterion-Mediated Attraction and Kinks on Loops of Semiflexible Polyelectrolyte Bundles
A. Cēbers, Z. Dogic, and P. A. Janmey
Published 21 June 2006
247801

Relaxation Processes in Supercooled Confined Water and Implications for Protein Dynamics
Jan Swenson, Helén Jansson, and Rikard Bergman

Published 22 June 2006
247802

Probing the Mechanical Unzipping of DNA
N. K. Voulgarakis, A. Redondo, A. R. Bishop, and K. Ø. Rasmussen
Published 21 June 2006
248101

Cytoskeleton Influence on Normal and Tangent Fluctuation Modes in the Red Blood Cells
S. B. Rochal and V. L. Lorman
Published 22 June 2006
248102

Soft Nanopolyhedra as a Route to Multivalent Nanoparticles
Jiunn-Ren Roan
Published 19 June 2006
248301
See Also: Phys. Rev. Focus

30 June 2006

Vol. 96, Number 25, Articles (25xxxx)
Articles published 24 Jun - 30 Jun 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=96&Issue=25

LETTERS

Relationship between Structural and Stress Relaxation in a Block-Copolymer Melt
Amish J. Patel, Suresh Narayanan, Alec Sandy, Simon G. J. Mochrie, Bruce A. Garetz, Hiroshi Watanabe, and Nitash P. Balsara
Published 30 June 2006
257801

Crystallization of a Quasi-Two-Dimensional Granular Fluid
P. M. Reis, R. A. Ingale, and M. D. Shattuck
Published 26 June 2006
258001
See Also: Phys. Rev. Focus

Velocity Autocorrelations and Viscosity Renormalization in Sheared Granular Flows
V. Kumaran
Published 29 June 2006
258002

Time-Invariant Person-Specific Frequency Templates in Human Brain Activity
Itai Doron, Eyal Hulata, Itay Baruchi, Vernon L. Towle, and Eshel Ben-Jacob
Published 26 June 2006
258101

Extinction of Species under External Forcing
R. E. Amritkar and Govindan Rangarajan
Published 29 June 2006
258102
See Also: Physics News Update

Enhanced Ordering of Interacting Filaments by Molecular Motors
Pavel Kraikivski, Reinhard Lipowsky, and Jan Kierfeld
Published 29 June 2006
258103

Microstructure and Rheology near an Attractive Colloidal Glass Transition
T. Narayanan, M. Sztucki, G. Belina, and F. Pignon
Published 27 June 2006
258301

Chiral Nematic Phase of Suspensions of Rodlike Viruses: Left-Handed Phase Helicity from a Right-Handed Molecular Helix
Fabio Tombolato, Alberta Ferrarini, and Eric Grelet
Published 28 June 2006
258302

7 July 2006

Vol. 97, Number 1, Articles (01xxxx)
Articles published 1 July - 7 July 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=97&Issue=1

LETTERS

Phase Diagram and Electrical Conductivity of High Energy-Density Water from Density Functional Theory
Thomas R. Mattsson and Michael P.

Desjarlais
Published 7 July 2006
017801

Free Cooling of the One-Dimensional Wet Granular Gas
V. Yu. Zaburdaev, M. Brinkmann, and S. Herminghaus
Published 7 July 2006
018001

Song of the Dunes as a Self-Synchronized Instrument
S. Douady, A. Manning, P. Hersen, H. Elbelrhiti, S. Protière, A. Daerr, and B. Kabbachi
Published 7 July 2006
018002
See Also: Physics News Update

Dynamics and Morphology of Microvilli Driven by Actin Polymerization
Nir S. Gov
Published 5 July 2006
018101

Effect of Confinement on the Interaction between Two Like-Charged Rods
G. Odriozola, F. Jiménez-Ángeles, and M. Lozada-Cassou
Published 6 July 2006
018102

Molecular Sieving in Periodic Free-Energy Landscapes Created by Patterned Nanofilter Arrays
Jianping Fu, Juhwan Yoo, and Jongyoon Han
Published 7 July 2006
018103

Light Guiding in Biological Tissue due to Scattering
Alwin Kienle and Raimund Hibst
Published 7 July 2006
018104

Dissociative Electron Attachment to Phosphoric Acid Esters: The Direct Mechanism for Single Strand Breaks in DNA
Constanze König, Janina Kopyra, Ilko Bald, and Eugen Illenberger
Published 7 July 2006
018105

Switching Mechanics with Chemistry: A Model for the Bending Stiffness of Amphiphilic Bilayers with Interacting Headgroups in Crystalline Order
Markus A. Hartmann, Richard Weinkamer, Thomas Zemb, Franz Dieter Fischer, and Peter Fratzl
Published 7 July 2006
018106

Single Polymer Molecules in a Protein Nanopore in the Limit of a Strong Polymer-Pore Attraction
Oleg V. Krasilnikov, Claudio G. Rodrigues, and Sergey M. Bezrukov
Published 5 July 2006
018301

Prediction of an Autocatalytic Replication Mechanism for Micelle Formation
René Pool and Peter G. Bolhuis
Published 7 July 2006
018302

Contact Instability in Adhesion and Debonding of Thin Elastic Films
Manoj Gonuguntla, Ashutosh Sharma, Jayati Sarkar, Subash A. Subramanian, Moniraj Ghosh, and Vijay Shenoy
Published 7 July 2006
018303
See Also: Erratum (August 11 issue)

Wetting and Contact Lines of Micrometer-Sized Ellipsoids
J. C. Loudet, A. G. Yodh, and B. Pouligny
Published 7 July 2006
018304

14 July 2006

Vol. 97, Number 2, Articles (02xxxx)
Articles published 8 July - 14 July 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=97&Issue=2

LETTERS

Coherent Kinetic Control over Crystal Orientation in Macroscopic Ensembles of Polymer Nanorods and Nanotubes
Martin Steinhart, Petra Göring, Haissam Dernaika, Munusamy Prabhukaran, Ulrich Gösele, Elke Hempel, and Thomas Thurn-Albrecht
Published 11 July 2006
027801

Frustrated Polyelectrolyte Bundles and *T*=0 Josephson-Junction Arrays
Gregory M. Grason and Robijn F. Bruinsma
Published 14 July 2006
027802

What Is in a Pebble Shape?
D. J. Durian, H. Bideaud, P. Duringer, A. Schröder, F. Thalmann, and C. M. Marques
Published 13 July 2006
028001

Migration-Driven Aggregate Growth on Scale-Free Networks
Jianhong Ke, Zhenquan Lin, Yizhuang Zheng, Xiaoshuang Chen, and Wei Lu
Published 10 July 2006
028301

Definability of No-Return Transition States in the High-Energy Regime above the Reaction Threshold
Chun-Biu Li, Akira Shoujiguchi, Mikito Toda, and Tamiki Komatsuzaki
Published 10 July 2006
028302

Realistic Quantitative Descriptions of Electron Transfer Reactions: Diabatic Free-Energy Surfaces from First-Principles Molecular Dynamics
P. H.-L. Sit, Matteo Cococcioni, and Nicola Marzari
Published 11 July 2006
028303

Faceting and Commensurability in Crystal Structures of Colloidal Thin Films
F. Ramiro-Manzano, F. Meseguer, E. Bonet, and I. Rodriguez
Published 13 July 2006
028304

21 July 2006

Vol. 97, Number 3, Articles (03xxxx)
Articles published 15 Jul - 21 Jul 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=97&Issue=3

LETTERS

Dynamically Induced Effective Interaction in Periodically Driven Granular Mixtures
Massimo Pica Ciamarra, Antonio Coniglio, and Mario Nicodemi
Published 19 July 2006
038001

Collective Dynamics of Interacting Molecular Motors
O. Campàs, Y. Kafri, K. B. Zeldovich, J. Casademunt, and J.-F. Joanny
Published 19 July 2006
038101

Lateral Membrane Waves Constitute a Universal Dynamic Pattern of Motile Cells
Hans-Günther Döbereiner, Benjamin J. Dubin-Thaler, Jake M. Hofman, Harry S. Xenias, Tasha N. Sims, Grégory Giannone, Michael L. Dustin, Chris H. Wiggins, and Michael P. Sheetz
Published 20 July 2006
038102

Optothermal Molecule Trapping by Opposing Fluid Flow with Thermophoretic Drift
Stefan Duhr and Dieter Braun
Published 21 July 2006
038103

Suppression of Thermally Excited Capillary Waves by Shear Flow
Didi Derks, Dirk G. A. L. Aarts, Daniel Bonn, Henk N. W. Lekkerkerker, and Arnout Imhof
Published 18 July 2006
038301

Two-Dimensional Foam Rheology with Viscous Drag
E. Janiaud, D. Weaire, and S. Hutzler
Published 20 July 2006
038302

Rhythmic Cluster Generation in Strongly Driven Colloidal Dispersions
H. H. Wensink and H. Löwen
Published 21 July 2006
038303

28 July 2006

Vol. 97, Number 4, Articles (04xxxx)
Articles published 22 Jul - 28 Jul 2006
http://scitation.aip.org/dbt/dbt.jsp?KEY=PRLTAO&Volume=97&Issue=4

LETTERS

Temperature Effects on Threshold Counterion Concentration to Induce Aggregation of fd Virus
Qi Wen and Jay X. Tang
Published 24 July 2006
048101

Transition to Bursting via Deterministic Chaos
Georgi S. Medvedev
Published 27 July 2006
048102

Dispersion Relation of Lipid Membrane Shape Fluctuations by Neutron Spin-Echo Spectrometry
Maikel C. Rheinstädter, Wolfgang Häußler, and Tim Salditt
Published 28 July 2006
048103

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PRE HIGHLIGHTS

Biological Physics Articles from

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June 2006

Volume 73, Number 6, Articles (06xxxx)
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RAPID COMMUNICATIONS

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ARTICLES

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061926

COMMENTS

Comment on "Solving the riddle of the bright mismatches: Labeling and effective binding in oligonucleotide arrays"
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Published 26 June 2006 (*2 pages*)
063901

Reply to "Comment on `Solving the riddle of the bright mismatches: Labeling and effective binding in oligonucleotide arrays'"
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063902

July 2006

Volume 74, Number 1, Articles (01xxxx)
http://scitation.aip.org/dbt/dbt.jsp?KEY=PLEEE8&Volume=74&Issue=1

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010903(R)

ARTICLES

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011901

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011919

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015201(R)

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015202(R)

FACULTY POSITION IN BIOLOGICAL PHYSICS

The Department of Physics & Atmospheric Science (http://www.physics.dal.ca), Dalhousie University, invites applications from outstanding candidates for a tenure-track faculty position, beginning July 1, 2007. The successful candidate will have a PhD, a strong background in physics, demonstrated research excellence in biological or medical physics, and the ability to teach effectively. Ideal candidates would demonstrate strong funding potential from CIHR, CFI, and NSERC. Our priority is excellence and all researchers in biological physics (**theory or experiment**) or medical physics are encouraged to apply and will be seriously considered.

Applicants should submit a current CV and statements of both proposed research directions and teaching interests, and should arrange for at least three letters of reference to be sent to us directly: Chair of the Search Committee; Department of Physics and Atmospheric Science; Dalhousie University; Halifax, Nova Scotia CANADA; B3H 3J5.

The review process will begin **October 15, 2006** but applications will be accepted until the position is filled. For specific inquiries, email physics@dal.ca.

All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

Dalhousie University is an Employment Equity/Affirmative Action employer. The University encourages applications from qualified Aboriginal people, persons with a disability, racially visible persons and women.

Assistant or Associate Professor of Physics
University of Missouri-St. Louis

The Department of Physics & Astronomy, UM-St. Louis, seeks applications for a tenured or tenure-track faculty appointment as Associate or Assistant Professor of Physics. The candidate must have a Ph.D. in physics or a closely related field. He/she will be expected to teach physics at the introductory and advanced levels and conduct an active research program in computational/theoretical physics, preferably in an area that overlaps with existing research programs in astrophysics, biophysics, or materials physics (http://www.umsl.edu/~physics/). The candidate will have the opportunity for collaboration with the campus' Center for Molecular Electronics (nanoscience) and Center for Neurodynamics (nonlinear dynamics in neural systems). Applicants should have a strong track record of research and scholarly activities and will be expected to direct research projects at the Ph.D., M.S., and undergraduate levels. Submit curriculum vitae, statement of teaching philosophy, research plan, and arrange for three letters of recommendation to be sent to: **Prof. Bruce Wilking, Chair, Dept. of Physics & Astronomy, University of Missouri-St. Louis, One University Blvd., St. Louis, MO 63121, FAX : (314) 516-6152, email: bwilking@umsl.edu.** Consideration of applications will begin **November 15, 2006** and continue until the position is filled.

The University of Missouri-St. Louis is an Affirmative Action, Equal Opportunity employer committed to excellence through diversity.

TENURE-TRACK POSITION
IN BIOLOGICAL PHYSICS

DEPARTMENT OF PHYSICS, UNIVERSITY OF OTTAWA

The Department of Physics of the University of Ottawa invites applications for a tenure-track position in experimental or theoretical biological physics. The appointment will normally be at the Assistant Professor level, but applications for higher ranks will also be considered. The Department is continuing to build its strength in areas such as, but not limited to, biological modeling and computation, neurophysics, computational biology, cellular interactions, genomics, proteomics, molecular biophysics and biophotonics. More information can be obtained at http://www.science.uottawa.ca/phy/eng/welcome.html.

Canadians and permanent residents will be given priority. As the University of Ottawa is a bilingual institution, bilingualism is an asset. Applicants are requested to send a curriculum vitae, the names of at least three referees, and a statement of research interests to: Search Committee (c/o Dr. André Longtin), Department of Physics, University of Ottawa, 150 Louis Pasteur, Ottawa, Ont. Canada K1N 6N5.

Applications will be reviewed starting in December 2006 until the position is filled.

SPECIAL ANNOUNCEMENT

NSF-sponsored travel grants
are available for young postdoctoral fellows
(US citizenship required)
to attend

Brain Physics & Mind Dynamics

A National Science Foundation-sponsored Workshop

Satellite of the Medyfinol 2006 Meeting
Mar del Plata, Argentina, December 6, 2006

For more details about the conference and travel grant applications, see

http://www.chialvo.net/medyfinol2006/brainphysicsworkshop.html